On-Line Services — **Which one will save you the most money?**

JULY 1995 / $3.95

MacUser

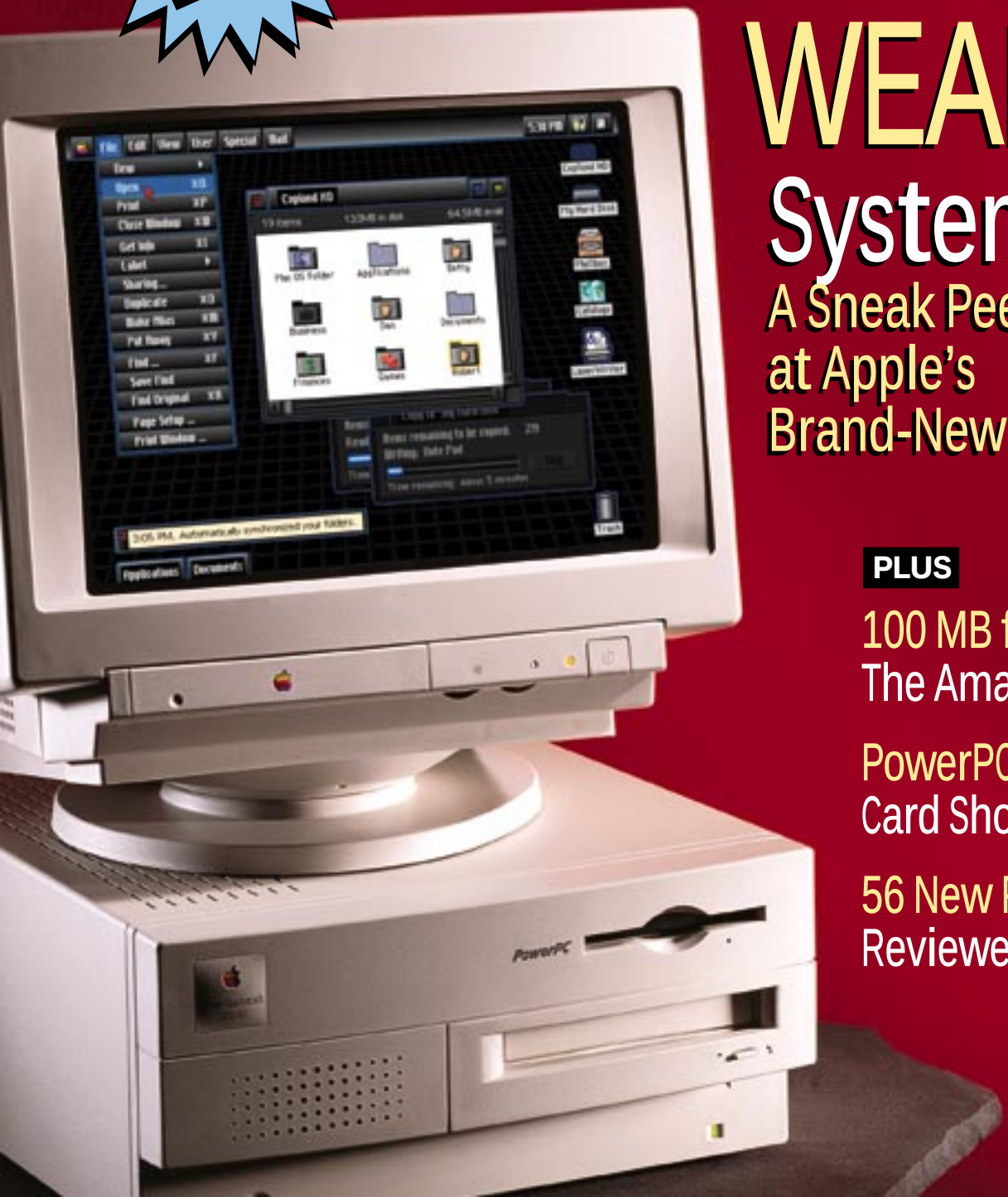
ZD ZIFF-DAVIS PUBLISHING COMPANY

FIRST LOOK!

APPLE'S SECRET WEAPON

System 8

A Sneak Peek at Apple's Brand-New Mac OS



PLUS

100 MB for $20!
The Amazing Zip Drive

PowerPC Upgrade-Card Shoot-Out

56 New Products Reviewed and Rated

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JULY 1995 / VOLUME 11 NUMBER 7

28 / Portable faxing.

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Cover photo / Giampiero Benvenuti

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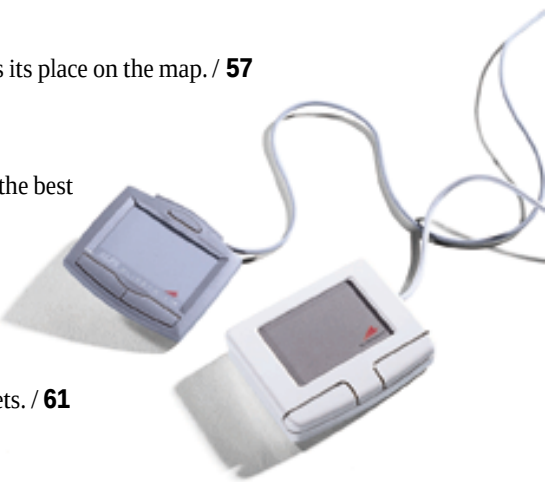

COVER STORY

Countdown to SYSTEM 8

Is Apple's next OS tough enough to snuff the competition? Or will it just raise the bar a couple of strategic notches?

THE NEXT OS FROM APPLE WILL BE FASTER and more reliable and will feature configurable assistants, easy Internet access, and a customizable interface — but you can't have it until late next year. Don't wait that long to find out what's inside. Here's *MacUser*'s first look at System 8, a.k.a. Copland, the first hardware-independent Mac operating system. BY HENRY BORTMAN / **62**

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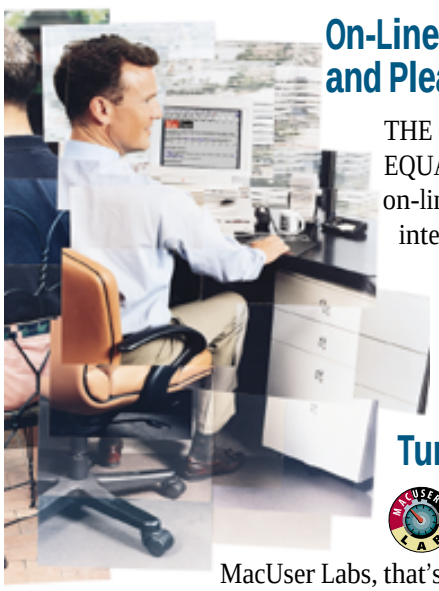

On-Line Services for Business and Pleasure

THE CONTENT IS ONLY PART OF THE EQUATION when you're selecting an on-line service; you must also consider the interface and the costs — including the hidden costs. *MacUser* checks out the various offerings from the six most popular commercial on-line services. BY DREW J. CRONK / **70**

Turbocharging Your Network

WHEN TRAFFIC SLOWS YOUR NET TO A CRAWL — who do you call? MacUser Labs, that's who. Working within two typical network environments (a desktop-publishing shop and an office workgroup), MacUser Labs evaluated a variety of possible approaches for improving network throughput. Here are the results. BY JOE SCIALLO AND KELLI WISETH / **80**

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In memory of John J. Anderson 1956 – 1989
and Derek Van Alstyne 1967 – 1989

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MacUser

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LETTERS

Special Secrets

THREE CHEERS FOR Blake Roberts and his article describing undocumented features of the System 7.5 Finder ("System 7.5 Finder Secrets," April '95, page 114). The secrets he revealed enhance my productivity and contribute to the "fun factor" of the Mac OS.

Mark T. Everett
via the Internet

Words to the Wise

I JUST FINISHED READING "War of the Words" (April '95, page 84), and all I have to say is, "Thank you." It is a breath of fresh air to finally see that there are people in this world who are no longer under the spell cast by Microsoft. As a recent convert to WordPerfect, I am glad to find that others understand why I would leave Microsoft Word. You have renewed my confidence in Mac computer magazines for unbiased reviews. Thank you again.

Jason S. Overby
overbyjs@ctrvax.vanderbilt.edu

YOUR REVIEW of word-processing software confused me. At first glance, your feature comparisons seemed to put Microsoft Word 6.0 near the top, but then you gave it 3.5 mice while awarding WordPerfect 4.5 mice and Nisus Writer 4 mice. Totaling up your "grades" shows that Word and WordPerfect were about equal, with Nisus Writer scoring lower. Considering the speed factor, I can understand your putting WordPerfect first, but to rate Nisus Writer ahead of Microsoft Word is not reasonable.

Ronald Matheson
Orange, CA

/ The difference in mouse ratings between Nisus Writer and Word is partly attributable to our overwhelming sense that Word 6.0 felt sluggish for nearly *all* tasks, not just those we tested. Furthermore, our grades didn't cover every attribute of the tested word processors. Unique features of Nisus Writer, such as text-to-speech; international-language support; and outstanding index, table-of-contents, and footnote tools (which we mentioned but did not have room to describe in detail), also contributed to the half-mouse difference. / JSA

I WAS INFURIATED by Microsoft's response to the conflicts Word 6.0 has with extensions: "Get a copy of 'Optimizing Your Mac for Word 6.0.'" At what point did a computer need to be optimized in order to run a word processor? It upsets me when a software company thinks that all computers run only *their* software.

Shawn D. Stewart
Center Point, TX

Double Helix

I BEG TO DIFFER with Don Crabb's review of Helix Express 3.0 (April '95, page 64). Crabb makes it clear that he prefers the complex procedural language of other relational-database programs to Helix Express' icons. But Helix Express targets people like me, who don't know how to write code in programming languages. Its icons allowed me to design an infinitely flexible database to track thousands of clients and prospects, and debugging the database is easy, because I understand the icons. Helix Express actually manages to make relational-database design, modification, and debugging fun.

Andrew Roblin
Emmaus, PA

/ As someone who has been teaching programming for 17 years and reviewing and using databases for

Write to Letters

c/o *MacUser*
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OPEN FOLDER

Nostalgia isn't what it used to be, but in this high-tech world, some readers still yearn for the days when letter writers spent hours refining their craft rather than simply dashing off a quick e-mail when the spirit moved them. "Doesn't anyone handwrite letters anymore?" mused Rob Shields, via the Internet. (That's a bit like the pot calling the kettle black, Rob.) "Almost everybody in your Letters column sends their letters via e-mail. It makes me wonder, Who's still writing letters by hand? And where have they *been*?"

All over the map, that's where. This month our (nonelectronic) mailbag was bulging with missives from such exotic locales as Japan; Portugal; and Chickamauga, Georgia. Placing his faith in the time-honored Ukrainian postal service, Alex Yurchenko, of Kiev, sent us a note (on Cyrillic letterhead) requesting reprint rights. Lucky for us, Alex also included his Internet e-mail address, in case we weren't interested in testing out America's time-honored "snail mail" system.

Legibility is in the eye of the beholder. Thanks to multimedia CD-ROMs, we're used to reading wacky fonts on strange backgrounds — but that can't be said of Herbert M. Rosenthal, of Albuquerque, New Mexico, who wrote, "The screen view of files in the 1995 Grolier Encyclopedia is almost unreadable . . . . it looks like 7.875623-point Urdu or Sanskrit!" We appreciate the sentiment, but we'd wager that Herbert's handwritten letter is probably harder to read than just about any CD-ROM screens out there.

Penmanship is an art that seems to decline a little more with each passing printer sold. In fact, most writers who compose handwritten letters have an ax to grind. "I apologize for my shoddy handwriting — if I had my Power Mac, that wouldn't be a problem," wrote Erik J. Hilden, of Portland, Oregon. Echoes Joel A. Hill, of South Euclid, Ohio, "I am writing this letter to you in longhand instead of via computer, because my monitor is at the factory being repaired." Which only goes to prove that the pen *is* mightier than the keyboard. After all, who ever heard of writing a poison *inkjet* letter?

ILLUSTRATION / DAVID LEMLEY, SEATTLE

ASK DR. POWER MAC

MY HIGH SCHOOL currently has about 150 Macs. We are contemplating replacing our aging Mac Pluses with newer hardware. Can you gaze into your crystal ball and tell us how long Apple will continue to build and support 680x0-series Macs? We guess that it will cease production of 680x0 series Macs within two years. Should we consider buying Power Macs as our base unit? Our turnover time is quite long, and we would like to have a hedge on obsolescence.

Floyd Smith
fsmith@ciao.trail.bc.ca

/ Apple has said that it expects to move the entire line of Macs to the PowerPC architecture, including low-end machines. The Power Mac 5200/75 LC should be available by the time you read this. At $1,699, it offers a great bargain for educators, because it includes a nice monitor, CD-ROM drive, stereo speakers, and optional networking. Because it has the latest industrial design, it is likely to remain in the line for several years and will be upgradable. Don't even consider buying a 680x0-based system unless the 5200 doesn't fit within your budget.

IN YOUR FEBRUARY '95 issue (New on the Menu, page 27), you described the DayStar Turbo 601 card for the IIci as "a PDS accelerator with a Power PC 601 chip onboard." To my knowledge, the IIci does not sport a PDS but does have a cache-card slot. Is the DayStar Turbo 601 perhaps not a PDS card but a sophisticated cache card?

Jan Zandbergen
janzand@xs4all.nl

/ You're right about the IIci having a cache-card slot and not a PDS. The IIci does not have a designated PDS design, but the cache-card slot shares many of the technical characteristics of a PDS design, such as direct connection to the CPU and system bus. A card designed for the cache-card slot can replace the CPU or provide other functions that require direct connection to the system bus, just as a PDS card does.

I'M NOT SURE what your definition of a *clone* is. In the PC world, manufacturers don't need IBM parts to make a clone.

Gary Goldberg
gg0012@epf12.epflbalto.org

/ For now, the Apple world is different from the PC one. Because the Mac OS is dependent on Mac ROMs as well as on Apple-designed ASICs, for the present, vendors must license parts from Apple. Once the Common Hardware Reference Platform becomes reality, the dependence of the Mac OS on Apple ROMs and ASICs will be severed and vendors will be able to create Mac OS-compatible systems that need not have any Apple-licensed or -supplied hardware in them.

more than 25 years, I have a different perspective. Helix Express' iconic system makes it tough to tie its databases in to the rest of the Mac and outside programming systems, which limits its usefulness. / DC

THE HELIX EXPRESS 3.0 review was factually inaccurate. Publish-and-subscribe was first supported in version 2.0; the sequence icons have nothing to do with either adding information from one field to another or setting up relations between fields; the user icons are not used to set up printing; there is no code editor, because there is no code; color has been supported ever since the program existed; and the client/server administrator screens have nothing to do with reporting and handling stored information.

Helix Express is the most "Mac-like" relational-database-management environment, and yet its intuitive iconic interface and nonprocedural object-oriented design environment was treated as a *disadvantage* by your reviewer. Helix Express is a remarkable achievement and a wonderful tool for novices and experts alike. The poor rating given was most undeserved.

Michael S. Scaramella
Cherry Hill, NJ

/ We apologize for the errors, which were introduced during the editing process; nonetheless, we stand by our overall rating for Helix Express, because of its incompatibility with mainstream SQL and ODBC database servers and also its lack of support for important Macintosh system features, such as AppleScript, QuickDraw GX, and PowerTalk. / CB

Back to the Drawing Board

I WONDER HOW qualified your reviewers are when it comes to reviewing CAD software such as Blueprint 5 (April '95, page 61). If you're amazed that a CAD program lets you move a drawing around on a page, you really should look at a few other packages. Most good CAD programs can perform the tasks you write about. You should be evaluating how easy it is to accurately place lines, circles, dimensions, and text, instead of discussing the difficulties of nudging a drawing.

Douglas S. Tayrien
Tulsa, OK

/ Having worked with CAD for 15 years and the Mac for 7, reviewer Jim Anders has a strong background in both subjects. He's reviewed at least five CAD-related products for *MacUser* in the past year and is extremely aware of the key features of all major Mac CAD packages. / JS

Fine Lines

I'M DELIGHTED WITH the four-mouse rating you awarded our PrePRESS VT1200 printer ("Fine Print," April '95, page 75). However, I take exception to your final analysis. You indicate that the $450 difference in price between the VT1200 and the Xanté Accel-a-Writer 8200 is due to the VT1200's font drive. But the VT1200 also includes an Ethernet port — a necessity for productivity in today's data-intensive prepress environments.

After upgrading the Accel-a-Writer 8200 to Ethernet, you won't have much of that $450 left to buy the $250 hard drive and over $500 worth of fonts needed to make the Xanté printer measure up to the VT1200.

Phil Rose, PrePRESS Solutions
philip.rose@prepress.pps.com

Works Out

I OWN, USE, AND LIKE ClarisWorks, but your review (April '95, page 60) missed a major drawback. People who buy integrated applications need cross-platform compatibility and interoperability with coworkers. But ClarisWorks cannot read or write Word, Excel, or PowerPoint files without the help of third-party translators.

George Spohrer
GASIII@aol.com

Resolution #9

THANKS FOR the review of the nifty, new Visioneer PaperPort scanner (April '95, page 58). Perhaps I am too demanding, but couldn't you have mentioned the scanning resolution?

Dave Fitzjarrell
via the Internet

/ The PaperPort offers scanning resolutions of 200 and 400 dpi. We do make a point of including contact phone numbers at the end of our reviews so readers can contact the vendor if they're interested in more detail about a product's specifications. / CB

CD Speedup

I WAS INTRIGUED BY your item about Peter N. Lewis ("Editors' Choice Awards," March '95, page 79), in which you mention that he wrote an extension that speeds up a CD-ROM drive.

What is this extension called?

Michael S. Schultz
via the Internet

/ The extension Peter Lewis cowrote with Fabrizio Oddone and Quinn is called CDIconKiller and is available in all the usual on-line locations, including ZiffNet/Mac. You can find it on the Internet at URL ftp://ftp.hawaii.edu/mirrors/info-mac/disk/cd-icon-killer-131.hqx. / JS

Teen Bundle

I AM 14 YEARS OLD and an avid reader of your publication. I think that commercial software companies have totally overlooked the teen market. I use Macromedia Director, Adobe Photoshop and Premiere, Microsoft Word 6.0, FileMaker Pro, and Quicken 5.0 to manage my bank account. None of these are "kiddie" programs.

Why is it that most software marketed toward computer users my age is all games and educational programs? Why is it that Apple hasn't marketed a Mac with a software bundle ideal for average teenagers? Several of my friends have bought computers for their personal use, and I think that a "teen-software bundle" would work.

Josh Barkin
via the Internet

Fooled You

ANDY IHNATKO'S APRIL column ("Farewell, Farewell," April '95, page 23) was heartbreaking. To see that he had jumped ship to Windows was a crushing blow! I began to question my own resolve! Had he seen something I had missed, or was my guru now a traitor?

Then I reread the article the next day. Boy, was I embarrassed. I used to think that I had an average sense of humor. Now I'm convinced I'm just a dork. You got me, Andy. I'm glad to have you back. And next April, I'll be ready.

Mike Ferguson
FERGINATOR@eworld.com

IMAGINE MY SHOCK, my surprise, my everwidening and crushing depression to learn that Andy Ihnatko was leaving. Imagine my subsequent relief to learn that it was an April Fool's joke. Imagine how foolish I felt. Imagine.

What are you trying to do? Give people heart attacks?

John Zavadil
jzavadi@sandia.gov

AS WITTY AS Ihnatko's April column was, I'm afraid Dvorak ("The Cupertino Papers," April '95, page 180) is a better liar.

Tom Dillof
PRS7@aol.com

CORRECTIONS

In "Ask Dr. Power Mac" (Letters, May '95, page 12), the Intel processor in the Power Mac 6100 DOS Compatible should have been identified as a 486DX66.

The correct toll-free number for E.E.S. Companies, maker of POS/OE 4 Mac ("Taking Care of Business," April '95, page 92), is 800-508-4444.

In our list of Internet service providers (May '95, page 72), *Telelink* should have been spelled *Telalink.*

MAGGIE CANON

New Additions

QUICK, WHEN IT COMES TO COMPUTER hardware, that's the operative word. New models come out so fast that by the time you read most magazine reviews, the manufacturer is already putting something newer on the market. Our answer to this problem: Quick Labs (page 90). Every month, beginning with this issue, *MacUser* will test, review, and rate the latest — and we mean the *latest* — offerings in printers, hard drives, and monitors. No longer will you have to wait for a major feature story to roll around before you can decide what hard drive to buy. And the next time you need to pick out a printer, you can be sure you've seen the test results for all the latest models. With Quick Labs, you'll get monthly product ratings on the types of products you buy most often.

The Quick Labs tests will be the same proven benchmarks we use in our longer stories and in our regular reviews. So, for example, a monitor will still be tested for sharpness, brightness, and image quality. The only differences are that the information will be condensed — and you'll get it sooner. And because we'll be using our standard tests, you'll easily be able to compare products from issue to issue.

Getting Personal

This month we're also introducing a new section — Personal Mac — in the back of the magazine. If you're anything like me, you've noticed a change during the past year, with Apple selling more and more Macs into the consumer market. Thanks to all those Performas out there, I'm constantly being asked for buying advice from my neighbors, in-laws, friends, and even my local grocery's checkout clerk. The frequency of these requests has increased exponentially in the past year, and as a result, I've realized that people are looking for a reliable source of product ratings for their home computers. And since *MacUser* is well known to business buyers for its rigorous and comprehensive product testing, it seemed a natural extension of our editorial mission to test and rate products for the home-computer market as well.

As the name might suggest, Personal Mac is the place to find reviews of products you use at home such as personal-finance packages, games, and educational and hobby software. Each month, we'll cover a specific product set — reference CD-ROMs are the topic this month. Other topics will include music, foreign-language learning, and wine collecting, to name just a few.

I'm constantly being asked for buying advice from my neighbors, in-laws, friends, and even my local grocery's checkout clerk.

With the baby boomlet in full swing, we also think parents will appreciate some help choosing kids' software from the hundreds of titles available. So our new column The Two Dads (written, of course, by two of our on-staff dads) will rate children's software and will also look at how violent the products are and whether they encourage creativity.

The last segment of Personal Mac is devoted to games. The Game Room will rate all the latest Mac games and some oldies-but-goodies too. And those of you gamesters who could use a little help, check out Cheat Sheet. The name says it all.

Clocking Clones

Speaking of new things, if you're thinking of buying one of the new clones now available, you might want to test-drive it first with MacBench 2.0, the latest edition of our performance-benchmark suite. MacBench measures the speed of a Mac OS computer's five basic subsystems: processor, floating point, disk, video, and CD-ROM. It lets you compare the performance of a system you may be thinking of buying to the full line of Apple Mac models — or to the computer you've already got at home. You might, for example, want to see how the quad-speed CD-ROM drives Power Computing offers in its clones stack up against the double-speed drives that Apple ships in its current lineup of Macs.

But I'll let you in on a secret. All the hoopla about superfast processors and floating-point units may not mean a whole lot to you if you're buying a computer for general business or home-office use. MacBench's results are based heavily on the behavior of such applications as Word, WordPerfect, Excel, FileMaker, and ClarisWorks — by far the most popular apps on the Mac — along with graphics applications such as PageMaker, QuarkXPress, FreeHand, and Illustrator. And for most of these applications, what boosts overall speed the most is not faster processors, floating-point units, or video cards, but faster hard drives. So when you go shopping, pay close attention to MacBench's Disk Mix score. If it's up over 10, you've got a winner. If it's under 8, you might want to reconsider.

We use MacBench all the time to test products, and we designed it so you can use it on your own. Try it out. It's easy to get. You can download it from ZiffNet/Mac (via CompuServe) or from *MacUser*'s World Wide Web page on the Internet (http://www.macuser.ziff.com/~macuser/).

ANDY IHNATKO

A Confederacy of Barneys

IF YOUR FIRST NAME IS BARNEY — which is highly unlikely, since *MacUser*'s grotesquely powerful marketing arm has

advised me that only nine Barneys subscribe, that seven of those don't get my jokes, and that the remaining two have been contacted personally and warned away from this month's column — you have my apologies. But certainly it's not news to you that guys named Barney have been given a bum rap by the popular media. Just turn on the TV, for instance: Barney Rubble, who — having had enough problems, what with his ongoing unemployment and his mutant son — was further saddled with Fred Flintstone's abuses; on *The Simpsons*, Barney Gumbel's substance-abuse problems have dulled a once promising intellect to the point that he's been reduced to practically a comic figure; and then there's Barney Fife, deputy sheriff of Mayberry. He's a nice enough fellow. His heart is in the right place. It's just that he has such a tenuous grasp on the issues staring him right in the face, and when he's confronted by the unexpected, his capacity for quick, reasoned action is just a notch below that of an elk's when it's confronted by oncoming headlights. No wonder Sheriff Andy keeps the guns locked up and lets Barney carry only one bullet.

And there you have our Congress in a nutshell. More than 500 voting Barney Fifes in all, most of whom mean well, have acceptable personal hygiene, and are kind to their mothers and small animals. Nonetheless, the way they publicly fumble when they sense a Need To Do Something about a '90s entity such as the Internet has all of us, especially those of us who would rather give up our cars than our modems, wishing for Kevlar socks. To be fair, however, our public officials are simply becoming aware, just as we have, of technology's ability to enhance our lives. After all, fiber-optic cable, as House Speaker Newt Gingrich ably demonstrated in a prime-time address a few months ago, can carry not only a thousand times as much *data* as traditional copper wiring but a thousand times as much political rhetoric as well. It's a simple prop, and a politician's dream come true. Think of all the ways in which the Information Superhighway has been exploited by various cheap-suit politicians in recent years:

I'm tough on crime. No one attempting to conduct private communication can be up to any good. If you're not doing anything wrong, then why don't you want law enforcement to have routine access to your message traffic and your hardware? Also, all government agencies should be so intimately wired together that you can be pulled over for a busted taillight just after breakfast in New Hampshire and before lunch become the prime suspect in a 12-year-old murder investigation in Arizona.

I'm a champion of public decency. Our children, dash it all . . . our *children!* All public discourse on the Internet should be moderated and edited to protect the innocent and sensitive minds of our nation's youth.

Education? Boy, am I ever for that. The kids, they need to know this computer stuff. Every school desk should have its own computer, linked up to every other computer on the planet.

Fiber-optic cable can carry not only a thousand times as much data as traditional copper wiring but a thousand times as much political rhetoric as well.

I'm heavily paraphrasing to save space, of course, but these are all points that have been trumpeted from sea to shining sea by politicians of both major parties. Noble sentiments, but did these people really give these ideas any thought? People in law enforcement — at least the ones I talked to for the purposes of this column — are keen to embrace new technology but regard such sweeping access to private communications as overkill. They aren't terribly comfortable about the scope of such powers. Although they're grateful for any new hardware they can get, they almost all would rather see the money spent on additional personnel . . . an opinion echoed by the public-school teachers I called. Is the same local government that can't afford to buy new textbooks every ten years going to back a huge initial investment in hardware, followed by a very serious annual expenditure in supplies and courseware?

Of course, the most frustrating thing about all this is that there is indeed a pressing need to update old laws to reflect new times. But here again we see the power of politics. In fact, Senate bill 314 started out as an honest attempt, through minor wordsmithing, to extend the scope of existing restrictions on public communications to include certain (not all) forms of public *electronic* communications. Fair enough. Unfortunately, somewhere along the way, politicians smelled fodder for reelection campaigns, and so the bill was transformed into the Communications Decency Act of 1995.

Decency, as you all know, is one of those

words, like *American*, *religious*, and *moral*, that are fine and dandy in most venues but become the source of immense mischief when slid into the name of pending legislation. It's a good illustration of the problems of Barney Legislation (no slander intended toward my state's own Congressman Barney Frank, of course — anyway, as I established earlier, he won't be reading this). Problem 1 occurs when legislators forget that computers are terribly unique entities that at times need terribly unique legislation. Taking existing, effective legislation and updating it by changing every occurrence of *telephone* to *telecommunications device* ignores the very clear differences in the way phones and computers are used and inadvertently raises colossal First Amendment issues. Problem 2 occurs when legislation is drafted without a full understanding of the system being affected by the legislation. Pornography (and here I'm talking about the worst possible kind — the category people don't want to even think about) is a serious problem, and it's both logical and effective to arrest or fine every individual involved in every step of its creation and distribution. But in an electronic medium, such a tactic is just plain silly; if the same depth of liability were extended to the mail, everyone from the person who empties the corner mailbox to the mail carrier who delivers the unknown cargo to its final destination could be prosecuted.

This column isn't about S.R. 314, though; it's about something larger. It's about how annoyed I am that I can't simply open my daily *Boston Globe* and zip right to the comics page, as I have since I was a zygote. No, now I have to peer across every column of every page of every section.

See, I don't have kids of my own, but I have two nieces and a nephew, all under 4. It embarrasses me to act like a Cassandra in public (for one thing, the dress does *nothing* for my waistline, let me tell you), but it's an honest sentiment: If we aren't extra careful *right now* to protect digital communications, an entire system is going to be ruined for our kids. I despise the term *Information Superhighway* as much as any right-thinking American should, but it's nonetheless true that today we are building an infrastructure that will be just as essential in the future as the highway system is today. If we let boneheaded legislators (one name springs to mind) and greedy corporations tinker with it endlessly, it'll suck.

So today, I keep my antennae up at all times. I monitor dozens of straight-news wire services. I frequent the ftp, Gopher, and Web sites of various groups that are trying to keep tabs on such things (almost all of them are reachable via the Electronic Frontier Foundation's Web page: http://www.eff.org/). I read the mail people send me at andyi@world.std.com. And because I don't necessarily trust any one person or organization, when I do hear of potentially idiotic new legislation, I phone up the House or Senate Document Room (202-225-3456 and 202-224-7860, respectively). They'll send you the complete text of any piece of pending legislation you specify, plus a complete background report, for free. And then I write my legislators.

Oh, and I do another thing: I vote.

INTERNET /

Adobe Stalks World Wide Web

Netscape alliance makes Acrobat nimble on the Net.

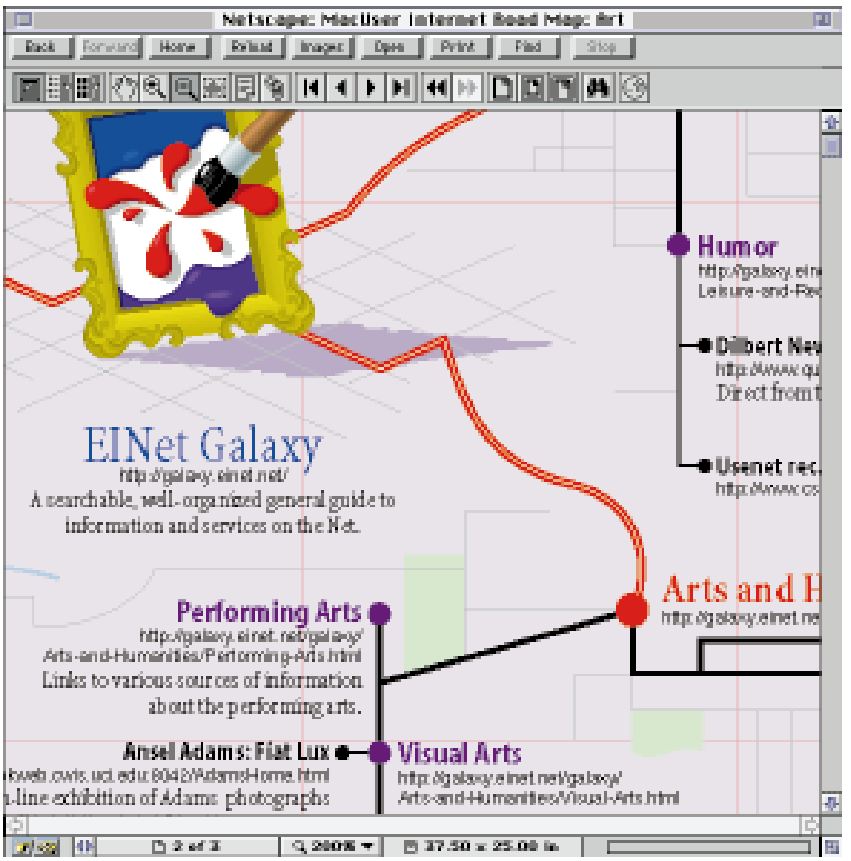
THE WORLD WIDE WEB became what it is today — perhaps the hottest subject in computing since the desktop-publishing revolution ten years ago — because of HTML, the HyperText Markup Language. But although HTML is great for simple hyperlinked documents that have small inline graphics, it doesn't provide the power over document design that traditional page-layout programs do.

Enter Adobe Systems and Netscape Communications, which are joining forces to teach the Web a second language. In April Adobe bought a partial interest in Netscape. By aligning itself with Netscape, Adobe seeks to make Acrobat the foundation of online publishing, just as it made PostScript the foundation of paper-based publishing a decade ago. And in the process, Adobe may just finally find a widely popular use for the Acrobat technology, which it's been touting for several years.

Later this year, expect to see a version of Netscape Navigator ($39, free to educational users) that lets you view Acrobat documents from the Navigator window.

Quick Downloads. Clicking on an Acrobat file in Navigator currently requires that you download the document and open Acrobat Reader to view it. Ultimately, clicking on a link to an Acrobat document will bring up an Acrobat tool bar within Navigator. Then an Acrobat page will appear in the Navigator window, just as an HTML file would. To reduce download time, Navigator will be able to download single pages of an Acrobat document as you need them.

Point and Click. Adobe's new Acrobat WebLink plug-in (which will be integrated into future versions of the free Acrobat Reader) lets Acrobat files include hyperlinks to other places on the Web, whether they're other Acrobat files or regular HTML files. Hopping back and forth between Acrobat and HTML files in Navigator should become a seamless process.



Netscape Navigator and Adobe Acrobat will work together to let users view complicated Acrobat page layouts from within Navigator.

HTML Lives. This doesn't spell the end for HTML, however. Many Web publishers are satisfied with the formatting abilities built in to HTML, and HTML files are much smaller (and take much less time to download) than Acrobat files. However, Web users will be able to speak two languages — one that's quick and efficient and another that's powerful and flexible. Adobe, 415-961-4400 or http://www.adobe.com/ (online); Netscape, 415-254-1900 or http://www.netscape.com/ (on-line). / Jason Snell

TECHNOLOGY TRENDS /

OLE's New Controls

RAMPING UP to put even more pressure on Apple, Microsoft is readying an enhanced version of its Object Linking and Embedding (OLE) technology for the Mac. Scheduled to ship to developers by the end of 1995, the revamped version of OLE reaches parity with its Windows sibling and addresses such shortcomings of Mac OLE 2.0 as its inability to work with simultaneously active objects — features expected in Apple's competitive OpenDoc technology.

In a recent demonstration, Microsoft showed a new version of OLE that takes advantage of technologies already available in Windows and that allows many small OLE objects (OLE Controls) to be active at the same time. When accessing Excel, say, the current

ON-LINE SERVICES /

As the eWorld Turns

New version beefs up Internet access.

INTERNET ACCESS and better mail-processing abilities highlight eWorld 1.1, the first revision of Apple's on-line service since it debuted last year. And to give users another reason to patronize its fledgling service, Apple also introduced for eWorld subscribers on-line tech support called Ask Apple, which promises one-day turnaround on even the thorniest technical problems.

eWorld 1.1. The new eWorld client software offers users access to a new area of the system: the Internet On-Ramp. Users can download files from Internet ftp sites and read Usenet newsgroups and should be able to surf the World Wide Web by sometime this summer. Current Internet users are now able to log in to eWorld via TCP/IP.

A new mail processor lets users file, forward, delete, and automatically respond to a message based on the information contained within the message.Fans of eWorld chat sessions can now use Apple's text-to-speech technology to have eWorld "speak" everything chat participants type — giving each chat participant a unique voice.

PHOTOGRAPHY / FRED STIMSON

Ask Apple. Instead of waiting on hold for a technician, Mac users who need tech support can now post questions on eWorld and expect a response the next day. The service is free, although connect charges do apply.

Located in the Apple Customer Center on eWorld, the new tech-support service features how-to information; software upgrades; a technical-documentation library; and access to Information Alley, Apple's newsletter of product bugs, fixes, and tips. Clicking on the Ask Apple, USA, icon lets you enter questions pertaining to specific product areas. Answers are posted publicly as well as returned via e-mail to your private account. 800-775-4556 or 408-996-1010. / JS

version of OLE launches the entire Excel application, but OLE Controls pave the way for OLE to use smaller Excel components (when Microsoft reworks its software to make such components available). The OLE Controls version of Mac OLE requires the Code Fragment Manager, already available for PowerPC systems and expected for 680x0 Macs later this year.

OLE Controls allows nonrectangular components in documents.

This updated Mac OLE uses a windowing-management and messaging system that allows one-click access to nested OLE objects. Based on the same core code as Windows OLE 2.0, Mac OLE 2.x will work more efficiently across platforms.The net result provides equal functionality to Mac and Windows users and to 680x0 and PowerPC Macs.

With these latest developments, Microsoft seeks to silence the critics who say that even though OLE hit the market well before Apple's OpenDoc, it lags behind its competition in terms of functionality. The official release of OpenDoc is expected in October.

One feature of the new OLE may appear in the Mac version before it does in the Windows version: true nonrectangular objects serving as active frames and objects within OLE documents. 206-882-8080. / Pamela Pfiffner

CD-ROM DRIVES /

NEC and Plextor Drives Hit 6x Speeds

SEARCHING VERY LARGE databases or loading 48-MB CMYK TIFF files from a CD-ROM is tedious, even with today's fastest 4x CD-ROM drive mechanisms. NEC and Plextor hope to alleviate some of that tedium and raise the price/performance bar for CD-ROM technologies. Both companies have released new 6x CD-ROM drives that offer transfer rates as high as 900K per second and access times of less than 150 milliseconds.

Similar Features, Faster. The NEC MultiSpin 6X CD-ROM drive is similar to its 4X cousin (which remains in the NEC lineup), having a double dust door, an LCD readout of track and time information, a self-cleaning lens, and front-mounted music controls. The real difference between the two models is under the hood — the 6X drive offers an average seek time of 145 milliseconds, nearly half that of its 4X cousin. This difference translates into much faster file lookups.

You may not realize the advantage of improved seek times just yet, though. Most multimedia titles that are authored to take advantage of only 2x CD-ROM technology won't be able to benefit from the increased speed. As a result, NEC is encouraging multimedia developers to create titles that work across the broad range of drive speeds available. The external MultiSpin 6Xe lists for $599, and the internal MultiSpin 6Xi lists for $499. 800-632-4636 or 708-860-9500.

First on the Block. Like NEC, Plextor is also bringing 6x CD-ROM technology to the desktop and should have superfast drives available for the Mac by the time you read this. The 6PleX CD-ROM drive offers a 900K-per-second transfer rate as well as a 145-millisecond average access time. Bucking the trend toward tray-loading drives, the Plextor 6PleX drive, like the NEC MultiSpin 6X, provides a caddy loading mechanism. Front-panel audio controls round out the Plextor package. The list price for the external drive is $699; the internal drive has a list price of $599. 800-475-3986 or 408-980-1838. / Sean J. Safreed

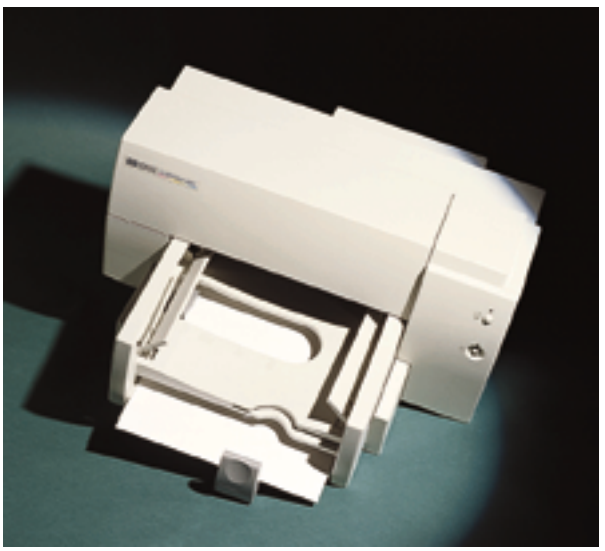
COLOR PRINTERS /

HP Inkjet Homes In

Faster DeskWriter makes its debut.

NOT SATISFIED TO OWN the corporate market, Hewlett-Packard has its sights set on home users too, with its new DeskWriter color inkjet printer. The DeskWriter 660C, which replaces the DeskWriter 560C, has a list price of $599 (estimated street price, $499).

The DeskWriter 660C offers faster printing speed and higher resolution than its popular predecessor, with 600 x 600 dpi for monochrome output and 300 x 300 dpi for color printing on plain paper. Resolution for color transparencies and glossy paper is 600 x 300 dpi.



Compared to the 560C, HP claims, the 660C is 100 percent faster when printing in color and 33 percent faster printing in monochrome. In the toner-saving Econo-Fast mode, the 660C can produce up to 4 ppm for monochrome and 1.5 ppm for color printing (in high-quality mode, output speed decreases to 1 ppm for monochrome and .3 ppm for color). Processing speed is faster too. The 660C has 512K of memory.

HP reformulated its inks for the DeskWriter 660C, with an eye toward producing more-vibrant color with better lightfastness on plain paper. The 660C uses one cartridge for black ink, and a second cartridge houses the cyan, magenta, and yellow inks. HP's ColorSmart technology helps give optimum color output for various types of graphics, from business charts to scanned photographs.

HP used a simplified design for the 660C, reducing the number of front-panel buttons to just two: power on/off and resume printing. Instead of having to adjust paper guides to print a single envelope, you can use the 660C's permanent cutout slot for feeding one envelope at a time (you can also load 20 envelopes in its multipurpose paper tray). Printing options such as ColorSmart are accessible through the printer driver. 800-752-0900. / Pamela Pfiffner

MAC TO PC /

Timbuktu Takes Control

Timbuktu Pro lets Windows users control Macs — yikes!

THE FIRST TIME you see the screen of one Mac appear in a window on another Mac, via Farallon's remote-control Timbuktu software, it seems a little weird. But now with the release of the Windows edition of Timbuktu Pro for Networks (twin-pack, $140; 100-pack, $3,900), that strange sense of displacement has gone cross-platform.

Macs running Timbuktu can control Windows PCs via their network — or even over the Internet, thanks to Timbuktu Pro's support for TCP/IP. And yes, Windows PCs can now control Macs remotely. In addition to providing a remote version of a PC or Mac screen, Timbuktu Pro also provides a drag-and-drop interface that allows for the easy transfer of files between machines (whether they're Macs or PCs) and an instant messaging system that lets you send "sticky notes" across the network to other users running Timbuktu.

Although this release is for Windows, Mac users can take heart — a new version of Timbuktu Pro for Macintosh, which will leapfrog the Windows version in terms of features, will be available later this year. 510-814-5000 or info@farallon.com (on-line). / Jason Snell

PHOTOGRAPHY / FRED STIMSON

MACUSER/ZMAC UTILITY OF THE MONTH

Out to Launch

A DOUBLE-CLICK HERE and a drag of the mouse there. That's all that's required to launch applications and open documents on the Mac. But with windows and icons all over the place, it's hard to get at the items you want. ZMac's QuickLaunch serves as a multipurpose launcher and application switcher. Any applications, scripts, folders, and documents to which you need easy access can be installed in QuickLaunch's stylish palette; switch among sets of icons in this palette by clicking on convenient tab markers. If you have System 7.5 or Apple's Macintosh Drag and Drop software, you can also move or open files by dragging them onto items in QuickLaunch's palette.

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

CD-ROMS /

Time Trip

TWO PARTS ADVENTURE, one part time travelogue. That's Presto Studios' three-disc adventure Buried in Time, the sequel to the groundbreaking CD-ROM The Journeyman Project. As you travel through time to prevent history from being altered, you also get to visit gorgeous 3-D rendered locales such as a 13th-century castle, Leonardo da Vinci's workshop, Mayan catacombs, as well as futuristic cityscapes. What a trip. Distributed by Sanctuary Woods. $60. 800-943-3664 or 415-286-6100. / JS

CROSS-PLATFORM /

SoftWindows Boasts 486 Emulation

Insignia offers DOS/Windows control through AppleScript.

RUNNING DOS/WINDOWS applications on your Power Mac 8100 means using Insignia Solutions' SoftWindows — and getting less-than-robust performance from its Intel 286 emulator. But in August, Insignia Solutions will release SoftWindows 2.0, which includes 486 emulation and a host of enhancements to make using Windows on your Power Mac easier.

By providing 486 emulation, SoftWindows 2.0 will run most applications available for DOS and Windows, including Windows multimedia titles. Windows 95 will also work under version 2.0, but a version optimized for Windows 95 is in development. SoftWindows 2.0 will provide better sound support, integrating the Windows Sound System with the Mac's speaker and microphone. If you want to run only DOS-based games such as Doom II, however, SoftWindows will still come up short, because it lacks SoundBlaster support.

PC networking has been improved as well. In addition to providing Internet services through TCP/IP connections, SoftWindows 2.0 will provide a complete set of networking protocols, including Novell NetWare, Banyan VINES, DEC Pathworks, Microsoft NT Advanced Server, LAN Manager, and Windows for Workgroups. Any kind of network connection will be possible under SoftWindows.

SoftWindows 2.0 lets you run Windows multimedia titles such as Microsoft Golf on your Mac.

Thanks to AppleScript, an entire office can connect to and use PC-based resources over a network. SoftWindows will run user-defined scripts and control DOS or Windows applications through AppleScript. Because AppleScript is network-savvy, remote users, even those connected via ARA, will be able to get data from a PC program running under SoftWindows. For instance, users will be able to get data from a Microsoft Access database query without actually running SoftWindows — a real boon for multiplatform environments.

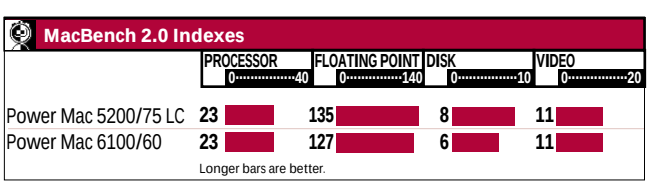
For the Power Mac platform, Insignia is expecting delivery during the third quarter of this year. $499; upgrade pricing not set at press time. 415-335-7100. / Sean J. Safreed

CPUS /

Power Mac 5200/75 LC Matches Power Mac 6100/60

APPLE'S LATEST POWER MAC, the 5200/75 LC, is based on the PowerPC 603, a chip that's somewhat slower than the PowerPC 601 found in previous Power Macs. To reduce the cost of the 5200, Apple left out several features available on all other Power Macs, including Direct Memory Access (DMA). Consequently, there's no GeoPort capability on the 5200. Add the lack of DMA to a 32-bit memory bus, and you have serious limitations. Thankfully, Apple includes a 256K Level 2 cache to help the 5200 compensate for its slightly slower architecture. We were pleased to find that, as a result, the Power Mac 5200/75 LC runs about as fast as the Power Mac 6100/60.

Our tests with MacBench 2.0 showed that the 5200 equaled the processor speed of the 6100 and surpassed the floating-point speed of the 6100 by a small margin. The Disk Mix test shows the speed benefits possible with the latest IDE mechanism — the 5200 was about 33 percent faster than the 6100 in the Disk Mix test. The video scores were identical. / SJS

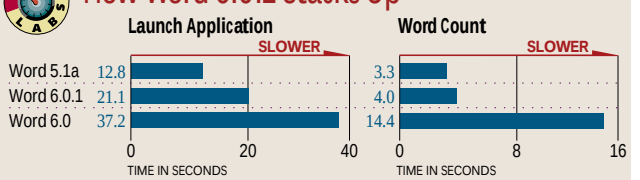


BUG FIXES /

Word 6.0.1 Smooths Speed Bumps

MICROSOFT WORD has taken a beating at the hands of users exasperated because version 6.0 runs slower than version 5.1. Registering these complaints, Microsoft has responded with an upgrade to version 6.0.1 that increases the lackluster speed of 6.0 in several areas, including application launch and word count. We put Word 6.0.1 through its paces and timed these functions, comparing those in versions 6.0 and 5.1a. On a Quadra 650 running System 7.5.1, with 16 MB of RAM and 65 Type 1 fonts installed, Word 6.0.1 launched almost twice as fast and counted 7,000 words more than three times as fast as version 6.0. Compared with version 5.1a, the latest Word was nearly as fast for the word count, but launching was 65 percent slower.

Microsoft also announced that due to customer demand, it will retain Word 5.1 on its product list. Users can purchase 5.1 directly from Microsoft or through retail channels. Microsoft Office 4.2.1 on CD-ROM is now available and includes both Word 6.0.1 and Excel 5.0a in addition to PowerPoint 4.0. 800-315-5081 or 206-882-8080. / SJS



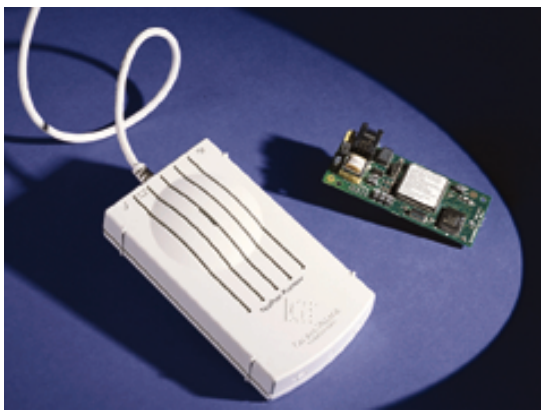
MODEMS /

TelePort Forges Ahead

Global Village enters V.34 arena.

CONSPICUOUSLY ABSENT from the first wave of modems using the high-speed V.34 standard were any from Global Village. But just as the compatibility battles inherent in every new modem standard die down, Global Village has jumped into the fray with V.34 modems for PowerBooks and desktop Macs.

Following in the footsteps of its Bronze, Silver, Gold, and Mercury siblings, the latest modems in Global Village's lineup are the PowerPort/Platinum ($399) and the TelePort/Platinum ($279). Each offers a data-transfer rate of 28.8 kbps, a fax transfer rate of 14.4 kbps, and enhanced call-handling capabilities: The PowerPort/Platinum, for the PowerBook 100 series, is smart enough to sense whether an incoming call is a fax or an ARA session. The TelePort/Platinum senses whether an incoming call is a voice or fax communication — great if you want to share the phone line among a telephone, an answering machine, and a fax modem.



The TelePort/Platinum has software designed to take full advantage of the high-speed serial ports on AV Macs and Power Macs. Users of Quadras and 68040-based Centrises can expect to see a speed boost, thanks to new software that compresses data before it's sent through the slower serial ports of these Macs.

Both of the new models also include the latest updates of Global Village's popular GlobalFax and GlobalFax OCR software. 408-523-1000. / Rik Myslewski

INPUT DEVICES /

Lean, Mean Fax Machine

FAXING WHILE DRIVING isn't recommended, but a new compact fax machine from Bansai lets you send faxes from any phone (although it doesn't receive faxes). And because the MFX-1 ($379) is so small and light (18 ounces), it's practical to carry with you for sending faxes from, say, an airport, a hotel room, or even your own desk.

You don't need a dedicated fax line to send faxes with the MFX-1, although you do have to wait until you're finished faxing to use your phone. When it's not transmitting, the 9,600-bps device is undetectable by the phone line. An acoustic coupler ($119) is required for phones that don't have an appropriate jack; an adapter ($79) is required for digital phones.

With a top resolution of 203 x 196 dpi, the MFX-1 doubles as a scanner for text documents and line art. But a serious drawback to the MFX-1 is that it lacks Mac software, which means you have to provide your own. 415-491-0561. / Nancy Peterson

CD-ROMS /

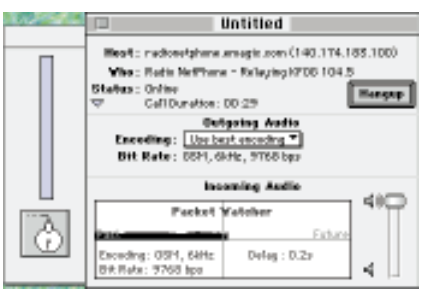
Out of This World

LOOKING TO VENTURE to another world? You can't miss with the following CD-ROM titles.

Earth Explorer. Apple's second product in the Apple Home Learning line of educational software takes children ages 10 and older on a multimedia tour of the planet. In an interactive, nonintimidating way, the Earth Explorer CD-ROM employs graphics, video, animations, and games to teach children about such timely topics as renewable energy, overpopulation, and ozone depletion. Sure beats the heck out of bio lab . . . . $99. 408-769-2775, ext. 5924.

Puppet Motel. If the otherworldly talents of the performance artist Laurie Anderson are more your speed, you'll definitely want to check out her newest venture, Puppet Motel. Traverse the 33 rooms in Motel to hear original, previously unavailable music in true-audio quality. In Anderson's eclectic CD-ROM, you can also reedit *Crime and Punishment*, join Anderson on the set of her Nerve Bible tour, and hang out with a ventriloquist's dummy. Pass the electric violin. $40. Distributed by Voyager. 800-482-2001 or 212-431-5199.

Men Are from Mars, Women Are from Venus. Planets are the metaphor for the age-old struggle between the sexes. John Gray, author of the best-selling book of the same name, attempts to bring communication down to Earth with this interactive relationship workshop. By filling out a short questionnaire, you can customize segments of the CD-ROM to fit your particular situation. In addition, you can follow a virtual couple in their everyday interaction or listen to Gray's often humorous nuggets of advice about the very different ways in which men and women interact. To the moon, Alice. $50. 800-424-6234 or 717-941-1500. / Kristin Balleisen



INTERNET /

Foiling Ma Bell

NOW THE INTERNET has a dial tone. Electric Magic's NetPhone ($55; two for $85) lets you hold real-time audio conversations over the Internet. Only one person can talk at a time, and it requires a Mac with a microphone and a 14.4-kbps or faster modem connection to work. The sound quality won't be giving AT&T True Voice a run for its money, but placing a NetPhone call to your pals in Australia might be cheaper than dialing through the trans-Pacific operator. 415-759-4100 or http://www.emagic.com/ (online). / Jason Snell

PHOTOGRAPHY / FRED STIMSON

NEW & NOTABLE

HARDWARE /

Lyrrus G-VOX Musician. The new version of this guitar-education package includes a redesigned pickup, which lets your Mac hear what you're playing. The new pickup is smaller and fits unobtrusively under the strings. The companion software, Riffs 2.0, lets players connect sample riffs and play them seamlessly. $350. 800-789-4869 or 215-922-0880.

FWB PCI SCSI JackHammer. Designed for the PCI bus on upcoming Power Macs, this Fast-and-Wide SCSI-2 card enables high-speed data transfer by taking charge of I/O tasks that would otherwise be performed by the Power Mac's processor. $499. 415-325-4392.

ZyXEL Elite series. Combining ISDN and V.34 (28.8 kbps) capabilities, these modems can communicate at high speeds over digital as well as analog lines. The 2864I-S/T ($699) requires an NT-1 adapter to connect to an ISDN line. The 2864I-U ($749) includes an NT-1 interface. Connecting the modems to an analog phone line requires an Analog Module ($99). 714-693-0808.

Parallel Storage Solutions PMCS-1000. A portable tape-backup system that includes an internal power supply, the PMCS-1000 uses 3.5-inch mini-cartridge tapes to store data and offers a SCSI data-transfer rate of up to 36 MB per minute. Retrospect 2.1 backup software is included. $1,295. 914-347-7044.

nView Presenter 101. An active-matrix LCD panel with a resolution of 640 x 480 pixels, this overlay for overhead-projector presentations weighs 4.3 pounds and features an onboard image-adjustment control panel. $2,795. 800-736-8439 or 804-873-1354.

RUN RunShare Graphic Server Accelerator. Translating the speed of RUN's RunShare software to servers, this 7-inch NuBus Ethernet card lets multiple RunShare users transfer information at accelerated rates from a server. $1,499. 408-353-8423.

Samsung SyncMaster 15GLi and 17GLi. With a maximum resolution of 1,024 x 768 pixels, these multisync monitors offer on-screen controls and a .28-millimeter dot pitch. The display of the 15GLi ($560) measures 15 inches diagonally; the 17GLi ($849) measures 17 inches diagonally. 201-229-4000.

Portrait Display Labs Pivot 1700 series. Using Radius' pivoting-monitor technology, these monitors can be used in either portrait or landscape orientations. The Pivot 1700 ($895) offers a top resolution of 1,024 x 768 pixels, and the Pivot 1700 Professional ($1,195) offers resolutions up to 1,152 x 870 pixels. 510-249-0444.

SOFTWARE /

Home Repair Encyclopedia. Next time you knock a hole in your kitchen wall, don't call a repairman — fire up your Mac. With information about nearly 200 common projects, this CD-ROM provides you with animated explanations and instructions for various tasks, allows you to calculate costs on custom calculators, and offers databases on topics such as how to find the right paint or adhesive for a job. $20. Books That Work. 415-326-4280.

Scorpio. A word processor without a high price, Scorpio has a spelling checker, type controls, word count, find-and-replace, and other word-processing essentials. $20. Abbott Systems. 800-552-9157 or 914-747-4201.

Nine Month Miracle. Billed as an interactive journey into the womb, this CD-ROM portrays the time between conception and birth with movies, still photography, and animations. It has a section for children, designed to explain what's going on inside Mom. $40. A.D.A.M. Software. 800-408-2326 or 404-980-0888.

Frankenstein: Through the Eyes of a Monster. Starring film actor Tim Curry as Dr. Frankenstein, this CD-ROM puts the player in the shoes of Frankenstein's monster. The adventure CD-ROM features a 3-D rendered landscape to wander through as well as several challenging puzzles. $50. MacPlay. 800-969-4263 or 714-553-6655.

Zonkers! Customizing your Mac has never involved so many decisions. Zonkers! offers thousands of ways to tweak your interface, from custom cursor, window, scroll-bar, button, and icon designs to wacky desktop patterns. The Zonkers! CD-ROM Edition includes 3,000 additional customization options. $30. Nova Development. 800-395-6682 or 818-591-9600.

Investment Basics. The goal of this CD-ROM is to teach the fundamentals of investing, from defining terms to explaining how to research potential investments. Topics include questions to ask when investing, various world stock markets, bonds, mutual funds, and more. $49. Competence Software. 603-435-5098.

Wild Cards. Seven popular card games — Fish, War, Crazy Eights, Old Maid, Klondike, Hearts, and 21 — come to life in this CD-ROM. Kids can play card games against animated, talking opponents in a variety of settings. Each setting offers additional games unique to that locale. $40. Corel. 800-455-3169 or 613-728-3733.

MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average sales prices of new and used Macs as of April 3, 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)	•	$450
Color Classic (4/80)	•	$700
LC III (4/80)	•	$700
Performa 475 (4/160)	$1,099	$850
Performa 550 CD (5/160)	$1,199	$950
Performa 575 CD (5/250)	$1,499	$1,225
IIsi (5/40)	•	$400
IIci (5/80)	•	$650
IIfx (8/160)	•	$850
Quadra 605 (4/80)	•	$575
Quadra 610 (8/160)	•	$800
Quadra 630 (4/250)	$999	$850
Quadra 650 (8/230)	•	$1,800
Quadra 660AV CD (8/230)	•	$1,200
Quadra 700 (8/230)	•	$1,275
Quadra 800 (8/230)	•	$1,950
Quadra 840AV CD (8/230)	•	$2,300
Quadra 900 (8/230)	•	$1,700
Quadra 950 (8/230)	•	$2,350
Power Mac 6100/60 (8/250)	•	$1,000
Power Mac 6100/66 CD (8/350)	$1,899	$1,650
Power Mac 7100/66 (8/250)	•	$1,750
Power Mac 7100/80 CD (8/700)	$3,049	$2,700
Power Mac 8100/80 (8/250)	•	$2,700
Power Mac 8100/100 CD (16/1GB)	$4,399	$4,000
Power Mac 8100/110 CD (16/2GB)	$6,299	$5,700
PowerBook 145B (4/80)	•	$850
PowerBook 150 (4/120)	$1,399	$1,150
PowerBook 165 (4/80)	•	$1,350
PowerBook 165c (4/80)	•	$1,200
PowerBook 170 (4/40)	•	$1,250
PowerBook 180 (4/80)	•	$1,600
PowerBook 180c (4/80)	•	$1,900
PowerBook 520 (4/160)	$1,799	$1,575
PowerBook 520c (4/160)	$2,299	$2,000
PowerBook 540 (4/240)	•	$2,600
PowerBook 540c (4/320)	$3,699	$3,200
Duo 250 (4/200)	•	$1,475
Duo 270c (4/240)	•	$1,800
Duo 280 (12/240)	•	$2,450
Duo 280c (4/320)	$3,499	$2,900

• = discontinued model

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

PHOTOGRAPHY / FRED STIMSON

PHOTOGRAPHY / LEON

QMS *magicolor* LX / How low can you go on the price of a desktop color laser printer? QMS has the answer.

THE FIRST COLOR LASER printer to break the $5,000 price barrier, the QMS *magicolor* LX, makes it seem, at first glance, that QMS is making yet another pioneering move in the field of desktop color laser printers. But although the *magicolor* LX may be a pioneer because of its price point, a closer look reveals little else that's new. The new printer is almost identical to its predecessor — the QMS *magicolor* Plus — albeit repackaged with fewer fonts and sporting a few slight improvements in color rendering.

Reviews Rating Key

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

Memory Lane

The 12 MB of memory that comes in the printer's $4,999 base configuration allows you to get 300-dpi output for color and 600 dpi for black-and-white. If you want 600-dpi color output, you'll need 24 MB of memory. QMS sells a *magicolor* LX with 24 MB of memory for $5,699, but since the printer uses standard 72-pin 80-nanosecond SIMMs, you can save yourself money by buying the base model from QMS and the SIMMs from someone else and installing the memory yourself. The *magicolor* LX can accommodate up to 64 MB of memory.

The *magicolor* LX comes with 39 PostScript fonts and an 80-MB internal IDE drive that includes QMS' Crown Technology architecture, for improving processing and streamlining network throughput, and space for downloadable fonts. For those who need more storage, the printer has a SCSI port for adding hard drives. It also has a 250-sheet paper tray, practical for light business use. You'll appreciate the printer's LocalTalk, parallel, and serial interfaces, for mixed-platform use, and its ability to automatically switch between PostScript and PCL 5. If you want acceptable speed over a network, however, you should buy the optional $650 Ethernet interface card. If you want an Energy Star-compliant model, you'll also have to pay an extra $100.

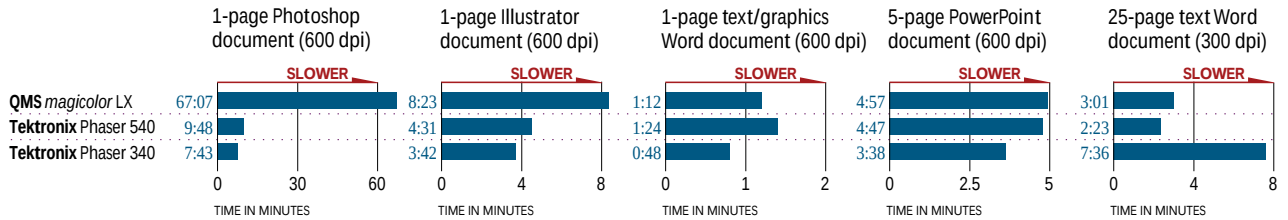
The process of setting up the *magicolor* LX is complex and involves careful handling of expensive parts. In fact, QMS recommends having a QMS technician perform the initial installation. The cost of this installation is included in the optional on-site maintenance plan, which costs $1,598 for the first year and $1,998 for each subsequent year. Alternatively, you can pay $99 for a one-time installation. If you know your way around printers and you want to do the installation yourself, you can follow the well-illustrated *Quick Setup Guide*. You'll have to refer to the manual frequently if you don't want to miss any one of the 56 steps, from unpacking the printer to printing the startup page.

Once the printer is in place, you have to remove the top cover and install four separate toner cartridges — one each for cyan, magenta, yellow, and black — and four separate developer cartridges. Each of the toner cartridges is keyed so that each color fits only into its correct slot, so this step, at least, is relatively simple.

Next, you have to open the front cover, remove two shipping pieces from the fuser roller, and install the cleaning pad and the fuser oil bottle. Since the first fuser oil bottle gets used up quite quickly, we wish that QMS included a second fuser oil bottle with the printer. After the initial startup, however, the fuser oil and the colored toner usually are consumed equally by the printer. You install a waste-toner pack in its own compartment, which you access through another door in the printer. And then, through yet another door, you install the organic-photoconductor-belt cartridge by opening the manual feed tray at the front of the printer, sliding the cartridge in most of the way, removing the light-shielding

Color-Printer Derby

The QMS *magicolor* LX color laser printer competes favorably for printing business text and graphics documents, but for color-intensive work, it's noticeably slower than its rivals.



paper, and shoving the cartridge in the rest of the way. It was disconcerting that we had to use a fair amount of force to do this, considering that this cartridge alone costs $400. To complete your setup, you simply load paper into the paper tray.

Keeping track of all these consumable items can be a formidable task. We were also disappointed in how flimsy some of the cover latches were. For instance, the manual-feed tray on our review unit consistently unlatched itself while we were printing. This stopped the printing process, since the open latch caused the printer to wait for manual insertion of media. We had to resort to taping the manual-feed tray shut just to get a print job done.

The software that comes with the *magicolor* LX includes the LaserWriter 8.2 driver, a *magicolor* LX PPD, and application-specific printer-description files. In addition, you get QMS' proprietary PS Exec application, which lets you turn off the startup page, manage the printer's hard disk, and fine-tune the parameters for the Crown Technology. The printer also comes with QColor, printer-specific options for color matching, which you access by clicking on the Options button in the Print dialog box. QColor gives you fairly self-explanatory options for handling graphics, photographic images, text, spot color, and overheads as well as for adding a third-party color-management system.

Performance Pitfalls

You can't get a color laser printer for less than you'd pay for the *magicolor* LX, but it falls behind noticeably in speed tests against its more expensive competitors, the $8,995 Tektronix Phaser 540 color laser printer (see review, May '95, page 48) and the $6,795 Tektronix Phaser 340 solid-ink color printer (see review, June '95, page 39). To be fair, the *magicolor* LX printed a one-page Microsoft Word document with a color pie chart and a logo slightly faster than the Phaser 540 and a 25-page all-text Word document faster than the Phaser 340. However, documents that used color more intensively crawled out of the *magicolor* LX. For instance, when we printed an Adobe Illustrator 5.5 file, the Phaser 540 and 340 were about twice as fast as the *magicolor* LX. Our *magicolor* LX, which we'd equipped with 32 MB of RAM, took more than an hour to print a 16-MB Photoshop document! The Phaser 540 and 340 each printed the same image in less than 10 minutes.

The print quality of documents printed with the *magicolor* LX didn't impress us. At 300 dpi, text printed with the *magicolor* LX looked worse than the text printed with most 300-dpi monochrome laser printers. At 600 dpi, the text looked somewhat better, but it still showed a lot of toner scatter, so the type looked somewhat blurry in comparison to the crisp 600-dpi text we got with the Phaser 540. Graphics printed with the *magicolor* LX had a muddy look, and the details in the images weren't as sharply rendered as with the Phaser 540.

Getting accurate and consistent color results out of the *magicolor* LX, in spite of the options you have in the driver, is a guessing game, even if you use an industrial-strength color-management system. Variations in temperature and humidity play havoc with the color consistency, and unless your office has perfect climatic controls, there's little you can do to correct this. This isn't crucial for simple business graphics, but if you're hoping to match Pantone colors or reproduce color images with any semblance of color fidelity and consistency, the *magicolor* LX is not what you want.

Our greatest reservation about the printer is that it is clearly based on first-generation color-laser-printer technology even though the second generation is already upon us. The Tektronix Phaser 540 is faster and produces more-consistent and -accurate color.

Keeping track of and replacing the consumable elements for the Phaser 540 or 340 is much easier. The Tektronix printers cost thousands more than the *magicolor* LX, but we expect to see more sophisticated color laser printers like the Phaser 540 at considerably lower prices in the months to come.

The Bottom Line

Since it uses dated technology, the QMS *magicolor* LX may soon be a dinosaur. If you do need a color laser printer immediately and cost is a decisive factor, recall that the QMS *magicolor* LX does cost considerably less than any of its competitors, although you should factor in the cost of Ethernet and additional RAM. For light-duty text and graphics, it can serve adequately, if not impressively, as a color/black-and-white laser printer. If you can wait, however, you'll have better options to choose from in the near future. / Bruce Fraser

QMS *magicolor* LX

Rating: 3½

Price: with 12 MB of RAM, $4,999; with 24 MB of RAM, $5,699; Ethernet interface card, $650 (list).

Pros: Relatively inexpensive. Reasonably fast for simple graphics and text.

Cons: Difficult to set up and maintain. Slow for color-intensive documents. Flimsy construction.

Company: QMS, Mobile, AL; 800-523-2696 or 334-633-4300.

Reader Service: Circle #401.

DayStar Turbo 601, Apple Macintosh Processor Upgrade, and DayStar PowerCard 601 / PowerPC upgrade cards.

FEELING LEFT BEHIND because you don't have a Power Mac-class machine? Now owners of Mac IIci's and 68040 LCs, Performas, and Quadras can run PowerPC-native applications and give their Macs a big boost in speed by installing a PowerPC upgrade card. For the Mac IIci, DayStar's 66-MHz Turbo 601 upgrade card costs less than $1,000 and delivers speeds comparable to those of a Power Mac 7100/66 (without a cache). Owners of low-end 68040 Macs can opt for either the $659 Apple Macintosh Processor Upgrade or the $649 DayStar PowerCard 601 — each card makes your Mac as fast as a Power Mac 6100/66.

Turbo 601

Easy to install, the DayStar Turbo 601 PDS accelerator card has a 66-MHz PowerPC 601 chip and a 256K cache onboard. To get the card up and running, simply plug it in to your Mac IIci's PDS and run the installer program. The card requires System 7.5, so if you haven't already upgraded, you'll have to shell out an additional $98.98 for the new system software (we wish DayStar had included the system software with the card). If you need to run non-PowerPC-native applications, you can easily switch from the PowerPC processor to your motherboard's 68030 processor by using a control panel.

Macintosh Processor Upgrade and PowerCard 601

The Apple and DayStar cards for low-end 68040 Macs are identical in every way except price and installation. Both are based on a DayStar design and are equipped with a PowerPC 601 and a 256K cache. The DayStar card is upgradable as faster versions of the chip become available. ClarisWorks and System 7.5, which is required for use of the cards, are included in the package.

The cards work by doubling the clock speed of the host Mac, so if you own a 33-MHz machine — a Quadra 630 or a Performa 550, for example — the card will allow your Mac to run at 66 MHz. Owners of 25-MHz 68040 Macs — the LC 475 or the Quadra 605, for example — will probably experience disappointing speed gains with either card installed, because their machines will run only at 50 MHz.

The Apple card must be installed and tested by your dealer (installation costs about $50), whereas the DayStar card requires a do-it-yourself installation that can be tricky if you're not used to poking around inside your Mac. To install the card, you must remove the motherboard, pull out the 68040 chip with a special tool provided by DayStar, plug the chip in to DayStar's PowerPC card, plug the PowerPC card in to the empty 68040 socket on the motherboard, and put the motherboard back into your machine. The installation is a bit more complicated than installing an add-in card, but if you know what you're doing, it takes just a few minutes. One caveat: The Apple and the DayStar cards each block your Mac's PDS, which precludes the use of any PDS cards you may already be using.

Like the DayStar Turbo 601, the Apple Macintosh Processor Upgrade and the DayStar PowerCard 601 each provide a control panel that lets you switch between the non-native and native PowerPC modes.

Compatibility and Speed

We were able to run a variety of third-party hardware products and applications on Macs equipped with the Apple and DayStar cards without a hitch. However, we did experience two minor compatibility problems with the Turbo 601 — a conflict with the DSP extension that comes with the Radius Thunder IV GX and PhotoEngine cards and an incompatibility with Apple's System 7.5 updater. According to DayStar, the updater problem should be solved by the time this review appears. Radius and DayStar are working together to resolve the incompatibility with the Radius products.

To see what speed gains you can expect to achieve with one of the PowerPC upgrade cards reviewed here, we used MacBench 2.0 to test the processor, floating-point, disk, and video subsystems of a Turbo 601-equipped Mac IIci and a Quadra 630 equipped with either the Apple Macintosh Processor Upgrade or the DayStar PowerCard 601. We compared the results with those of both the unaccelerated base platforms and the Power Mac models that use the same PowerPC chips. We set the internal video at a color depth of 8 bits for all tests except for those with the Power Mac 7100/66, which used VRAM video.

Results for all three cards showed impressive speed gains over the unaccelerated base platforms. No surprise there. However, although the processor speed of the Turbo 601-equipped Mac IIci was nearly identical to that of a Power Mac 7100/66 without a cache, its speed fell short of the Power Mac 7100/66 *with* a cache (an inexpensive option that no Power Mac 7100 owner will want to be without). Because the Mac IIci's slot has a 32-bit bus, it prevents the Mac from taking full advantage of the 64-bit PowerPC-processor bus.

The speed of the Quadra 630 equipped with either the Apple or the DayStar upgrade card proved to be about even with

PowerPC Superchargers / upgrade cards for low-end Macs

MacBench 2.0 Indexes

	PROCESSOR (0–35)	FLOATING POINT (0–100)	DISK (0–10)	VIDEO (0–20)
66-MHz DayStar Turbo 601 in Mac IIci	28	90	7	8
Power Mac 7100/66 (with cache)	31	97	8	20
Power Mac 7100/66 (without cache)	27	97	5	13
Mac IIci	1	3	5	3
Apple Macintosh Processor Upgrade in Mac Quadra 630	30	95	10	10
DayStar PowerCard 601 in Mac Quadra 630	30	95	10	10
Power Mac 6100/66	31	98	8	18
Mac Quadra 630	10	10	10	10

Longer bars are better.

that of the Power Mac 6100/66 in every test except the Video Mix test, where the Quadra 630's slower motherboard video circuitry and 32-bit bus act as bottlenecks.

The Bottom Line

For Mac IIci owners who can't afford to trade their machines for new Power Macs, installing a DayStar 66-MHz Turbo 601 represents a cost-effective way to upgrade to Power Mac speed.

Owners of Quadra 630s and other low-end 68040 Macs will gain identical speed boosts from the Apple Macintosh Processor Upgrade and the DayStar PowerCard 601. We recommend either card for owners of 33-MHz 68040 Macs, but owners of 25-MHz machines probably won't gain enough of a speed boost to make the purchase worthwhile. For those who feel fairly comfortable mucking around inside their Macs, the less expensive DayStar card is the one to buy. / Jeffrey K. Milstead

Apple Macintosh Processor Upgrade

Rating: 3½

Price: $659 (estimated street).

Pros: Inexpensive. Excellent performance. Cache upgradable to 1 MB.

Cons: Requires dealer installation. Poor performance with 25-MHz machines. One-year warranty. Blocks the PDS.

Company: Apple Computer, Cupertino, CA; 800-776-2333 or 408-996-1010.

Reader Service: Circle #402.

DayStar PowerCard 601

Rating: 4

Price: $649 (estimated street).

Pros: Inexpensive. Excellent performance. Chip upgradable. Three-year warranty.

Cons: Poor performance with 25-MHz machines. Tricky installation. Blocks the PDS.

Company: DayStar Digital, Flowery Branch, GA; 800-962-2077 or 404-967-2077.

Reader Service: Circle #403.

DayStar Turbo 601

Rating: 4

Price: $999 (estimated street).

Pros: Easy installation. Solid performance. Chip upgradable.

Cons: Not as fast as Power Mac 7100/66 with a cache. Requires additional purchase of system software.

Reader Service: Circle #404.

Iomega Zip Drive / Inexpensive removable-cartridge drive eclipses the competition.

AFFORDABLE and rugged, Iomega's new Zip removable-cartridge drive is the most convenient storage system since the brown paper bag. It's just about as easy to use, serves admirably as a backup and data-exchange device, and works nicely as an extension to your hard drive.

The one-pound $199 Zip drive uses a low-cost, flexible-magnetic-media technology that gives it a decided price advantage over drives that use SyQuest and magneto-optical technology. The media are cheap too — a 3.5-inch, 100-MB cartridge costs only $20 ($15 if you buy in quantity). Compare these prices with those of 88-MB or 105-MB SyQuest drives, which cost about $350 to $400 apiece and use $50 cartridges. Magneto-optical drives cost about $700 to $900 each, with 128-MB and 230-MB cartridges priced at about $35 and $45, respectively.

The Zip wins no prizes for speed, although it's zippy enough for most purposes. Our MacBench 2.0 test showed the Zip's overall speed to be similar to that of an 88-MB SyQuest or 128-MB magneto-optical drive. A 105-MB SyQuest drive, however, was more than twice as fast, as was a 160-MB hard drive in a Quadra 605. Still, the Zip drive was significantly faster in our MacBench tests than the 80-MB hard drives that initially shipped with Apple's entry-level Macs.

The Zip performed better when we used the same real-world application tests as we used for our February '95 removable-media-drive roundup. When saving or copying files in Photoshop, PageMaker, or the Finder, the Zip was essentially as fast as 200-MB and 270-MB SyQuest drives and two to three times as fast as 230-MB magneto-optical drives. The Zip loses its speed advantage when it comes to opening files, however — its speed dropped about 50 percent behind the others in our tests.

The Zip is reliable and rugged. We subjected the Zip cartridges to our extreme heat, cold, humidity, and drop tests, and they came through with flying colors.

We also checked to see if files written by one Zip drive could be read by another. Again, no problem — even when we had subjected the cartridges to our ruggedness testing. In addition, we put drives and cartridges through the grueling airport baggage-handling experience, connected drives to complex and quirky SCSI chains, and even performed the dreaded absent-minded-200-pound-editor-sits-down-with-cartridge-in-back-pocket test. Never a problem. The Zip is tough.

Compact and easy on the wallet, the innovative $199 Iomega Zip drive is both rugged and reliable.

Also high on our list are the nifty Zip Tools backup and disk-cataloging software; the drive's convenient vertical/horizontal styling; the plethora of available accessories; and the Zip's ability to work seamlessly with Windows, DOS, and OS/2.

Our complaints are few and minor — there's no on/off switch, SCSI-ID options are limited, and the drive comes with a ludicrously large AC-power adapter.

The Bottom Line

Although we can't predict the long-term reliability of the Iomega Zip drive and its media, our initial tests indicate a winner: The Zip drive is cheap, rugged, and fast — enough. / Rik Myslewski

Iomega Zip drive

Rating: 4½

Price: $199; 100-MB cartridge, $19.95; ten-cartridge pack, $149 (estimated street).

Pros: Inexpensive. Lightweight. Good performance. Switchable termination. Rugged media.

Cons: No on/off switch. SCSI-ID 5 and 6 only. Large AC adapter. 25-pin SCSI connectors.

Company: Iomega, Roy, UT; 800-697-8833 or 801-778-1000.

Reader Service: Circle #405.

PHOTOGRAPHY / LEON

DrawingSlate II, MultiPad, PenMouse, XGT 6" x 8", and ArtPad / Compact drawing tablets priced to fit any budget.

IF YOU HATED giving up your pencil for a mouse but couldn't afford a graphics tablet, take a look at the latest offerings from established manufacturers. Five new tablets are more compact than traditional tablets, and more important, they cost a lot less. These tablets — the Kurta PenMouse, Wacom ArtPad, CalComp DrawingSlate II, Hitachi MultiPad, and Kurta XGT 6" x 8" — cost between $199 and $425 and have drawing areas between 4 x 5 inches and 6 x 9 inches. Each gives you better control, especially for graphics work, than the mouse does. You can also navigate Mac menus, select spreadsheet cells, and highlight text with the tablets' cordless styli.

Working with any of the tablets feels much like drawing on a piece of paper. The tablet's surface maps directly to your monitor: When you touch the upper left corner of your tablet with the stylus, your cursor jumps to the upper left corner of your screen. Pressing the stylus tip against the tablet is the same as clicking the mouse. Each of the tablets works concurrently with a mouse. And all but the PenMouse have pressure-sensitive styli, with which you can paint and draw thick or fine lines in a natural way, if you have a graphics program that supports pressure sensitivity.

Space Savers

Kurta PenMouse. A 4-x-5-inch drawing tablet, the PenMouse doesn't measure up to the competition. Its stylus isn't pressure-sensitive, the button on the stylus can't be set up for any function other than a double-click, and you can't set up macros for use with the tablet. On top of all that, it's poorly designed. It's difficult to discern the black drawing area from the black frame, and your hand can hang uncomfortably off the edge of the almost half-inch-thick tablet when you're drawing near the bottom. Unlike all the other tablets in this review, which connect to your Mac's ADB port, the PenMouse plugs in to a serial port, which you may already be using for a modem or a printer. Furthermore, the PenMouse draws its power through an included AC adapter, adding yet another cable to the tangle underneath your desk. You'll have to pay more for the $249 PenMouse bundled with Fractal Design's Dabbler software than you'll pay for the ArtPad — a similar tablet from Wacom that's better designed — which also is available bundled with Dabbler for $239.

Wacom ArtPad. Like the PenMouse, the $199 ArtPad — a smaller version of Wacom's ArtZ tablet — is 4 x 5 inches. The ArtPad is the least expensive pressure-sensitive drawing tablet you can buy. You can't trace anything larger than a postcard on it, but it fits nicely next to the keyboard on even the most crowded desks. The ArtPad has a well-designed control panel that lets you easily customize sensitivity, tablet-to-screen mapping, and stylus-button functions. There aren't any macro buttons on the tablet, but you can set up the stylus button so pressing it brings up a list of macros on-screen. However, the stylus has only one button, for which you might want to set any one of several commands.

Other than needing an additional button, the stylus stands out among its competitors for comfort and convenience. The styli of the other tablets in this review require batteries, which make them top-heavy and bulky in comparison. You also have to tap the battery-operated styli out of sleep mode when you start using them; the featherweight ArtPad stylus, which uses electromagnetic resonance to work with the tablet, operates immediately. The ArtPad stylus is also the least expensive stylus to replace. However, you can't trace through a thickness of more than a quarter inch with the ArtPad stylus; all the battery-operated styli can trace through stacks of documents at least twice as thick.

Elbowroom

If you want a slightly larger drawing surface and have more money to spend, you can step up to the DrawingSlate II, the MultiPad, or the XGT 6" x 8". Each of these tablets is large enough for tracing drawings and has a clear plastic overlay to keep the images you're tracing in place. If you use CAD programs, you might want to buy the crosshair four-button pucks available for the DrawingSlate II and the XGT. All three tablets are large enough that they have shortcut keys, which give you instant access to setup options, user-definable keystroke combinations, and your own macros created with Affinity Microsystems' Tempo II or CE Software's QuicKeys.

CalComp DrawingSlate II. The most user-friendly of these midsized tablets is the 6-x-9-inch DrawingSlate II. It has a pressure-sensitive stylus with two customizable side buttons and gives you several tablet-to-screen mapping options. Besides having preset keys for Open, Save, Cut, Copy, Paste, and Undo, the tablet also has 18 well-marked, user-definable keys, giving it the most usable keys of any of the tablets reviewed. The control panel is straightforward and the documentation top-notch. Although you can define a pressure range for several of the pressure-sensitive styli among these products, none are easier to adjust than this one: The pressure-sensitivity dialog box gives you numeric feedback on how much pressure you're applying.

CalComp DrawingSlate II

Rating: 4½

Price: $395 (list).

Pros: Well-designed tablet and software. Many on-tablet macro keys.

Cons: Recessed pen buttons can be difficult to find without looking.

Company: CalComp Digitizer Division, Scottsdale, AZ; 800-458-5888 or 602-948-6540.

Reader Service: Circle #406.

Hitachi MultiPad

Rating: 3½

Price: $269.95 (list).

Pros: Good at recognizing angled stylus strokes. Good value.

Cons: Poorly designed control panel. Uses clunky ADB converter. Many cryptically marked macro keys don't work with Mac.

Company: Hitachi Digital Graphics (USA), Sunnyvale, CA; 408-747-0777.

Reader Service: Circle #407.

PHOTOGRAPHY / GIAMPIERO BENVENUTI

No matter how tight your budget or how limited your desk space, you can find the right drawing tablet for you, whether it's the Wacom ArtPad, Hitachi MultiPad, Kurta XGT 6" x 8", Kurta PenMouse, or CalComp DrawingSlate II (clockwise from top left).

The DrawingSlate may not have some of the features of the XGT, such as tablet templates, and the stylus's buttons have a low profile that makes them harder to find with your finger, but its easy-to-use software will get you up and running quickly and the slim tablet is a pleasure to use on a daily basis.

Hitachi MultiPad. The 6-x-9-inch MultiPad has an impressive mix of features for only $270. Like the XGT, it has a pressure-sensitive stylus and the ability to define a smaller drawing area on the tablet. It's also better than the other reviewed tablets at recognizing angled stylus strokes. Designwise, however, the MultiPad is no prize. You have to plug in a clunky, cigarette-pack-sized ADB converter between the tablet and your ADB port. Nearly half the keys on the tablet don't work with a Mac, and those that do are marked with cryptic, hard-to-read type. The stylus uses only two batteries instead of the standard four, making it lighter than the other battery-operated pens, but it still isn't as light as the ArtPad's stylus. And it has only one button.

Kurta XGT 6" x 8". The $425, 6-x-8-inch XGT tablet doesn't skimp on features. It has a two-button pressure-sensitive stylus. You can use the tablet's shortcut keys to customize stylus functions, set scaling, and create up to six macros. If you want to control the cursor with smaller hand movements, you can set the tablet's drawing area to 3 x 3 inches. You can set the stylus not to react to pressure changes or, alternatively, change its pressure sensitivity to produce proportionally thicker lines than it would with its normal sensitivity when you press harder. The XGT tablet also supports tablet templates that let you tap a spot you've selected on the tablet and launch a macro.

However, the XGT tablet has some of the same physical-design problems that plague the PenMouse. The tablet's drawing area is the same color as the frame, making it too easy to inadvertently draw out of bounds, and you have to hold your wrist in the air or let it droop awkwardly over the edge of the almost half-inch-thick tablet, which makes it difficult to draw with precision.

The Bottom Line

For those with limited finances or desktop space, the ArtPad is a small but terrific mouse alternative. But if you need to do any tracing or want a larger drawing area (and can't afford a full-sized 12-x-12-inch drawing tablet), consider Wacom's 6-x-8-inch ArtZ or the comfortable and well-designed CalComp DrawingSlate II. / Shelley Cryan

Kurta PenMouse

Rating: ❦

Price: $249 (list), including Dabbler.

Pros: None.

Cons: Overpriced. Stylus not pressure-sensitive. Awkward tablet design. Uses serial port.

Company: Muton America, Phoenix, AZ; 800-996-8864 or 602-276-5533.

Reader Service: Circle #408.

Kurta XGT 6" x 8"

Rating: ❦❦❦

Price: $425 (list).

Pros: Supports tablet templates. Pen can trace through 1-inch stack of documents.

Cons: Awkward tablet design.

Company: Muton America, Phoenix, AZ; 800-996-8864 or 602-276-5533.

Reader Service: Circle #409.

Wacom ArtPad

Rating: ❦❦❦❦

Price: $199; including Dabbler, $239 (list).

Pros: Lightweight pen. Inexpensive. Well-designed software.

Cons: Too small for most tracing. Only one pen button.

Company: Wacom Technology, Vancouver, WA; 800-922-6613 or 360-750-8882.

Reader Service: Circle #410.

UMAX Vista-S8 / Affordable flatbed scanner captures fine lines as well as vibrant color.

ABLE TO SCAN delicate line art as adeptly as it captures nuances of color, the $995 UMAX Vista-S8 is a one-pass color flatbed scanner that replaces the Vista-S6. The new scanner catches up with its rival, the Agfa StudioScan II, which bested the Vista-S6 in color-quality tests for our last low-cost-scanner review (see March '95, page 56).

Razor-Sharp Resolution

The UMAX Vista-S8 has the same 800-x-400-dpi resolution as the Agfa StudioScan. However, unlike the StudioScan, which has a maximum interpolated resolution of 2,400 x 2,400 dpi, the Vista-S8 has a higher interpolation, 6,400 x 6,400 dpi. But the Vista-S8's scans are limited to 8.5 x 11.7 inches maximum, whereas the StudioScan can scan 8.5-x-14-inch documents.

Using VistaScan, UMAX's Photoshop plug-in for the scanner, you can easily adjust brightness, shadows, color, and more in your scan. When you buy the Vista-S8, you also get Caere's OmniPage Direct (optical-character-recognition software) and a limited edition of Adobe Photoshop. If you do extensive work with graphics, however, you'll probably want to spend an extra $100 to receive the full version of Adobe Photoshop and Kai's Power Tools, from HSC Software, instead. You also receive MagicMatch (a color-calibration product that works with Apple's ColorSync), which is bundled with either package. In addition, you can add hardware to your scanner, either a $495 fifty-sheet automatic document feeder or a $595 adapter for scanning transparencies.

Battling Scanners

We pitted the Vista-S8 and the StudioScan II against each other to compare speed and scanning accuracy by scanning a color photograph that had bright primary colors as well as subtle midtones. We then printed each scan, using a Tektronix Phaser 480 dye-sublimation printer. We also scanned a detailed line-art image that had fine, tightly curved lines and printed the image, using a 1,200-dpi Xanté Accel-a-Writer 8200 high-resolution laser printer.

Colors were saturated smoothly with both the Vista-S8 and the StudioScan; we saw no color banding. However, we did have to use the VistaScan plug-in to adjust the scan from the Vista-S8, since its scanned color image had a blue cast to it.

To see any difference between the line-art scans from either scanner, we had to examine each image closely with a loupe. Under magnification, we could see that the Vista-S8's scan had crisper lines and fewer jagged edges than the StudioScan II's did.

Affordable and fast, the UMAX Vista-S8 is an excellent low-end color scanner for homes and small businesses.

Higher-quality scans frequently mean slower scanning speed, yet the Vista-S8 scanned the color image in 70 seconds, almost twice as fast as the StudioScan II.

The Bottom Line

If you don't need to scan legal-sized documents, the Vista-S8 may be the ideal color scanner for your small business or home.

/ Roman Victor Loyola

UMAX Vista-S8

Rating: ♦♦♦♦

Price: $995 (list.)

Pros: High-quality line-art scans. Fast. Affordable.

Cons: Need to adjust scan for color accuracy. Can scan only up to 8.5 x 11.7 inches.

Company: UMAX Technologies, Fremont, CA; 800-562-0311 or 510-651-8883.

Reader Service: Circle #411.

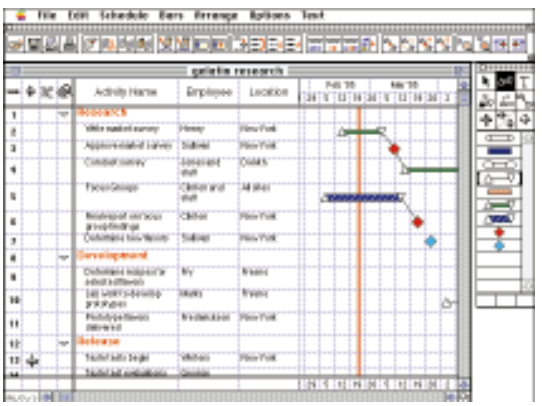
PHOTOGRAPHY / GIAMPIERO BENVENUTI

FastTrack Schedule 3.0 / Keep your schedules on track with smart Gantt charts.

MOST PROJECT-MANAGEMENT and business-graphics packages — and even a few electronic calendars — can create decent Gantt charts. But few make designing such charts as easy as FastTrack Schedule does. Version 3.0 of the program includes dozens of new features that let you produce professional timelines and schedules that are both accurate and elegant.

Time Chart

On one side of your FastTrack schedule sheet, you have a columned outliner in which you list your activities, along with any related information, such as the start and completion times for each activity. The other side of the sheet shows your Gantt chart — the same activities on a timeline. You can modify start and finish times and the relationship among scheduled activities by adjusting the bars in the chart. You can have up to three distinct bars for each activity: one to show the original scheduled start and finish times, one to show the revised times, and one tracking the progress of the activity. The scheduled start and finish times for an activity, as well as the revised ones, pop up when you click on the activity's bar in the Gantt chart.



Making it easier and more convenient to create the kind of Gantt chart you need, FastTrack Schedule 3.0 puts many of its commands in a floating, resizable palette and lets you design the milestones, bars, and links for your activities.

The revamped interface saves you from having to pull down menus or open dialog boxes. You can access most commands by clicking on their icon buttons on the new floating control palette. You can orient this palette vertically or horizontally and make it as wide or narrow as you wish; you can't, however, add any buttons for commands that aren't represented or remove the buttons of commands you don't use. The action column, four optional columns on the left side of the FastTrack schedule, gives you a quick way to select whole rows at once, reorder activities, add page breaks, and expand or collapse the outlines of activities.

The new Work Calendar feature is one of the most useful additions in FastTrack Schedule 3.0. In a work calendar, you note the actual days you work each week; which hours you work, taking account of your breaks; and your holidays and vacations. When you assign activities to your schedule, FastTrack automatically refers to your work calendar and calculates completion dates and times, based on your work schedule.

You can sort and filter the activities in your schedule with FastTrack Schedule 3.0. You can set up any kind of order for the activities in a schedule, using sorting, and if you want a certain kind of order to apply to all your projects, you can create a sorting template. Filtering lets you display only specific activities, based on multiple search criteria: For instance, you might filter to see tasks assigned to a specific subproject and to a specific employee. However, unlike most of the other databaselike products we've seen, which by default search for any text string you type in a field, FastTrack requires you to conscientiously use a wildcard character in front, after, or in a text string if you don't know the exact name of what you're seeking.

Eventful Linking

Just like previous versions, FastTrack Schedule 3.0 makes it easy to establish links and dependencies among scheduled events. Hard links postpone all activities that come after a delayed activity. Soft links also preserve the sequence of activities, but they postpone linked activities only when one activity's finish date conflicts with the starting time of the next activity.

You can design the way these links look as well as the bar and milestone styles for each chart. You can draw links with angled or straight paths, with or without arrowheads, using the color, pattern, and line thicknesses you prefer. However, you have only two line thicknesses and two patterns to choose from. Likewise, for the bar and milestone styles, you have a choice of only eight colors and a few dozen patterns. However, when you send in your registration card, AEC will send you a disk with hundreds of bar styles.

Our main gripe about FastTrack Schedule 3.0 is that its interface suffers from some irritating quirks. The Undo command works with some functions but not with others; you can't undo an aspect as basic and common as text formatting. And when you change the name of an activity, its cell doesn't resize to accommodate any new text: You have to drag each column out in order to see what you've typed.

The Bottom Line

Don't confuse FastTrack with a project-management program, which can also allocate resources and manage equipment as well as chart schedules. On the other hand, if you only occasionally need to create schedules for projects, spending $299 just to get great Gantt charts is overkill. But if you use Gantt charts frequently, FastTrack Schedule 3.0 is a tool worth owning, since it performs its job gracefully and efficiently.

/ Joseph Schorr

FastTrack Schedule 3.0

Rating: ♦♦♦♦

Price: $299 (list).

Pros: Can schedule activities, using a customizable calendar that reflects actual work hours. Can filter and sort activities. Supports numerous bar and milestone styles.

Cons: Idiosyncratic interface. Cannot remove buttons from or add them to control palette.

Company: AEC Software, Sterling, VA; 800-346-9413 or 703-450-1980.

Reader Service: Circle #412.

Theorist 2.0 / PowerPC-native power for fast numerical analysis.

POWERFUL TOOLS for manipulating algebraic expressions and graphically displaying the results have transformed math teaching and research into a dynamic art. Mathematica, the best known of such tools, can be overwhelming. Theorist, an affordable and easier alternative, is now PowerPC-native and has several new features that make it more convenient to use.

Talking Math

Theorist lets you put together mathematical statements, which it calls *propositions*, in a main window, which it calls a *notebook*. You can then manipulate the statements to derive conclusions. As you create structures of propositions defining constants and creating assumptions, you produce a *theory* you use as a model for a domain of mathematics, such as differential equations. You can graph your propositions and theories right in a notebook. And you can annotate your notebooks and use them as teaching materials.

Theorist lets you create propositions by using either traditional mathematical symbols or the FORTRAN-like mathematics notation from older mathematics programs. You can enter these symbols from your keyboard or from the icon palette; this palette now has more symbols, so you do less typing, especially of some symbols' hard-to-remember key combinations.

Theorist has several more usability and convenience improvements besides giving you more symbols in its palette. The program's seven menus have been combined into five, which organizes the functions more clearly. A new feature, Page Break, lets you place a page-break symbol so you can control where your notebook pages end. Theorist now also gives you more control over creating a QuickTime graph within a notebook.

Figures into Formats

With the Windows version of Theorist, we had no problems reading notebook files created on the Mac, and vice versa. If you copy an expression from a Theorist 1.5 notebook into a Theorist 2.0 notebook, though, it may not mean what it formerly meant, because the order the program uses for mathematical operations has changed. This is not a problem if you open the entire Theorist 1.5 notebook in Theorist 2.0.

When you deleted or modified a statement in earlier versions, all statements that had originally derived from it remained the same, leading to some bizarre conclusions. But now Theorist reevaluates the statements derived from a deleted statement and changes them accordingly.

The already good documentation has improved, particularly the tutorials, which give you more help on numeric and symbolic integration and advise you how to send notebooks via e-mail and how to recover corrupted notebooks.

Although its ability to still work on a Mac Plus will be appreciated by cash-strapped students, Power Mac users will appreciate Theorist's snappy PowerPC-native speed even more.

Oddly, Theorist now calculates only to 15 decimal places, 4 fewer places than in earlier versions. In practice, however, this is inconsequential, since the actual usable precision in complex computations is usually less than 15 decimal places.

The Bottom Line

Theorist is an ideal mathematics tool for high-school and undergraduate college students and their teachers. It's also an invaluable resource for engineers who need a good mathematical-graphing tool. However, if you need the power of programming, portability to UNIX, or very high precision, you'll need to spend more and get Mathematica. / Michael Swaine

Theorist 2.0

Rating: ♦♦♦♦

Price: $299 (list.)

Pros: Affordable. Easy to use. Supports both mathematical and FORTRAN-like notation. PowerPC-native.

Cons: Programmability for very advanced math functions not supported.

Company: Waterloo Maple Software, Waterloo, ON, Canada; 800-267-6583 or 519-747-2373.

Reader Service: Circle #413.

Hewlett-Packard LaserJet 5MP

HP delivers high-quality, low-cost laser printing for small offices.

REMEMBER WHEN $1,500 for a 600-dpi PostScript laser printer seemed like a good deal? Not anymore. Hewlett-Packard's latest low-cost laser printer offers small offices even more for less than its predecessor did. The 600-dpi HP LaserJet 5MP leapfrogs its older sibling, the LaserJet 4MP, by offering improved speed, an innovative infrared port for wireless printing, and an even more attractive price tag. Energy-saving features and more efficient memory handling are icing on the cake.

Bigger and Better

The Adobe PostScript Level 2 LaserJet 5MP is street-priced at about $1,000 — that's about $500 cheaper than the cost of its predecessor, the LaserJet 4MP, which it replaces. Although the 5MP is the same understated gray as the 4MP, the similarities end there. The new printer is slightly bulkier than the 4MP — it measures 8 inches high, 16 inches wide, and 17.5 inches deep — but it's still quite compact for crowded offices. And weighing in at only 15 pounds, it's 5 pounds lighter than its sibling.

HP is known for its plug-and-play printers, and the 5MP is no exception. The printer's toner cartridge slips in easily, an installer places the printer software in all the right places on your hard disk, and the cables plug in to clearly marked ports.

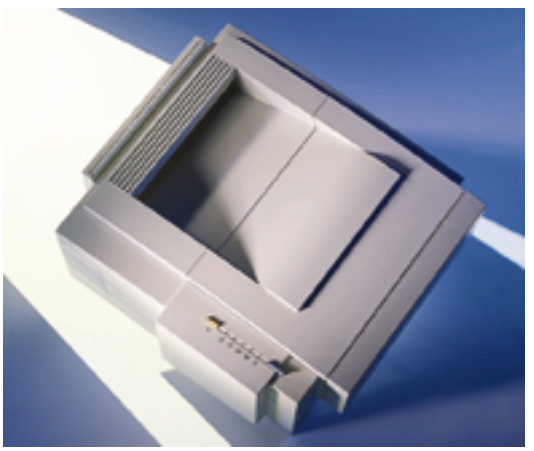
With the 5MP, HP has revamped its printer controls. Unlike its predecessor, the 5MP doesn't have a control panel on the front. Instead, there are lights that indicate the status of the printer: ready, processing, error, and paper-tray use. Most functions that need a control panel, such as emulation switching and ports, occur automatically. However, for controlling such things as gray-scale enhancement and EconoMode, you use the bundled LaserWriter 8 driver.

If you use the printer frequently enough to keep it constantly powered on, you'll appreciate HP's new method of saving energy. After each print job, the 5MP goes into a 5-watt, Energy Star-compliant sleep mode. And when you send a print job to the printer, the warm-up time is nominal — we found that sleep mode had almost no effect on the 5MP's overall performance.

Look, Ma — No Cables

The 5MP is the first printer to sport a built-in infrared port for wireless printing — a convenient feature that allows notebook-computer users to print without fussing with cables. No physical connection with the printer is required. Unfortunately, because the current crop of PowerBooks and Newtons — unlike many PC notebook computers — isn't equipped with the technology required to take advantage of the infrared port, we weren't able to test this feature firsthand. However, given the convenience of wireless printing, we fully expect Apple to incorporate the technology in PowerBooks currently under development.

Network features are what you expect from an office printer. The 5MP comes equipped with a LocalTalk port, two parallel ports, and automatic switching among all ports and between the PostScript and HP PCL 5 printer languages. An Ethernet option is available with the JetDirect external print server, for $399. If you're looking for a SCSI port for a hard drive, however, you're out of luck — the 5MP doesn't have an option for either an external or an internal hard drive.

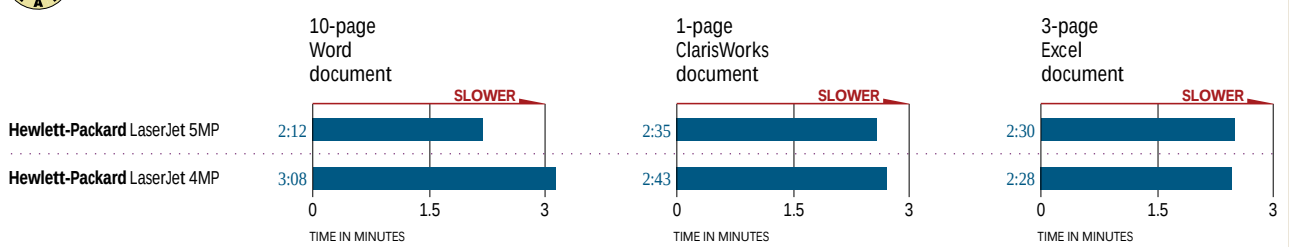


Street-priced at about $1,000, the compact, 600-dpi HP LaserJet 5MP sets a new price/performance standard for low-cost laser printers.

Incorporating Adobe Memory Booster Technology for efficient memory management, the 5MP requires much less memory than its predecessor to print PostScript pages. Out of the box, the 5MP comes with only 3 MB of memory, which keeps the printer's cost down while allowing it to print faster than the 4MP equipped with 6 MB of memory. For even better performance, you can expand the 5MP's memory to a total of 35 MB, using standard SIMMs.

The 5MP's 250-sheet paper tray uses a simple built-in size adjuster for letter and legal sizes. The external multipurpose feeder holds envelopes or 100 sheets of paper.

Sibling Rivalry / the HP LaserJet 5MP prints faster than its predecessor, even with less memory



PHOTOGRAPHY / GIAMPIERO BENVENUTI

Print Quality

You expect top-notch print quality from a 600-dpi PostScript laser printer, and the 5MP doesn't disappoint. Combining HP's Resolution Enhancement technology with microfine toner, the printer produces crisp text and sharp hairlines. Gray-scale output is equally impressive — the 5MP, which supports 120 shades of gray, produced clean and clearly detailed images and smooth gray ramps. And HP has designed the 5MP with a straight-through paper path, which successfully solves the paper-curl problem that somewhat compromised 4MP output quality.

The 5MP has a 20-MHz RISC processor that helps it make short work of PostScript pages. To see how the 5MP's speed compared with that of the 4MP, we printed a variety of typical business documents. To test the speed of the printers' engines, we printed a ten-page Microsoft Word document. To test overall speed, we printed a three-page Microsoft Excel document consisting of a worksheet and a pie chart and also printed a one-page newsletter created with ClarisWorks. Our test platform was a Power Mac 6100/60 with 16 MB of RAM, running System 7.5.

The results of our tests showed that HP has clearly made improvements in printing speed. Billed as a 6-ppm printer, the 5MP printed at a rate of 4.5 ppm and bested its sibling in two out of the three tests — only on the Excel test was the 4MP just slightly faster than its replacement.

The Bottom Line

The Hewlett-Packard LaserJet 5MP sets a new price/performance standard. Affordable, surprisingly quick, and able to produce excellent-quality output, the printer is a great purchase for small businesses and home offices alike. We recommend it without reservation. / Roman Victor Loyola

Hewlett-Packard LaserJet 5MP

Rating: ★★★★½

Price: $1,299 (list).

Pros: Solid speed. Excellent output quality. Affordable.

Cons: Lacks SCSI port.

Company: Hewlett-Packard, Santa Clara, CA; 800-752-0800 or 208-396-2551.

Reader Service: Circle #414.

NEC MultiSync MT Multimedia Theatre and Proxima 8400 Multimedia LCD Projector

State-of-the-art LCD projectors.

TWO NEW MULTIMEDIA projectors produce images that look almost as good as the ones on your computer screen. The new projectors offer image quality and ease of use so far beyond that of overhead LCD panels that it's hard to imagine why anyone would opt for a panel over a projector these days.

Priced at about $10,000, the NEC MultiSync MT Multimedia Theatre comes with its own special light-filtering technology for extrasharp images and vivid colors. The same goes for the Proxima 8400 Multimedia LCD Projector, which also costs about $10,000. Each projector is analog, which frees it from the limited palettes of digital projectors and allows it to project all the 16.7 million colors available from Mac and PC display cards as well as the color nuances generated by video sources. Each comes with its own bright built-in lamp — a big improvement over the overhead-projector light source of LCD panels. And if you've ever fumbled with all the cords and connectors associated with panels, you'll really appreciate the plug-and-play setup of the NEC and Proxima projectors.

NEC MultiSync MT

The most striking aspect of the NEC projector, aside from its excellent image quality, is its elegant, futuristic styling — it would look right at home on the *Starship Voyager.* Connectors for your computer, composite-video source, and stereo audio-in and -out are located on a front panel. The projector's wireless handheld remote control docks neatly into the top of the projector, but you have to keep a close eye on the remote — using it is the *only* way to turn the projector on and off and to control such things as audio volume and image brightness, contrast, color, and position. The projector's power supply powers the remote when it's docked, so there's no need to fuss with batteries, and NEC's convenient single cable works with Macs and PCs.

When we powered up the MultiSync MT, we were impressed by the brightness of its 250-watt metal-halide lamp, which helped it deliver bright, vivid images to our projection screen. Projected images can range in size from 40 to 200 inches diagonally. The projector lens is well designed — it's angled slightly upward and aligned easily with our screen to produce a clean, square image. You can also set the projector to reverse images or project them upside down (NEC can provide information on ceiling-mounting the MultiSync MT). You adjust lens focus and zoom levels manually. We missed the ability to control these with the remote.

Elegant and futuristic styling, combined with bright, colorful image quality, makes the NEC MultiSync MT Multimedia Theatre (right) an asset to any corporate boardroom. The Proxima 8400 Multimedia LCD Projector is more portable and requires less time to set up, but its images aren't quite as bright.

We tested the MultiSync MT with both a Power Mac 7100 and a PowerBook 520. In both cases, the projector required some adjustment of its image and pixel-lock controls to sync properly with the computers' video sources — an easy but time-consuming process.

Proxima 8400

More industrial-looking than the NEC projector, the Proxima 8400 Multimedia LCD Projector is housed in a dark-gray case. Weighing in at 29 pounds, it's smaller and lighter than NEC's product, so it's more portable. Located at the rear of the projector are connections for your computer, an audio/video source, and a composite- or S-video source in addition to a monitor-out connection for use with composite video. Two computer-video cables come with the projector — one for Mac video and one for PC VGA video. Each cable has a Y configuration that lets you connect a desktop monitor, as well as your computer, to the projector, so you can view your presentation on both the monitor and the projection screen. If you don't have a monitor connected, you must use the supplied terminator with the cable.

To control the projector, you can use either the backlit controls located on top of it or a wireless handheld remote control. Unfortunately, we found the labels on the projector controls confusing — it isn't clear which label goes with which button. Luckily, the inside of the lid that covers the controls also has labels that align exactly to the right of each button.

The 190-watt metal-halide lamp of the Proxima projector was not as bright as the MultiSync MT's, so the 8400 did not work as well in dimly lit rooms, and images were not quite as sharp as the NEC projector's. Adjusting the position of the projector to our screen was also a bit problematic: The 8400's resizable front feet didn't extend far enough to raise the projector to the proper height. We had to stack a few magazines under the feet to angle the projector's beam higher, which made the setup look messy on our conference-room table. What we did like was the ability to control lens focus and zoom level remotely.

Unlike with the NEC projector, you don't have to fiddle with the 8400's controls to get it to sync properly with your computer's video. And though its images aren't as bright as the MultiSync MT's, the colors are every bit as vibrant. Audio and video quality with a VCR was quite acceptable. A keystone control lets you preshape images to minimize distortion when the projector is angled up at the screen.

An added plus with the 8400 is Proxima's innovative $1,195 Cyclops remote-pointer system, an option that lets you control your Mac or PC by simply pointing and clicking on interface elements in the projected

PHOTOGRAPHY / GIAMPIERO BENVENUTI

image. That means you're not chained to your computer keyboard and mouse while you're presenting.

The Bottom Line

The NEC MultiSync MT Multimedia Theatre and the Proxima 8400 Multimedia LCD Projector each produce bright, vivid color; smooth gradients; and natural flesh tones for photographic images. With light source, sound, and video capabilities all built in to one device, the projectors offer obvious advantages over LCD panels.

Each projector offers distinct advantages to different audiences. With its stylish but heavy case, superbright images, and ceiling-mount capability, the NEC projector is tailor-made for permanent boardroom installation. The smaller, lighter Proxima projector can sync to computer video with no adjustments, making it a more portable device that will have special appeal to novices. Add the optional Cyclops remote-pointing system to get the best projector for interactive presentations. / Jeff Pittelkau

NEC MultiSync MT Multimedia Theatre

Rating: ★★★★

Price: $9,995 (estimated street).

Pros: Bright image. Vivid colors. Stylish design. Single cable works with Mac and PC VGA systems.

Cons: Some image adjustment required. Lacks remote-controllable focus and zoom. Heavier than Proxima's projector. Wireless remote is the only controller. Lacks S-video input.

Company: NEC Technologies, Professional Graphics Group, Wood Dale, IL; 800-632-4636 or 508-264-8000.

Reader Service: Circle #415.

Proxima 8400 Multimedia LCD Projector

Rating: ★★★½

Price: $10,795 (list).

Pros: Vivid color. Smaller and lighter than NEC projector. Controls are on the projector as well as on the remote. Innovative optional Cyclops pointer system.

Cons: Images not as bright as the NEC projector's. Poorly labeled controls on the projector. Foot and lens design limits positioning flexibility.

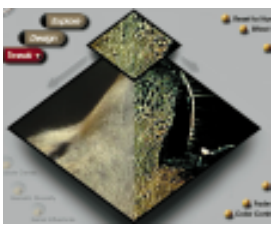
Company: Proxima, San Diego, CA; 800-447-7694 or 619-457-5500.

Reader Service: Circle #416.

KPT Convolver / Corrective and creative Photoshop plug-in

PUTTING A FRIENDLY FACE on complex technology is HSC Software's strength, and KPT Convolver is a shining, if a bit overdone, example. Convolver — HSC's abbreviation for *Convolution Kernel Explorer* — applies color effects, such as hue shifting, with surface effects, such as embossing or sharpening, on any Photoshop document. The program takes an interactive, nontechnical approach that encourages and rewards exploration.

Special Effects. The program offers three modes: Explore, Design, and Tweak. You can make complete color swaps or create radical textures in Explore mode. Design mode lets you vary the intensity of any two of ten effects (such as contrast and relief) simultaneously. The Explore and Design modes use a diamond-shaped grid containing 15 preview tiles to show you the varying results of your choices — sort of a space-age version of Photoshop's Variations feature. Design and production professionals will find the most-practical corrective tools in Tweak mode: You can add a slight emboss to an image or highlight its edge; adjust its hue, saturation, value, or contrast; and apply Gaussian Blur and Unsharp Mask effects.



Convolver's biggest benefit is its ability to make multiple adjustments in one round. You can use Photoshop alone to get the same results, but you need to wait after every operation; Convolver applies its effects quickly, even on large images.

Cool but Quirky. We appreciate HSC's innovative interfaces, but Convolver goes a bit too far. The three modes overlap too much — one mode would probably be enough. The previews' diamond shape is annoying — it cries out to be a square. And as you make adjustments in Tweak mode, the cursor disappears and a number readout appears at the bottom of the screen, which fluctuates according to your maneuvering of the now invisible cursor. This is disconcerting and nonintuitive. Moreover, we would like to be able to manually enter our numeric values rather than clicking on a button.

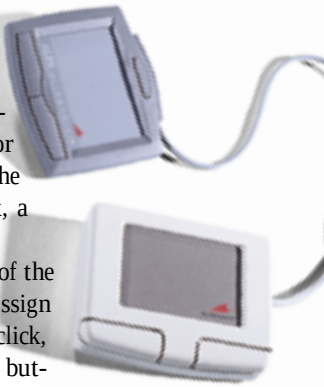
Convolver is a brilliant, practical program that produces great results and will appeal to your artistic side, but the interface takes some getting used to. / Jim Benson

KPT Convolver 1.0 ★★★★ / **Price:** $199 (list). **Company:** HSC Software, Carpinteria, CA; 805-566-6200. **Reader Service:** Circle #417.

ALPS GlidePoint and MicroQue QuePoint / Finger-clicking fun

UNTIL RECENTLY, the only Mac users who had a trackpad were those who owned one of the 500-series PowerBooks. You don't have to envy those folks anymore, though, because you can now get a trackpad that works with any Mac, through the ADB port.

The GlidePoint and the QuePoint trackpads offer improvements over the trackpad on the 500-series PowerBooks. Each of these independent trackpads has more than one button: The GlidePoint has three programmable buttons, and the QuePoint has two, one for clicking and the other for clicking and dragging. You can also tap on the surface of either trackpad for a single-click, a double-click, or a click-and-drag function.



ALPS GlidePoint. The GlidePoint slides ahead of the QuePoint in a few areas. Its software lets you assign one of several preset actions — including click, double-click, cut, copy, and paste — to each button, so you can position the trackpad any way you like. For instance, since the single button on one side required more pressure than the two opposite it, we oriented the single button for a thumb press.

You can click by tapping on the pad's surface, but the GlidePoint lets you turn off this ability. If you're wondering why you'd want to remove this feature, be aware that the pad is so sensitive that you can end up clicking when you meant to drag the on-screen pointer.

MicroQue QuePoint. The QuePoint's advantage over the GlidePoint is its pass-through ADB port, which lets you use a mouse or a graphics tablet together with the trackpad.

Switching from a mouse to a trackball can take some getting used to, and starting out with a trackpad can be awkward at first too. Read through the quick lessons that come with either trackpad, in order to pick up some tips that may keep your trackpad from becoming a shelved novelty.

By the time you read this, MicroQue plans to offer a trackpad with five programmable buttons. The new trackpad's surface will add a few square inches, useful for those with large monitors. You can expect the price to be similar to the QuePoint's. / Nancy Peterson

ALPS GlidePoint ★★★½ / **Price:** $99 (list). **Company:** ALPS Electric (USA), San Jose, CA; 800-950-2577 or 408-432-6000. **Reader Service:** Circle #418.

MicroQue QuePoint ★★★ / **Price:** $99 (list). **Company:** MicroQue, Murray, UT; 801-263-1883. **Reader Service:** Circle #419.

Instant Replay / Desktop filming

YOU CAN CAPTURE what happens on your Mac screen and create QuickTime movies for instruction or software demos with Strata's new screen-recording utility, Instant Replay.

Like Motion Works' CameraMan (see review, November '94, page 64), Instant Replay comprises an extension that captures what's happening on your screen as a QuickTime movie, and it has a basic editing program that lets you edit the movies and import and export sound and graphics.

Key Control. You can start, pause, and stop the recording by using hot keys, enabling you to zoom in to menu bars or dialog boxes and then pause and zoom out for a full-screen view. Instant Replay also provides the Follow Cursor option, which centers the filming frame around your cursor, and you can add voice narration as you record your movies.

There's nothing specifically wrong with Instant Replay except that CameraMan does everything it does and more. CameraMan can make your screen emulate a smaller one, and it also lets you add more than one track of audio. With Instant Replay and CameraMan costing the same, there's no reason to choose Strata's less complete program. / Bob LeVitus

Instant Replay 1.0 ★★ / **Price:** $149 (list). **Company:** Strata, St. George, UT; 800-678-7282 or 801-628-5218. **Reader Service:** Circle #420.

Route 66 / Mapping on your Mac

STRAIGHTFORWARD and easy to use, Route 66 creates a map; written directions; and estimates of cost, miles, and times for trips between any two points in the U.S. — for all but the smallest towns.

Creating a map with detailed directions is a cinch: Select New Route, and a dialog box asks for starting and ending points, with an option for an intermediate destination. Then choose the fastest, cheapest, or shortest route from a pop-up menu and click on Find, and Route 66 creates an uncluttered map and written itinerary in seconds. The directions are easy to follow, and the map is clear.

Hang On to That Street Map. Like other route planners we've seen, Route 66 doesn't include city maps and so can't plan your trip door to door. In addition, some smaller roads are unnamed and no exit numbers or rest stops are noted.

Strangely, it has no Save command; you have to paste maps and directions into another application. Another potential annoyance is that the full-screen map window has no scroll bars — moving the map requires using the awkward crosshairs tool. On the plus side, Route 66 is completely AppleScriptable and you can import and keep a database of contacts for plotting a route to each one.

Despite its limitations, Route 66 should make planning your next trip much easier — just don't leave home without your trusty street map. / Joe Holmes

Route 66 ★★★ / **Price:** $79.95 (list). **Company:** Route 66 Geographic Information Systems, San Jose, CA; 408-446-0660. **Reader Service:** Circle #421.

TypeTamer / Fast font identification

NEED TO IDENTIFY font versions or view character sets from within documents and applications? You won't find much faster classification than that provided by Impossible Software's TypeTamer. It scans a document and appends a list of all the fonts contained in the document to the Font menu. This list flags appearances of multiple versions of the same font, whose subtle differences might be tricky to see. The program also displays installed fonts in hierarchical menus grouped by definable collections. Moving the arrow pointer over PostScript or TrueType icons, which appear alongside font names, displays each font's character set.

Keyboard Twister. The additional features of this product are not particularly compelling. SpeedFonts, for example, lets you type the first three letters of a font's name for quick selection — a neat trick for those with long font menus. Attempting to type while holding down the mouse button however, seems less a convenience than a game of keyboard "twister."

TypeTamer is incompatible with Adobe Type Reunion and WYSIWYG Menus, but no conflicts appeared between TypeTamer and System 7.5's hierarchical menus. However, Impossible Software's tech support was often less than exemplary.

If type identification is your primary goal, TypeTamer will definitely do the trick. But those searching for a more full-featured font tool would do best to look elsewhere. / Doug Dominic

TypeTamer 1.0.4 ★★★½ / **Price:** $59.95 (list). **Company:** Impossible Software, Irvine, CA; 714-470-4800. **Reader Service:** Circle #422.

SuperCard / Not your father's HyperCard

UNFAIRLY DESCRIBED AS "HyperCard on steroids," SuperCard is more like Macromedia Director or the Apple Media Tool than HyperCard. It's a powerful multimedia-application-development system that lets even nonprogrammers build commercial-quality programs that have all the great interface elements — such as regular, hierarchical, and pop-up menus; custom icons; and all kinds of windows and dialog boxes — that make the Mac so easy to use.

Powerful Controls. With its color control, integrated debugging tools, and ability to handle all kinds of media, SuperCard is an all-in-one authoring tool that has been used to create such programs as Pierian Spring's Digital Chisel (see review, January '95, page 56).

SuperCard's scripting language, SuperTalk, can be described as a brawnier kind of HyperTalk. SuperTalk has every HyperTalk command plus many additional ones. If you can write HyperCard programs, you'll be up and running with SuperCard in no time. Also, SuperCard can convert HyperCard 2.x stacks into SuperCard projects and supports most HyperCard XCMDs and XFCNs.

SuperCard has always had a solid feature set, including a complete set of painting and drawing tools and the ability to script any graphic object. Creating interface elements such as menus, dialog boxes, and windows is as easy as in previous versions. SuperCard also supports QuickTime and has HyperText linking, built-in animation support, and text-to-speech capability on AV Macs.

Version 2.0 introduces the Standalone Maker, which automatically sets the version number, memory requirements, creator code, icon, and other important resources when you turn your SuperCard stack into a stand-alone application. And this version is PowerPC-native and can create PowerPC-native stand-alone applications.

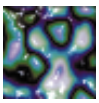
Strong Support. After nearly expiring from neglect after Silicon Beach was acquired by Aldus, SuperCard is now well supported by its new owners, Allegiant Technologies. Its documentation consists of three books, of which the 100-page *Macintosh Tutorial* is enough to get you started. Our calls to technical support were returned promptly by knowledgeable and helpful staffers.

The two drawbacks of SuperCard-built applications are slow speed and large size. The speed of applications ranges from almost acceptable to downright sluggish, depending on the contents and the computer you're using. And SuperCard applications are huge — even the smallest program requires well over 500K of disk space; stand-alone applications, whether they're PowerPC-native or not, are even larger.

Regardless of whether you're a veteran codeslinger or have never programmed before, using SuperCard is almost certainly the fastest and easiest way to build elegant stand-alone Mac multimedia applications. / Bob LeVitus

SuperCard 2.0 ★★★★ / **Price:** $695 (list). **Company:** Allegiant Technologies, San Diego, CA; 800-255-8258 or 619-587-0500. **Reader Service:** Circle #423.

ILLUSTRATION / DAVID LEMLEY, SEATTLE



Alien Skin Textureshop and TextureMaker / Textures unlimited

YOU CAN CREATE a virtually unlimited number of attractive textures for use as backgrounds, patterns, and 3-D-object image maps with Virtus' Alien Skin Textureshop and Adobe's TextureMaker. Both of these texture-generating applications can create intriguing textures, but each does so differently.

Alien Skin Textureshop. Working either as a stand-alone application or as a Photoshop plug-in, Textureshop can create textures that tile well. To begin, choose one texture from a selection of storage bins filled with wild patterns and decide how radically you want Textureshop to alter the pattern's turbulence, height, color, and lighting. If you like, you can select one of the resulting textures for further mutation. All of the Textureshop patterns are 3-D reliefs, and you can change the angle and the color of your single light source for each texture. If you use 3-D graphics, you'll appreciate Textureshop's ability to export separate image files, such as color components or the height map, from a texture.

Textureshop can be frustrating, however. You have no access to rendering and texture-generation parameters, and the mutation slider, which has markings that range from None to Oodles, has no concrete values for consistent altering. And there are no animation capabilities.

TextureMaker. TextureMaker also starts you out with a wide variety of patterns, including woods, marbles, and metals. After choosing a pattern, you can add as many as ten layers of definable effects. You can add layers of flat color; materials such as clouds, marbles, and stone; imported PICT images; and Photoshop-compatible plug-ins. You can use as many as three lights of different colors; create flat, beveled, or rounded frames for your texture; and add surface effects such as waves, bumps, and wrinkles. Just as with Adobe Photoshop 3.0's layers, you can apply modes, which are called compositing options, to each layer to affect how it interacts with other layers. TextureMaker also gives you unique animation capabilities, including the ability to rotate the texture incrementally around two axes.

TextureMaker is fairly straightforward, but mastering it takes some time. Also, few of the Photoshop filters we tried worked with it; fewer still worked without crashing the application. And you can't tile your textures, as you can with Textureshop.

Graphic designers can never have too many tools. For finding outrageous textures almost by chance, you can rely on Alien Skin Textureshop; if you prefer to create a specific texture, such as a marble background for a presentation, choose TextureMaker. Either application can provide a satisfying scratch for the texture-making itch. / David Biedny and Nathan Moody

Alien Skin Textureshop 1.0 ★★★½ / **Price:** $99 (list). **Company:** Virtus, Cary, NC; 800-847-8871 or 919-467-9700. **Reader Service:** Circle #424.

TextureMaker 1.0 ★★★½ / **Price:** $199 (list). **Company:** Adobe Systems, Seattle, WA; 206-622-5500. **Reader Service:** Circle #425.

Insta Software / Low-priced, high-powered PIMs

THE LOW-COST OFFSPRING of Chang Labs' high-end contact manager, C•A•T IV, the new Insta Software line combines the power of relational databases with a set of commonly used forms and invoices into a series of PIMs (personal information managers) tailored for people in a handful of vertical markets. Unfortunately for most users, however, these powerful features are not worth the time and effort needed to overcome the software's complex and somewhat Byzantine interface.

And Databases for All. All nine Insta products offer cheap, modular contact managers and form packages that work well either by themselves or in combination to create custom, integrated relational databases. Five products in the series are designed for specific professionals — photographers, building contractors, printers, real-estate agents, and consultants — who have businesses that rely heavily on contacts and forms. Insta Photographer, for example, includes form templates that make it easier for a photographer to create invoices and letters, contracts, proposals, work orders, and more.

Using a relational product rather than a flat-file PIM, such as Claris Organizer or Now Contact, can have benefits. For example, all the forms pertaining to a particular client or contact are always stored in the same file as the client's contact information, allowing easy retrieval of customer histories. Should you need to create a new form (such as an invoice for a new order), the included set of template forms instantly inserts a contact's information and can even perform simple mathematical calculations within the application.

In addition to these five vertical products, there are four supplemental packages — Insta Invoice, Insta Contact, Insta Address Book, Insta Write, and Insta Purchase — that work with the industry-specific products or alone. These products offer more-general functions that can be useful for all businesses; Insta Address Book, for example, allows you to print pages that fit in a Day-Timer.

You Get What You Pay For. Unfortunately, all the Insta programs have the same difficult interface. Assigning permanent categories to groups of contacts, for example, is tricky and frustrating, because you must assign values — such as category=friends — within a contact's Note field. Should you want to change that category later, you must search for the value by using a complicated Find dialog box and then change each contact's Note field individually. Additionally, there is the glaring omission of longtime Mac PIM features such as drag-and-drop and the ability to access contacts directly via a menu-bar icon without having to launch the program.

Despite some powerful features and a superb adoption of System 7.5's Apple Guide, Insta Software still falls short as day-to-day programs, because of their steep learning curve. Nevertheless, for folks in one of the vertical markets Chang addresses, Insta Software may offer enough value to be an alternative to more-expensive PIMs or relational databases that lack the specialized set of forms they need. / Steve Rubel

Insta Software 1.0 ☆☆½ / **Price:** $19.95 each (estimated street). **Company:** Chang Labs, Cupertino, CA; 408-727-8096. **Reader Service:** Circle #426.

COUNTDOWN TO SYSTEM 8

THE NEXT MAC OS WILL BE FASTER, MORE RELIABLE, AND EASIER TO CUSTOMIZE — AND IT'LL REQUIRE LESS RAM. TOO BAD IT WON'T SHIP TILL MID-1996.

By Henry Bortman

YOUR MAC'S OPERATING SYSTEM needs an overhaul. This isn't surprising, considering that whatever you're currently running — be it System 7.5, System 7.0, or even lower on the evolutionary scale — is, at its core, the same system that shipped with the first Macs back in '84. Sure, Apple has made cosmetic changes and added functionality, but even the latest and greatest system, 7.5.1, is essentially still System 1.

Fortunately, as you read this, the much needed overhaul is being busily engineered in dozens — perhaps hundreds — of cubicles at Apple headquarters in Cupertino. Code-named Copland, and sometimes called System 8, this radically new OS will focus on three areas of improvement: advances in performance and stability resulting from fundamental changes in system architecture; enhancements to some of the Mac OS's existing features, such as QuickDraw GX and PowerTalk, along with the inclusion of new features such as OpenDoc; and a bold new approach to the user interface that will enable users to customize the Mac's look and feel to suit their individual work styles and levels of expertise.

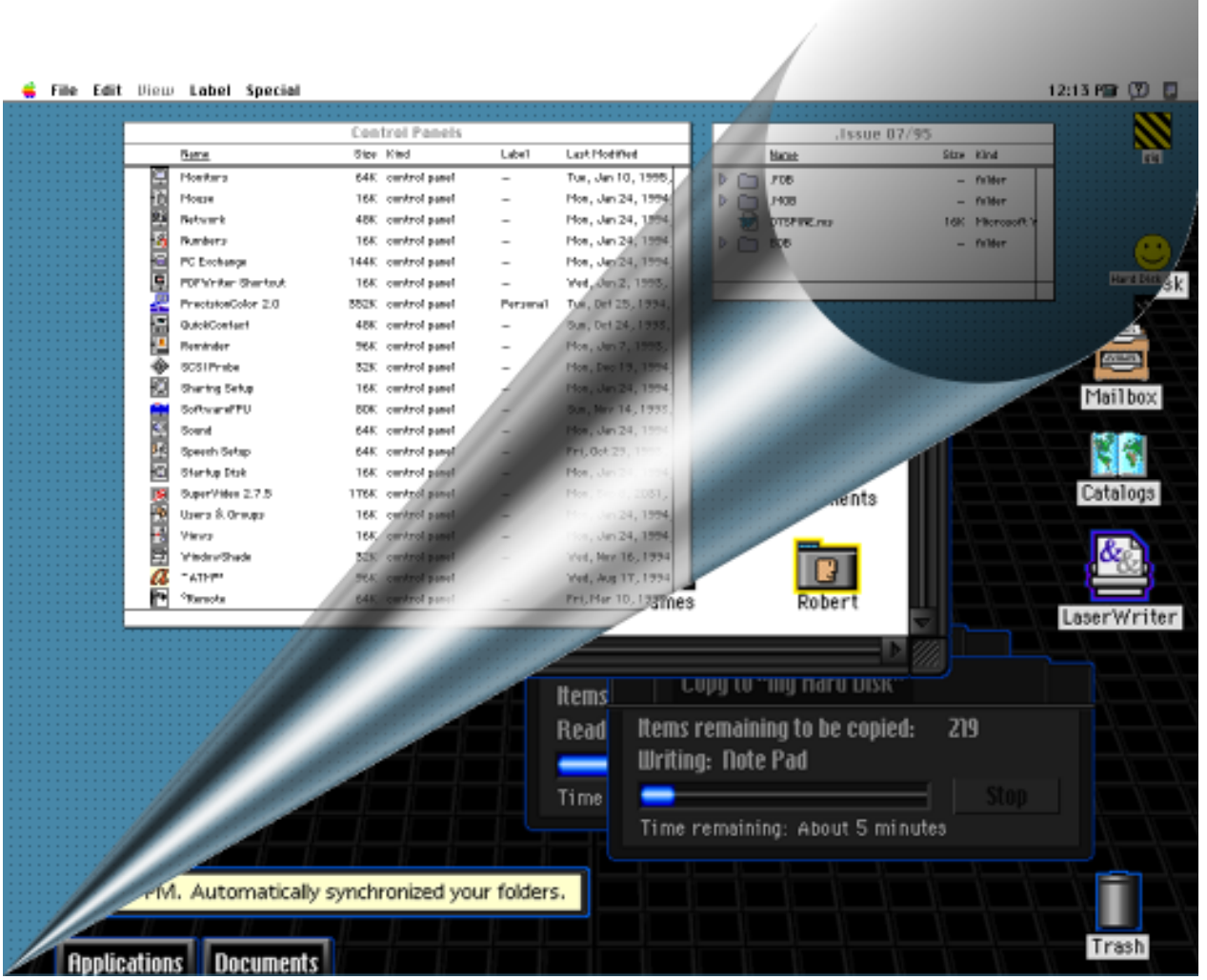
Now for the bad news: Copland won't be released until mid-1996. It was originally scheduled to ship in late 1995, but Apple decided to slip its schedule to make the new system "hardware independent." This will enable clone vendors to build machines that run the Mac OS without having to rely on custom Apple circuitry — ROMs and ASICs. Whether trading Copland's original ship date for hardware independence was a sound business decision remains to be seen. But the move will guarantee that any company that thinks it has the technical moxie to build a Mac-compatible will be able to make a go of it, without having to negotiate for Apple's proprietary hardware.

Not all improvements will be held up until mid-1996, however. Some new system-software pieces will be released before Copland, much as PowerTalk and QuickDraw GX were released prior to their inclusion in System 7.5. Open Transport, the Mac's new multiprotocol networking architecture, is due out this summer. And OpenDoc, Apple's more versatile advance over Microsoft's limited OLE component-software technology, is expected by year's end.

What Copland has to offer, however, is still a year away — which is why, uncharacteristically, Apple decided to take the wraps off many of Copland's features this long before shipping the new system. Perhaps Apple figured that if Mac users can't expect to have a new system anytime soon, they should at least have something to dream about. Perhaps Apple felt Windows 95 breathing down its neck. Whatever the reason, we're glad the company decided to let us give you a peek into the future — we think it's a bright one.

New Solutions to Old Problems

The first Mac was a one-trick pony. Only one program could be active at a time. When you launched an application, you left the Finder and couldn't return to it without quitting the application. Then came the MiniFinder, an efficient if limited desktop replacement that let you switch among applications without taking the time-consuming trip to the Finder — and in those days of glacial hard drives, a trip to the Finder was a less than snappy affair. Next in the evolutionary line was Switcher, which let you launch more than one application at a time, but switching among them was a bit crude.



MultiFinder was a vast improvement over Switcher — you could have windows from multiple applications open on the desktop simultaneously and switch among them merely by clicking on them. In System 7, MultiFinder became the Finder's everyday personality.

All these changes brought improvements in productivity — but at a price. To accomplish these changes while maintaining backward compatibility, Apple had to hack and patch things together. Clever, even brilliant hacks in some cases, but hacks nonetheless. To make matters worse, third-party software developers made their own changes to the OS, in the form of system extensions. Chugging along on an aging operating system that's been asked to do tricks for which it was never designed, an extension-loaded Mac, not surprisingly, wins few awards for stability.

Copland will have some good news for the crash-prone. One way Copland will improve reliability is by laying the foundations of a more advanced operating-system architecture. For example, it will implement *preemptive multitasking* (see the "New Foundation" sidebar), a scheme that gives the OS much more authority in managing how applications interact. However, applications will have to be rewritten to take advantage of the speed and versatility preemptive multitasking provides. In addition, only those that use extensive background processing will benefit, since application processes that require user-interface activity won't be able to be preemptively multitasked. Full-scale preemptive multitasking for all applications won't arrive until Gershwin, System 9.

The good news is that many system processes — such as Finder activity, I/O, and networking — will immediately benefit from preemptive multitasking and will run just fine — and even concurrently — in the background. And, as a result of this and other changes in system architecture, when an application crashes under Copland, your Mac won't be as likely to freeze as it is in 7.5. Yes, you'll still have to restart after a crash, but it'll be a kinder, gentler restart. Chances are, much of your system will stay up and running; most of your extensions won't have to be reloaded; and Finder copies, including network file transfers, might even keep chugging away.

Extension conflicts are another key source of crashes. Extensions are a power user's delight: They let you create a more versatile system by adding screen savers, menu modifiers, disk mounters, macro creators, and just about any other enhancement you can imagine. Problem is, Apple never provided developers with clear-cut rules for writing extensions. Extensions stretch and twist the system, forcing it to behave in ways it was never designed for — and sometimes one developer's stretch doesn't get along so well with another developer's twist. Your Mac crashes.

Copland will alleviate this problem via the Patch Manager, a programming interface developers must use to create extensions that load cleanly and don't step on each others' toes. To work under Copland, though, today's extensions will have to be updated.

Works Great, Less Filling

The new system architecture will bring other benefits as well. Speed, for example: Copland should greatly improve the speed of Power Macs and any PowerPC-based Mac clones, because 95 percent of it will be PowerPC-native. These new chunks of native

THE COPLAND DESKTOP / A LOT THAT'S NEW, A LOT THAT'S IMPROVED

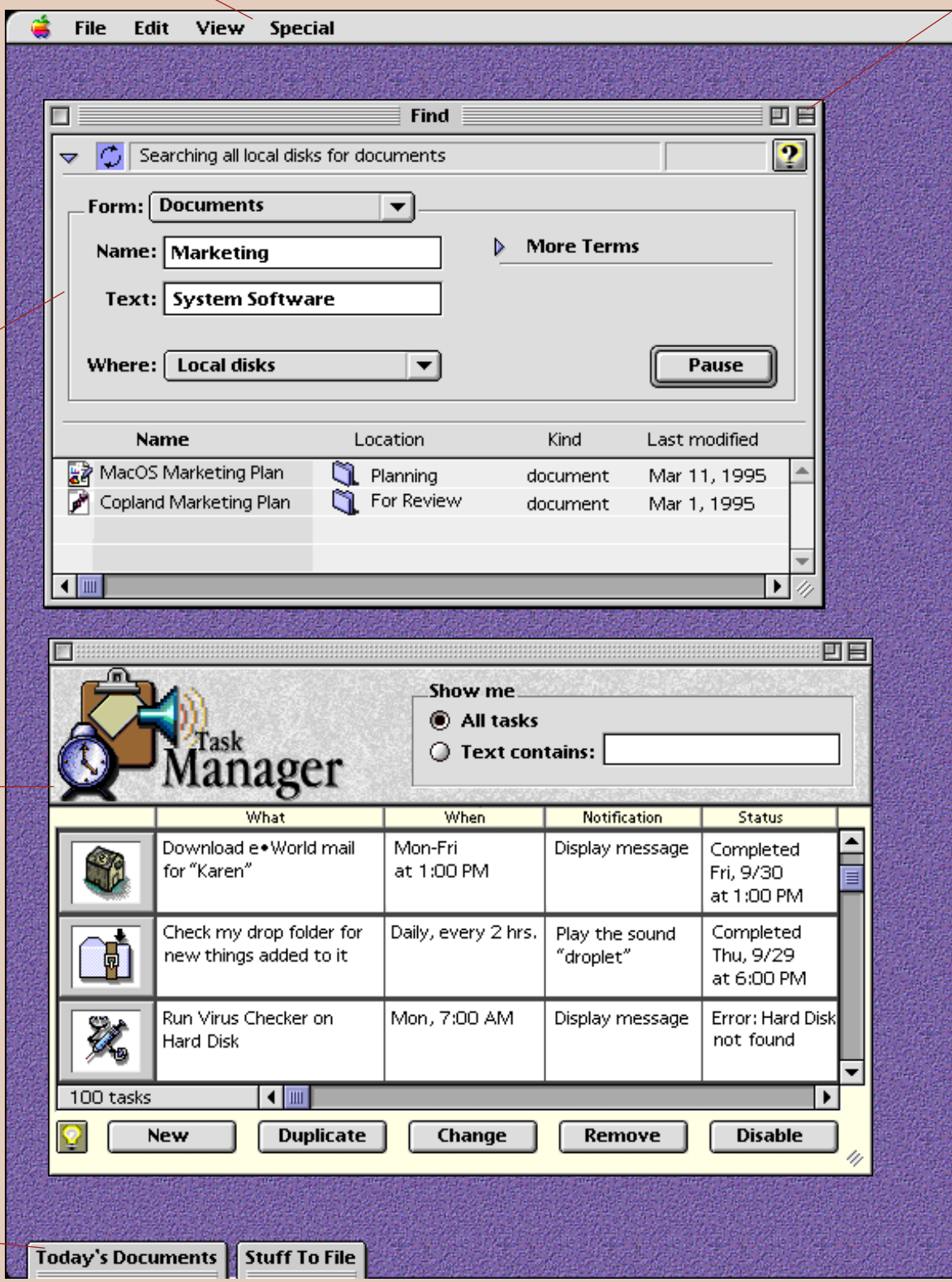
The familiar Mac desktop, at first glance, appears to be maintained in next year's new Copland operating system. A closer look, however, reveals a host of new features. Among these will be each user's ability to choose among a variety of desktop "styles." Shown here is the basic 3-D look, which most closely resembles today's Mac OS interface.

New Fonts
One interface element that will vary from style to style is the system font. If you look closely, you will notice that the menu bar (and window titles) for this style are not the traditional Chicago (they're Espy Bold).

Improved Find
Copland's new Find command will be light years ahead of System 7.5's — which was light years ahead of System 7.0's. Not only will it let you search for text strings within documents (as well as by title, modification date, and the like) but you'll also be able to store Find requests as icons. Copland will continually update these requests in the background.

New Assistants
In Copland, you'll be able to use Apple Guide to create active *assistants* that can perform repetitive tasks automatically. The Task Manager will display a list of your assistants.

New Drawers
To reduce desktop clutter, Copland will introduce *drawers*. If you drag any open window to the bottom of the desktop, it will become a drawer, represented by an icon that looks like a file-folder tab.

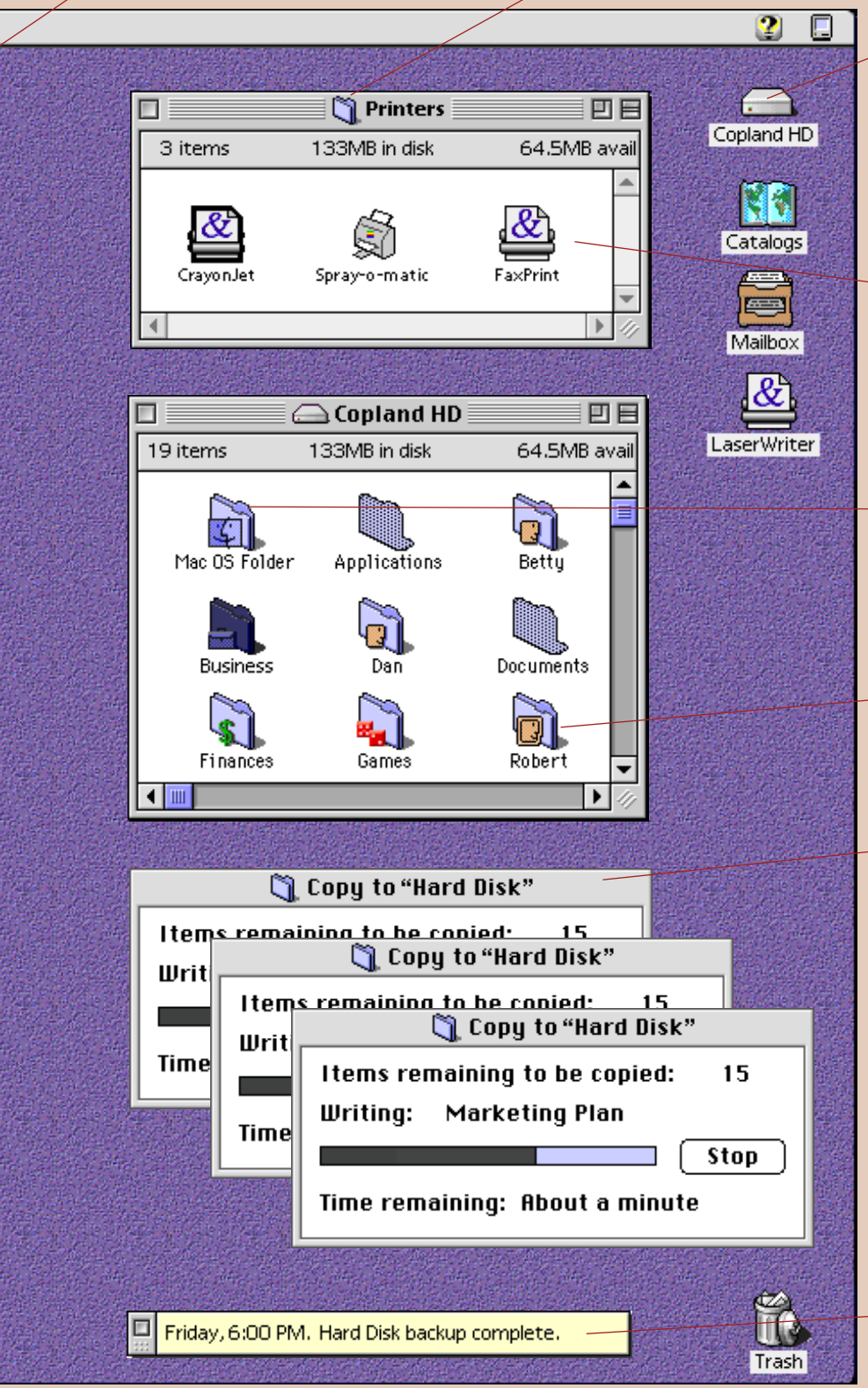


Improved WindowShade

The WindowShade function, which was built in to the Mac OS in 7.5, will get more prominent play in Copland. The icon for zooming a window, which in 7.5 is located on the right of the window's title bar, will be joined by a new window-shade icon.

New Icons

Each file and folder in Copland will be represented by a new icon in its title bar. You'll be able to move or copy a file or folder and, in addition, to mail, fax, or print a file by dragging its icon to the appropriate destination on the desktop.



Improved Icons

Copland will sport new hard-disk and Trash icons. Most likely, PowerTalk's catalog and mailbox icons will also be redrawn, but at press time, they had not yet been updated.

Improved GX

QuickDraw GX's desktop printer icons in 7.5 cannot be moved off the desktop. In Copland, you'll be able to store them wherever you like.

New System Folder

Say goodbye to the System Folder. In Copland, it will be renamed the Mac OS Folder.

New Profiles

In Copland, you'll be able to set up multiple user profiles, each with its own set of preferences, such as interface style.

Improved Copying

You will be able to initiate multiple simultaneous file-copy operations in the Copland Finder.

New Notification

You can configure assistants to notify you when they complete their tasks.

A NEW FOUNDATION / ADVANCED TECHNOLOGIES OFFER SPEED AND CRASH-RESISTANCE

COPLAND WILL BE NEW FROM THE GROUND UP, the first complete rewrite of the Mac OS since the first Mac shipped, over ten years ago. There'll be a lot that's different — and a lot that's improved.

Users may first be drawn to Copland because of its new look and features, but the most important improvements will be more fundamental. The way Copland will be structured — its *architecture* — incorporates many technologies now in use in high-end workstations.

Improved Virtual Memory

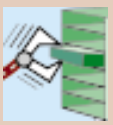
Copland will have a vastly improved virtual-memory system, resulting in better performance of the *code-fragment manager*, the part of the OS that's responsible for loading into memory only those parts of an application that are actually needed at any given moment. Applications will load faster and require less RAM.

Protected Memory

Applications will also be able to spin off multiple *server tasks* into their own protected memory spaces. There they will be able to run unattended in the background, safe from most system crashes. However, only those processes that do not require user-interface activity will be able to become server tasks.

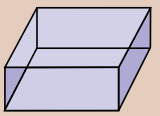
Preemptive Multitasking

In the current Mac OS, applications compete for CPU resources, with the result that some hog processing power while others starve. Copland will reduce this anarchy by using a technique called *preemptive multitasking*, in which the OS takes over resource scheduling — but only for server tasks and some OS functions. The result will be faster, more responsive performance of file and network I/O and greatly improved background-task performance.



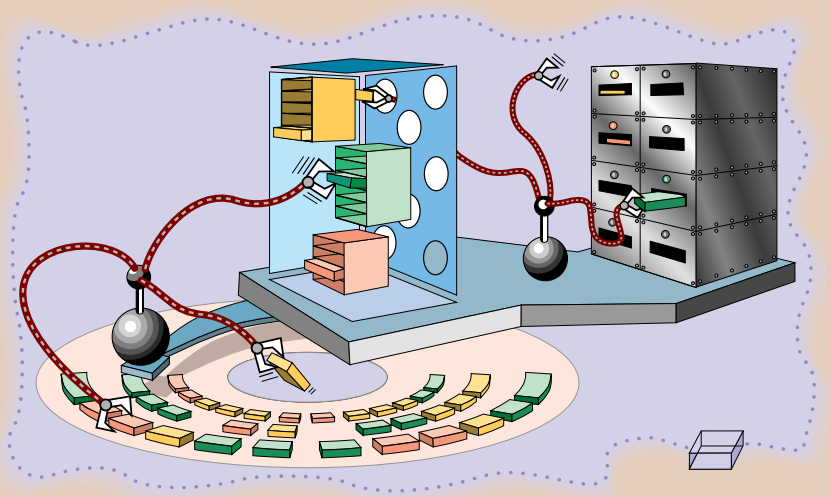
The Compatibility Box

Even though Copland is fundamentally different from the current Mac OS, current applications will run without modification in what Apple engineers call the *compatibility box*. One important benefit: If an application crashes, only the compatibility box will need to be rebooted — most core system functions, extensions, and server tasks should remain unaffected, resulting in a greatly reduced rebooting time.



The Microkernel

At Copland's core lies the *microkernel* — the behind-the-scenes arbitrator of the complex machinations that make Copland such a significant advance over System 7.5. The microkernel will be responsible for managing memory (including virtual memory), allocating CPU time to all software — applications running in the compatibility box, preemptively multitasked server tasks, and the OS itself — and several other low-level activities, such as interprocess communication. As its name suggests, the microkernel is only a tiny bit of Copland's code, but its performance and reliability will be critical to Copland's success — and considering the resources that Apple has dedicated to perfecting it, we consider the probability of that success to be good.



/ Rik Myslewski

PowerPC code will improve networking, I/O, and the file system.

Expect to do a lot less waiting. Copland's Finder, for example, will let you initiate multiple file copies, empty the Trash, and launch applications at the same time. You can expect the system to be more responsive to your mouse and keyboard actions, even when you have several things going on in the background at once.

Waiting for PrintMonitor to spool your documents to disk should also become a thing of the past. And you'll have plenty of hard-disk space to work with: The current limitation of 4 gigabytes per volume — unimaginably large for some but pitifully small for those whose daily fare is digital video or audio — will be bumped up to 256 terabytes. That's more than 256 thousand gigabytes — or 281,474,976,710,656 bytes — which should hold even the most ravenous consumers of storage space for a while.

Copland's improved VM (virtual memory) system will change the rules of RAM. Since System 7.1.2, when you turn on virtual memory, the *code-fragment manager* loads only those parts of software into RAM that are immediately needed — but because of the performance hit, most users leave VM off. In Copland, VM will always be on — and it'll be fast.

Today, the amount of RAM you have in your system limits how many applications you can load simultaneously. You're probably no stranger to the RAM-partition shuffle: shaving a couple of kilobytes off one application's memory partition to give it to another so that all your favorite applications fit into available memory. Under Copland, such budgeting should no longer be necessary. Even users with only 8 megabytes of RAM will be able to run the full Mac OS, including PowerTalk and QuickDraw GX, along with as many applications as they like. Of course, there is a catch: The more applications you launch, the slower your Mac will run. Add RAM, and

speed will increase. Apple promises that the speed hits will be negligible — we look forward to running some tests and telling you the results.

Some Things Old, Some Things New

So much for the basics. What about new goodies?

QuickDraw GX. You probably didn't bother to install it in System 7.5; you didn't need to, because few applications take advantage of its power. Under Copland, you won't get a choice: It'll be there whether you want it or not (QuickDraw 3D will also ship as part of the standard Copland release). Although applications that call older plain-vanilla QuickDraw routines will still work, non-GX printer drivers won't. Nor will non-GX Type 1 fonts. You'll have to make the switch.

If this scares you, you may get some comfort from knowing that Apple intends to make the transition to Copland graphics, type, and printing a much smoother one than the transition to 7.5 GX. For example, you may see a new GX-style LaserWriter printer driver in Copland. But unlike the LaserWriter GX driver in System 7.5, this one may use the information in the PPD files that graphics professionals use extensively today, as well as LaserWriter 8.x, to access the special features of different printers.

Because everyone who upgrades to Copland will have GX, vendors *may* start to support the Line Layout Manager, which provides some very spiffy typographic capabilities, including automatic kerning and on-the-fly ligature choices. Then again, software vendors may still opt *not* to implement the Line Layout Manager, because as we go to print, Apple is still refusing to make GX available for Windows. Many developers are unwilling to commit to massive rewrites of the Mac versions of their applications to support features they can't also put into their Windows versions. Get the hint, Apple?

Developers who are interested in the exploding international Mac market, however, would be crazy not to take advantage of Copland's international support. Copland will include fully native WorldScript and other performance enhancements that will be particularly valuable to users of languages such as Arabic and Hebrew, which read right to left, and Japanese and Chinese, which not only are often written vertically but also are composed of character sets infinitely richer — and more complicated — than our simple ABCs. In addition, the context-sensitive character-choice feature of the Line Layout Manager will be invaluable for users of languages such as Arabic, where a character's appearance can change depending on its position in a word.

Copland will also add full support for the international Unicode character standard and allow information necessary for sorting and grouping to be tagged to individual characters — a powerful advantage for languages such as Chinese, where simple alphabetization as we know it is impossible. The Mac OS's international advantage will take a quantum leap when Copland is released.

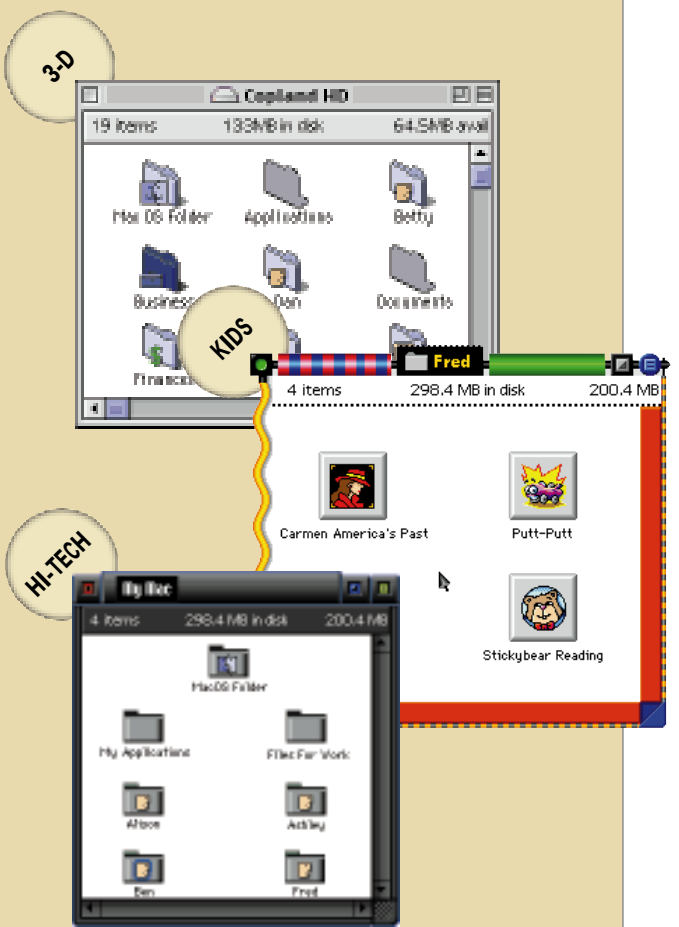
PowerTalk. Another 7.5 sleeper, PowerTalk will also be turned on by default in Copland. You will, however, be able to turn off some of PowerTalk's features, although Apple hasn't yet specified which. Apple plans to shore up PowerTalk's basic mail capability, adding customer-requested features such as return receipt, unsend, and folders in the mailbox. Look for gateways to eWorld, the Internet, and other popular mail and messaging systems to be built in.

OpenDoc. Scheduled for release by the end of 1995 as an option, OpenDoc component-software technology will be built in to Copland. Although only a handful of software vendors have yet committed to supporting OpenDoc, Apple is putting a lot of eggs in this basket. At press time, Apple wasn't talking, but the leading rumor about how OpenDoc will be used within Copland is that it will form the basis of a new network-resource browser that will replace much of the functionality of today's Chooser. Widespread use of OpenDoc components within the Mac OS, however, won't come until Gershwin, Copland's successor, arrives in 1997 — or later.

Open Transport. Power Mac users, rejoice: Apple will provide a native AppleTalk protocol stack, along with a new native protocol stack for TCP/IP. If you've ever set up an Internet connection, you'll be happy to hear that MacTCP — along with its convoluted user interface — will go away. Don't worry about current applications that require MacTCP, though — Apple claims that Open Transport will

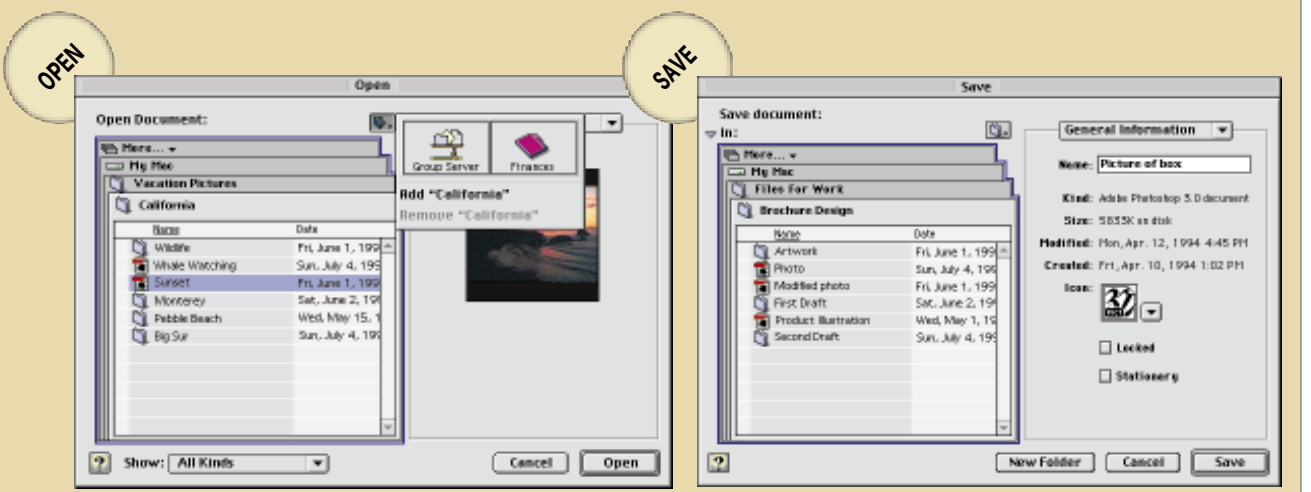
NEW STYLES / THE CHOICE IS YOURS

Unlike previous versions of the Mac OS, Copland will let users choose from a variety of desktop styles that affect the look and feel — and in some cases even the sound — of the Mac's user interface. Shown here at the top is a basic 3-D look. In the center is a style with kid appeal, featuring animated flip-down menus accompanied by amusing sounds. This style also shows Copland's "by button" view, which uses At Ease-style one-click buttons instead of the Mac's typical double-click icons to represent applications, files, and folders. At the bottom, the hi-tech look.



OPEN AND SAVE / IMPROVED NAVIGATION AND INFORMATION

Although much of the Mac's interface has been tweaked and improved over the years, its Open and Save dialog boxes have gone largely unchanged. Copland, at long last, will improve them. The new Mac OS will feature more-intuitive ways of navigating your disk's file hierarchy, including a pop-up menu that lists user-selected and recently used folders (see Open dialog box, left). The new dialog boxes will also display a wealth of information about your files (see Save dialog box, right).



be backward-compatible with them. IS managers will appreciate Open Transport's *multihoming* feature; with it, they'll be able to equip their servers with multiple networking cards for multiple connections, using multiple — or even the same — protocols. You won't have to wait till Copland debuts to get Open Transport. Start looking for this upgrade "real soon now" — although the multihoming feature won't be available until Copland ships.

QuickTime. Finally, look for better digital-video performance than what's available today: higher frame rates, higher resolution, better compression, and an expanded set of multimedia authoring tools.

The Desktop with a Thousand Faces

And what would a major new Mac OS release be without some entertaining interface tweaks? This time, though, Apple is going way beyond tweaks. In fact, with Copland, there will no longer be a Mac interface — there will be several. Perhaps dozens. Even hundreds.

The new Mac OS user interface — it's now officially called a "user experience," by the way — will be extensively customizable. Users will be able to select from several Apple-supplied styles (see the "New Styles" figure), and third-party developers will undoubtedly offer others. More important, Copland will *interview* you to learn your level of expertise — don't worry, you decide how smart you are, not Copland — and then adjust your "experience" accordingly.

Copland will store each user's settings in a personal folder. When you log on to the system, you indicate in a dialog box who you are, and your personal settings will restore your system to the state it was in when you logged out. In addition to reestablishing your style, the system will reopen any Finder windows you had open on the desktop and restore any aliases or other icons to the desktop as you left them. Sorry, Copland won't reopen applications or their documents, because logging out forces all applications to quit.

Copland will support more than one user per Mac (although only one at a time, of course). You might, for example, set yourself up as an advanced user on the Mac in your home office, selecting a standard 3-D style and arranging windows and desktop icons to reflect your business priorities. You'll give yourself full access to all of your control panels, set your monitor for the maximum bit depth, and turn on a slew of desktop utilities. For your five-year-old daughter, however, you might choose a kids' desktop style, with animated flip-down menus, easy-to-use single-click buttons representing files and folders, and extensive use of sound to accompany various mouse actions, but you'll restrict her access to control-panel settings and turn off scheduling extensions that might interrupt her enjoyment of Reader Rabbit.

In addition to a customizable interface, Apple will debut several new features that will make using the Mac more pleasant and productive. The boldest of these will be the introduction of *assistants* (see the "Easy Automation" figure), often referred to generically as *agents*. Copland's assistants will extend Apple Guide technology to help you automate common tasks. For example, you might set up an assistant that automatically backs up your hard disk each night. You'll do that through an interview that determines which disk, what types of files, and when you want to back up and how you want the system to notify you each time it completes the task. Using Copland's new Task Manager, you'll be able to review at any time the list of assistants you've created.

Another useful automation feature will be Copland's Find command. For starters, it will let you search not only for filenames, types, modification dates, and the like but for text strings contained within files as well. In addition, you will be able to save each Find request you generate as a "viewer" icon (the name is provisional). Any time a viewer icon's window is active, the system will continuously search for files that match your criteria. This may sound like a tremendously resource-intensive task, but remember that in Copland some system operations will be preemptively multitasked — the OS should be smart enough to do its updating intelligently in

the background, not stealing precious CPU power from your work. Viewers will thus enable you to maintain an up-to-date list of all files that, for example, reference the name of an important client, and will do so without slowing you down.

And, lest you worry that all these active viewers will clutter up your desktop, Copland provides a solution: Just drag them down to the bottom of the screen and they become *drawers*, represented by compact file-folder-tab icons. In fact, any Finder window on the desktop can be dragged to the bottom of the screen and turned into a drawer. Drawers are considered active windows by the system, so viewers consigned to the drawer domain keep working in the background. When you want to access the contents of a drawer, drag it back up from the bottom of the desktop, and it'll pop open for you.

Copland will also offer the "spring-loaded folder" feature found in such third-party packages as Now Utilities, but with a twist — literally. When, for example, you drag a file icon onto a folder icon and keep the mouse button depressed for a user-specified interval, the folder's window will spin open, replacing the previous window on the desktop. By keeping the mouse button depressed, you can drill down into the file hierarchy as far as you like. Once you've moved the file's icon away from the open window, the window closes and you see the folder icon as it originally was.

This feature will work quite well in tandem with another Copland innovation: an icon in the title bar of each open window that acts as a proxy for that window. This will work not only for folders in the Finder but for application documents as well. You'll be able to drag the icon to the Trash to delete an item, to a desktop folder to move or copy it, to a PowerTalk business card to mail it, or to a desktop printer icon to print or fax it.

We Have Seen the Future — And We Hope It Works

There will be more, no doubt. With over a year to go before Copland ships, you can be sure Apple will add a few more tidbits to this new Mac OS "experience" before unleashing it on the public. You'll forgive us if we hold off a bit on making our usual "is-it-for-you?" pronouncements. With not even an alpha release in sight, and no testing under our belts, it's a tad early to be offering upgrade strategies.

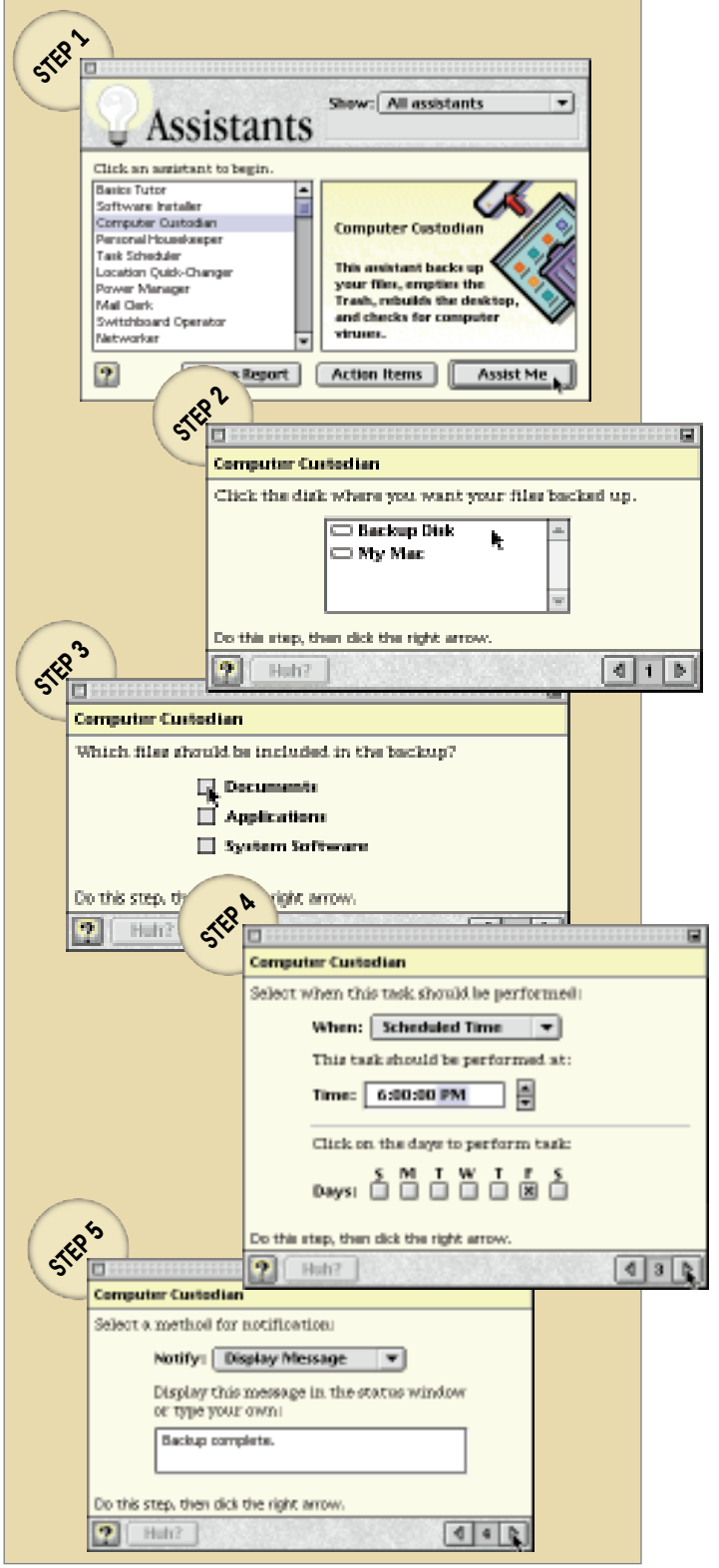
If Apple comes through with the improved performance and stability, the increased functionality, and the customization ability it is promising, Copland should be a hit — if it ships on time. Enough of a hit to maintain the Mac OS as an alternative to Windows? The technical edge is there. The user-experience edge is there. The ease-of-use edge is there. Let's see what the market decides.

There's one last thing you ought to know, though. When Copland first ships, it will ship for PowerPC-based Macs only. In fact, Apple has yet to decide whether it will ever release Copland for 68040-based machines. It might rework some of Copland's user-interface improvements for older Macs, but it would take significant engineering resources to make all of Copland's underlying system architecture work on 680x0 as well as PowerPC Macs. And Apple could well decide that those resources could be better spent getting Gershwin, Copland's successor, out the door sooner. To be frank, we wouldn't blame them.

Henry Bortman, *MacUser*'s technical director, doesn't like waiting for the future any more than you do.

EASY AUTOMATION / SETTING UP ASSISTANTS

Apple Guide will be expanded in Copland to support active *assistants* — sometimes referred to as *agents* — that automate repetitive tasks. You create an assistant by answering a series of questions. This example shows the process of setting up an assistant that automatically backs up your Mac's hard disk.



ON-LINE SERVICES

for BUSINESS *and* PLEASURE

Six on-line services promise fast, inexpensive access to a vast store of data. Do they deliver? BY DREW J. CRONK

WITH ALL THE PRATTLING about Internet access these days ("If you ain't got at least six lanes running through your hut, you're Nobody, man! Hear me? Nobody!"), you'd think the major on-line services would be getting a little nervous — if they're not already too busy picking out their roadside Historical Landmark plaques, that is. After all, what could America Online, CompuServe, Delphi, Apple's eWorld, GEnie, or Prodigy have to offer that a SLIP account and an Internet service provider can't?

For one thing, more organization. Even the most hard-core Net surfer will admit that the Net is a highly disjointed kinetic entity, often difficult to navigate and impossible to inventory. An on-line service, in contrast, is in the *business* of organization. It offers you a source of centralized, cataloged information and communications. And, as a member of an on-line service, you're entitled to certain benefits, such as tech support and help finding your way around.

Second, contrary to popular belief, not *everything* is available on the Net. Many database operators, personal- and business-service providers, and on-line publishers, for example, prefer to market their goods exclusively through a well-established on-line service. And finally, all the on-line services include some Internet functionality, whether it's simply e-mail or nearly complete access.

The fact that on-line services are experiencing phenomenal growth rates (America Online nearly tripled its membership between 1993 and 1994; CompuServe brings in over 120,000 new members per month) strongly suggests that many consumers prefer the features that an on-line service can provide. So is an on-line service for you? And if so, which one should you try first? Here's our in-depth report on each service's interface, content, and costs.

What You Need to Get Started

Other than your Mac and a phone line, there are only two items you need in order to get on-line: a modem and communications software. If you're only now purchasing a modem, you should choose one that's capable of transmitting at least 14,400 bits of data per second. Anything slower may end up costing you extra in metered access fees. You'll want faster modem speeds if you plan to download files frequently (see our specific recommendations in "Mach-Speed Modems," June '95, page 84).

The type of communications software you need depends on which service you join. America Online, CompuServe, eWorld, GEnie, and Prodigy each have proprietary applications you get for free when you sign up for the service. In most cases, you can buy a membership kit that includes both the software and a guidebook from a bookstore. CompuServe also offers CompuServe Navigator ($50), an optional application geared to more-experienced CompuServe members who know exactly which forums they want to visit. You can program CompuServe Navigator to automatically log on, retrieve specific items, and sign off. You can't, however, use it to

PHOTOGRAPHY / CHLOE ATKINS

browse through the service at your leisure.

To access Delphi, you need to use third-party communications software. If you want basic, inexpensive software, you should check out shareware products such as ZTerm ($30) and TeleFinder Pro ($25). You can usually get these shareware products from your local Mac user group. Alternatively, if you already own ClarisWorks or Microsoft Works, you can use the competent communications module in each of these programs. If, however, you want heavy-duty scripting features or telnet or terminal-emulation tools, then you should spring for a commercial, stand-alone application such as The FreeSoft Company's White Knight ($139), Software Venture's MicroPhone Pro ($150), or Aladdin's SITcomm ($60).

Comparing the Interface

With an on-line service, you're dealing with everything from huge, multitopic databases to live interactive communications — most of which originates on remote computers running non-Mac operating systems. An on-line service's interface should bring all that down to a level that lets you feel comfortable in a complex environment, navigate the service with relative ease, and quickly locate specific items and services. If an on-line service's interface fails to meet any of these criteria, you're not getting your money's worth.

The way on-line services present themselves varies greatly. For example, America Online, eWorld, and Prodigy place a completely graphical interface between you and everything, well, alien. These services offer environments full of color, icons, buttons, pull-down menus, formatted text, and even digitized photos and sounds. Delphi, on the other hand, presents you with a strictly text-based interface — you use commands, not mouse clicks, to get around. CompuServe and GEnie fit somewhere between these two extremes. These services are actually text-based; the Mac software you use to access them sits on top of the text layer and provides icons, buttons, and menus for accessing most functions. A few areas, however, are not supported by the graphical interface, so you end up in text mode once in a while.

Having a graphical interface, however, doesn't guarantee a Mac-like experience. America Online and eWorld were designed for the Mac from the start. Not surprisingly, using these services is like being granted access to a multimedia maven's well-stocked Mac.

Prodigy, on the other hand, is anything but Mac-like. The immense screen fonts make it impossible to view more than a few lines of text at a time, and the cartoonish Windows/Intel product ads (appearing on nearly every screen) practically scream, "What are *Mac users* doing here?" Provided you can overlook all that, you'll occasionally be rewarded with a dialog box containing neither a Cancel nor a next-action button. (Can you say, "Force Quit"?)

Delphi currently has no Mac front-end software, so its environment consists solely of the small text common to all terminal

emulators. When you sign on, you're greeted by a prompt asking you what action you'd like to take next. You must then respond with a command such as Shopping. This computer-issues-prompt/user-returns-command routine continues from sign-on to sign-off. If you learn Delphi's command structure (a 290-page manual costs $19.95; a more exhaustive 495-page one costs $27), you can work efficiently with the service's interface. Yet, no matter how familiar we became with the command structure, we still found it more tedious than clicking the mouse to open files.

Both the CompuServe Information Manager (CIM) and the GEnie FE application fluctuate between providing a completely graphical and a completely text-based interface, depending on what part of the service you're using. CIM uses a graphical interface more often than GEnie. You may not, in fact, even encounter CompuServe's text mode during the course of your daily on-line tasks. When you do, however, you'll find it both stable and easy to use, in most cases requiring only that you enter numerical choices (not commands) corresponding to the displayed options.

GEnie's text mode, on the other hand, is something you have to use nearly every time you sign on. We found it to be, in a word, indecisive. On more than one occasion, choosing a listed command resulted in GEnie's either totally ignoring the command, returning jumbled characters, or simply exiting text mode and dropping us back into graphical mode — in precisely the location we'd just left.

Navigation Tactics

When you first sign on to America Online, CompuServe, eWorld, GEnie, or Prodigy, you see a screen containing icons or buttons that represent general-interest areas (such as computing, reference, or travel). Clicking on one of the buttons or icons takes you to a second screen that shows what's available within that particular area (for example, an encyclopedia, an airline reservation service, or a Macintosh forum). On Delphi, rather than seeing icons or buttons, you just receive a prompt for you to enter the name of your destination area. Pressing the Return key takes you there.

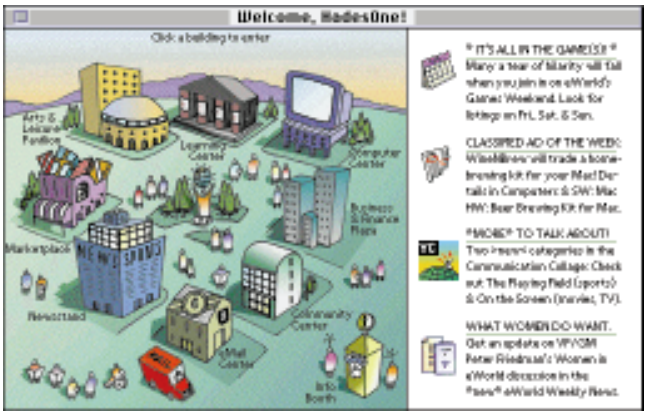
This scheme works fine if you're browsing around the on-line service to see what's available. The more you use the service, however, the more you'll want to go directly to specific areas. It's then that an on-line service's keyword functions become indispensable.

Keywords are short text strings attached to a particular area. For example, the keyword for getting to stock quotes might be *stock*. When you enter these keywords (usually into a dialog box you bring up from a menu), the on-line service transfers you directly to that area, bypassing everything that lies between where you are and where you want to be. On all the services except Delphi, you can save your most frequently used keywords for future use. Delphi provides no means for saving its keywords (other than printing out a list of them). Some services also provide "Go" words for various areas on a service. Unlike keywords, Go words are predefined, and you must enter them exactly or you won't move from your current area.

To find the appropriate keyword on America Online, CompuServe, GEnie, or Prodigy, all you need to do is open a dialog box and enter a keyword. The service searches for all close matches and lets you pick the correct one. eWorld and Delphi provide only a list of keywords through which you can scroll. Although keywords offer time-saving shortcuts to specific areas, they can't find specific pieces of information. To find specific items, you need to use special search tactics.

Search Tactics

On-line services contain a vast amount of information — far, far too much to rely on navigation tactics alone for locating specific information. Each service, therefore, includes search utilities. And, like an on-line service's navigation methods, the variety and accessibility of the service's search utilities add to or subtract from the overall value of the service. The largest databases in the world, after



That home-town feeling. eWorld, Apple's on-line service, is a comfortable place to be. This Mac-centric service offers high-quality content and provides an official route to Apple's technical notes and system software, but it lacks the depth of some of the older services.

THE BOTTOM LINE

DECISIONS, DECISIONS, DECISIONS. Fact is, you may find that one on-line service isn't enough. Fortunately, for a combined monthly fee that's less than what most cable-TV services charge, you can have two. Here are our recommendations.

+ / OUTSTANDING ● / ACCEPTABLE − / POOR

RATING	PRODUCT	PRICE	SUPPORT	INTERFACE	CONTENT
4½	America Online	+	●	+	+
4	CompuServe	●	●	+	+
4	eWorld	+	●	+	●
3	GEnie	−	●	●	●
2½	Delphi	−	●	−	●
2	Prodigy	●	●	−	−

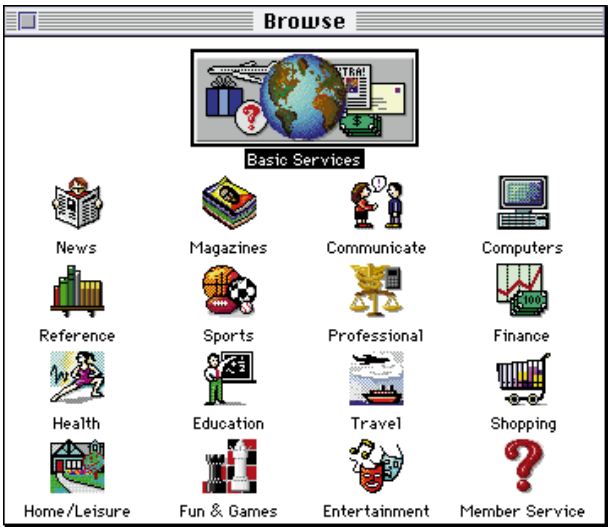
BEST BUY

America Online For after-hours fun, we recommend America Online. This lively service is frequented by folks of all kinds; the content is equally diverse. Connect charges are low, the interface is extremely easy to use, and the Internet access is above average. Expect busy signals, however.

BEST BUY

CompuServe For getting work done, we recommend CompuServe. This mature service has a wealth of forums, databases, and reference materials. Recent price reductions and newly added Internet access make CompuServe a solid value. You also get two pricing plans from which to choose.

LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.



Function, not flash. CompuServe's interface isn't as snazzy as that of some of its competitors, but it's always straightforward and stable. Beneath the icons, you'll find a vast storeroom of information.

An alien world. Delphi's text-based interface will seem archaic to many Mac users. Even the opening screen (above) is less than inviting. In order to get around efficiently, you need to learn a slew of commands.

all, are useless unless specific items within them can be located — and extracted — easily, logically, and quickly.

Both America Online and CompuServe have *global-search* utilities that let you search for Macintosh shareware in several Mac-related forums. CompuServe also includes a similar utility for finding graphics files in these forums. This ability to sign on, type a filename into a dialog box, and quickly retrieve the item is hard to do without.

Unfortunately, global searches are good only for finding shareware and graphics files. To find most other items, you need to perform *local* searches. In other words, you need to navigate to a particular area — such as a discussion board, software library, or news database — and, once there, enter a text string, which the service uses to locate information.

The accuracy and usability of an on-line service's local-search utilities is critical when it comes to saving time. For example, CompuServe and Delphi are the only two services that allow you to search messages posted on a discussion board, using a text string as a parameter. This can be particularly helpful if you're trying to find out, say, if someone else out there is having trouble with the same misbehaving peripheral. All the other services allow you to search messages only by using various combinations of predefined parameters such as the date the message was posted, the author's name, and the message's number.

America Online, CompuServe, Delphi, eWorld, and GEnie include utilities for searching most of the software libraries in their forums. America Online, CompuServe, and eWorld's search utilities are quite easy to use, although America Online and eWorld do not include them in every library. GEnie's search utilities don't actually search — instead they remove all nonmatching files from sight, forcing you to manually sort through what's left in hopes of finding the item you're after. Delphi's libraries include precise search functions, but you've got to have a working knowledge of Delphi's command structure in order to operate them.

Searches of literature databases such as Books in Print work much like searches of software libraries. (CompuServe and GEnie, however, dump you into text mode when you're searching some of their more specialized databases.) Searches of news databases vary more widely. eWorld and GEnie, for example, let you browse through various wire services. America Online and CompuServe let you pinpoint specific data — you can type in a search string, which the service uses to find matches.

America Online, eWorld, and GEnie let you mark files as you browse around and then download them all at once sometime in the future, be that at the end of your session or next month. CompuServe provides a similar feature, but the files must be downloaded before you leave their forum. Delphi allows you to download multiple files at once, but you need to write down their exact names as you go along. Then, before your session is over, you type in various commands along with your list.

Business Content

As on-line services have grown in popularity, the amount of content each contains has exploded. They all offer similar kinds of information — for example, all offer business information, reference materials, and areas devoted purely to fun. But, as you might expect, the quality, accuracy, and quantity of each type of information vary from service to service.

It used to be that if you wanted information critical to your business — say, stock quotes, financial news, or business profiles — you had to pay hefty premiums. Now, however, most of the services include access to at least some of this information in their hourly connect charges. (You have to pay a surcharge to access some specialized databases, such as those for health or legal professionals.) Several of the services even let you download stock quotes for free; others charge only a few cents per quote.

For business use — whether personal or corporate — your best bets are CompuServe and GEnie. Although all the services except Delphi offer Hoover's Company Profiles, CompuServe is the best place to go for detailed business profiles and SEC disclosures. GEnie too provides many specialized sources of information, including Dun & Bradstreet, TRW, and Dow-Jones.

When it comes to reference materials, all the on-line services offer a variety of encyclopedias (Grolier's is the most common) and

magazines. CompuServe offers an abundance of reference databases for both personal and business use. You can find everything from specialty publications such as Peterson's College Database to general-interest publications such as Consumer Reports. In most cases, you can download abstracts as well as the full text of articles. The worst performer, Delphi, relies mostly on the Internet for access to reference materials.

If you're more interested in late-breaking news, you can access articles from various newspapers and wire services such as the Associated Press. Prodigy is the worst service in this regard — many of its news stories are edited, leaving you with less-filling information. All the services let you browse through the news; America Online even offers a pull-down menu item that lets you search only that day's news. If you're willing to pay a premium, most of the services will provide a clipping service for you — the service searches out the information you want and places it in your mailbox each day. CompuServe and eWorld provide excellent clipping services.

You can also get up-to-the-minute weather reports from the on-line services. Again, Prodigy falls short — its weather map consists solely of a static eight-color image. In contrast, CompuServe's weather center includes radar and satellite maps that are updated hourly, short-term and extended forecasts, and marine forecasts, as well as detailed aviation reports and daily climatological reports from the National Weather Service.

Seeing as *MacUser* is a magazine devoted to, well, Mac users, we'd be remiss if we didn't tell you where to go for information on Mac software and hardware. Only CompuServe and eWorld have official Apple support forums where you can find Apple technical notes, bug reports, product lists, and company announcements as well as Apple software. (Apple, however, usually distributes major system updates to other on-line services as well.) Only eWorld offers an area where you can post questions about any Apple product and get a response from an Apple technician within 24 hours. CompuServe and America Online offer the largest number of Mac-vendor forums where you can go for technical support and software updates.

A fun place to be. America Online offers a big entertainment bang for only a few of your bucks. Content is designed to pique just about anyone's interest, and the interface is second only to eWorld's in ease of use and elegance.

Prodigy once again snubs Mac devotees — it does not offer any Mac-specific forums.

For shareware, America Online, CompuServe, and eWorld have large libraries stocked with top-notch shareware. You can find these libraries in the Macintosh forums. In addition, CompuServe and eWorld offer ZiffNet/Mac, which sports a comprehensive library of the most-popular shareware programs (eWorld has about 6,000 files; CompuServe has about half that). ZiffNet/Mac also provides a new, custom-designed utility every month. CompuServe members pay an extra $3.50 per month for access to ZiffNet/Mac, but they can download the custom utilities for free. eWorld members do not have to pay extra to access ZiffNet/Mac, but they do pay connect-time charges to download custom utilities. (ZiffNet/Mac is owned by Ziff-Davis Publishing Company, the parent company of *MacUser*.) Delphi's and GEnie's resident Mac shareware libraries are relatively scant, and the only way to access Mac-specific software libraries on

THE GREAT SOFTWARE SEARCH

TO GIVE YOU A SNAPSHOT of how each on-line service operates, we recorded our attempts to locate and retrieve two files: the U.S.

AMERICA ONLINE

Finding our files on America Online was nearly effortless. We used the service's global-search utility; entered the text **`Declaration of Independence`**; and ended up with a list of several files, including the Declaration of Independence in .sit format. Three clicks later, we had marked the file for retrieval. We repeated the procedure to find DropStuff with Expander Enhancer. This time, entering simply **`DropStuff`** brought up a successful hit. We then accessed America Online's Download Manager and had it download both files.

COMPUSERVE

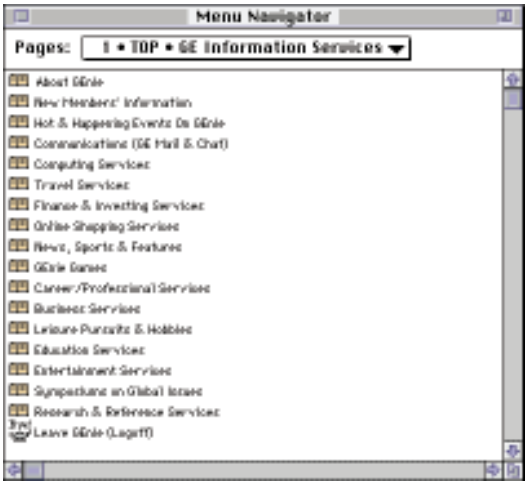
We used two equally easy file-finding methods in CompuServe. First, we clicked on the opening screen's Reference icon to reach the Grolier Encyclopedia. We entered our search string (**`Declaration of Independence`**) and found the file on the first try. We saved it and moved on.

To find DropStuff, we used CompuServe's global-search utility, entering **`DropStuff`** and **`Aladdin`** as our keywords. Again, we got an immediate hit. CompuServe gave us a description of the file, and we clicked on the Retrieve button and downloaded the file.

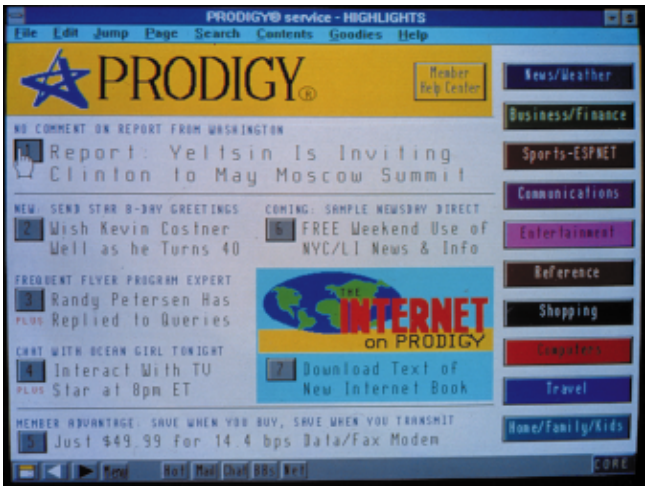
DELPHI

We first had to open our communication software's capture log and sign on. In our Declaration of Independence search, we found the Grolier Encyclopedia in the Reference section, entered our search string, took our choice of three hits, and told Delphi to keep the text coming (**`/LENGTH=0`**).

In looking for DropStuff, we searched a compression-utilities database, but to no avail. So we cheated: We typed the DIR command to see a list of the database's contents, manually located DropStuff, copied its filename (DROPSTUFF W/ EXP. ENHANCER 3.5.2.), issued the DOWN (download) command, and pasted in the filename. Two clicks and a command later, the file was on its way.



The good and the bad. GEnie's interface bounces between being barely graphical (as in this opening screen) and being completely text-based. We did, however, find a solid base of business content on the service.



The Mac gets snubbed. Prodigy is the least Mac-friendly service — it doesn't include any Mac-specific forums, the graphical interface ignores all Mac conventions, and most of the on-line help is geared to DOS users.

Prodigy is through a gateway to ZiffNet (for which you will incur a hefty surcharge of $7.95 per month plus a fee for downloading software).

Just for Fun

OK, but enough of the work ethic. What if you just wanna have fun? You can compete with other users in interactive, arcade-style games. You can make travel plans, booking airline, train, cruise-ship, hotel, and rental-car reservations through major worldwide systems such as Eaasy Sabre. You can browse through forums devoted to almost any topic you can imagine, leaving messages or questions as well as reading items left by other users. (CompuServe has nearly 900 predefined forums; Delphi not only has predefined forums but encourages you to create your own as well.)

There are even places on on-line services for two all-time popular activities: shopping and talking (but you can't do both in the same place). Shopping takes two forms: malls with storefronts and huge databases of products. Malls are fun for browsing, but we found the product databases to be incredibly handy when you need to do some serious buying. One of the largest product databases, Shoppers Advantage, stocks over 250,000 products, any of which you can order directly from your Mac. You can search the database by category, such as Computers, or type in the name of the product, and Shopper's Advantage will tell you who has the best price (we found some great deals on Macs). You'll get the same service and support by ordering on-line as you would if you walked into a retail store.

The glitzy fad these days, however, is hanging out in chat rooms. You can chat with anyone who enters the room, or you can attend scheduled symposiums that feature a guest of honor such as a politician or celebrity to whom you pose questions or direct comments. America Online's chat rooms are the most active, but that's not always good: Public chat rooms are open to all, even those who lack

Declaration of Independence and Aladdin Systems' DropStuff with Expander Enhancer shareware utility. The icon to the left of the service's name indicates how happy — or not — we were with both the process and the results.

eWORLD

From eWorld's opening screen, we quickly clicked our way to the Grolier Encyclopedia in the Reference section. We entered our Declaration of Independence search string, and eWorld gave us 105 hits. We then added the string **`document`** to narrow the list to 13. Finally, we found our file and saved it.

Since eWorld is a Mac-centric service, we bet that Aladdin would maintain a forum here. So we chose eWorld's Go to Keyword menu to open a dialog box and entered **`Aladdin`**. Bingo! eWorld instantly transferred us to the forum, and we clicked on Aladdin's Software icon, found the file, and added it to our download list.

GEnie

We started out well, quickly locating the Declaration of Independence in the Grolier Encyclopedia. GEnie, however, dropped us into text mode when we accessed the encyclopedia. To retrieve the file, we had to copy the text from the screen and paste it into a word-processing file.

To find DropStuff, we entered **`Aladdin`** in GEnie's Move dialog box. Alas, we moved to a front-end application for PCs, called Aladdin. Back at GEnie's Top page, we chose Computing Services. Three clicks later, we were at Mac Vendor Software Libraries, and there lay the Aladdin folder. We clicked on the folder and . . . found ourselves in GEnie's mail room. We retraced our steps, and this time it worked.

PRODIGY

We quickly went to the Reference section and found the Declaration of Independence in the Grolier Encyclopedia. But we faced a dilemma: The text wasn't selectable. Worse yet, the Save menu item was disabled. We eventually went to Prodigy's Copy menu item and, lo and behold, the resulting dialog box contained a Save As button.

Since you can access Mac files on Prodigy only through a gateway to ZiffNet, and since access to the gateway costs $7.95 a month, we opted to write a check to eWorld for its $8.95 monthly membership fee.

good manners. Also, if you're not a fast typist, you may find yourself falling behind in the conversation. Prodigy's chat rooms are also busy, whereas chat rooms on CompuServe, eWorld, and GEnie are relatively quiet — 30 to 50 people, compared to America Online's 300 to 500. Delphi's chat rooms are too hard to maneuver through: You need to learn roughly ten commands just to carry on a conversation. Finally, a word to the wise about *all* chat rooms: Choose your screen name carefully. "Aphrodital" received a total of five marriage proposals in one night; "HadesOne" was largely ignored.

Another way of chatting, albeit with a delayed response, is to send e-mail or files to others who subscribe to the service or to people on other services, including the Internet. All the on-line services provide a communications center that you use to manage your electronic correspondence. Usually this center is set up like a small

THE COST OF GOING ON-LINE / *pricing information*

RECENT — AND DRASTIC — price decreases have made most on-line services as affordable as a subscription to cable TV. Still, you'll want to compare prices before you settle on a primary service. You can use our "Comparing Costs" chart to figure out approximately how much your monthly bill will be for each of these services.

First, write down in a column the features you plan to use each month. In a second column, write down the number of hours you think you'll spend using each feature. Then, in a third column, enter the applicable fees. In our chart, an **H** means you'll be charged the hourly fee for your connect time; **free** means you won't be billed for any connect-time charges; **none** means the feature is not available on the service. Multiply the hours by the fees, and/or add in any applicable surcharges. Remember that most on-line-service pricing plans include several hours of access in their monthly fees. Don't forget to eliminate those hours from your calculations. Likewise, don't forget to add in the monthly charge.

A word of warning: If the on-line service does not provide a local access number, you'll either have to use SprintNet or Tymnet for access (thereby incurring hefty surcharges) or you'll have to pay long-distance charges for your connect time. Either way, your total on-line bill is going to skyrocket. Delphi is the worst culprit here, since the service does not offer any local

COMPARING COSTS / *prices are dropping*

	America Online	CompuServe Standard Plan	CompuServe Alternative Pricing Plan	Delphi 10/4 Plan	Delphi 20/20 Plan
Membership fees and information					
Sign-up fee	none	none	none	none	$19
Monthly membership fee	$9.95	$9.95	$2.50	$10	$20
Number of free hours per month	5	none	none	4	20
Standard hourly fee	$2.95	$4.80 or $.08/min.	$12.80 (2,400 bps); $22.80 (14,400 bps)	$4	$1.80
Other surcharges	none	$11.70/hr. prime time; $1.70/hr. nonprime time for SprintNet or Tymnet	$11.70/hr. prime time; $1.70/hr. nonprime time for SprintNet or Tymnet	$9/hr. prime time for SprintNet or Tymnet†	$9/hr. prime time for SprintNet or Tymnet†
General services					
Topic forums	H§	H	H	H	H
Mac-related forums	H	H	H	H	H
Mac-shareware libraries	H	H	H	H	H
Stock quotes	H	H◊	H	H◊	H◊
Portfolio tracking	H	free	H	H	H
Business profiles	H	H	H	H	H
Business/industry publications	H	H	H	H	H
News and weather	H	free	H	H	H
Custom news-clipping service	$4.95/mo. for 5 profiles	$15/hr. surcharge	$15/hr. surcharge	none	none
Encyclopedias	H	free	H	H	H
General-interest publications	H	H	H	H	H
Literature databases	H	H	H	none	none
Educational-institution information	H	free	H	H	H
Chat rooms	H	H	H	H	H
Discussion boards	H	H	H	H	H
Games	H	H	H	H	H
Shopping	H	free	H	H	H
Travel	H	free	H	H	H
Servicewide e-mail	H	free††	H	H	H
Fax service	$2/addressee	***	***	§§	§§
U.S. Postal Service letter sending	$2.50/addressee	free	◊◊	none	none
Internet-access services					
E-mail	H	$.15 per piece received	$.15 per piece received	H	H
Anonymous ftp	H	H	H	H	H
Usenet newsgroups	H	H	H	H	H
Gopher search capability	H	none	none	H	H
WAIS capability	H	none	none	H	H
Archie search capability	none	none	none	H	H
Company	**America Online** Vienna, VA 800-827-6364 703-448-8700 703-883-1509 (fax)	**CompuServe Information Services** Columbus, OH 800-848-8990 614-457-8600 614-529-1610 (fax)	**CompuServe Information Services** Columbus, OH 800-848-8990 614-457-8600 614-529-1610 (fax)	**Delphi Internet Services** Cambridge, MA 800-695-4005 617-491-3393 617-491-6642 (fax)	**Delphi Internet Services** Cambridge, MA 800-695-4005 617-491-3393 617-491-6642 (fax)

*Currently, a special offer lets you get 10 free hours.

**Alternatively, you can pay $29.95/mo. plus a per-article charge.

***$.75 for the first 1,000 characters; $.25 for each additional 1,000 characters.

†If you don't use SprintNet or Tymnet, you'll incur long-distance charges; Delphi has no local access numbers.

††Up to 90 three-page messages.

§§$1.25 for the first page; $.50 for each extra half page.

office, complete with an electronic address book, a simple word processor, and a place to record your incoming and outgoing messages. Some services also offer the electronic equivalent of Mailboxes Etc., complete with Internet e-mail capability, fax sending, and even generation of hard copy and mailing through the U.S. Postal Service. Generally, you pay an extra fee for these services.

Finally, for the ultimate in information access, look for a service that provides full-featured Internet communication services — and that puts a completely graphical interface on the Internet. All the on-line services let you send and receive Internet e-mail. Others, such as America Online, also have an area where you can search for and subscribe to Internet mailing lists. Once you've signed up, messages are automatically delivered to your on-line mailbox.

Many services also allow you to access Usenet newsgroups. These newsgroups operate much the same as mailing lists, except messages are routed to a special area in the service rather than to your mailbox. Some services provide even more Internet features, such as Anonymous ftp (which lets you search and download files from remote databases without supplying a password) and access to utilities such as Archie, Gopher, and WAIS for locating information, documents, and files that reside on Internet databases. Currently, only CompuServe and Delphi have outbound telnet, which allows you to interact directly with (and even issue commands to) host computers on the Internet. Fortunately, each on-line service is rapidly expanding the type of Internet access it offers. We found America Online's interface into the Internet to be better than that of any other service.

America Online Price Breakdown

Chat rooms	2 hours	x	$2.95	$5.90
Shareware libraries	1 hour	x	$2.95	$2.95
Servicewide e-mail	2.5 hours	x	$2.95	$7.40
File downloads	1 hour	x	$2.95	$2.95
Topic forums	3 hours	x	$2.95	$8.85
Custom news-clipping service				$4.95
Subtotal				$33.00
Minus free hours	5 hours	x	$2.95	-$14.75
Subtotal				$18.25
Monthly charge				$9.95
GRAND TOTAL				**$28.20**

Here's a simple example of how to use the pricing information shown below to estimate what you will pay in access fees each month for a specific on-line service.

access numbers outside the 617 area code. GEnie also trips you up on surcharges: $2 extra per hour for prime-time usage and $2 to $6 per hour extra for 9,600-bps or faster access.

	eWorld	GEnie	Prodigy
	none	none	none
	$8.95	$8.95	$9.95
	4*	4	5
	$2.95	$3	$2.95
	none	$2/hr. prime time; $2/hr. SprintNet (9,600 bps); $6/hr. GEnie (9,600 bps)	none
	H	H	H
	H	H	none
	H	H	$7.95/mo.
	H	H	H
	H	H	H
	H	H	$14.95/mo.
	H	H	H
	H	H	H
	$29/mo.	$25/mo. for 10 profiles	$695/yr.**
	H	H	H
	H	H	H
	none	H	none
	H	H	none
	H	H	H
	none	H	H
	H	H	H
	H	H	free
	H	H	H
	H	H	H
	none	$.85/page	H
	none	none	$2.50/letter
	H	H	H
	H	H	H
	H	H	H
	none	H	H
	none	H	H
	none	H	H
	Apple Computer Cupertino, CA 800-775-4556 408-996-1010	**GEnie Services** Rockville, MD 800-638-9636 301-251-6475 301-340-4433 (fax)	**Prodigy Services Co.** White Plains, NY 800-776-3449

§Hourly fee for connect time. ◊Downloads cost a few cents per quote.
◊◊$1.50 for the first page; $.20 for each additional page.

What to Join

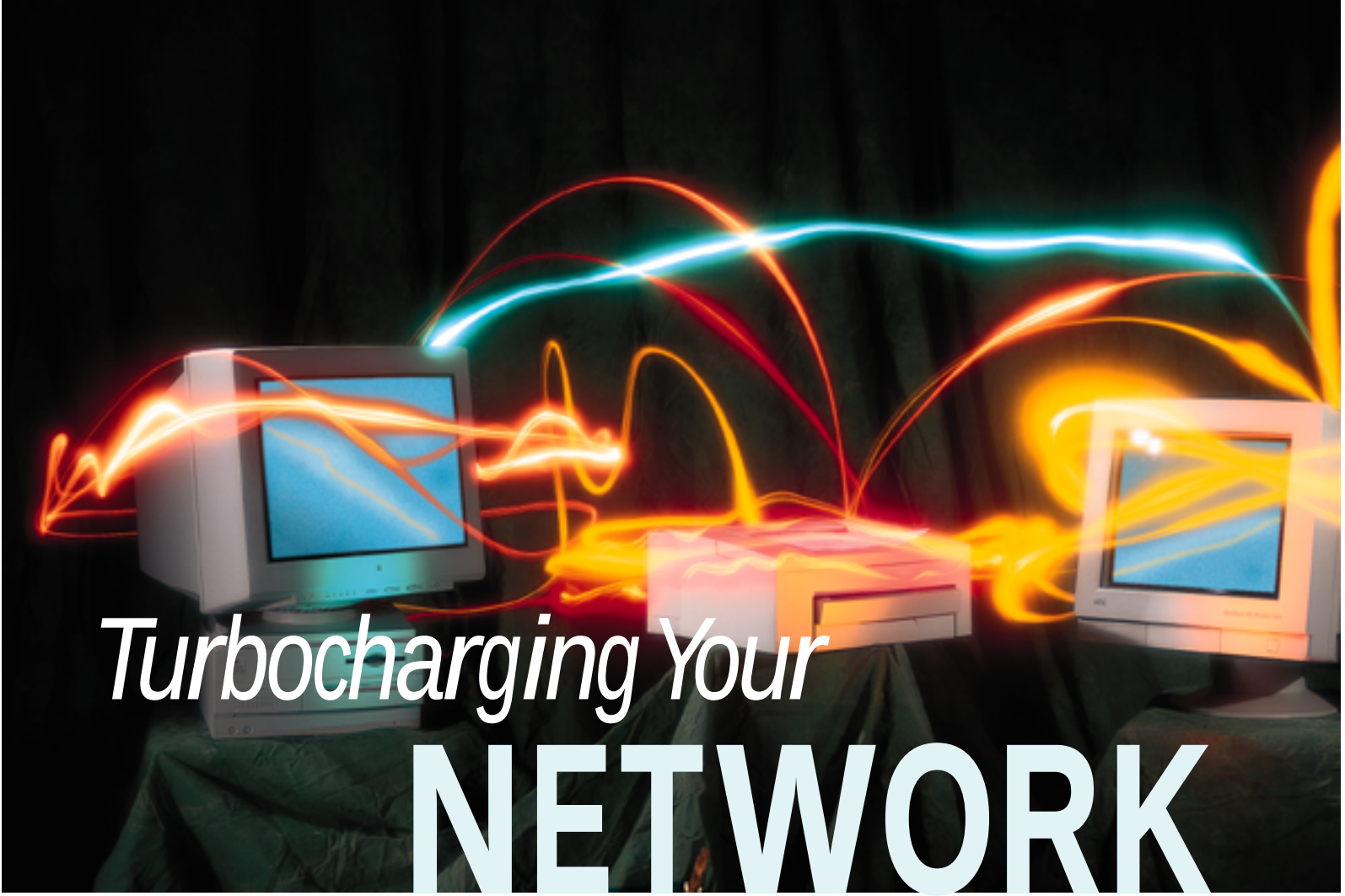
When it comes to picking our favorite on-line service, we're hard-pressed to choose between America Online and CompuServe. For pure wealth of information and connection reliability, we prefer CompuServe. But America Online has become quite popular lately, for several good reasons: The price is low, the interface is extremely easy to use, the content is expanding daily, and the Internet access is the best of all the services'. Be aware, however, that until America Online upgrades its system, you may experience annoying busy signals, file-transfer delays, and possibly even halts in all action.

Our two runners-up, eWorld and GEnie, are good secondary choices. eWorld, Apple's own clubhouse, offers members a rock-solid, pure Mac interface. It's also a quick and easy source for Apple support, technical documentation, and timely system-software updates. Unfortunately, eWorld's content, although well balanced, remains relatively slim. If you plan to do a lot of on-line research, especially for business or personal investing, GEnie is a good backup source to CompuServe. Its interface, however, is often unpredictable (although GEnie plans to update it soon).

We'd stay away from Delphi and Prodigy. Although Delphi plans to do a complete interface and content overhaul in the future, its current text-based interface is cumbersome and will feel especially alien to most Mac users. For a while, Delphi was the only major on-line service to offer full Internet access, but now that other on-line services have caught up, Delphi's strong point has become only a historical footnote. Prodigy too has a long way to go before it becomes appealing to Mac users. Its poorly implemented graphical interface alone is enough to turn away most; the fact that there's little viable content hiding beneath it is enough to cause the rest to say, "See ya."

Drew J. Cronk is a freelance author. He currently has six phone lines running into his office. Someday he'll buy a phone, and then there will be seven.

You can find the shareware referenced in this article in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See How to Reach Us for instructions on accessing ZiffNet/Mac.



Turbocharging Your NETWORK

Your network's speed is not what it used to be. The production manager is complaining that it takes too darn long for files to make their way from the server to the color-retouching workstation to the printer. The chief financial officer is wondering why the company's state-of-the-art client/server order-entry system isn't keeping pace with customers' phone calls.

And you're wondering, Now what? Over the years, you've done all the right things to keep your network running at top speed. You've upgraded from LocalTalk to Ethernet, replaced the SE/30 with an Apple Workgroup Server, installed a ridiculous amount of RAM in the server, and added a RAID tower for the fastest data access possible. Most of the Macs on the network have also been given a shot in the arm — more RAM, fast hard drives, and high-performance Ethernet cards.

This time, however, the bottleneck isn't at the server or the workstations; instead, there's simply too much traffic for your network configuration to handle. You've got a network-utilization problem.

It's time to do something. The question is, What? There's an alphabet soup of potential solutions to your network's bandwidth problems, from ATM, to FDDI, to Fast Ethernet, to 100VG AnyLAN, to switching hubs, to file-transfer utilities. But some of these technologies are too pricey, complex, or exotic or aren't readily available. You need solutions that won't break the bank and that are here today. (For more information on emerging technologies such as Fast Ethernet, see Net Tools, page 100 of this issue.)

MacUser Labs tested a variety of solutions designed to improve network speed. To keep our results grounded in the practical rather than the theoretical, we modeled our tests on the two most common Mac network environments: the hectic desktop-publishing shop and the office workgroup. Because the network-traffic patterns in these two environments are very different, a different set of potential solutions emerged for each. Here's what we found out about how each solution performs and how much it will cost you to purchase, install, and support it.

The Desktop-Publishing Shop

In a thriving publishing studio or service bureau, production is the name of the game. The scanner operator scans a full-color photograph, for example, and stores it on the file server. The photo retoucher then copies the scan to his Power Mac for color correction. Later still, the designer places the image into a QuarkXPress document. Finally, after printing a proof on a DuPont 4Cast and tweaking the color one last time, a staff member outputs the entire file to the imagesetter as film color separations.

To the network administrator, however, the process looks like a massive file bogging down the network periodically throughout the day. Whenever the file is moved across the network, the administrator sees utilization spikes, each of which causes increased packet collisions. With each collision, AppleTalk must retransmit data, and as more data is retransmitted, network utilization goes up even more, creating a vicious cycle.

For this type of traffic pattern — the intermittent transmission

You've added a powerful server and upgraded your Macs, but users are still complaining about network speed.

What do you do now?

BY JOE SCIALLO AND KELLI WISETH

of files larger than 20 MB — you can attempt to speed up throughput in one of three key ways: Increase the number of packets that AppleTalk can send over Ethernet in a given amount of time, by using a file-transfer utility; install a network topology that's faster than Ethernet; or forget about network-transport methods altogether and move the files over the SCSI bus (see figure 1).

OPTION 1: **Use a File-Transfer Utility.** Numerous file-transfer utilities are available, such as IPT's TurboTalk and Symantec's CopyDoubler, that promise to increase network speed. For our tests, we picked the product that set the pace in this arena when it was introduced over a year ago — RunShare, from RUN (800-478-6929 or 408-353-8423). RunShare works seamlessly in conjunction with the Finder; you don't have to launch a special application when transferring files — just start a Finder copy, and RunShare takes over.

RunShare improves overall network speed by squeezing more packets than normal onto Ethernet. It continuously monitors the network for free time, and when it finds it, it inserts additional packets onto the wire. Both the sending and the receiving Mac must have the RunShare software installed for this scheme to work, and if one Mac is involved in transfers with more than one other Mac, only two Macs at a time can enjoy the speed boost. (RUN recently released RunShare GSA, which comprises an Ethernet adapter with RunShare built in. RunShare GSA lets up to six RunShare clients transfer data simultaneously.)

Because RunShare works by monitoring the network for free time and sending data at those times, it works best on a network that has limited file transfers: The more simultaneous RunShare-initiated network transfers there are, the higher the network utilization and the less free time there will be on the network, thus lowering each session's overall speed gain. In our tests, RunShare reduced the time it took to transfer files over a passive-hub-based Ethernet network by anywhere from 44 to 55 percent. For example, copying a 30-MB file to an Apple Workgroup Server 80 from a Power Mac 8100/80 over Ethernet without RunShare took slightly under 2 minutes; RunShare more than halved the time, to 51 seconds (see figure 2).

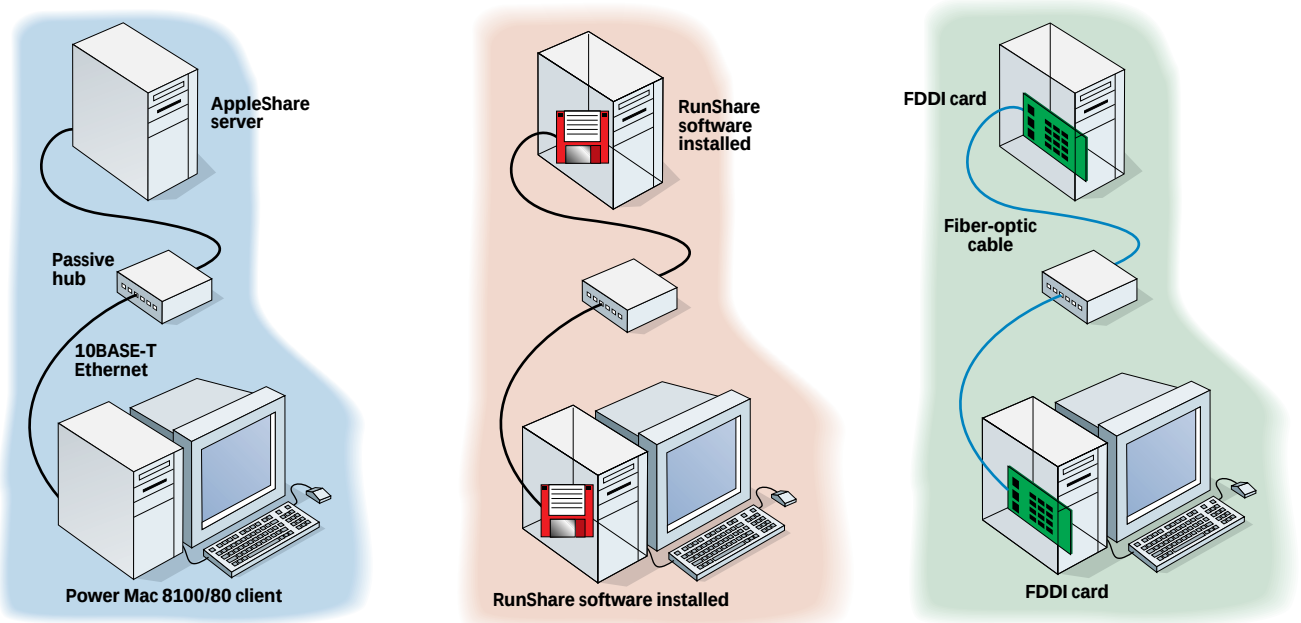
Although RunShare wasn't the fastest solution in any single test, it was able to speed network traffic along well and at a reasonable cost. A 25-user package for networks that run on LocalTalk, EtherTalk, TokenTalk, or FDDITalk costs $2,499 (about $100 per user). One warning: Be sure to hang on to your RunShare installation disks. There's a set number of licenses per disk (for 2, 5, and 25 users), and the installer keeps track of the number of licenses you've used. To transfer a license from one Mac to another without losing it, you must deinstall the software, using the original disks, to reclaim the used license.

OPTION 2: **Use a Faster Network Standard.** Whenever we see high-end specifications, we expect the most from a product. Thus, we had high hopes for the speed improvements FDDI (Fiber Distributed Data Interface) could give our test publishing network. The FDDI standard specifies a token-passing, ring topology at 100 Mbps (megabits per second) that uses fiber-optic cabling. That's pretty

PHOTOGRAPHY / LEON

figure 1

The Desktop-Publishing Shop / *network-configuration details*



BASELINE CONFIGURATION:
A small number of connected powerful Macs, each of which transfers large files sporadically — that's the kind of network typically found in desktop-publishing shops. And that's how we set up our baseline test network.

OPTION 1:
Use a File-Transfer Utility.
For this solution, we simply installed RUN's RunShare software on the server and on the client. Otherwise, our baseline configuration remained unchanged.

OPTION 2:
Use a Faster Network Standard.
This high-priced solution requires the installation of an FDDI card in the server and in each client machine. The hub and the cables also need to support FDDI.

powerful stuff compared to Ethernet's 10-Mbps, shared-media (CSMA/CD) copper or twisted-pair scheme.

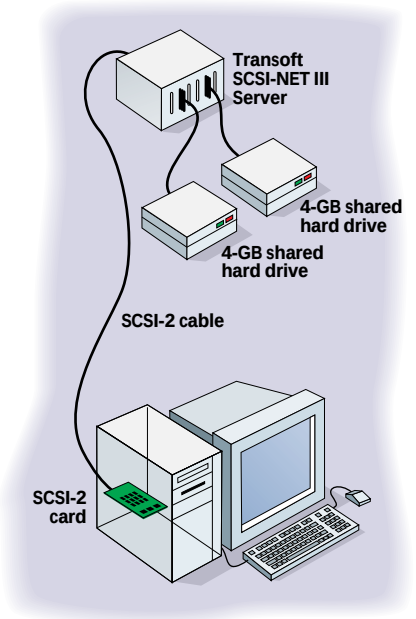
In addition to faster speed, FDDI offers greater security than Ethernet (optical fiber doesn't emit electrical signals that can be tapped) as well as greater reliability (fiber is immune to electrical interference). That's why FDDI is typically implemented as a backbone that joins other network topologies. But such considerations aside, it is the combination of 100-Mbps speed and FDDI's specified 4,500-byte packet size that appears to make it a boon for publishing. Larger packets mean less overhead — a 20-MB file broken into big chunks makes for faster, more efficient throughput than one divided into smaller packets, since each packet includes a fixed amount of header information.

In our test publishing environment, which used AppleShare, we found that FDDI's speed was (as Camille Paglia might say) pathetic. Without the help of a companion file-transfer utility, FDDI was slower than our baseline Ethernet network for all tests. For example, copying a 30-MB file to the Apple Workgroup Server 80 over the Ethernet network took slightly under 2 minutes; using FDDI alone (without a file-transfer utility), the file copy took slightly over 2 minutes, when we used a Cabletron FDDI card. When used with its file-transfer utility, however, the FDDI card fared much better, cutting the copy times for the 30-MB file to 44 seconds.

By and large, vendors shipping FDDI cards for the Mac include file-transfer utilities that help squeeze better performance out of the cards. That's great, because as we found in our tests, you'll see speed improvements with FDDI only when you use a file-transfer utility — but the file-transfer utility works only when you're copying a file from one shared volume to another. If your AppleShare server is being used as a mail, print, or database server, don't expect to see any speed improvement in those functions. And the utilities included with FDDI cards do not generally run in the background; you have to launch the utility to use it for file transfer. Although this may not seem like a big deal, it forces yet another easy-to-forget step into an already busy production process.

So what about all FDDI's impressive specifications? Unfortunately, AppleTalk can't take advantage of FDDI's large packet size. The maximum packet size allowable under AppleTalk protocols is 586 bytes. File-transfer utilities override this limitation, but only when transferring files.

We cannot recommend using FDDI in an AppleShare environment. By the time you add up the cost of the cable and cards — anywhere from about $1,695 to $1,995, depending on the type of card — and the cost of an FDDI module for your hub ($3,895 for a single-attached module or $4,950 for a dual-attached module from SysKonnect, for example), the speed improvement for such a narrow subset of the publishing shop's activities — file transfer — doesn't justify the price. In addition, managing the FDDI topology is yet another learning curve for the network administrator to negotiate. (All is not lost, however. As you'll see later in this report, using FDDI with NetWare — instead of AppleShare — is a super solution.)



OPTION 3:
Move Files over a SCSI Bus.
Transoft's SCSI-NET III Server isn't really a networking solution at all, because it works by isolating traffic from the network. If you want to access network services, you'll still need to connect to a server.

OPTION 3: Move Files over a SCSI Bus. Ironically, one of our network-speedup strategies involves a product — the SCSI-NET III Server, from Transoft (805-565-5200) — that works by getting traffic *off* the network. Don't be misled by the *NET* in *SCSI-NET III Server.* The SCSI-NET III Server is not a networking solution in the true sense — there are no network protocols; no interface cards; no problems of network contention, collisions, or bandwidth utilization.

The SCSI-NET III Server is a SCSI-controller box bundled with software that enables up to 36 Macs to share up to 500 GB of hard-disk storage. The SCSI-NET III Server hardware comes in a variety of configurations, but the model we tested had one port for daisy-chaining up to 49 hard drives as well as six SCSI-2 differential ports for connecting as many as six Macs, each of which requires a differential SCSI-2 card, such as the ATTO SiliconExpress 4D. (In addition to providing Fast SCSI-2 throughput, the differential cards enable the Macs to be up to 82 feet away from the SCSI-NET III Server.) Users work on files on hard drives connected to the SCSI-NET III Server as if they were working on files on their local hard drive, albeit faster: Opening and saving a Photoshop file on the SCSI-NET III Server was about 6 to 9 percent faster than performing the same operation on a local hard drive. SCSI-NET III Server Administrator software, installed on each Mac connected to the SCSI-NET III Server, provides version control by ensuring that no two users access a file at the same time.

The SCSI-NET III Server was consistently the fastest of all the desktop-publishing solutions in our tests. For example, copying a 30-MB file from one hard drive attached to the SCSI-NET III Server to another took about 22 seconds. Transferring the same file between the Apple Workgroup Server 80 and a Power Mac 8100 over Ethernet took nearly four times as long. We got even faster results when we used CopyDoubler in conjunction with the SCSI-NET III Server: Copying a 30-MB file between hard drives took only about 14 seconds.

Not only is the SCSI-NET III Server the fastest solution but it's also the most expensive. Prices range from $14,000 for a bare-bones SCSI-NET III Server to $40,628 for a fully configured, plug-and-play package for six users that includes all cables, six 4-GB hard drives, the unit itself, SCSI cards, and software. (With the bare-bones configuration, you'll still need to purchase differential SCSI-2 cards and cables for each Mac as well as the hard drives you want to share.) The total price makes the SCSI-NET III Server cost-effective for only the most speed-sensitive service bureaus (or video-production studios, in which the real-time delivery of video frames is critical).

Also keep in mind that the SCSI-NET III Server and its connected Macs comprise their own isolated island, a fringe element outside

figure 2

Desktop-Publishing Solutions / *from fast to slow*

Walk into a busy prepress shop, and you'll find users shuttling multimegabyte files from drum scanner to file server to Photoshop color-retouching station to imagesetter, clogging up the network each step of the way. In this scenario, the network's raw speed is extremely important.

We tested three ways of speeding up this type of network: using a file-transfer utility (RUN's RunShare); using FDDI, a network standard that (theoretically, at least) is faster than Ethernet, with and without a file-transfer utility; and using Transoft's SCSI-NET III Server drive-sharing setup. To make our tests realistic, we copied two files: a 30-MB file that was modeled on a full-color, one-page ad and a 70-MB file that was modeled on a full-color, two-page ad. We copied the files from a Power Mac 8100/80 to an Apple Workgroup Server 80 (or in the case of the SCSI-NET III Server, to a shared hard drive) and then back again.

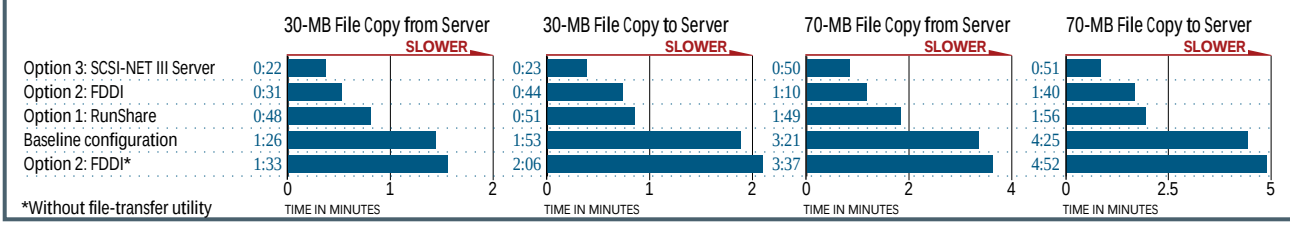
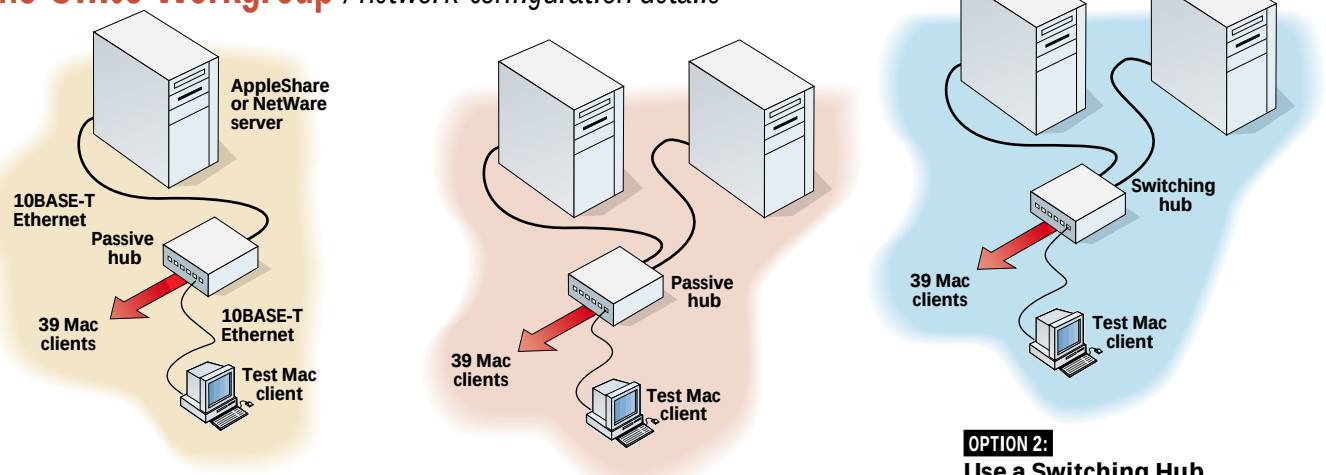


figure 3

The Office Workgroup / *network-configuration details*



BASELINE CONFIGURATION:
Lots of connected Macs, ranging from low end to powerful, that steadily transfer small files — that's the kind of network typically found in office workgroups. We set up our baseline test network to simulate an office environment and ran our tests, once using NetWare and once using AppleShare.

OPTION 1:
Use Two or More Servers.
For this solution, we attached a second server to the main (passive) hub. Thus, the network load was split between two servers.

OPTION 2:
Use a Switching Hub.
For another easy-to-implement solution, we replaced the main (passive) hub with a switching hub. We did this with both the one- and the two-server configuration.

the rest of an organization. If users want to be in the e-mail loop and partake of other companywide network services, they'll still need to be connected to the appropriate network. And only the Macs connected to the SCSI-NET III Server and configured with SCSI-NET Administrator software are able to access the SCSI-NET III Server's hard drives: Users can't turn on file sharing and open the contents of the SCSI-NET III Server's drives to folks outside their workgroup.

The Office Workgroup

Constant communication and collaboration are the trademarks of today's office. For example, at 9:00 A.M., most of the managers arrive, log in, and check mail; a few stragglers roll in at 9:25 A.M. and log in. When the senior accountant strolls in at 9:45 A.M., she starts firing off e-mails to individuals, to the entire office, or to small teams of people. Meanwhile, the clerks have been busy since 7:55 A.M., hammering on the database server, entering new orders, processing payments, and searching for answers to customers' queries.

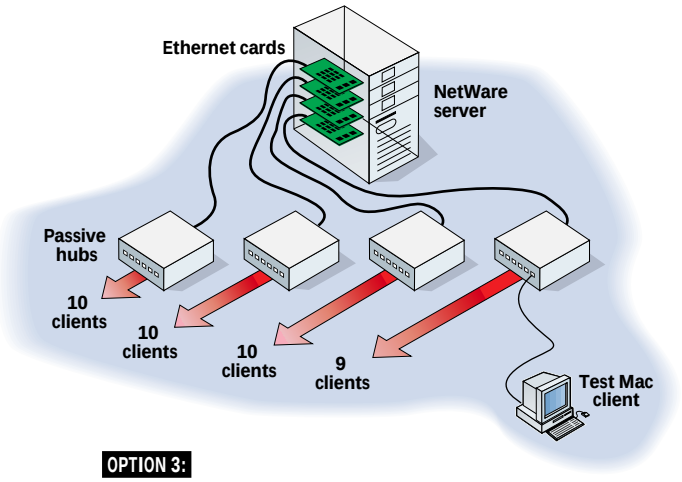
What the network administrator sees, however, is a fairly steady stream of traffic with occasional bursts of activity all day long. During the bursts of activity, the collision rate rises; network utilization rises; and overall throughput slows down, particularly when the traffic is aimed in one direction, such as at a single server.

The strategies that we tested for this scenario include splitting the network's load between two servers; replacing a passive hub with a switching hub; in a NetWare environment, opening up more than one path to the data; and installing FDDI (see figure 3). If you're already using NetWare instead of AppleShare to connect Macs to your network, you're ahead of the game. In the past, MacUser Labs has demonstrated that a network using the Novell NetWare for Macintosh NLM consistently outperforms one using AppleShare, thanks to NetWare's speedy file and print architecture. Note, however, that NetWare's speed advantage is most noticeable in situations where the network is heavily taxed.

OPTION 1: Use Two or More Servers. When the line at the supermarket checkout counter grows too long, the manager often opens up a second lane to speed things up. Similarly, by adding a second server to our test configuration and splitting the 40 Mac clients evenly between the two servers, we witnessed dramatic leaps in network speed over our baseline, one-server configuration. Our NetWare network's data-transfer times improved by as much as 58 percent, depending on the test, and our AppleShare network's times improved by as much as 61 percent (see figure 4).

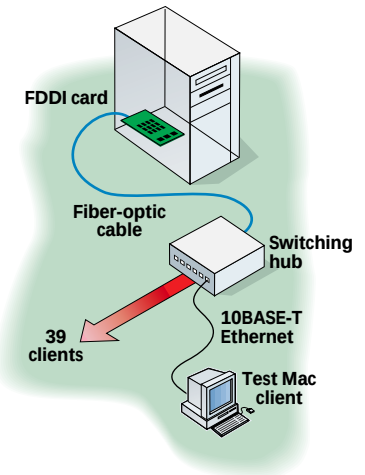
Adding a second server isn't necessarily the least expensive approach — you'll need to buy the hardware, software (AppleShare or NetWare), and appropriate Ethernet adapters. An Apple Workgroup Server 95 configured with 32 MB of RAM and a 1-GB hard drive runs about $10,345, for example. In addition to the direct costs, you'll also encounter the indirect costs associated with installing and configuring a second server. Nonetheless, balancing your network traffic among two or more servers is good basic network design, and in many cases, there's little reason to throw money at other hardware solutions if you haven't taken this step first.

OPTION 2: Use a Switching Hub. What if you've already installed several servers but network speed is still slow? If you have a passive hub, your best bet is to replace it with a switching hub. Unlike a passive hub, which transmits packets through all ports, a switching hub looks at the MAC-layer (media-access-control layer) address and sends the packet through only the appropriate port. For this reason, switching hubs are effective *only* for networks that have multiple servers: If all the Macs on a network are attempting to use the same server, all the packets from those Macs will be heading toward the same MAC-layer address, thus creating a bottleneck at



OPTION 3:

Use Multiple Ethernet Cards.
In our NetWare test environment, we installed four interface cards in the server, thereby making it — not the hubs — the centerpiece of the network.



OPTION 4:

Use FDDI.
To keep the cost of this solution down, we opted to use FDDI only to connect the server to the hub rather than to connect each client Mac to a hub.

the server or at the port in the switching hub connected to that server.

We saw an average reduction of 20 percent in data-transfer times for both our NetWare network and our AppleShare network when we upgraded the passive hub in our two-server configurations to an Alantec PowerHub switching hub. Taken together, these two strategies — balancing the network load among two or more servers and replacing a passive hub with a switching one — offer a one-two migration punch to building a more responsive network.

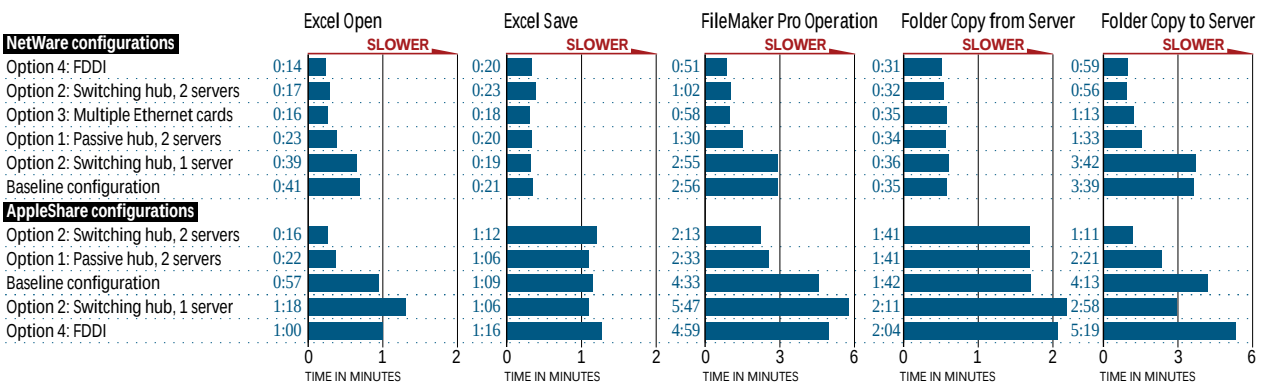
The advantage of using a switching hub is that you can install it without changing your existing cabling or Ethernet cards. We found that it took only a matter of minutes to swap out a passive hub (or replace a module in a hub). We used an Alantec PowerHub switching hub in our tests, but you'll find a wide variety of sub-$2,000 products from which to choose, including units from vendors such as NRC, Sonic Systems, and Tribe Computer Works.

figure 4

Office-Workgroup Solutions / *obvious answers*

Everyday activities such as sending files via QuickMail tax a network more than you might expect. A steady stream of small- to medium-sized files can easily become a flood of data clogging the network. Fortunately, you have a variety of options for unclogging the data pipeline.

For our tests, we used a NetWare and an AppleShare network. Thirty-nine client Macs generated enough traffic to get our network utilization up to 65 percent. We then conducted five tests, using a client Power Mac 8100/80: opening and saving a 900K Excel file on the server; executing a FileMaker Pro script, which performed numerous common database operations on an 8,000-record database file stored on the server; and copying a 2.5-MB folder (containing multiple files, each of which was less than 32K) from and to the server. After running these tests with our baseline configuration, we ran them again, this time trying out different solutions.



Preventive Maintenance / *before a problem strikes*

PERCEPTION IS EVERYTHING. Users will perceive a network slowdown faster than any analysis tool can. And once they've perceived the slowdown, they will expect you to fix it — and fix it fast. If you're armed with solid information about your network, you'll be able to spot the problem quickly. Here are some hints for what to do before a slowdown occurs:

HINT 1: **Document your network configuration.** Use a mapping tool such as Neon Software's LANsurveyor to document your topology — know how many routers, servers, and Mac workstations your network contains; know how many network segments you've got and how your zones are organized. Much like an architectural blueprint, your network map will give you a snapshot of your network layout. In addition, record the configuration information for all servers — installed RAM, cache settings, cards installed, driver configurations, and so forth.

HINT 2: **Record software and configuration data for each Mac.** Use a program such as Saber's LAN Workstation. You'll uncover any conflicting versions of software, outdated drivers, and other sources of potential problems.

HINT 3: **Monitor network activity to establish vital signs.** Utilize monitoring tools such as AG Group's Skyline or Neon Software's TrafficWatch II to document the traffic levels on all network segments and through all connected devices, especially routers and hubs, at specific time intervals. Also monitor your server's activity.

At these same intervals, document the activity on all servers. For example, using AppleShare, check the server utilization in the Connected Users window. You'll see a list of connected users, how long they've been connected, and the total percentage of current remote-user activity. Watch this percentage at selected intervals during the day, and document the fluctuations for a range of times during the day. To further refine your baseline picture, sample at smaller intervals — say, every five minutes — during times of peak usage.

HINT 4: **Look for potential problems in your network design.** Using a monitoring tool, identify users whose bandwidth demands make them prime candidates for segmenting onto their own subnets or whose traffic patterns suggest that they belong on a different network segment from the one they are on. Trace traffic between start and end points to be sure the users and the services they need are appropriately distributed.

You might, for example, monitor the activity at the research department's printer to make sure all the users sending jobs to the printer are on the same network segment. If some users are regularly going through a router to get to the printer, they should be put on the same network segment as the printer, for efficiency's sake.

There are three basic switching-hub architectures. *Store-and-forward* switching hubs buffer a complete packet and perform a CRC error check before sending the packet on through the appropriate port or dropping it. *Cut-through* switching hubs, such as those from Kalpana and Tribe, are faster, because they read just the destination address and send the rest of the packet without checking for errors. The disadvantage of the cut-through design is that bad packets and collisions can be propagated. *Modified cut-through* switching hubs, such as those from Grand Junction, offer a compromise between store-and-forward and cut-through switching hubs. Modified cut-through switching hubs perform limited error checking — for example, reading only the first 64 bytes of a packet to ensure that collisions don't get forwarded.

You'll hear arguments about the advantages and disadvantages of each type of switching hub, but the key point to look out for is how well a particular switching hub will fit into your existing network infrastructure. In order to ascertain this, ask these questions:

- How many ports does the hub contain?
- Are the ports private? (If they are, then the hub can support only a single MAC-layer address, meaning that you can connect only a single Mac to it.)
- How many ports are switching, and how many are passive?
- Can you connect other hubs through one or more of its ports?
- Is the hub managed through SNMP?
- Can you upgrade it with flash memory?
- Does the hub have ports, such as FDDI ports, that allow high-speed data transfer?

OPTION 3: **Use Multiple Ethernet Cards.** Although our tests showed solid speed improvements in NetWare and AppleShare environments when we added more servers and then, later, replaced a passive hub with a switching hub, those of you who are running NetWare should consider yet another option — adding more network-interface cards to the server. A NetWare server, unlike its AppleShare counterpart, can perform routing functions (that is, it can shuttle packets to different internetworks) in the server software itself. This means that you can achieve network segmentation easily by installing more network-interface cards in the server.

When we took our baseline NetWare configuration — 40 Mac clients, one server, and a passive hub — and added three Ethernet cards to the server, we saw time reductions as great as 67 percent. By dividing our NetWare network into four segments, we managed to achieve higher overall speeds than we did by adding a second server or replacing the passive hub with a switching hub. This solution would have surpassed even our two-server/switching hub configuration in overall speed, had it not been for a slowdown when copying a folder to the server. How can network segmentation have such an impact on speed?

Ethernet is a shared communications medium, akin to a party-line telephone, with which callers share the same line and have to wait to talk. Segmenting a network by adding more network cards to the server is like providing more party lines and grouping callers evenly among the additional lines. A caller can then access the line more readily than before.

Although the server does have additional demands placed on it by the extra Ethernet cards and routing functions, overall this alternative is a low-budget, high-yield one. For example, since you can find Ethernet cards in mail-order catalogs for around $100 each, you can get a large speed gain for less than $500. You do, however, need to install the cards, reconfigure the server to bind the protocols to the cards, and reconfigure the Mac workstations onto different cabling segments. On the plus side, however, you won't be dabbling with any new technology, and depending on how easily you can trace your network connections, the investment is more in time and labor than in hard dollars.

OPTION 4: **Use FDDI.** In the desktop-publishing scenario, we connected each client Mac to the server via FDDI. In the office-

Curing What Ails */ after a problem strikes*

NO MATTER HOW MUCH preventive maintenance you perform on your network, problems are bound to arise. But if you think the problem through methodically — and if you've followed our advice about documenting your network's statistics — you'll be able to narrow down your troubleshooting options. Here are some hints on what to do when a network problem strikes:

HINT 1: **Identify the type of problem, using a top-down approach.** Does the problem appear to be with the entire network or just a segment? Is the problem with the entire segment or just a single user's Mac? Does the problem occur at the same time every day? Under what conditions?

"The network is slow" is an indication of a different kind of problem from "I can't log in to the server." An inability to connect may indicate a physical connectivity problem or misconfiguration, whereas slow speed might indicate traffic problems. But physical connectivity problems, such as a crimped cable, can also lead to "the network is slow."

HINT 2: **Monitor network traffic.** Use software such as Neon Software's TrafficWatch II or AG Group's Skyline to check statistics on a given network segment. Skyline, in conjunction with AG Group's Satellite software, allows you to collect data for each segment on an internetwork. Compare the current information with your baseline figures. Also look for high levels of broadcast packets and multicast packets, which may indicate a malfunctioning router, Mac, or application process.

HINT 3: **Identify the sources of the network traffic by node.** You can zoom in on your network statistics to find out which nodes are generating the most traffic. Skyline can give you detailed statistics about network activities, including the nodes and the protocols in use, that were occurring when unreasonable spikes occurred. If the problem is due to an individual user's Mac, you'll discover that during this process.

HINT 4: **Check the server.** Determine whether hardware or software is at fault. Check the utilization percentage displayed on the Server menu to see if it's higher than normal. If the server is not a dedicated one, how much processing power is assigned to server functions? For example, at the server, you might discover that 50 — instead of the expected 25 — users are logged in to the server and utilization is at 100 percent instead of the normal 70 percent. Thus you'd expect speed to be less than normal. While at the server, check the Ethernet cards, cables, and all connections to it.

HINT 5: **Check the user's Mac.** Interview the user to narrow down the problem. Was new hardware or software installed? What is different about the Mac now compared to the last time it was used for the same task? Check all network components and software. Make sure the network connection is firmly seated in the network adapter and that the correct network driver is selected. Finally, be aware that fixing some problems may require upgrading. Users who have old Mac Pluses and external SCSI-connected Ethernet boxes are going to have to live with slower network throughput than folks who have Ethernet-equipped Power Macs.

workgroup scenario, however, we took a different tack — we connected the 40 client Macs to switching hubs that had an integrated FDDI port and then connected the server to the hub via FDDI. (We installed a SysKonnect FDDI card in the server.) Because the server handles traffic from numerous Macs, the extra bandwidth of FDDI would be most beneficial at the server. We could have installed an FDDI card in each Mac, as we did in the desktop-publishing scenario, but such an approach is too expensive for most offices, with their greater numbers of users.

In the NetWare environment, using FDDI was the fastest method, even with only one server installed on the network. We attribute the speed advantage FDDI has when running under NetWare to the fact that NetWare was designed to optimize network file requests at the operating-system level.

When we ran our tests under AppleShare, however, we found — as we did in the desktop-publishing scenario — that FDDI was not a viable solution. Overall speeds were slower than Ethernet, since we were not able to use a file-transfer utility. (File-transfer utilities work only if the server and all the clients have an FDDI card installed.)

FDDI does not come cheap: FDDI cards typically cost $1,500 and up. And to implement this setup, you also need a switching hub capable of supporting FDDI. If your hub doesn't support FDDI and has a fixed-port configuration — in other words, if you can't add modules or swap out a card — you'll have to buy a new hub. (As an example of cost, the base configuration of the SysKonnect SK-NET switching hub costs $9,495.) Finally, you'll have to install the FDDI card in the server and reconfigure the server to use the appropriate LAN drivers. In short, you'll be faced with a significant investment in money as well as in labor and time.

Choosing a Solution

If you run a desktop-publishing shop whose investment in hardware, software, and technical staff is in the $500,000 to million-dollar range, it may well be worth the expense of the SCSI-NET III Server (upwards of $14,000) to gain virtually immediate access to shared files. If getting a SCSI-NET III Server will break your budget, however, we suggest that you get RUN's RunShare. It's inexpensive and easy to install. And finally, we suggest that you avoid installing FDDI, at least for now.

If your networking needs fall mostly in the office-workgroup area — the transfer of steady streams of small files — you have more factors to consider before picking a solution. If all your services are on a single AppleShare server, add a second server. Next, consider migrating to NetWare, since our tests prove that it's faster than AppleShare. (Even better, NetWare will be updated to run in native mode on PowerPC-based servers.)

If you already use NetWare, we recommend that you install an FDDI card in your server and use an FDDI module in your hub. (Note, however, that if you have to replace your current hub with one that supports FDDI, then this option may be too expensive.) A less expensive alternative is to install more Ethernet cards in your server. Keep in mind, though, that you'll need to reconnect your clients to different segments and that you'll incur the indirect costs of time and labor for segmenting the cabling system.

No matter which solution you choose, expect to spend at least a small amount of time installing and troubleshooting it. After all, any change to a network, no matter how small, can cause unforeseen problems. In the end, however, you'll have a faster network and users will stop complaining — for a while at least.

Joe Sciallo is an independent networking consultant. Kelli Wiseth is a freelance writer specializing in networking-technology issues. MacUser Labs associate project leader Alan Chan managed the testing for this report.

QUICK LABS

• Personal Printers That Raise the Bar • High-Quality Monitors • Small-Footprint Drives

Quick. That's the operative word. Every month, beginning with this issue, *MacUser* will test, review, and rate newly introduced printers, hard drives, and monitors — products in three of the most rapidly advancing — and indispensable — Mac hardware categories. For concise, accurate, and above all timely buying information in these ever changing categories, turn to the Quick Labs section each month.

To rate the products, our labs staff conducts its usual exhaustive tests and our editors scrutinize product features and functions. We then boil our findings down to the essentials you see here — at-a-glance briefings on how each product stacks up against its competitors in key areas such as value, support, and speed. You can expect to see these ratings, as well as information on product trends, each and every month.

Our testing methods will remain the same from month to month, so you'll be able to compare products across issues of *MacUser*. And before long, you'll be able to find cumulative results in a database on ZiffNet/Mac. Don't worry — Quick Labs doesn't replace our regular full-blown, product-laden roundups. It's just a faster way of getting you the kind of reliable buying information you've come to expect from *MacUser*.

NEW PERSONAL AND WORKGROUP PRINTERS

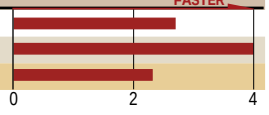
Talk about bargains: The personal laser printers we tested — the Texas Instruments microLaser 600 and the Hewlett-Packard LaserJet 5MP — come equipped with PostScript, sport a resolution of 600 dpi, print on both letter- and legal-sized paper, and cost $1,000 or less. With specifications this good, we recommend these printers for either individual users or small workgroups with low-volume printing needs. The lack of support for Ethernet and the slow printing speeds, however, keep these printers from being suitable for large workgroups.

Our workgroup printer of the month, the GCC Elite XL 808 (pictured) may seem expensive at first glance, but it's chock-full of features that make it a solid value. This versatile PostScript laser printer can print edge to edge on letter-, legal-, and tabloid-sized paper, and it supports an optional 500-sheet paper tray that boosts total capacity to 800 sheets. For networking, the Elite XL 808 can print from Macs as well as PCs. We were surprised, however, that its 800-dpi resolution yielded only average-quality text output.

To test speed and output quality, we printed dozens of pages of text, line art, and gray-scale graphics. We timed the printers producing a variety of documents, from simple files that print quickly to complex ones that print slowly, and weighted the results to reflect everyday usage. You can't compare speed results between personal and workgroup printers, however: We printed longer, more complicated documents on the workgroup printer in order to better reflect real-life conditions.

REVIEWER / CHERYL ENGLAND TESTING / JIM GALBRAITH

+/ OUTSTANDING ●/ ACCEPTABLE −/ POOR	ESTIMATED STREET PRICE	RESOLUTION	WARRANTY	TEXT QUALITY	GRAPHICS QUALITY	PAPER HANDLING	SUPPORT	COMMENTS	PAGES PER MINUTE
5555½ **Hewlett-Packard** LaserJet 5MP*	$1,000	600 dpi	1 year	+	+	+	+	Gray-scale graphics so beautifully rendered they look like photos.	
5555 **GCC** Elite XL 808	$3,250	800 dpi	1 year	●	+	+	●	A highly versatile printer that fits well in Mac or Mac/PC offices.	
5555 **Texas Instruments** microLaser 600*	$899	600 dpi	1 year	●	●	●	●	A great price for a fully equipped, 600-dpi PostScript printer.	



*Tested as a personal printer.
LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.

NEW 350-MB TO 9-GB HARD DRIVES

From low capacity to high, we tested a hodgepodge of drives. All except one sport the features you'd expect — two 50-pin SCSI connectors, power and access lights, external or switchable termination, and well-designed software. The drives from Spin (pictured), APS, and MacProducts come in small, sturdy plastic cases. The 9-GB drives from MicroNet and Micropolis are big and bulky; it takes a lot of platters to hold that much data.

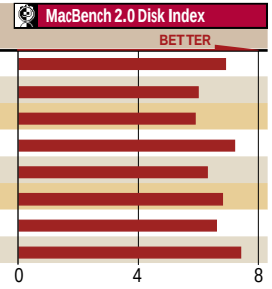
We were dismayed by the poor design of the Micropolis MicroDisk AV LT 4300. This drive comes in several pieces (which are easy to assemble), the SCSI-ID selector is hidden inside the case, and the case is as large as those of the 9-GB drives. To daisy-chain other SCSI devices, you need to buy an adapter that adds a second SCSI port. You can stack more 2-GB and 4-GB modules, however.

We tested drive speed by using MacBench 2.0. The results are relative to that of a 250-MB Quantum IDE drive in a Quadra 630, which is given a score of 10.

REVIEWER / CHERYL ENGLAND TESTING / KRISTINA DE NIKE

+ / OUTSTANDING ● / ACCEPTABLE − / POOR	ESTIMATED STREET PRICE	FORMATTED CAPACITY	PRICE PER MEGABYTE	WARRANTY	CASE	SOFWARE/ MANUALS	SUPPORT	COMMENTS
★★★★½ **APS** Q 730	$360	696.9 MB	$.52	2 years	+	●	+	Same design as the Q 365. APS has a reputation for great support.
★★★★ **APS** MS 4.0	$1,600	4,091.4 MB	$.39	5 years	+	●	+	Higher capacity, slower speed than APS' other two entrants.
★★★★ **MicroNet** SB-8640	$4,595	8,661.6 MB	$.53	3 years	●	●	+	Bigger than a shoe box and heavier too — but it holds 9 GB.
★★★★ **Micropolis** MicroDisk AV LS 9100	$4,170	8,662.4 MB	$.48	5 years	●	●	●	Oversized case with a snap-on top. 9-GB modules can be stacked.
★★★★ **Spin** Seagate 2.1GB	$1,199	2,045.5 MB	$.59	5 years	●	●	+	A love-it or hate-it design for a solid product.
★★★½ **APS** Q 365	$280	347.3 MB	$.81	2 years	+	●	+	Sturdy, stylish case includes switchable active termination.
★★★½ **MacProducts** Magic Q500	$312	514.3 MB	$.61	2 years	+	●	+	This solid performer has a small, sturdy case.
★★½ **Micropolis** MicroDisk AV LT 4300	$2,520	4,092.6 MB	$.62	5 years	−	●	●	A speedy drive but spoiled by a clumsy design.

LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.



NEW LARGE-SCREEN COLOR MONITORS

This month's crop of color monitors — three 17-inch and three 20-inch models — are aimed squarely at business users. The Mitsubishi (pictured), NEC, and ViewSonic monitors reflect a trend in display systems: on-screen controls that reduce front-panel clutter and allow you to adjust the displays from easily accessible menus. The Philips monitor is the only one we tested that lacks digital controls for "remembering" your preferred settings if you switch among screen resolutions. It's also the only monitor that can't automatically dim the screen after a specified interval of inactivity.

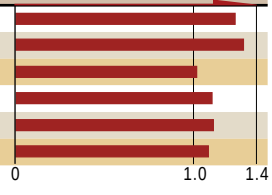
All the monitors require an adapter for connecting to a Mac, but only Mitsubishi and Philips supply one in the box. NEC will send you one free, along with nifty resolution-switching software; ViewSonic will sell you an adapter over the phone; Optiquest supplies Mac adapters to dealers, but you might not get one unless you ask for it.

The image-quality scores reflect the results of our tests for image sharpness, focus, brightness, uniformity, pincushioning, color range, and color accuracy and vibrancy. Be aware that maintaining sharpness and focus is technically more difficult on a large monitor than on a small one, so 20-inch monitors — even very good ones — tend to score lower than comparable 17-inch models. A score of 1.0 is considered acceptable.

REVIEWER / JIM SHATZ-AKIN TESTING / MARTIN WONG

+ / OUTSTANDING ● / ACCEPTABLE − / POOR	ESTIMATED STREET PRICE	SCREEN SIZE	MAXIMUM RESOLUTION	WARRANTY	MANUALS	SUPPORT	CONTROLS	COMMENTS
★★★★½ **NEC** MultiSync XV17	$799	17 in.	1,024 x 768 pixels	3 years	+	+	+	A tremendous bargain, with great, easy-to-use controls.
★★★★ **Mitsubishi** Diamond Pro 17TX	$1,199	17 in.	1,024 x 768 pixels	3 years	●	+	+	Offers every imaginable control, but at a premium price.
★★★★ **ViewSonic** 20PS	$1,500	20 in.	1,152 x 870 pixels	3 years	+	●	+	Good DTP monitor. Has convenient controls.
★★★½ **Optiquest** 2082 DC	$1,399	20 in.	1,152 x 870 pixels	3 years	−	●	●	Reasonable performance doesn't quite justify the price.
★★★½ **Optiquest** 4500 DC	$795	17 in.	1,152 x 870 pixels	3 years	−	●	●	Good general-purpose display system.
★★★ **Philips** Magnavox MagnaScan/20	$1,049	20 in.	1,024 x 768 pixels†	1 year	●	●	−	You get what you pay for with this low-cost monitor.

†At 72 Hz; the others run at 75 Hz.
LISTING IS ALPHABETICAL WITHIN GROUPS OF EQUAL MOUSE RATINGS.



GET INFO / **APS Technologies** 816-483-6100 **GCC Technologies** 617-275-5800 **Hewlett-Packard** 415-694-2000 **MacProducts USA** 512-892-4070 **MicroNet Technology** 714-453-6000 **Micropolis** 818-709-3325 **Mitsubishi Display Products** 714-220-2500 **NEC Technologies** 508-264-8000 **Optiquest** 909-468-3750 **Philips Consumer Electronics** 615-521-4316 **Spin Peripherals** 508-787-1300 **Texas Instruments** 512-794-5970 **ViewSonic** 909-869-7976

PHOTOGRAPHY / LON CLARK

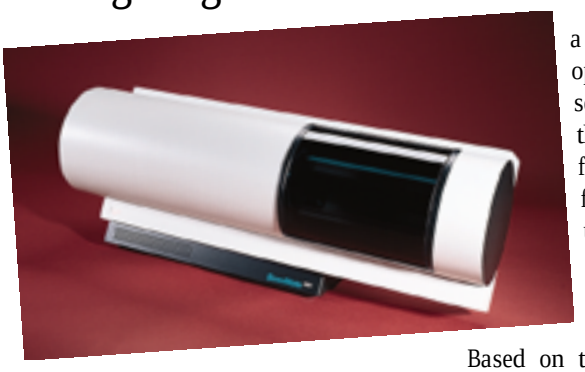
SCANNERS /

Scan to a Different Drum

Two drum scanners head for higher ground.

SERVICE BUREAUS that want to offer in-house scanning services face a trade-off between the quality of inexpensive flatbed or slide scanners and the price of high-end drum scanners. But now scanner vendors are targeting service bureaus, with new models that combine the best of both in affordable — well, relatively — desktop drum and flatbed scanners.

With price tags well above $40,000, drum scanners have traditionally been in the domain of prepress shops that need the color fidelity and speed these units provide. One of the significant differences between drum scanners and flatbed units is the type of light sensor each uses. Flatbed scanners use CCDs (charge-coupled devices) that traverse the length of the platen, whereas drum scanners employ PMTs (photomultiplier tubes) that remain stationary while the drum spins rapidly. PMTs offer higher resolution, greater tonal range, better registration, and more shadow detail than has been possible with CCDs, although that distinction, too, is changing as CCD technologies improve.



ScanView ScanMate 3000. Set solidly in the middle of ScanView's product line in terms of price and features, the new $19,995 ScanMate 3000 targets those who require the high resolution and shadow detail of a PMT-based scanner but not the throughput that comes with a removable-drum model.

The ScanMate 3000 scans prints or transparencies as large as 8.5 x 11.5 inches at true optical resolutions up to 3,000 dpi. Like its higher-priced siblings, the ScanMate 3000 has three PMTs for fast, single-pass scanning and offers both manual and automatic focus. It uses a fixed drum and offers a dynamic range of 3.6.

The 36-bit scanner ships with a Photoshop plug-in. ScanView's optional ColorQuartet color-separation software ($1,650 for the CMYK version and $1,100 for the RGB version) provides features, such as automatic unsharp masking, available with high-end drum scanners. 415-378-6360.

Mirror DS4000 Drum Scanner. Based on technology from the German company Optotech, the $19,900 DS4000 uses a single PMT to capture 36-bit color data in three passes. Focusing is automatic, but users can opt to set focus manually. The scanner offers resolutions of up to 4,064 dpi for images as large as 8.5 x 11.7 inches, and it has a dynamic range of 4.0.

The DS4000's drum is removable, so users can mount images on a second drum ($1,699) while scanning the first. A Photoshop plug-in is bundled with the unit. Available through MacUSA. 800-654-5294 or 612-832-5622. / Pamela Pfiffner

PowerPC-Native Painting for Peanuts

FEATURE-PACKED BUT PRICEY imaging packages such as Adobe Photoshop and Fractal Design's Painter may be out of reach for many Power Mac users. If you're one of them, take a look at MicroFrontier's Color It! 3.0, a PowerPC-native low-end painting and image-editing application.

For $150, Color It! offers many of the retouching capabilities of Photoshop, such as masking tools, Photoshop-compatible filters, and image-adjustment features, along with a complete set of painting tools. A competitive upgrade package lets you purchase Color It! 3.0 for $50 if you prove that you own one of any number of desktop-publishing applications. It's hard to pass up such a deal. 800-388-8109 or 515-270-8109. / Sean J. Safreed

PAINT PROGRAMS /

Painter Packs In More Effects

NUMBERS DO LIE — at least when it comes to the number of new features packed in to what seems like a minor update to Painter. With version 3.1, Fractal Design has taken great pains to make its paint program more robust. Thanks to the program's 32 levels of undo, you can experiment with various brush strokes or filter effects without worrying about ruining a work in progress.

New special effects stand out in version 3.1. With the Express Texture filter, you can take a paper texture and apply it to an image to create a uniquely screened black-and-white image similar to the dot-etched pictures in *The Wall Street Journal*. The Apply Surface Texture filter has been revised to include multiple lights from any angle, resulting in textured images that have a more photographic look.

Taking a cue from the company's name, fractal technology finally makes an appearance in two new functions: a fractal-pattern generator that makes organic-looking tiled patterns and the Growth filter, which creates designs similar to the hand-rendered symbols common in architectural drawings. There's also a new gradient editor and full support for Photoshop 3.0 files, including layer import and export.

Upgrades from Painter 3.0 cost $13 (free online); $109 from X2, and $159 from earlier versions. 408-688-5300. / SJS

PAGE LAYOUT /

FrameMaker 5, XTensions Target Net

PROVING THAT THE INTERNET is a flourishing area for publishing, new tools for page-layout programs are targeting the creation of electronic documents.

FrameMaker 5. Highlighting the latest version of Frame Technology's FrameMaker is support for on-line publishing, including HTML, the language of the World Wide Web. FrameMaker 5 will include an HTML translator that works on FrameMaker files and on any other file formats supported by FrameMaker's import filters.

Frame has transformed its own format into an electronic delivery medium by offering FrameReader, a free utility available on-line that allows anyone to view FrameMaker documents. FrameMaker 5 also lets you create bookmarks, hypertext links, and annotations and export them to Adobe Acrobat.

Other new features in FrameMaker 5 include the ability to set wraps around graphic objects, create "straddled" objects that automatically balance the columns preceding them, and import text linked to an editable source document. FrameMaker's import/export-filter architecture has also been rewritten so that filters are consistent across FrameMaker's Mac, Windows, and UNIX versions. $895; upgrade from FrameMaker 4, $225. 408-975-6000.

FrameMaker 5's new straddle-columns feature lets you automatically combine multiple-column elements in a single layout.

XTensions. Two XTensions help automate the translation of QuarkXPress documents into Web pages by mapping QuarkXPress style sheets to equivalent HTML styles. Astrobyte's BeyondPress ($595) lets you choose what stories and pictures to export into Web format from your QuarkXPress file. 303-534-6344.

Designed as an archiving tool for QuarkXPress documents, Compatible Systems Engineering's Archiver ($2,000) can extract text from QuarkXPress documents and translate it into HTML as it's storing your files. 703-941-0917. / Jason Snell

COLOR PRINTERS /

Kodak Dye-Sub Goes Mainstream

NUDGING DOWN its price barrier for high-quality printers, Eastman Kodak now sells a dye-sublimation color printer for less than $7,500 — that's $1,000 less than the unit it replaces, the Kodak ColorEase.

Based on the same zippy PostScript Level 2 engine as the $9,995 XLS 8600 PS, the Kodak XLS 8400 PS offers fast 300-dpi printing with edge enhancement that smoothes the contours of type and line art. For greater color fidelity, Kodak's UltraColor technology takes advantage of the color-rendering dictionaries built in to PostScript Level 2.

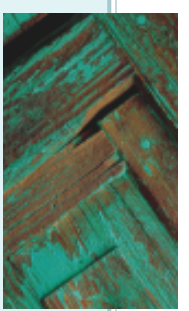
Powered by a 33-MHz RISC processor, the unit ships with 32 MB of RAM, upgradable to 64 MB, to allow the processing of large files even while another file is printing, according to Kodak. An Adobe Photoshop plug-in exports files directly to the RIP, further boosting processing times. Parallel, serial, and SCSI ports are standard, as is support for LocalTalk. A $995 network card provides EtherTalk, NetWare, and TCP/IP protocols.

The XLS 8400 PS uses Kodak's sturdy Ektatherm media (unlike the XLS 8600, it doesn't use Kodak's XtraLife self-laminating media). With oversized media (9.5 x 14 inches) for printing the maximum image size of 8.4 x 12 inches, the price per print is $2.60. Three-color ribbons cost $175 each, and a 100-sheet pack of oversized paper costs $85. Other sizes are available. $7,495. 800-235-6325 or 716-724-4000. / PP

PHOTOGRAPHY / MICHAEL FALCONER

In the Background

A RICH SOURCE of creative material for graphic artists, CD-ROMs containing backgrounds and textures have boomed in the last few years. **Artbeats** (503-863-4429) and **D'pix** (614-299-7192) tapped into the natural world for their images — richly veined marble, lichen-encrusted rocks — and their collections remain some of the best around. But try these relative newcomers. ✻ **Vivid Details'** recent releases include the appealing Old Paint and Rustic Wood collections ($179 each). Weighing in at 37 MB apiece, each TIFF image in the three-disc sets is equivalent in size to a 9-x-12-inch image at 300 ppi; a 72-ppi version of each image is included as well. Sample disc, $39. 800-948-4843 or 805-646-0217. ✻ **DiAMAR Interactive** ships a grab bag of styles, from detailed close-ups of synthetic objects to distorted photos of office buildings, on its new Backgrounds and Textures CD-ROMs ($80 each). To meet the needs of screen designers as well as print publishers, all images are shipped in a bevy of sizes and formats, including Photo CD, CMYK TIFF, and indexed-color PICT. 800-234-2627 or 206-340-5975. ✻ Two collections in Photo CD format supply abstract imagery. **FotoSets** draws on dramatic lighting and rich colors for its Art Textures and Backgrounds CD-ROM. $249. 415-621-2061. **Digital Stock** now sells Painted Backgrounds, featuring original artwork by Gregory Ochocki. Each Photo CD file is cropped and color-corrected. $379. 619-794-4040. ✻ Packaged in its own flip-box carrying case, **Letraset's** 11-CD-ROM Phototone collection ($199) offers more than 1,000 natural (butterfly wings) and unnatural (traffic pylons) backgrounds — the image of fake bear fur is *made* for fur-protest posters. Page through the beautiful color catalog, use the 50-dpi preview images for comps, and then call Letraset to unlock the high-resolution files for a cost of $199 each. 201-845-6100. / PP



PREPRESS / BY ERIC TAUB

Ten Tips for Trouble-Free Printing

Before you take your files to the service bureau, it pays to take the time to prepare your documents properly. Following these Top Ten tips may save you money.

ANY DESKTOP PUBLISHER KNOWS that time is money. Jobs that must be redone — either because they didn't produce usable film when you took them to your service bureau or because they didn't print properly on press — cost you whatever profit you might otherwise have made from a project. Fortunately, there are steps you can take to improve your odds of getting it done right the first time. Here are ten quick tips for preparing your Mac files for final output.

1. Get on the phone. Don't make contacting your printer the last part of your production process; make it the first. A lot of heartache, waste of film, and botched print runs can be avoided simply by talking to the people who are going to be responsible for final output. Do not assume that the great-looking document on you matches the requirem service bureau and/ or printer. Find out what resolution (in lines per inch) your printer's presses, inks, and papers can handle, and then set line screens in your applications accordingly. Furthermore, don't ask your service bureau for paper positives when your printer needs film negatives.

2. Make your page-layout page the size of your real document. In the bad old days (a few years ago), prepress workstations and imagesetters couldn't record the parts of a document that bled off the defined page area. If you wanted your bleeds to print properly, you had to change the document size in your page-layout program to accommodate your real page size *and* your bleed. This customized extralarge document size required the creating and positioning of crop marks by hand, with attendant possibilities for errors. New prepress equipment isn't as hindered by these limitations (for example, many imagesetters today have larger imaging areas and use wider film). Most printers recommend that you make your Macintosh document the size of your real page and let your application automatically generate correctly positioned crop marks.

3. Work by the numbers. Every page-layout application today gives you two methods of sizing and positioning page elements: the touchy-feely way of clicking and dragging on handles and objects with your trusty mouse or the cold, impersonal way of typing soulless numbers into various dialog boxes and palettes. Instead of eyeballing it or using alignment guides and rulers, the only way to be absolutely certain a box is exactly an inch and a half wide is to type 1.5" into the width field.

4. Simplify EPS graphics. Overly complicated paths in PostScript files are a major culprit in creating jobs that print incorrectly — if at all. Paths that have too many control points and/or a flatness setting that's too low add to the complexity of a file and can choke many laser printers and imagesetters, resulting in the dreaded "limitcheck" or "VMError" PostScript errors. In Adobe Illustrator or Macromedia FreeHand, split complicated paths and give them higher flatness settings or use FreeHand 5's handy Simplify Paths command, especially when files are destined for high-resolution devices. When you're tracing hand-drawn paths in Adobe Streamline, take advantage of its path-simplification features to reduce path complexity. And in Adobe Photoshop, use a high tolerance value to reduce the number of control points when converting selections into clipping paths.

Don't nest EPS graphics within other EPS files. Picture this: Import a couple of EPS graphics into an Illustrator file, save that as EPS, place it in a QuarkXPress page, save that page as EPS, and bring it into another QuarkXPress document. If you're lucky, that file just might print, but your chances of success go down with every layer of embedded PostScript. If you must bring an image of an entire QuarkXPress page into another document (cover thumbnails for a book catalog, for example), consider using the excellent epsConverter shareware utility to modify the QuarkXPress EPS into one that can be rasterized by Photoshop. Have Photoshop image the file as a bit map, and

ILLUSTRATION / JAMES O'BRIEN

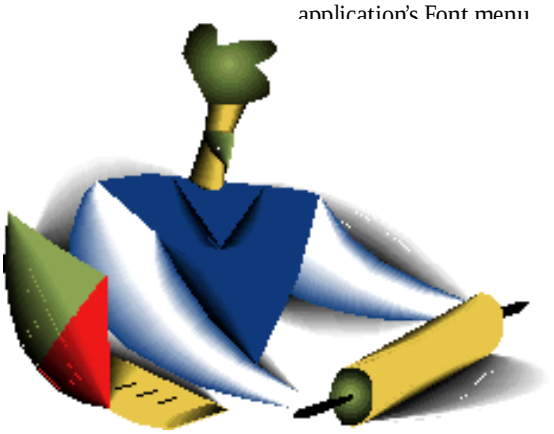
then save it as either Photoshop EPS or TIFF, neither of which adds extra layers of PostScript code.

5. Smooth out your gradients. The kind of algorithmic gradients QuarkXPress and Adobe Illustrator make are fine for short gradients that span a few inches, but limitations in PostScript will result in banding if you try to create full-page, subtle gradients. Instead, create the gradient as a raster image in Photoshop (with liberal use of the Add Noise filter), and import it into the other applications.

However, you should not use Photoshop to process gradients made in Illustrator. Photoshop's rasterizer for Illustrator EPS files will not give you as many intermediate levels of color as you would get by creating the gradient from scratch in Photoshop.

6. Finesse your fonts. Most service bureaus prefer that you avoid using TrueType fonts. PostScript fonts have become the service-bureau standard, and TrueType fonts often bear the same name as their PostScript counterparts, resulting in font conflicts. TrueType fonts have to be downloaded manually to the imagesetter's RIP, a time-consuming process. If you must use them, be certain to contact your service bureau first.

Don't use the standard Style commands to apply bold or italic to a typeface. Rather, select the weight or style directly from the application's Font menu



character thick or oblique — but only on-screen. On output from a PostScript printer, your type will look as if you hadn't applied a style command at all. The bottom line? Avoid applying artificial styles to fonts that don't have those styles built-in.

If you're using a typeface that has particularly fine serifs or thin strokes (Bodoni is a good example) and you're setting it at a small size, don't specify a process color. The tiniest shift in plate alignment will show up, and you will always have misregistration around the most-delicate elements.

7. Convert colors carefully. Before you send your files out, convert your RGB colors to CMYK. True, RGB images look great on your screen and many color pros prefer to work on an image in RGB mode. But you won't have a clue what these images will look like when they're separated and printed (some page-layout programs don't even attempt to separate RGB images). Convert your images to CMYK (in Photoshop or another application that can do conversions) before placing them in a page-layout program or before sending them to a service bureau.

Make certain you don't have a spot color incorrectly specified as a process color, or vice versa. One such mistake can ruin every piece of film you make. If you're paying for your own film, it's not a mistake you're likely to make more than once.

Do make sure your named colors have the same names in your page-layout application as they do in your graphics programs. Otherwise, your page-layout program may treat as a process color a spot color you have defined in Illustrator or FreeHand. The latest versions of QuarkXPress and PageMaker read and append to a document's list of colors the names of colors contained in any EPS files you import, so this risk isn't as great as it once was.

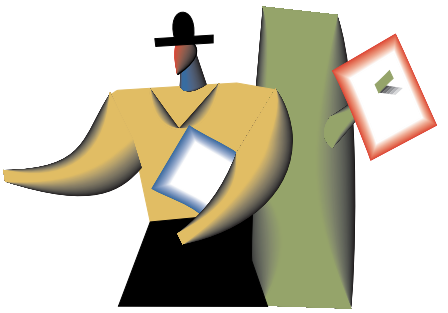
8. Get your ducks in a row. We're not going to dwell on this point, because it's one everybody should be familiar with by now, but it's also one that can't be repeated often enough. In addition to all the picture files used in your document, you must send to your service bureau the files containing both the bit-mapped (screen) and outline (printer) fonts for the PostScript typefaces you've used.

Most page-layout applications today have something similar to QuarkXPress' Collect for Output command, which creates an exhaustive report about your document and automatically copies the document (along with all graphics files used) to a folder, floppy disk, or SyQuest cartridge. If your service bureau has progressed beyond the mom-and-pop stage, it will almost certainly have the entire Adobe font library on hand, so you can often get away with not including most Adobe fonts in jobs you are sending out.

9. Preflight your file. The dos and don'ts in steps 7 and 8 are a simplified version of what's become known as document preflight: checking for any omitted elements, improperly defined colors, and even PostScript errors. (For more information on preflight, see Expert Tips, November '94, page 113, and December '94, page 127.) Preflight tools range from simple document checkers, such as Lepton Technology's DocumentDoctor for QuarkXPress or Adobe's CheckList for PageMaker, to sophisticated error checkers, such as Systems of Merritt's LaserCheck (which uses your laser printer to simulate an imagesetter) or Acquired Knowledge's Download Mechanic. Software RIPs, such as Panther Proof, from PrePress Solutions, or Adobe's PrePrint Pro, perform a low-resolution rasterization of your document to your screen. This allows you to check for — and solve — common PostScript problems before you actually send a job out.

10. Make a paper trail. Make paper printouts of everything. Indicate any special considerations, especially color breaks, by marking them up. Good old-fashioned color markers are great for this if you don't happen to have access to a color printer. Include prints of each separation, so that it's clear exactly what should be knocked out or overprinted.

Eric Taub coauthored The QuarkXPress Book *and* QuarkXPress Tips & Tricks, *both from Peachpit Press.*



GRAPHICS HOW-TO / BY JANET ASHFORD

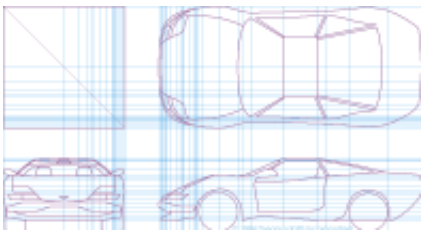
Sculpting a 3-D Dream

Watch as DreamLight uses smoothly flowing spline curves to create a photo-realistic 3-D rendering of an imaginary car.

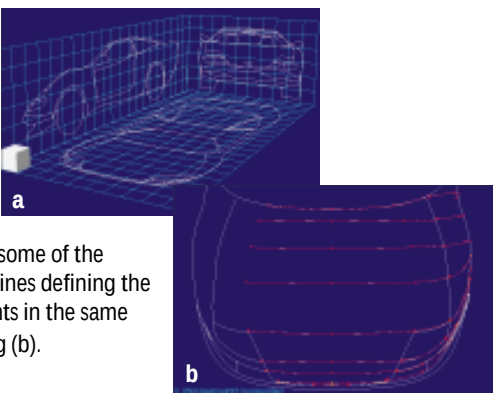
USING SPLINES — Bézier curves that travel through a 3-D space rather than across a 2-D surface — yields smooth, realistic shapes in 3-D programs. Michael Scaramozzino, of DreamLight in Stoneham, Massachusetts, drew on splines to fabricate a sleek vehicle for Bose's ads in car-industry magazines. (Bose, which sells stereo systems to car manufacturers, didn't want to offend potential customers by picturing a competitor's model.) Scaramozzino designed, modeled, and rendered the car from scratch, using three Macromedia tools: FreeHand to create the initial 2-D designs, MacroModel to create spline-based models, and Three-D to render them. The illustrations appeared in alternating issues of *Car and Driver* and *Motor Trend* magazines as well as in leading German and Japanese automotive magazines.

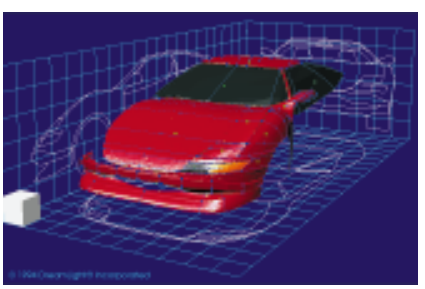
Janet Ashford designed interface screens and composed original music for the Photo CD disc accompanying The Official Photo CD Handbook *(Peachpit Press).*

1. Designing a new car model. After studying the styles of various sports cars, Scaramozzino draws front, side, and top views in FreeHand. Because they're Bézier curves, the lines are defined at intervals by control points that determine the slope and direction of the curve on either side of the point.



2. Moving from 2-D to 3-D. He imports the 2-D profiles into MacroModel and places them on grids on the faces of a box in which the 3-D model will be made (a). To create the 3-D spline curves that produce a smooth final rendering, Scaramozzino uses MacroModel's tools to draw splines that follow the imported 2-D curves, positioning the splines' control points where cuts will be needed later. He clones some of the splines and positions the copies so that all the splines defining the hood, for example, have the same number of points in the same order from left to right to prevent surface twisting (b).





3. Cutting splines to create parts. To fashion various car parts, Scaramozzino cuts some of the splines at their control points to make segments, moving control points where necessary before cutting to position them correctly (in the gap between the hood and fender, for example). He then selects the spline segments belonging to each body part and "skins" them. This technique applies a 3-D surface — akin to stretched rubber — over the splines. Creating the car parts from segments of a single spline makes the whole auto body flow together seamlessly, eliminating gaps between pieces.

4. Rendering the model. Scaramozzino continues creating, cloning, positioning, cutting, and skinning splines to create all parts of the car visible from a front view. He imports the model into Three-D; positions lights and cameras; defines surfaces and reflections; and renders the model, which takes five days on a Quadra 950 with 72 MB of RAM. After completing the front view, Scaramozzino uses this spline-based approach to design, model, and render additional car parts, including the rear (a) and a wheel (b). He retouches all the images in Photoshop before printing.

EXPERT TIPS / BY BOB SCHAFFEL AND CHUCK WEGER

Go Directly to Press

Direct digital presses are revolutionizing the way we print information. So how will this new method of printing affect you?

IT'S HARD TO GO ANYWHERE in the graphic-arts business these days without hearing about direct digital presses. In fact, this topic rates right up there with multimedia as a Hot Issue. Why? Because digital presses have the potential to revolutionize the output side of the publishing industry. What is a direct digital press? It's a printing press that doesn't use plates or conventional inks. Instead of PostScript data going to an imagesetter, page-layout data goes directly to the printing press.

Let's step back for a moment and recall how traditional offset printing works. You take your work to a PostScript service bureau, where your files are RIPped and turned into pieces of film. The printer uses these films to make printing plates for mounting on the cylinders of a printing press. Through the magic of offset, ink is transferred to the paper via the plates.

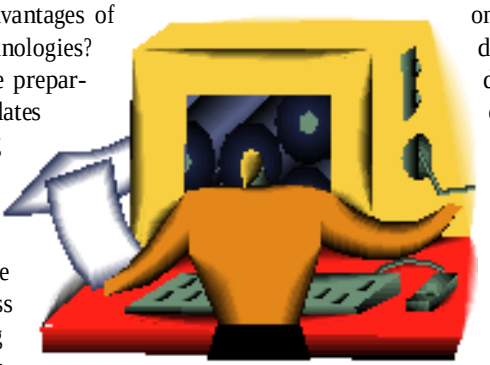
Digital presses change all that. There's no film. There are no plates. There's no ink (not as a real printer would know it, anyway). Thank goodness, there's still paper (no, Veronica, we're not on the Internet yet!).

Currently, there are five major competing technologies and systems: Indigo (E-Print), Xeikon (DCP-1), Agfa (ChromaPress), Xerox (DocuTech), and Scitex. There's also Heidelberg/Presstek, whose GTO-DI bypasses imagesetters and film but still uses conventional printing plates and inks.

Of these, the GTO-DI system is most like a conventional offset press. The Xerox, Xeikon, and Agfa systems use toner-based printing similar to that used in laser printers and copiers. The Indigo system uses a liquid toner, and the Scitex system uses an inkjet spray (similar to that used in its Iris printers).

Each of these represents a technology in its infancy — the GTO-DI was first shown in 1991, the Indigo in 1993 — and each has its merits. It's too early to predict which, if any, will be the long-term favorite. Screening and image quality, although pretty good at this early stage, will undoubtedly improve.

What are the advantages of these new technologies? Speed — no more preparing film and then plates and then going through press makeready. Instead, you can just zip your page from Mac to press (kind of like using a laser printer, but a lot more expensive). Flexibility — because the pages are going directly from computer to press, you can change text and images on the fly (the industry calls these changeable elements "variable data"), much like doing mail-merge in a word-processing program. Convenience — this approach is one more step on the road to "distribute and print" instead of the old "print and distribute." You can print your documents when and where you need them, a kind of just-in-time print process.



What are the disadvantages? Quality — it's palpably lower than that of offset (for now). Cost — it's much higher than that of offset, but higher per-page costs may be ameliorated by the ability to economically print shorter runs. Unemployment — the graphic-arts industry lost a bundle of jobs because of the phasing out of positions for typographers, offset strippers, dot etchers, and so on, largely due to the Mac and PostScript systems. Printing presses haven't been touched by the digital revolution, until now.

A big advantage of digital presses that excites marketing types is the ability to produce finely targeted printing. Some ad agents talk about "atomic" marketing — no, we're not talking Einstein here, but the printing of extremely personalized materials. Is this a Good Thing? It depends entirely on how you feel about direct mail — hey, don't throw that catalog at us!

Do we like this technology? In a word, yes. It's especially good in cases in which the product life of the printed page is short (such as advertising slicks that change with product specs or markets). Variable data is very attractive for some markets, as is the ability to rapidly turn around a complex four-color print job.

To find out if using a direct digital press makes sense for you, consider: How big are your print runs? What kind of paper do you use? (Stocks and sizes are more limited than with conventional offset.) Do you need rapid updates? Most metropolitan areas have several of these presses installed now, so you may be able to get more information locally.

Bob Schaffel is technology director of the Professional Prepress Alliance. Chuck Weger is a consultant and publisher of the Photoshop Monitor *newsletter.*

ILLUSTRATION / JAMES O'BRIEN

SERVERS /

Apple Revs Servers, AppleShare

THE FASTEST POWER MAC to date arrived in April, with the debut of the Apple Workgroup Server 9150/120, a 120-MHz replacement for the 80-MHz Workgroup Server 9150. The Workgroup Server 9150/120 is the top of a new line that also includes the 110-MHz Workgroup Server 8150/110 and the 66-MHz Workgroup Server 6150/66, based on the Power Mac 8100/110 and Power Mac 6100/66 desktop Macs, respectively. And Apple also announced a speed boost on the software side with an upgrade to AppleShare server software for the Power Mac.

All the new servers come with an enhanced bundle of third-party software: Now Up-to-Date and Now Contact, from Now Software; Acrobat Reader, from Adobe; Viper Instant-Access, from IT Design; and FileWave, from Wave Research. Customers who purchase AppleShare with a Workgroup Server also get Server Manager, from Santorini Consulting.

The new Workgroup Servers still carry pre-upgrade price tags, ranging from $2,549 to $8,709 — an effective price drop, given the faster processors and added software. The upgrade kits for the 80-MHz Workgroup Server 8150 and 9150 include System 7.5.1 and Apple RAID Software 1.0.2 but not the third-party software bundle. No upgrade is available for the 60-MHz Workgroup Server 6150.

AppleShare 4.1, which supports only PowerPC-based servers but is not a PowerPC-native application, boasts increased speed, thanks to larger memory caches. Apple says that most of the speed improvements occur with Finder-intensive tasks, such as large-file transfers between server and client. AppleShare's read-ahead and write-behind caches have been increased from 128K to 1 MB each in size. AppleShare Workstation 3.6 client software, released with version 4.1 of the server software, adds a 32K cache.

AppleShare 4.1 and version 3.6 of the workstation software are designed to take full advantage of System 7.5.1, which was released in March. System 7.5.1 includes a new Finder version tuned to speed up network tasks. The company says you'll see maximum speed gains when client and server caching work together, although each component is compatible with older client and AFP server software. Through a licensing program, Apple is allowing other vendors to make their server software compatible with the new client software. Licensees can set a flag within their server software to recognize Apple's new Finder and AppleShare Workstation 3.6. 408-862-3385. / Shelly Brisbin

INTERNET /

Macs Move Up to Server Status on the Internet

NOT TOO LONG AGO, Internet servers had to be high-priced workstations. But now you can make your business a presence on the Internet without Sun's help, thanks to new Web-server software for the Mac.

WebStar, from StarNine (510-649-4949 or info@starnine.com), turns your Mac into a World Wide Web (WWW) server. WebStar — formerly MacHTTP, from BIAP Systems — uses the Apple Thread Manager to support many simultaneous WWW transactions. StarNine claims that WebStar, which begins life at version 3.0, is substantially faster than MacHTTP 2.0. Another improvement is a more complete administration interface, which allows administrators to manage several WebStar servers from a single Mac.

StarNine plans to add security and commercial-transaction features to WebStar, either in a later version or via modular add-ons. WebStar will use the Secure Sockets Layer Protocol (SSL), from Netscape Communications, to authenticate and encrypt user log-ins and passwords; users will need SSL-capable client software, such as Netscape Navigator, to access a protected WebStar server. The First Virtual Internet Payment System will let WebStar servers accept product orders and initiate fund transfers from a customer's First Virtual bank account. WebStar is $695. Current MacHTTP 2.0 owners can upgrade to WebStar for a nominal fee.

Apple is acknowledging Internet growth by including WebStar in a new hardware/software bundle geared toward Internet publishers. The company will distribute a CD-ROM containing WebStar and several popular freeware and commercial applications with three configurations of its Workgroup Servers. Other software in the bundle will include AppleSearch 1.5 (which supports Internet searches), Adobe's Acrobat Pro, Bare Bones Software's BBEdit text editor, run-time versions of Claris FileMaker Pro and HyperCard, Netscape Navigator, and templates for creating HTML (HyperText Markup Language) documents for the World Wide Web. Also included is a collection of CGIs (Common Gateway Interfaces), applications based on AppleScript that allow WebStar to use database programs and other applications in conjunction with the server. This summer Apple will add MacDNS, a domain-name server package, to the bundle. Prices for the hardware/software bundle start at $2,909.

If WebStar hasn't got what you need, wait a little longer: The new InterServer software, from InterCon Systems (800-468-7266, 703-709-5500, or info@intercon.com) will ship in June. Priced at $795, the InterServer package includes WWW, ftp (file-transfer protocol), and Gopher server software. / SB

REMOTE ACCESS /

LanRover Meets NetModem

IT'S A NETWORK MODEM — NO, it's a remote-access server. Actually, it's both, if it's a LanRover running ShivOS Release 3.5. This version of the LanRover software from Shiva (800-977-4482 or 617-252-6300) adds the functionality of the NetModem network modem to the LanRover remote-access server. That means your LanRover hardware can provide dial-out modem access for network users while it's handling incoming remote-access calls.

There's more good news about Release 3.5. Using data-compression techniques licensed from Stac that work with the compression algorithms in V.42bis modems, it will provide faster modem-based connections than past versions could. ShivOS now lets users send faxes via a LanRover, supporting fax software from Delrina (Fax PRO for Mac users and WinFax PRO for PC users). And ShivOS now supports the TACACS protocol, used by UNIX authentication server software, which allows verification of the identities of dial-in callers.

ShivOS Release 3.5 is available for the LanRover/Stack, LanRover/PLUS, LanRover/E&T, and LanRover2E PLUS remote-access servers. Upgrade kits (including required memory) cost $199 to $699. The program also runs on Shiva's new NetModem/E 28.8 modem ($1,999), which the company says is suitable for sites — branch offices, for example — that require only dial-out access. The new NetModem includes an

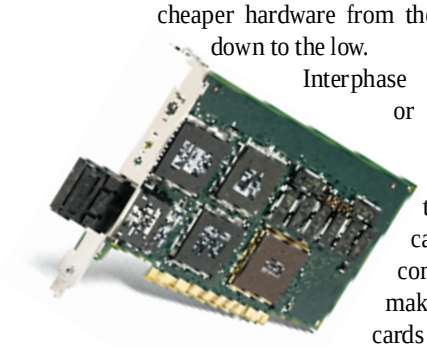
internal V.34 modem as well as support for ARA 1.0 and 2.0 and TCP/IP.

Shiva isn't the only company that's sprucing up its multiprotocol products: Two other manufacturers of remote-access servers, 3Com (800-638-3266 or 408-764-5000) and Microcom (800-822-8224 or 617-551-1000), have added ARA support. Both companies' servers must be administered from a PC. 3Com's AccessBuilder 2000 ($2,795 for four ports, $3,895 for eight ports) supports AppleTalk, TCP/IP, IPX, and NetBEUI network protocols as well as ARA, SLIP, and PPP serial connections. Microcom's LANexpress 2000 (with 14.4-kbps modems) and LANexpress 4000 (with 28.8-kbps modems) support TCP/IP, IPX, and NetBEUI. Prices range from $3,499 to $11,899. / John Rizzo

NETWORK HARDWARE /

Spare Parts for Every Network

THERE'S A BOOM in Mac connectivity products this year, with faster networks and cheaper hardware from the high end on down to the low.



Interphase (800-327-8638 or 214-919-9000) is the latest entrant into the Mac PCI-card market. The company, which makes PCI network cards for PCs, plans two versions of its 5515 PCI ATM (asynchronous-transfer mode) adapter card for Apple's forthcoming PCI-based Macintoshes. The cards will begin shipping when the new Macs become available later this year.

The 155-Mbps adapter supports LAN Emulation, as specified by the ATM Forum. LAN Emulation translates between ATM and networks that use AppleTalk, TCP/IP, IPX, or NetBIOS. Without emulation, network clients using these standard protocols cannot communicate with ATM clients.

The Interphase card will ship with Mac drivers and CellView graphical diagnostic software. CellView enables network managers to configure the card by using simple scripts. The 5515 costs $650 for ATM networks using Category 5 copper cable and $800 for those with fiber-optic cable.

At the opposite end of the networking spectrum is a new line of Mac networking equipment from Linx (800-701-7000 or 415-934-2600). Products available from the company include Ethernet adapters ($79 to $135 apiece), Apple AUI transceivers ($49 to $77), SCSI Ethernet adapters ($235 to $249), 10BASE-T Ethernet hubs ($155 to $229), and LocalTalk-to-Ethernet hardware bridges ($269 to $379). All products include a lifetime warranty and unlimited technical support. Linx sells the products directly, via mail order. / David Kison

PHOTOGRAPHY / MICHAEL FALCONER

NET BYTES

Home on the Net

SURFING THE NET in shark-infested waters? **InterCon Systems** encourages it with the Shark series, a new line of Internet-access software. **MailShark, WebShark,** and **NetShark** look a lot like the company's TCP/Connect integrated Internet application, but they have a simplified configuration. All are intended for the home market. NetShark, due for release in June, combines news, ftp and Gopher, mail, and World Wide Web access. MailShark ($59.95) and WebShark ($19.95) are available now and include e-mail and World Wide Web access, respectively. NetShark will sell for $99.95. 800-468-7266 or 703-709-5500. ✶ **Performance Systems International** (PSI) now offers **Instant InterRamp for the Mac.** InterRamp includes a PSI Internet account and access software based on InterCon Systems' TCP/Connect integrated application. The service costs $9 or $29 per month, depending on usage, plus a $1.50-per-hour fee for additional access. The software is free. 800-774-0852 or 703-904-4100. ✶ **Open Door Networks** (503-488-4127) is offering an innovative way for you to get yourself onto the Internet: by using Apple Remote Access. With an ARA account on Open Door's server, you can use e-mail, the World Wide Web, and other Internet services. Open Door specializes in Mac-based Internet access and offers storage space for World Wide Web pages on its host system with the purchase of an account. Account setup is $20, with a minimum charge of $20 per month for e-mail and Web-page maintenance. ✶ ARA is ordinarily used for remote access to an office network. **Tribe Computerworks** (800-778-7423 or 510-841-3900) does it differently, incorporating remote access for Macs, based on PPP (Point-to-Point Protocol), into its **TribeLink** servers. The newest version, version 8, of the server software adds improved Mac PPP client software and management software. The upgrade is free to owners of TribeLink servers. TribeLink servers also support network dial-out access via Stalker Software's PortShare, available for $295 from Tribe. ✶ The latest

product from **Stalker Software** is **CommuniGate,** a telephone application that supports network fax and also allows you to create automated voice-mail systems. CommuniGate is available for $299. 800-262-4722 or 415-383-7461. / SB

NET TOOLS / BY SHELLY BRISBIN

Fast Ethernet: Wired for Speed

If the promise of blazing network speed is enticing you to upgrade to Fast Ethernet, get expert advice first. Here are some answers to help you decide whether to do it and what you'll need.

Q. *Do I really need Fast Ethernet?*

Most desktop Macs don't move large amounts of data over the network, so they'll gain little from Fast Ethernet. However, printers that can produce camera-ready output are good candidates for an upgrade, as are file servers. Separate these resource hogs from the rest of the network to maximize the benefits of a faster network, and use Fast Ethernet as a *backbone* — the central network that connects slower networks to one another.

Q. *Can I use the same wiring for Fast Ethernet as for 10BASE-T?*

Both Fast Ethernet (100BASE-TX) and standard Ethernet (10BASE-T) use two pairs of wire within an unshielded twisted-pair (UTP) cable. However, many 10BASE-T networks use older Category 3 cable, whereas 100BASE-TX requires Category 5, which has thicker copper and more twists to make it suitable for high-speed networking. You can still use Category 3 cable to connect 10BASE-T segments of the network, but it's a good idea to plan for growth by upgrading as much wiring as possible.

Q. *How do I know whether my current wiring is Category 3 or Category 5 — and does Category 5 cost a lot more?*

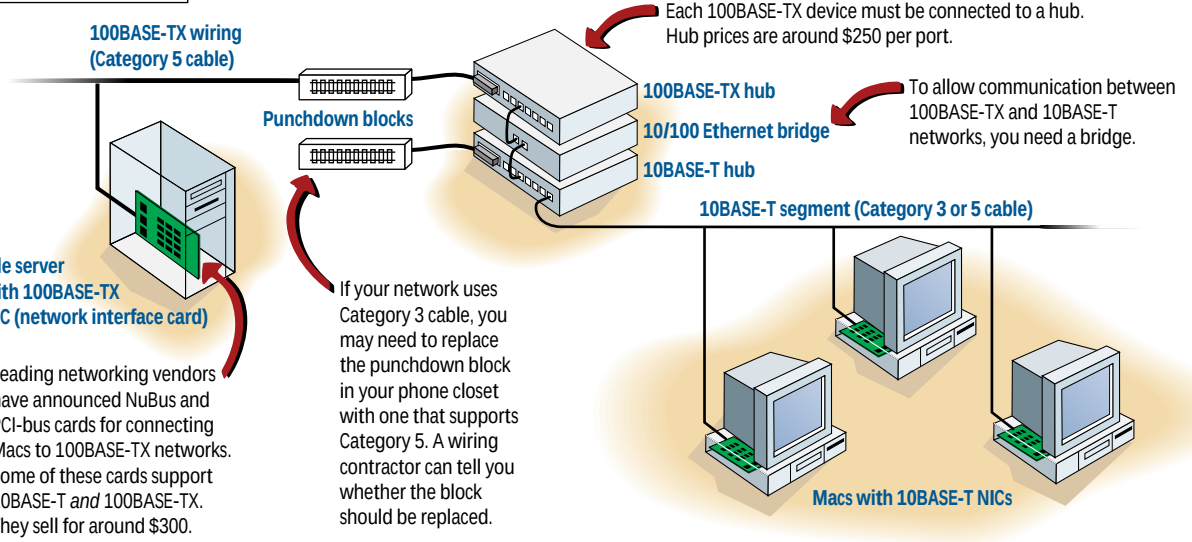
If your network was wired more than a year ago, it probably uses Category 3 cable, which must be upgraded for 100BASE-TX. The category number may be printed on the cable itself. If it's not there, ask a wiring contractor to tell you what you have. Category 5 cable is only slightly more expensive than Category 3. However, you also have to make room in your budget for rewiring, which is labor-intensive, and for a few new pieces of equipment that are available from traditional Mac vendors such as Apple, Asanté, and Farallon (see "What You Need").

Q. *Is 100BASE-TX my only speedy-network option?*

100BASE-TX is one of two Fast Ethernet topologies. The other, 100BASE-T4, lets you create networks with four-pair, Category 3 cable (but if your current Ethernet shares Category 3 cable with a phone system or another network, it probably doesn't have the wire to spare for 100BASE-T4). 100VG AnyLAN is another high-speed Ethernet standard, which is popular on the PC side. Because all three technologies are new, it's unclear whether it will be possible to connect networks that use different standards. Neither 100BASE-T4 nor 100VG AnyLAN has developed a following among Mac-networking vendors yet, though, so 100BASE-TX looks like your best choice today.

ILLUSTRATION / DAVID LEMLEY, SEATTLE

WHAT YOU NEED



MAC TO PC / BY JOHN RIZZO

The Universal Client

Four new Mac-to-PC networking products look toward a new era in cross-platform communications — even though they work with PCs.

THE STATE OF THE ART in Mac-to-PC networking is advancing, thanks to a new batch of networking products. These products move PCs and Macs a step closer to the goal of becoming universal clients — machines you can use on any network, regardless of operating system or network protocol. None of these products gets installed in a System Folder or fits into a NuBus slot, though — they're all products for Wintel PCs.

Why are these products showing up on the PC side? There are compelling technical reasons for vendors to focus on the PC side right now. PCs just aren't as easy to network as Macs, so they need to catch up in the march toward universal clienthood. Network applications for universal clients need to run on multiple types of networks, so the applications should be separate from the network protocols. With the Mac, it's clear that the MacIPX and MacTCP control panels aren't part of any application. With the PC, the protocol/application distinction is blurred and users also have to contend with obscurely named files (NET.CFG, for example) scattered in lots of directories.

The most recent crop of Mac-to-PC products attempts to give PCs more-Mac-like ease of networking while supporting a wider range of networking standards. These products include new AppleShare-for-Windows software from Apple and Miramar, a PC-to-multiprotocol-LAN connectivity device from Apexx Technology, and PC-based remote-control software from Farallon. Together, they promise easier collaboration and a more plug-and-play type of networking in cross-platform environments.

Personal MACLAN Connect ($199 list), from Miramar (800-862-2526 or 805-966-2432), has been around for several years, but version 5.0 takes a big step toward universal clienthood by providing two-way file sharing and printing for Mac/PC networks. The software gives PCs the file-sharing capability of System 7 Macs and lets Macs access PC hard disks as well. This combination of features is a first; previous products offered either one capability or the other.

At the heart of version 5.0 is Miramar's revitalized, speedier AppleTalk protocol stack for Windows. Through the use of PC-standard NDIS and ODI drivers, the new stack enables PCs to stay connected to PC servers while communicating with AppleTalk devices. The new protocol stack also supports modern Windows programming standards — including the use of 32-bit code and the avoidance of memory-hogging DOS TSRs (memory-resident programs) — making AppleTalk a much more attractive option than it has been up to now for PC networking and PC developers.

Apple (408-996-1010) is using Miramar's AppleTalk protocol stack, rather than Farallon's older stack, in AppleShare Client for Windows (estimated street price, $199). Apple's application doesn't give Macs access to PCs but does give PCs access to AppleShare-compatible file servers and Mac volumes shared with System 7 file sharing.

On the hardware side of networking, what's new is the EtherChain ($349), a second-generation parallel-port network connector for PCs, from Apexx (800-767-4858 or 208-336-9400), that can connect Wintel laptops to your network. There have been numerous parallel-port-to-LocalTalk connectors (including Apexx's PCTalk), but the EtherChain is the first parallel-port-to-Ethernet connector. It uses Farallon's EtherWave technology to give PCs access to Mac or PC 10BASE-T Ethernet networks, using a daisy-chain configuration — that is, without requiring a hub.

You can use the EtherChain to connect a PC laptop to NetWare-, LAN Manager-, and TCP/IP-based LANs as well as a dozen other flavors of Mac and PC Ethernet networks. Drivers for AppleTalk, NDIS, and ODI are included. The ODI driver supports both the new Miramar AppleTalk stack (so it works with Personal MACLAN Connect and AppleShare Client for Windows) and Farallon's AppleTalk stack (Farallon's PhoneNET PC and Timbuktu for Windows software are among the items in the EtherChain package). Although the EtherChain's multiprotocol nature embodies the spirit of the universal client, the PC itself does not, and you can run into trouble if you install the Miramar software on a PC that already has the older Farallon software. The two AppleTalk stacks are incompatible, so you'll have

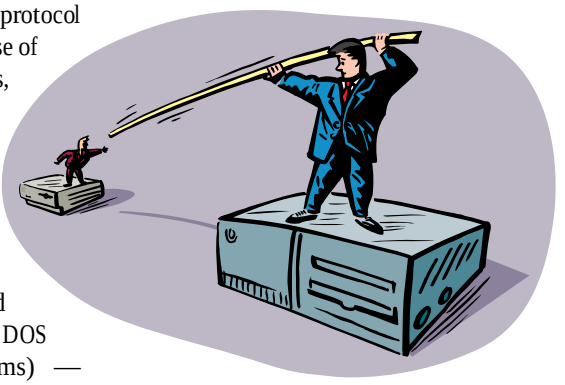


ILLUSTRATION / LIN WILSON

to remove all the traces of one (scattered in various directories) before getting the other to work. If you have a choice of the two stacks, pick Miramar's, since it's faster and lets the PC stay connected to a PC network while using AppleTalk.

The new Timbuktu Pro for Networks, Windows Edition (estimated street price for two users, $139), from Farallon (510-814-5100), also moves PCs toward universal clienthood, but it takes a different route. Instead of supporting AppleTalk, as in the previous Windows version, "TPN Win" supports TCP/IP and Novell's IPX protocol. Because you can use the IP protocol to communicate with Macs running the existing Timbuktu Pro product, you can create Mac-to-PC Timbuktu links over the Internet.

By avoiding AppleTalk, Farallon seems to be aiming TPN Win at enterprise environments. However, even at large sites, AppleTalk does exist in workgroups. Farallon has indicated that AppleTalk may be supported in a future version. It has also indicated that TPN Win and the older Timbuktu for Windows will eventually be able to use Miramar's AppleTalk stack.

TPN Win enables users to view and control Macs from PCs (and vice versa) as well as to send files and messages. But it also offers features that aren't available with Timbuktu Pro for Mac or Farallon's Windows-only competitors. For instance, TPN Win includes built-in remote access, using Shiva's PPP (Point-to-Point Protocol), a PC remote-access standard since its adoption by Microsoft. A Mac "edition" of Timbuktu Pro for Networks is due soon.

Mac to Win . . . 96?

We'll see some other major steps toward the universal client later this year. On the Mac side, Novell's Macintosh Client for NetWare will enable Macs to run any type of NetWare software that PCs run, and it will make adding Macs to a server configuration as easy as adding PCs. Apple's Open Transport, a complete rewriting of the Mac's network system software, will lessen the Mac's reliance on AppleTalk, by making other protocols as easily available to applications as AppleTalk is now. Both developments are expected in the middle of this year.

The most significant event on the PC side will be the appearance of Windows 95, Microsoft's successor to the Windows 3.1 operating system. Windows 95 is supposed to make PC networking easier for protocols, applications, and hardware, and it should clear up some of the current hassles of configuring network software.

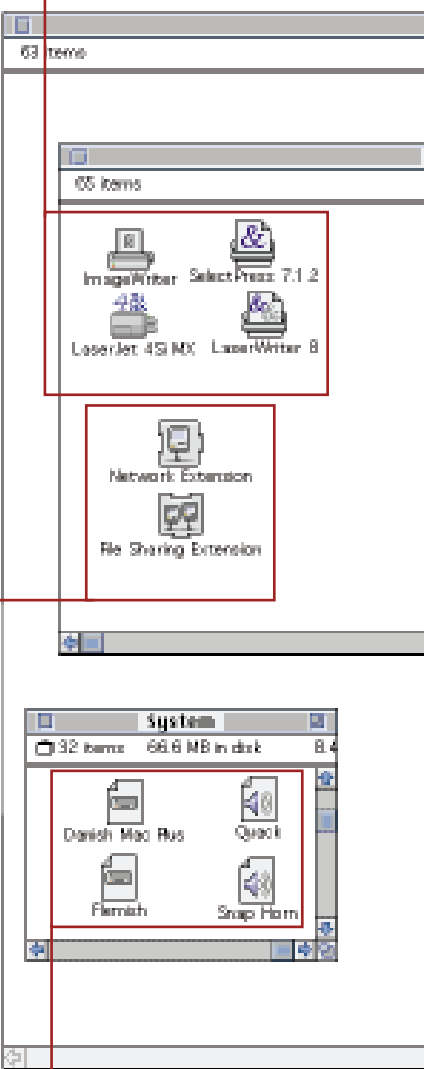
Apple and Miramar have promised AppleTalk applications for Windows 95, and Apexx, Farallon, and most other networking companies have promised Windows 95 compatibility as well. At press time, the scheduled ship date for the new Microsoft OS was in August, but most software developers I've talked to won't put money on it. So for now, those of you putting PCs on your Mac networks may want to get better acquainted with your NET.CFG files.

John Rizzo is the author of MacUser Guide to Connectivity *and* How Macs Work.

HANDS ON

10 STEPS to a Slim System

FREE UP HARD-DISK SPACE, reduce the likelihood of crashing, and speed up your Mac without spending a cent. Here are ten ways to reclaim many megabytes of valuable disk real estate by doing some belated spring cleaning in your System Folder. / BY TED LANDAU



It's never too soon to discard the rubble from your System Folder. Surprisingly, a cleanup is in order even if you took your Mac out of the box yesterday. Every time you load system software or a new program, files you may not need appear in your System Folder. The trick is to know which files to trash and which ones to keep. The following techniques should help you discriminate, but be sure to make copies on floppy disks of all files destined for the Trash before you throw them out. You may decide later that you need them.

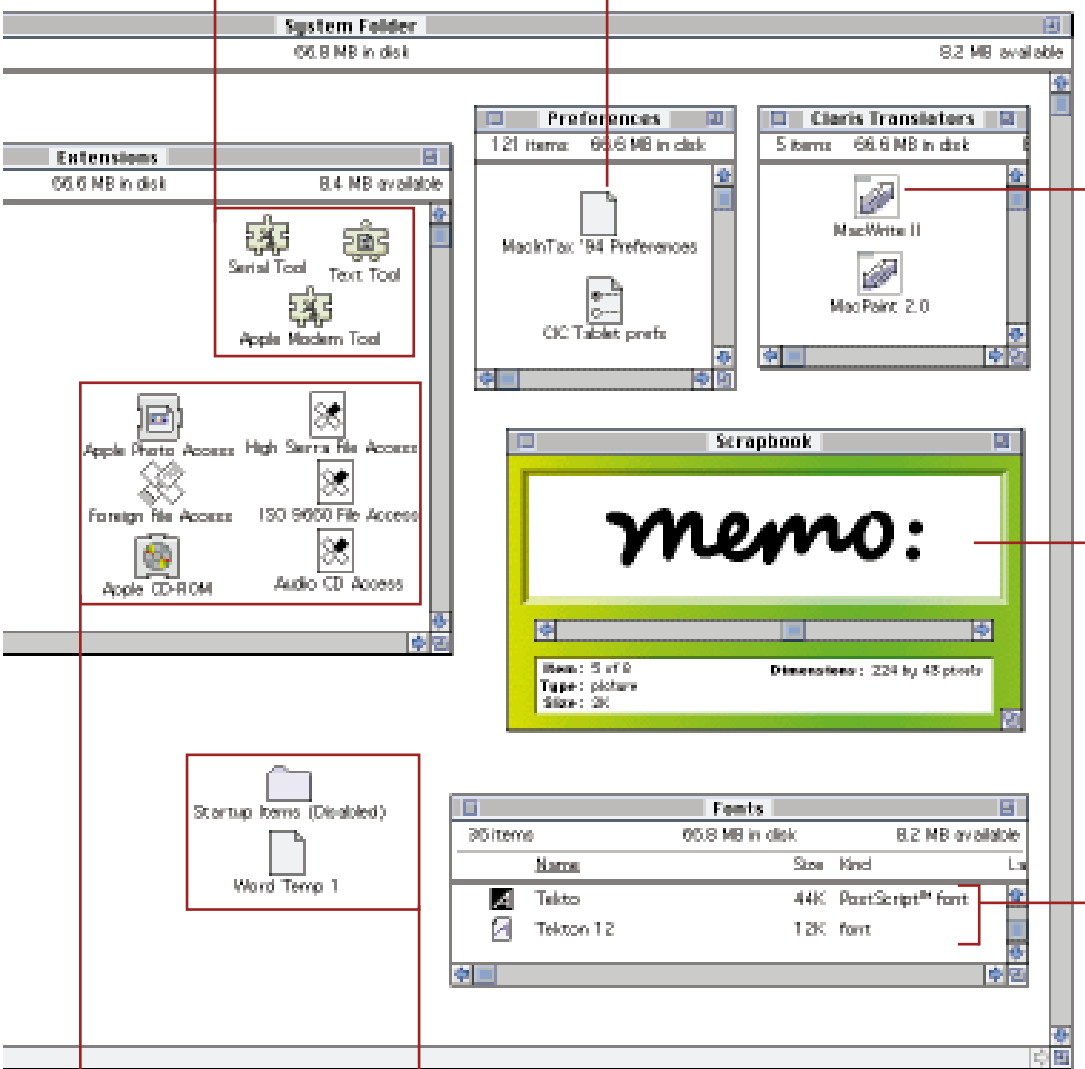
1. Printer Drivers

You can trash all printer drivers except the ones for the printers connected to your Mac. (You'll find the whole lot of them in your Extensions folder.) Besides discarding the obvious, such as a driver for an inkjet printer you don't have, PostScript LaserWriter users can throw out either the LaserWriter driver or the newer LaserWriter 8 driver. You're not likely to need both.

Unless you use the LaserWriter 8 driver, you can also discard the entire Printer Descriptions folder. Even if you do use LaserWriter 8, you can still discard everything in this folder except the description file for the printer you use. It's a good idea to keep the file called General.

2. CD-ROM Software

If you don't have a CD-ROM drive, you have some expendable files: the CD-ROM-related extensions Apple CD-ROM, Apple Photo Access, Foreign File Access, Audio CD File Access, ISO 9660 File Access, and High Sierra File Access. The AppleCD Audio Player from the Apple Menu Items folder and the AppleCD Speed Switch control panel are also only taking up space. Delete them.



4. You can trash at least some of these files if you don't use a modem.

6. You may have missed some pieces when removing old programs. Check the Preferences folder for hangers-on.

9. Translator files for programs you'll never use can be deleted from the Claris Translators folder.

7. Among the expendable items in the Apple Menu Items folder are Scrapbook graphics you don't anticipate ever using.

5. You can get rid of fonts you don't use. For PostScript fonts, be sure to remove both printer (top) and screen (bottom) fonts.

2. If you don't use a CD-ROM drive, you can trash these files.

10. Many files and folders with words such as *Temp* or *Disabled* in their names can be trashed.

3. File-Sharing and Networking Software

If you are not on a network, you can chuck a wide array of extensions and control panels, including all files with the words *Sharing, Share, Network,* or *Token* in their name. You can use Find File to locate them, but the best way to remove them is with the Custom Remove option of the System 7.5 Installer (see the "Installer as Janitor" sidebar).

4. Communication Files

After you've installed certain applications, such as ClarisWorks, you may find a collection of communication tools with puzzle-shaped icons, such as Apple Modem Tool, Text Tool, and Serial Tool, in your Extensions folder. If you don't use a modem, you can get rid of the first two files. You can also trash the Serial Tool unless you have a device, such as an Apple QuickTake camera, that requires it.

Installer as Janitor

THE INSTALLER UTILITIES included with Apple's system software can be handy assistants in maintaining a lean System Folder. And System 7.5's Installer gives you more control than before. For starters, the Custom Install option lets you choose which items, such as printer drivers and control panels, you want to install. Conversely, Custom Remove makes it easy to delete unwanted files you've already installed. This is useful, since it's not easy to identify some System Folder files. For instance, Custom Remove can remove sets of related files, such as all networking software, without your having to first learn what files are part of the category (it doesn't remove associated Preferences files, though).

The corpulent portions of System 7.5 — QuickDraw GX, PowerTalk, and PlainTalk — come with separate Installers, which makes it easy to leave those portions out. If you've already installed them and don't want them, you can use Custom Remove to get rid of two of them: QuickDraw GX and PlainTalk. Unfortunately, Apple chose to omit the Custom Remove option from the PowerTalk Installer, so you'll have to trash PowerTalk manually.

There are other times when the Custom Install and Custom Remove options don't provide the level of control you might like. For example, you can't select which System 7.5 extensions to install or remove. And the PlainTalk Installer doesn't let you select which voice files (located in the Voices folder in the Extensions folder) to install. In these cases, you still have to depend on the Finder's trusty Trash.

5. Font Files

You probably have fonts in your Fonts folder (or System Folder if you use system software older than 7.1) that you'll never ever use. Trash them. For PostScript fonts, be sure to delete both the printer-font files and the corresponding screen-font files. PostScript printer fonts are identifiable by their Kind description, which is "PostScript font." PostScript screen fonts have a Kind description that says either "font suitcase" or "font," and the letters on their icons are just one size rather than multiple sizes.

Adobe Type Manager (ATM) can also help you save space. As long as you have a PostScript screen font installed in at least one size, ATM will create other sizes as you need them, so you can trash all but one size.

6. Preferences Files

When you remove a program from your hard disk, you may miss some of the pieces, particularly those tucked away in the Preferences folder. You can remove these pieces manually or use a utility such as ZiffNet/Mac's Clean Sweep or the shareware Prefs Cleaner. Either can help you find straggling preferences files. (Clean Sweep also hunts for other "junk" files, such as duplicates and empty files.) Clean Sweep is available exclusively on ZiffNet/Mac (see end of article), and Prefs Cleaner is available on all major on-line services. If you don't have access to an on-line service, try contacting a Mac user group.

Files in the File Sharing folder are one type of file cluttering up your Preferences folder that these utilities may not find. If you have such a folder, it contains files for every CD-ROM you've ever mounted while file sharing was active. You can delete all these files. The Mac will create new ones if you ever remount the discs.

7. Apple-Menu Items

Some of the Apple-menu items included with your system software, such as Apple's Jigsaw Puzzle, are of minimal utility at best. Delete any that have gone into hibernation on your disk. Also, open the Scrapbook and cut any items you don't want.

8. The System File

When was the last time you needed to use the Flemish keyboard layout? There are many keyboard layouts you'll probably never use. Double-click on the System icon to open its window, and trash the unused layouts you find there. You can trash *all* the layouts if you want — the default layout, U.S., is built in to the system software.

You can whittle down the sound files also. Unless you want the variety, discard all the sound files except the one you prefer as your alert sound.

9. The Claris Folder

If you use Claris products, you may have some unneeded files buried a couple of folders deep in your System Folder. Claris programs, as well as some others, use translator files that let you use a Claris program to open documents created by other programs. Delete any files from the Claris Translators folder, in the Claris folder, for formats you never expect to translate. For example, the Microsoft Works DB/SS file is necessary only if you expect to open an MS Works database or spreadsheet file from within a Claris program.

If you don't rely on the disk-based help that's included with Claris products, delete the Help files (some of which can exceed 1 MB in size) from the Claris folder. And if you don't use the Claris spelling checker or thesaurus, trash the Dictionary and Thesaurus files.

Aldus programs also store some unnecessary items in the System Folder. You can delete the TeachText program and the Aldus Installer utility from the Aldus folder.

10. Defunct Files

Check all folders that end in *(Disabled)*. You might as well delete them if they're going to remain disabled permanently. Also, delete folders in the System Folder with names such as Temporary Folder and Duplicate Items. Delete files with titles that contain *Temp* or *Temporary*. It's best to quit all applications except the Finder before trashing these folders and files.

When in Doubt

If you're waffling about whether or not to delete a file, because you're not sure what it does, you may get a useful explanation by using Balloon Help. ZiffNet/Mac users should also check the short report in the MacWEEK Forum called SYSFOL.TXT (see end of article). It summarizes the function of most System 7.5 extensions and control panels. *Macintosh System 7.5 for Dummies* (San Mateo, CA: IDG Books, 1994), by *MacUser* contributing editor Bob LeVitus, includes a similar listing, along with Bob's opinions on what's worth keeping and what isn't.

Once you get rolling, you're sure to discover many other files eligible for the torch. From the Launcher to the Graphing Calculator, the basic rule is this: If you don't use it, incinerate it.

Ted Landau solves more Mac mysteries in the second edition of his troubleshooting book, Sad Macs, Bombs, and Other Disasters.

You can find the programs referenced in this article in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See How to Reach Us for instructions on accessing ZiffNet/Mac.

MOBILE MAC / BY SHARON ZARDETTO AKER

Leaks, Docks, and Patches

Call it a mixed bouquet, call it a passel of updates — here's the latest in issues ranging from Technöggin trade-ins to new docking stations.

INPUT FROM READERS, sometimes-heated discussions with PowerBook-product makers, mistakes in software documentation, and new developments in the PowerBook world have prompted me to update some Mobile Mac columns from the last 12 months. Here are the highlights:

Assault on Batteries

Did you get scorched by one of the leaky Technöggin batteries? You can get a replacement but not from Technöggin. For a discounted replacement, you'll have to turn to VST Systems (508-287-4600) or perhaps the reseller that sold you that battery.

I first heard about one of the faulty batteries when colleague Bob LeVitus mentioned that his Technöggin battery leaked through his carrying case and onto his lap — ouch! But I didn't report it in my January '95 column on batteries (page 123) because at that point, it appeared to be an isolated incident. Months later, I found out that Bob's leaky unit may have been the rule rather than the exception. In fact, Technöggin — placing blame on the battery-cell manufacturer — notified registered users that its batteries were dangerous and should be disposed of immediately. Technöggin offered no replacements and no refunds and ceased doing business. Company president Paul Allen explained to me that he closed down Technöggin out of concern for his customers. Too bad he didn't show concern for his customers by investing in the kind of product-liability insurance that might have taken care of all the abandoned battery users.

In that same column, I mentioned that competitor VST Systems used the same cells from the same manufacturer as Technöggin, yet the VST batteries posed no threat to their users' laps. Vince Fedele, head honcho of VST Systems, explained that VST caught virtually all problems with the cells during the quality-control process.

VST now buys cells from a different manufacturer and offers trade-ins for Technöggin batteries: Send in your Technöggin PowerPlate 3x or Mini 3, and get $30 off a VST ThinPack; send in a Technöggin 5x or Ultra 5, and get $60 off a ThinPack Plus.

If you bought your Technöggin through MacConnection, you can get a discount on a BTI battery. Call 800-800-4444, and ask for customer support. If you shopped through MacWarehouse, call its customer-support line at 800-925-6227 for discounts on trade-ins.

Honorable Discharge

There's a new device for the important task of reconditioning NiCd batteries. As I mentioned in the column on batteries, battery-management utilities don't get the NiCd

POWERBOOK SECRETS / *the Duo dilemma*

DUO BATTERIES KEEP IMPROVING, but their ease of use seems to be heading in the opposite direction. There are three models, cleverly named Type I, Type II, and Type III (you'll find the name right on the battery); they are, respectively, .95, 1.4, and 1.6 ampere-hours. Type III provides more than twice the battery life of Type I.

So, what's the problem? You may need specific software if you use a Type II or Type III battery. Wait, it gets more complicated — the software differs according to the system software you're running.

This may help clear up the confusion: For Type II batteries (which shipped in the Duo 250, 270c, and some 280s), System 7.1 users need Duo Enabler 1.0 *and* the Duo Battery Patch extension. System 7.1.1 users need Duo Enabler 2.0, which has Battery Patch rolled in. If you're in this group and previously installed Battery Patch, you can trash it. (You can't use Duo Enabler 2.0 with System 7.1.) For Type III batteries (which shipped in some 280s and the 280c), System 7.1 users need Duo Enabler 1.0 and the Type III Battery extension. System 7.1.1 users need Duo Enabler 2.0 and the Type III Battery extension.

All of these enablers and extensions are readily available from the Apple support forums on most on-line services. But the easiest way around this whole mix-and-match game might be to switch to System 7.5, which doesn't require enablers or battery extensions for Duo battery use. / Rich Wolfson

figure 1 / **Docking-station convenience** is now available to 500-series PowerBook owners who get the BookEndz 500 Series, from Pilot Technologies.

battery cells all the way down to the recommended 1 volt. And hardware dischargers can be costly — unless you get the inexpensive Power Conditioner (approximately $15), from Shoreline Electronics (408-987-7733). It's inexpensive partly because it only discharges the battery and leaves the recharging up to you. That's no problem, since you can recharge it with your PowerBook. The reconditioner is roughly the size of a battery case and, in fact, can be used as one if you turn off the discharge switch.

Back-Word Compatible

So far, using Microsoft Word 6 on a PowerBook is, at best, an April Fool's joke, as I pointed out in my April '95 column (page 117). If, like me, you're switching back to Word 5 but still need to work with Word 6 documents (because, for instance, you use Word 6 on your desktop machine or you receive Word 6 files from other users), you'll need software that can translate Word 6 files into Word 5 files. Microsoft has created a filter that does just that. You can find it in Microsoft's libraries in the company's Desktop Application forum (GO:MSDTAPP) on CompuServe. The file's called Word 6.0 for Windows&Macintosh.

If you're sticking with Word 6, allocating memory wisely is of the utmost importance. For detailed information on making the most of Word 6 on a PowerBook, have a look at my April column, but keep in mind this correction: If you've allotted more than 6 MB of RAM to Word, you can set the BITMAPMEMORY amount to as high as 3 MB to get more speed when working with lots of graphics. Based on some misinformation in Microsoft's tech note on Word 6, I suggested lowering the BITMAPMEMORY amount to 512K. (The tech note falsely stated that Word 6 sets aside 1 MB of memory for bit-mapped graphics. The truth is that Word can use *up to* 1 MB for bit maps. You can make Word use more by adjusting the BITMAPMEMORY amount.) Decreasing it may actually slow you down — just what you need!

AppleTalk at Home

I wrote about TANs (tiny-area networks) nearly a year ago. Although I've had one of these (my PowerBook, my desk machine, my printer, and a dangling connector for visitors who want to connect to the network — really!) for as long as I've had my PowerBook, moving to a new house meant that I had to create a new, larger home network. I took the bold step of moving up to installing a full-scale AppleTalk network. And I did it by using phone line, so I can connect any of my Mac devices without having to string wire.

You too have an AppleTalk network waiting to happen. Phone lines consist of at least four wires, only two of which (usually the red and the green ones) are used by the phone; the other two are just sitting there doing nothing. Anywhere that you have a phone jack, you have a potential network connection.

Once you've installed an AppleTalk network, you can have such luxuries as printing to the LaserWriter in your office from the PowerBook you're using in the front room. Next year: Ethernet at home? Wireless? Both?

PB 500 Dockers

Now there's a docking station for the 500 series of PowerBooks; that station is the one item that wasn't ready in time for my roundup of 500-series products in the March '95 issue (page 125). The BookEndz 500 Series (see figure 1), from Pilot Technologies (612-828-6002), makes a potentially awkward situation a breeze: It holds the printer/network, phone, and power cords in position, so all you have to do is slip the PowerBook in and out.

BookEndz comes in two flavors: with an Ethernet pass-through adapter ($175) and without ($150).

PowerMerge Trip

Grandiose. That's how Nelson Greenwood, of Leader Technology, described my comments on file-synchronization software in my December '94 column (page 147). Grandiose? Who, me? I simply observed that this category of software seemed to have lost its initial importance. That observation was based solely on the lack of Macworld Expo hoopla surrounding such software. I myself use Leader Technology's PowerMerge for syncing and backing up.

A Secret Date

I often recommend the company DriveSavers and have mentioned it more than once in these pages. It specializes in retrieving data from crashed hard drives. If the folks at DriveSavers can't retrieve your data, you're not likely to find anyone who can. One thing I never mentioned about them, because I didn't know it, was a secret contest they've been running, one I accidentally entered.

It started quite uneventfully — I saw the DriveSavers phone number, 800-440-1904, and noticed that it was significant for a company that deals with Macs. When I mentioned this to them, their reaction was explosive: They had purposely chosen the number and had waited for *years* for someone to notice. A few days later, I received a DriveSavers mug filled with Life Savers!

If you understand the mystery behind that number and want to cash in on your vast Macintosh-trivia knowledge, you can call DriveSavers, but I wouldn't. For all I know, they're out of prizes. Instead, send your guesses to me (see the end of this article for information on how to contact me), and I'll suitably reward the first correct answer with a brand-spanking-new *MacUser* T-shirt.

Collaborative Efforts

Feedback from readers and colleagues inspires this columnist to report on the many changes that come along in PowerBook computing. Keep those cards and letters coming to *MacUser*, and keep the e-mail flowing to 74774,27 on CompuServe.

Sharon Aker is still happy with her PowerBook 170 after all these years. When Rich Wolfson isn't writing about PowerBooks, he's busily installing modems and memory in the 520s at the university where he works.

NET TRAVELER / BY MICHAEL SWAINE

Virtual Vacation

From Paris to California, from Iceland to the beach: Travel the world from your desktop.

YOU SWOOP DOWN INTO PARIS out of the virtual sky. Leaving the satellite view of the Virtual Tourist World Map (http://wings.buffalo.edu/world/), you dive into the City of Light. Seconds later, you're investigating lodging and dining at http://www.calvacom.fr/relais/france/paris/paris.html. What a way to research ideas for your summer vacation: clicking your way around the planet on the World Wide Web.

Virtual Museum. Let's see, you've been to the Louvre and seen the Mona Lisa, but you recall how Mona's sly grin was deconstructed in the April *Scientific American* by computer artist Lillian Schwartz. Coincidentally, she's exhibiting her own work just now at (click) the Pompidou Center: http://www.cnac-gp.fr/horaires.html. Now you're wishing your French were better.

Well, there's always the Smithsonian at http://www.si.edu/. Maybe the kids would prefer the interactive science exhibits at San Francisco's Exploratorium (http://www.exploratorium.edu/) or a theme park picked from the list at Stanford's Yahoo site: http://www.yahoo.com/Entertainment/Amusement_Parks/.

Once you've put the little ones on the roller coaster, send the teens to the Lollapalooza Electric Carnival, companion to the music festival of the same name (http://lollapalooza.com).

The WWW's a Stage. By some odd neural link, this makes you think: theater. The obvious destinations are Broadway (http://www.escape.com/eMall/exploreny/broadway/bway1.html) and London (http://www.nag.co.uk/0/Homes/RobertI/Theatre.html), but you've never been one for the obvious. Pausing briefly to check the weather (http://rs560.cl.msu.edu/weather/interactive.html) and bed-and-breakfast vacancies in northern California (http://www.baynet.com/bb/list.html), you click over to read through the theatrical offerings at Shakespeare Santa Cruz (http://www.circus.com/~jasona/shakespeareSantaCruz.html). Looks good.

During the days, you can tour mountain wineries (http://www.wines.com/scevents.html). Or maybe you'll stay on the East Coast and explore New York at http://www.escape.com/eMall/exploreny/ny1.html.

Natural Highs. But now you're getting into something completely different, as you click back and forth between http://www.gorp.com/ and http://www.yahoo.com/Entertainment/Outdoors/ for information on hiking, backpacking, climbing, canoeing, kayaking, rafting, and so on. You check the Major League Baseball schedule, if any, at http://www.cs.rochester.edu/cgi-bin/ferguson/mlb. Let's see . . . nude beaches at http://www.realtime.net:80/~kr4ah/.

How about something even more different? Spelunking. That's it. Why don't you visit a nice cool cave. And, of course, the primo place for *real* cavers is Iceland. Let's see, Icelandic spelunking . . . that would be http://www.strengur.is/~throstur/cave/cave.html.

Home on the Home Page. Eager though you are to crawl on your belly under the Icelandic countryside, maybe this would be a good year to stay home and face some of those repairs you've been putting off. You screen the *Popular Mechanics* QuickTime home-repair videos at http://popularmechanics.com/. Better yet, you could just kick back, sip proper mint juleps (the Internet Bartender's Guide is at http://www.mcs.com/~doc/guide.html), and click on the Electronic Newsstand (http://www.enews.com/) to get caught up on your summer reading.

Then it hits you. There's a whole world to explore. *It's all here.* You'll spend your summer in cyberspace.

Tip of the Month

If you're using an old version (1.x) of NCSA Mosaic, get yourself a newer one or switch to MacWeb or Netscape. The older Mosaic

doesn't support forms — a nifty feature that lets you search or enter information on Web pages. Get up-to-date at http://www.ncsa.uiuc.edu/SDG/Software/MacMosaic/MacMosaicHome.html.

Don't Know HTTP from HDTV?

MacUser maintains a list of frequently asked questions (FAQs) about the Internet, *MacUser* itself, and this column specifically. Send mail to faq@macuser.ziff.com. *MacUser*'s World Wide Web address is http://www.macuser.ziff.com/~macuser/. You can reach me at traveler@macuser.ziff.com.

ILLUSTRATION / LIN WILSON

BY CHRISTOPHER BREEN AND BOB LEVITUS

Help Folder

A slew of tips for those who never want to lift their fingers from the keyboard, advice on buying memory chips, and an introduction to the Web.

The Keys to Mac Survival

Q. Could you print a list of all the combinations of Command, Option, Control, Escape, Slice, and Dice keys that enable such mysterious and marvelous feats as turning off extensions, rebuilding the desktop, quitting frozen programs, and zapping PRAM? As it is now, I simply use the two-elbow method, in which I mash down as many keys as possible and wait to see what happens.

Bill Knauer
via CompuServe

BOB: Your wish is our command. Here are a few sequences you hold down at startup:

• To rebuild the desktop, hold down Command-Option. This can solve such problems as icons that turn generic or recurring application-can't-be-found messages.

• Hold down the Shift key at startup to turn off all extensions and control panels, a troubleshooting technique.

• The Command-Option-P-R combo zaps the parameter RAM (PRAM), a technique to try when such settings as time and date are out of whack.

• Delete-Option-Command-Shift (DOCS is the easy-to-remember acronym) lets you boot from an external hard disk (as long as it has a valid System Folder).

CHRIS: And here are a few that work after you've already fired up your Mac. (Keep in mind, however, that the combinations that use the power key don't work with older Macs such as the IIfx.)

• The deadly Command-Option-Esc lets you force-quit an application. Make sure you restart after this one, or your Mac is likely to crash.

• If you need to restart your Mac in an emergency situation, such as a crash, press Command–Control–power-key.

• For those times when the only thing that will soothe your soul is a bit of programming, press Command–power-key to access the debugger.

• And for fun, press Command–power-key just as your screen goes dark at restart. You'll hear a rare sound — the error tone your Mac plays when it fails its hardware-diagnostic test at startup.

BOB: For a complete list, check out the August '94 article "75 Ways to Raise Your Mac IQ" (page 72).

CHRIS: Or have a look at the Finder Shortcuts on the Balloon Help menu. You'll learn such tricks as arranging icons in alphabetical order (Option+Clean Up) and trashing locked files (Option+Empty Trash).

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.

MacPhone

Q. Is there software for a Centris 610 that lets you make and answer calls directly from the computer?

Bill Pugh
via the Internet

CHRIS: It's a good-news/bad-news situation. By the time you read this, some exciting things will be emerging on the Mac-telephony front. Regrettably, since you don't have a GeoPort Mac (AV Quadras and Power Macs are currently the only GeoPort-compatible Macs), you'll be cheering from the sidelines until someone offers GeoPort-on-a-NuBus-card.

figure 1 / **Can your Mac substitute** for your telephone? Apple's GeoPort Telecom Adapter Kit includes updated telecom software as well as telephony software that lets a Mac make and receive calls.

Apple's GeoPort Telecom Adapter Kit should be available by now from the usual sources. This package, which has an estimated street price of $130, turns GeoPort-equipped computers into digital answering machines and speakerphones — using a PlainTalk microphone for voice input. GeoPort users will also be able to receive faxes directly in their PowerTalk In Trays as well as send faxes by dragging and dropping documents to a QuickDraw GX printer driver.

BOB: I guess the real question is, Do I really want to use the GeoPort? I've heard a lot of bad things about the GeoPort over the years. For instance, using software to perform the functions of a modem was reported to slow down the Mac. Recently, though, the buzz has been that the GeoPort has improved. The new kit from Apple may make the GeoPort capable of what it was predicted to do — not only work as a fax modem but also replace your telephone.

CHRIS: The kit contains the GeoPort adapter

pod, version 2.0 of Apple's telecom software, Aladdin's SITcomm Special Edition, and some telephony applications from Cypress Research (see figure 1). Upgrades for current GeoPort owners are available free on-line.

SIMM Pity

Q. I'd like to get more RAM for my Mac, but while I'm at it, I'd like to invest in RAM SIMMs I can reuse if I ever get a newer Mac. Is there any way to get the modern 72-pin SIMMs to work in my IIci, which normally requires the old-style 30-pin SIMMs?

Sten Kristian Finckenhagen
Sandviken, Norway

CHRIS: As the owner of a couple of thousand LPs, I want you to know that I feel your pain. Although someday there may be a way to play my LPs on a laser-equipped device, there's no way my turntable is ever going to do anything but a very poor impression of a lathe on my prized Elvis Costello CDs. You're asking for *forward* compatibility, and Sten, my friend, that's not how the world works.

But Bob and I aren't being paid to leave you in the lurch. Although I was unable to locate any adapters that allow you to plug 72-pin SIMMs in to a 30-pin slot, there are adapters that let you gang 30-pin SIMMs onto a card that plugs in to a 72-pin SIMM slot. With one of these cards, you can buy more 30-pin SIMMs now and reuse them later — as long as they're fast enough for your new Mac. Companies such as SimmSaver Technology (800-636-7281 or 316-264-2244) or Sermax (800-209-7126 or 212-410-1597) have these doodads, starting at around $60.

BOB: I'm wary of putting anything in my Mac that knocks it out of spec. Two 30-pin SIMMs ganged up to fit into one 72-pin slot may use more power than the Mac's SIMM slot is rated for. And the more SIMMs you load into a Mac, the hotter it makes the inside of the Mac.

Instead, I'd buy 30-pin SIMMs now and trade them in for the ones you need when you get a new Mac. Many RAM vendors, such as TechWorks (800-695-5928 or 512-794-8533), offer trade-ins on old RAM. Or SimmSaver will put your old RAM chips onto new SIMMs.

Mouseless Cursor Control

Q. Is there a way to move the cursor around on the Mac's screen without using a mouse? How about within dialog boxes?

Darin Spence
via the Internet

CHRIS: Because I'm not concerned only about answering your question but also about the mass media's image of computer users — you know, corpulent guys with Milky Way Dark wrappers strewn about their cubicles — I've devised a system that takes care of your problem and provides a complete upper-body workout.

Place a block of wood inside a lambswool car-washing mitt, and position it near your mouse. To move the cursor, violently biff the block with a heavy mallet. This action causes the mouse to skitter across the mouse pad and lodge the cursor elsewhere. I haven't quite figured out how to consistently click the mouse yet, but extensive experimentation reveals that employing the mallet for this purpose requires a deft touch.

BOB: I once had a foam-rubber hammer-shaped device called a SmackAMac. It provided similar functionality without the spattered mouse parts.

CHRIS: And without the aerobic benefit as well.

Perhaps a more refined solution is to use Easy Access, the control panel that comes with your system software. With the Mouse Keys portion of Easy Access switched on, you can use the Mac's keypad to move the mouse around in eight compass directions.

As for dialog boxes, try Christopher R. Wysocki's shareware control panel Escapade. Much like CE Software's DialogKeys (part of the QuicKeys package), Escapade lets you cycle through buttons in dialog boxes and click on them by pressing key combinations.

TIPS / Page Layout

QUARKXPRESS CUSTOM FONT SIZES

Curiously, QuarkXPress provides no way for users to add custom font point sizes to the Size menu item. But it's easy to do with ResEdit:

Working on a copy of the application, open QuarkXPress with ResEdit and locate and open the MENU resource. Open the Style menu (resource 1005), and double-click on the word *Size*.

When MENU ID=35 appears, select Create New Item from the ResEdit menu. A black bar will appear at the bottom of the scrollable Size window. Type a custom point size (11 point, for example), and drag the new point size to its proper place on the menu. Add as many custom point sizes as you like.

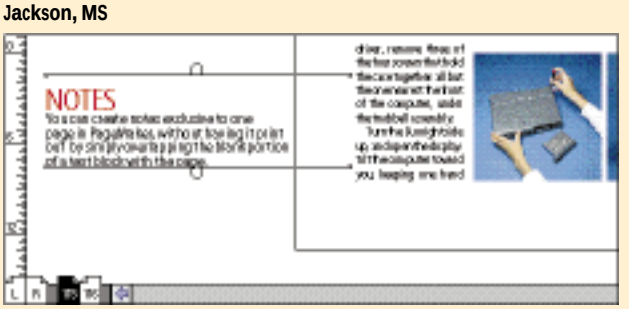
Charles Downs
via CompuServe

PAGEMAKER NOTES

I've heard about a PageMaker Addition that lets users attach nonprinting notes to their PageMaker documents. I've also read convoluted tips that instruct users to type notes in colors that won't be used during separation. Why bother? There is a vastly simpler way to add notes to PageMaker documents — type them on the pasteboard. Use this trick to make them appear only on the page you choose:

Type your notes on the pasteboard, and then make the text block wider than the text, by dragging one of its window-shade corners. Now move the text block so the blank portion overlaps the page (see the figure in this box). To avoid confusion, label each note with a large colored heading. Now the notes will appear only when that page is on-screen. And you don't have to worry that the notes will print out, since the text is outside the page area.

William Pitts
Jackson, MS



The Erroneous Zone

Q. My programs keep quitting suddenly because of a "type 1 error," according to my Mac. It happens most frequently with some of my CD-ROM programs. What is a type 1 error, and how do I fix it?

Frieda Mann
San Francisco, CA

BOB: Don't you love clear, concise error messages? Don't you wish we had some on the Mac?

The dreaded type 1 error almost always indicates that the program in question needs more memory. Some programs warn you to close windows and save documents before they reach this point, but far too many others are less polite.

CHRIS: When a program is so impolite as to quit unexpectedly, it's a good idea to save open documents in all other programs you're running — your Mac may be feeling a little touchy after a type 1 error. To be perfectly safe, restart as well.

BOB: And to guard against getting these error messages in the future, give the program that's unexpectedly quitting a little more memory. To do this, first quit the program. If the program is on a CD-ROM, copy the program onto your hard disk (the Mac doesn't let you change memory allocation for programs on CD-ROMs). Click on the program's icon to select it, choose Get Info from the File menu (or use the keyboard shortcut Command-I), and increase the preferred size of memory by 20 percent or more.

When you use the program, if it's one you moved from a CD-ROM, remember to run the copy that's on your hard disk, since it has the increased memory allocation.

CHRIS: If you still get the error messages, try disabling all the control panels and extensions you can do without. They can hoard RAM.

figure 2 / **Internet Web pages** make it easy to find what you're looking for. To find material related to what you see on a Web page, just click on the underlined text. You can find this Web page at http://www.euro.net/5thworld/moon.html.

What a Web We Weave

Q. What is this Web thing I keep hearing about? Is it part of the Internet? People tell me about Web pages, and I see them in ads. How do I check them out?

Richard Dale
San Francisco, CA

BOB: Web is short for World Wide Web (WWW), the most exciting part of the Internet. The Web makes it easy to access information and associated topics.

CHRIS: To explain how it works, a little history may help. The WWW was put together at the European Particle Physics Laboratory near Geneva as a way for European physicists to share information across the Internet. These Swiss science folk created an information-accessing system based on hypertext.

BOB: Like golf, hypertext is all in the links.

CHRIS: Absolutely. The idea behind hypertext is that it's easier to access information by association than it is linearly. For instance, say you're reading a transcript of some recent congressional hearings. As you browse the document, you notice that the word *pork* is underlined. Clicking on this word takes you to the Pork Farmers of America page. The underlined hypertext links on this page might then lead you to pages detailing anything from Bob Dole's feelings on farm-subsidy programs to the proper handling of bacon. (See figure 2 for a sample Web page.)

BOB: To browse Web pages, you need a piece of software called a Web browser, such as Netscape Navigator, Mosaic, or MacWeb. They're free on-line (see end of article for information on accessing them via ZiffNet/Mac). Next you need a SLIP or PPP Internet connection ($15 to $50 a month), which means finding a provider or building the connection yourself (for specific information, see "Making the Internet Connection," May '95, page 66).

If you belong to a major on-line service, you don't have to go to all that trouble: CompuServe, America Online, eWorld, and Prodigy all expect to have World Wide Web browsers sometime this summer or early fall. Through those services, you'll be able to surf Web pages without a SLIP or PPP account and without Netscape or Mosaic.

And at the risk of self-promotion, for information on creating your own Web pages, check out my new book, *Webmaster Macintosh*, available late this summer from AP Professional (Chestnut Hill, MA).

DOS Power

BOB: Back in April '95, we talked about using your Mac to initialize disks for DOS (page 120). As many sharp-eyed readers have informed us, we left out an easy and inexpensive solution for those who don't have System 7.5 — Apple File Exchange, an application that comes with system software. If you don't already have it installed, you can find it on the Tidbits disk.

TIPS / PowerBook

JUMPY TRACKPAD

The trackpads on PowerBook 500s have a feature you may not have discovered. You can make the cursor instantly leap from one corner of the screen to another by following these steps:

Put one finger on the pad — this represents the current cursor position. While keeping the first finger down, place a second finger where you want the cursor to end up. When you lift the first finger, it's as though your finger had instantly moved from the first position to the second and the cursor zooms across the screen accordingly.

[*You can also perform this trick with standalone trackpads. — Ed.*]

Steve Haddock
Santa Barbara, CA

WHEN IT'S TIME TO RESTART

When you're away from your desk and don't have a paper clip handy, trying to find something with which to press the recessed restart button on your PowerBook can be frustrating. Look no further than the prong on your wristwatch band. I never need to search for a toothpick or a pen, since my watch is always on my wrist.

Troy Dickey
Boring, OR

You can find the shareware and freeware programs referenced in this article in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See How to Reach Us for instructions on accessing ZiffNet/Mac.

A New Reference Shelf

From the development of internal combustion to the national anthem of Chechnya, CD-ROMs are the way to look it up.

BY VICTORIA VON BIEL

MY DAD STILL SWEARS that the 29-volume *Encyclopedia Britannica* he bought in the mid-'60s got my brothers and me through school. I can't speak for my brothers, but the only time *I* used the encyclopedia was to check out the diagrams of anatomically correct naked bodies with clear-plastic overlays showing all the internal organs. Other than that, it just took up shelf space.

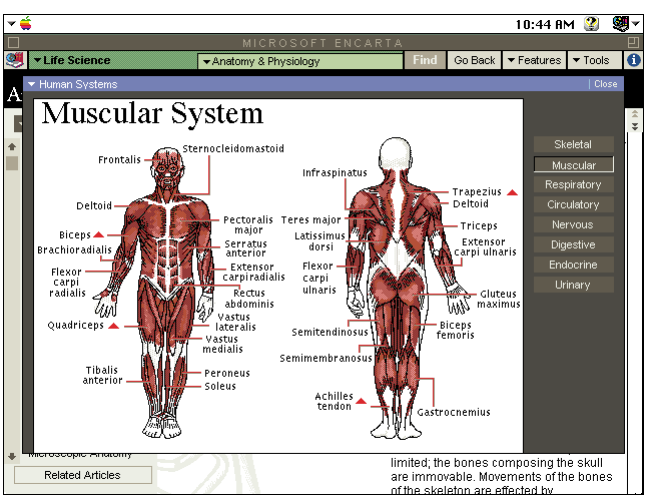
But the urge to have a well-stocked reference shelf must be genetic. Recently, I've found myself pondering the merits of one encyclopedia over another, wondering if my daughter will find the *Encyclopedia Britannica* more helpful than *Groliers*. The difference is that the reference works I'm considering squeeze 29 volumes of information — plus color pictures, video, sound clips, and animations — onto one CD-ROM. Even better, they cost about the same as one volume of the *Encyclopedia Britannica* did in 1967.

Sounds great, doesn't it? But before you rush to your local superstore to stock up, make sure you know what you're buying. Some of the most egregious examples of shovelware — the shameless dumping of megabytes of scrolling text onto a compact disc — are reference CD-ROMs. The encyclopedia or atlas you choose should make good use of the medium: It should contain in-depth, easily searchable information that combines printable text, sound clips, movies and/or photographs, diagrams, and hypertext links to related topics. You should be able to print what you find, and the interface should be easy enough for a ten-year-old to use.

The good news is that the best encyclopedias meet these criteria. Here are the CD-ROMs I plan to foist on my daughter:

The Encyclopedia

It almost kills me to say this, but Microsoft (800-426-9400 or 206-882-8080) is the master of quality reference works on CD-ROM. Far and away the best multimedia encyclopedia is Microsoft's **Encarta '95** ▼ ($99.95 list). It includes all the information you would expect to get in a book, plus skillfully compiled audio and video examples. What sets this CD-ROM apart from the competition is the ease with which you can find information — whether or not you know exactly what you're looking for. The Wizard feature steps you through the process of finding articles, and once you get there, hypertext links and lists of related topics make it easy to skip around to your heart's content. If you find yourself wandering too far afield, you can get back to where you started with a few clicks on the Go Back button.

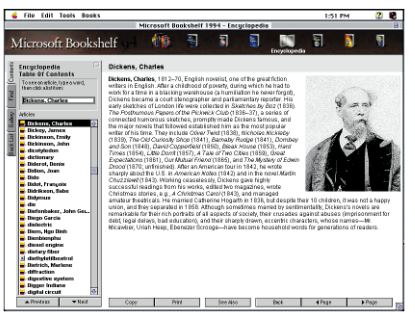


New to the current version are six excellent InterActivities, which use the encyclopedia's content to teach you about various topics. My favorites are World Music, a map of the world that shows you different instruments and musical styles from around the world, and a Nutrition module, which lets you create a personal nutritional profile based on your age, sex, and diet.

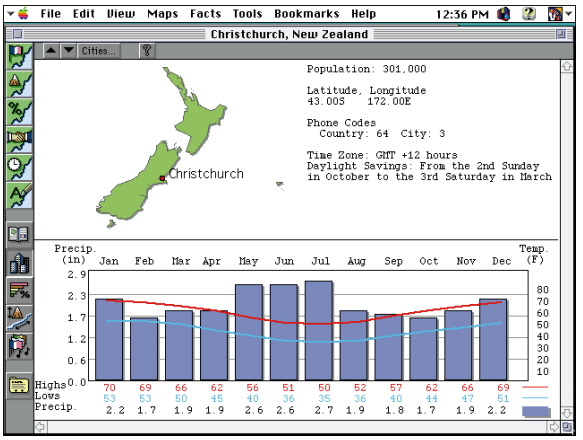
Other InterActivities cover topics such as fractals, immigrants to Ellis Island, and the orbits of the planets. All the InterActivities feature extensive use of multimedia elements such as sound and video.

The Dictionary, Thesaurus, and Book of Quotations

It slices, it dices, it tells you the meaning of *jejeune* — it's **Bookshelf '94** ▲, Microsoft's other heavyweight entry in the reference-books category. Bookshelf ($69.95 list) is a wonderful CD-ROM packed with the contents of seven reference sources: a dictionary, a miniencyclopedia, an almanac, an atlas, a thesaurus, a book of quotations, and a time line. You can choose to access all seven sources at once, or you can browse through each volume separately.



The encyclopedia is no replacement for Encarta, and the atlas doesn't equal a stand-alone atlas CD-ROM, since there simply isn't as much content or as many multimedia enhancements. But Bookshelf does include a feature, called Quickshelf, that allows you to access the contents of the disc from any other application. Of course, to make use of this feature, you have to keep the Bookshelf disc in your CD-ROM drive all the time. This can be a drag, but for occasional use — or if you need to look up a quotation — Bookshelf's great.



The Atlas

Ever since I was a kid, I've loved atlases, maps, and globes, and I was never convinced that a multimedia version could challenge the real thing. Then I saw **3D Atlas** (estimated street price, $69.95), from Electronic Arts (800-245-4525 or 415-571-7171). This CD-ROM provides a three-way view of the earth: a physical view, an environmental view (showing man's effect on the earth), and a political globe. You can zoom in to individual countries to get specific information, or you can view the earth spinning in space.

Of course, you get all the data and statistics you'd ever want (and more) in the atlas's statistical view. There's information on agriculture, health, education, politics, and economics — all of which can be graphed, should you ever want to do such a thing. My favorite feature, however, is the narrated time-lapse sequences, which show such things as the long-term effects of acid rain and what would happen to northern Europe if the polar ice cap melted. Bottom line: This atlas makes *great* use of multimedia.

I also like **Maps 'N' Facts** ▲ ($32 list), from Brøderbund (800-521-6263 or 415-382-4400). It's not as slick as 3D Atlas, and it doesn't contain any video or slide shows, but it's packed with information (including a recording of each country's national anthem as well as the usual economic and demographic stats) and it's exceptionally easy to use. With its ability to compute distances between points and its time-zone and currency calculators, this is a great CD-ROM to consult before planning a vacation.

The Video Guide

So, what do you do after you've spent an evening slaving over your multimedia encyclopedia? Watch a movie, of course. No reference shelf would be complete without an encyclopedia of videos, and once again Microsoft comes to the rescue. **Cinemania '95** ▼ ($59.95 list) has video and audio clips and capsule reviews of hundreds of films. New features include ListMaker, which lets you compile lists of the best and worst movies ever, and Cinemania Suggests, which suggests movies within genres.

A Full Shelf

So there you are: a multimedia reference shelf that'll keep you well informed (and entertained) for at least six months — at which time you'll need to stock up again. Of course, what *I'm* waiting for is that CD-ROM version of the *Encyclopedia Britannica,* which should be out any day now. I want to see what they've done with those clear-plastic overlays.

The Two Dads

BY RIK MYSLEWSKI AND JIM SHATZ-AKIN

RIK: Getting my kids to write can be a real pain.

JIM: Why? Carey and Rox both seem to have dynamite imaginations.

RIK: Thanks, but they get stuck on the same characters — Kimberly the Power Ranger, Helen Kitty . . .

JIM: That's "Hello Kitty." Have you tried a kid's writing program that tweaks their imaginations with suggestions about what to write?

RIK: We've tried two. Carey started with **Storybook Weaver,** from MECC, but now it's a bit clunky for her refined ten-year-old tastes.

JIM: I know Weaver. Like **Storybook Maker,** from Josten Home Learning, its new Deluxe CD-ROM version is an earnest effort that falls a bit short.

RIK: Rox, my seven-year-old, is now doing some experimenting with **Imagination Express** ▼, from Edmark. Like Storybook Maker and Storybook Weaver, it lets her create scenes out of backgrounds, props, and characters and then write about them.

JIM: Imagination Express beats the others hands down. It has animated characters that scale automatically as you move them around, QuickTime movies of kids giving story ideas, and multiple "theme packs" — and I bet Rox likes the fire-breathing dragon.

RIK: And anything else that's potentially life-threatening.

JIM: The girls also deserve to try out a copy of **The Amazing Writing Machine,** a story-essay-letter-poem-etcetera creator from Brøderbund. It's got Kid Pix's drawing capabilities but adds suggestions for phrases, jokes, quotations, and story ideas that are not only helpful but also fun. Its Spin mode is a little like the "Mad-Libs" books, in which you complete a composition by supplying key words and phrases. It's hard to describe, but by itself, it's worth the price of admission.

RIK: Maybe I should just buy it and find out?

JIM: Not a bad idea.

The Amazing Writing Machine ★★★★

Ages: 6 – 12 years.
Price: Floppy disks, $45 (list).
Kids can write from scratch or "Spin" poetry or prose by placing key words in prebuilt compositions. Inspiration tools suggest words, phrases, or topics that are often funny.
Company: Brøderbund, Novato, CA; 800-521-6263 or 415-382-4400.
Reader Service: Circle #427.

Imagination Express ★★★★

Ages: All.
Price: CD-ROM, $44.99 (list).
The best of the "create-a-picture-and-then-write-about-it" packages is feature-packed and powerful but may be a bit confusing for younger kids.
Company: Edmark, Redmond, WA; 800-320-8378 or 206-556-8484.
Reader Service: Circle #428.

Storybook Maker ★★½

Ages: 4 – 9 years.
Price: CD-ROM, $49 (list).
This friendly but humorless program suits younger kids but can't keep pace as skills advance.
Company: Jostens Home Learning, San Diego, CA; 800-521-8538 or 619-587-0087.
Reader Service: Circle #429.

Storybook Weaver Deluxe ★★★

Ages: 6 – 12 years.
Price: CD-ROM, $69.95 (list).
This rich collection of scene-creating images and "story starters" is marred by a nonintuitive, sluggish interface.
Company: MECC, Minneapolis, MN; 800-685-6322 or 612-569-1500.
Reader Service: Circle #430.

The Game Room

BY BOB LEVITUS

IF GORE-STREWN MAYHEM isn't your idea of entertainment, please skip this month's column; I promise to stick to completely nonviolent games next time. However, the objective of the extremely popular "spatter" games covered in this month's column is to shoot, stab, punch, blow up, laser-blast, or fry everything that moves.

Marathon, Wolfenstein 3D, and Sensory Overload have a lot in common besides the bloodshed. All are accelerated for the PowerPC. All have downloadable demos on your favorite on-line services (including ZiffNet/Mac). All place you, via first-person perspective, in multilevel mazes. And all feature the same hackneyed premise: Find stuff, and use it to kill things.

Beyond these similarities, though, the games couldn't be more different. Marathon is nothing less than awesome. Wolfenstein 3D is cruder, with blockier graphics, cheesier music, and less of a plot, but it's amazingly fast on almost any Mac. Sensory Overload, sad to say, pales by comparison to either.

Marathon

Wickedly Good

IT'S SICK, IT'S TWISTED, it's gory, and I love it to death. Marathon is the most spectacular Mac game in years. Better still, it's the most addicting network game ever.

You play a lone security officer in the future, left to defend your ship against hostile and intelligent aliens (and enemy security officers, if you're playing against others on a network). The plot serves as your excuse to search for futuristic weapons and then use them to toast your enemies.

The beautifully rendered graphics surpass those of any other game in the genre — yet Marathon is surprisingly fast on most newer Macs (at least a 68040-based machine is recommended). Its moody atmosphere is highly realistic, with lighting effects that change as you move about and incredible stereo sound that tips you off to approaching aliens — before they appear on your motion sensor.

Solo play is great, but network play is even better — it adds that extra thrill of competition against real opponents. Each retail package

allows two players to compete in the network game. Try it if you can — it's the best. If you buy only one gorefest this year, make it Marathon.

GAME POINT

Get Marathon. Then, after a few months, if your craving for carnage isn't slaked, get Wolfenstein 3D. If *it* doesn't satisfy your appetite for destruction (and if your poor, abused fingers can stand it), there's always Sensory Overload.

Marathon ★★★★★

Price: $40 (estimated street).
Company: Bungie Software, Chicago, IL; 312-563-6200.
Reader Service: Circle #431.

Wolfenstein 3D ★★★★

Price: $40 (estimated street).
Company: MacPlay, Irvine, CA; 800-462-2752 or 714-553-3530.
Reader Service: Circle #432.

Sensory Overload ★★★

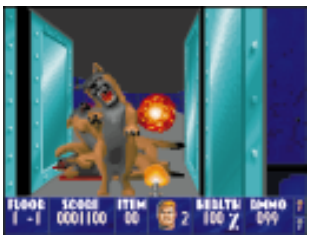
Price: $40 (estimated street).
Company: Reality Bytes, Cambridge, MA; 617-621-2500.
Reader Service: Circle #433.

Wolfenstein 3D

Fast and Furious

WOLFENSTEIN 3D is a game so sick and perverse it was banned in Germany and on CompuServe (which does business in Germany).

The plot of Wolfenstein 3D is simple: Kill anything that moves — dogs, humans, mutants, and even Hitler himself — while you make your escape from a torture chamber in Castle Wolfenstein. Don't be squeamish — you have to kill lots of dogs and Nazis to escape this 90-level bloodbath.



Wolfenstein 3D is not as slick or stylish as Marathon, but what it lacks in appearance, it makes up for in speed — it's by far the fastest and most responsive game of the three. It even includes a Speed Governor option, in case it runs too fast on your Mac.

If you're looking for fast, furious, politically incorrect carnage with a minimum of plot, Wolfenstein 3D is the game for you.

Sensory Overload

Aging Gracelessly

A YEAR AGO, when it hit store shelves before the world had seen Wolfenstein 3D or Marathon, Sensory Overload might have received a pretty good review. It's not a bad game. Its plot is no more cliché-ridden than the others', and its speed is acceptable. But it's uglier than Marathon and slower than Wolfenstein 3D, and that combination makes it less fun than either.

Cheat Sheet

BY ROMAN VICTOR LOYOLA

Mastering Marathon

Just got your copy of Marathon, and you keep getting your butt kicked? Follow these basic tips, and you'll be on your way to becoming an interstellar hero.

- **Pay attention** to your detector. Planning ahead for an attack will give you the upper hand.
- **Manage your weapons.** If you're near a single enemy, consider using your fists. The deeper you get, the more you'll need precious ammo.
- **If your ammo cartridge** is nearly empty, waste the last few shots and reload with a fresh cartridge.
- **If your shields** are dangerously low and you're likely to get smoked, run through unknown areas of the ship and map as much as possible. Remember where you've been, and use that information when you start a new game.
- **Keep track** of how many shots it takes to kill a particular alien, and use that knowledge to manage your ammo.
- **Use corners** as a cover, and pick off the aliens as they come into view.
- **Learn how to creep up** and attack aliens around corners before they notice you.
- **When you flip** a switch, listen carefully. It may activate something in the distance.
- **Shield energizers,** pattern buffers, and oxygen outlets can be used over and over, so take advantage of them.
- **Running is almost** always better than walking.

Finally, if you need drastic help, try the Marathon Secrets 1.0 application — it provides you with maps of all the levels. And if you want the ultimate upper hand in battle, try Marathon Cheat 2.5, which fills you to the gills with ammo. Both are available on most major BBSs.

JOHN C. DVORAK

The Teflon™ Computer Company

WILL MACINTOSH CLONES RETURN the Mac to the mainstream of America's consciousness? In the next few months,

the numbers will be in and we'll know one way or the other. I think it will be stronger than ever by the end of the year, and how often do you get a prediction like that from the likes of me?

What is it about the Mac that assures its continued existence? I'd have to say it's charisma. I sure can't think of any other credible explanation. If you think about it, no other personal computer has come close to having so much influence on our culture and society, whether for good or evil. Let me list a few examples, starting with the mostly positive:

1. The iconization of commercials and page layout. Have you noticed over the past decade how Mac-type icons, menu bars, and open/close boxes have become a part of American culture? They show up in ads, magazine layouts, and commercials.

2. The Chicago typeface. As part of the aforementioned graphical revolution, the offbeat Chicago typeface has taken a seat among the great typefaces in history. It's often used in its jaggy form as somehow hip.

3. The art revolution. Although computers were known to be productivity boosters for writers and bookkeepers, who would have suspected that artists would use them in much the same way? It was never predicted that computers would essentially take over the commercial-art business. Artists have increased their productivity 400 percent or more. No longer do they have to repaint a background — they click on a button, and it's done.

4. The photo revolution. Many newspapers have gone to hi-band 8mm camcorders for their photos. They put the camera on high-speed shutter and shoot the action. The individual photos are captured from the video and enhanced by computer. Say goodbye to film. All because of the Mac.

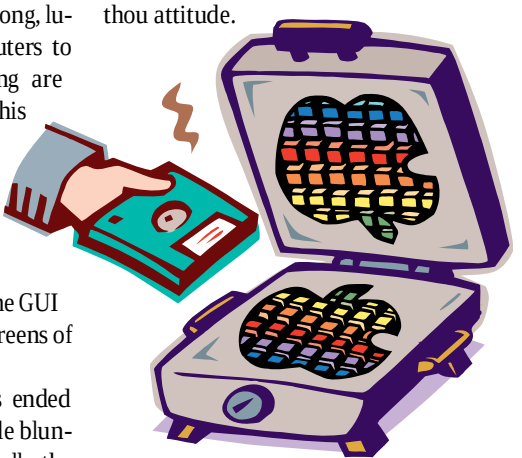
5. GUI paradigm shift. Eventually, Microsoft will take credit for this revolution, just as Apple did even though Xerox PARC was the actual originator. No matter — the GUI is a big deal. The days of having to type long, ludicrous command lines into computers to get the computers to do something are largely over. The newest phase of this change is the CD-ROM environment, where each and every CD-ROM is coming with its own idea of what a GUI should be like. Just when we thought things were standardizing, they got worse instead. At least the GUI is prettier than those horrid green screens of text.

6. Internet revolution. Actually, this ended up becoming one of my favorite Apple blunders. The Internet revolution is actually the World Wide Web revolution, since the W3 is where all the nifty activity is happening. Cool Web sites and buttons leading to other cool Web sites all began with Mosaic — a Mac-centric product. Apple, which had always been a bit player in telecommunications when compared to companies in the PC world, suddenly had the upper hand. Nothing like Mosaic existed on the PC. More important, the Internet scene suddenly was red-hot. So what did Apple do? eWorld! Are these guys clueless at the executive level or what?

7. The mouse. Apple made the mouse into the computer equivalent of the car cigarette lighter. All computers will forever have one — needed or not. Of course, as usual, Apple failed to capitalize. Logitech and Microsoft make and sell the most mice.

Every time I make these lists, I wonder how Apple stays in business. It never fully exploits what it's accomplished. Then again, maybe some of this is punishment for the negative aspects of its success. Let's look at some negative societal fallout:

1. Arrogance. Apple has long been known for this — like the time it welcomed IBM into the business with a full-page ad in a national newspaper. To this day, the top executives constantly exhibit a holier-than-thou attitude.



2. Cornball business titles. Along with arrogance comes a penchant for wacko business-card titles: Evangelist, Intergalactic Market Specialist, Major Domo, and so on. Other companies now do this, and I find it as annoying as the guy with the President/CEO card who is the head of a two-person company.

3. Bad decisions. Another consequence of arrogance has been bad decision making. Not licensing the Mac OS years ago and letting Microsoft get the upper hand is a perfect example. More recently, not putting the powerful Live Picture image-manipulation capability into the OS was a mistake. Ignoring the laptop/notebook megatrend and being the last in line is a big joke in the industry.

And yet this company is still successful and growing? Now *that's* charisma!

ILLUSTRATION / ROBERT ZIMMERMAN