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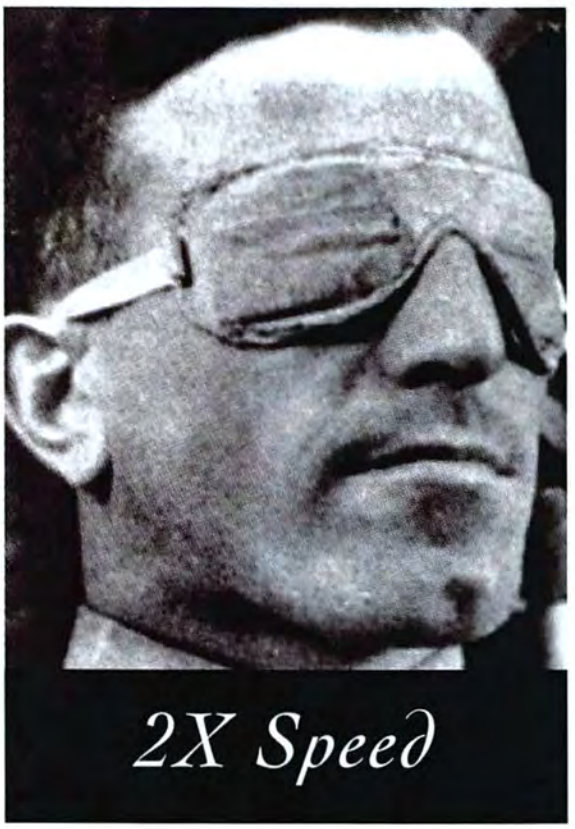

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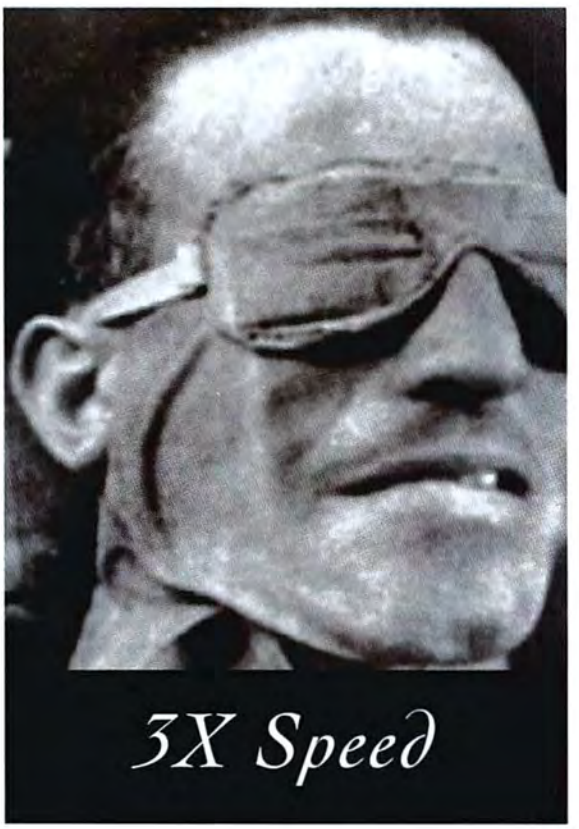

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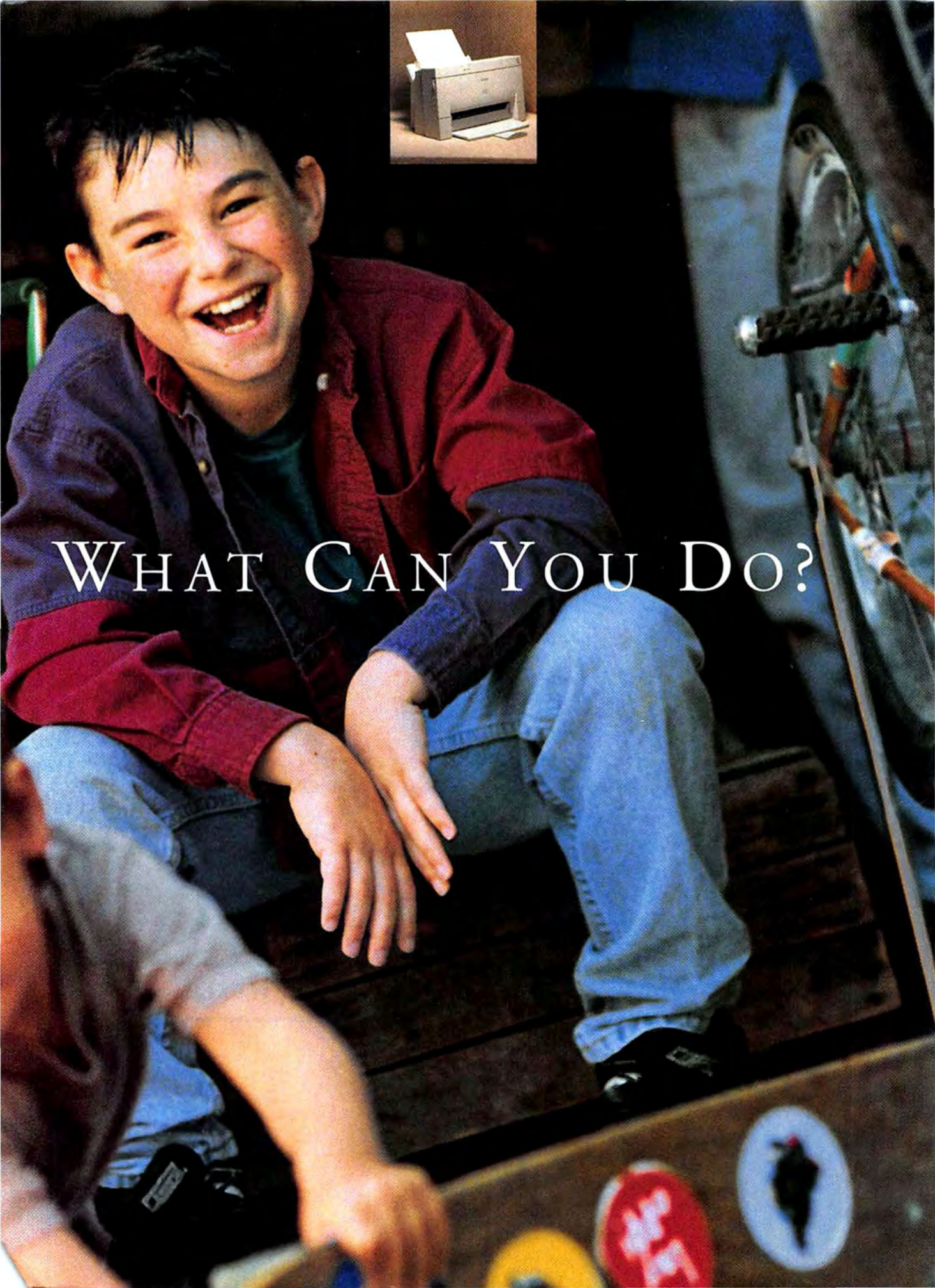
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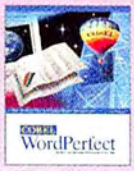

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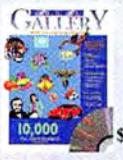

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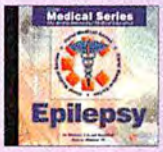

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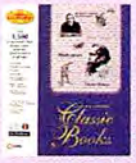

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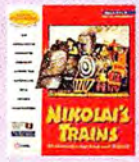

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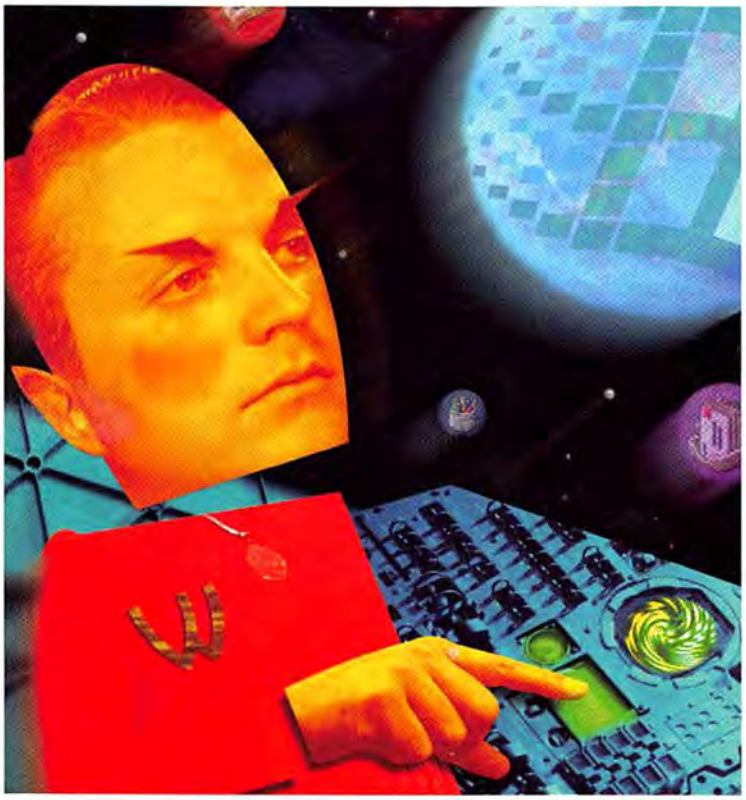

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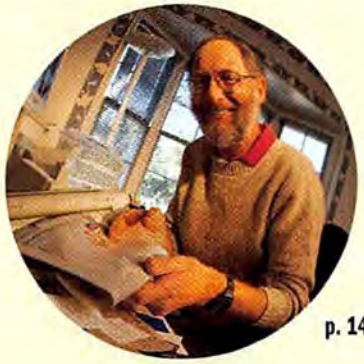
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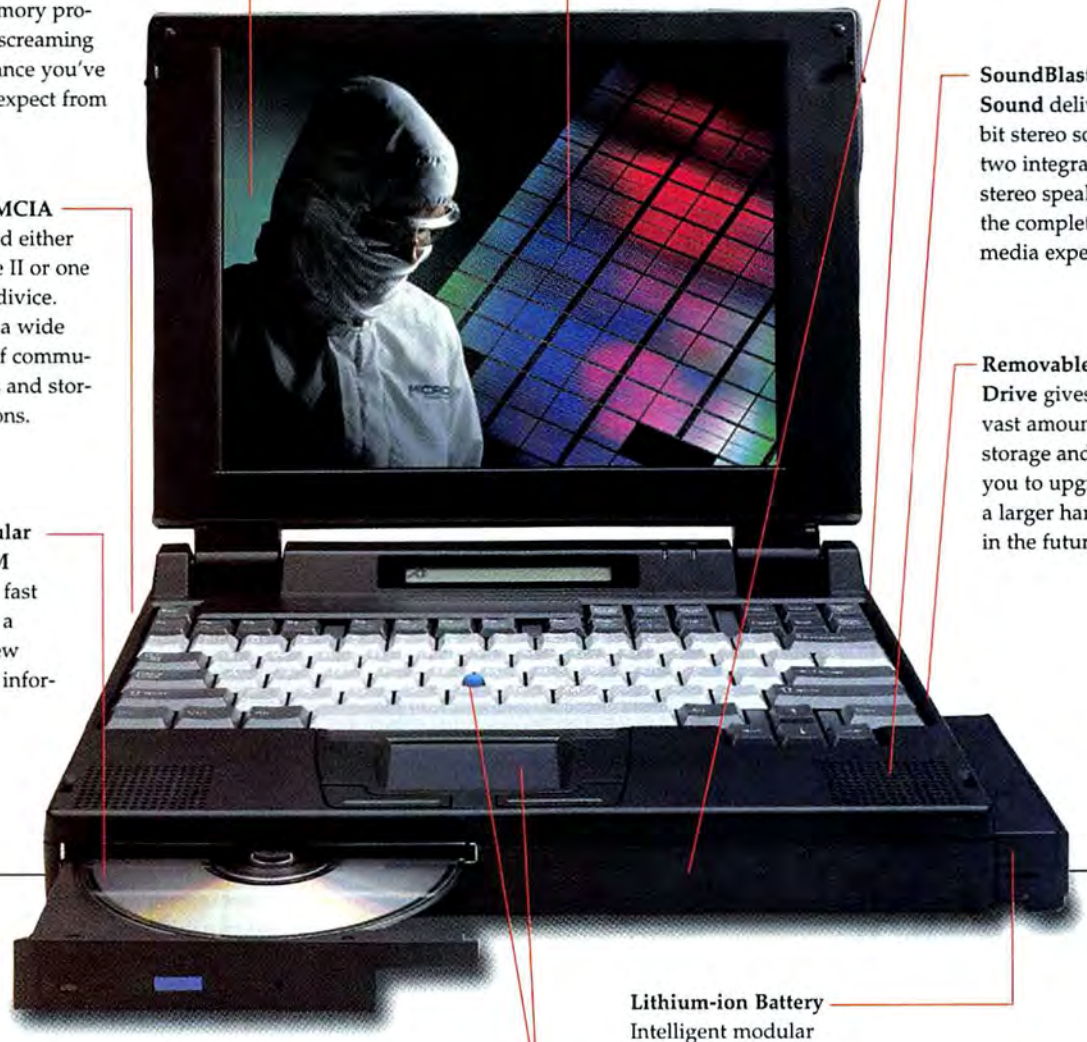

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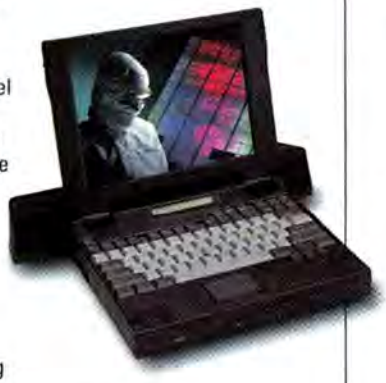

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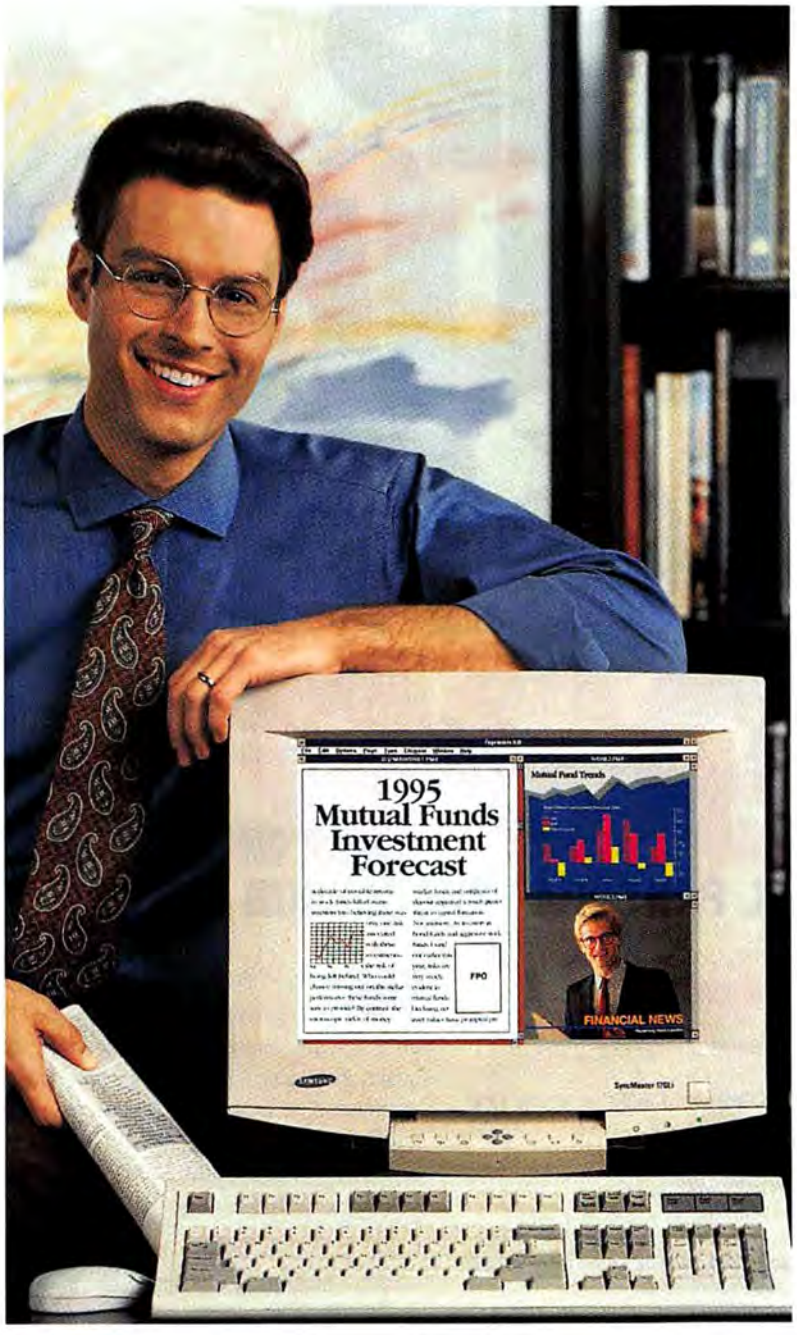

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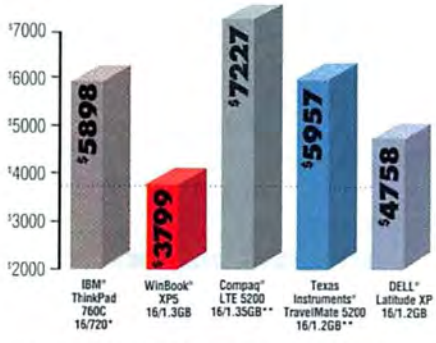

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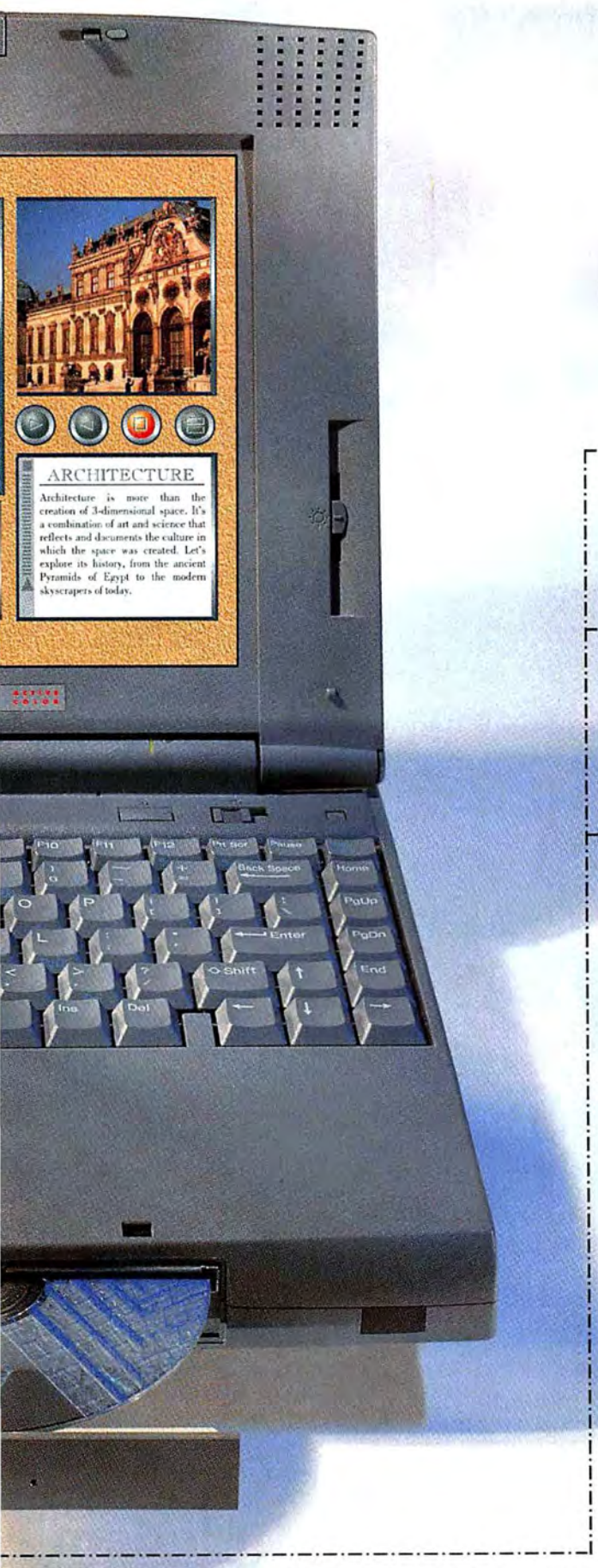

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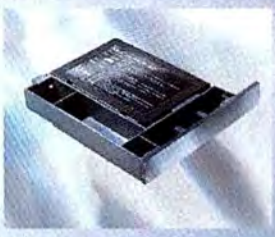

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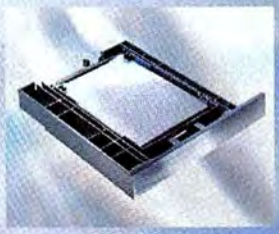

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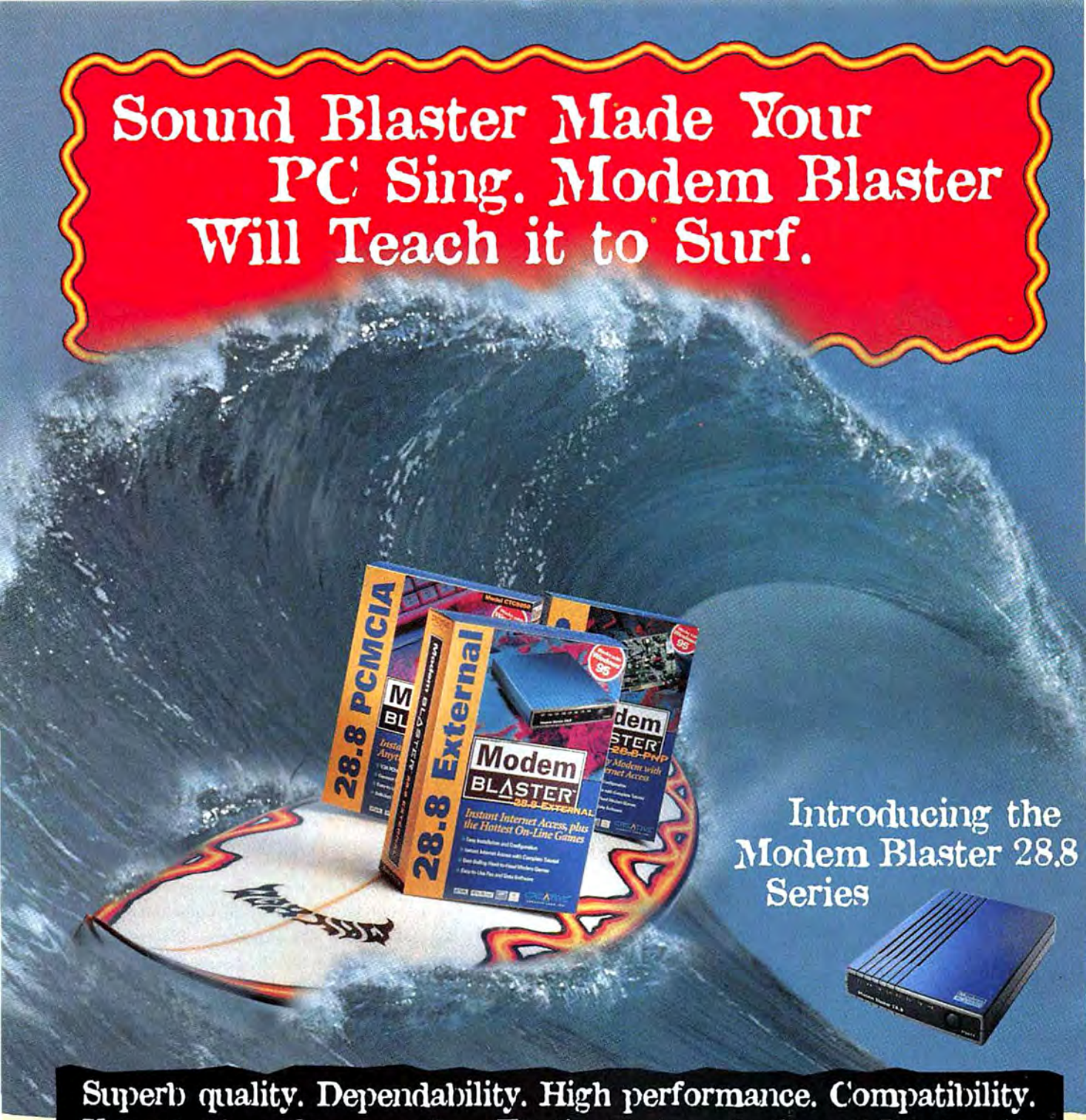

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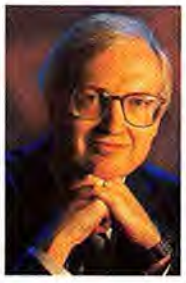
Your Verdict on Windows 95



ERIK BUTLER

Win 95, as a compromise between technical progress and compatibility with old products, risked pleasing no one. It could upset technical purists by mimicking Windows 3.1's architectural flaws, and disappoint everyone else by failing to run a favorite program. Despite these potentials for disaster, *PC World* has been voicing its opinion that most Windows users would be better off upgrading. Last August, Microsoft unleashed a marketing campaign powerful enough to sell life-support systems to Dr. Kevorkian. The latest figures say Microsoft has sold 16 million copies of Windows 95, contributing to its $575 million in profits last quarter. Clearly, Win 95 has done well for Microsoft—but what has it done for you?

Some 5000 readers responded to our survey about Windows 95. In "Close Encounters With Windows 95," Senior Associate Editor Yael Li-Ron reports the results. Two-thirds of those who responded had moved to Windows 95. Asked to compare their satisfaction with Windows 95 to satisfaction with their previous operating system, 5 percent chose "poor" and 8 percent "fair," while 77 percent indicated they are highly satisfied, and a judicious 10 percent said it's too soon to tell. Asked "Are you glad you switched to Windows 95?" 75 percent said yes, 8 percent no, and 17 percent were unsure. These results are amazing because 35 percent of upgraders reported difficulty with installation and 50 percent reported software problems. Although the course of the upgrade didn't always run smoothly, most people found the trip worthwhile. Li-Ron analyzes the survey responses by such criteria as the type of processor and amount of system memory. If you're still not sure whether to upgrade, her analysis can help you decide.

One sidelight in the data concerns OS/2 Warp users. Of all respondents who upgraded to Windows 95, only 3 percent said they were moving from Warp. Of those who did kiss Warp good-bye, 70 percent were glad they moved to Windows 95. Given the fanaticism of the letters we receive from Warpies, we were surprised anyone chose to undergo deprogramming.

For help ironing out the wrinkles in Win 95, read "Windows 95 at Warp Speed." The article is filled with tips on how to use Win 95 effectively, speed it up, and bend it to your will. The article recommends products that remove or conceal Windows 95's defects. And if you are persuaded that self-improvement is the only answer until Win 95's next release, you can adopt "The 7 Habits of Highly Effective (Windows 95) People."

An Unexpected Breakthrough: NEC's CromaClear

The commercial manufacture of cathode-ray tubes began in the 1930s, and for the most part, improvements in CRT design have come slowly. In the late 1960s, Sony improved things by laying down color phosphors in stripes rather than dots and directing electron beams through slits rather than tiny holes, which generally yielded greater brightness and finer focus. There has not been a comparable advance in the technology since the Beatles broke up.

Just as Sony's Trinitron patent expires, promising a wave of monitors based on that approach, NEC is introducing *CromaClear*, a new type of CRT. Your eyes tell you CromaClear is a breakthrough: In *Top of the News*, Staff Editor John Goddard explains why. It's rare to get new technology without paying a premium, but NEC's new Multisync line of CromaClear monitors arrives with a $599 price for the 15-inch M500 and $849 for the 17-inch M700. This technology should revitalize the CRT until affordable flat displays finally show up.

Help for the Weary Pentium

Face it, you can't buy a new PC every time Intel brings out a new processor. If you buy a 75-MHz system, there's a 100-MHz machine in its place on the shelf before you get to your car. If you buy a 100-MHz PC, Intel ups the ante to 120, then 133, then 166. Even if you bought several PCs a year, you'd still fall behind. Still, like compulsive gamblers, many of us yearn to call Intel's bet at every speed. Will Intel's new Pentium OverDrive chips provide the answer? The Pentium OverDrive replaces your current Pentium and, in most cases, provides a much greater boost in performance than the disappointing OverDrives for 486s. The PC World Test Center tried these chips in a variety of systems and compared their performance to new PCs running at similar clock speeds. For details, read Contributing Editor Eric Knorr's assessment in *Top of the News*.

Microsoft has sold 16 million copies of Windows 95. Clearly, Win 95 has done well for Microsoft–but what has it done for you?

Phil Lemmons

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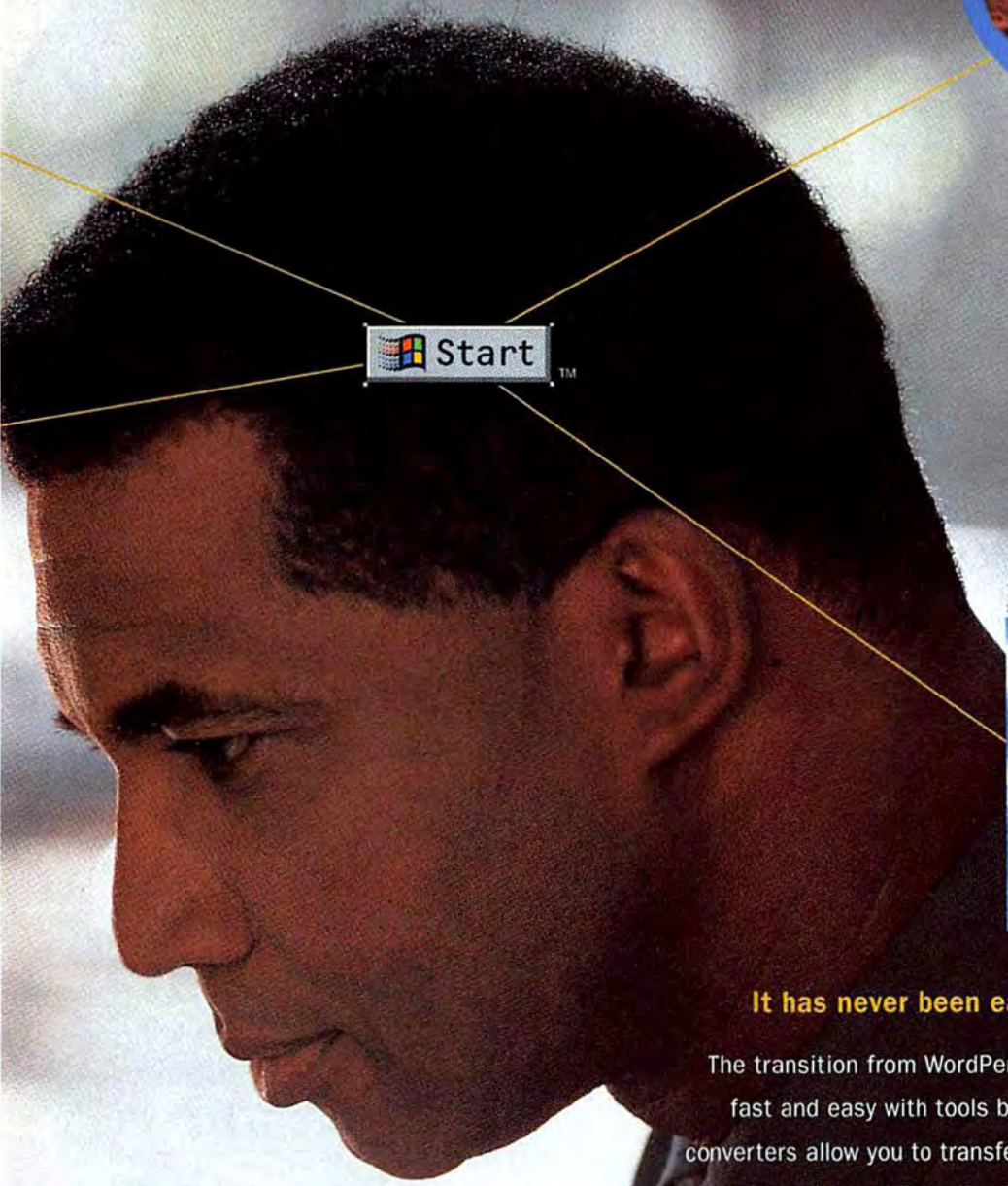

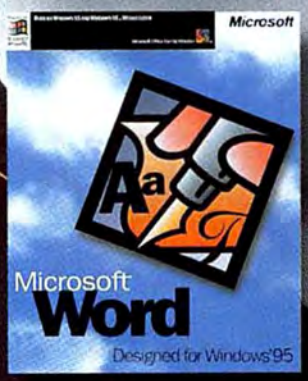

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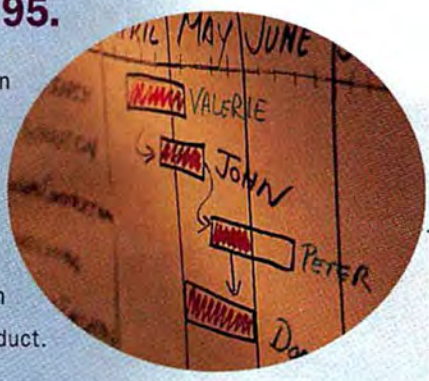
your project down a clear path

Microsoft Project for Windows 95.



Now you can manage projects more simply, more smoothly, by communicating project information as it occurs. With Microsoft® Project you can convey project status quickly and effectively so your boss, customers, and coworkers are always in the loop. From sharing task deadlines and responsibilities, to letting people know about changes and the impact they'll have on the deadline, you have the tools to organize your projects into manageable steps and keep them moving in the right direction. Microsoft Project unlocks the doors of communication and gives you the power to navigate the most efficient route to a successful end product.

Graphical views let teammates visualize where the project is going.

With Microsoft Project you can display project data in ways that everyone can understand. Great-looking Gantt Charts integrate text, timelines and graphical bars so everyone can see start and finish dates, interdependencies and task assignments. Throughout your project, you can also use a Monthly Calendar report to share your plan in a format that's clear and easy to read. And since Microsoft Project shares many of the same key commands with other Office applications, it will be easy to create schedules and reports. But if at any time you need help, type in a question and the Answer Wizard gives you the information you need. Microsoft Project helps you illustrate every phase of your project so you and your team keep your goals in sight.

Microsoft

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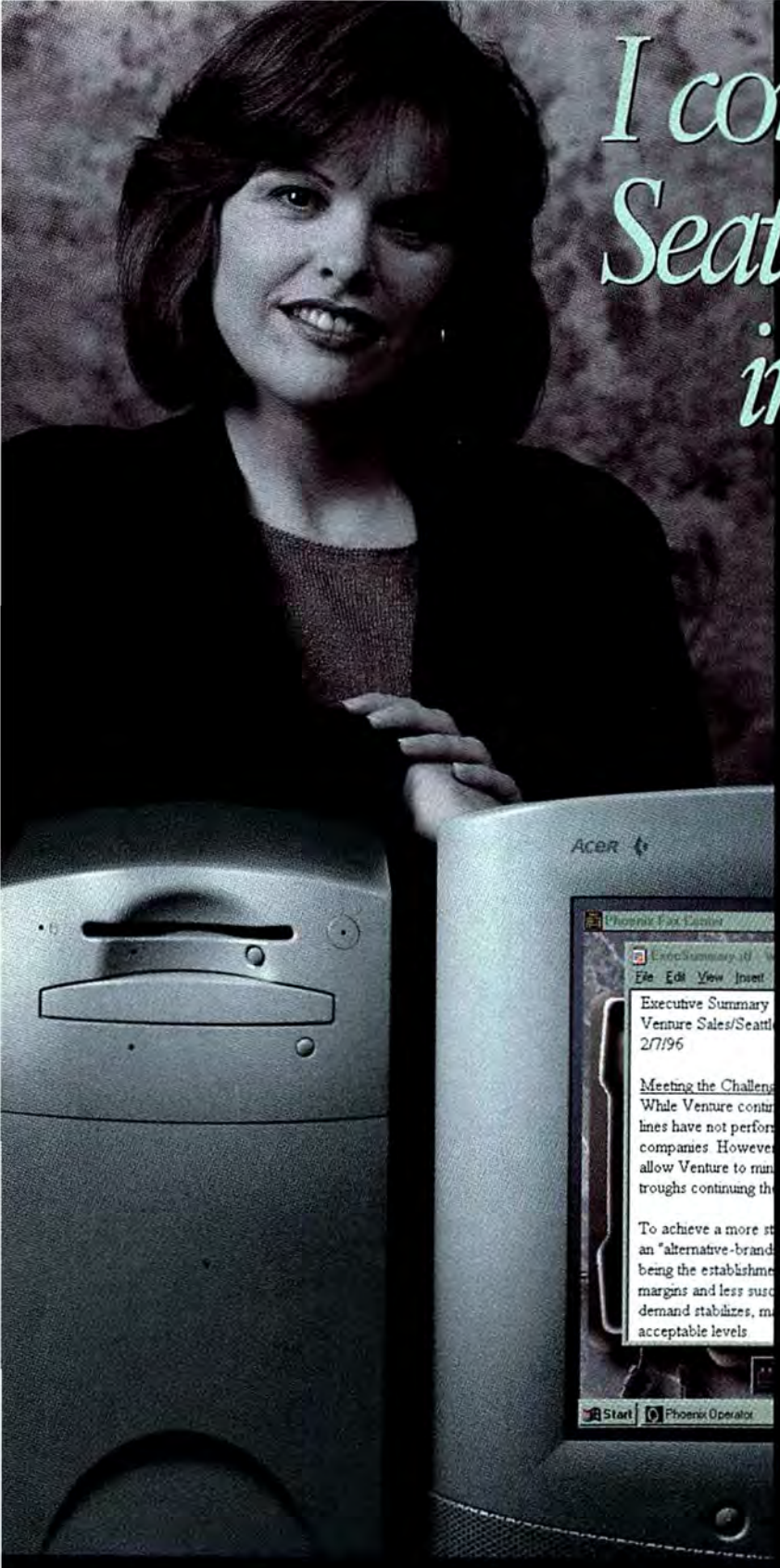
Keep everyone moving on the same track with open lines of communication.

Microsoft Project is completely integrated with a wide range of e-mail systems* and Schedule+ so that with a single click, changes and additions are immediately distributed to and from teammates. Assignments, task changes, and progress can be communicated and updated without ever reentering information, so you save time and eliminate mistakes. And because Microsoft Project is a member of the Office family, sharing data between programs is easy. For example, you can start building a schedule by simply dragging a task list out of Microsoft Excel and dropping it directly into your Microsoft Project plan. You keep communication clear and information consistent and your project continues to move exactly the way you planned.

Now you can take full advantage of Windows 95.

Microsoft Project is the world's best selling project management software and now is optimized to work hand-in-hand with the 32-bit performance, advanced multitasking, and simplified user interface of the Windows® 95 operating system. Together, they help open the lines of communication. Together, they help you enhance the way you manage your projects.



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Circle 102 on reader service card

Two Cents on 32-Bit Power, Slow-Footed E-Mail

Up to Speed With Disk Compression

Thank you for a reasoned and in-depth comparison ["Windows 95 Versus Windows NT Versus Warp Versus Mac," February]. I found it to be a very good article: informative and reasonably objective. For once I can show my Macintosh-loving colleagues that *some* PC magazines don't slam the Mac every chance they get.

However, the chart "Four Roads to 32-Bit Power" indicates disk compression isn't included in Windows NT 3.51, but it is. Having used Stacker in DOS and Windows 3.1, DoubleSpace, and DriveSpace (or whatever they used to call it), I can say that I prefer the Windows NT 3.51 version. Finally I don't have to waste CPU time on compression for an entire partition. Users can designate individual files and directories as being compressed, right from within the antiquated File Manager. This is nice because, as you mentioned, NT can be slow on 16-bit apps. My patience won't take the slowdown.
Thom Randolph, Renton, Washington

Author's response: Our features chart was incorrect. Windows NT 3.51 indeed supports file compression for its native file system, NTFS. *—Harry McCracken, senior associate editor*

Beyond the Norm

I just finished reading "Windows 95 Versus Windows NT Versus Warp Versus Mac." I found it to be a big change from your normal articles in that it was not totally slanted toward Windows 95. Or perhaps it is a testament to just how weak an operating system Windows 95 really is.
Phil Stewart, Internet

Out of My Magazine

In your article "Windows 95 Versus Windows NT Versus Warp Versus Mac," I don't see how you can even put a Mac in the same magazine as a PC. If Macs are more usable, why do 80-plus percent of the people use IBM-compatible machines? Apple is in deep trouble, and you know it. I have considered subscribing to your magazine on several occasions, only to pick up a copy and see an article about a damn Mac. Macs are headed for the junkyard or maybe the Smithsonian.
Gregg Wardlaw, Nicholson, Georgia

Inconsistent Software Reviews

The only bonus I found in the "great blizzard of '96" was that it gave me time enough to read *PC World* cover to cover. As I did, lo and behold, I think I found a little screwup.

New Products gives a less than lukewarm review to WinProbe 4 ["Two Windows 95 Diagnostic Utilities Need Help Themselves," February]. Then *Quick Takes* puts the same product back out there as kind of a good thing. I understand the complexity of your magazine; the problem is that people really do rely on your reviews, and someone who saw just the *Quick Takes* review would be a little unhappy to buy the software and later see the other review.

That said, let me say your magazine and your writers, particularly your technical writers, are absolutely the best. Every issue has something in it that saves me some grief or makes me more productive.
Mario Suriani, Internet

Editor's response: Several readers caught our oversight. Not only did we assign WinProbe to two authors, but they came to different conclusions, which we failed to reconcile. We apologize for the confusion. *—Gabrielle Mitchell, senior associate editor*

Witty and Wise

PC World frequently outshines its competition in quality of writing. Along those lines, let me commend Naomi Wise's evident talent in her review of Betty Crocker's Cookbook in

February's *HouseWare* column. Rarely do I ever laugh out loud while reading a magazine devoted to computing, but Wise's phrase "gruesomely Midwesternized" made this current captive of Michigan just about die laughing.

Besides the comedy, I appreciated that the author took the time to evaluate the subject matter of the CD-ROM. I have been burnt before by reviews that only examine ease of installation—finding that the CD that took me only 2 minutes to install is totally without merit.
Holly Helterhoff, Rochester Hills, Michigan

Upgrading Without a Hitch

I had been toying with the idea of adding a second hard drive to my system for a couple months when, after reading the procedure in "Adding a Second Hard Disk Without a Hitch"

JEFFREY PELO

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LETTERS

[*Help Line*, January], I decided to take the plunge. I purchased a Seagate ST31231N 1GB to complement my original Maxtor 7345S, and in about 2 hours total installation time I was up and running. The combination of SCSI's easy setup and your article's step-by-step instructions made this upgrade a breeze. Thanks.

Maurice Sendall, Stamford, Connecticut

Good Timing

Just wanted to express my appreciation for the content and style you use in putting together the articles in your magazine. I especially enjoyed reading several in the February issue, including the 32-bit operating system comparison and the cover story, "From 586 to Pentium Pro: Choosing Your Dream PC."

Perhaps it's only because I've gotten more exposure to PCs over the past several months, but I find your articles are both timely and informative. Just when I'm ready to learn more, there sits the information that helps me to understand the rapid changes and innovations taking place in the world of computing.

I do hope, though, that you will also continue to present information on good old Windows 3.*x* as well as the applications that run in that environment. As an independent trainer on various software packages, I find there are plenty of folks out there who are just beginning to get their money's worth from computing. While I'm happy to read about the future of computing, please don't pull the plug on the tremendous articles you present on "yesterday's" news.

Art Robinson, Union City, Georgia

Crying Wolf

I for one am tired of all the horror stories from people about the Windows 95 installation. Except for Myst not working, my upgrade went without a hitch. No error messages, no crash, no stall, nothing. Magazines need to note that the majority of users will have no problem with the installation/upgrade. The stories are likely scaring people away from a great operating system. Credit should be given where it's due.

C. J. Thompson, Internet

Editor's note: For more insight into the Win 95 upgrade experience—as recounted by our readers—check out "Close Encounters With Windows 95" in this issue.

The Price of Free Time

Judy Heim's article ["Getting the Message: The Great E-Mail Shoot-Out," February] was well presented and chockfull of the kinds of things a consumer can't know in advance of buying. The article, though, quotes the rates of each provider and follows with "*x* free hours." What is free? Those hours cost $5.95, $12.95, or whatever the purchaser agrees to. Whether I use those hours or not, the price is the same unless I exceed the hours limit. Then it's more.

PC World is not the guilty party here, but those companies that advertise this way are. It's much like buying a pair of eyeglasses for $300 and being told that the lenses are "free."

Mark Stonebraker, Cleveland Heights, Ohio

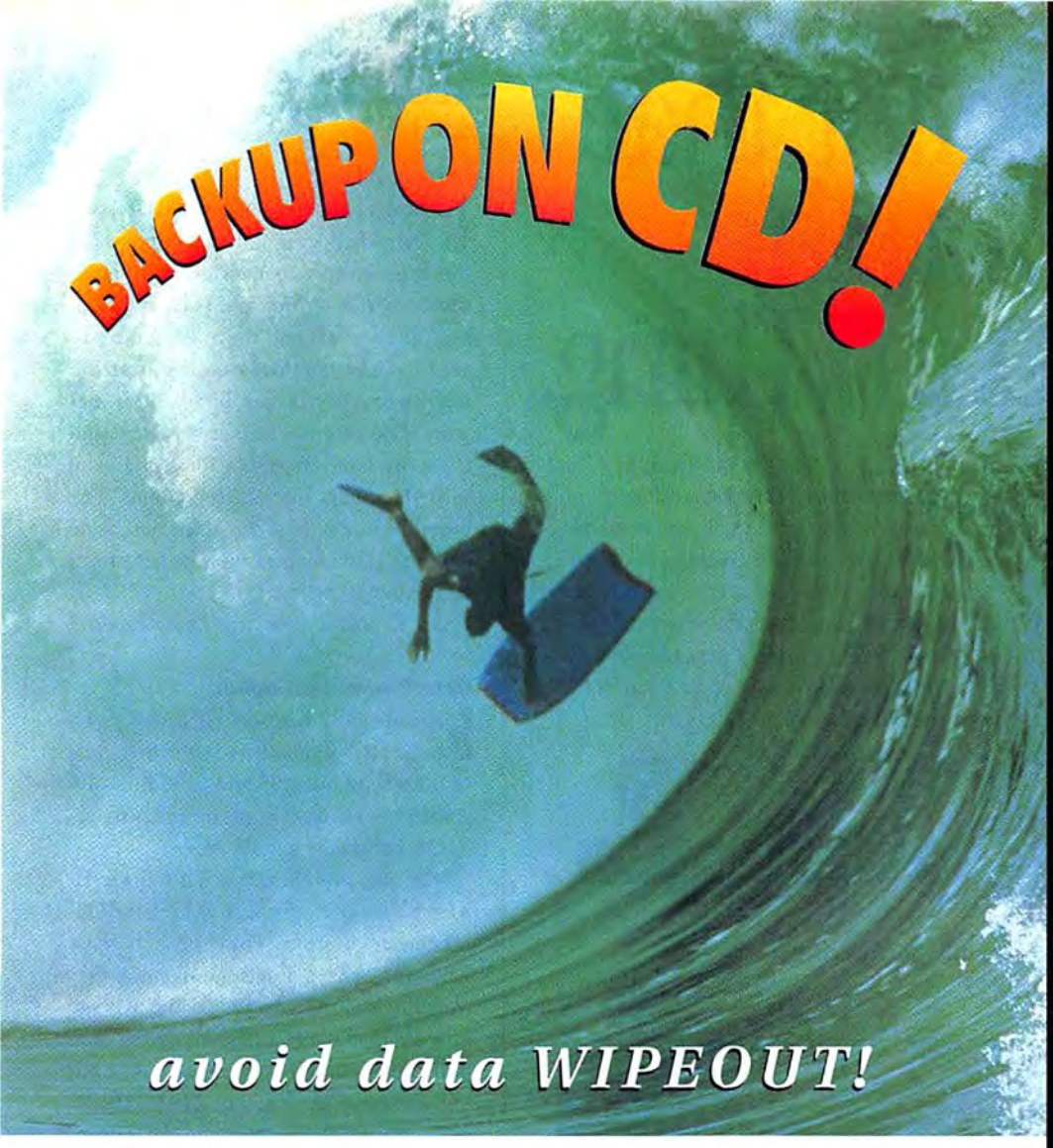
Give AOL a Break

I found that your evaluation of America Online ["Getting the Message: The Great E-Mail Shoot-Out," February] was negatively biased. When e-mail sent via CompuServe was extremely slow, you attributed that to a "transient glitch." Yet when AOL was slow, you said "its performance does not measure up." Certainly it deserves the benefit of the doubt for transient glitches.

Roberta Dikeman, Martinez, California

Editor's response: Before writing this story, we'd received many messages from AOL subscribers complaining about e-mail delivery problems. We receive few, if any, such complaints about CompuServe. AOL itself admits to persistent problems keeping up with e-mail volume. Also, in our testing, the poor delivery times we found on CompuServe were isolated to one day; on other days, the service delivered our mail in a timely fashion. By contrast, we found the slowdowns on AOL evenly distributed over the days we tested. The anecdotal and testing evidence pointed us to our conclusion that CompuServe is only occasionally slow, while AOL seems slow consistently.

—Dan Miller, senior online editor



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The Recordable CD replaces tape with superior technology, such as random access to all your data (tape is slow); RCD media is playable in millions of CD-ROM drives (not tape); RCD media has a guaranteed shelf life of 100 years (tape has a life?). Just as CDs have replaced tape cassettes in the music industry, CDs are now well on their way to replacing tape in the computer industry.

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Transient Glitches

The real reason e-mail takes so long is that it is handled by gremlins. Gremlins are the little critters that reside in Internet servers and carry the data back and forth between servers and from the servers to your modem. Gnomes handle it from the modem to your machine, but that's another story. The Internet is relatively new, and there are more messages for gremlins to carry than there are trained gremlins. The gremlins do the best they can, but as the Internet grows, expect them to get slower before they get better.

Frank C. Mellott, Lemoyne, Pennsylvania

Corrections and Clarifications

December's "Microsoft Office 95: Who Needs It?" should have stated that users of both Schedule+ 95 and Schedule+ 1.0 can send and receive group meeting requests between applications.

"Getting the Message: The Great E-Mail Shoot-Out" (February) contained inaccuracies in the "How Fast Is Fast Enough?" chart. For sending messages over the Microsoft Network, the average time to arrive is 4 minutes; 96 percent were delivered in under 10 minutes. For sending messages by Internet SLIP/PPP, 95 percent were delivered in under 10 minutes. For receiving messages by Internet SLIP/PPP, 96 percent were delivered in under 10 minutes.

The features comparison chart in February's "Windows 95 Versus Windows NT Versus Warp Versus Mac" should have listed the PowerPC as the processor for the Mac OS 7.5.2.

A phone number for Hewlett-Packard was listed incorrectly in our February Power Desktops chart ("Top 20 PCs: Pentium Power Play"). The correct number is 800/752-0900.

In the "Winners and Losers" table in March's "PC Reliability and Service: Homeward Bound or Bound for Trouble?" the "Source" listing should have said the questionnaires were returned between May and November 1995.

PC World regrets the errors.

Letters *welcomes your responses and ideas.* *See page 14 for contact information.*

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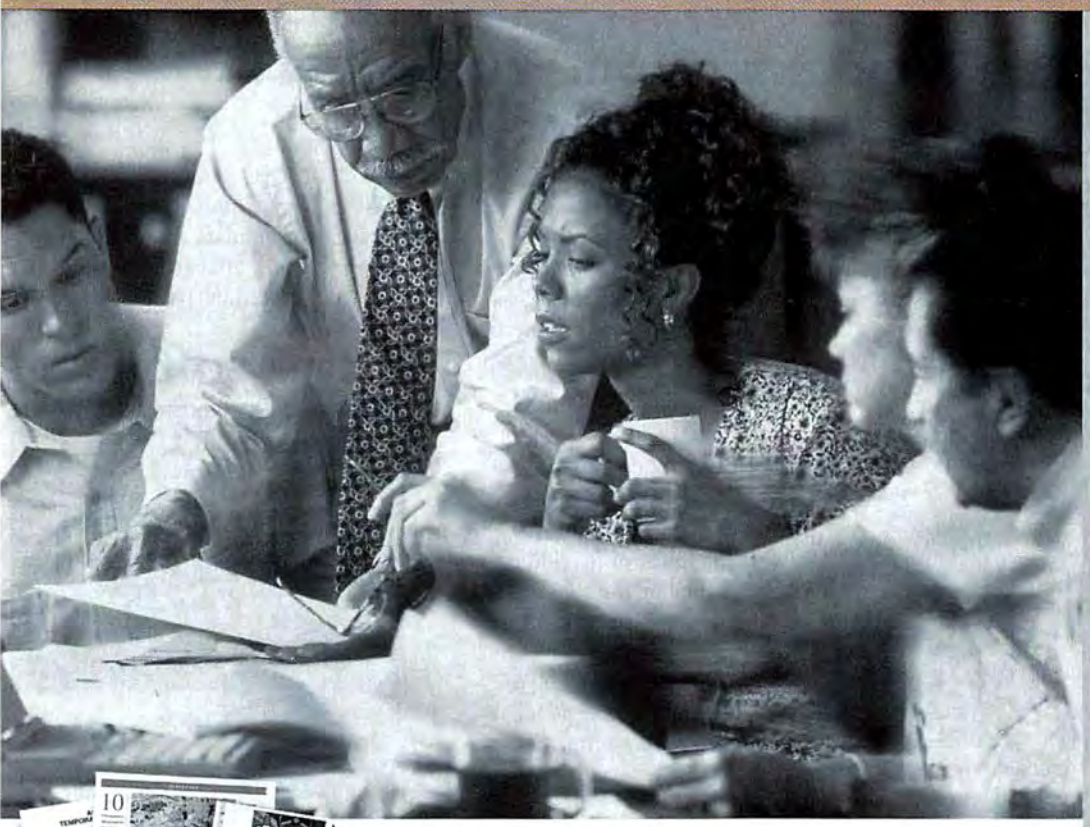

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Plug & Play

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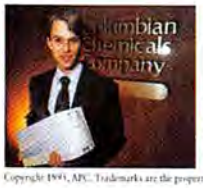
No surprise that *PCWeek* showed power problems such as blackouts, brownouts, and surges accounted for almost as much data loss as all other factors combined, or that a leading accounting firm attributed the largest single cause of computer downtime to—you guessed it—bad power.

MULTI-TASKING MULTIPLIES YOUR RISK OF "THE BIG ONE"

Multi-tasking operating systems like Windows 95 and Windows NT Workstation let you open and manipulate multiple files and applications at the same time. That's why, unfortunately, as *PC Magazine* says "When Windows 95 does crash, it's a horrible mess..."

Moreover, if you are "wired" to the Internet, an on-line service, or dialing into the office, you'll discover that phone lines are common paths for surges taking the express route direct to your motherboard.



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In short, if you still don't have proper protection (that $5 surge strip doesn't count) it's time to protect yourself before you kick yourself. Experts agree: If you choose not to decide on proper protection now, the next time you see this ad may be too late.

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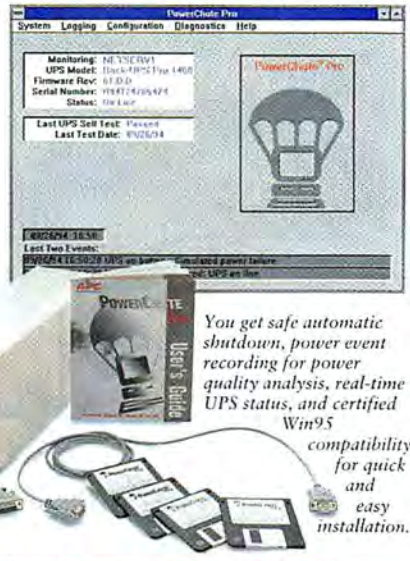

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1250 (software not included)	$689	75 min

*Runtime shown is for typical Pentium desktop system and may vary with your actual load. Note: Back-UPS 200 not recommended for Pentium systems

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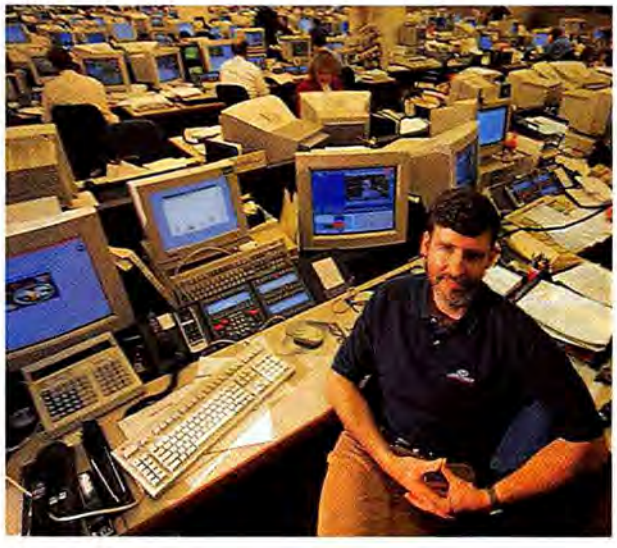
Circle 224 on reader service card

PC Meets TV: It's More Than "Film at Eleven"

No matter how busy you are, there are times when being able to watch TV on your PC—whether to check the daily stock market analysis or to get the latest on a natural disaster—would give you a real edge.

Of course, you can do this right now. Television-capable PCs with direct hookups to your cable system, such as the Compaq Presario CDTV 978, are widely available. But adding television capability to *existing* computers can be costly and difficult. This month Steve Scullen, a director of treasury systems for Bank of Boston, an 18,000-employee multinational banking firm headquartered in Boston, describes how networked video compression software helped deliver TV to the bank's trading room PCs. —*Editor*



SETH RESNICK

Watching TV Is Part of the Job

If you've ever visited a trading room floor—or even seen one on television or in the movies—you know that they're as chaotic as O'Hare International Airport on the day before Thanksgiving: Elbow-to-elbow traders shout at one another while telephones ring, printers clatter, and TVs blare.

In Bank of Boston's trading rooms in North and South America, Europe, and Asia, our traders run the portfolios of Fortune 1000 clients. These professionals buy and sell currencies and securities, perform risk management for our clients, and manage the bank's risk positions and balance sheet. While the traders perform transactions for our customers, they also need to be in continuous contact with other traders, and to be constantly tuned in to anything that affects fast-changing markets—such as fluctuations in interest rates, sessions of Congress, and Federal Reserve chair Alan Greenspan's comments on the economy—in order to make smart on-the-spot investment decisions.

Trading rooms are traditionally crowded places; it's common to have six traders, with their computers and other equipment, squeezed into a tiny 150-square-foot area. Most trading rooms also have TV monitors stationed on walls around the room so the traders can watch the news while they're working. Unfortunately, these monitors can present as many problems as they solve. To begin with, they must be hung low enough for the traders to see stock prices. But it's difficult to place the monitors without interfering with lines of sight around the room—and traders need to share immediate information with each other. Plus, the blaring sound from the TVs can raise the already high noise level to a deafening pitch. And we all have to watch the same channel, even if there's a different program that an individual trader might find more useful or informative.

Three years ago, when TV-capable PCs were first introduced, it was clear to us that the new technology could solve these problems. But the cost and hassle of installing television boards in every trader's PC were overwhelming. To equip all our existing Compaq and Digital multimedia PCs running under Windows 3.1, as well as our Sun workstations running under UNIX, with the right boards and cabling would have cost about $5000 per seat. It also would have required ripping up our trading room facilities to install the cabling.

In mid-1994, as we began building a new trading room, we were seriously considering spending a fortune to make our computers TV-capable. Then we saw an article in a technical journal about software that we thought would give us what we wanted without forcing us to reconfigure workstations and rip up our walls. The software, called InSoft Network Television, transfers live or recorded digital video from a server to client machines—both multimedia-equipped PCs and UNIX workstations—on the network.

TV on the PC helps speed investment decisions, notes Bank of Boston's Steve Scullen.

Instead of needing a television board for every PC, INTV requires a single video board on a network server configured with standard NTSC television cabling. Once our server hardware was ready, installing INTV was simple.

We loaded the software on the video-ready network server, downloaded it through our existing ethernet local area network to each workstation, and that was it. INTV compresses the digital information on the server and then distributes the video to the PCs, where our traders can watch CNN in a small window on their monitors. A hand-held

remote control device that comes with the software lets them adjust the sound and select channels. The network administrator has control over each user's frame rate and video window size. The administrator also controls the video and audio compression to reduce network traffic.

The Price Is Might

There are downsides, however. INTV isn't exactly cheap: Our setup costs included $5000 for the server software, $1500 for the server video board, and $250 per workstation. Still, this is considerably less than paying $5000 per workstation for more labor-intensive alternatives. And though INTV will run over our 10-megabit ethernet network, we notice a slowdown if we run more than one or two channels. (Fortunately, we're in the process of upgrading our network to Fast Ethernet, which is 30 to 40 times quicker than our old one; when this is done, our traders will be able to select from more channels.)

Despite these issues, the traders love the fact that the large, loud TV monitors have disappeared. They now run the INTV software most of the time—in fact, it's become a prerequisite to doing business on our trading floor. They're also glad to be able to plug into worldwide news at their own discretion. As more and more broadcast companies deliver "raw" video information—unedited, commentary-free sessions of Congress, for example—our traders can draw their own conclusions about the news, which helps them make clear, unbiased decisions. Ultimately, our traders can respond with lightning speed to market changes and deliver better service to the clients who rely on our judgment.

- **InSoft Network Television** $250 and up per PC, $5000 per server, $1500 and up per server video board; InSoft Inc.; 717/730-9501; **http://www.insoft.com**
  Reader service no. 603

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 14 for contact information.*

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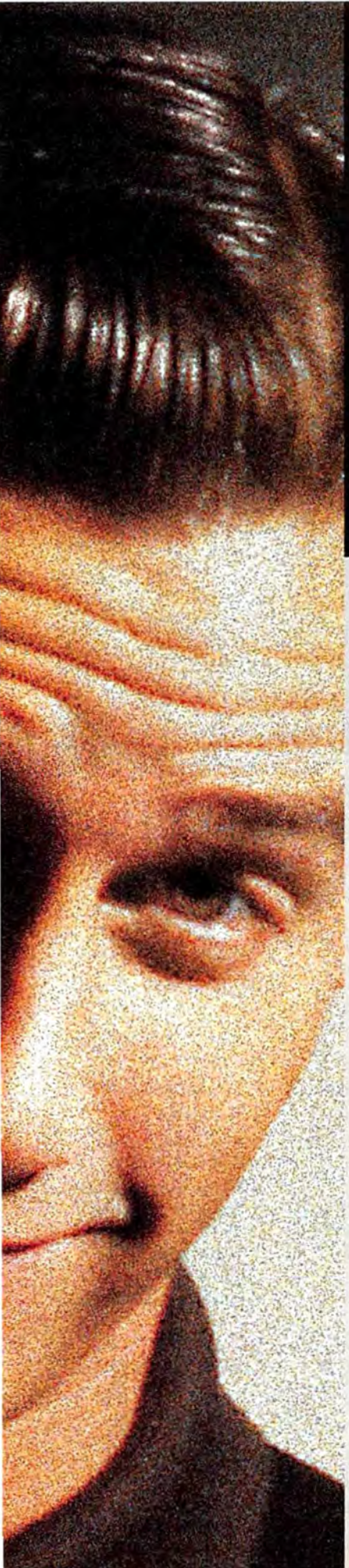

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It's Not the Base, It's the Data

By Stephen Manes

Every month or so somebody calls up to pitch me an amazing new personal information manager or financial manager or simplified database. The story's always the same: This wonderful new program will make it easier than ever for just plain folks to manage their address books or checking accounts or contact lists. I always respond with the same question: Who's supposed to enter the data? So far, the answer has always been the same: Me.

Sorry, I'll pass. It's not the programs that are the problem; it's getting data into them in the first place. To this day the only database I use is a decrepit copy of PC-File, into which I enter five simple lines regarding each item of business income and expense. So far I've managed to steer clear of just about every program that promises to organize my life, even though my life could certainly use some organizing.

My requirement is simple: If anybody has ever entered information into a computer anywhere, I should be able to bring that data into my machine and manipulate it with tools of my own choice. It may sound a little grandiose, but it turns out this idea is more or less at the root of what's known in the corporate world as *work flow*. Corporate information officers have begun to realize that once somebody in the company takes your order, no one else should ever again have to type your name, address, or phone number. Yeah, right—the goal of one entry for all is as far out of reach in the corporate world as it is in a Filofax full of Post-it notes.

But in this age of connectivity, things are slowly getting better. With two gigabytes of hard drive storage at my disposal, I only rarely delete files I download from the World Wide Web and online services. The information in those files becomes a terrific free-form database—provided I can extract what I'm looking for. I do that with the ancient Lotus Magellan, which automatically and effectively indexes those files every time I boot my PC and retrieves the relevant ones whenever I ask. I keep hoping for a Windows program that can take the long-orphaned Magellan's place, but nothing else I've found works as simply or as well.

Making a Statement

More specialized data is beginning to come down the wires in useful forms. When you pay with a credit card, all the information on your transaction is zapped to a computer. So why can't you get at it? Once the wrinkles are ironed out, you'll be able to. Online banking will let you download your entire credit card statement, and it will be complete (as your checking account will not), because all payees will be included. The trouble so far is that the computer and banking industries can't seem to understand that the bank for your credit card might not be the same one where you keep other accounts. When they get it right, sign me up.

Then bring on my long-distance bill. It's already in digital form, and business customers can usually get theirs that way. I want mine, too. Just loading it into the simplest of databases would show me who I've been spending too much time on the phone with and organize the phone expenses that my clients reimburse me for. Combine it with Caller ID data, another form of information that's easy to suck into your machine without typing, and the possibilities get even better—or would if Caller ID included business extension numbers. It doesn't.

What's next? I use an on-screen calendar on my desktop PC, but it's a drag on the road. I can transfer it from my desktop to my laptop, but that's not enough. And pocket organizers are no better. I still haven't seen one that's small enough, light enough, capable enough, and good enough at synchronizing information, though they're getting closer all the time.

It's not the programs that are the problem; it's getting data into them in the first place. Who's supposed to enter the data? Me?

When one does fill the bill, I'll probably want to enter lots of addresses into it. So far, that's a toughie. I was intrigued when the latest crop of business card scanners came along, but current optical character recognition software is no match for the quirkiness of business cards. With hand-feeding and correcting, it's faster just to type the things in.

But who has the time or inclination to do that when business cards get outdated faster than cottage cheese? Build a universal, accurate, constantly updated online phone book, and the world will beat a path to your virtual door. Till then, the stacks of business cards on my desk will continue to resemble a scale model of the Sears Tower.

PC World *Contributing Editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*

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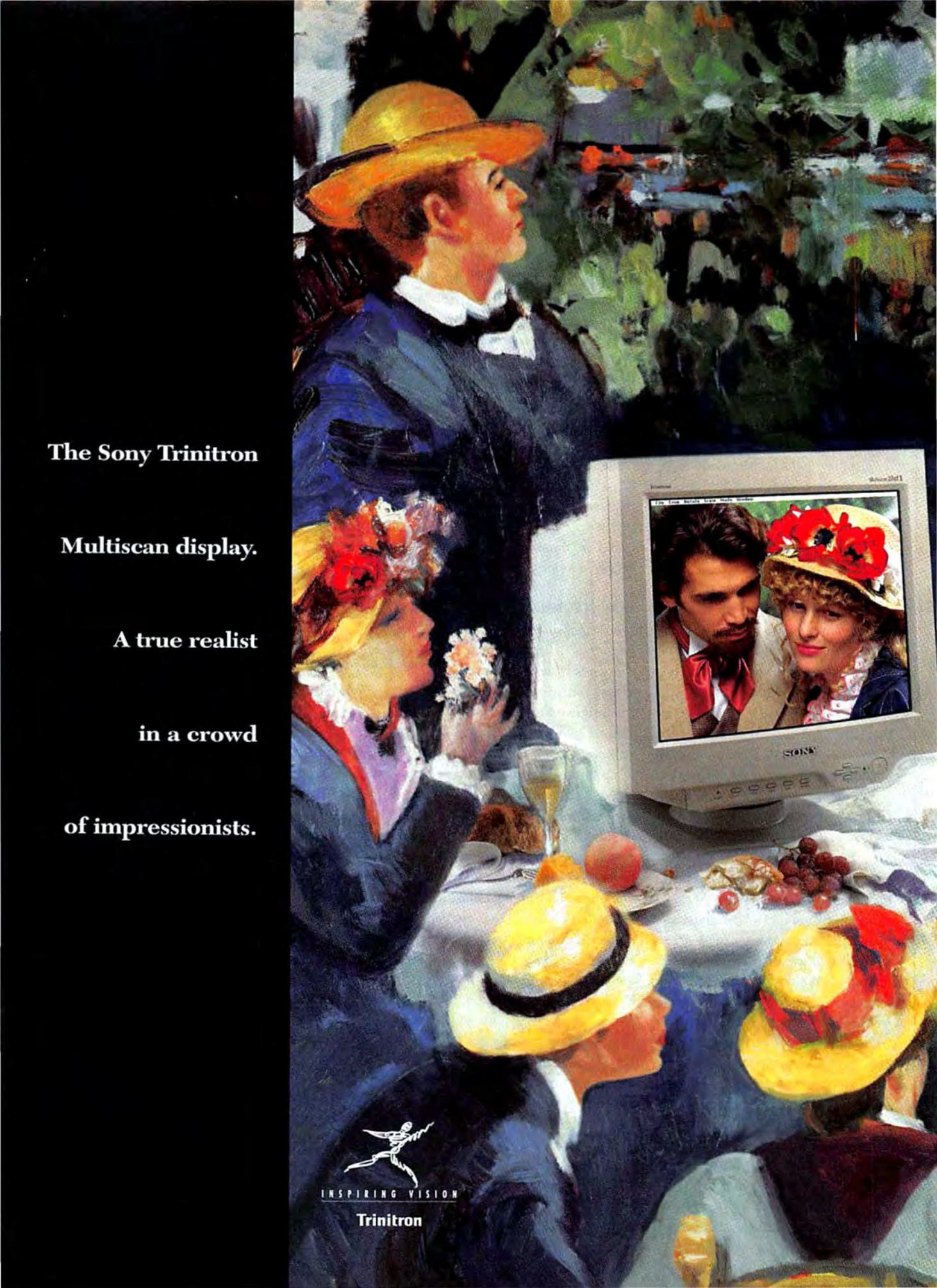
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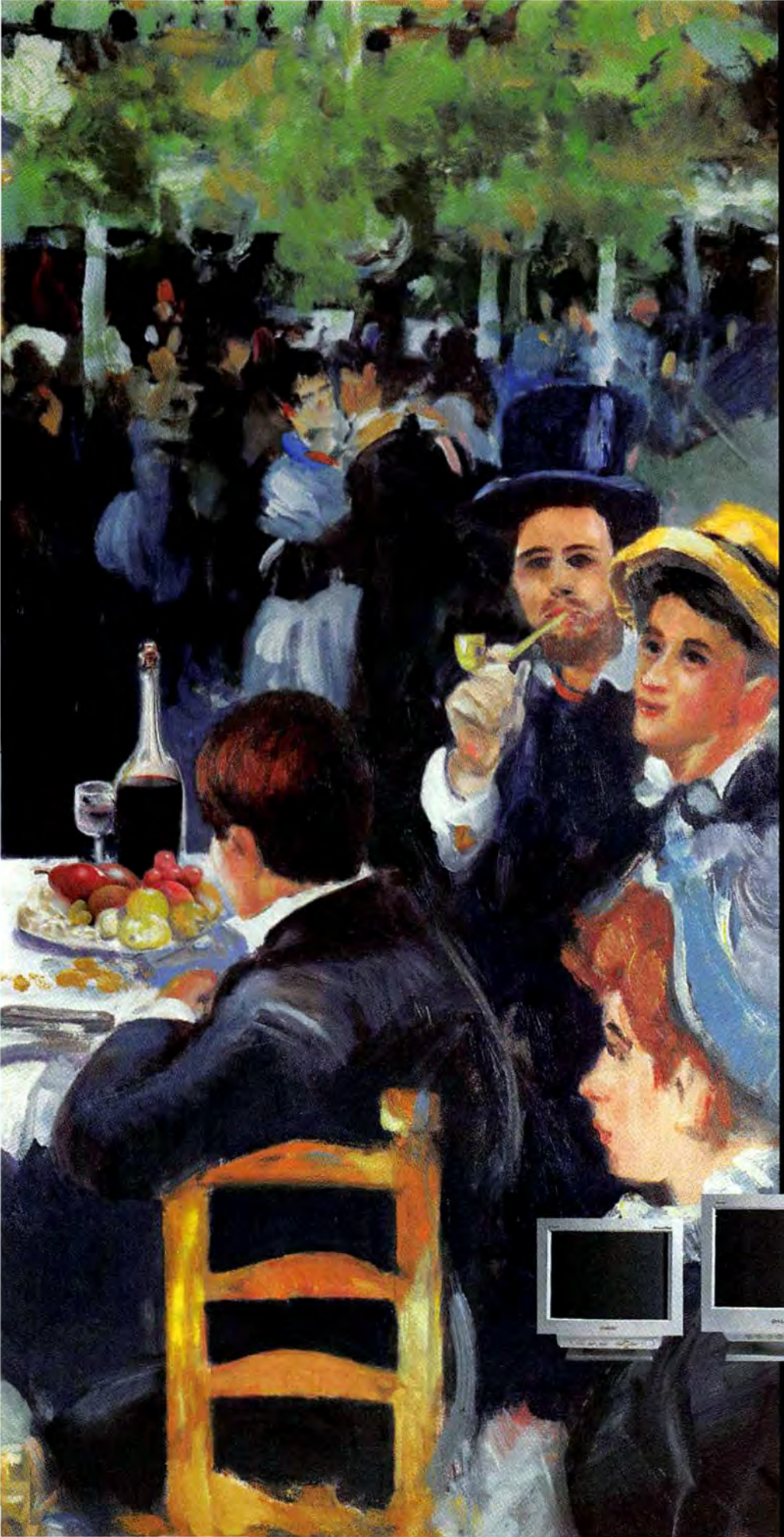

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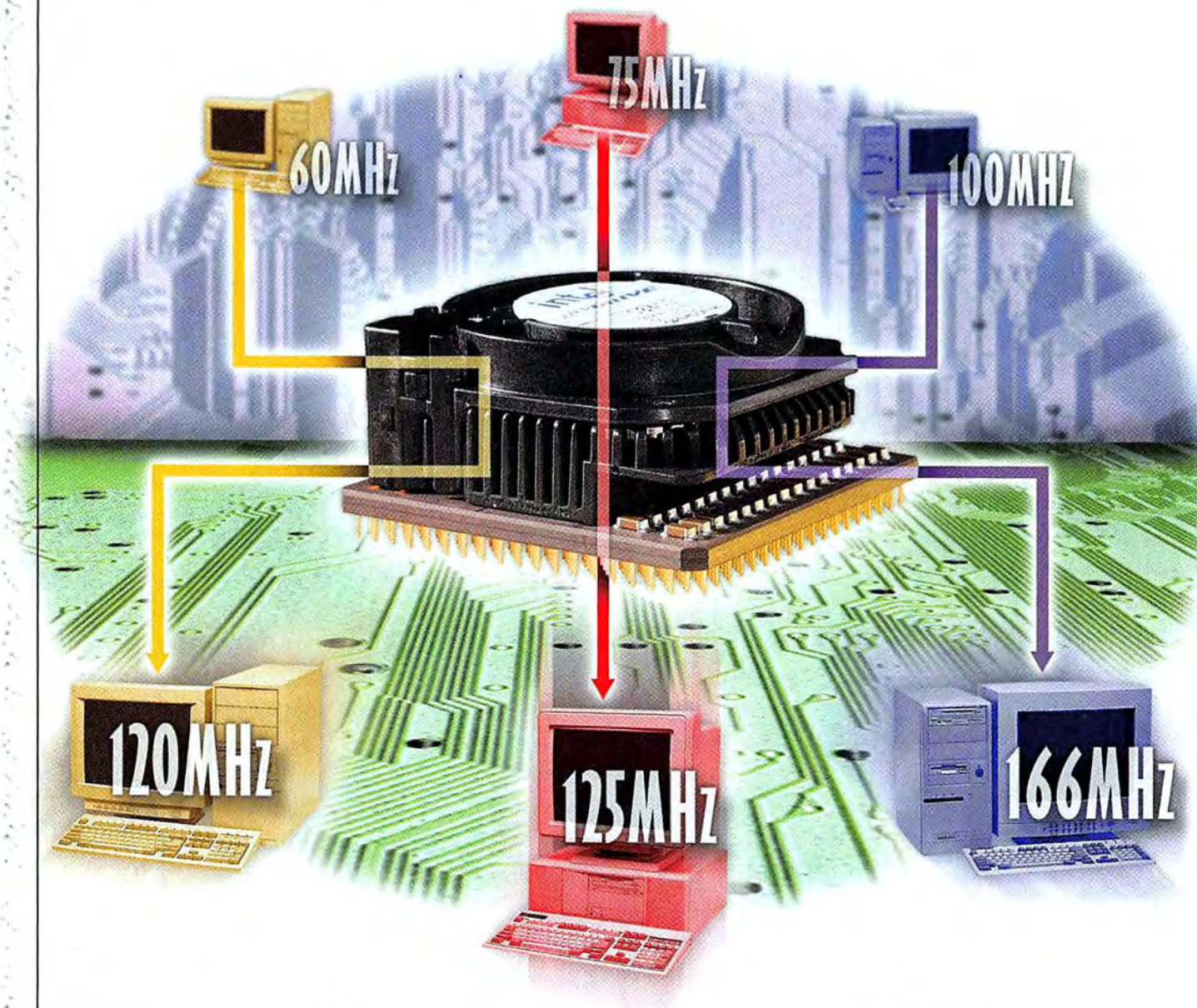


Turbocharge Your

Intel's newest OverDrive upgrades boost performance–but they're not cheap.

Edited by Andy Reinhardt and Randy Ross

Pentium PC

Our test results tell the whole story.

Upgrade chips for Pentiums already? Why not? The first Pentium systems rolled off the assembly line three years ago, so it's about time sputtering old 60- and 66-MHz Pentium PCs got a healthy shot in the arm. What's surprising about the new line of OverDrive chips is that versions will also be available for pumping up 75-, 90-, and even relatively new 100-MHz Pentium systems.

Evaluations by the PC World Test Center reveal promising results from the new chips: Unlike the disappointing Pentium OverDrives for 486s, Intel's latest upgrades let you nearly match the performance of a top-of-the-line Pentium PC for a fraction of the cost. But our tests also make clear that adding RAM can be a much more cost-effective way to boost the speed of your PC.

Fast and Faster

Two species of chips make up the new OverDrive flock. The first lists for $399 and plugs into either 60- or 66-MHz Pentium systems, doubling the clock speed of their CPUs to 120 MHz and 133 MHz, respectively. The second species comes in three varieties and increases the clock speed of 75-, 90-, and 100-MHz systems by two-thirds, to 125 MHz, 150 MHz, and 166 MHz. These three OverDrives list for $399, $499, and an eye-popping $679, respectively. The 90-to-150-MHz and 100-to-166-MHz chips will be available in May, while the others are available now.

So, are they worth the money? It depends on what kind of system you have, how it's configured, and how much you're willing to spend to squeeze more performance out of it. Our test results paint a complex picture.

Owners of 60- and 66-MHz Pentium systems get the best price/performance deal but fall furthest from matching the speed of a new system: Installing a $400 OverDrive-120 into a Pentium-60 PC raised its performance on our Windows 95 PC WorldBench test suite between 14 and 21 percent, to about the level of comparably configured Pentium-90 systems.

The speedups for 75-, 90-, and 100-MHz systems, on the other hand, ranged from a paltry 8 percent to 15 percent. Should you spend $400, $500, or nearly $700 for such an incremental gain? This may be a lot to pay for such a small boost, but it's still much cheaper than buying a new system.

However, boosting memory configurations from 8MB to 16MB typically raised performance in our tests far more than an OverDrive upgrade did—and for less money. Before rushing out to buy the latest upgrade chip, do the math carefully.

Breaking News

CHEAPER CHIPS: **Intel has set the stage for continued PC price cuts in 1996. By shifting more Pentium and Pentium Pro production to a process that squeezes more chips from each wafer, the company will significantly reduce its costs. Intel's goal: P-166 systems selling for $1500 to $2000 by year-end. One motive for the cuts could be to undermine the threat of non-Intel–based Internet PCs. Another reason: IBM is moving into volume production of Cyrix 6x86 processors, half of which it makes for Cyrix and half for selling on its own. The first vendors to use the IBM chips will be lesser-known firms such as MicroExpress and Sys Technology, but sources expect first- and-second tier vendors to consider the 6x86 this year. —G. M.**

CORELPERFECT: **The struggling WordPerfect division of Novell has found a new home with Corel, the Canadian software firm best known for its flagship CorelDraw graphics package. In a deal worth about $115 million in cash and stock (Novell bought WordPerfect 20 months ago for $850 million), Corel picked up most of the PerfectOffice suite, plus licensing rights to Novell's Envoy portable document technology and GroupWise groupware client. Corel officials say they'll release the Windows 95 version of PerfectOffice (previewed in *Top of the News* last month) in April as planned, and may integrate into it CorelDraw or**

(continued on page 45)

LEFT: CHIP PHOTO BY JOHN GREENLEIGH, ILLUSTRATION BY JEFF BERLIN; ABOVE, JEFFREY PELO

TEST REPORT

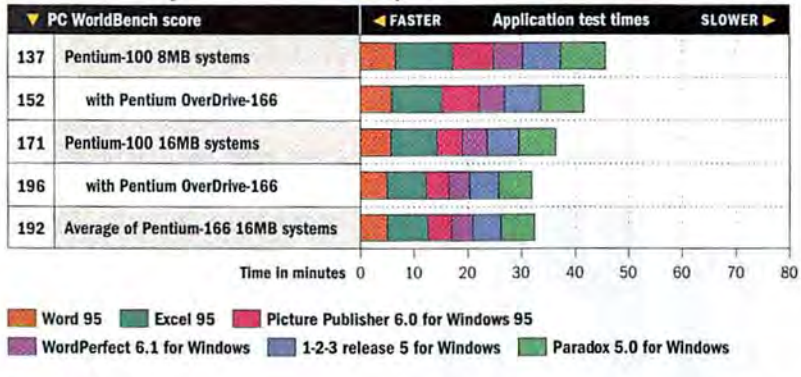
OverDrives Lift Performance, but Adding RAM Has a Bigger Payoff

The OverDrive-120's performance fell short of Pentium-120 systems'.

The OverDrive-125 produced the least gain of any OverDrive—blame the bus.

The OverDrive-150 let us match real Pentium-150s.

The OverDrive-166 yielded true Pentium-166 performance—but is it worth the cost?



Methodology

We ran the Windows 95 PC WorldBench test suite on six systems configured with 256K of secondary cache and 8MB or 16MB of RAM. To gauge OverDrive performance in both memory configurations, we replaced the original CPU with the appropriate OverDrive and reran the WorldBench suite. The systems were IBM Aptiva 710 (Pentium-60), Digital Venturis 575 and Compaq ProLinea 575 (Pentium-75), Maximus Magna Internet Media (Pentium-90), and Dell Dimension XPS P100 and Micron P100 Millennia (Pentium-100).

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

New Life for Ancient Pentiums

Do you feel burned because you bought one of the first Pentium systems only to discover that your cutting-edge 60- or 66-MHz machine ran like a 486DX4? A 120- or 133-MHz Pentium OverDrive can soothe your bruised ego.

The 120/133-MHz OverDrive works much like the 486DX2 clock doublers of yesterday: When you pull the original CPU from its ZIF socket and plug in a 120- or 133-MHz OverDrive, the new chip runs at *double* the native 60- or 66-MHz speed of the system bus. Of course, this doesn't mean you double the speed of your computer. We installed an OverDrive into a 60-MHz IBM Aptiva 710 configured with 8MB of RAM and saw a 14 percent performance improvement on our Windows 95 PC WorldBench test suite—to roughly the range of an 8MB Pentium-90.

Adding the same chip to a 16MB Pentium-60 system boosted results by 21 percent, to about the level we see in 16MB Pentium-90 PCs. The configuration with more RAM showed better results because it spent less time swapping to disk, especially in RAM-hungry Win 95 applications.

True, you won't get the performance of a bona fide 120-MHz Pentium PC; our tests showed that an upgraded Pentium-60 was still around 15 percent slower. But $400 could buy you the real Pentium performance you've been missing.

Advantage: RAM

The real shocker is this: We were able to boost performance in the same 8MB Aptiva by a solid 35 percent merely by adding another 8MB of RAM instead of the OverDrive chip. When you calculate the cost benefit—8MB of 72-pin SIMM memory now sells for between $219 and $259—you get more than *four times* as much bang for your buck by adding RAM as you do from an OverDrive. Of course, the best performance is achieved by adding both.

The upgraded Aptiva was slower than our average for off-the-shelf 120-MHz Pentium PCs because, like other 60- and 66-MHz Pentium PCs, it uses pokier

JOHN GREENLEIGH

SMART UPGRADE STRATEGY: RAM FIRST, OVERDRIVE SECOND

For $220 to $260, bump your Windows 95 system from 8MB to 16MB of RAM to get a 25 to 40 percent performance boost. Then consider an OverDrive upgrade.

Your current PC	OverDrive chip	Cost	Available	Speed gain in 16MB PCs	Performance equivalent
Pentium-60	120 MHz	$399	now	21%	Pentium-90
Pentium-66	133 MHz	$399	now	not tested	not tested
Pentium-75	125 MHz	$399	now	10%	Pentium-90
Pentium-90	150 MHz	$499	May	15%	Pentium-150
Pentium-100	166 MHz	$679	May	14%	Pentium-166

Data based on PC WorldBench testing conducted by the PC World Test Center. All rights reserved.

peripherals and an older chip set. The question is whether it's worth spending $620 or more on RAM and an OverDrive to bring your 8MB Pentium-60 up to a performance level lower than you'd get from a new $2000 Pentium-120 system. If doing so buys your PC another year or two of life, the upgrade may well be worthwhile. But you might want to save your money to buy a new system—especially since it'll also include other newer and faster components.

Diminishing Returns

The return on investment is actually worse for 75-MHz systems: The $400 125-MHz OverDrive upgrade raised the speed of two 8MB Pentium-75 test systems by just 8 percent. And despite its 125-MHz label, the chip still produced results 13 percent below those for off-the-shelf 16MB P-120 PCs, mainly because P-75 systems have a slower 50-MHz bus rather than the 60- or 66-MHz bus newer Pentiums use.

Results were better for 90-MHz PCs. When we swapped the $500 150-MHz Pentium OverDrive into a 16MB Maximus Pentium-90 PC, the machine actually bested the average benchmark scores for the off-the-shelf 16MB Pentium-150 systems tested by *PC World*.

We replaced the CPU in two Pentium-100 systems with the $679 166-MHz Pentium OverDrive and likewise got true Pentium-166 results. But our conclusion here has a mixed message. The dilemma: diminishing return on investment. While the 150- and 166-MHz OverDrives do indeed produce P-150 and P-166 performance for roughly one-quarter the cost of buying a new system, the incremental speed gain is actually quite small for the outlay.

Plug and Play for Real

Intel contends that Pentium OverDrives are easier to install than previous upgrade processors, and our experience in the test lab fully supports this claim. With earlier upgrade chips—especially the ones that professed to bring Pentium performance to 486s—you had to mess with jumpers on the motherboard to get the device to work (or to discover that it wouldn't). Here, with six different machines, we confirmed Intel's promise that you can just plug and go without touching a jumper.

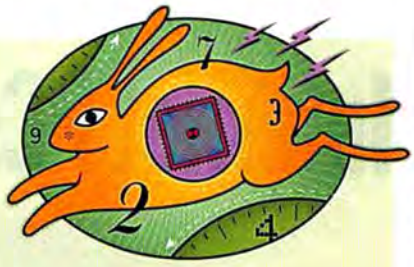
The new Pentium OverDrives do the best job of any OverDrive so far at delivering performance comparable to new systems. If you want to buy some time for your old Pentium, these upgrades offer a cheaper alternative to purchasing a new system. But you should expand your RAM first, and then look closely at how much difference an OverDrive will make before shelling out for an upgrade chip.

—Eric Knorr

Pentium OverDrive processors

Intel Corp., 800/538-3373

Reader service no. 799



Breaking News

(continued from page 43)

Corel Ventura. Analyst Eric Brown of Forrester Research says WordPerfect faithful should be happy with the deal, noting that Corel doesn't habitually discard acquired product lines. —R. O.

DECENT BACKLASH: Only hours after President Clinton signed the controversial Telecommunications Act of 1996 in February, the ACLU, the Electronic Frontier Foundation, and 18 other advocacy groups jointly filed a suit in federal court, charging that the legislation's antipornography provisions are unconstitutional. The groups argue that the bill, which would make it a crime to transmit "indecent" material over the Internet, is vague and overly broad and represents an unconstitutional expansion of federal authority. They argue also that other, less restrictive techniques, such as filtering and labeling of content, are available. The U.S. Circuit Court of Appeals in Philadelphia could take up the matter within a few months. —A. R.

POP-UP NEWS: Internet news meets screen savers with the PointCast Network, a free service that delivers information while your PC is idle. You pick favorite topics—sources include Reuters, PR Newswire, SportsTicker, AccuWeather, and others—and PointCast grabs text and graphics from the Internet, arranges them to match your specifications, and sends the images

(continued on page 47)

JEFFREY PELO

Internet PCs: Next Wave or Nonsense?

RADICAL NEW DESIGNS typify new low-cost Internet PCs. Clockwise from upper left: the TransPhone, Sun's Java terminal, and the ViewCall America WEBster.

Call them what you will: $500 PCs. Internet appliances. Network terminals. The whole computer industry is abuzz over proposals for ultralow-cost devices that let you surf the Net, shop and bank from home, run programs remotely, and play games.

Not in recent memory has an alternative to the traditional PC stirred such interest—or such controversy. Executives like Oracle CEO Larry Ellison and IBM chair Lou Gerstner proclaim these new devices the wave of the future, arguing that their low cost and ease of use will open up the computer market to millions of home and business users. Critics call them this year's fad, a step backward from the independence of personal computing to a centrally controlled pay-as-you-go model.

Given that the first of these machines will be available by midyear, is it time to forgo a new Pentium in favor of an Internet surfbox? Not likely. "The power of the PC is local ownership of resources," says Dataquest senior analyst Kimball Brown. "These machines shatter this prospect. Access to the Internet is only a small part of what can be done with a computer."

Stripped-Down PCs

The idea behind these low-cost systems is that conventional PCs, no matter how inexpensive their parts, are unlikely ever to sell for less than about $1200. This is far too much money for many consumers. Yet PCs won't get much cheaper because each needs its own powerful processor, ample local storage, and fancy peripherals.

By contrast, the new Internet PCs (or whatever you call them) trade off power and features for ease of use and lower cost. They typically include only a simple processor—either *x*86, PowerPC, or another RISC chip—a small amount of RAM, an input device (keyboard, mouse, and/or infrared handheld remote), and a modem or other communications hookup. Some connect to your TV, while others work with a computer monitor or LCD screen.

Instead of running all software locally, these terminals use a client/server architecture: Most heavy lifting is done by a remote system to which you connect over a network or phone line, while the local device primarily displays data and graphics. (This is how it works today when you access the World Wide Web using Netscape Navigator or another browser.) The client can be quite simple—and you don't have to install software or manage files locally.

Organizations looking for ways to trim expenses may embrace the idea of hooking up low-cost terminals to central servers: Maintenance is simpler, and users can't load unauthorized apps or games into their systems. "In a business, you want people to [work] rather than playing Solitaire or downloading files from the Internet," says Jeff McNaught, a marketing director for terminal maker Wyse Technologies.

Industry Politics

Network PCs are also inescapably political: Many proponents hope to grab business from the dominant Windows and Intel *x*86 standards. The rise of the Web, and with it Netscape and the Java language from Sun Microsystems, is seen by rivals as the best opportunity in years to make a dent in the Wintel juggernaut.

Why? Because Web browsers are *universal clients*. It doesn't matter whether you're running Windows, a Macintosh, or

TRANSPHONE AND VIEWCALL PHOTOS: JOHN GREENLEIGH; ILLUSTRATION: JEFF BERLIN

NOT YOUR FATHER'S DUMB TERMINAL: Wyse's Winterm runs Windows apps—even a browser—off an NT server.

a proprietary surfbox: As long as you have a compliant local browser, you can point it at any Web server and interact with it. Sun's Java adds the ability to execute inside your browser little programs, or *applets*, that are sent across the wire from the server.

Instead of today's all-inclusive apps, which are overkill for many users, network terminals could run smaller, simpler programs designed for specific tasks. The big loser in this scenario could be Microsoft.

Multiple Approaches

The network terminals announced thus far use a wide variety of designs but share essential elements (see table below). Oracle has disclosed that it will use an Advanced RISC Machines chip in its as-yet-unnamed $500 Internet box. The company has reportedly created a Web browser and a Java interpreter that run natively on the chip. Ideal users would be those who retrieve and assimilate information but don't create it. In the corporate environment that could mean anyone from the CEO to data entry clerks and telemarketers.

Start-ups ViewCall America and Teknema are also using ARM chips and Web browsers. ViewCall's WEBster system, expected to cost around $300, connects to a TV and comes with a handheld remote control or an optional keyboard. It's designed for people who want to use the Web for information access, shopping, banking, and e-mail. Teknema is seeking OEM partners to sell its $400 Easy Rider.

Sun Microsystems has entered the fray with a proposed device designed specifically to run Java software and powered by chips that run Java natively—and thus very quickly. The price is expected to be more than $300; delivery dates and potential partners are as yet unknown.

Wyse has adopted a different architecture, inspired by host/terminal systems of the past. The new Winterms—costing $500 for a monochrome model and $750

A WHOLE NEW WORLD: CHEAP NETWORK PCS ON DECK FOR 1996

Company/product	Price	Processor	Display	Contact info
Oracle/Oracle NC	$500	ARM	TV	415/506-7000
Teknema/Easy Rider	$400	ARM	CRT	800/656-8834
ViewCall America/WEBster	$300	ARM	TV	770/729-2929
TransPhone/TransPhone	$350–$500	x86	LCD	800/872-0809
Wyse/Winterm	$500–$750	x86	CRT	800/438-9973
Bandai/Pippin Atmark	$600	PowerPC 603	TV	310/404-1600
Sun/Java terminal	$300+	n/a	CRT	800/821-4643
IBM/InterPersonal PC	n/a	n/a	n/a	n/a
WebBook/WebBook	$700	ShBoom RISC	LCD	810/644-2725
THE REAL $500 PC: BUY A USED SYSTEM OR BUILD YOUR OWN TO WEB SURF—AND RUN WINDOWS				
AST/Premium 25E	$485 (used)	486SX-25	CRT	n/a
no-name/components	$620 (new)	486DLC-40	CRT	n/a

n/a = not available

Breaking News

(continued from page 45)

scrolling across your screen. The service works over a direct or dial-up connection and includes ads. You can download the free Windows software, which includes a Web browser, from http://www.pointcast.com. For more information, call 408/253-0894. —S. F.

HIT THE DEC: Digital Equipment is bowing out of the family PC market. The company has discontinued its Starion line of home PCs and will instead focus on machines for small offices and home offices. Digital plans to introduce new SOHO models of its HiNote mobile systems this spring and new Venturis Desktop PCs later in the year. The company says it will continue to provide tech support to Starion owners and will honor the Starion's three-year limited warranty. —L. M.

TIDBYTES: IBM has released OS/2 Warp Server, the Warp version of its LAN Server network operating system. The software will compete with NetWare and Windows NT, but analyst Craig Burton of The Burton Group says it won't make much of an impact on the market. "That game is over," he says...Bye-bye Blackbird: Shifting its energy to Internet-based tools, Microsoft has discontinued work on Blackbird, the development and content-creation platform for the Microsoft Network. Early Blackbird customers are reportedly steamed. —A. R.

Edited by Andy Reinhardt

PHOTO: JOHN GREENLEIGH; ILLUSTRATION: JEFFREY PELO

for color—work in conjunction with Citrix Systems' WinFrame multiuser extensions to Windows NT. The terminals display Windows 3.1, 95, and NT programs that execute on the server. You can also surf the Web using a browser that runs on the host. Then, if you link to a WinFrame server via the Web, you can run Windows applications remotely from your terminal.

WinFrame also has broader usage than multiuser business apps: A start-up called TransPhone is using the technology for a $350 to $500 device that gives novices access to electronic shopping and banking. The TransPhone unit resembles a fax machine with a top that unfolds to reveal a keyboard and color LCD. With a built-in modem, handset, credit card swiper, and two PC Card slots, the TransPhone is a turnkey electronic commerce system.

Mavericks

Japanese game maker Bandai Digital Entertainment has announced a $600 hybrid between a CD-ROM game player and an online appliance. Based on Apple's Pippin technology, the Bandai Pippin Atmark uses a PowerPC 603 chip and runs modified Macintosh applications and a Web browser.

GAME MACHINE WITH A MAC HEART: Bandai's CD-ROM player uses Apple's Pippin technology and doubles as a Net surfbox. The $600 device hooks up to your television.

WebBook plans a portable device built on a proprietary RISC processor called ShBoom that will run Java applets. With a miniature keyboard, four Type III PC Card slots, speakers, and 4MB of RAM (expandable to 16MB), the WebBook system is expected to sell for around $700.

A near total mystery is the so-called InterPersonal PC from IBM, a diskless PC the company has mentioned publicly but not described. It's aimed at corporations.

Skeptics Abound

Don't get your Pentium ready for the rummage sale just yet. Investment is pouring into surfboxes right now because average people may turn out to prefer single-function devices to the endlessly expandable—but notoriously complex—PC. Says Steven McAllister, vice president of sales and marketing for Bandai: "[These systems will] open up the Web...to a huge market that either couldn't afford a PC or didn't want to be a hobbyist." But nobody's sure customers really want them.

—Gabrielle Mitchell

Bug Watch Death, Taxes, and Software Bugs

Intuit's TurboTax for 1995 Depreciation, Keogh Errors

▶ Bugs: If you entered information on assets acquired before 1994 into the 1994 version of TurboTax (leaving the Prior Depreciation field blank), then imported 1994 data into TurboTax for 1995 (Deluxe and Business versions), your depreciation may be overstated. If you used the Keogh and SEP Contribution Worksheet to determine your maximum contribution for 1995, your deduction may not calculate correctly.

▶ Work-arounds: Instructions for correcting these errors are on Intuit's TurboTax Web page at http://www.intuit.com/turbotax/support/1/ttsupt1c.html.

▶ Fix: Intuit promised fixes for both problems in February. To receive the update, contact Intuit Customer Service at 520/295-3100, or fax your request to 800/766-5034.

Parsons 95 Tax Mate Form 1040A Print Glitch

▶ Bug: Parsons Technology says the 16- and 32-bit versions of its 95 Tax Mate always print the Total Tax on Form 1040A, line 28 as zero. And for a moment there you thought 1995 was a good year!

▶ Work-around: Since the printing error doesn't affect any other values printed on the form, you can simply print a copy of Form 1040A and write the sum of lines 25, 26, and 27 on line 28 by hand. Or, you can use Form 1040, which prints correctly.

▶ Fix: Parsons has released a patch, tmatefix.exe, that fixes the printing error. You can find it on CompuServe (go parsons) and at http://www.parsontech.com/infocentral/new.html.

Kiplinger TaxCut 95 Electronic Filing Bugs

▶ Bugs: The 1995 Filing Edition of Kiplinger TaxCut for Windows has problems with electronic filing. If you claim Single, Head of Household, or Qualifying Widow status, the program won't let you complete line 10 of Form 8453—and then prevents you from sending the incomplete return. It also won't file electronically in several situations involving a Form 8453 or an attached Schedule SE.

▶ Fix: Block Financial has a patch. Find Update B (updat95b.exe) on CompuServe (go taxcut) or AOL (keyword taxcut). You don't need the patch if you aren't filing electronically—or if you had less than $400 net earnings as a self-employed person. —Scott Spanbauer

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JOHN GREENLEIGH

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"When you delete files, CleanSweep bundles them into a package, compresses them, and archives them where it can find them again...this looks to be...one of the 'must have' Windows 95 supplementary programs."
JERRY POURNELLE, BYTE, NOV 95

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DVD Drives: Giant CD-ROMs and Movies, Too

After a fierce battle, giants of the PC and consumer electronics industries have agreed on a standard for ultra-high-capacity optical discs capable of storing data, CD audio, and digital video: DVD. (That's now the official name; the letters formerly stood for Digital Video Disc.)

By September, Toshiba is expected to ship a $600 DVD-Video device that connects to a TV and plays an entire movie from a silver platter the size of a CD. And by December, the company plans to ship a $500 DVD-ROM drive for PCs that will read today's CD-ROMs as well as new discs that store seven times more data. PC storage and home entertainment may never be the same.

Higher Capacity, Better Performance

Initially, DVD will pack about 4.5GB onto a disc the same diameter and thickness as a CD-ROM; that translates to 133 minutes of digital video, enough for most feature films. It's no coincidence: Although DVD has obvious applications for data storage, its creation was driven by the film industry, which sought a storage medium cheaper and more durable than videotape.

DVD's higher capacity allows video and audio quality that will blow away CD-ROMs, VHS tapes, and even video laser discs. Video will be stored using MPEG-2, a video compression standard employed by today's high-resolution digital TV satellites. DVD supports six channels of audio, and users can choose from three types of theater-quality sound. Additional tracks on DVD discs will handle up to eight foreign language dubs, subtitles, and even options to change R rated films to G. (Sorry, the reverse is not yet possible.)

DVD will be fast, too. Even though the standard specifies a rotation speed slightly slower than that of a 4X CD-ROM drive, tightly packed data will stream off a DVD at 1.3 megabytes per second—the equivalent of a 9X CD-ROM drive, if such a beast existed. At that rate, DVD drives will nearly equal the speed of a hard drive.

Thorns on the Rose

Several technical issues remain unaddressed, most important among them sound and video decoding. PC users who want to take advantage of DVD's multimedia capabilities will need to buy a sound-and-video card that can handle MPEG-2 and the three DVD audio formats. This hardware doesn't exist yet, but is expected to cost around $200.

TOSHIBA'S DVD-ROM, due this year, looks like a CD-ROM drive but holds a stunning 4.5GB of data.

Another potential snag: DVD is supposed to play current audio CDs and CD-ROMs plus the handful of Video-CD movies now available, but this compatibility is proving to be a technical challenge. DVD's tightly focused lasers have trouble reading less densely packed data on current CD formats.

Another drawback may initially discourage home video buffs more than it does computer users: The first DVD devices won't record. A recordable DVD standard isn't likely to be finalized for several years.

Worth Waiting For?

If you currently have a 4X CD-ROM drive, consider waiting for DVD instead of upgrading to a 6X or 8X model, since virtually no software exists to exploit the faster drives, and little is expected before the end of 1996.

If you already have a 6X or 8X drive, there's no rush to switch to DVD; in fact, the DVD units won't play your existing discs as fast. The new format fulfills its promise of improved performance only when playing new DVD discs. And while upwards of 300 DVD movies are supposed to ship by the end of 1996, DVD-ROM titles aren't anticipated in quantity before 1998, says Mary Bourdon, analyst with market researcher Dataquest.

Nevertheless, playing movies on your PC could prove to be a killer application. Says Arjen Bouwman, director of Philips DVD-ROM, "If your kids ask to watch *Lion King* for the 53rd time, let them do it on your 17-inch PC monitor while you relax in the living room." Sometimes justifying your appetite for leading edge technology takes extra imagination.

—Jeff Sengstack

DVD Hardware and Software on the Horizon

Shipping	Product	Company
third quarter 1996	first DVD-Video player	Toshiba America
	250 DVD movie titles	Time-Warner
fourth quarter 1996	DVD-ROM drive	Philips
	DVD-ROM drive	Toshiba America
	DVD-Video player	Philips
	DVD-Video player	Sony
	50 DVD movie titles	Columbia
1997	DVD-ROM drive	Sony

ILLUSTRATION: GORDON STUDER

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Completely Focused: NEC's New MultiSyncs

Trinitron has met its match: NEC has introduced a new family of monitors, the MultiSync M500 and M700, which use a significant new tube technology called CromaClear. The result: better image quality, especially in the corners of the screen, at comparable prices.

NEC's 15-inch MultiSync M500 (13.8-inch diagonal screen) is $599, and the 17-inch MultiSync M700 (15.8-inch diagonal) sells for $849. These prices are typical for high-end monitors. Both sport a handsome design, with a casing that sweeps back from the monitor's flat face. The units also have built-in speakers, a headphone jack, a mike, and a mute button.

But the key enhancement is the new CRT technology. Most monitors produce color images and text by projecting an electron beam onto tiny dots of red, green, and blue phosphors. Sony's groundbreaking Trinitron tubes substituted stripes, which yielded brighter colors but sacrificed some color saturation at the edge of the screen. NEC's new CromaClear tubes use vertical bundles of three elliptical spots that approach the brightness of stripes while retaining the crispness of dots. Plus, you don't see the faint lines visible on Trinitrons.

Instead of expressing sharpness in terms of dot pitch, as with standard monitors, or stripe pitch, like Trinitrons, NEC coined a new term, boasting of a .25mm *mask pitch*. Screen refresh is flicker-free—75 Hz at resolutions of 640 by 480, 800 by 600, and 1024 by 768. Another nicety: The NEC MultiSync models support Level 2b Plug and Play, so your monitor and graphics card synchronize to optimal settings.

NEC offers on-screen menus for monitor settings, which are accessible by pressing a front-panel button. All the commands are in plain English; for example, the setting usually called *pincushion* is labeled simply 'In/Out'. Unfortunately, you can't adjust contrast and brightness by using knobs under the bezel but must instead repeatedly press little buttons.

These new MultiSyncs aren't the only game in town. Look for the arrival of other challengers to the Trinitron's preeminence. Tube designs such as Mitsubishi's DiamondTron will appear in Sampo's 17-inch AlphaScan 760 and other products later this year. NEC Technologies, 800/632-4636. **Reader service no. 796**

—John Goddard

Point-and-Shoot LAN Links:

Hewlett-Packard has devised a new way to connect your notebook PC to a local area network: the $289 NetBeamIR (pronounced *net-beemer*). This desktop device—about the size and shape of a clock-radio—has an infrared port on top and attaches directly to your LAN's network cable. When you point your notebook's IR port at the NetBeamIR, the devices recognize each other in seconds, and you can log right on to the LAN. Then you can exchange files, run applications from the network, send e-mail, or send a job to a network printer. The NetBeamIR demonstrates the potential of IR technology, which should become more popular in mobile products this year.

Hewlett-Packard NetBeamIR

NetBeamIR works with any notebook that has an IrDA-compliant IR port and Windows 95. (Win 3.1 users are out of luck.) I tested a preproduction NetBeamIR attached to a NetWare LAN. My 90-MHz Pentium notebook had 16MB of RAM and a 115-kilobits-per-second IR port. The installation took longer than expected, but your results may vary. You need IR software for Windows 95, which HP provides and some notebooks already have. (Microsoft will also include it in the Win 95 service pack)

If connecting to a LAN is your main concern, the NetBeamIR may be a better investment than a docking station, which can cost as much as $600 and usually works with only one type of notebook. However, the NetBeamIR costs significantly more than PC Card ethernet adapters, which are available for as little as $79.

The NetBeamIR connects to an ethernet network and works with NetWare, Windows NT, LAN Manager, and IBM LAN Server. Your notebook must be within three feet of the device. Speed varies according to your notebook's IR port.

The downside? The NetBeamIR is a bit ahead of notebooks that will take best advantage of it. While it runs at up to 4 mbps, most of today's notebook IR ports top out at 115 kbps. (A few, such as those in IBM's top-of-the-line ThinkPads, support 1-mbps IrDA.) NetBeamIR works with these slower ports, but performance lags. Vendors won't widely implement higher speeds until fall.

Look for competing IR units from Extended Systems and others later this year. When prices drop and 4-mbps IR ports proliferate, devices like NetBeamIR will take off. Hewlett-Packard, 800/533-1333, http://www.hp.com. Reader service no. 797 —Laurianne McLaughlin

PHOTOS: JOHN GREENLEIGH

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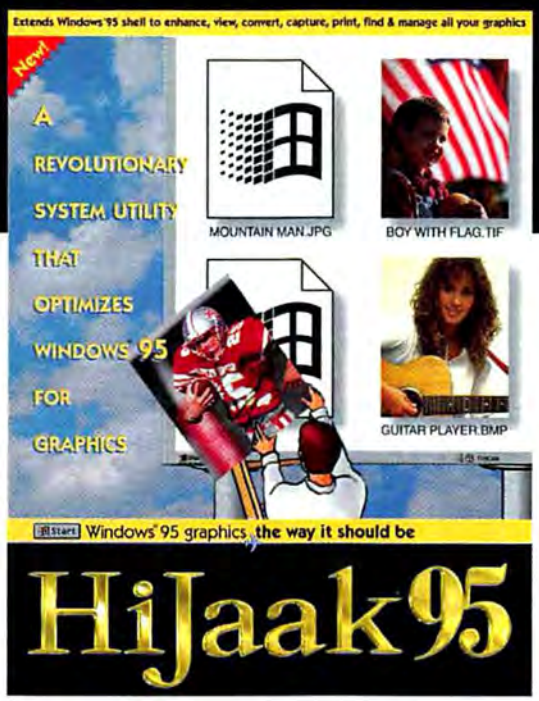

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Hard Drive	720MB	720MB	510MB (removable)	810MB (removable)
Cache	16KB Internal	16KB Internal	256KB, 64-Bit	256KB, 64-Bit
Diskette Drive	Internal 3.5" 1.44MB	Internal 3.5" 1.44MB	Modular 3.5" 1.44MB	Modular 3.5" 1.44MB
Display	10.4" Color Dual Scan	10.4" Color TFT	10.4" Color Dual Scan	10.4" (800x600) CTFT
Video Graphics	32-Bit Local Bus	32-Bit Local Bus	32-Bit PCI Local Bus 1MB VRAM	32-Bit PCI Local Bus 1MB VRAM
PCMCIA Slots	2 Type II	2 Type II	2 Type II	2 Type II
16-Bit Audio	No	No	Yes	Yes
Internal CD-ROM Drive	N/A	N/A	Optional QuadSpeed	Optional QuadSpeed
Pointing Device	Optical Trackball	Optical Trackball	EasyPoint™ II	EasyPoint II
NiMH Battery	3-5 Hours	3-5 Hours	2-4 Hours	2-4 Hours
Ports	Keyboard/Pointing Device, Enhanced Parallel, Serial, External SVGA	Keyboard/Pointing Device, Enhanced Parallel, Serial, External SVGA	External Keyboard/ Pointing Device, Headphone/Speakers, Microphone, Infrared Communication, External SVGA	External Keyboard/ Pointing Device, Headphone/Speakers, Microphone, Infrared Communication, External SVGA
Software	MS-Windows® 95 or MS-Windows 3.1	MS-Windows 95 or MS-Windows 3.1	MS-Windows 95 or MS-Windows 3.1; MS-Video for Windows, Compaq Sound System	MS-Windows 95 or MS-Windows 3.1; MS-Video for Windows, Compaq Sound System
Dimensions/Weight	11.9"x9"x2.2"/6.25 lbs.	11.9"x9"x2.2"/6.5 lbs.	12.2"x9"x2"/7.1 lbs.	12.2"x9"x2"/7.4 lbs.
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HP Targets Small Businesses

If you depend on a PC to keep your small business running efficiently, your livelihood is on the line when your system goes down. And without an MIS staff to turn to, who you gonna call?

Hewlett-Packard wants to be the answer. This month, the company is unveiling a new line of PCs bundled with software and support plans tailored to small businesses. The Vectra 500 systems include business applications, networking software, and communications tools preinstalled—and supported—by HP. By offering customers a single point of contact, HP aims to eliminate the usual passing-of-the-buck between hardware and software vendors when something goes wrong with your PC.

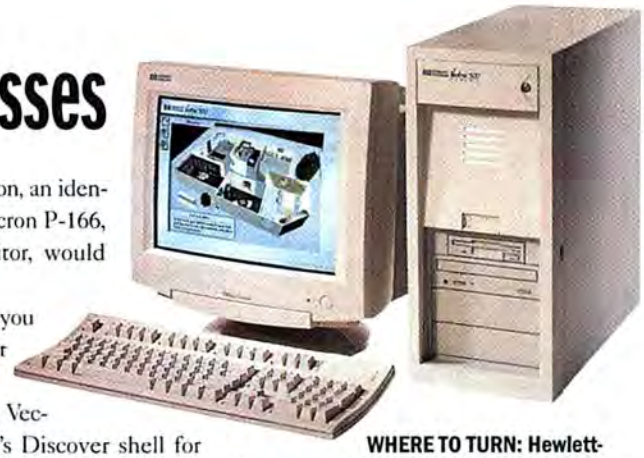
The extra goodies and hand-holding don't come free, of course, but the price difference between Vectra 500s and competitors is surprisingly low. A no-frills HP Pentium-75 desktop computer with 8MB of RAM and an 840MB hard drive will sell for an estimated street price of $1300, not including a $410 monitor. And a top-of-the line Pentium-166 tower system with 16MB of RAM, 256K of secondary cache, a 1.6GB hard drive, a quad-speed CD-ROM drive, and a 28.8-kbps fax-modem and telephony card will cost $2950, without a monitor. By comparison, an identically configured Micron P-166, also without a monitor, would cost $2799.

For the extra $150, you get a good, but not dazzling, package of software and support. Vectra 500s include HP's Discover shell for Windows 95, which helps novices find, launch, and learn the preinstalled apps. Also included is Microcom's Carbon Copy remote control software, which allows HP tech support to dial in to your PC and diagnose and fix many software-related problems, such as outdated drivers.

The Vectra 500 warranty isn't noteworthy: It runs for one year and includes on-site service—comparable to what many mail-order vendors now offer. The bonus is HP's electronic remote support and a special toll-free help line just for Vectra 500 owners (available 16 hours on weekdays and 7 hours on Saturdays), which you can call for 90 days to get help with all the bundled apps. For $299 more, HP sells an additional year of toll-free software aid and 24-hour, seven-day-a-week support. That's cheap compared to the cost of a consultant.

Vectra 500s are solid but not spectacular; what you're buying into, concludes Abhijeet Rane, home office/small business analyst for researcher IDC/Link, is "HP's good reputation for reliability and support."

—James A. Martin



WHERE TO TURN: Hewlett-Packard's Vectra 500 includes electronic remote support for all software.

Vectra 500 series

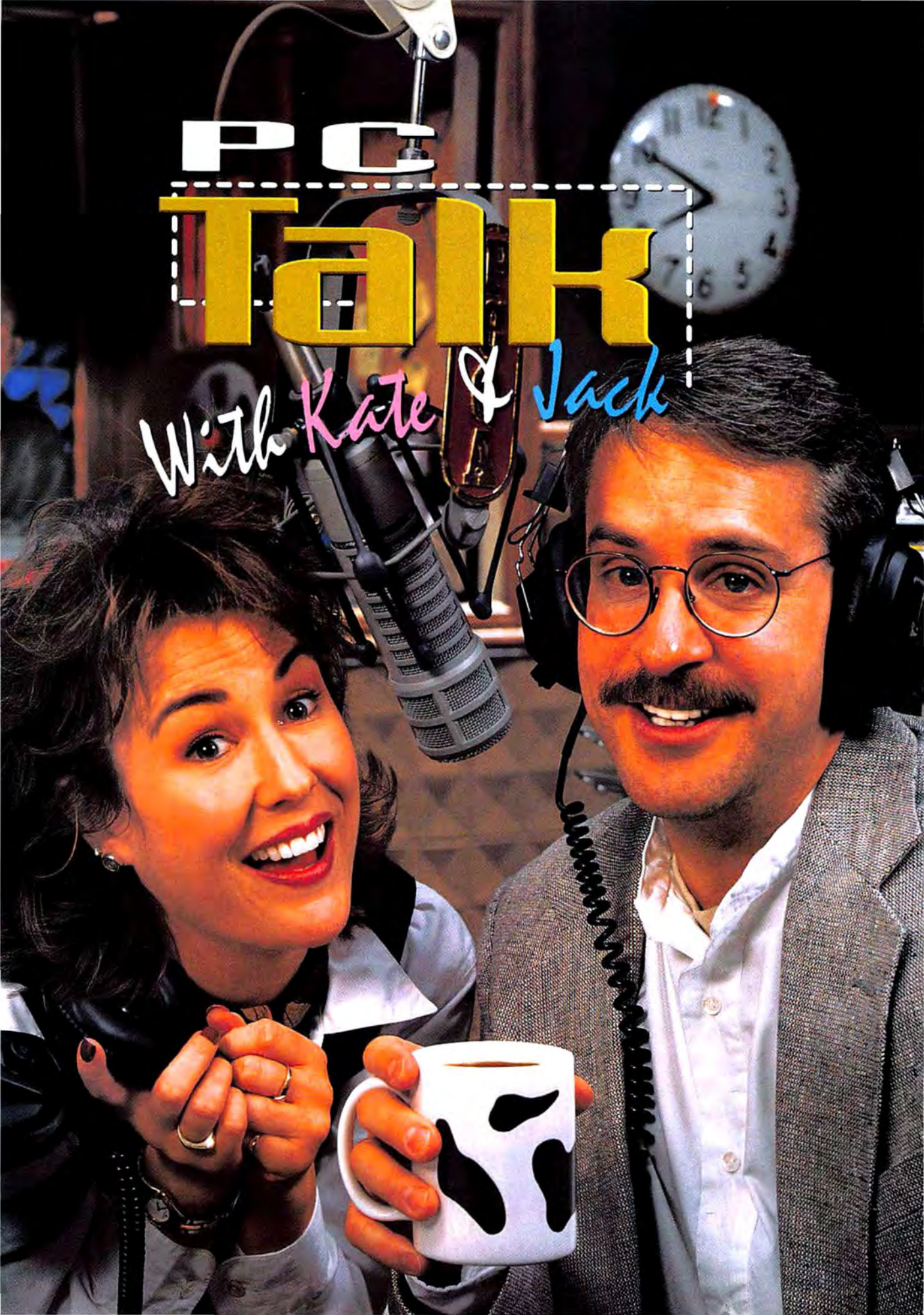
Small-business Pentiums with extra help.
Key Features: Microcom Carbon Copy • ClarisWorks • Lotus Organizer • Adobe Acrobat Reader • HP Discover shell
Pricing: $1300 to $2950
Availability: Immediate
Hewlett-Packard, 800/752-0900, http://www.hp.com
Reader service no. 798

The Web Browser: Java, Java, Java

By now you've caught the buzz about Sun Microsystems' Java language, which runs over the Web and enables tiny applications that execute inside your Web browser. Finished applets are dripping out, and it's high time to sample some. We started at Gamelan, a storefront for hundreds of applets. http://www.gamelan.com/...Here we found the smartest financial applet we've seen: WallStreetWeb, a stock watcher (not a ticker) that charts an issue's performance and includes nine graphing options. http://www.bulletproof.com/WallStreetWeb/...Clickable interactive maps are a great idea, but Virtual Boston is not ready for prime time. Until modem speeds increase, map applications are just too slow and can't compete with their print and CD-ROM equivalents. http://www.pmg.lcs.mit.edu:80/~ng/Map/...Presentations anyone? A developer at MindSpring, an Atlanta Internet service provider, has posted a set of applets for adding a slide show to your Web page. http://www.mindspring.com:82/~apollo/java/applets/effects/java.htm ...Taken together, these first pickings are pretty good harvest, and many more Java applets are brewing. —Richard Overton

BulletProof's WallStreetWeb, a Java applet, tracks stock volumes, highs, and lows from an interactive, Windows-like interface.

JOHN GREENLEIGH


PC
Talk
With Kate & Jack

PC
Talk
With Kate & Jack
PCQA
PCQA

Kate: Rise and shine sleepy heads! It's time to drag your sorry tails out of the sack and boot up your PCs. You're locked into PCQA's *"PC Talk with Kate and Jack."* Your *only* source for the latest computer industry news.

Jack: That's right! We're ready to dive headfirst into some heavy-duty PC talk. But first I want to let all you computer gurus out there in on our little secret.

Kate: *Jack!* You blabbermouth — I thought we were going to keep a lid on it until the news! Bob, you're the controller. Keep your ears peeled for loose lips today!

Bob: Sure thing, Kate!

Jack: *Sorry Kate* — you know I can't keep a secret. Here's the scoop — we're fired up this morning because we're starting a new product review segment. We'll kick it off at approximately 10 a.m. when Chuck the delivery guy arrives with the black-and-white cow-spotted boxes.

Kate: OK, the cat's out of the bag! We're ready to talk speed! Meg from Maine, you're on!

Meg: ***Hey, Gateway 2000 created a real screamer when they took the fastest Pentium® processor on the market — the Intel 166MHz Pentium processor — and put it in their P5-166 Professional system.***

The P5-166 Professional system features 16MB EDO DRAM, 256K pipelined burst cache, 2GB hard drive, 6X CD-ROM drive and Microsoft® Office 95, Professional Edition for only $2,899.

Jack: You've got that right. Gateway has a reputation for ultra-speedy PCs. In fact, the February 1996 *Windows Sources* cover tagged a Gateway 2000 166MHz Pentium processor-based system as "the fastest Win 95 PC ever."

Meg: *I believe it! We have a whole fleet of Gateway P5-166 Professional systems at my accounting firm. Our clientele has doubled in less than two months because we're cranking through spreadsheets and crunching numbers like crazy. In a nutshell, productivity has skyrocketed, and that means my business is more profitable.*

Jack: Where'd you get these mean machines, Meg?

Meg: *Gateway 2000. Only $2,899 a crack.*

Jack: How can Gateway offer such a powerful system at that low price?

Meg: *It's simple, Jack.* ***Gateway knows how to cost effectively configure their systems for optimal performance.*** *The combination of 16MB EDO performance DRAM and 256K pipelined burst cache in the Gateway P5-166 Professional system produces blazing speed that processes data by the truckload.*

Jack: Why does this particular combination of memory and cache pack such a punch?

Meg: ***Pipelined burst cache and EDO DRAM speed up data delivery to the PC's processor.*** *This reduces the bottleneck created when high-speed processors try to access data from slower conventional memory.*

Jack: Amazing. And don't most Gateway PCs come with 16MB EDO performance DRAM?

Meg: *Absolutely. They know running 32-bit software apps like those in MS Office 95 with 8MB DRAM would be like driving a Ferrari with the parking break on.*

Kate: Pop the clutch, Meg! Sydney from Seattle, you're on!

Sydney: *What's all this hubbub about needing 16MB of memory? I thought 8MB was plenty.*

Kate: Get with the program, Sydney! **With 16MB of memory instead of 8MB you get a 25- to 30-percent performance increase. Al from Atlanta, you're on!**

Al: *Hey guys!* ***Not only does Gateway 2000 build extra-fast PCs — they custom-build each system to your exact specifications.***

Kate: Excellent point, Al. Gateway knows that cookie-cutter PCs don't meet the unique computing needs of their customers.

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Kate: Boy, everyone's on a Gateway kick this morning. We must be sending out Gateway vibes!

Jack: C'mon Kate — our listeners are smart, and they're up to speed on the PC industry. We have another caller. Lenny from Los Angeles, you're on the air!

Lenny: *Yeah, I'm looking for a computer for my family. I need Microsoft® Word to write about my travels through the Amazon. And my kids want a PC to play games and help them with their homework.*

Kate: There are a lot of excellent home PCs out there. I'd recommend the souped-up version of the 166MHz Intel Pentium® processor-based system we talked about earlier. You need a PC loaded with all the goodies you can find, including a 6X CD-ROM drive for ultimate multimedia performance. Don't even think about a 4X IDE CD-ROM drive in a desktop PC. And you need a large selection of all the latest software versions.

Lenny: *I just read about a computer like that in PC Magazine. They named the Gateway P5-166XL multimedia system Editor's Choice in their February 20, 1996, issue. I thought maybe it was just a lot of hype — but if you guys say that's what I need, I'm a believer! I have to call Gateway right now!*

Kate: Smart choice. *Whoa!* The lines are lighting up. Let's see what Tex from Austin has to say.

Tex: *Yeah, what's all this Gateway talk? Sounds to me like you're biased — big time!*

Jack: Biased? Get off that jive, Tex. Ever heard of the First Amendment? We're just providing a forum so our listeners can make a knowledgeable decision when they purchase a computer.

Tex: *Well ... I'm just playing devil's advocate.*

Jack: Whatever. Go saddle up your horse or something. Next. Cole from Chicago you're on!

Cole: *What was up with that yahoo?! Doesn't he know that Gateway is one of the few PC companies that provides true "personal computers." Each system is built to order at no extra cost — in fact you have over 15 million configuration options!*

Jack: That's a boatload of options! Thanks for the math lesson!

Kate: We have a caller from America's heartland. Hal from Holstein, Iowa, you're on the air!

Hal: *Mega power, Kate! I've been calling your show for years. I can't believe I actually got through.*

Kate: Thanks Hal, what's on your mind?

Hal: *I just bought my first Family PC™ multimedia system from Gateway. I was intimidated at first, but my sales rep, J.T., was very helpful. He helped me custom configure a P5-120 Family PC multimedia system, and he even took the time to tell me about MPEG data compression technology.*

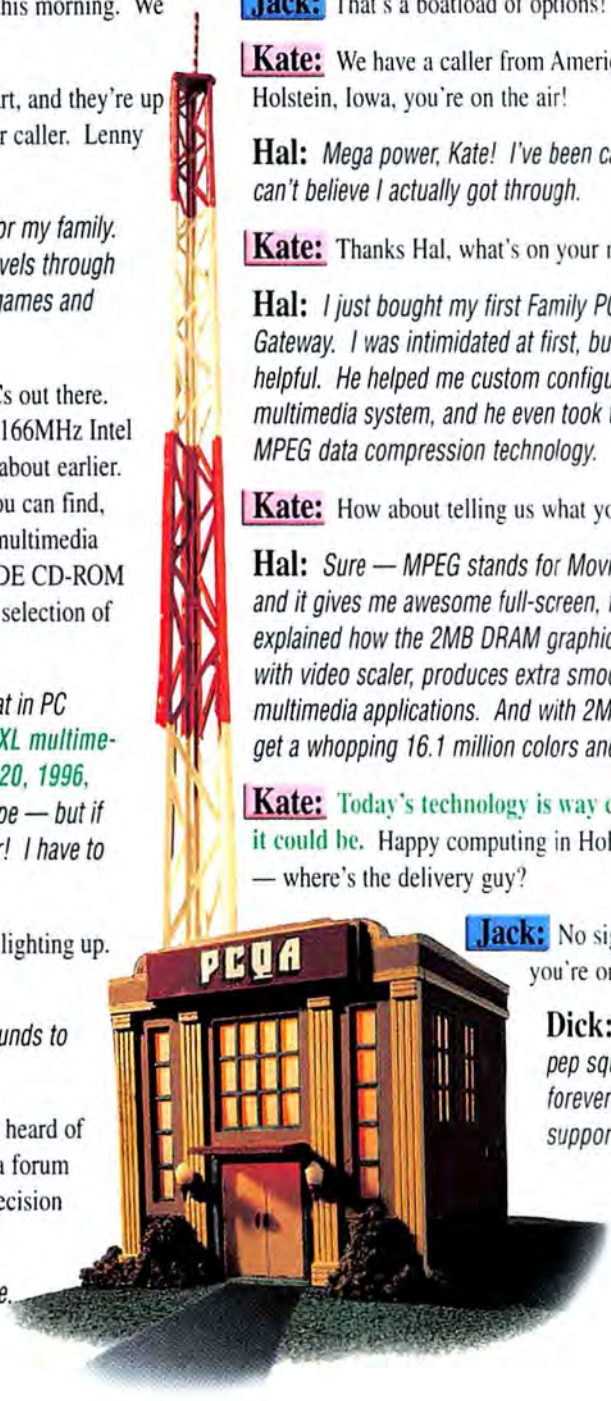
Kate: How about telling us what you know about MPEG?

Hal: *Sure — MPEG stands for Moving Picture Experts Group, and it gives me awesome full-screen, full-motion video. J.T explained how the 2MB DRAM graphics accelerator combined with video scaler, produces extra smooth video playback for MPEG multimedia applications. And with 2MB DRAM instead of 1MB, I get a whopping 16.1 million colors and a performance boost.*

Kate: Today's technology is way cooler than I ever dreamed it could be. Happy computing in Holstein! Hey, that reminds me — where's the delivery guy?

Jack: No sign yet. Dick from Detroit, you're on!

Dick: *What are you — a Gateway pep squad? I've heard it takes forever to get through to their tech support.*



Jack: OK *Dick* — let's set the record straight. Gateway had a few growing pains awhile back, but last year they beefed up their service with Gateway Gold™ service and support. It features 24-hour-a-day toll-free technical support, seven days a week; free

software technical support for all Gateway-provided operating systems and application software, plus much more.

Dick: *You win I'll give them a call.*

Jack: We're *so* good! Dee from Denver, you're on!

Dee: *I'm just getting into this computer stuff. I want a PC so I can get on the Net and the Web. Any recommendations?*

Jack: An ideal Internet computer for beginners is a Gateway P5-100 Family PC system with 8MB EDO Performance DRAM, a large hard drive, sound capabilities, a 6X CD ROM drive and a 28.8 fax/modem.

The P5 166XL mulitimedia PC features 16MB EDO DRAM, 2GB hard drive, 16-bit sound card, speakers w/ subwoofer & 28.8 fax/modem for only $3,799

Dee: *Do I really need a 28.8 fax/modem?*

Jack: Absolutely. You don't want to use yesterday's technology to cruise today's graphic intensive Internet content.

Dee: *OK, you've convinced me, but I'm still a little nervous.*

Jack: Relax. **When you buy a Gateway multimedia PC you get a TelePath® 28.8 fax/modem along with the Gateway Info Highway CD.** It has an easy-to-use tutorial of included trial memberships to CompuServe,® Prodigy,® America Online® and Reuters Money Network, plus you get Global Network Navigator for Internet browsing. It's everything you need and more. Don't forget to check out Gateway's Web site at http://www.gw2k.com! Phil from Fresno, you're on!

Phil: ***When I decided to go with the Intel Pentium Pro, I couldn't afford not to get the Gateway G6-200. It's specially configured for ultra-high performance.*** *The G6-200 flies through intense applications, and with the Matrox® 4MB WRAM graphics accelerator, I get fantastic graphics performance and 3-D hardware support with more colors.*

Kate: And remember the Gateway G6-150 is now only $3,199! Marge from Minneapolis is up next, and she's ready to talk MS Windows NT.™

Marge: *I haven't heard a lot on your show about Windows NT. It's the only way to go for business apps.*

Kate: How's that, Marge?

Marge: ***We use Windows NT 3.51 at my engineering firm, because it's a powerful 32-bit operating system that efficiently processes our data-intensive applications like those in MS Office 95, Professional Edition.***

Kate: Where do you get this ultra-efficient operating system?

Marge: *We get all our PCs from Gateway 2000. They preload Windows NT Workstation on our systems and configure the needed drivers for compatibility with Gateway hardware and software.*

Kate: Aren't all Gateway PCs loaded with MS Windows® 95?

Marge: *Not anymore. Customers have a choice of Windows NT or Windows 95 on their G6 systems, and Windows NT is available as an upgrade for only $99 on all Pentium processor-based PCs.*

Kate: Thanks for the Windows NT lesson, Marge! And don't forget Windows for Workgroups 3.11 is also available on Gateway Pentium processer based desktop and portable systems. This is some prize stuff, Jack! Our listeners are educating the masses on how to find the very best values on leading computer technology.

Phil: ***Man, that Intel Pentium Pro processor pumps out the raw power I need for my graphics and design applications.*** *Now my work is done by mid-afternoon, and I have time to hit the links.*

Jack: Now you're talkin'! Tell us more!

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PC
Talk
With Kate & Jack
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GATEWAY2000 SOLO™

S5-75XL

- 10.4" SVGA Color Display
- 75MHz Intel® Pentium® Processor
- 8MB RAM (expandable to 40MB)
- 256K L2 Pipelined Burst Cache
- 540MB Hard Drive
- Modular 4X CD ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16 Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- EZ Pad™ Pointing Device
- 86-Key MS Windows 95 Keyboard
- Parallel, Serial, Infrared, VGA & PS/2® Ports
- Built In Mic, Headphone and Line In Jacks and External Volume Control Dial
- 11.8" x 8.8" x 2.0"
- Microsoft® Windows® 95
- MS Works 95
- Carrying Case

$2999

S5-90XL

- 10.4" SVGA Color Display
- 90MHz Intel Pentium Processor
- 16MB RAM (expandable to 40MB)
- 256K L2 Pipelined Burst Cache
- 810MB Hard Drive
- Modular 4X CD ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16 Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- EZ Pad Pointing Device
- 86-Key MS Windows 95 Keyboard
- Parallel, Serial, Infrared, VGA & PS/2 Ports
- Built In Mic, Headphone and Line In Jacks and External Volume Control Dial
- 11.8" x 8.8" x 2.0"
- Microsoft Windows 95
- MS Office 95, Professional Edition[1]
- Carrying Case

$3799

S5-120XL

- 10.4" SVGA Color Display
- 120MHz Intel Pentium Processor
- 40MB RAM
- 256K L2 Pipelined Burst Cache
- 1.2GB Hard Drive
- Modular 4X CD ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16 Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- 28.8 PCMCIA Fax/Modem
- EZ Pad Pointing Device
- 86-Key MS Windows 95 Keyboard
- Parallel, Serial, Infrared, VGA & PS/2 Ports
- Built In Mic, Headphone and Line In Jacks and External Volume Control Dial
- 11.8" x 8.8" x 2.0"
- Microsoft Windows 95
- MS Office 95, Professional Edition[1]
- Carrying Case

$5299

PERIPHERAL OPTIONS

- PCMCIA 28.8 Fax/Modem **$299**
- PCMCIA 14.4 XJACK® Send/Receive Fax/Modem **$150**
- Solo Docking Bar **$150**
- Call for additional memory and hard drive options

SERVICE & WARRANTY

- 3 Year Limited Warranty **$100** *(For a free copy, call or write.)*
- VIP Warranty **$100**
- Portable specific toll free service and support
- One year limited warranty standard. *(For a free copy, call or write.)*

90 DAYS
NO PAYMENTS
Ask About Our "90 Days No Payment" Program!

[2]MS-DOS® 6.22 and MS Windows for Workgroups 3.11 available upon request.

[1]MS Office 95, Professional Edition includes Word, Excel, PowerPoint® presentation graphics program, Schedule+, MS Access database and Bookshelf® 95.

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Matt: *OK, I'm almost sold, but I have some pretty unique computing needs. Can I get this multimedia portable PC custom configured to my specifications?*

Kate: You bet! Gateway custom-builds all their PCs, so you get the configuration for your individual requirements.

Matt: *I'll give Gateway a call right now!*

Kate: We have another caller — Nancy from New York wants to tell us about her Gateway Solo multimedia PC.

Nancy: *I just love my Gateway Solo S5-120XL portable PC! I'm in sales for a Fortune 500 company, and I need both power and portability. I process tons of numbers and create complex spreadsheets with my Gateway Solo portable PC. Then I use MS PowerPoint® to plug this info into impressive presentations for executive bigwigs.*

Jack: What kind of configuration do you have?

Nancy: *My Gateway Solo portable PC is loaded with an Intel 120MHz Pentium® processor, 40MB RAM, a 1.2GB hard drive, 28.8 PCMCIA fax/modem, modular 4X CD-ROM drive, MS Office 95, Professional Edition and a 10.4-inch active matrix SVGA color display for only $5,299. It's a lot of PC for the money.*

Jack: I bet it's great to have full multimedia capabilities.

Nancy: *You've got that right. The stereo sound adds a professional touch to my presentations, and when I do get a chance to relax I can pop in my favorite CD.*

Kate: Is this your primary PC?

Nancy: ***It sure is.*** *The Gateway Solo PC has the power and performance of a desktop PC along with multimedia capabilities.*

Kate: All this talk is making me crazy to play with our new products. Let's take a station break. While we boot up our portable wonder and wire this Gateway Destination monitor to our desktop computer, *you* can call Gateway 2000 and order your own personal computer. **Back in 30.**

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Jack: I'm really pumped about this review segment. Bob, the controller, is even excited — he's keeping a sharp eye out for the delivery truck as we speak.

Bob: *Jack! Kate! Cow-spotted box alert! Delivery truck at 2 o'clock and closing!*

Kate: All right! Jack's headed for the door to greet Chuck.

Jack: Chuck! Buddy! How's my favorite delivery guy? Let me get my hands on those boxes. Whoa! That one is gigantic!

Chuck: *You've got that right!*

Jack: Thanks, Chuck! See ya tomorrow!

Kate: Let's open the big box.

Jack: Hey! It's a huge charcoal-colored monitor and a wireless keyboard and remote! Did they give us info on this stuff, Kate?

Kate: **No, this is a real mystery. The only clue is this Gateway 2000® Destination™ logo on the front of the monitor.**

Jack: According to this yardstick the monitor has a viewable area of 31 inches! Now my 21-inch monitor looks like a postcard.

Kate: Well, it could be something for presentations or a new tool for video conferencing. Or maybe it's a computing device that could replace the television.

Jack: You just might be onto something, Kate.

Kate: Gateway keeps rolling these new products off the line, don't they? It makes me wonder what else they have brewing up there in South Dakota. I have a feeling it's something spectacular.

Jack: You know I have the same feeling, Kate. What's that, Bob? Ted Waitt, Chairman and CEO of Gateway 2000, is on line three? Ted, you're on the air!

Ted: *Hey, how are you guys doin'?*

Kate: We're great. Say what's up with this Destination stuff?

Ted: *There's some really cool stuff happening in the PC industry right now, Kate.* ***The convergence of the PC, TV and consumer electronics is just around the corner, and all I can tell you is that these products play a big part in all of it.***

Jack: What's your destination in all this, Ted? Are you saying there's a new PC in Gateway's future?

Ted: *We're always coming up with new stuff, Jack.* ***Let's just say there's a revolution on the horizon, and you can bet that Gateway will lead the way.*** *Well, it's been great, but I gotta get back to work. Great show!*

Kate: Wow! I can't believe Ted called us! Well that's enough hoopla for now. I bet the Gateway team put something awesome in our small box, too. Let's open it!

Kate: It's a performance-packed Gateway Solo™ S5-75XL multimedia portable PC. Hey, get a load of this invoice — it's only $2,999!

Jack: Unbelievable! That's an incredible price for a full-featured multimedia portable PC. Value like that is hard to come by in today's PC market, especially on a hot product like this. It's no wonder the December 28, 1995, *Chicago Sun Times* said, "The Gateway Solo is the best multimedia notebook on the market."

Kate: And, according to this press release, all Gateway Solo portable PCs now come standard with modular 4X CD-ROM drives and 10.4-inch SVGA color active-matrix screens.

Jack: Callers, what are your thoughts on the Gateway Solo portable PC? Matt from Montreal, go ahead!

The Gateway Solo S5-120XL portable PC features a 10.4' SVGA color display, 40MB RAM, 1.2GB hard drive, modular 4X CD-ROM drive, 28.8 PCMCIA fax/modem, 16-bit sound, speakers and MS Office 95 for only $5,299.

Matt: *I have to admit that's a tempting price tag, but there has to a be a catch. I bet it has a dinky hard drive, almost no memory and low-rent software.*

Kate: You've got it all wrong, pal. The Gateway Solo S5-75XL is outfitted with a roomy 540MB hard drive, 8MB RAM, 256K L2 pipelined burst cache, Microsoft® Works 95 and Windows® 95.

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pentium PROCESSOR

Multimedia Systems

P5-100 FAMILY PC™

- Intel® 100MHz Pentium® Processor
- 8MB EDO Performance DRAM
- 1.2GB 9ms EIDE Hard Drive
- 1MB DRAM, 64 Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X EIDE CD ROM Drive
- 16 Bit Gateway Sound Card
- Altec™ Lansing ACS 40 Speakers
- TelePath® 28 8 Fax/Modem with TAD[1]
- Gateway Information Highway CD
- 3.5" Diskette Drive
- CrystalScan®15 .28dp Color Monitor (13 9" viewable)
- 7 Bay Desktop Case
- 104+ Keyboard & MS Mouse 2 0
- Microsoft® Windows® 95
- Generations II Software Collection
- Gateway Gold™ Service & Support

$1999

P5-120 FAMILY PC

- Intel 120MHz Pentium Processor
- 16MB EDO Performance DRAM
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64 Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X EIDE CD-ROM Drive
- 16 Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers
- TelePath 28.8 Fax/Modem with TAD[1]
- Gateway Information Highway CD
- 3.5" Diskette Drive
- Vivitron™15 .26dp Color Monitor (13 9" viewable)
- 7 Bay Desktop Case
- 104+ Keyboard & MS Mouse 2 0
- MS Windows 95
- Generations II Software Collection
- Gateway Gold Service & Support

$2499

P5-133 FAMILY PC

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X EIDE CD-ROM Drive
- 16-Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers with ACS-250 Subwoofer
- TelePath 28.8 Fax/Modem with TAD[1]
- Gateway Information Highway CD
- 3.5" Diskette Drive
- CrystalScan17 .28dp Color Monitor (15.7" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations II Software Collection
- Gateway Gold Service & Support

$2899

P5-166XL

- Intel 166MHz Pentium Processor
- 16MB EDO Performance DRAM
- 512K Pipelined Burst Cache
- 2GB EIDE 10ms Hard Drive
- Matrox® 2MB WRAM Graphics Accelerator w/ MPEG Video Scaler
- 6X EIDE CD ROM Drive
- 16-Bit Ensoniq® Wavetable Sound Ca
- Altec Lansing ACS-400 Speakers with ACS 250 Subwoofer
- TelePath 28.8 Fax/Modem with TAD
- Gateway Information Highway CD
- 3.5" Diskette Drive
- Vivitron17 .26dp Color Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition[1]
- Generations II Software Collectio with Gaming Pad
- Gateway Gold Premium Service & Su

$3799

[1] *Telephone Answering Device (TAD) gives you complete voice messaging capabilities*

Professional Systems

P5-75

- Intel 75MHz Pentium Processor
- 16MB EDO Performance DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64 Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- CrystalScan15 .28dp Color Monitor (13 9" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2 0
- MS Windows 95
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$1899

P5-120

- Intel 120MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.2GB 9ms EIDE Hard Drive
- 2MB DRAM, 64 Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron15 .26dp Color Monitor (13 9" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$2299

P5-133

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.2GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron15 .26dp Color Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$2399

P5-166

- Intel 166MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 2GB 10ms EIDE Hard Drive
- 2MB DRAM, 64 Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron15 .26dp Color Monitor (13 9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2 0
- MS Windows 95
- MS Office 95, Professional Edition[1]
- Gateway Gold Service & Support

$2899

Workstations

G6-150

- Intel 150MHz Pentium Pro Processor
- 16MB DRAM
- 256K Internal Cache
- 2GB 10ms EIDE hard drive
- Matrox 2MB WRAM Graphics Accelerator w/ Video Scaler
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron15 .26dp Color Monitor (13.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
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CD-ROM Jukeboxes: Quick Changers for Small Change

Most of us accumulate piles of CD-ROMs, from single-disc applications to suites and games that comprise several CDs. Doing the ol' disc shuffle can be a real drag, but several manufacturers have come to the rescue with multidisc 4X CD-ROM drives that make the most of a small space by fitting four or five discs into a single internal half-height 5¼-inch-wide drive bay. Unlike the cookie-cutter similarity of single-disc drives, the approach to handling multiple discs in a single drive varies among the manufacturers.

Alps 4X Internal CD-ROM Changer

In addition to creating PC peripherals, Alps makes the Alpine line of automobile stereos. This background shows in the Alps 4X Internal CD-ROM Changer, which uses a disc magazine similar to the one in a car's audio CD player. The magazine holds four discs. You slide the whole unit into the drive. This approach has advantages and disadvantages. On the plus side, magazines are great for multi-CD suites and games. Having a shelf of preloaded magazines sounds tempting, but reality hits quickly: Additional magazines (from Alps) cost an unacceptably high $24.95 each. And it's not easy to change the CD-ROMs once they're loaded into a magazine. The lightweight disc carriers are fragile and require a gentle hand to load. Alps' magazine can be too difficult to use if you have a lot of individual CD-ROMs that you exchange regularly.

ALPS' FOUR-DISC MAGAZINES are great for suites but not for changing discs quickly.

NEC MultiSpin 4x4

The NEC MultiSpin 4x4 has some interesting technological twists. There are no carriers or sliding drawers to accept discs. Instead, each disc gets its own slot and push-button controller. Press a button, and a single door pops open. You then just insert the disc into the slot, where it's pulled in. To eject a disc, just press a button: The disc is pushed out far enough for you to grab it by the center hole.

One or Many

The Alps and NEC drives I tested each come with virtually identical Future Domain/Adaptec EIDE interface cards. I found it easier to use these drives with their included cards, but if your PC already has an EIDE interface, that will work too. Installing devices with add-in cards that use I/O ports and interrupts can potentially be difficult, especially if your PC is already loaded with peripherals. These drives are no exception. Both Alps and NEC offer extensive installation information, although NEC has the edge, thanks to a quick-start poster and a well-produced video. Both companies also offer technical help by telephone.

THE NEC MULTISPIN 4x4 has individual slots that keep every disc in its place and make changing CD-ROMs easy.

Both the Alps and NEC drives give you the option of assigning each disc its own drive letter (D, E, F, and G, for example) or assigning the entire drive a single letter. The latter is useful for multi-CD games that expect to read discs from the same drive. Frankly, I found it easier in most cases to use multiple drives instead. I tested single-drive mode under only Windows 3.1; single-drive Windows 95 drivers weren't available at press time.

In my tests, both the Alps and NEC drives delivered true 4X performance, with sustained 600-K/sec data transfer rates. Both have 128K buffers and access times in the 250ms range. It takes only about 5 seconds for the drives to switch between discs. The NEC drive is great if you do a lot of CD-ROM changing, but it's not as handy as the Alps for organizing suites of CD-ROMs.

–Stan Miastkowski

Alps 4X Internal CD-ROM Changer, NEC MultiSpin 4x4

4X drives play multiple CD-ROMs from an internal half-height bay.
Alps Electric, Inc.
800/825-2577
List price: $430
Reader service no. 777
NEC Technologies, Inc.
800/632-4636, 508/264-8000
Street price: $279
Reader service no. 778

New Ricoh Digital Camera Goes Multimedia

The new Ricoh RDC-1 Digital Camera is a digital dynamo: It not only shoots still images—at a resolution of 768 by 480 pixels in 24-bit color depth—it also records short video and sound clips. Although the full-motion (30-frames-per-second) scenes with sound are limited to 5 seconds each, Ricoh is betting that's enough to satisfy a variety of business clients, ranging from insurance and real-estate brokers to those involved in training, education, and security. Virtually any company could use the RDC-1 to record employee introductions for personnel databases or multimedia presentations, for example.

Unlike bulkier digital cameras that capture only snapshots and store them in internal memory, the svelte, 9-ounce RDC-1 stores its multimedia data on removable PC Cards, available in 2MB, 8MB, and 24MB versions. The RDC-1 can also be connected directly to Ricoh's optional 2½-inch color LCD monitor, so you can play back and review your work on the spot. Like other digital cameras, the RDC-1 can transfer its data directly to a computer through a PC Card slot or serial cable, or over phone lines via a modem.

Clearly no cybertoy, the RDC-1 comes at a price. The base unit, which includes a 2MB memory card, an AC adapter, remote control, a serial interface, and software, costs a hefty $1699. The 24MB card, which can capture a maximum of 492 images or four 5-second video clips with sound, costs an additional $1699. The preproduction version we reviewed performed well indoors as well as outdoors, although the unit's 8MB memory card limited us to a single 5-second video clip. The Ricoh clearly represents a laudable advance in state-of-the-art digital photography.

—Richard Jantz

THE POCKET-SIZE RICOH RDC-1 is a multimedia marvel that shoots snapshots, sound, and video.

Ricoh RDC-1 Digital Camera

Pocket-size digital camera combines photography, video, and sound.
Ricoh Consumer Products Group
800/225-1899, 201/625-4180
List price: Base unit with 2MB memory card $1699
Reader service no. 779

PC Card Readers Bridge the Data Gap

PC Card slots are a regular feature on most notebooks these days. But what do you do with the data on your PC Card once you get back to your office? Two new Plug and Play PC Card adapters from SCM Microsystems and Mitsumi Electronics bridge the gap between your desktop and your notebook.

Installing both these adapters requires some mucking about in your computer. You'll need to pop the 16-bit interface card into an open ISA slot and slip the card reader into an open drive bay, then attach the card to the reader via cables and connectors. We used a PC Card Type II modem and a PC Card Type II flash memory card to test-drive these readers.

The $279 SCM SwapBox PnP fits in a 3½-inch drive bay and includes a 5¼-inch bay adapter. Windows 95 recognized the SwapBox PnP immediately. The SCM unit works with Type I, II, and III memory, and I/O PC Cards. It promptly recognized both our PC Cards. The SwapBox PnP is designed to run under Win 95; drivers for other operating environments are unavailable.

The lower-price Mitsumi PCMCIA Card Companion ($199) is a space saver—a combination 3½-inch floppy drive and PC Card reader that fits in a 3½-inch drive bay. It does not come with an adapter for a 5¼-inch drive bay. I found the shipping version of the Mitsumi more complicated to install than the SCM. The floppy drive requires its own power supply connector, and you have to tweak Windows 95 before it recognizes the device. Additional drivers extend the Mitsumi to DOS, Windows 3.1, and Windows for Workgroups.

SwapBox PnP

Easy to install but expensive.
SCM Microsystems
408/370-4888
List price: $279
Reader service no. 780

PCMCIA Card Companion

Handy two-in-one unit has a complicated installation.
Mitsumi Electronics
800/648-7864
List price: $199
Reader service no. 781

The SwapBox PnP and the PCMCIA Card Companion each disabled our test system's internal modem on COM2; it took some tinkering to get it going again. The SCM is easier to install, but the Mitsumi's two-in-one arrangement is convenient if you're short on space.

—Theresa Carey

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Circle 182 on reader service card

Citizen's "Photo Quality" Printer Offers Affordable Output

A new color printer from Citizen America produces near-photographic print quality for less than $600. The Printiva 600C, based on Citizen's "Micro Dry" technology, boasts nonsmearing, waterproof color output that Citizen says will not fade over time.

We found that for plain text, the Printiva 600C easily rivals 600-dpi laser printers. Color output is equally impressive, with bright colors and smoothly blended tones. Gray-scale images were also very good. The Printiva is aimed primarily at the graphics user who requires high-quality, 600-by-600-dpi color, or 1200-by-600-dpi monochrome output in an affordable small desktop unit.

Print speed ranges from 2 ppm in monochrome to ¼ ppm for color images. The printer features a single bidirectional parallel port. It ships with drivers for both Windows 3.1 and Windows 95.

The Printiva uses four small ribbon cartridges. The cyan, magenta, yellow and black cassettes snap into place easily. They cost $8 per cartridge and are good for about 60 photographic pages before replacement. That comes to about 53 cents per page—somewhat higher than with most ink jets.

—Bill Underwood

Printiva 600C

Near-photographic images but a high cost per page.
Citizen America Corp.
800/477-4683
List price: $599
Reader service no. 782

PHOTO FINISH: The affordable Printiva 600C boasts near-photographic image quality that's waterproof and nonsmearing.

HP Upgrades Color LaserJet With High-Quality Monochrome Output

Hewlett-Packard has answered the recent spate of color laser printer announcements from Apple, Lexmark, Tektronix, and other vendors with the introduction of two new models of its own. The 300-dpi Color LaserJet 5 and 5M are based on the same engine HP introduced in the original Color LaserJet over a year ago. But they now feature Image REt 1200, software-based image enhancement that improves print output regardless of the engine's dots-per-inch capabilities. Image REt can, for example, make colors appear more solid and make black text print at a higher dpi quality, according to HP.

The Color LaserJet performed admirably on a variety of typical office print jobs, but we found nothing that overwhelmed us. At 300 dpi, our color test pages stood up well against the likes of Apple's 600-dpi Color LaserWriter, which earned a second place score in our Workgroup Printer Top 10 color chart (see "Two Hot Numbers Debut: HP LaserJet 4M Plus and 4MV," January). The color test pages appeared a bit less saturated than the Apple's deeper colors, however. Our monochrome samples were very good for plain text and line art, but the gray-scale capability was not quite as impressive as the Apple's.

When it's time to load toner into the printer, care is the cautionary word: The process can be a bit messy. Instead of replacing a whole cartridge, you add new toner by pouring it from plastic bottles into designated holes. Squeezing a toner bottle, which seems like a natural thing to do, can (and did) cause a little toner to leak out.

With a street price of $5995, the Color LaserJet 5 features 20MB of RAM, which is expandable to 84MB. Only a parallel port is built in, but for another $369 you can add an HP JetDirect interface card that provides Ethernet and LocalTalk connectivity. Drivers for Windows 3.*x* and Windows 95, as well as for Macintosh, OS/2, and DOS, are included.

The pricier Color LaserJet 5M ($7395 on the street) comes with extras such as Level 2 PostScript and an Ethernet/LocalTalk interface card, as well as NetWare and LanServer network software. The 5M comes with 36MB of RAM, expandable to 76MB.

Both the Color LaserJet 5 and the 5M feature PCL5 emulation and a monochrome engine speed of 10 pages per minute at 300 dpi. When printing in color, both models are slower—only 2 ppm—and print only at 300 dpi.

—Bill Underwood

Hewlett-Packard Color LaserJet 5, 5M

Monochrome printing in 1200-dpi class.
Hewlett-Packard
800/527-3753
Street price: Color LaserJet 5 $5995, Color LaserJet 5M $7395
Reader service no. 783

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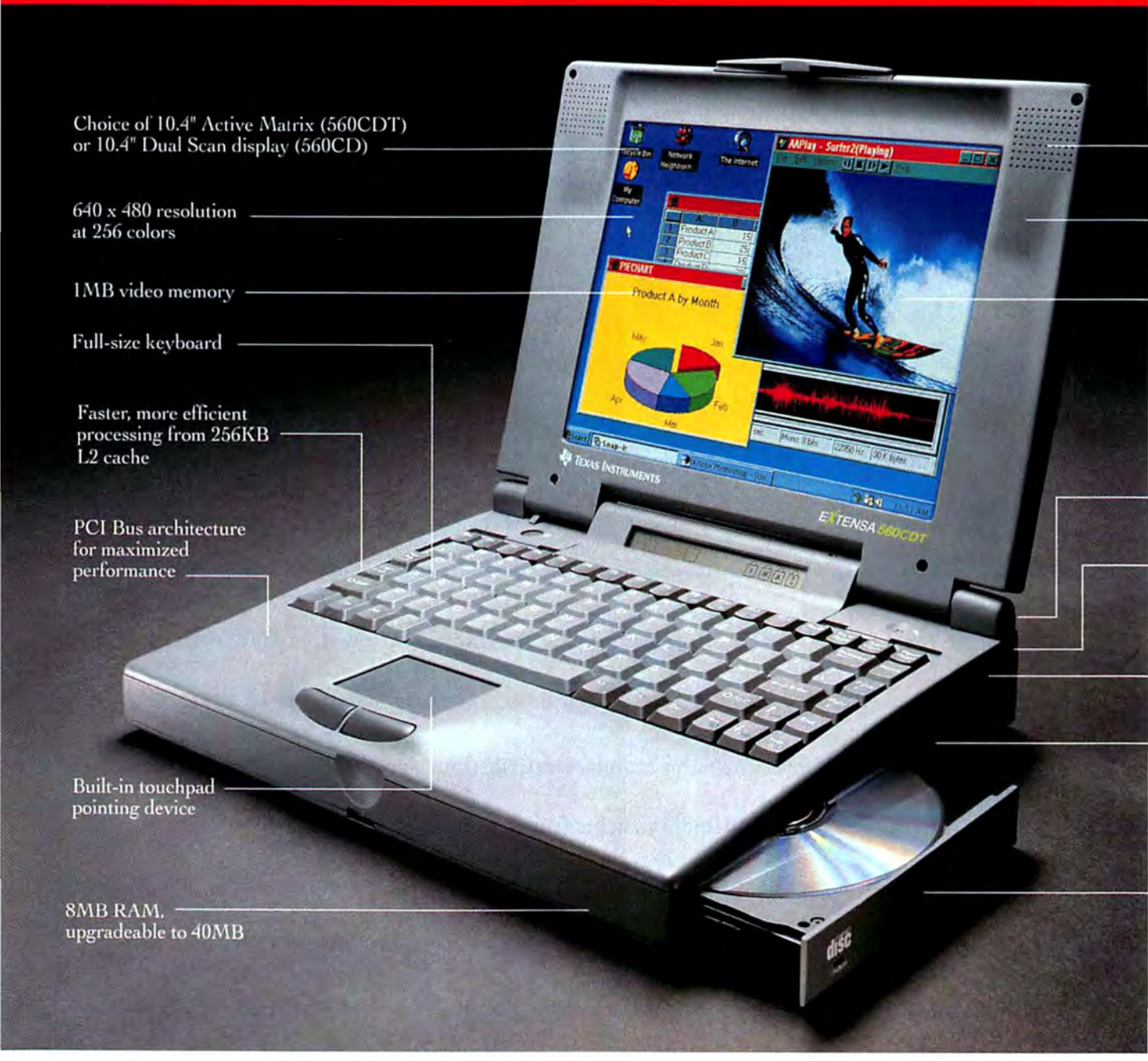

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WINDOWS MAGAZINE
1996 WIN 100

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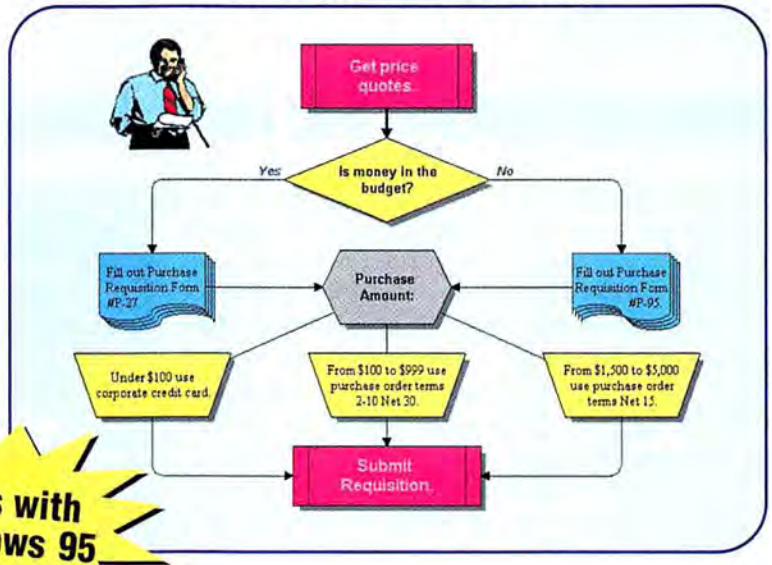

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Circle 26 on reader service card

Approach and FileMaker Pro: Finally, Relational Databases for Win 95

Although souped-up versions of programmers' delights like Paradox and Access crowd the Windows 95 database field, simpler relational databases are finally starting to appear. FileMaker Pro 3.0, from Claris, and Approach 96, from Lotus, are as easy to use as their predecessors, but the new versions are more powerful and add capabilities of interest to more advanced users.

FileMaker Pro 3.0 Gets Relational

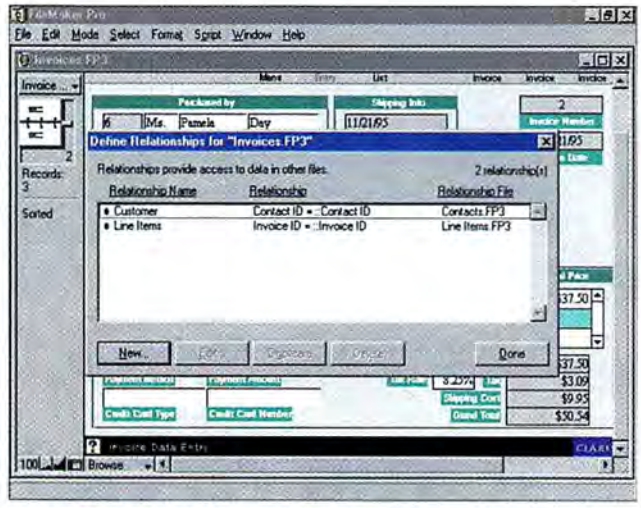
In the past, one key difference between Approach and FileMaker Pro was that the latter wasn't truly a relational database. You were limited to working with one file at a time. You could do things like look up a name and address from a customer file while you worked with an order file. You could even set up a group of repeating fields to hold details like line items that would go into their own file in an actual relational database. But these features fell far short of Approach's capabilities.

The key addition to FileMaker Pro 3.0 is the ability to relate files. This means you can show details from a customer file and a line item's file when you're working with an orders file. Although this relational capability adds a lot to FileMaker Pro, it is still not as flexible as Approach. For example, to show descriptions from a product file along with records from a line item file on an order form, you still have to rely on lookups as with the old version.

Though only the Windows 95 version supports OLE, FileMaker Pro 3.0 also comes in versions that run under Windows NT 3.51 and on the Macintosh, making it a nice solution for people seeking a fairly simple cross-platform database.

Approach 96: New Features for Developers

Approach always made it easy for you to relate several levels of files without concerning yourself with how files are indexed or keyed. It nicely created indexes for you behind the scenes and kept the process of relating files simple. This made Approach a very attractive product for database users who didn't have the time to learn programs such as Paradox and Access. Database developers tended to shy away from the program, though, as it lacked a true programming language.

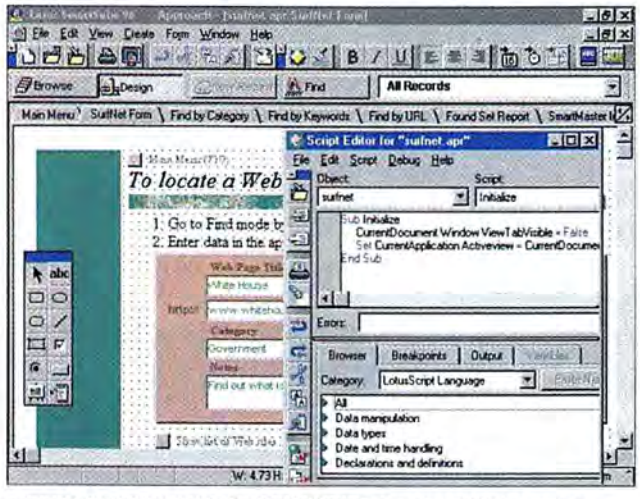


WITH FILEMAKER PRO 3.0, you can define relationships between files to show data from more than one file in the same layout.

But Approach 96 offers developers flexibility with LotusScript, the programming language that comes with other SmartSuite applications. The language is object-oriented and allows a database developer many more options than were available with Approach's macro facility alone.

Even if you aren't looking to become a programmer, you can still create action buttons by defining macros in a point-and-click dialog box. And there are lots of other new features that are useful to all levels of users. My favorites are the Find Assistant (a dialog box that helps you define a find or a sort and then save it—big news for those who ended up creating the same finds over and over again) and the Drill Down to Data button, which lets you instantly see the details underlying a selected portion of a cross-tab or chart.

—Celeste Robinson



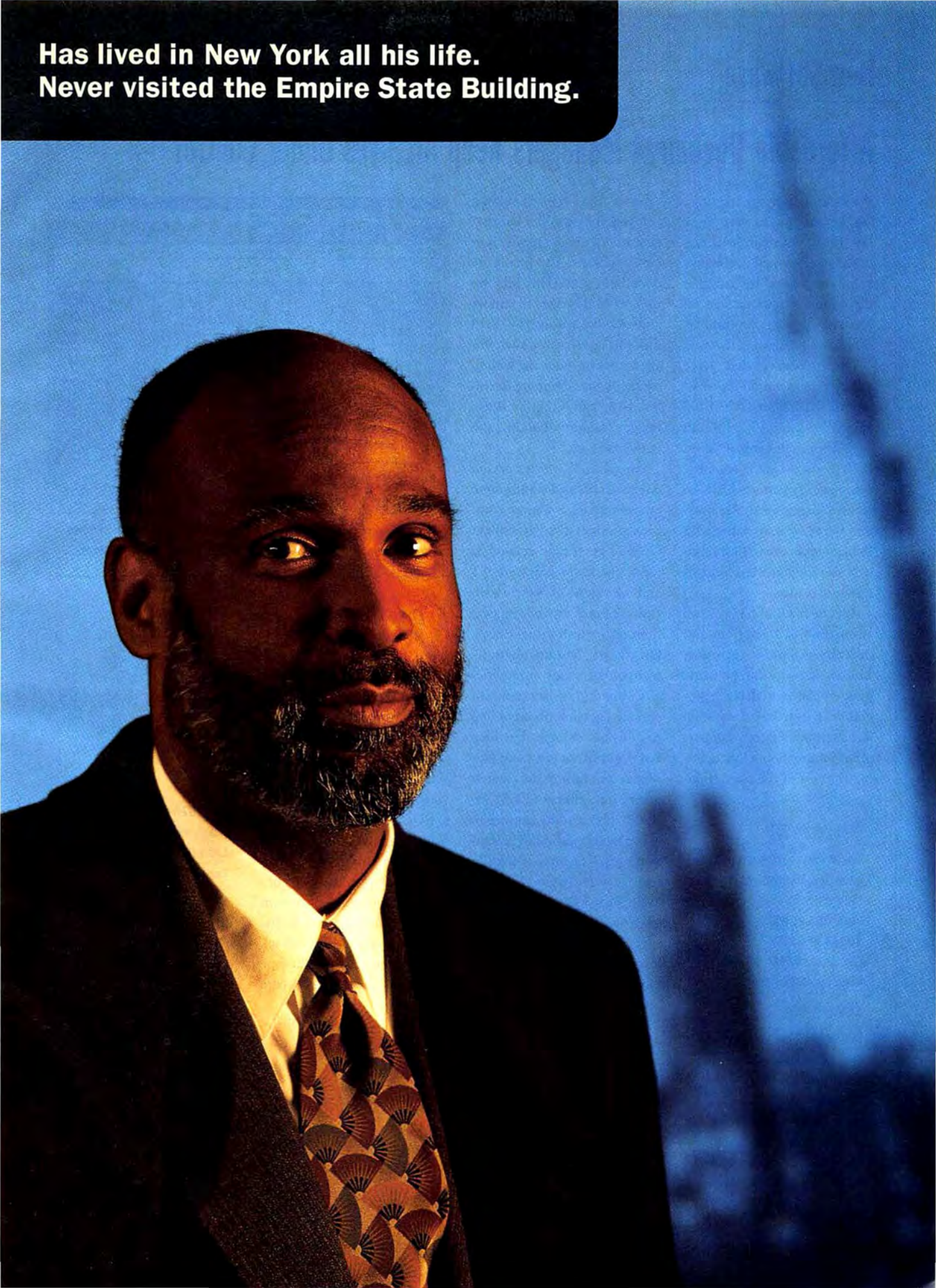
APPROACH 96 INCLUDES LOTUSSCRIPT, the SmartSuite programming language, and many new conveniences for all levels of users.

FileMaker Pro 3.0

Windows 95 version adds features that improve the program in every area.
Claris Corp.
800/544-8554,
408/727-8227
http://www.claris.com
Street price: $199, upgrade $99
Reader service no. 670

Lotus Approach 96 Edition for Windows 95

Well-rounded database tool.
Street price: $105
Lotus Development Corp.
800/343-5414,
415/335-2200
Reader service no. 671


Has lived in New York all his life.
Never visited the Empire State Building.

Affordable Document Managers Keep Archives Under Control

Scanning is going big time. Scanner prices have come down, but with the influx of all those scanned documents comes the need for running them through optical character recognition programs and archiving and managing them.

Two products that have staked out a claim in this market are Recollect Gold from MindWorks and Visual Recall from XSoft, a division of Xerox. Both products control scanners, automatically perform OCR on scanned pages, and build a full-text database searchable with Boolean operators. Both products also support word processing and fax files.

Recollect Gold has several strong points. Its options and defaults simplify scanning. Moreover, forms can be made into templates, so that the program can extract information like a customer number or payment information while ignoring the rest of the page. It allows for fuzzy-logic searching controlled by a slider bar that determines the degree of accuracy you want. And finally, its document portability lets the user off-load images to removable media before the hard disk fills up. Because each image carries its index tag with it, another system running Recollect Gold can integrate these images without rebuilding the entire database.

Visual Recall, which works in client-server and stand-alone environments, is a more complex product than Recollect Gold. The server version is ready-made for NetWare 4.1 and uses some of Novell's security features. But two innovations distinguish Visual Recall. One is its "summarization" technology, which automatically highlights sections of searched documents according to rules-based logic. The idea is to identify not just those passages containing the search terms, but others of likely interest. The second innovation is the incorporation of animation and 3-D images for file management. In Grid View, for example, a 3-D time line like a giant filing cabinet shows a perspective of the relative age and location of documents, then rotates to bring selected documents to the foreground.

Recollect Gold needs interface improvements and support for word processing files in their native formats (it imports them as ASCII text). Visual Recall's animation and 3-D support may be unnecessary. Still, the products are priced right for the home or small business.

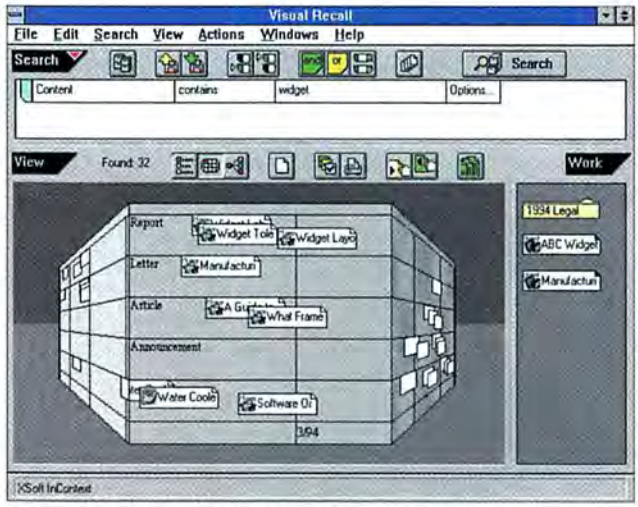
—Lawrence Kingsley

Recollect Gold

Document manager has budget price, limited interface.
MindWorks
800/683-8005, 408/730-2100
List price: $499
Reader service no. 672

Visual Recall

Midprice-range imaging and document management.
XSoft (Xerox)
800/428-2995
List price: $695 for server, $395 for client, including copy of TextBridge for OCR
Reader service no. 673



VISUAL RECALL'S GRID VIEW (one of three viewing options) shows searched files as hits on a 3-D edifice much like a filing cabinet.

A Backup Program to Avoid

At first, the $99 NovaBack for Windows 95 seemed like a dream come true: a backup utility with an optional DOS-based restore program. Why? If you lose everything on your hard disk, you don't want to have to reinstall Windows 95 (which may require your DOS CD-ROM drivers and Windows 3.*x* floppies as well) before you can even launch your backup program. And NovaStor claims that NovaBack supports more than 300 tape drives. But the program's cure is worse than the disease.

NovaBack uses a little-known utility that comes with Windows, lfnbk.exe, to put long file names into a backup that DOS can understand. But lfnbk.exe is a dangerous tool—Microsoft warns that it's "not intended for everyday use." The shipping version of NovaBack I tried renamed many files and folders on my hard drive. Consequently, several programs couldn't find their support files.

If you don't want the ability to restore from DOS, NovaBack is just a confusing program. It's not clear how to handle tasks, and one feature (setting compression levels) is in the documentation but not in the actual product. NovaBack makes Windows 95's own backup program look good.

—Lincoln Spector

NovaBack for Windows 95

Good idea for a backup program fails miserably in execution.
NovaStor
805/579-6700
http://www.novastor.com
List price: $99
Reader service no. 674

Was born and raised in Paris.
Has never been to the top of the Eiffel Tower.

Two Quick Zips That Fix Fat Files

There's always room for a file compression utility in your software toolbox. Since Microsoft has never addressed this need, companies like Vertisoft and PKWare are glad to provide tools for archiving and decompressing files.

With PKZip for Windows, PKWare finally puts a face on the file compression program that pretty much defines the standard for file compression.

That's appropriate, since the latest generation of computer users doesn't want to mess with the DOS commands once necessary for using PKZip. But several good shareware programs already put a Windows interface on PKZip or comparable compression utilities. PKZip for Windows, then, is too little, too late. It supports only Windows 3.1, and it doesn't capitalize on features in Windows 95 that could make PKZip even easier to use.

You do get the tools you need to archive and extract files. To zip a file, just drag it to the minimized PKZip icon or to the open PKZip window. To unzip a file, open it in the PKZip window and select the destination. PKZip for Windows can handle files that span multiple floppy disks, and can even zip only those files that have had the archive bit set—so the program works as an alternative to backup software.

The elements missing from PKZip for Windows can be found in Vertisoft's Zip-It. Unlike PKZip, Zip-It supports both Windows 3.1 and Windows 95. Under Win 95, Zip-It uses Explorer extensions so you can archive and extract by right-clicking a file. Under Windows 3.1, the Zip-It options are added to the File Manager menu bar. As with PKZip for Windows, you can extract or zip files by dragging and dropping them on the Zip-It window or minimized icon.

PKZip for Windows will support long file names during extraction but not compression, while Zip-It offers full long file name support under Windows 95. Both programs are nearly equal in speed and compression ratios. Using default values in both programs, a 1.15MB Word 6.0 file (a mix of graphics and text) was reduced to 561K under PKZip for Windows and 562K under Zip-It.

Both packages let you view compressed files, but PKZip requires the native applications and an association. Zip-It's modest file viewer supports 21 popular file formats. And Zip-It lets you temporarily extract files, which is extremely helpful for trying out shareware.

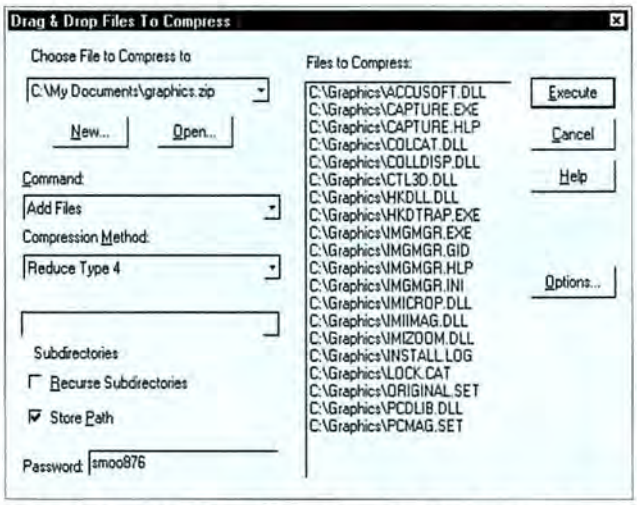
—Peter Scisco

PKZip for Windows

Popular compression utility doesn't keep up.
PKWare
414/354-8699
List price: $49
Reader service no. 675

Zip-It

Full feature set and great Windows 95 support.
Vertisoft
800/466-5875, 803/295-5875
Street price: $39.95
Reader service no. 676



DRAG AND DROP FILES onto the Zip-It window, icon, or Shortcut, then select the compression options you need to store your files.

Which & Why Helps Weigh Factors

Decisions, decisions. We make them every day, but sometimes we need help with the process.

Arlington Software's Which & Why incorporates decision-making concepts and statistical analysis (including wisdom from the likes of Francis Bacon and Ben Franklin) to help you with complicated decisions.

As with other decision-making packages, such as DecideRight, you list all the factors to be considered. Then you assign each factor a weight according to its importance, and score each option against the factors listed in the Which & Why model. The program then uses its unique matching index to find the optimum balance between value and price and recommend the best choice.

Which & Why also has a groupware function. Group members can work on one central model, or on diverse models that can be assessed and combined in the final analysis.

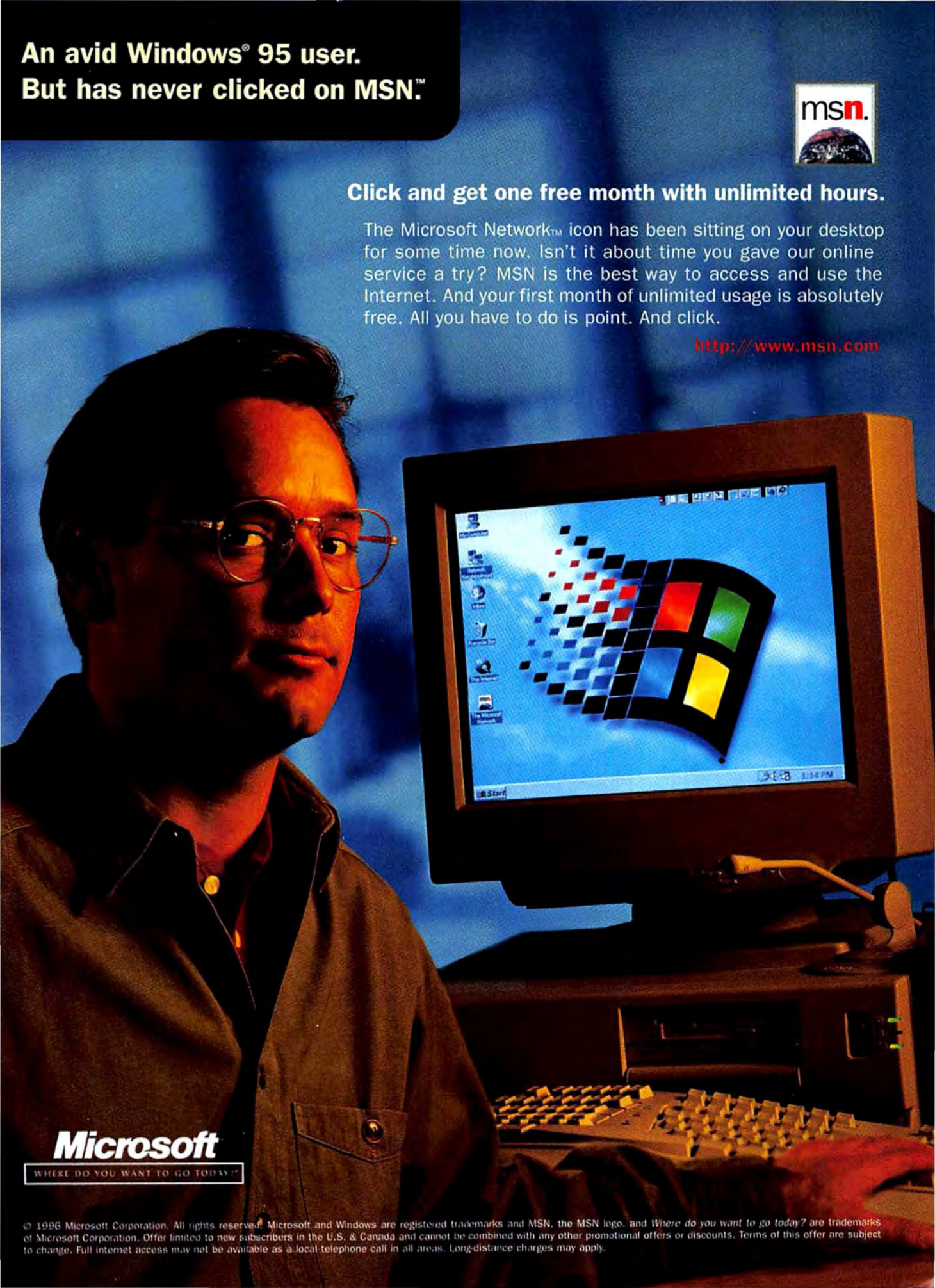
The software comes with a 200-page guide to familiarize you with its complex process. There are poster-size visuals that are supposed to make understanding the program easier, but I found them unwieldy. Instead, the program should have an on-screen tutorial.

Which & Why is a 16-bit application compatible with Windows 95 and Windows 3.*x*.

—John P. Mello Jr.

Which & Why

Sophisticated, complex decision-making aid.
Arlington Software Corp.
514/954-3665
info@arlingsoft.com
List price: $349
Reader service no. 679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Credit Checks From a CD-ROM

American Business Information's CD-ROM is a relatively affordable, but imperfect, option for firms needing to do basic credit checks. The ABI Credit Reference Directory CD-ROM, at $1295 per year, includes credit ratings for 10 million U.S. businesses (not individuals), plus a 12-volume hard-copy version. But before you buy, be aware of a few drawbacks and hidden costs.

This product is less expensive than its competitors, and it gives credit ratings for many medium-size companies. But ABI has an unusual method of assigning ratings. Firms like Dun & Bradstreet determine credit ratings by considering a company's actual payment history; ABI collects basic information on each company, and on industry trends, then does a statistical analysis to rate a company's *likely* ability to pay.

As for hidden costs, the disc limits you to 2500 searches per year. Additional searches cost 20 to 30 cents each.

ABI updates the CD-ROM only annually. For updated records, you can download files from ABI's online service or have records faxed—at $3 for a basic company record or $29 for a detailed credit history.

Unfortunately, this 16-bit program ran slowly under Windows 95. The company's 60-day free trial offer is the safest way for you to evaluate ABI.

—John P. Mello Jr.

Credit Reference Directory

Do credit checks by CD-ROM.
American Business Information
800/555-6124
Pricing: $1295 per year
Reader service no. 639

CREDIT RATINGS for 10 million firms can be found on the Credit Reference Directory CD-ROM. It's affordable but far from perfect.

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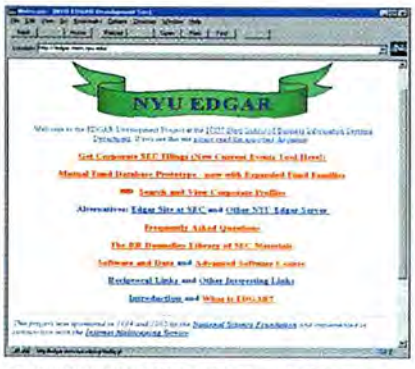


FIND FREE FINANCIAL DATA and SEC filings at NYU's EDGAR Development Site.

NYU and the Internet Multicasting Service have made 10-K (annual) and 10-Q (quarterly) SEC filings as easy to find and sort as possible. The site's tools allow you to search for filings by ticker symbol, by company name, or within a specified time period. The retrieved pages—in ASCII format—don't look as pretty as most Web content, but they're useful. Even casual investors will find what they need in short order.

It takes two to three days before an SEC filing shows up on this Web page. You'll also find corporate profiles and access to the R.R. Donnelley Library of SEC Materials; a mutual funds database is starting up.

For a similar site with added features, see EDGAR Online (**http://www.edgar-online.com/**). This Web-based service run by Cybernet Data Systems costs $9.95 to $99.95 per month (depending on volume of searches), but posts SEC filings more quickly (within one day) and provides extra capabilities, such as automatic updates on filings by companies you specify.

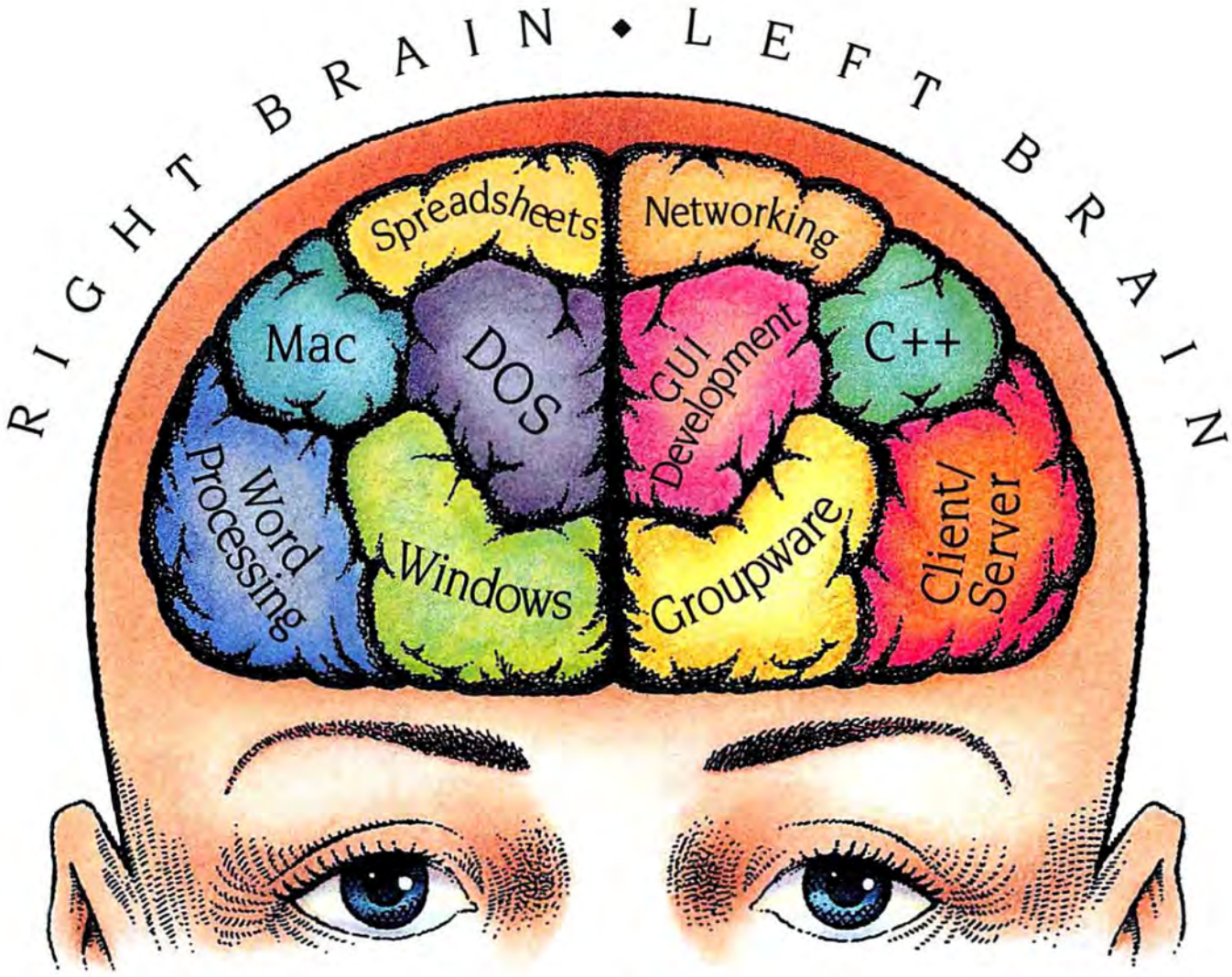
—Richard Overton

The NYU EDGAR Development Site

Free SEC filing information for investors.
New York University and Internet Multicasting Service
http://edgar.stern.nyu.edu
Pricing: Free
Reader service no. 640

EDGAR Online

Cybernet Data Systems
http://www.edgar-online.com/
Pricing: $9.95 to $99.95 per month
Reader service no. 641



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- 16MB of DIMM memory standard, expandable to 256MB with 8 DIMM memory expansion sockets
- 1,000MB** Enhanced-IDE hard drive
- PCI Matrox Millenium graphics card with 3D acceleration and 2MB of WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT 3.51 or IBM OS/2 Warp
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Microsoft's Browser Makes Waves, Navigator Sails On

Microsoft's Internet Explorer 2.0 heralds a new era in the "browser wars," a battle dominated until now by Netscape Navigator. (International Data Group, the parent company of *PC World*, is a minority shareholder in Netscape Communications.) Internet Explorer is a clever, distinctive product that outmaneuvers the market leader in many areas, but it struggles in the shadow of Navigator's titanic feature set and helper applications.

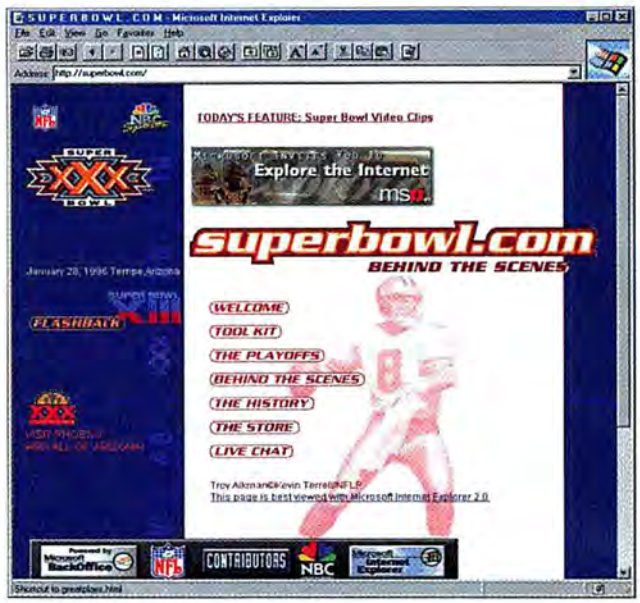
Internet Explorer 2.0 is the flagship of Microsoft's new Internet strategy. The browser fits on a single floppy with room to spare, approximately a third the size of Navigator. Explorer has cast off version 1.0's news and e-mail features for a big payback in speed. I tested

NETSCAPE NAVIGATOR, while not as fast as Internet Explorer, does support ShockWave, used in this Web game.

the two browsers side by side, and almost without fail Internet Explorer rendered pages noticeably faster than Navigator. Even Netscape's much-visited home page loaded faster through Microsoft's browser.

But it's more than speed that floats your boat. Microsoft has taken Netscape's lead and created enhancements that, for now at least, are specific to Internet Explorer. For example, go to navy.news.service (**http://www.wf.net/~cbell/navynews.html**), which carries a "Best viewed with Microsoft Internet Explorer 2.0" button. On this site, the theme to the original *Star Trek* plays while the page is rendered—but this is not a plug-in like Progressive Networks' RealAudio, a popular tool that lets sound files be played as they are downloaded. The *Star Trek* theme is running under a Microsoft HTML invention (known in Webspeak as a *tag*) called *background sound*. As the background music plays, a stream of text flows from right to left near the top of the screen, but it's not a ticker tape written in Sun Microsystems' Java. Instead it's a *marquee tag*, another Microsoft invention.

These new tags underscore Microsoft's intention to ride out the browser wars. Although the company has publicized its intent to use Java, this version of Internet Explorer is Java-free. As a result, the growing Java-enabled content on the World Wide Web is persona non grata in Microsoft's browser. And this is where smart, fast Internet Explorer begins to take on water.



MORE NIMBLE THAN NETSCAPE: Microsoft's Internet Explorer 2.0 requires less disk space and downloads Web pages faster.

Netscape: Full Speed Ahead

Internet Explorer lacks many features found in Navigator 2.0. The latter includes news and e-mail functionality. But its plug-in architecture, the very thing that makes Web-based applications so revolutionary, really makes the difference. Navigator can view Web content developed with a host of plug-ins, such as Java, Macromedia ShockWave, Envoy, Adobe PDF, and other enhancements that swim circles around Internet Explorer. (For a full review of Navigator, see January's *New Software*, "Web Browsing Made Better.")

Finally, the Internet Explorer strays off course with its drop-down menu feature called Favorites, an address book of oft-visited Web sites. They're like bookmarks—or ought to be. Almost every browser lets you import your bookmarks from whatever Internet tool you were using previously. Incredibly, Internet Explorer doesn't.

We may have to wait for version 3.0—when Microsoft tries to make Internet Explorer interact seamlessly with its suite of office applications—to be truly impressed. All this version can do is make waves.

—Richard Overton

Internet Explorer 2.0

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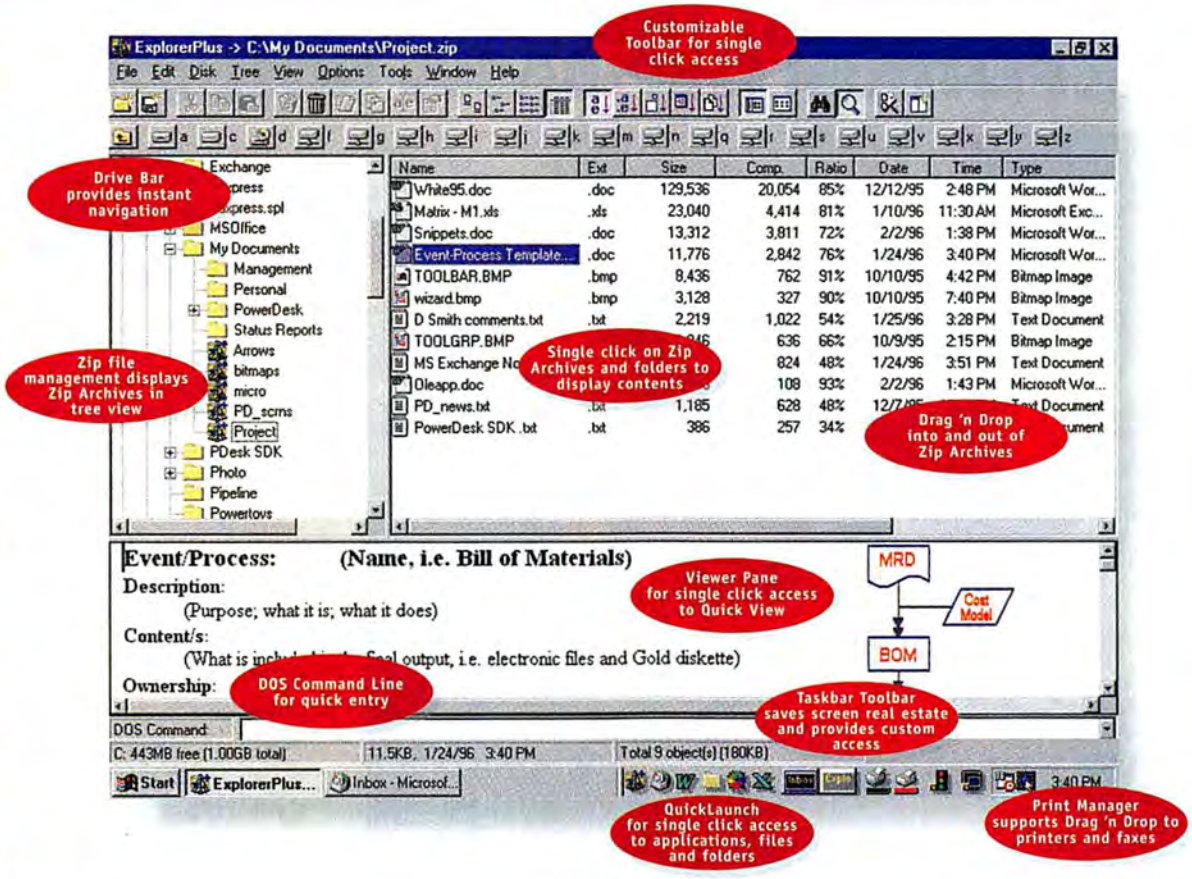
"POWERDESK: WHAT EXPLORER AND DASHBOARD SHOULD HAVE BEEN"

— *PC Magazine* February 20, 1996



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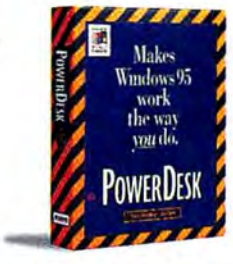

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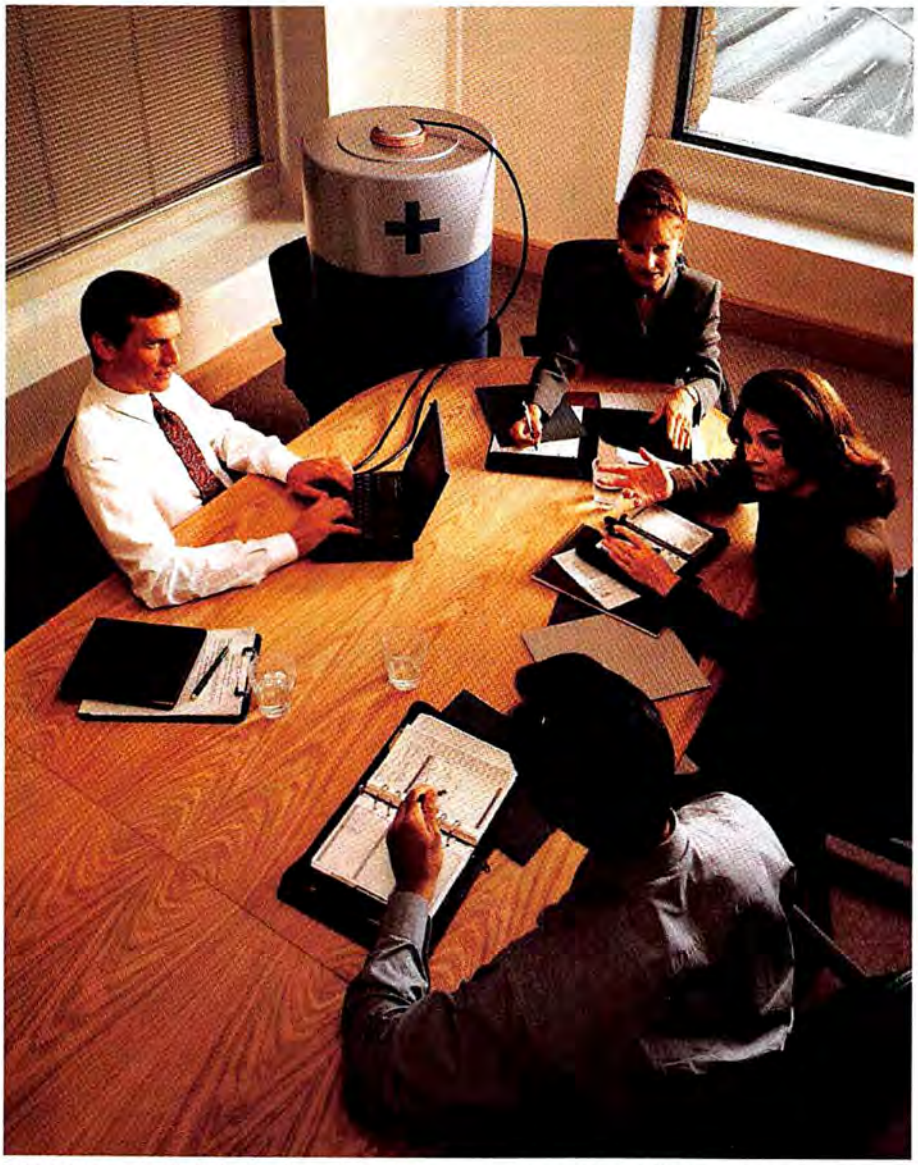

The way some office meetings go on forever, you'd think you were passing a bill through Congress. Luckily, though, the Dell Latitude XPi comes with the battery power to keep up.

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Quick Takes

PowerPoint 95's New Pal

Like your home, PowerPoint 95 presentations begin to look a little drab if they're not redecorated occasionally. If you'd like to spruce up your PowerPoint 95 shows with some new trimmings, take a look at Three D Graphics' **Compadre**. This $49.95 CD-ROM provides 120 templates, 23 brief video clips, 131 sound effects and music clips, and hundreds of background images, textures, and interactive buttons for your presentations. A full-color printed guide helps you to locate elements that meet your needs, and the unusually flexible setup program allows you to copy files to your hard disk or to conserve space by creating Shortcuts to the CD-ROM. The one convenience that the product lacks is a selection of clip art illustrations to supplement those that come with PowerPoint 95. (Compadre does not work with the earlier versions of PowerPoint.) Three D Graphics, 800/913-0008.

Reader service no. 604

A CD-ROM Lightweight

If your notebook doesn't have a CD-ROM drive, consider the **Panasonic KXL-D740** portable quad-speed drive. This lightweight 14-ounce unit connects to your notebook's PC Card Type II slot or your desktop PC's SCSI interface card. While the drive's access time is a somewhat slow 295 milliseconds, its transfer rate is a respectable 600 kilobytes per second. The unit runs on six AA batteries; Panasonic says you'll get up to 2 hours of use for data-based CD-ROMs, up to 4 hours if you're listening to audio CDs. A power-save feature switches the unit to sleep mode after 4 minutes of idle time. The list price is $499. Panasonic Communications & Systems, 800/742-8086, 201/348-7000.

Reader service no. 605

Graphics for OS/2 Warp

OS/2 Warp users looking to better their images will want to check out **Impos/2 2.0**. This bit-map editor and screen-capture program works especially well for World Wide Web pages, with built-in support for GIF, JPEG, and Photo-CD images, as well as many other types of graphics files. Version 2.0 has many new features: support for popular Hewlett-Packard scanners; magic wand and circular selection tools (so you can easily select areas of an image); sponge and gradient tools (for color effects and fills); and filters such as waves, oil paint, and crinkling. Powerful REXX macros can be executed with a single mouse click, saving you time (REXX is OS/2's batch programming language for macros). List price is $129.95. Indelible Blue, 800/776-8284, 919/878-9700.

Reader service no. 606

PORTABLE CD-ROM: Panasonic's KXL-D740 4X drive weighs only 14 ounces and connects to notebooks via a PC Card Type II slot.

Norton on CD-ROM

For help as you say farewell to Windows 3.1, you can count on **Norton Utilities for Windows 95 on CD-ROM**. This package provides all the Windows 95 utilities for which Norton has won acclaim, along with an ▶

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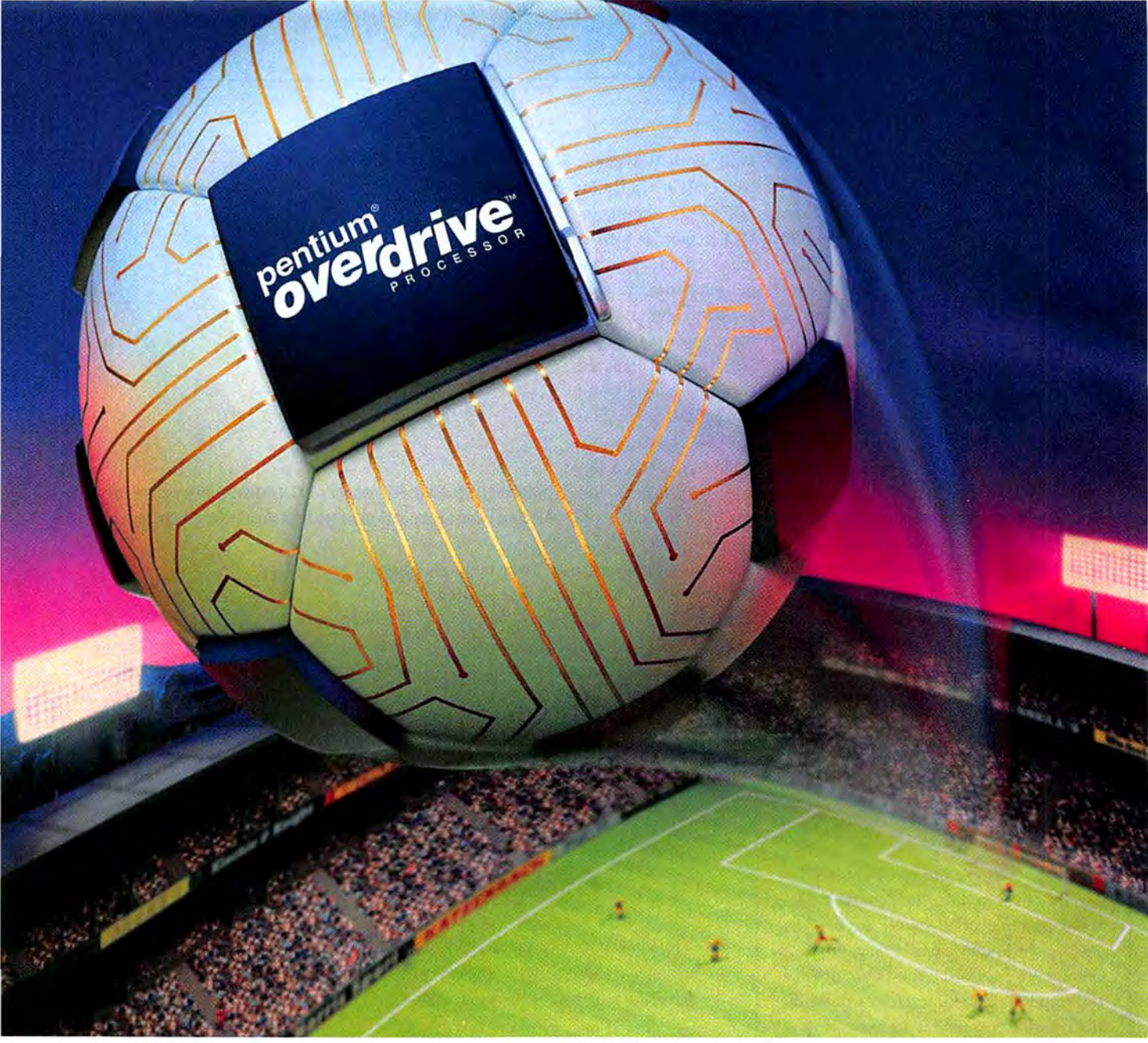

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upgrade assistant for people moving to Windows 95 from Windows 3.1 or Windows for Workgroups. The disc also includes three interactive multimedia tutorials not incorporated in the previously released floppy disk version. The first tutorial, the Norton Utilities Companion, provides a basic introduction to Norton Utilities. The Disk Companion explains Windows 95's file system and shows you how to detect and repair file and disk problems. Finally, the Memory Companion describes Windows 95's memory management and shows you how to take maximum advantage of available memory. This software is a good value at the $129 street price. Symantec, 800/441-7234.

Reader service no. 607

High-Capacity Backups

To meet today's storage demands, many PC hard drives have capacities of a gigabyte or more, so the ante has had to be upped at the backup end, too. That's just what Tandberg Data has done with its **Panther Mini 2000** minicartridge tape drive. The SCSI-2 drive uses Sony QIC-Wide 3.5-inch minicartridges that accommodate 2GB of compressed data. The unit automatically formats cartridges as it writes to them—a bonus, since unformatted cartridges cost less than the preformatted cartridges that some drives require. Unlike a number of drives, the Panther automatically verifies data as it writes to tape rather than making a second pass to verify what it has recorded. This approach makes the backup process faster. The internal version lists for $549, the external for $659. Tandberg Data, 800/826-3237, 805/579-1000.

Reader service no. 608

Low-Cost Backups

Pertec Memories has introduced an affordable, durable internal tape backup system, **MyTape 800**. It mounts in either a 3.5-inch or 5.25-inch drive bay and features a rugged aluminum frame (many drives in this class use less sturdy plastic frames). Pertec designed the system for 3M's Travan technology—the emerging standard for tape backups. But the unit is also backward compatible with QIC-80 and QIC-Wide tape. MyTape stores 400MB of uncompressed data or 800MB of compressed data on a Travan TR-1 cartridge. Pertec throws in backup software for DOS and for Windows 3.0, 3.1, and 95, plus one blank cartridge. The unit comes with a five-year warranty. Street price is $159. Pertec Memories, 408/461-6080.

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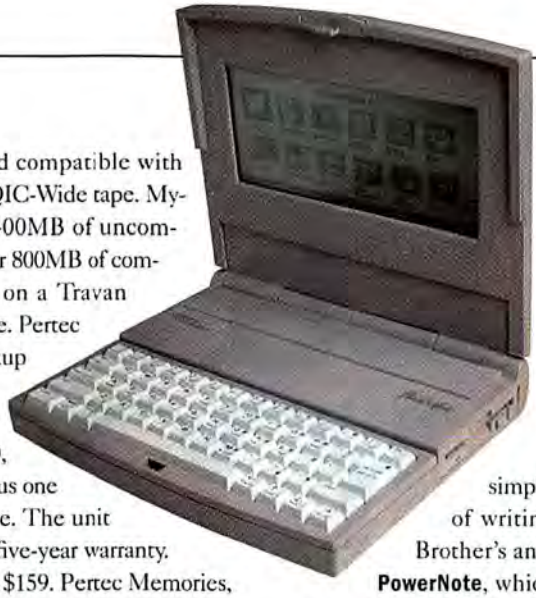

A $300 PC: Brother's Super PowerNote lets you do basic word processing as well as balance your checkbook.

Brother's $300 "Notebook"

Perhaps you don't want to pay big bucks for a full-fledged notebook just to do basic word processing or to balance your checkbook. Or maybe you don't want to have to lug around an 8-pound portable simply for the purpose of writing a few memos. Brother's answer is the **Super PowerNote**, which promises basic computing power for a $299 street price. This 5-pound unit doesn't do Windows, but it has its own word processor (including both a thesaurus and a dictionary), a spreadsheet that handles budgeting and checkbook balancing, and a calendar and address book. You can exchange .txt files with popular word processors and swap .wks and .xls files with a number of spreadsheets. However, the storage in this ▶

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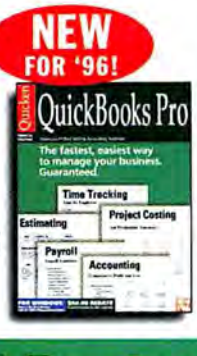

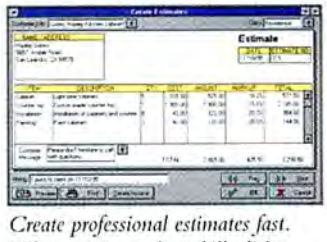

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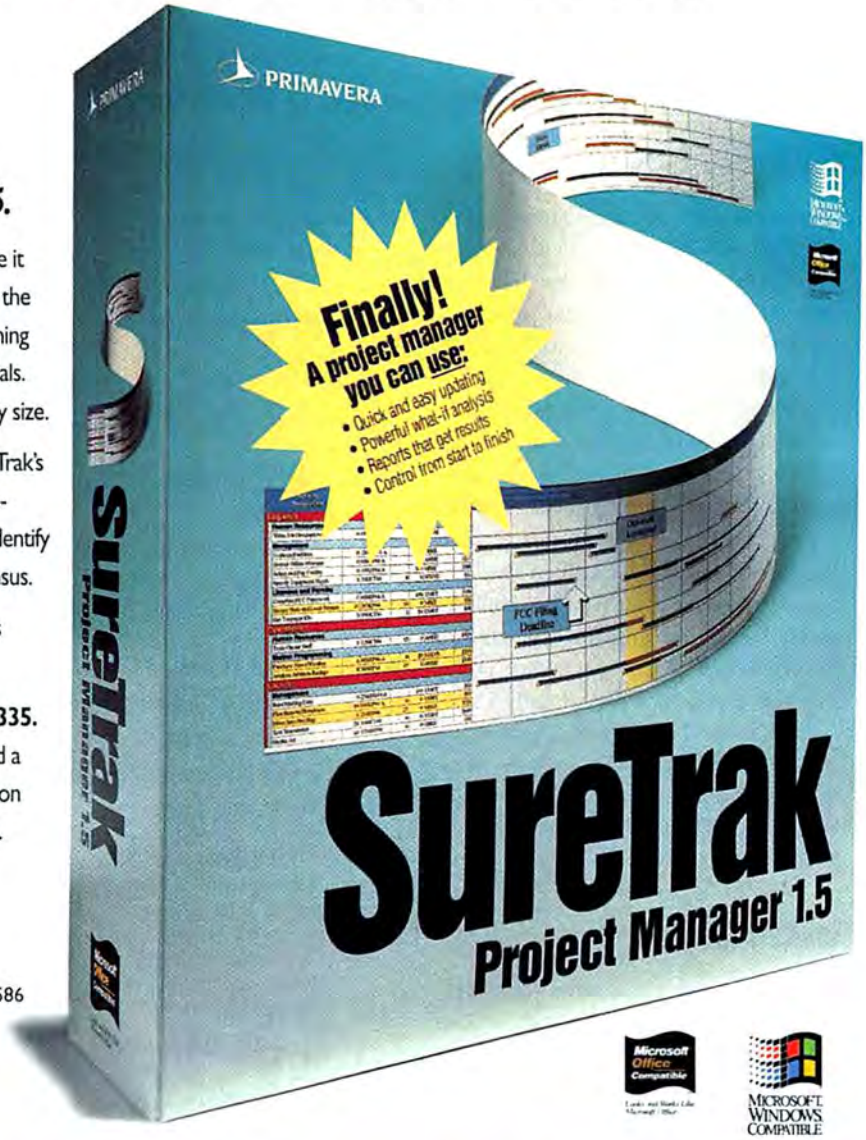

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system is practically nonexistent: The unit has a 1.44MB floppy drive, but it doesn't have a hard drive. You can use the Super PowerNote with a printer, or with a modem running at up to 9600 bps (for sending or retrieving text files but not graphics). The monochrome LCD measures 8.5 inches wide by only 3.5 inches high (80 characters by 22 lines). The unit comes with an AC adapter, but strangely, you must pay an additional $69.95 to get a NiCd battery that powers the unit for up to 8 hours. All in all, *super* isn't the best way to describe this product. Brother Int'l Corp., 800/284-4357, 908/356-8880.

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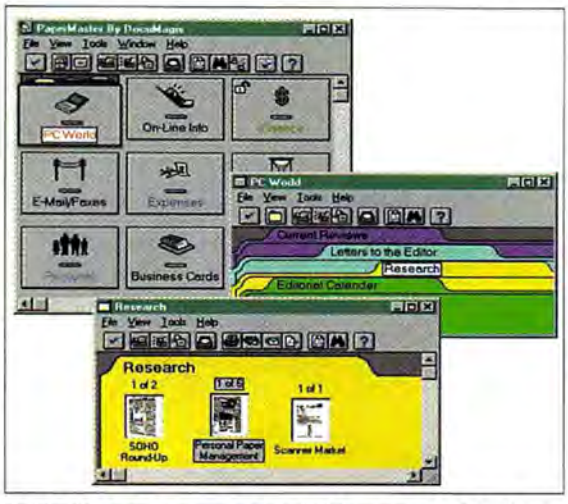

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Clear That Desk

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Remote Control Help

Would you like to be able to help your colleagues solve their computer problems without having to leave the comfort of your own desk? Check out Fujitsu's affordable **LiveHelp**, a program that allows screen sharing and remote control of applications. Let's say one of your coworkers is stuck in Excel. Using LiveHelp, you can control your stymied colleague's computer across the network and fix the problem as they watch and learn. You can also cut and paste a screen shot showing what's happening to an on-screen "white board," then mark up the screen shot to explain your point. Coworkers on the LAN or WAN can use LiveHelp, as can remote users via modem. The software is compatible with Windows 3.1 and Windows 95. LiveHelp Expert software (for the person giving help) lists for a reasonable $99; Client software costs $175 for a 10-user pack, up to $1225 for 100 users. Fujitsu Business Systems of America, 800/446-4736.

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For more information about any product, contact the manufacturer or circle the number on the reader service card. ■

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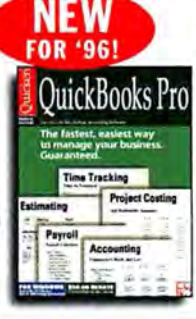

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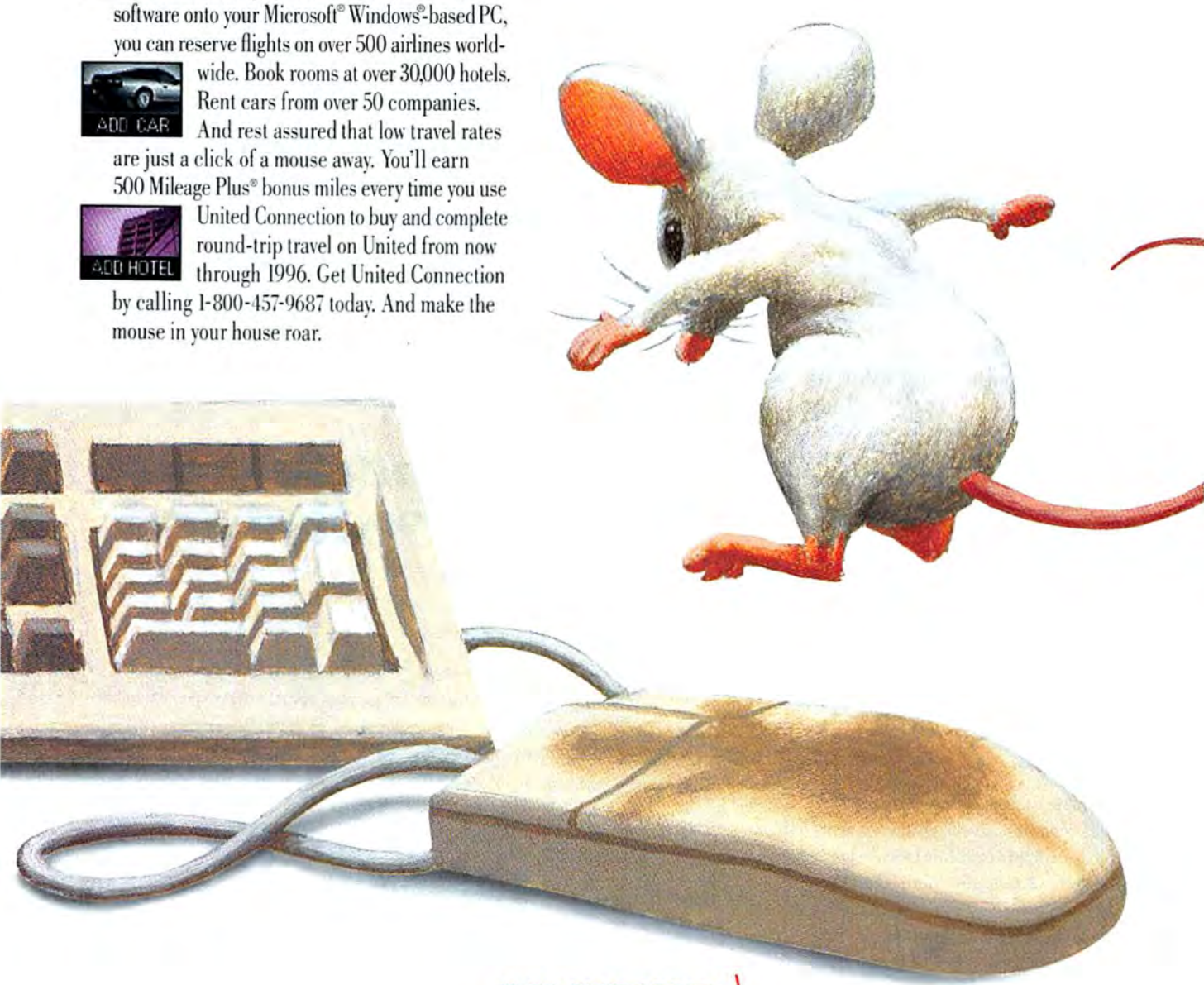

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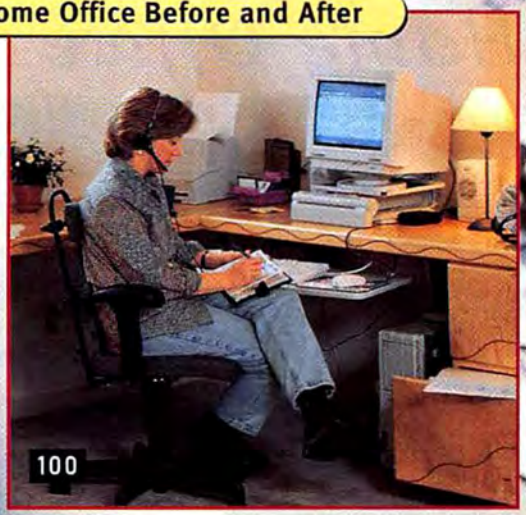
Small Office Home Office

From high-rise to home: How to set up a small office that works.

EDITED BY MICHAEL S. LASKY
PHOTOGRAPHS BY MARION BRENNER AND PHILIP SALAVERRY

Home Office Before and After



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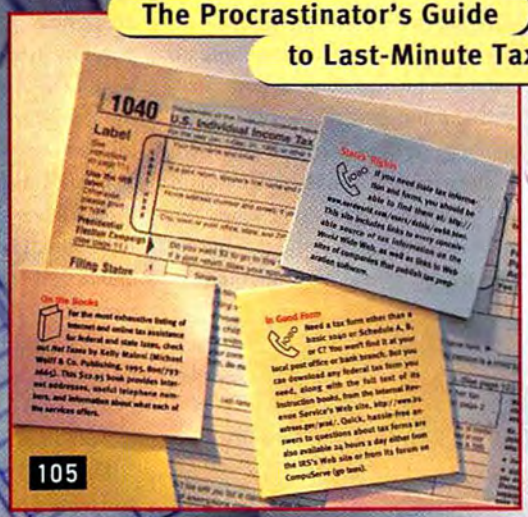
The Procrastinator's Guide to Last-Minute Tax Tips



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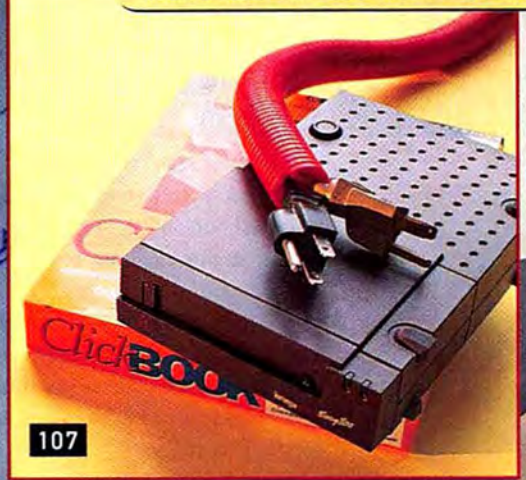
Hot Picks for the Home Office



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Home Office Before and After

How our consumer reporter transformed her family room into her work room.

BY ROBERTA FURGER

I MOVED INTO MY NEW HOME office last night. After two months of demolition and reconstruction, space planning and furniture selection, and lots of waiting for craftspeople to come and ply their trades, I was finally able to unpack the boxes and set up shop. And it's terrific—plenty of filing space, an adjustable keyboard tray and chair so I don't work my body into knots, and a huge tabletop where I can spread my work out.

The bar is now closed: Designing my office meant I could rip out the built-in bar and install new furniture.

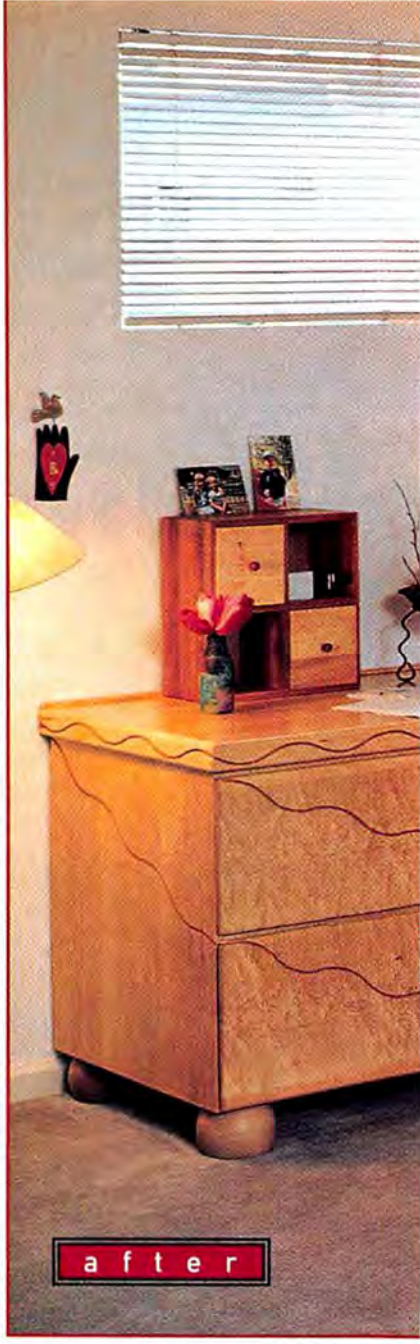
After more than ten years of commuting, I've gone from 2 hours of fighting freeway traffic each day to a 30-second walk to my family room. From business clothes to sweatpants, from mornings where the din around my house resembled a pit at the Indy 500 to...well, you get the picture.

My move started back in September, when my boss made me an incredible offer: Why not work at home full-time? The move would free up a much-needed office at the magazine's headquarters, and—more important, from my perspective—it would free me from having to juggle the weekday schedules of two schoolkids and two working parents.

There was just one *tiny* problem: I didn't have a home office to move into. Sure, I had a computer at home and a desk and a chair, all of which were fine for telecommuting a couple of days a week. But this was going to be my only office, and the desk and PC I shared with the rest of the family would never cut it.

The previous owner of our house had added on a 20-by-20-foot family room. The room came equipped with a built-in bar that took up almost one-quarter of the room and was, to be diplomatic, just a tad unattractive. Great, I thought. Now's my chance to ditch the bar—and put an office in its place.

Still, this was going to be a significant investment—one I'd be living with for many years—so I was determined to get it right. I've had a lot of neck, arm, and back trouble from typing, so a good chair and a tabletop that could handle an adjustable keyboard tray (no drawers to get in the way) were vital. I also wanted plenty of shelves and filing space so I could finally get organized. And because the office would be a section of our family room, I wanted it to look nice.



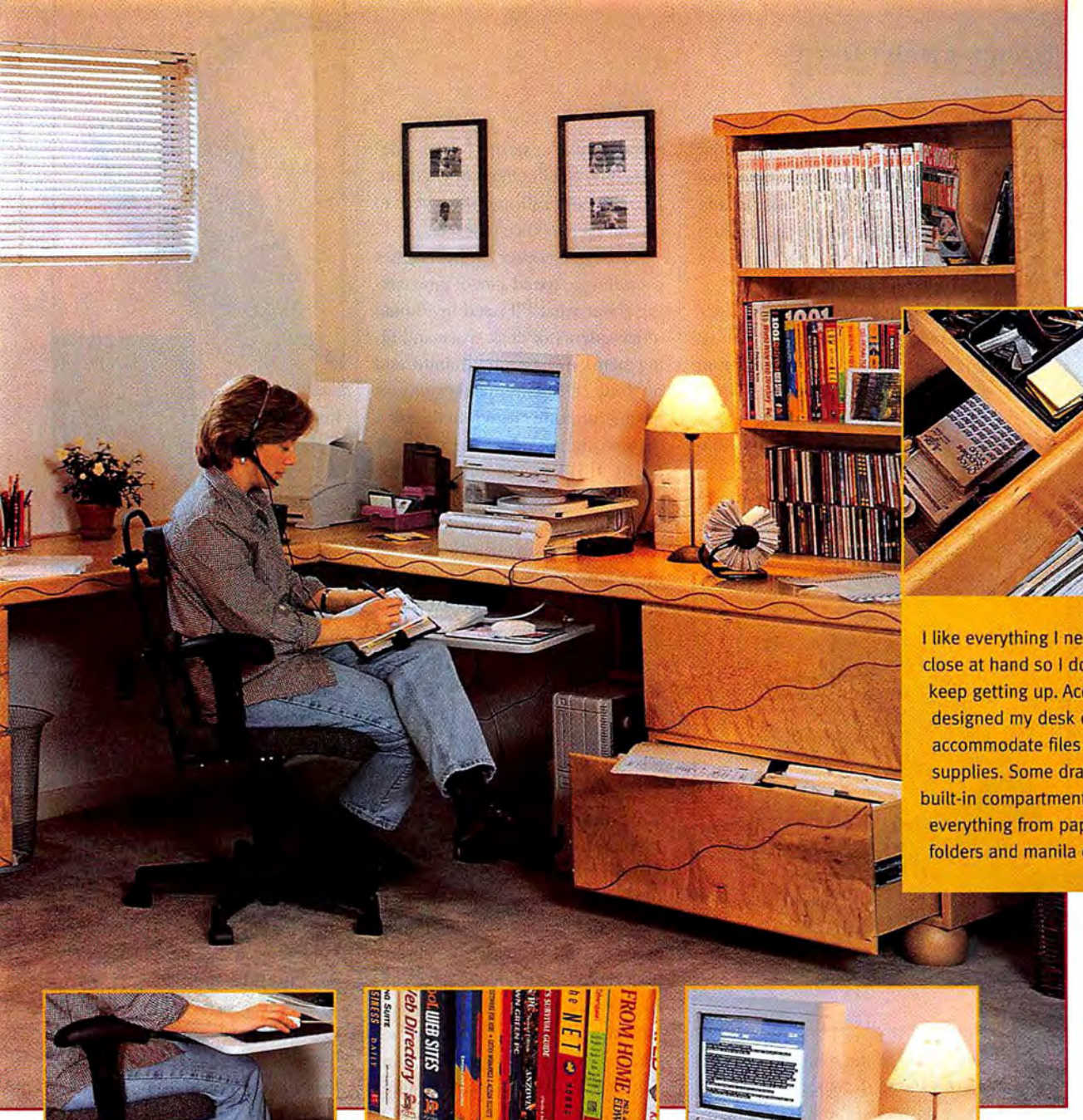
PHOTOS BY MARION BRENNER

PHASE ONE

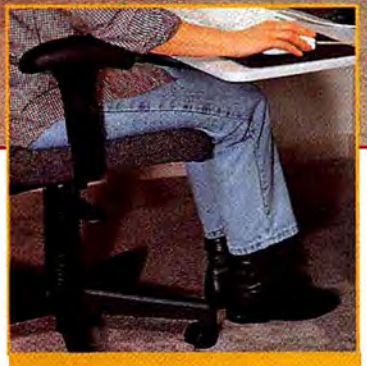
Time and Materials

Saturday, October 21, 1995 The contractor comes to take out the bar. It's too big and heavy to be hauled out in one piece, so he winds up sawing it into pieces. By the end of the day, we've got a major hole in the wall and no power in the back half of the house. We light some candles, and the kids think it's a party.

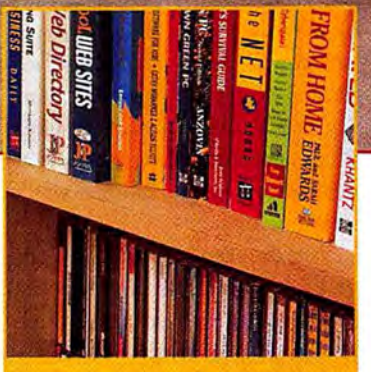
Sunday, October 22 The doorbell rings at 8 a.m. It's the contractor with



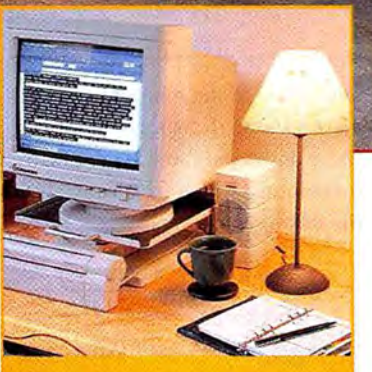
I like everything I need for work close at hand so I don't have to keep getting up. Accordingly, I designed my desk drawers to accommodate files and office supplies. Some drawers have built-in compartments to handle everything from paper clips to folders and manila envelopes.



Ergonomics was a prime concern when I had this desk built. It's 29 inches high so my keyboard shelf can hang below the desk without hitting my legs. The ZackBack chair isn't much to look at, but it adjusts for proper computing posture. And my monitor stand adjusts for the best viewing level.



The bookshelves are sized to accommodate books, magazines, and the CD-ROMs I review all the time as part of my work for PC World. With the bookcase built into the desk, my furniture doesn't take up a lot of floor space, but I get all the storage I need for a variety of reference materials.



Soft, indirect room lighting with spot task lighting is best for computer work areas. I had planned to install ceiling track lights but found that strategic placement of incandescent lamps on and near my desk combined with natural light from the overhead window was just right.

an electrician in tow. They figure out the wiring problem, and the contractor starts patching the holes in the wall and ceiling where the bar and light fixture once were and prepping the walls for painting.

Monday to Friday, October 23–27 The next few days are crazy. We've got sheets of plastic hanging from the ceiling to the floor to keep dust from going through the entire house, and all the furniture is crammed into one corner of the room. At the end of the week the sheets of plastic come down and the walls are ready for painting, which we do ourselves the following weekend.

The compact Visioneer PaperPort Vx is a desktop lifesaver that lets you scan documents on the fly.

PHASE TWO

How to Use the Space

Wednesday, November 1 After visiting a number of office supply and home furnishing stores, I still can't find any furniture that I like. Everything's either too institutional looking, pretty but nonfunctional, or overpriced and poorly made. In search of inspiration, I start looking through home office design books, such as *The Complete Home Office* by Alvin Rosenbaum (Viking Studio Books, 1995, 800/253-6476), and come across a setup I love—designed by Shelli Oreck of Oakland. I give Shelli a call, and she agrees to consult on my office redesign.

Monday, November 6 Shelli comes over, and we spend a lot of time talking about what I'll need in a home office (plenty of desk space and filing room), my taste in furniture, and my budget. Shelli quickly suggests having furniture custom-built rather than trying to find pieces to fit my needs. I balk at the idea, thinking there's no way I can afford custom-built furniture, but she soon convinces me that *(a)* it won't be *that* much more expensive, and *(b)* it will be just what I need—not just something I'll make do with.

Tuesday, November 7 With the painting finished, it's time to install the carpet. We're having the whole house done, so it takes two days, but it'll look great when they're through.

Thursday, November 9 Shelli faxes me a draft of the furniture design, which calls for one cabinet with file drawers and one with shelves and sliding garage-door–type covers to hide the clutter. I ask a ton of questions; we fiddle with the design, then agree it's a go. Shelli starts calling furniture makers for estimates.

Friday, November 10 Robert Jaeger, of Gustave Jaeger & Sons Woodworks in San Francisco, likes the design, has time for the project, and comes in with a bid that won't break my bank.

Tuesday, November 14 Robert, Shelli, and I meet to talk about the final design. We settle on curly maple and scrap the idea of cabinets with garage-door closures in favor of drawers, which Robert will custom design to hold stationery and other office supplies.

PHASE THREE

Finishing Touches

Tuesday, December 5 The furniture is built, but cool, damp weather prevents Robert from applying the stain. We all wait for the rain to stop long enough for Robert to get the varnish on and deliver the pieces.

HP's Printer Pal transforms the LaserJet 5L into a handy fax-receiving machine. Alas, it cannot send faxes.

Saturday, December 16 Delivery Day. It takes a couple of hours to install the furniture (the two long tabletops need to be fastened together, then mounted on the wall). I spend the rest of the weekend unpacking and settling in.

EPILOGUE

Lighting is a big issue in any office, not just mine. Rather than rushing out to get fixtures that may not be practical in the long run, I work in the office for a few days to get a sense of what type lighting would be most useful—and where to put it. The room gets lots of natural light, so task lighting seems to fill the bill.

So was it worth it? So far, so good. I've already finished one article—you're reading it now.

Roberta Furger is a senior writer for PC World.

Home Office Makeover: The Cost	
Desk	$3347
Contractor fee	995
Computer	2000
Chair	600
Printer	500
Carpet (office space)	260
PaperPort Vx scanner	369
Printer Pal fax device	200
Miscellaneous equipment	200
Total	**$8471**

PHOTOS BY PHILIP SALAVERRY

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The Procrastinator's Guide to Last-Minute Tax Tips

BY RICHARD MOROCHOVE

You can't believe you waited this long to do your tax returns. But now that April 15 deadline is upon you, and you need information pronto. It's panic time!

Well, maybe not. Relax, and check out these eleventh-hour resources—available online, in print, and by phone—to make your filing less taxing.

On the Books

For the most exhaustive listing of Internet and online tax assistance for federal and state taxes, check out *Net Taxes* by Kelly Maloni (Michael Wolff & Co. Publishing, 1995, 800/793-2665). This $12.95 book provides Internet addresses, useful telephone numbers, and information about what each of the services offers.

States' Rights

If you need state tax information and forms, you should be able to find them at: http://www.nerdworld.com/users/dstein/nw50.html. This site includes links to every conceivable source of tax information on the World Wide Web, as well as links to Web sites of companies that publish tax preparation software.

In Good Form

Need a tax form other than a basic 1040 or Schedule A, B, or C? You won't find it at your local post office or bank branch. But you can download any federal tax form you need, along with the full text of its instruction books, from the Internal Revenue Service's Web site, http://www.irs.ustreas.gov/prod/. Quick, hassle-free answers to questions about tax forms are also available 24 hours a day either from the IRS's Web site or from its forum on CompuServe (go taxes).

At Your Service

CompuServe provides intensive tax assistance online in its CompuServe Tax Connection area (go taxes). The service offers electronic tax filing to all 50 states as well as downloadable IRS forms, instructions, and publications. Several tax preparation software companies (Computer Associates, Intuit, MECA, and Parsons Technology) maintain support forums on the service. The Accounting and Tax section of CompuServe's Working From Home forum (go work) includes advice specifically targeted at small office entrepreneurs. H&R Block also has free information by category in its area.

Loop the Loophole

Want to find a loophole or the exact wording of a tax law? You can search the full text of the U.S. Internal Revenue Tax Code at http://www.fourmilab.ch/ustax/ustax.html.

Dialing for Your Dollars

The IRS operates Tele-Tax at 800/829-4477. This 24-hour service provides prerecorded information on some 140 tax topics. Just dial a three-digit code to access the topic you want; dial 123 to hear an index. After filing your return, you can call Tele-Tax to hear the status of your refund.

Richard Morochove is a Fellow Chartered Accountant in Toronto.

PHOTO BY PHILIP SALAVERRY

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Hot Picks *for the Home Office*

BY STEVE BASS

No-Excuse Backups

I've always thought that I had good reasons *not* to back up: It's too expensive, the hardware's a pain to install, and backing up's slower than molasses. Well, folks, with Iomega's Ditto Easy backup drives, I've run out of excuses. The external Ditto Easy 800 stores 800MB of compressed data and installs in a jiffy. My mother, who's not a technical superstar, installed the Ditto on her computer in no time. After plugging the Ditto's parallel port cable into the computer and piggybacking the printer cable behind it, she simply plugged in the AC power adapter, inserted the cartridge and the software, and the job was done. The Ditto Easy 800's data transfer rate is a reasonable 1 megabyte per second, and because the drive is portable, you can use it to back up everyone's data in a multicomputer office. Iomega also offers a smaller 420MB drive and a gigundo 3.2GB unit. So now what's *your* excuse?

Ditto Easy 800, street price $149.95; Iomega; 800/697-8833, 801/778-1000.

Reader service no. 631

This Seat's for You

I'm sitting in a chair that costs $895. Yeah, yeah, I know—that's a lot of bread, but ergonomic specialists say the chair is the most important piece of furniture in your office. And the BodyBilt K-Series, while expensive, is amazingly well designed. It's got an inflatable lumbar support to die for and a fully adjustable backrest. A ridge (known as a *pommel*) down the middle of the seat distributes the body's weight, reducing pressure on the thighs, and I can adjust the height and seat tilt any way I want. Not only do I get the support I need and improve my sitting posture, the chair is remarkably comfortable—so much so, it may even improve my writing. BodyBilt K-Series, list price $895; BodyBilt; 800/233-8673, 409/693-7000.

Reader service no. 632

Have a seat: BodyBilt's comfortable K-Series chair is ergonomically designed and user adjustable.

Cable Wrangler

They're lurking around your desk—cables, wires, and cords, all snarled and tangled, waiting to grab you. Don't wait another second: Stuff all those cords into a Big Tube. It not only neatly organizes and conceals the wires, it also eliminates the risk of your tripping over them. Big Tubes are available in four colors; tubes range from 6 to 12 feet in length, and from 1 to 1½ inches in diameter. Six sheets of color-coded labels give you a handy way to identify and reconnect cables, and you get six reusable ties. Who knows, if your cables are organized, you may even be able to put your feet under your desk again. Big Tube Cord Control Kit, list price $12.95 to $18.95; Get Organized; 408/438-0259, 408/438-0359 (fax).

Reader service no. 633

Get Unwired: Big Tubes neatly organize all those cables, wires, and cords under your desk.

PHOTOS BY PHILIP SALAVERRY

Fast, Cheap Laser Printing

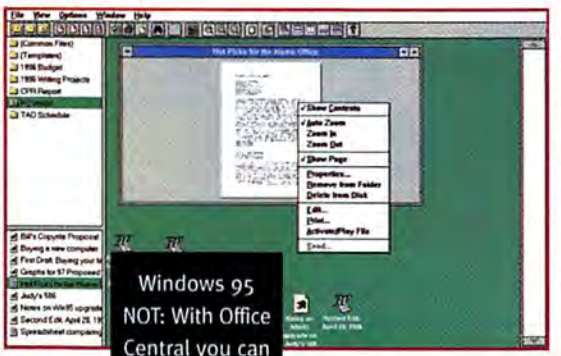
It's a fact of life: Small offices need lightning-fast, dependable, high-quality printers. I've tried lots of

them, but when I got my hands on Hewlett-Packard's LaserJet 5P, it was love at first print. For a street price around $830, the 5P prints at a crisp 600 dots per inch and gives my user group newsletter a sharp, professional look. It cranks out documents at a speedy 6 pages per minute, and with 2MB of RAM standard (upgradable to 20MB), it almost never gives me 'out of memory' errors. The 5P's tray holds 250 sheets of paper; a second tray handles another 100 sheets or 20 envelopes. HP LaserJet 5P, list price $1109; Hewlett-Packard, 800/752-0900.

Reader service no. 634

What's in a Name?

Admit it: You want the neat features in Windows 95 but haven't the fortitude to upgrade from Windows 3.1. I'm in the same boat. I've been using a handy Windows 3.1 file organizing utility called Office Central to simulate some of Win 95's slicker features. For starters, Office Central lets you replace cryptic 8-character file names with long, meaningful titles. Icons—as well as titles—of all my relevant files



Windows 95 NOT: With Office Central you can use Windows 3.1 and get virtual Win 95 features.

are on Office Central's file cabinet–style desktop. A mouse click lets me preview the file or instantly launch its application. I can create new folders, move and copy files to other folders, and search for keywords within documents. Office Central, list price $49.95; Panther Software; 800/372-5380, 310/372-6806, 310/372-2347 (fax).

Reader service no. 637

Do-It-Yourself Stationery

Pop quiz: Name two items every new business needs. How about business cards and stationery? Instead of hassling with expensive desktop publishing programs or racing to the print shop, check out T/Maker's World's Easiest assortment of $14.95 software packages for

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print needs such as certificates, announcements, custom notes, and invitations. The no-brainer software automatically inserts your name and vital information into a dazzling array of sample designs. You can print your designs immediately using the supplied sample stationery and perforated sheets of business cards. If you want something fancy—say, embossed letters on your cards, or personalized Post-it notes—you can click on a button to send your customized order via modem to the World's Easiest Print Center. World's Easiest, street price $14.95 per package; T/Maker; 800/730-3279, 415/692-0195, 415/962-0201 (fax).

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Reader service no. 638

Contributing editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group.

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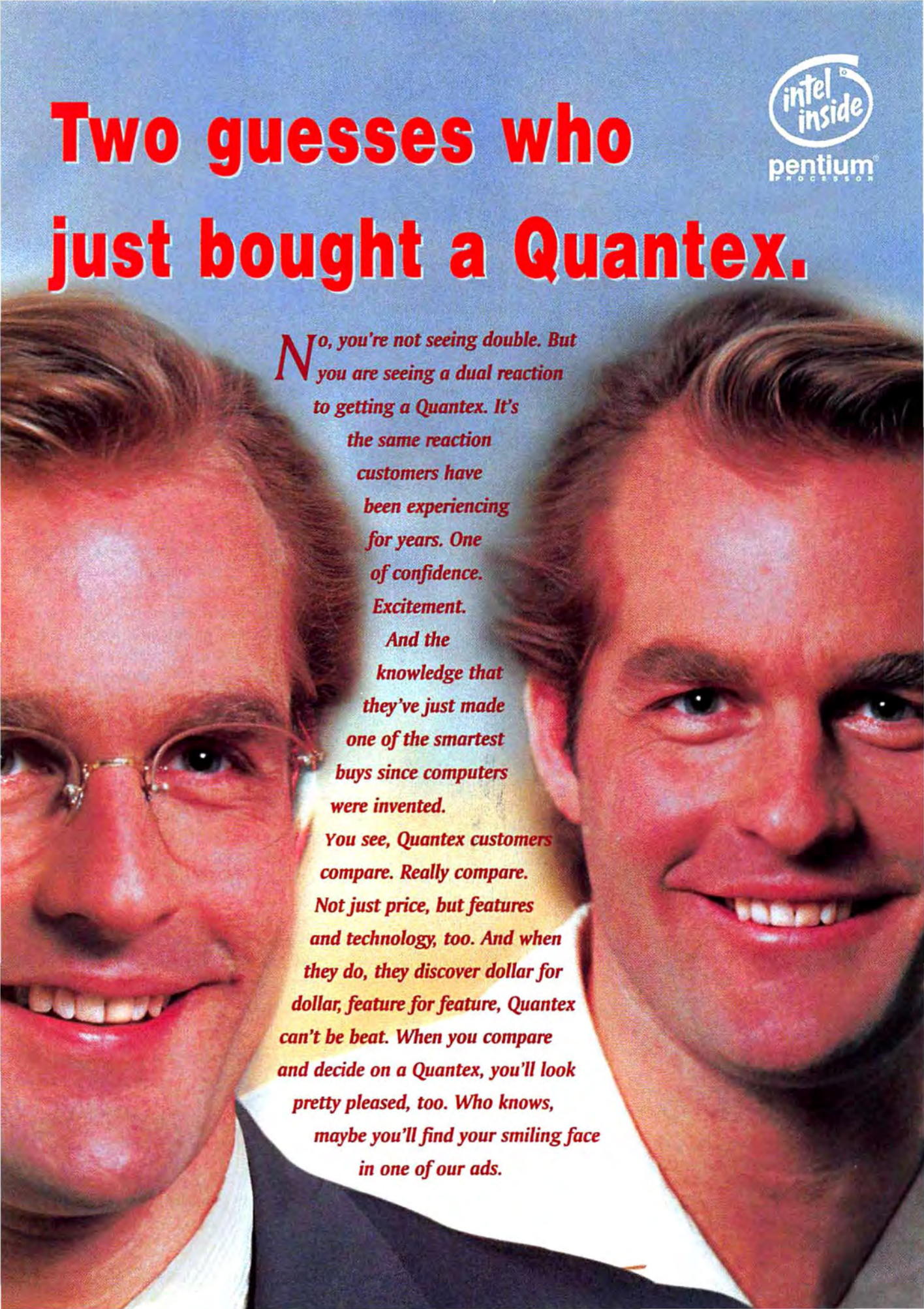
Two guesses who just bought a Quantex.



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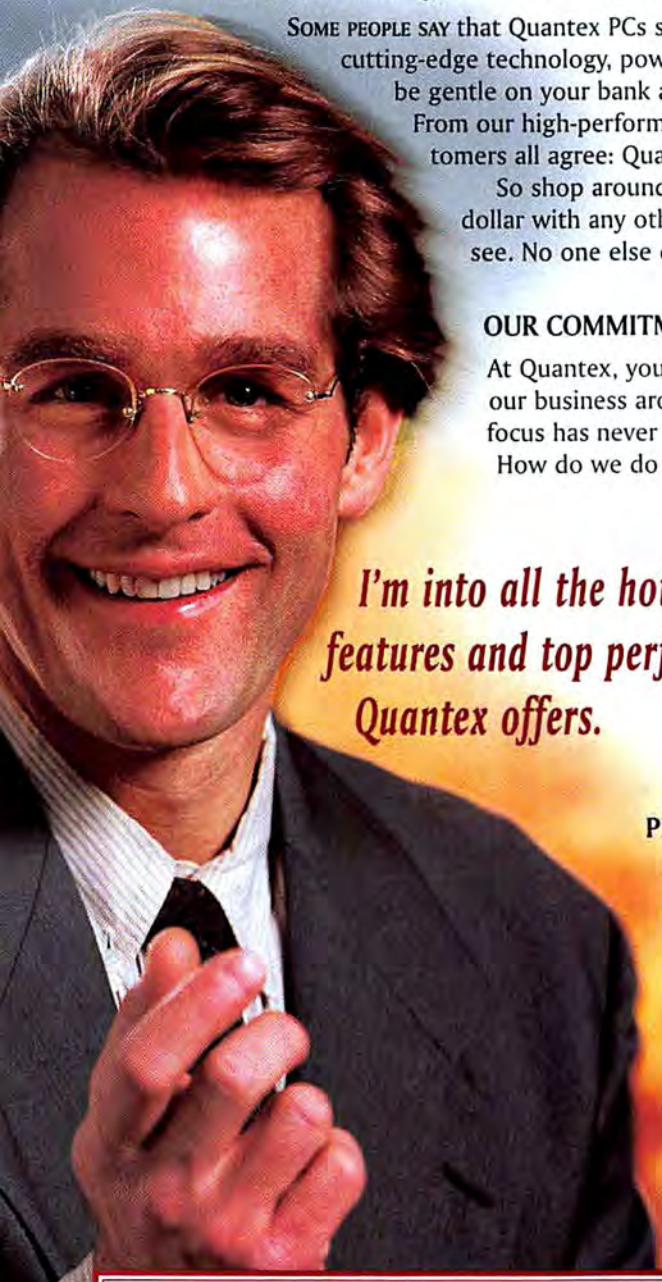

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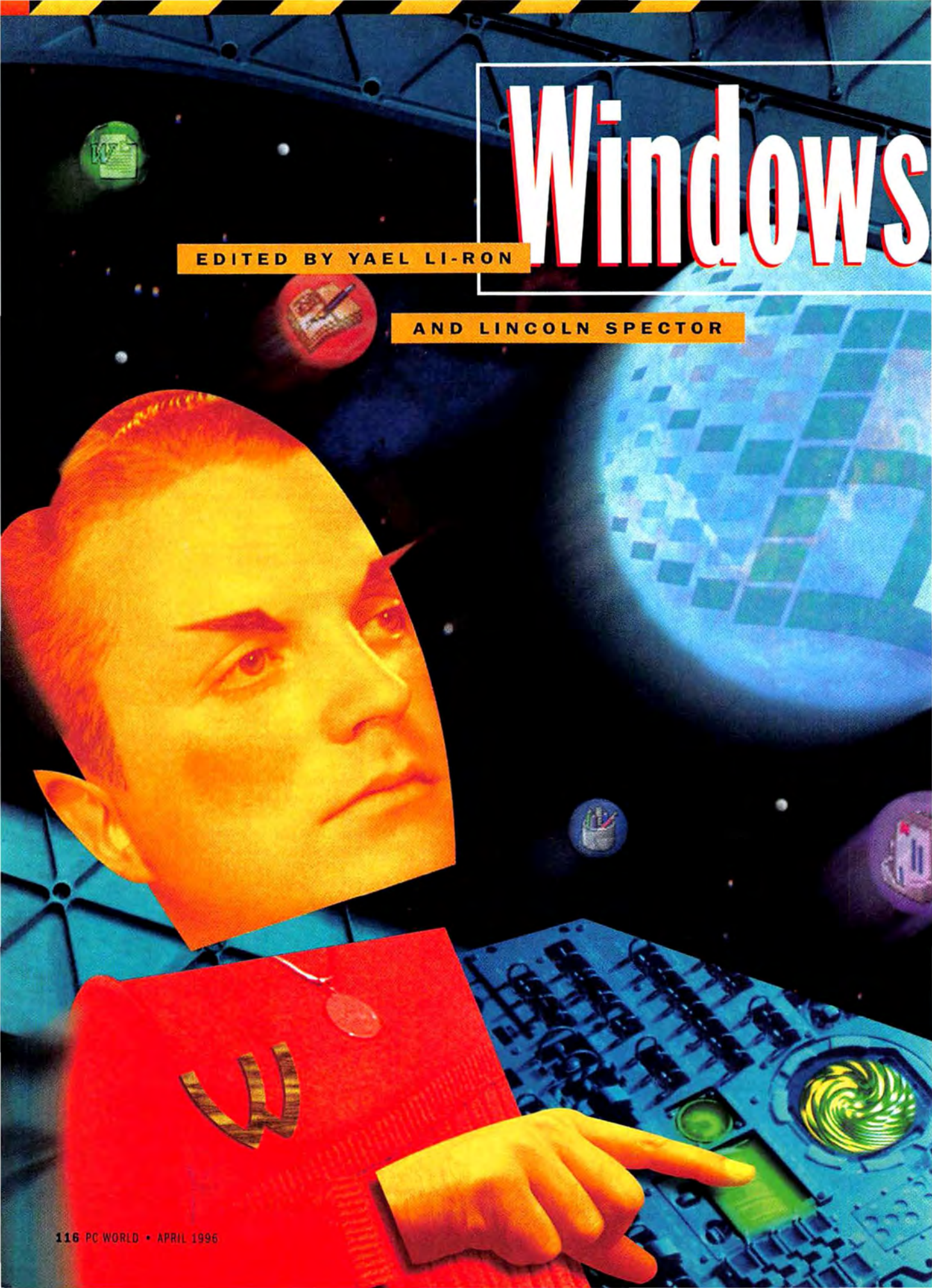
Windows

EDITED BY YAEL LI-RON

AND LINCOLN SPECTOR



95 at Warp Speed

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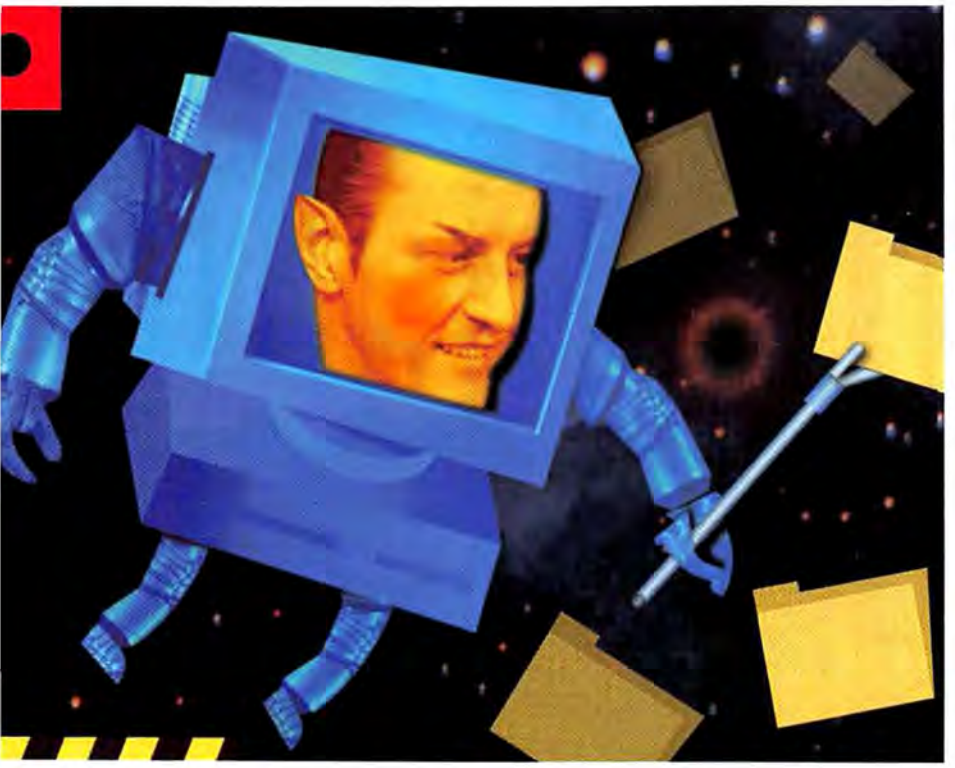
Windows 95–the latest frontier. These are the recommendations of the *PC World* editors. Our 11-page mission: to explain strange new words. To seek out new shortcuts and better ways to store data. To boldly show what no one has shown before!

And we've got plenty to show you. There are infinite ways to make Windows 95 faster, safer, and easier to use, and on the next several pages we'll discuss some of our favorite tricks. You'll find out how to best organize files and folders for easy access; what you can do to speed up your system; which utilities and techniques help you keep your hard disk healthy and dependable; and how to be more effective in your work.

If you simply use Windows 95 as it came out of the box, you're letting someone else shape your environment and your work habits. Why not take a little time to make the operating system your own? It's the logical thing to do.

GORDON SUTDER

Call to Order: Manage Your Files



Leave things up to the application vendors, and you'll never find anything. Your WinWord and Excel files would be in a folder called My Documents, your Quicken files would be in the same folder as Quicken itself, and anything you create with Windows Paint would be dumped into that growing mass of miscellaneous flotsam called c:\windows. (For those of you new to Windows 95, *folder* is the new, improved word for *directory*—just another way of making Windows friendlier to novices at the expense of the rest of us.)

If you want to gather up all the files connected with a particular project—to take them home or maybe even back them up—good luck! You might as well try to find all of your 3-year-old's Legos.

The rule for children is "Put away your toys." For computer users, it's "Store your data files in one place, separate from the applications you created them in." Sure, Lotus 1-2-3 may want to store your annual budget with all its other worksheets, but 1-2-3 doesn't know how important that budget is to you. Wouldn't it make more sense to keep the worksheet with other files related to the year's budget? I mean, do you organize important papers by ink color?

Keeping your data together makes a number of jobs easier. If you can't find that letter to Jody and don't remember what you named the file, a text search on a 10MB folder branch (a folder and its subfolders) is a lot faster than one on an 800MB hard disk. If you want to bring some work home with you, it's all in one place. And if you have no tape drive, you can at least back up your data to floppies without a massive effort.

If you haven't already done so, create a folder right now called c:\Data, or c:\Documents, or c:\Files I Really Use, or c:_____ (if you want to guarantee that it's always the first folder listed alphabetically). What you actually call the new root folder is up to you (I call mine c:\Articles, a reflection on what I do for a living), although for the purposes of this story, let's assume you call it c:\Data. If you're using Microsoft Office 95, simply rename the existing My Documents folder.

The Folders Below

But don't go moving your files to c:\Data just yet. First you want to create subfolders to help you organize your files. After all, if you're going to store financial reports in the same folder as letters to Aunt Agatha, you may as well print everything and keep it all in a pile on your desk.

How you organize your files depends on your job and your work habits. I've got subfolders within c:\Articles for every issue of *PC World* I'm working on. Within these, I

All the Right Moves

Reorganizing your hard disk means moving files around. Here are some tips to make the changes as easy as possible.

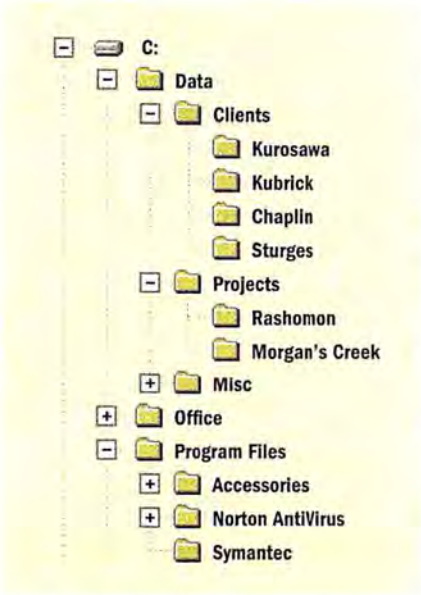
Put your destination on the desktop: In Explorer, right-drag your destination folder to the desktop. When you're prompted, select *Create Shortcut(s) Here*. Your desktop now has a Shortcut to your destination folder. To move a file to the folder, simply drag it to that Shortcut. When you're done moving files, delete the Shortcut.

Sort things out: Need to quickly grab a group of files with similar names? The same extension? How about the most recent files? If you sort your files by name, type, or date, you can easily group files that match. Select *View • Arrange Icons* to see your sorting options.

Find the files you need: To find more complicated groups of files from inside Explorer or any folder window, press <F3> for Windows 95's Find File program. If you don't have Explorer or a folder window open, click *Start • Find • Files or Folders*.

Remember, you can move a folder: Just drag it as you would a file.

When in doubt, right-drag: If you can't remember what combination turns a drag into a copy or move, right-drag. You'll get a pop-up menu of options. –L. S.



ORGANIZE YOUR HARD DISK so it's convenient for you, not for your applications.

have a folder for each article. I've also got folders in c:\Articles that don't fit into a particular magazine issue, such as Notes, Personnel, and the ever-popular Miscellaneous. You might prefer another approach, like organizing your files by client, project due date, or planet of origin.

Don't fret too much. If you find your organization method doesn't work, you can always create a few new subfolders and move your files around.

Applying Your Applications

For your arrangement to be truly convenient, your applications must accept c:\Data as the default data folder—when you launch an app, create a new file, and save it, the File•Save command should bring you into c:\Data. Applications all have their own ideas of where their files should go, and they're not always happy when you change that default location. (Keep in mind that these are the same programs that fill your Windows folder with pointless files and copy over essential ones.)

Microsoft could have defined a default data folder as part of Windows' configuration, but it didn't. It would sure be nice if every new application automatically saved to the same place.

The closest Windows comes to this idea is the 'Start in' property in every Shortcut, a carryover from the Working Directory option in Windows 3.1's Program Manager. And that's the first place you should go when you need to teach an application where to save its files: Right-click the Shortcut that launches the app, and select *Properties*. Click the *Shortcut* tab. Go to the 'Start in' field and enter **c:\Data** (or whatever), and click *OK* (see "The Long and Short of Shortcuts" for more on this type of thing). In theory, your application will always open in that folder when you launch it with the Shortcut. In theory.

But unfortunately, many applications—including those in the Windows 95 versions of Microsoft Office and Lotus SmartSuite—ignore the 'Start in' field and save files to their own default folders. Then it's up to you to go into the programs and look for an option that lets you change this default.

Curiously, Microsoft came up with a great way to organize your files, but put it in Office instead of Windows where it belongs. The Microsoft Office 95 installation program puts a folder on your hard disk called c:\My Documents, and the Office applications open in that folder. This is great if you don't already have a special place for your data. If you do, too bad—Windows won't let you delete 'My Documents'.

Luckily, you can rename 'My Documents' to make the folder seem a little less possessive and a little more personal. After I discovered that I was stuck with 'My Documents', and after I finished cursing every programmer in Redmond, I moved everything from my original data folder, c:\Articles, into this unwanted intrusion. Then I deleted the empty c:\Articles. Finally, I renamed 'My Documents' as 'Articles'. And voilà—everything was in c:\Articles again. My new Office applications see the folder they were designed to be loyal to (they don't care about the name; they recognize the old 'My Documents' from something in the Registry), while my old apps find what they think is the original Articles branch.

The problem with Office's solution is that it's part of Office, not Windows, and non-Office programs don't use it. Even other Microsoft applications, such as Publisher 95, don't know about this special folder.

And Lotus SmartSuite isn't even aware of the concept. When you install SmartSuite, your 1-2-3 worksheets go into c:\lotus\work\1-2-3, your WordPro files into c:\

7 The 7 Habits of Highly Effective (Windows 95) People

How effective are you? If your performance ranks lower than that of a 386DX with 4MB of RAM running Windows 95 (which, according to Microsoft, is a feasible configuration), you need to take a long, hard look at your work habits. Start with a self-help book. I'm still waiting for *Women Who Love Windows and the Windows That Crash on Them*, but for this article I studied *The 7 Habits of Highly Effective People*, a pop-psychology book that has supposedly converted everyday slobs into captains of industry and author Stephen R. Covey into a wealthy man. Proof of the book's popularity is the abridged electronic version included with Microsoft's Schedule+ 95.

According to Covey, mastery of your own fate lies in a few simple maxims: "Be proactive," for instance, and "Put first things first." Turns out, same thing applies to Windows users. There are three kinds of users: Two, the procrastinating slobs and the obsessive organizational freaks, make up the ineffective ends of the spectrum. Somewhere in the middle, the effective users lurk. You know the type: They're the ones who get the job done better and faster. So can you, if you follow our Stephen Covey–inspired 7-Habit guide. After all, according to Covey, PC stands for Production Capability. Practice these habits, and you'll be on your way to achieving higher spheres. Or at least an aspirin-free workday.

1 Habit 1: Be Proactive

Much as you may delight in troubleshooting and solving system problems, if you spend more than an hour a month playing doctor with your system, you're doing something wrong. "Act or be acted upon," says Covey. What does this mean to you? The disasters–data loss and breakdowns (systems as well as nerves)–can be prevented if you remember that paranoia is the best medicine. Get your hands on an antivirus program and have it run at startup and as a memory-resident program. Three excellent options are Symantec's Norton AntiVirus, McAfee's VirusScan, and S&S International's Dr. Solomon's Anti-Virus Toolkit for Windows 95. But don't stop there. Download monthly upgrades from your antivirus vendor's home page, and never trust any file, whether it comes from a CD-ROM with clouds on the label or from your mother via e-mail. Next, install Symantec's Norton Utilities, clearly the best collection of diagnostic

lotus\work\wordpro, and so on. You can change the 'Start in' settings for each of your Lotus Shortcuts, but you might as well click your heels together three times and say "There's no place like c:\Data"—Lotus isn't going to hear you either way.

How do you change your default data folder in the SmartSuite applications? Select *File • User Setup • WordPro Preferences* (or *Freelance Preferences*, or *Approach Preferences*, or what have you). The resulting dialog box varies from app to app, but the Preferences dialog box always gives you a way to change your default directories. (In the current, 16-bit version of 1-2-3 that ships with SmartSuite, User Setup is in the Tools rather than the File menu. This will change in the 32-bit version, which IBM/Lotus promises to ship in June.)

What about non-Office and non-SmartSuite apps? (Remember those?) If changing the 'Start in' field doesn't work, look through the program's menus for configuration options. You're bound to find something for the default folder or default directory.

When You're Not Anywhere at All

Ever want to keep the same file in two places at once? What if you want to organize your files by client *and* by project due date? Sure, you can copy the file, but that's hardly the same thing. Which file do you edit?

If you can't put a file in two places at once, you can at least put a Shortcut in one of those places. For instance, with your files already organized by client, you could create a folder called 'Due in May', and fill it with Shortcuts pointing to appropriate files. Such a folder could go in c:\Data, or you could put it directly on the Start menu or the desktop for easy access.

If you already know how to create a folder and put Shortcuts in it, skip to the next paragraph. Now that we've got a smaller class, here's how to create a folder called Top Priorities on your desktop: Right-click the desktop and select *New • Folder.* Type in the name **Top Priorities** and press **<Enter>**

Why You Still Need Norton

Windows 95 has changed many things, but not the reality that hard disks have moving parts. You may learn this fact of life the hard way when your disk goes down for the count, taking irreplaceable files along for the ride.

And don't think you can depend on your Windows 3.1 disk utilities to work safely (or at all) with Windows 95. They don't.

Win 95 comes with two disk utilities: ScanDisk, which diagnoses and repairs most disk problems, and Disk Defragmenter, which keeps your files from scattering their clusters all over the disk. And Symantec offers Norton Utilities for Windows 95, whose Disk Doctor and Speed Disk handle the same tasks.

The question is, Do you need to spend the extra money for the Norton tools when perfectly good equivalents are built right into Win 95? The answer: If you're smart, yes.

For starters, if there's any pair of applications that you *don't* want to crash in midoperation, it's your hard disk repair utility and file defragger. Who knows where your files will be by the time you reboot? Norton Utilities are true 32-bit applications, which makes them sturdier and less likely to crash than Microsoft's 16-bit equivalents.

A second plus for Norton: Both Speed Disk and Disk Doctor can be triggered automatically by Norton's memory-resident System Doctor, which looks for small problems and fixes them before they become big ones. Windows 95 has no equivalent capability.

Battle of the Defraggers

When it comes to the basics, there's not much to argue about. Norton and Windows 95 each hit all the marks: They search the hard disk for fragmented files and stick all the pieces together. They suck the free space from between the now-contiguous files and move it to the back of the disk. They offer all of the usual defragging options: files only, space only, files and space together. They check for disk errors before defragging. And although they both claim to run in the background while you write a report or polish a presentation, the reality isn't pretty. If an application writes to the disk while you're defragging, both defraggers start over from the beginning. Moreover, running a muscular program like a defragger in the background can have a molasses-like effect on whatever's in the foreground. My advice: Run these apps at night or over a lunch hour.

Beyond the Basics

Microsoft's defragger is adequate, but Symantec's goes well beyond that—and takes better advantage of Windows 95's new tricks. For instance, only Norton Speed Disk can use Win 95's new file-access–tracking system to automatically place files in their best location: frequently accessed files at the front of the disk, frequently changed files at the back (where they will cause less disk disruption). In addition, Norton Utilities' defragger verifies that it's rewriting your data correctly.

Finally, a minor point that makes a pleasant difference: Norton Speed Disk shows you a handy thumbnail map of the entire drive while it defrags, giving you the big picture at a glance—including how much free space you have left. Microsoft's Disk Defragmenter forces you to scroll down through its drive map, hiding the overall perspective.

In short, the only advantage I can see to Microsoft's Disk Defragger is that you don't have to pay for it.

An Ounce of Prevention and a Pound of Cure

Even well-defragged hard disks can become discombobulated: a Windows crash trashes the File Allocation Table; a power spike rewrites the boot sector; phased tachyon parti-

twice—once to finish naming the folder, and once to open it. Launch Explorer, go to your data folder, and look for top-priority files. When you find one, right-drag it into Top Priorities, selecting *Create Shortcut(s) Here* when asked. Finally, edit the file name to get rid of the words 'Shortcut to'.

Of course, you'll have to constantly maintain and update that folder full of Shortcuts, removing old ones and adding new ones. But what's life without its little annoyances?

When you create a Shortcut to a folder, you have to ask yourself whether you want the result to appear in a regular folder window or in Explorer, with its scrollable view of your drive and folder structure next to the file list—an easy tool for navigating folders. If you want easy access to the files in a [illegible] a regular window is fine. But if you want easy access to other *folders* within that folder, as you might with c:\Data itself, bringing it up in Explorer is a lot easier.

To create a Shortcut to a regular window, simply right-drag the folder to your destination, select *Create Shortcut(s) Here*, and remove the stupid 'Shortcut to' from the folder's name. To make that Shortcut launch Explorer, right-click it and select *Properties*. Click the *Shortcut* tab. Press **<Home>** to get to the beginning of the Target field, and enter **explorer /n,/e,** in front of the text that's already there. Click *OK*.

cles from the Q Dimension derange your partition table.

When it comes to protecting yourself from common catastrophes, there's not much of a difference between Norton Disk Doctor and Microsoft's ScanDisk. As the Cajuns say, you won't go hungry from either pot.

Both of these products are painless to use. They can find and repair lost clusters, fix problems in the FAT, look over the file system, and scan the hard disk's surface to lock out damaged sectors. In stickier scenarios, both utilities attempt to untangle cross-linked files. And both are comfortable dealing with DoubleSpace or DriveSpace compressed drives.

But if you're unlucky enough to run into uglier types of disk disasters, Norton Disk Doctor gives you functions that Microsoft's ScanDisk doesn't bother with: It can repair boot-record problems; it patches up an ailing partition table; and if it finds two cross-linked files, it can rectify both of them (ScanDisk fixes only one).

And if you care about such things, Norton Disk Doctor gives you a spiffy drive map to watch while it does its thing. Microsoft's ScanDisk merely shows you a boring old number that increases as the utility rolls along. Be still, my racing heart.

Microsoft's ScanDisk does take home one medal, though: Its surface-testing routine includes a write-testing option, which puts the hard disk under serious duress; Norton Disk Doctor employs only read-testing, which isn't as revealing.

NORTON DISK DOCTOR not only keeps your drive in good repair, it does so with cute animation.

Even so, this contest is another runaway victory for Norton. Especially since Norton owners can still use ScanDisk.

Cheap Insurance

Many people will never run into disk problems that Win 95's built-in utilities can't fix—but for us unlucky ones, Norton Utilities for Windows 95 is a lifesaver. At $119, the Norton package is every bit as important as a spare tire in the trunk. —*Michael Goodwin*

• Norton Utilities for Windows 95
floppy disks $119 (street), CD-ROM $129 (street), upgrade $59 (list); Symantec Corp.; 800/441-7234, 541/334-6054
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Reader service no. 743
AScan street price $50; McAfee
http://www.mcafee.com/ (trial version)

Habit 2: End in Mind

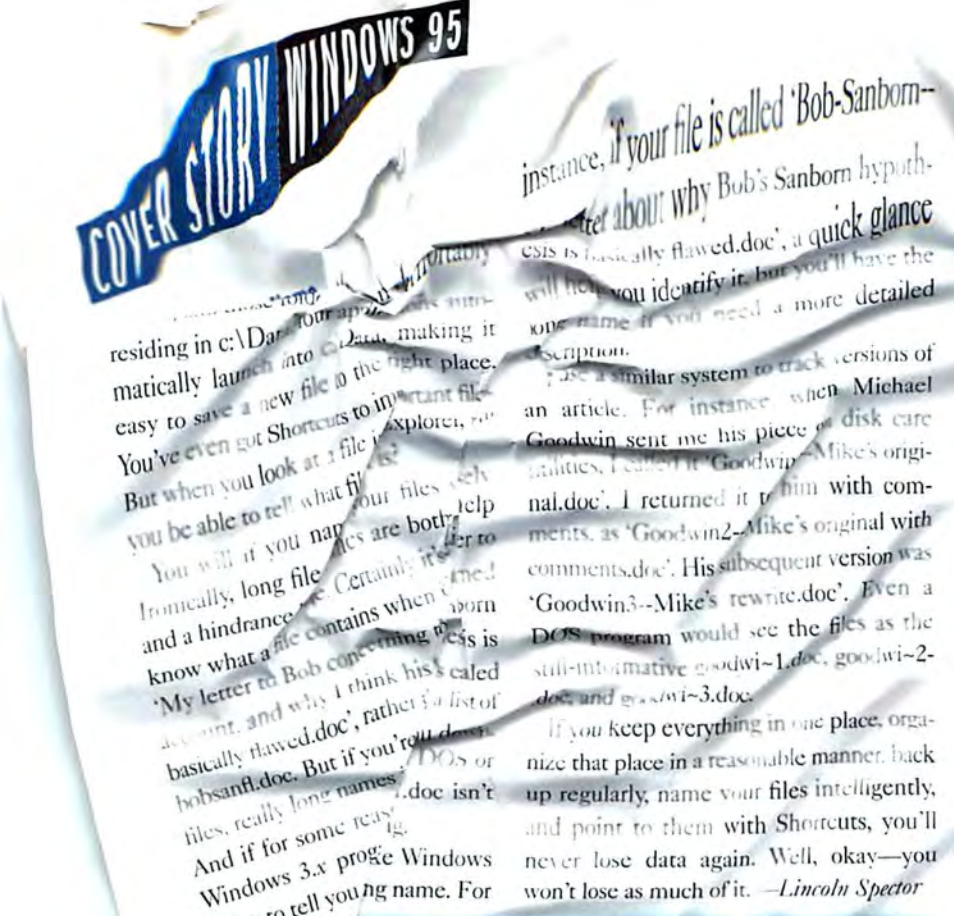
Applications
documents; it's
matter. So think
can save hours eve to create
cations and then open that
instead, double-click t you
document and associate
And keep associating your
sions (in Explorer select Vie
the *File Types* tab, then the Ne
Then add your most commonly
tions to your Send To menu, for
whose extensions you don't want to
(see the "Quick Peek" section in the m
cle for instructions). Save documents you
often (or at least their Shortcuts) to your d
top. Your desktop also needs a Shortcut to you
printer(s), so you can print by dragging documents to that icon (files must be associated, though). And always launch recently-edited documents from the Start • Documents menu.

One last thing: Don't settle for the watered-down Quick View that comes with Windows 95. Buy the full-blown Quick View Plus, which supports many more viewers and even lets you view the contents of embedded OLE objects.

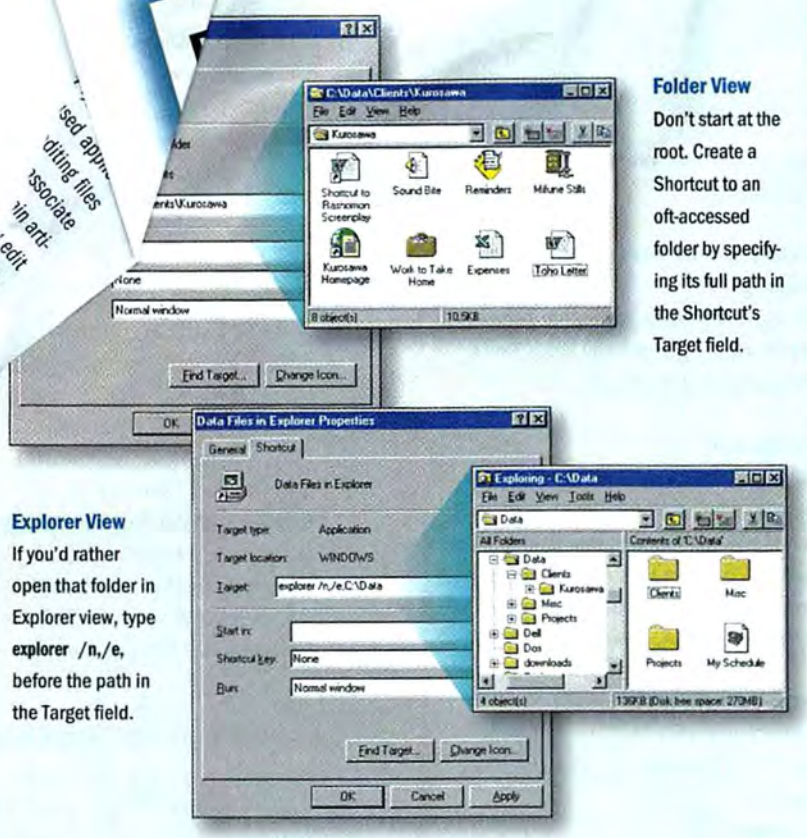
• **Quick View Plus** street price $49; Inso Corp.; 800/333-1395 **Reader service no. 745**

Habit 3: Put First Things First

The Startup folder is a great time-and-effort saver, but it has one annoying quirk: Programs in that folder get launched according to an arbitrary sort order, and there's no way to specify



Explorer: It's Your Call



Folder View
Don't start at the root. Create a Shortcut to an oft-accessed folder by specifying its full path in the Shortcut's Target field.

Explorer View
If you'd rather open that folder in Explorer view, type **explorer /n,/e,** before the path in the Target field.

that you want one program to load before another. There is a solution, though. Windows 95 lets you launch any application from the command line, so use Notepad or any other text editor to create a batch file that loads those applications in the right order, and save it in any folder. Next, create a Shortcut to that batch file and place it in the Startup group. To ensure that the DOS window closes after the batch file has run, right-click the Shortcut, select *Properties*, and click the *Program* tab. Check the *Close on exit* option, and you're done.

For your most-frequently accessed applications, download Tray (free) or TrayIcon (shareware) from PCW Online's various sites. Both let you anchor a Shortcut to the Taskbar for a single-click launch.

4 Habit 4: Think Win-Win

Win-Win, says Covey, is a belief in a third alternative; it's not your way or my way, it's a better way, one that exercises your options. And the command-line interface is an oft-overlooked option to the brave new GUI world. Cute icons and drag-till-you-drop don't mean that you can't or shouldn't use the command line. That warm and fuzzy DOS prompt is, after all, still there, and sometimes it's your fastest route. Just select *Start • Run* (better yet, press **<Ctrl>-<Esc>**, then hit **R**) and type your command. Want to launch Word and don't feel like looking for it on the desktop or in the Start menu? As long as it's in your path, type **winword** and it launches. Even better, just type a document's file name, and the appropriate application launches, opening that file (provided the document resides in a folder that's in your path). Same goes for Internet cruising. If you use the Microsoft Internet Explorer, type a URL in Run's Open box, and your Web browser launches, taking you there. In short, think Win-DOS.

5 Habit 5: Seek First to Understand, Then to Be Understood

Sure, Windows 95 is the most user-friendly OS you've ever used, but compared with DOS or Windows 3.x, that doesn't say much. There's still plenty of room for improvement, and lots to learn. So invest some time learning about Win 95 and the way it interacts with your hardware, your applications, and your data. If you don't, you'll have to rely on technical support people, and some of them take two days to return an

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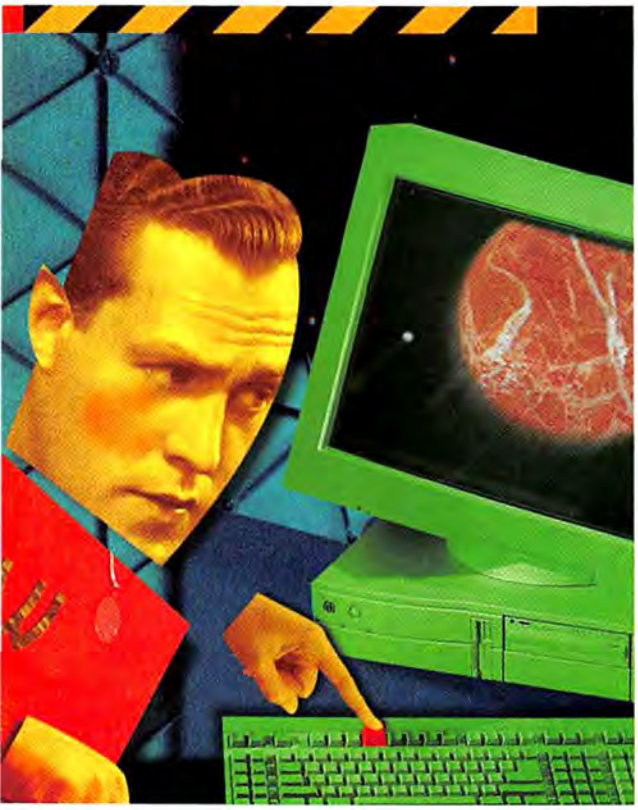
The Long and Short of Shortcuts



When you launch a program in Windows 95, you probably do it with a *Shortcut*—a little file that points to something else, usually an executable program file, although it can also point to a data file or folder. When an installation program adds an icon to the Start•Programs submenu, what it's actually putting there is a Shortcut.

But where's the best place for that Shortcut? On the desktop? The Start menu? One of the Start menu's submenus? Your c:\Windows\System\Iosubsys folder? (Well, not there, actually.)

The Start Menu

Installation programs almost always put Shortcuts into Start•Programs, a submenu of the Start menu. This isn't a bad place—you always know where to look—but it's inconvenient for programs you use all the time, and it can get crowded fast. If you put too many options on a menu, it becomes difficult to read and to navigate with your mouse. The simple fix is to add a submenu and move some of the lesser-used Shortcuts there.

Put Shortcuts to the programs you use the most in a place you can get to quickly—directly on the Start menu itself. Shortcuts to programs you use less often can go on a submenu, and those to programs you almost never use can get stashed in a dark recess somewhere—a submenu of a submenu. (It's remarkably easy to create a Shortcut directly on the Start menu, by the way. Just drag the file you want the Shortcut to point to onto the Start menu. Windows creates a Shortcut automatically.)

But the Start menu grows every time you add an option directly to it. If it gets too tall, use smaller icons: Right-click a blank spot on the Taskbar and select *Properties*. On the *Taskbar Options* sheet, check the *Show small icons in Start menu* option, then click *OK*. You'll now be able to fit more options on the menu.

Since Shortcuts are files and the submenus are folders, the easiest way to move them is with Explorer. Right-click the *Start* button, select *Explore*, and away you go. Windows does have a dialog box for adding and removing Shortcuts from the Start menu's submenus—right-click a blank space on the Taskbar, select *Properties*, and click the *Start Menu Programs* tab—but its abilities are annoyingly limited. You can't move or otherwise alter an existing Shortcut through this dialog box.

Icons on the Desktop

Launching a program from a desktop icon is simpler and faster than clicking the Start button and navigating a set of cascading

emergency call. Here's a great way to start: Put a Shortcut to the Windows 95 Resource Kit on your desktop, and spend 20 minutes every day browsing its electronic pages. This is one of the most comprehensive resources around, and it's free. Copy it from the Win 95 CD, in the *Admin\Reskit* folder, or download it from **http://www.microsoft.com/windows/software/reskit.htm.** It may not be as entertaining, as, say, your IS department's instruction sheet ("Do not call between 10 and 4 on Monday, Wednesday, and Friday; when in doubt, turn the system off and wait for a technician"), but it'll do.

Habit 6: Synergize

Windows 95 makes it fairly easy for mere mortals to network with their peers. Once you've recovered from the NETBEUI, IPX/SPX, TCP/IP, DNS mumbo jumbo (see Habit 5 for more information), the rest is a piece of cake.

Yeah, right.

For many users, a network is a pricey, complex solution that presents few advantages. If you need to share resources (CD-ROM drive, printer, hard disk) between two systems that you're using yourself–such as a notebook and a desktop–the free applet Direct Cable Connections can give you just the network functionality you need, without requiring any additional cost or technical savvy. The only thing you need to invest in is a parallel or null modem serial cable, and these sell for about $20 in any computer store. The guest/host paradigm of DCC lets you use both systems as one, from a single keyboard. You can even map the host system as just one more drive on the guest. A caveat: The host cannot read the guest system, so this is a one-way network.

Habit 7: Sharpen the Saw

Use any sharp tool for a while, and it gets dull. This rule applies to your hard disk or, more to the point, to file management. Unfortunately, your file management tools haven't improved much in the last 15 years, because, contrary to popular belief, DOS is alive and well and living in your nightmares. One of its clunkiest features, still lurking under the pretty surface, is the File Allocation Table, single-handedly responsible for file fragmentation, which often results in slowdowns, even data loss. We can't say this often enough (in fact, we do, ad nauseam): Defrag, defrag, defrag. Enough said. –Yael Li-Ron

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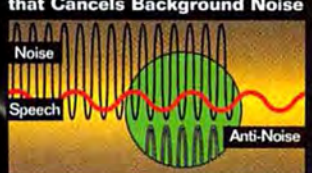

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menus—if there isn't anything in front of the icon. If something is obstructing it (most likely a window), you've got an annoyance. If you have a lot of windows open, you'll have to minimize them all by right-clicking the Taskbar and selecting *Minimize All Windows*. If most of your desktop is covered up when you work, you should probably keep your Shortcuts on the Start menu.

But if part of your desktop is often peeking through, you've got yourself a convenient place to put some of your most frequently used Shortcuts. This is especially useful if you've got children: Large desktop icons are a major convenience for people who have not yet learned to read.

Shortcuts on the desktop also provide you with one option that simply doesn't exist in the Start menu: dragging a data file to an application shortcut, thereby launching the program and file together. For instance, suppose you want to load a .txt file into WinWord. Double-clicking the file loads it into Notepad. Launching WinWord from the Start menu and then dragging the file to the running program is a two-step process. But if there's a WinWord icon on the desktop, you can simply drag the file there.

One last suggestion about the desktop: Even if you don't use it for anything else, the desktop is a great place for temporary storage. If I want a file to be handy for a little while, I drag it onto the desktop or create a Shortcut there.

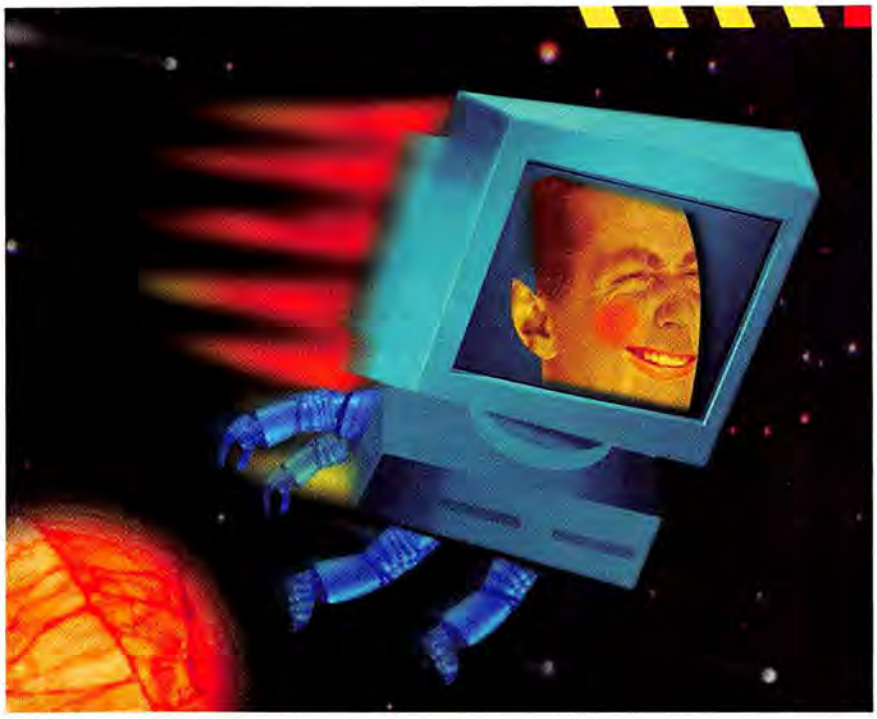
Hot Keys

What's faster than navigating the Start menu or double-clicking a desktop icon? Pressing a key combination. You can assign a *hot key* to any Shortcut on the desktop or Start menu's Program submenu to launch a program without even touching the mouse.

How do you assign a hot key? Right-click a Shortcut and select *Properties*. Click inside the 'Shortcut key' field and press the key combination you want. Windows doesn't let you pick a combination that's likely to be used elsewhere. Nor does Windows accept a combination you've already assigned. (It doesn't tell you what you're doing wrong, mind you; it simply refuses to respond.)

Find what works for you and don't worry too much about it. Microsoft didn't call them Shortcuts so you could spend hours fidgeting with them. —*Lincoln Spector*

Break the 95 Speed Limit



So you have a new Pentium with a graphics adapter that's reaching the speed of light and a hard disk that reads your mind. Congratulations. But don't let these expensive features lull you into thinking that your system is going as fast as it can. As you'll see, there's plenty of software tweaking you can (and should) do to improve upon even the fastest system money can buy.

The Swap File's Yo-Yo Diet

One way Windows manages to multitask so efficiently is by relying on virtual memory—a clever trick using a dynamic swap file, which increases the available RAM by swapping parts of it to the hard disk. This file shrinks and grows according to usage—the more you do, the larger it gets. So it stands to reason that the more heavy-duty multitasking you do, the more hard disk space should be available. If the swap file doesn't have sufficient room to grow, you're risking slowdowns and crashes. In addition, because the print manager spools print jobs via the hard disk, insufficient disk space can result in failed print jobs and the cryptic 'Insufficient memory' error message.

To prevent these scenarios, leave yourself at least twice as much hard disk space as the amount of your installed RAM—more, if you can spare it. And defrag often, to avoid sluggish performance (the swap file is, after all, disk-based).

Another option is to place the swap file on a different drive or partition, where there's plenty of room to spare and no major fragmentation-inducing activity. Right-click *My Computer* and select *Properties*. Click the *Performance* tab, then the *Virtual Memory* button. Click *Let me specify my own virtual memory settings*, select your preferred drive from the *Hard disk* list, then exit and restart Windows. Warning: Unless you're absolutely sure you know what you're doing, don't set a fixed size for the swap file. Keep it dynamic and let Windows manage it.

Tweaking Authority

Windows 95 does a pretty good job of configuring itself for your hardware, but it never hurts to double-check its settings. Right-

Drivers' Ed

CHAPTER 6:

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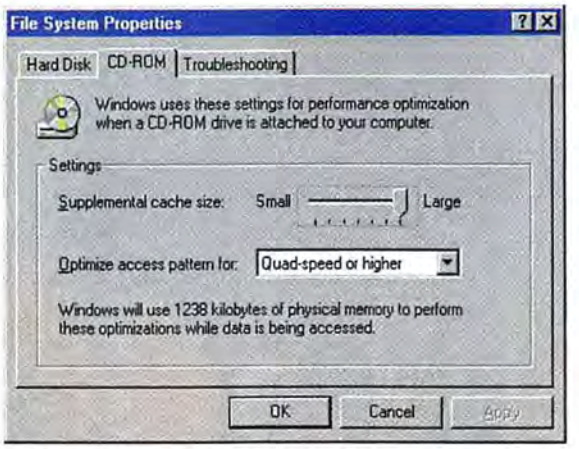
click *My Computer* and select *Properties*. Click the *Performance* tab, then the *File System* button.

In the File System Properties dialog box, click the *CD-ROM* tab first, and check the settings: Windows 95 doesn't always identify your CD-ROM drive's speed correctly. If your drive performs at the high end of its class, you'll get better performance by choosing a faster drive setting from the *Optimize access pattern for* list.



A 4X CD-ROM DRIVE is only as fast as Windows thinks it is. You may need to identify its speed for optimal performance.

While you're in this dialog box, click the *Hard Disk* tab and make sure the configuration shown suits your computer's role—desktop, server, or portable—especially memory caching. A notebook allocates the least memory to caching, a server uses as much as possible, and a desktop system falls somewhere in between. The larger your cache, the better the performance, but most notebooks and desktops just can't spare the necessary memory.

Cache and Save

If your CD-ROM drive doesn't play multimedia files as fast as you think it should, you may need to optimize its cache settings. Right-click *My Computer*, select *Properties*, then click the *Performance* tab. Now click the *File System* button, then the *CD-ROM* tab. Drag the *Supplemental cache size* slider all the way to the right to optimize the settings for large .avi or .wav files.

Preempt Cooperative Multitasking

Windows 95 multitasks 32-bit applications preemptively, controlling which app gets the processor's attention. The 16-bit apps, however, get multitasked cooperatively, so they decide themselves when to relinquish their hold on the CPU—and they're not always polite about it. So if you have a 16-bit app that spends a lot of time accessing hardware (such as a fax program), consider upgrading to its 32-bit version.

Keep Networking to a Minimum

Networking can slow you down, especially if you have unnecessary protocols and services running. For example, the Setup Wizard installs NetWare IPX drivers whether you are on a NetWare LAN or not. To remove unwanted protocols and services, right-click *Network Neighborhood* and choose *Properties*. Select the unwanted protocol or service from the top of the dialog box, and click *Remove*. Warning: Do not attempt this unless you absolutely know what you're doing, or you may lose settings that are hard to re-create.

Likewise, sharing your printers and files takes up valuable memory. If no one needs

Utility Free-for-All

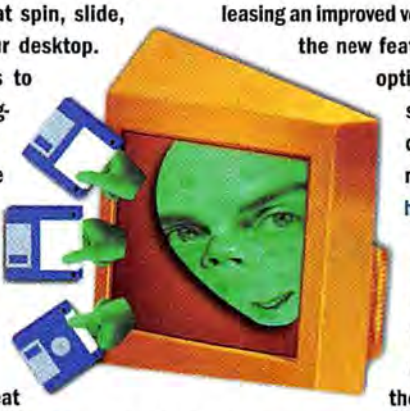
There's no such thing as a free lunch, but there *is* plenty of free software if you know where to look. We set out on the infobahn in search of the very best Windows 95 freeware, and while we didn't find any full-fledged applications gratis, we did manage to unearth some useful utilities and engaging toys. This is all genuine freeware—you won't be asked to pay a registration fee for any of it. And you can download any of these files from PC World Online.

Microsoft Power Toys

This is a collection of interface enhancements created by members of the Windows 95 development team. Among the goodies: a tool for eliminating the "Shortcut to" from Shortcut file names, an audio CDs applet, and a super-handy resolution changer. A new right-click menu item shows you the contents of a folder. Look for powertoy.exe on PC World Online.

Motion

Ready to add a little life to your desktop? Check out Motion, a collection of 44 animated cursors that spin, slide, and flash across your desktop. From whirling globes to blinking railroad signals to exploding dynamite, you're sure to find a cursor that will suit your craziest mood. The file name is motion.zip.



DOS Explore

This one's a special treat for command-line junkies. Tired of going through the Start menu, only to end up at the root? DOS Explore is the utility you've been waiting for. Right-clicking a folder lets you go to a DOS session in the same directory. Look for the file dosexp.zip.

HyperTerminal Private Edition

The communication applet that comes with Win 95 is not a Microsoft product (which becomes evident as soon as you launch it and see the Hilgraeve logo). Hilgraeve is now releasing an improved version, for free. Among the new features there's a redial option for busy numbers, support for Zmodem crash recovery and more. Look for the file htpe.exe.

Desktop Toilet

If you're bored with Windows 95's Recycle Bin, replace it with the Desktop Toilet and send your unwanted files down the drain. This amusing (if somewhat tasteless) freebie includes a .wav file for flushing noises, just to provide the right ambience and annoy your coworkers. No plunger required. If you want it, look for toilet.zip. *—Angela Freeman*

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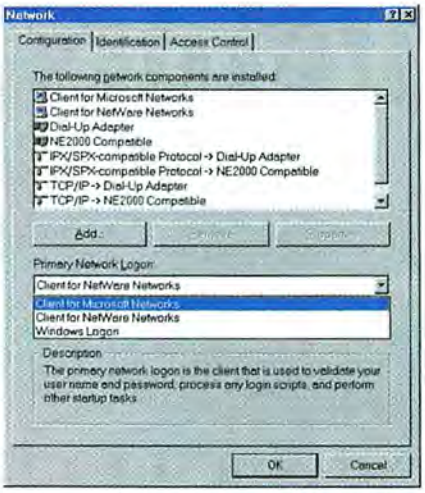
network access to your computer, click the *File and Print Sharing* button on the same sheet, uncheck those options in the resulting dialog box, and accept the changes. You'll be prompted to restart your system when you're done, because changes to the Registry (such as removing or adding drivers) don't take effect until you restart Windows.



TO ELIMINATE ONE LOG-ON DIALOG, select Windows Logon as your primary.

Turn Off Animation

If you don't have a fast video card, you can improve performance by shutting off the animation displayed when you minimize and maximize windows. This involves tweaking the Registry, so back up the Registry files, just in case: Copy all the .dat files from your Windows folder to a floppy disk. Then select *Start•Run*, type **regedit**, click *OK*, and go to the *HKEY_ CURRENT_USER\Control Panel\desktop\WindowMetrics* folder as if you were navigating Explorer. Right-click an empty area in the right-hand pane, and select *New•String Value*. Name the new object **MinAnimate**. Double-click the object, enter the value **0**. Exit RegEdit and restart Windows. Now you can maximize and minimize Windows snappily.

Daily Defrag Duty

You've heard it before and you'll hear it again: Badly fragmented hard disks are responsible for system slowdown and data loss. You know that you need to defragment your hard disk, but you probably have a dozen other tasks you've got to get to first.

You can automate the process so your hard disk gets a daily, weekly, or monthly tune-up. One method is to add a Shortcut to Defrag to Startup. This won't take long, because your hard disk gets only mildly (if at all) fragmented in one day.

To add Defrag to Startup, right-click the *Start* button, select *Open*, and open the *Programs* folder, then *Startup*. Right-click inside the window, select *New•Shortcut*, click the *Browse* button, and double-click *Defrag.exe* in the Windows folder. Now, add a space and the command-line switches **/all /u /nonprompt** to the end of the entry in the 'Command line' box and you're done.

Daily Defrag Plus

If you own Microsoft Plus, you can set System Agent to run Defrag when you're away from your system (for example, on Friday nights). Note that Defrag will stop and complain if it finds disk or file errors, so it's a good idea to run ScanDisk just before Defrag, either from a batch file or by setting the agent to run these programs in sequence.

Hit the Ground Running

If you're the only user of a system, there's no point in going through the log-on dialog box every time you boot up. For a standalone system, the solution is simple: Open *Control Panel*, double-click *Passwords*, click the *User Profiles* tab, and check the option *All users of this PC use the same preferences and desktop settings*. When you reboot, you'll go straight to your desktop.

If you're on a LAN, Windows expects you to go through two dialog boxes to log on—one for the network and one for the system. To eliminate one of these dialog boxes, open the *Network* applet in Control Panel, and set Primary Network Logon to *Windows Logon*. When you're prompted to restart the computer, click *No*. Open the *Passwords* applet in Control Panel, click the *Change Passwords* tab, click *Change Windows Password*, type your old password, and leave the New and Confirm fields blank.

Quick Peek

The Quick View option in Windows 95 is helpful when you need to examine the contents of a file quickly without launching its associated application. But what do you do if the file type is not associated? One simple solution is to view the file's binary content and hope it contains enough plain English to identify it. there's no need to invest in or learn a third party utility, because you already have a "utility" to do this: WordPad, the tiny word processor that comes with Win 95, lets you view the contents of just about any file (except executables and .dlls). So add WordPad to your Send To menu, and you can "send" any file to it for viewing. To modify the Send To menu, right-click *Start* and select *Open*. Open *Programs*, then *Accessories*. Right-click the *WordPad* Shortcut and select *Copy*. In the Windows folder, open the *Send To* folder. Right-click anywhere in that folder and select *Paste*.

The More RAM, the Better

Microsoft's claim that Win 95 needs 4MB of RAM (8MB recommended) is a bit, well, optimistic. We suggest a minimum of 8MB and recommend 16MB for best results. —*Scott Dunn, Yael Li-Ron, Scott Spanbauer*

Scott Dunn is a PC World *contributing editor and coauthor of* 101 Windows Tips and Tricks *(Peachpit Press, 1992, 800/283-9444). Angela Freeman is a* PC World *editorial researcher. Michael Goodwin is a frequent contributor to* PC World *and author of* Making Multimedia Work *(IDG Books Inc., 1995, 415/655-3000). Yael Li-Ron is a* PC World *senior associate editor and coauthor of* Windows 95: Making it Work for You *(ZD Press, 1995, 510/601-2077). Scott Spanbauer is a contributing editor for* PC World *and author of the* No BS Windows 95 Book *(No Starch Press, 1996, 800/420-7240). Lincoln Spector is a* PC World *senior associate editor.*

Online Resources

PC WORLD online **Can't figure out how to accomplish a task in Windows 95? Something not working right? Don't want to stay on hold for half an hour? No need to worry. We've compiled a list of the spots online for Windows 95 information. Point your browser to http://www.pcworld.com/apr96/win95resources or go to PC World Online's site on America Online, CompuServe, the Microsoft Network, or Prodigy.**

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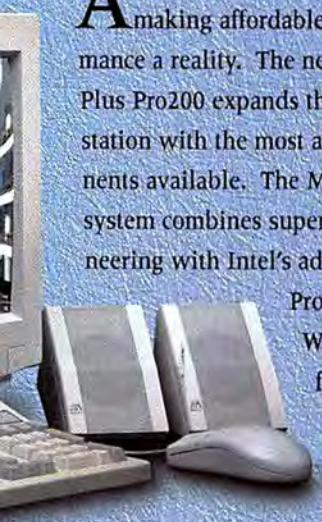

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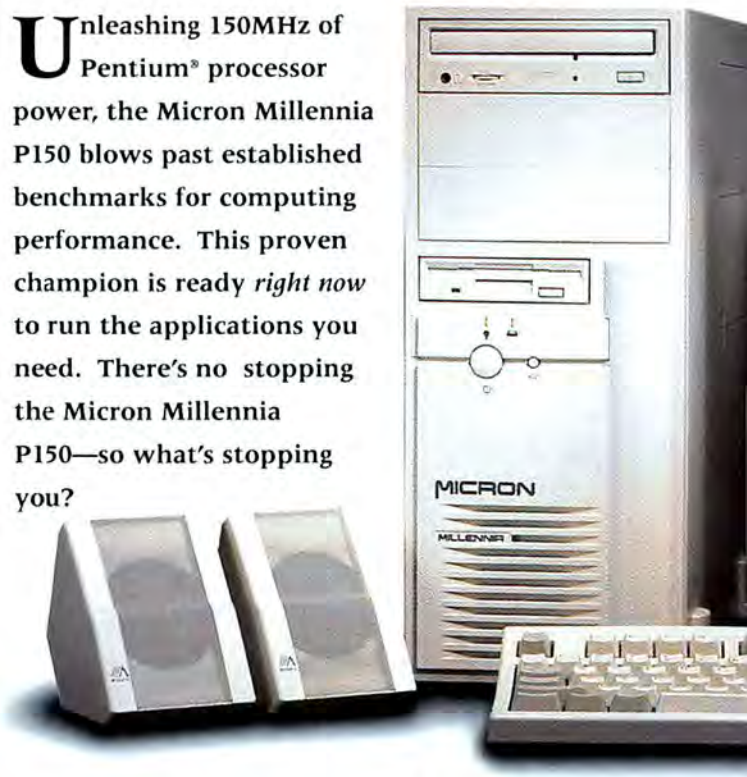

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PC MAGAZINE EDITORS' CHOICE
May 30, 1995
MILLENNIA P120

MVP PC Computing
December 1995
MILLENNIA P133

MILLENNIA

PC MAGAZINE BEST OF 1995

January 9, 1996
MILLENNIA

MILLENNIA PLUS P166

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- *Tool-free* mini-tower or desktop
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- Microsoft Windows 95 CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
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- Microsoft Works 95
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- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
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PC MAGAZINE EDITORS' CHOICE
May 16, 1995
HOME MPC P90

PC WORLD
July 1995
HOME MPC P90

HOME PRO MPC P150

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- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD & Microsoft Plus 95
- Microsoft Office 95 & Bookshelf 95 CDs
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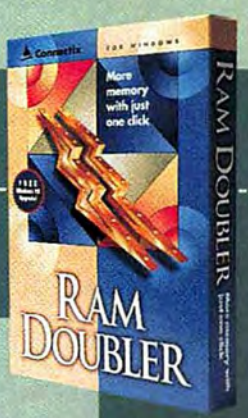

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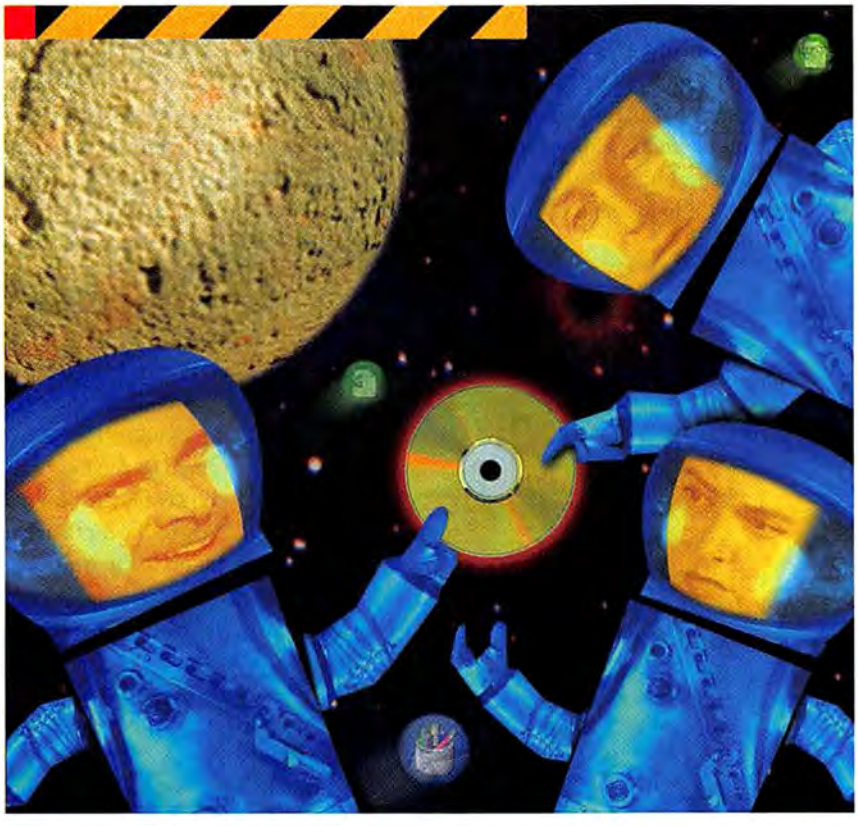
Close Encounters With Windows 95

BY YAEL LI-RON



GORDON STUDER

PC World readers who've explored the new operating system tell us what they like—and hate.

Changing your operating system can be as traumatic as moving to a new country. Things aren't where you're used to finding them, the locals have odd customs, and you're still looking for a decent cappuccino. But as long as your neighbors don't sic their rottweiler on your miniature schnauzer, and if you're lucky enough to catch the termites before they finish off the roof beams, you eventually settle in and lose your accent.

In the wake of Windows 95, we wanted to learn how *PC World* readers were adjusting. So we included a questionnaire in the January issue asking whether you'd taken the plunge and if you liked it. If you hadn't upgraded, we asked for your reasons. This fax-back survey generated about 5000 responses, some of which are detailed below. But beyond mere numbers, we were interested in your experiences—told in your own words—and there was plenty of colorful language.

The bottom line is, you like it. You really, really like it. But not everything went smoothly—far from it. Even the most experienced upgraders told us of installation problems, crashes, bugs, and incompatibilities. Yet despite the headaches, most Windows 95 users say they are satisfied with their new OS. And it doesn't matter how much RAM or how fast a CPU they have. In fact, there are some very happy 386/4MB users in the mix—proof positive that some people are still happy with reliable old WordPerfect 5.1. And who can blame them?

Still Happy After All These Problems

Headaches, schmedaches. The majority of users who experienced installation problems, crashes, or bugs say they're happy they upgraded to Windows 95.

Sixty-eight percent of our respondents have upgraded to Windows 95. That, by far, is the most stunning figure we've seen since we added up the bugs documented in *The Windows 95 Bug Collection* by Bruce Brown (Addison Wesley, 1996, 800/447-2226)—a whopping 1000 all told. But maybe we shouldn't have been surprised, since this is a survey of a very computer-savvy group. Also, this is not a random sample: Readers who had an interesting story to tell (in this case, the upgraders) were more likely to respond.

The first wave of people to embrace Windows 95 hit the retail stores, sweeping copies off the shelves. Toward the end of the year, more people began getting new systems with Windows 95 preinstalled. Even this form of upgrade presented a few difficulties. Mark Kazmer of Spearfish, South Dakota, runs a Radio Shack store. "Twenty percent of my customers have come back and asked to replace it with Windows 3.1," he told us in a phone interview.

About a quarter of the people who installed Windows 95 on their existing systems upgraded their hardware (RAM, hard disk, or both) first. Others went for a major computer face-lift, replacing enough of the old parts to cost them almost as much as a new system. Some users gave up on patching an old PC and bought a whole new one just to get the new operating system. "It would have been too much trouble to upgrade our old system," says Sandy Hall of Reno, Nevada, "so we decided to go the whole way and get 16MB of memory, 28.8 modem, the works. We bought a Compaq Presario with Windows 95 preinstalled."

Thirty-five percent of those who installed Windows 95 over an existing operating system report installation headaches. Curt Kauffman of New York was finally successful "after uninstalling and reinstalling turned into a trip through the Gates of Hell" (pun definitely intended). He spent hours on the phone with Microsoft tech support until his problems were resolved. Anthony Cicalese of Short Hills, New Jersey, says he finally installed Windows 95 after 30 or 40 attempts. "Microsoft released this thing *way* before they had it all figured out," he claims. "It's not compatible with anything except the generic system it was designed for. I'm happy with its operation, but not with its installation and support."

In Search of 32 Bits

The top reason for upgrading is cited as "To keep up with technology," and the second reason is "To run 32-bit applications." Unfortunately for the first wave of upgraders, in August 1995 there were very few true 32-bit applications on the market. So none of us would have been surprised if many August and September upgraders were disappointed. But as new 32-bit applications hit the market, many users report finding the value of running true 32-bit apps on a 32-bit operating system. Qi Li of Philadelphia says he's enjoying Windows 95's stability and reliability: "The really big plus is the 32-bit processing, which lets you do a lot of things at once, in a more reliable fashion." Ron Keller of San Jose, California, adds: "I've discovered that all the 16-bit stuff runs a bit slower, but the 32-bit stuff runs faster."

About two-thirds of those who have upgraded say they're using Win 95 at work; the rest use it at home. Based on the low number of those who say they're on a network, we're fairly confident that corporate users, traditionally cautious when it comes to upgrading operating systems, are not highly represented in our survey.

An employee of the federal government who requests anonymity has this to say: "We are very conservative, so we normally don't upgrade until six months or so after a new system has come out. We wait until all the bugs are gone. Right now, we have no concrete plans to upgrade. Maybe in the future."

Face to Face With the New OS

Since improved ease of use is touted as a Windows 95 hallmark, we wanted to hear what our readers had to say on the subject. Clearly

Windows by the Numbers

Percent of respondents who upgraded: **68**
Percent who upgraded from DOS or Windows 3.*x*: **94**
Percent who upgraded from OS/2: **3**
Percent who cited "other" OS: **1**
(Is CP/M still around?)

Percent of upgraders running 386s with 4MB or less: **3**

Percent of upgraders who reported installation problems: **35**
Percent of upgraders who uninstalled: **20**

Percent of upgraders who are glad they switched: **75**

Percent of upgraders who like the new interface: **27**
Percent who say it's worse: **2**

Percent of upgraders who use long file names: **33**
Percent who use it sometimes: **33**
Percent who still don't: **33**
(THEY'LL LRN)

Percent of respondents who haven't upgraded: **32**
Of those, percent who plan to: **51**

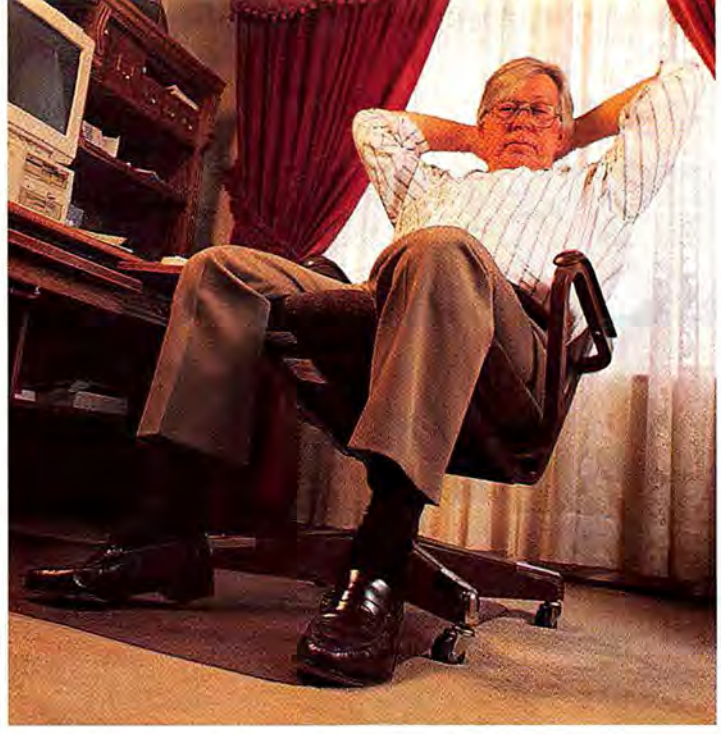
Percent of nonupgraders who distrust Microsoft: **24**

Percent of nonupgraders who say their hardware isn't powerful enough for Windows 95: **33**
Of those, percent who have a minimum of 486/8MB: **87**
(Must be holding out for a Cray.)

Percent of respondents who use desktop systems: **90**
Notebooks: **7**
Not sure: **3**
(Here's a clue: Does it hurt your shoulder?)

It took me about 40 hours to install, uninstall, and re-install Windows 95. I had to format my hard disk to make it work.

–Ron Keller, consultant



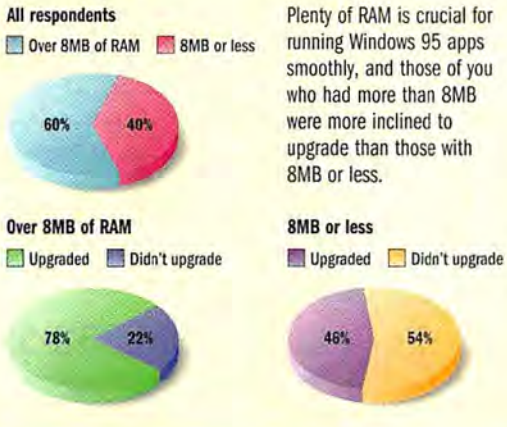
BOB HOLMGREN

there are mixed emotions. "I miss my .ini files," says Ari Knorr of Fort Lauderdale, Florida. A recurring complaint is that Explorer is not as intuitive or useful as the old File Manager. Several readers say they're using the 16-bit File Manager that comes with Windows 95. About a third report using long file names regularly; another third use them sometimes. The rest don't use them at all. We were intrigued by Kazmer's observation that "the long file name feature isn't readily evident" and similar statements by others. Obviously a new feature is valuable only if people know it's there and can figure out how to use it; the long file name option doesn't meet those criteria. On the other hand, Kazmer thinks the Start menu is "fantastic," as are AutoPlay and the easier installation and uninstallation of programs.

Just as we expected, experienced Windows 3.*x* users had as much trouble with Windows 95 as relative novices did. Unlearning old skills seems just as taxing as learning new ones. Hall, who describes herself as an intermediate-level user, recounts her struggles: "With Windows 3.1, I knew how to attach sounds to system events, but I seem to be able to do this with Win 95 only partially." Hall also admits she misses Program Manager. She'd like to pick custom icons instead of "boring manila folders."

Plenty of respondents have good things to say about the user interface, with 39 percent citing it as a prime reason for upgrading. Of the upgraders, 27 percent say they like the new interface, and 32 percent think it's easier to use than their previous OS. Kauffman never used Windows 3.1. "I hated it," he says. "I was a DOS user until I saw Windows 95. The new Explorer is terrific; the whole interface is slick."

Memory of Things Fast



Computing With Oven Mitts?

Nearly half of our respondents say their PCs are running faster since the upgrade; 14 percent say performance is slower. Most of those with better performance have 16MB of RAM or more, while half of those who complain about slowdowns have 8MB or less. As we've contended all along, Windows 95 likes its memory, and you're likely to be happier if you have at least 16MB installed.

Unlike RAM configuration, CPU type doesn't seem to make a difference. The satisfaction rate, as well as reports of installation problems, is no worse on a 486 than on a Pentium. "Overall," says Brad Lightle of Chesterfield, Missouri, "programs run a lot faster, and Win 95 has made me more effective." Mike Abelson of Pittsburgh disagrees. "It's like computing while wearing oven mitts." So, back to Windows 3.1, then? No way, says Abelson. "It enabled me to get on the Internet easily." He also likes the new Shortcuts, though they were "borrowed from the Mac."

Abelson echoes the sentiments of many upgraders: There are problems, but they'll keep it. They like the stability and speed, and once they get over the "unlearning" curve, they like the interface. "Committing to a new operating system is like a marriage," says one reader who requested anonymity. "You invest time and energy learning it, and you develop habits and routines. It's just too difficult to break up."

Top 10 Reasons for Upgrading

1.	To keep up with technology
2.	To run 32-bit applications
3.	Greater stability/crashproof
4.	Improved interface
5.	Faster performance
6.	Long file names
7.	Preemptive multitasking
8.	Plug and Play
9.	Improved multimedia
10.	Good reviews in the press

Yael Li-Ron is a senior associate editor for PC World. *Assistant Editor Aoife McEvoy also contributed to this article.* *See page 14 for contact information.*

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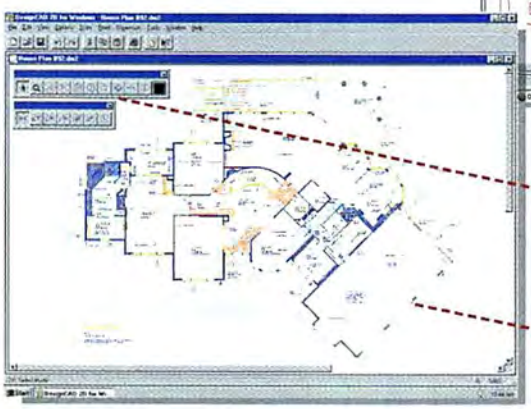

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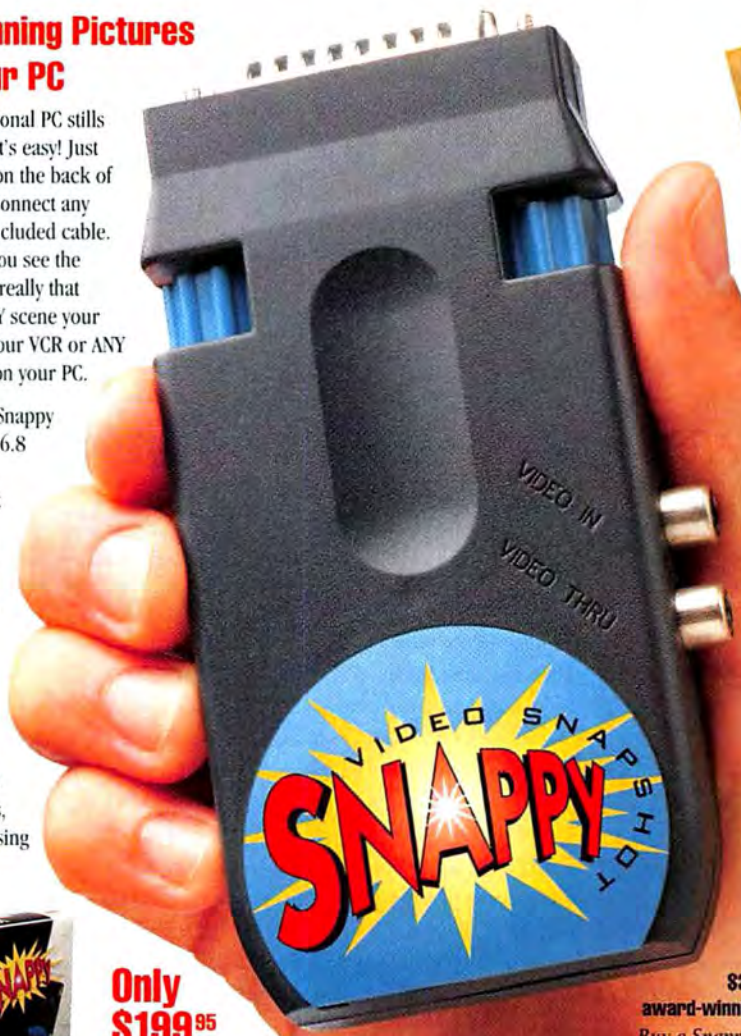

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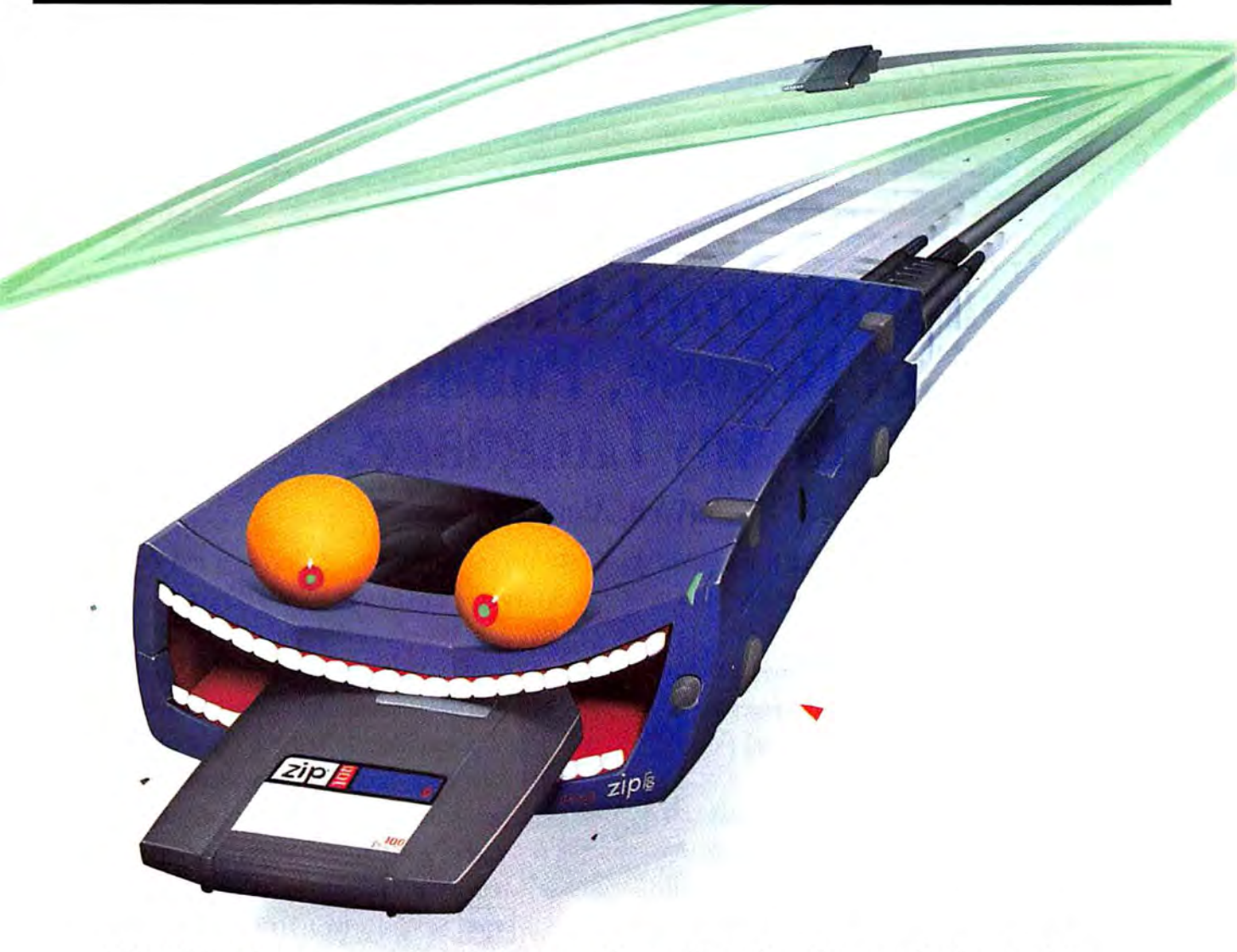

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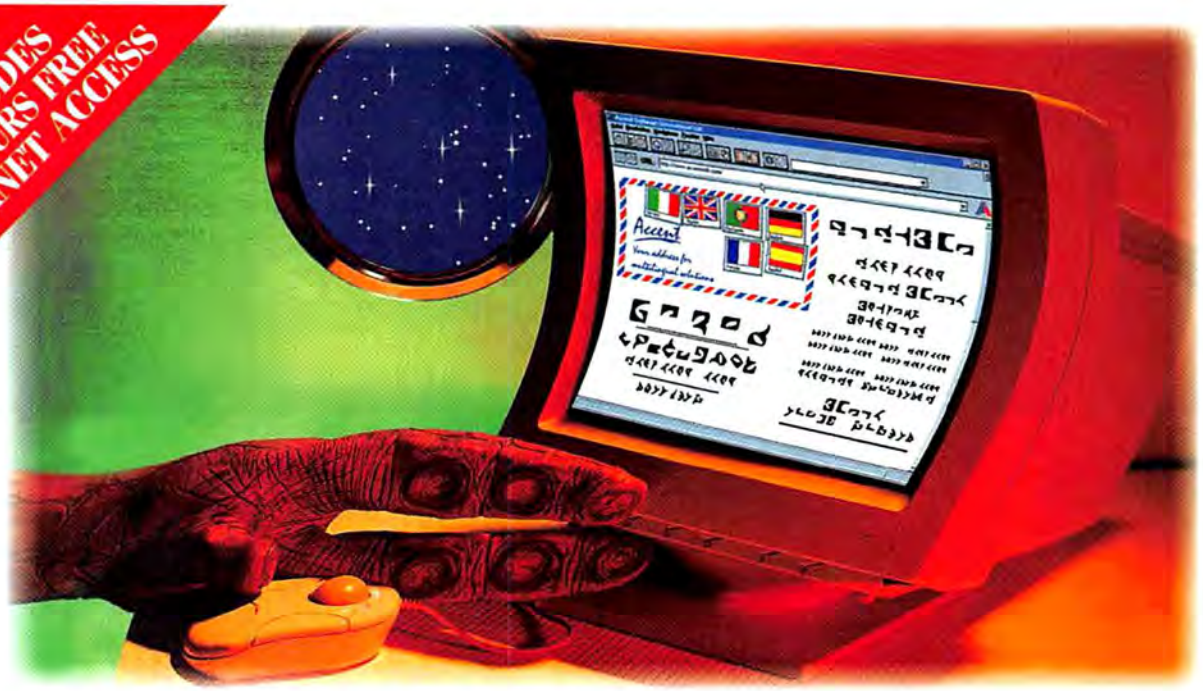

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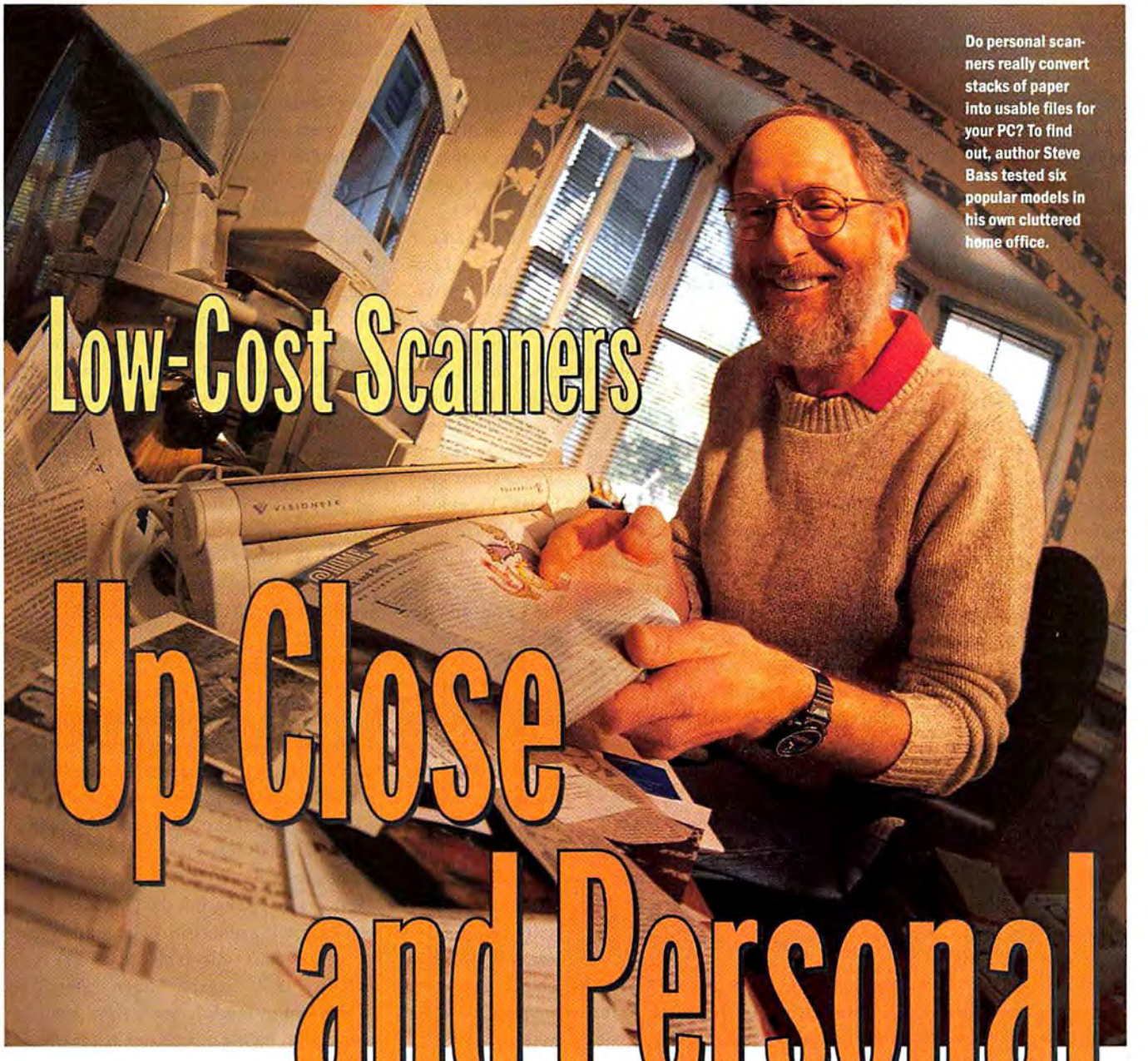


Do personal scanners really convert stacks of paper into usable files for your PC? To find out, author Steve Bass tested six popular models in his own cluttered home office.

Low-Cost Scanners Up Close and Personal

The latest personal scanners are small, cheap, and easy to use. But can they really clear off those messy desks? Our reviewer tried out six models–two did the job.

By Steve Bass

Okay, I know the dilemma. You've toyed with the idea of buying a scanner, but they take up lots of room, installation can turn your hair gray, and a decent one will set you back an arm and a leg. Besides, you don't really need one, right?

Don't be too sure. There's a whole new breed of "personal" sheetfed scanners on the market—easy-to-use units that are less expensive, smaller, and simpler to set up than flatbed scanners. Question is, do these pint-size devices work as promised?

I had my doubts, but after using six of these small scanners in my home office for a month, I'm a convert. Although my office didn't turn paperless, I liked how I could quickly scan text or photographs from within the business software programs I regularly use, then use optical character recognition to turn my paper documents into editable files. And because they work with printers and your computer's fax-modem, these scanners make pretty good stand-ins for full-fledged copiers and fax machines. For example, to copy a letter, just feed the paper into the scanner, then click the copier icon. The page is scanned and sent directly to your printer. For sending faxes, most

personal scanners assume you are using your fax-modem's software or Windows 95's Microsoft Fax. Just feed in the paper, click a fax icon, and the document is sent to your modem software. It's as simple as that.

I had more success with some scanners than others, particularly with setup, and none performed perfectly. Text scan quality was uniformly good, but gray-scale quality varied. Speed was acceptable. But optical character recognition was disappointing; the scaled-down OCR packages that ship with these scanners read my single-column pages fairly well, but half of the scanners I tested balked at multicolumn newspaper and magazine articles, resulting in way too many spelling errors. In the final analysis, Logitech's PageScan Color (the only color personal scanner currently available) and Visioneer's quick PaperPort Vx emerged as Best Buys for their superior features and ease of use.

Best Buys

Looking for a scanner that not only handles color but also carefully reproduces pages from bound documents? Logitech's $399 PageScan Color stands head and shoulders above the crowd with 24-bit color and a design that lets you use it as a detachable handheld device.

It was a tight race between Visioneer's PaperPort Vx and Umax's PageOffice. Both are $299. The Umax is a good scanner, but it's harder to install. The Visioneer's easier setup, quicker scan times, smaller footprint, sophisticated business software tools, and straightforward interface earn it our Best Buy.

Flatbed or Personal?

Some color flatbed scanners now cost about the same as personal models. Why not buy a flatbed? Unless you need high-quality graphics, a smaller, simpler personal scanner may suit you better. Personal scanners are great for business and home-office users who need a convenient way to convert important paperwork to PC files that can be used with other applications. All the software bundles I looked at let you add icons for popular business programs—such as Word, Excel, and cc:Mail—for easily importing and routing scanned items. Most of these devices also include copier, OCR, and document management software.

Color flatbed scanners, which can cost over $1000, have most of these tools and can scan at higher resolutions—up to 1600 dpi, compared to 400 dpi for personal scanners. To attract graphics professionals, these scanners bundle color calibration and image editing software such as Adobe Photoshop. If you work with high-resolution graphics, you're better off with a low-end color flatbed scanner starting in the $450 range. But for tidying up your office, managing documents, or copying a few articles, a low-cost personal scanner may fit the bill.

I looked at Delrina's WinFax Scanner, Epson's Personal Document Station, Logitech's PageScan Color, Microtek's PageWiz, Umax's PageOffice, and Visioneer's PaperPort Vx. Each of these scanners supports the TWAIN standard, and most of them plug into a parallel port, or serial port in the Visioneer's case. Only Umax's PageOffice needs a SCSI interface card. All of the scanners except for the Epson and the Visioneer include a pass-through device—a gift from the computer gods—that allowed my Hewlett-Packard printer's bidirectional skills to work unhindered, giving me status reports on each print job. I simply plugged a scanner's cable into my PC and my printer cable into the back of the scanner. Just remember, turn the scanner on first to use the printer.

How I Tested Scanners

To test these devices, I scanned 14 typical office documents: a dog-eared press release, two 11-by-17-inch legal pages filled with congressional gobbledygook, two wallet-worn business cards, three *PC World* articles, four odd-size *Wall Street Journal* clippings, and two photos, color and black-and-white. I used two 486DX-100 PCs with 16MB of RAM as my test beds. One ran Windows 95, the other ran Windows for Workgroups. For each scanning task, I set the resolution to the highest dots per inch recommended.

At the top of my list was ease of use. No matter how appealing a personal scanner initially is, if it gives you trouble it can easily become a pricey dust-gatherer. Most of these scanners were faithful servants, but none were perfect. I recorded how fast each scanned and noted whether they could perform in the background. On the software side, I checked out setup and interfaces. With few external controls, these personal scanners rely heavily on user interfaces that integrate image acquisition, OCR, and document management capabilities. With some models, such as the Logitech, simply feeding in paper calls up the scanner's software. Visioneer got brownie points for locating and adding icons for my installed word processing, spreadsheet, and e-mail programs. Others either defaulted to Write or Microsoft Fax or asked me to add icons for the programs I already use. To judge test scan quality, *PC World* Staff Editor John Goddard and I compared notes using a Trinitron monitor as a visual benchmark.

Creature Comforts

The ads show personal scanners sitting nicely between your monitor and keyboard. But in my office, my cluttered desk is the last place I want a scanner, no matter how small. The closest any scanner got was on a side table, alongside my printer. Microtek's unit is the smallest, while Epson's is as big as a notebook.

It may seem petty, but the length of the scanner's cable and the size of its AC power adapter are also important. My CPU is under my desk. Snaking Umax's 54-inch cable down to reach it was a pain. Visioneer's cable, on the other hand, is a generous 96 inches. Logitech has the smallest AC adapter. And Visioneer offers a small adapter but charges $30 extra for it.

Considering that these scanners are marketed for the home office, I was surprised that only Epson and Umax offer toll-free technical support, and none offer weekend support. My advice: Wait until Monday to install one.

Contributing Editor Steve Bass is a marriage and family therapist and president of the Pasadena IBM Users Group. His Home Office *column is a regular* PC World *feature.*

For more information about all products in this article, circle reader service no. 911.

Delrina WinFax Scanner

PROS: Quick installation, built-in paper feeder

CONS: Slow scan speeds, poor OCR on complex documents

If you fax frequently, Delrina's $299 WinFax Scanner is the way to go. It comes with a full version of WinFax Pro 4.0 software. Beyond that, you may be less impressed.

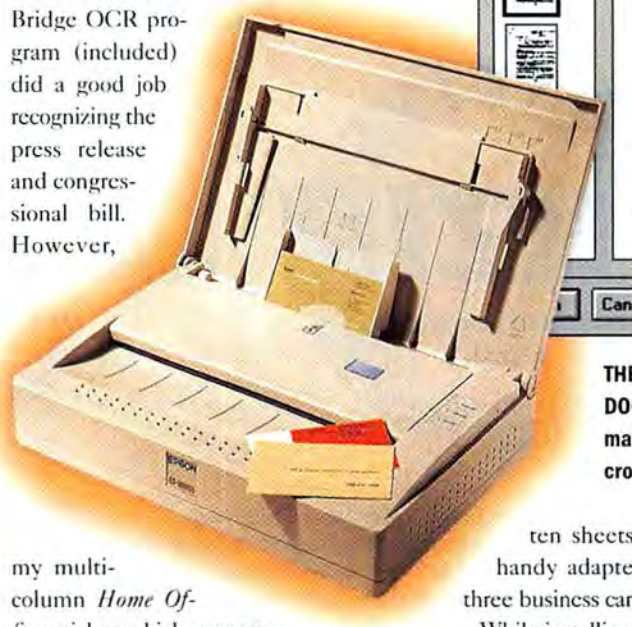
Delrina's scanner (made by Fujitsu) is just over 11½ inches wide, 4 inches deep, and 4 inches high. A built-in paper feeder stores ten sheets (pages exit from the bottom). Settings range from 100 to 300 dpi, and I could set it to handle line art or 256 shades of gray. Installation took less than 12 minutes—and my laser printer's bidirectional features continued working.

As long as the WinFax software is loaded, the scanner stands ready. Unfortunately, scans averaged a slow 13 seconds per page of text. And odd-size items such as a long newspaper article stopped the scanning process midway. On a positive note, the WinFax software's extensive use of the right mouse button let me easily delete, straighten, and flip image thumbnails.

Fax mavens will like how they can take ten pages from their desktop, scan them in, and have WinFax Pro kick in and do the rest. Unfortunately, WinFax Pro's interface makes it difficult to do anything but fax. For example, even though I saw a drag and drop icon in WinFax, I couldn't find anything on the desktop to drag and drop onto. Clicking Edit brought me to Leadview Lite, a bundled image-editing program with tools to view, manipulate, and convert images to more than 40 file formats. Too bad it's poorly integrated with the scanner's software.

WinFax's document manager saves files to one of 25 graphic file formats, or as its own proprietary file format. But modifying these saved files later is an awkward process.

The Xerox TextBridge OCR program (included) did a good job recognizing the press release and congressional bill. However, my multicolumn *Home Office* article—which uses several fonts and graphics—was a mess. It would have been easier for me to type it in from scratch. *Delrina; 800/734-2379, 408/363-2345.* **Reader service no. 784**



THE EPSON PERSONAL DOCUMENT STATION'S size makes it tough to fit onto a crowded desk.

Epson Personal Document Station

PROS: Great document manager, good OCR on simple pages

CONS: Large footprint, cumbersome setup, only one parallel port if included card is not installed

The first thing I noticed is how big Epson's Personal Document Station is—12 inches wide, 9 inches deep, and 3 inches high. When my wife saw it, she asked if I was looking at a notebook. Epson's $449 gray-scale scanner has impressive credentials: 300-dpi resolution with software interpolation simulating up to 400 dpi. The input tray holds ten sheets of paper, and there's a handy adapter that can handle up to three business cards or seven checks.

While installing the Xerox Desktop Document Management Suite, I was pleased to see that it supports familiar fax packages: Bit Software's BitFax, Delrina's WinFax Pro and Lite, and SoftNet's FaxWorks. It also asked me if I wanted to connect to Microsoft Mail or Lotus cc:Mail. Like the WinFax Scanner, the Personal Document Station uses Xerox's TextBridge OCR package.

The Epson scanner doesn't have a pass-through device. I had to either give up my PC's only parallel port to connect to the scanner or install the extra port card included with the scanner. Under Windows 95 I was up and running in minutes using the first method, but setup under Windows 3.1 was a bear. The scanner flatly refused to recognize my parallel port as well as the port that came with it. Swell. Epson's toll-free tech support was busy, but its toll line got me an expert in 10 minutes. We worked for an hour, me tugging at cables and unloading software, him looking up arcane error messages until we found the culprits: an incorrect parallel port interrupt address and a Windows memory manager.

I found that the scanner's software had a lot to offer once it was finally working. To begin with, the Xerox software suite fully integrates faxing, printing, OCR, e-mail, and document management, so all are accessible

THE WINFAX SCANNER'S boxy design won't win any beauty contests, but faxing is a breeze.

PRODUCT PHOTOS: JOHN GREENLEIGH

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Circle 212 on reader service card

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U.S. Robotics

Circle 173 on reader service card

from the scanner's on-screen menu. The scanner senses if there's a sheet in the paper tray and calls up the software. I could scan a document as text, line art, photo, or halftone, and choose between 100 and 400 dpi. The scanned image came up in a preview mode, along with thumbnails of all my other scanned images. Before printing or faxing a document, I could use several tools to remove spots, or straighten and rotate its position. Black and white photos—scanned in gray-scale at 100 dpi—looked terrific.

Epson's OCR did fine on simple jobs, but multicolumn pages gave it fits. To get the documents recognized correctly, I had to tweak the text and resolution settings. I had no problem under Windows 95, but when I scanned the newspaper clipping at 400 dpi on my Windows 3.1 PC, I got an out-of-memory error even though only Word was running. After I reduced the resolution to 200 dpi, it scanned and recognized the clipping and my *Home Office* article, but accuracy was poor. All in all, it was one of the slower scanners I tested.

Power users will love the Visual Recall document manager. I quickly set up a database of all my scans, browsed through documents, and searched for items by keyword or date. Once I found the page I needed, faxing, printing, or e-mailing it was just a click away. Epson's Personal Document Station is a powerful tool, but getting it up and running can be tricky. *Epson America Inc.; 800/289-3776.*

Logitech PageScan Color

PROS: Easy setup, intuitive user interface, 24-bit color, scans bound documents, handles large-size paper

CONS: No paper tray means page-by-page feeding

Of the scanners I tested, Logitech's PageScan was the only one that could handle color. For kicks, I scanned a ton of vacation photos that were on my desk. I wasn't disappointed—the scans looked great; if I had a color printer, I could have cranked out copies. But that's not the only reason this $399 personal scanner is a Best Buy: The PageScan can be detached from its base and used for scanning bound documents. Setup was so easy I didn't even open the manual. Sending faxes and using my printer to make copies was a dream. Like the others, the PageScan had some OCR problems with multicolumn documents, but overall it performed better than most.

THE PAGESCAN COLOR is about the size of a rolled-up newspaper, and it has two features no one else does: full color and the ability to scan bound documents without damaging them.

Getting the PageScan up and running took just over 15 minutes, from the moment I pulled it out of the box to when the first scanned page appeared on screen. Unlike other scanners, which forced me to plug cables for both the printer and scanner directly into the back of the scanner, the PageScan's pass-through parallel port is a mouse-size box that attaches separately to the generous 84-inch cable, so I could put the scanner wherever I wanted. The PageScan doesn't take up much room—it's 12 inches wide, 3 inches deep, and 4¼ inches high, with a 6-inch paper holder in the back. I was afraid I'd snap the thin wire paper-output guide behind the scanner, but it was much sturdier than it looked.

Simply stick a page into the PageScan, and the software pops up. The PageScan's Control Center contains five icons that let me choose how to handle my page: Scan it as text or pictures, send it off as a fax or to the printer for a copy, or put it into a file management system. Clicking an icon offers more options. For example, the File icon launches a "light" version of Documagix's PaperMaster, a document manager that let me assign long file names to documents, drag and drop them into "cabinets," and search by keywords. The Picture icon launches the PageScan Image Editor, which offers a basic set of manipulation and annotation tools. I could scan color pictures at 200 dpi, or black-and-white at up to 400 dpi. Text mode let me specify whether the document had one or multiple columns, with similar options for output.

I got mixed results from the bundled Xerox TextBridge OCR program. It did best on the congressional bill and press release, with nearly 100 percent accuracy. But when I set the software to take the three-column newspaper article, it choked. After I switched to 'Small or Poor Quality Text' it scanned at a brisk 6 seconds per page. This scanner averaged 79 percent OCR accuracy on complex pages, ranking it below Umax and Visioneer, but still good. The three *PC World* pages didn't fare as well—random characters popped up throughout. And the business cards? One came though with flying colors; the other was unreadable.

There's no sheet feeder on the PageScan. You feed each page individually; the software waits patiently for another feeding, or until you tell it you're done. When you detach the PageScan to scan bound documents, the tiny rubber wheels that otherwise draw paper through it move it across a page. When it reaches the edge of the bound page, it stops scanning. On most paper types, the scanner chugs along without missing a beat. But the PageScan found thin magazine paper too slippery—the rollers sometimes lost their traction, making the device fishtail and distort the scan. *Logitech; 800/231-7717, 510/795-8500.* **Reader service no. 785**

Microtek PageWiz

PROS: Great price, portable, fairly good OCR on simple documents, easy-to-use desktop interface

CONS: No bidirectional printer support, poor gray-scale, awkward paper feed, outputs onto desk

Microtek's PageWiz is small, lightweight, portable, and at $199, a sure bet if you're on a tight budget.

Since my system has only one parallel port, I was happy to see that PageWiz had a pass-through connection. Installation was easy; I attached the 54-inch cable to the back of the scanner and connected the

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Circle 214 on reader service card

THE PAGEWIZ, one of the smaller scanners of the bunch, has a low profile that makes it ideal for cluttered desktops.

printer cable to the scanner. One catch: The PageWiz does not allow bidirectional communication between your printer and PC.

PageWiz's bundled software suite, PageSuite, lets you scan, copy, and manage documents. It also performs OCR and hooks up to your printer, fax, and e-mail program. PageWiz gets extra points for its simplicity: Dragging and dropping a file onto any of the icons was easy and intuitive, and switching among thumbnail, half, and full views was a snap. Its file management capabilities let me give documents long file names and add comments. Double-clicking on the DocuPad icon sent me to the annotation screen, where I could quickly highlight and mark up the document with my own comments.

Scanning was also easy. As soon as I put a page into the feeder, it was scanned and the file showed up on the PageSuite desktop. However, unlike the other scanners reviewed here, which wait a split second before grabbing a page from the feeder, the impatient PageWiz gobbled paper immediately, giving me no chance to position it correctly. If a document didn't land perfectly, it was fed in at an angle. (An optional automatic sheet feeder, which handles up to ten pages, is available for $29.) Nor did I like how pages that I fed into the top of the PageWiz slid out of the bottom, pushing against mousepad, coffee cup, and anything else in the way—even launching my eyeglasses into my lap. Not so cool.

The PageWiz can scan at 300-by-300-dpi resolution—but in 16 shades of gray, the lowest of the bunch. As a result, images were not sharp and were often darker than those of the other scanners.

Considering the quality of the PageWiz's scans, its abridged edition of Caere's OmniPage OCR did a remarkably fast and accurate job on single-column documents. The congressional bill and press release had few glitches. It took me 40 minutes to correct all the errors in one multicolumn newspaper article, a tough job because OmniPage could not make heads or tails of the article's pictures. PageWiz's OCR messed up royally when it saw my *Home Office* column—I hope not because of the content. There were lots of bizarre characters and extra gaps where the graphics should have been. In short, I'd recommend the PageWiz only if you are on a budget and don't need to scan photographs or complex multicolumn documents. *Microtek; 800/654-4160, 310/297-5000.* **Reader service no. 786**

Umax PageOffice

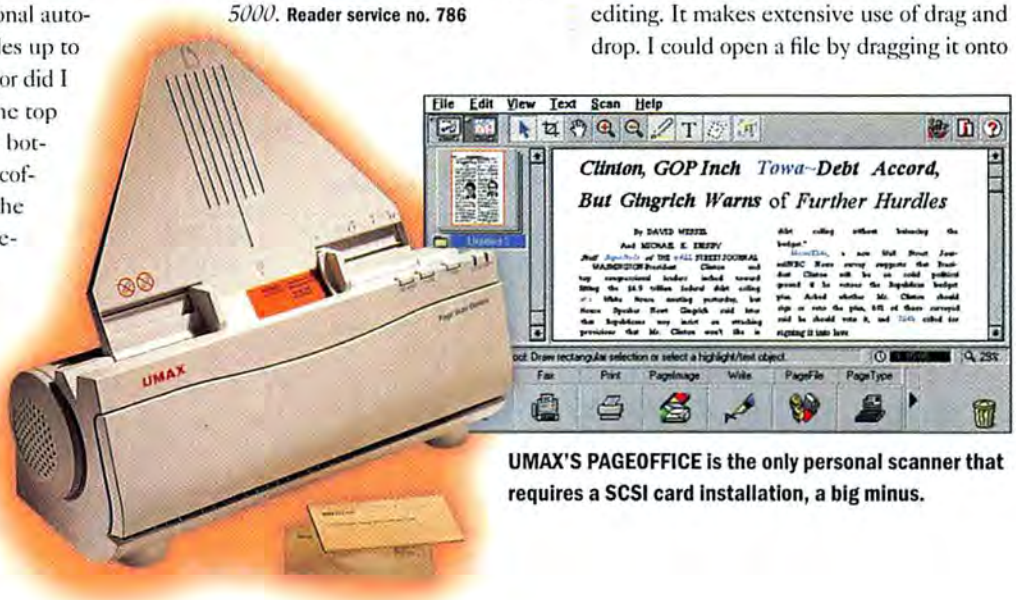
PROS: Quick, detailed scans, high OCR accuracy, intuitive software and hardware design, integrated image editor

CONS: SCSI card installation required, relatively large footprint, spews output onto desk

Umax's $299 PageOffice was the only personal scanner I tested that requires a SCSI card, which means a trip to the inside of your system. Within seconds of installation, the PageOffice and my computer's CD-ROM drive were fighting over the same SCSI ID. Fortunately, I just had to change Umax's ID setting in the scanner software. My advice: Check the documentation on your other peripherals before installing the PageOffice. One other thing: The cable that's included with the scanner only works with Umax's SCSI card; I wasn't able to daisy-chain my other SCSI card without a special cable. Setup took 25 minutes, total.

About the size of a quart of milk, Umax's PageOffice is too big to fit between a keyboard and monitor. But the well-designed paper tray adjusts from a standard 8½ inches down to business-card size. And although its stated capacity is 10 sheets, I had no problem stuffing the tray with 15. Legal-size sheets are the biggest this device can handle. And like Microtek's PageWiz, the PageOffice has a bad habit of spewing paper onto the desk. However, I really liked how three buttons on the front of the Umax let me pick whether I'm scanning a document, a photo, or quitting the job. This is much easier than digging through software.

PageManager, the scanner's software suite consists of four main modules: OCR, file management, page annotation, and image editing. It makes extensive use of drag and drop. I could open a file by dragging it onto



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the Word or Excel icons at the bottom of the screen. I could even add up to eight icons for programs that I use regularly.

Like Logitech's PageScan and Visioneer's PaperPort, the PageOffice took just 6 seconds to scan a letter-size page. And I was surprised at how well the PageOffice handled photos. The scan of my black-and-white photo was sharp. Even magazine pages that contained pictures looked good.

PageOffice's document annotation module performs the usual highlighting and markup feats. But have you ever received a fax with a form you needed to fill out and fax back? If so, you'll like how PageType lets you move through the document and fill in the blanks. The software suite also has PageImage, an image editor with tools that are perfect for quick fixes.

With the PageFile document manager, I quickly viewed and assigned keywords to images, then dragged them into folders or onto any of the icons for PaperManager's modules. Umax's own OCR software tied with Visioneer's OmniPage Lite for the best results. My press release was near-perfect, as was the congressional bill. The more complex newspaper articles fared well, as did my *Home Office* column, each taking me only 5 minutes to clean up. Business cards were recognized, but thicker ones jammed in the feeder. After OCR is done, possible spelling mistakes are shown in blue. That gave me a rough idea of how much of the document needed fixing.

Despite its SCSI card installation, the PageOffice's versatile software bundle, and superb scan quality, almost earned it a Best Buy. But the Logitech and Visioneer scanners' easier installation, speed, and support for higher resolutions won out. *Umax; 800/562-0311, 510/651-4000.* **Reader service no. 787**

FEATURES COMPARISON Umax Does It All, But Logitech and Visioneer Work Best

● = Yes ○ = No

Standard features	Delrina WinFax Scanner	Epson Personal Document Station	Logitech PageScan Color	Microtek PageWiz	Umax Page-Office	Visioneer PaperPort Vx
Street price as of 11/27/95	$299	$449	$399	$199	$299	$299
Width x depth x height (inches)	11.5x4.3x4	12x9x3	12x3x4.25	11x4x2	13x5x5	12x2.5x3.75
Weight (pounds)	3.5	4.8	3	2.5	5	2.5
Resolution (dots per inch)	300x300	300x300	400x400 [1]	300x300	300x300	200x400 [2]
Gray-scale shades	256	256	16.8M [1]	16	256	256
Maximum paper capacity	10	10	1	1	10	1
Scans business cards	●	●	●	●	●	●
Scans bound documents	○	○	●	○	○	○
Maximum paper size (inches)	8.5x14	8.5x14	8.5x22	8.5x14	8.5x14	8.5x30
Paper path (in/out)	top/bottom	top/front	front/back	top/front	top/front	front/front or back
Paper-activated software	●	●	●	●	●	●
Front-panel controls	○	○	○	○	●	○
Brightness/contrast controls	●/○	○/○	●/●	●/○	●/●	●/●
Bundled software						
OCR	●	●	●	●	●	●
Document management	○	●	●	●	●	●
Copier	●	●	●	●	●	●
Fax	●	○	○	○	●	○
Image editing	●	●	●	○	●	○
Form editing	○	○	○	○	●	○
Other	○	○	Xerox PerfectScan, Xerox Color Manager, PaperMaster SE	○	○	SharpPage
Interface						
Parallel port	●	●	●	●	●	○
Serial port	○	●	○	○	●	●
SCSI adapter	○	●	○	○	●	○
Proprietary software	○	○	○	○	○	●
TWAIN-compliant scanning support	●	●	●	●	●	●
Service and support						
Warranty (years)	1	2 [3]	1	1	1	1
Toll-free support	○	●	○	○	●	○
Weekday support (hours)	9	12	10	10	9	8
Weekend support	○	○	○	○	○	○

BEST BUY

[1] In color mode, 200 x 400 dpi at 16.8 million colors (24 bit).
[2] 400 x 400 resolution simulated using software.
[3] One year if warranty card not returned.

Visioneer PaperPort Vx

PROS: Quick setup, small footprint, fast, up to 400-dpi gray-scale, handles large pages

CONS: No image editor or pass-through port

One of the first personal scanners available, Visioneer's $299 PaperPort Vx installs quickly, is versatile, and is easy to use. It's easily a Best Buy. PaperPort is the second-smallest scanner here after the Microtek: 12 inches wide by 2½ inches deep and a little under 4 inches high. A replaceable 9-volt external battery that

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1 You need the big picture to make good decisions. With SPSS' statistical charts, you can better understand your data. In this boxplot, you see the average, minimum, maximum and distribution all at the same time.

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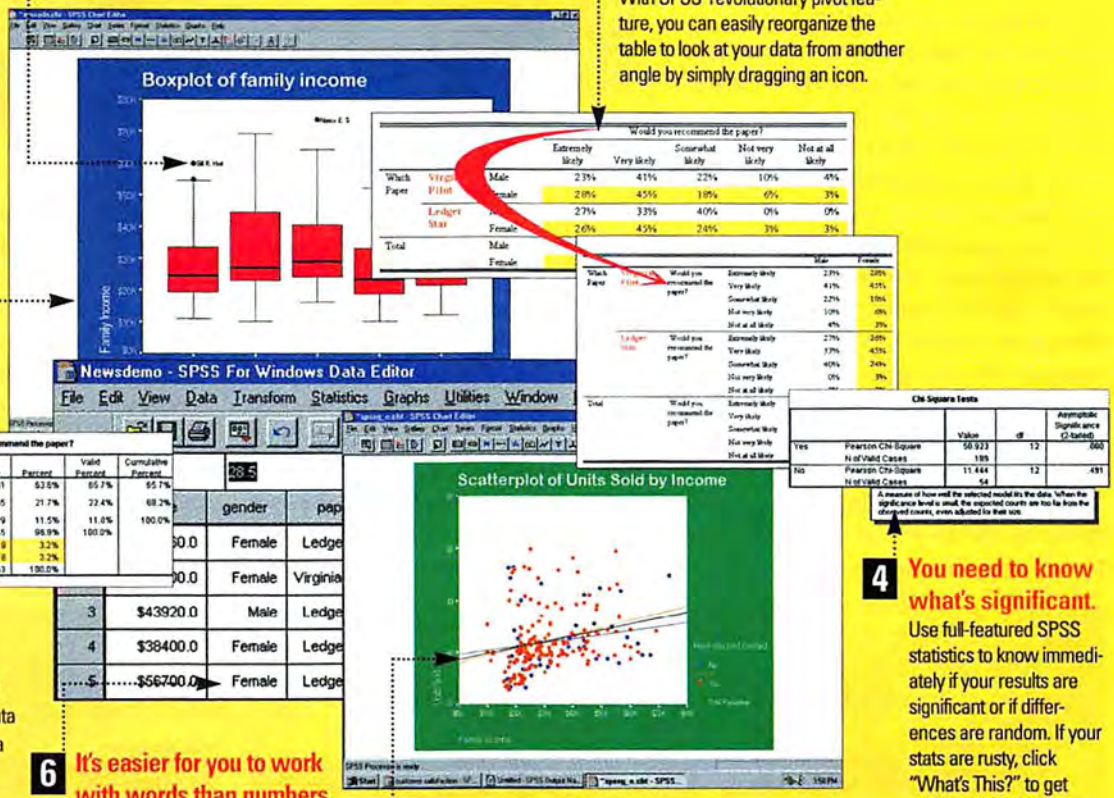
3 You need to look at the data more than one way. When you create a report, what you see often leads to more questions. With SPSS' revolutionary pivot feature, you can easily reorganize the table to look at your data from another angle by simply dragging an icon.



4 You need to know what's significant. Use full-featured SPSS statistics to know immediately if your results are significant or if differences are random. If your stats are rusty, click "What's This?" to get explanations, definitions and rules of thumb for statistics or results.

5 You need to separate the apples from the oranges. SPSS lets you quickly and easily run reports and graphs for different groups so you can look at them separately or compare them.

6 It's easier for you to work with words than numbers. Within a familiar row-and-column setting, SPSS lets you work with words instead of confusing codes – and still do calculations. Your labels are automatically applied to your graphs and reports for clearer, faster presentations.

7 You need accurate results even when some of the data are missing. When there's data missing, or when you enter a code for a "don't know" answer, SPSS can adjust calculations accordingly.

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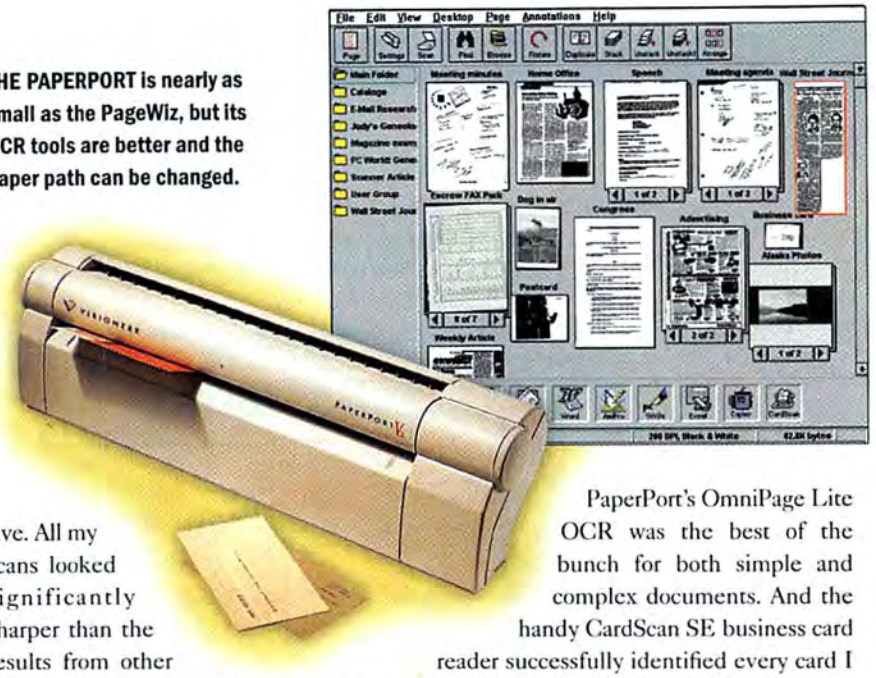
lasts more than 100 scans should also be available by the time you read this, making the PaperPort portable as well as petite. (See *HouseWare* for our review of Compaq's keyboard with built-in scanner.)

Installation was a 5-minute trip to heaven. It uses a free serial port—the software not only found the port but also checked to see if everything was connected. Lovely. Pages slide into the front of the PaperPort at the bottom, and come out at the top. It takes a moment to change the paper's path so it exits to the back. An automatic document feeder and an extra parallel port interface (not a pass-through) are sold at extra cost.

Placing a page into the PaperPort brings the scanner to life. You can pick settings for articles, letters, business cards, and snapshots, or set your own. Preferences can be changed either through a pull-down menu or a button on the side of the scanner. The software supports over 120 programs and creates icons along the bottom of the screen.

The PaperPort scans in gray-scale, and resolution can go as high as 400 dpi. Visioneer's SharpPage setting was also impressive. All my scans looked significantly sharper than the results from other scanners. The press release scanned in 6 seconds. Managing documents was easy, too. Folders appear on the left side of the desktop, thumbnails on the right. I could pile document thumbnails, name the stack, and drag the mess into a folder. I could also pluck out specific pages to fax or copy.

THE PAPERPORT is nearly as small as the PageWiz, but its OCR tools are better and the paper path can be changed.

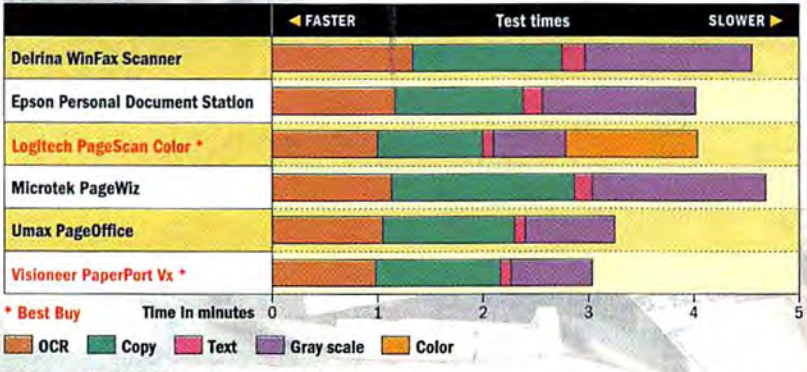


PaperPort's OmniPage Lite OCR was the best of the bunch for both simple and complex documents. And the handy CardScan SE business card reader successfully identified every card I tried. I also liked how a copier tool let me copy several images onto just one sheet.

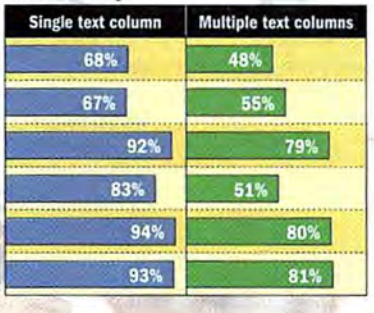
If OCR is a high priority and you want sharp images, a cool business card reader, and fast scanning, the PaperPort Vx is your best choice for a personal scanner. *Visioneer; 800/787-7007.* **Reader service no. 788**

TEST REPORT Color Logitech Also Fastest at Gray-Scale Scanning

Speed average



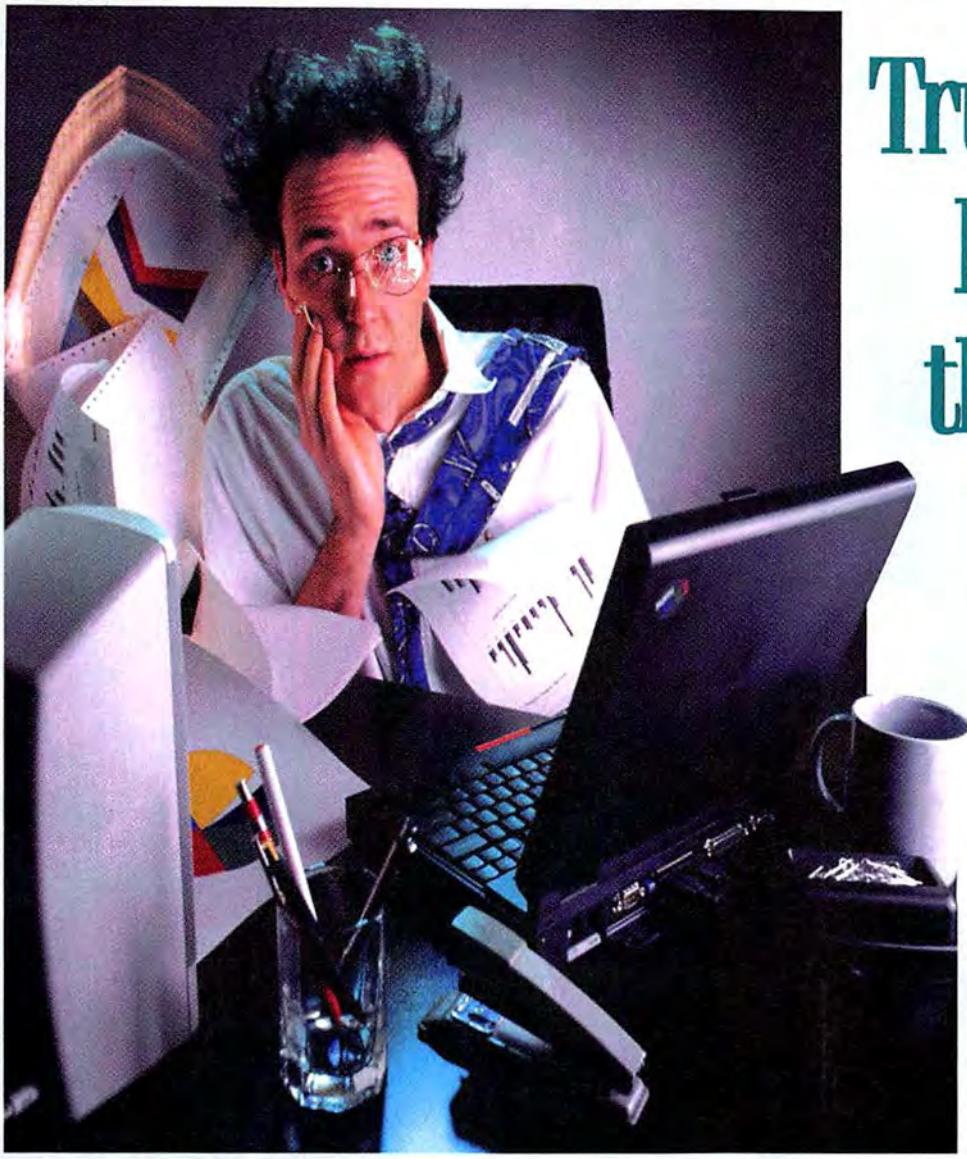
OCR accuracy



Scan quality (rated from poor to excellent)

	Copy	Text	Gray scale	Color
Delrina WinFax Scanner	very good	good	fair	n/a
Epson Personal Document Station	very good	good	fair	n/a
Logitech PageScan Color *	excellent	very good	very good	excellent
Microtek PageWiz	very good	good	fair	n/a
Umax PageOffice	excellent	very good	excellent	n/a
Visioneer PaperPort Vx *	excellent	very good	excellent	n/a

Methodology Scanners tested in a home office. Speed measured by scanning items three times at 300 dpi (Visioneer at 400 dpi) and averaging results. OCR accuracy measured by dividing average error count by character count on originals and subtracting from 100 percent. OCR test scanned and recognized a press release, two 11-by-17 congressional bills, two business cards, three single-page magazine articles, and four newspaper clippings. Copy test scanned and printed one newspaper clipping and one press release. Text test scanned two business cards, three single-page magazine articles, four newspaper clippings, and one 11-by-17 congressional bill. Gray-scale test scanned one black and white photo and one color photo at 300 dpi. Color test scanned color photo three times at 200 dpi. Scan quality judged on screen by PC World staff.



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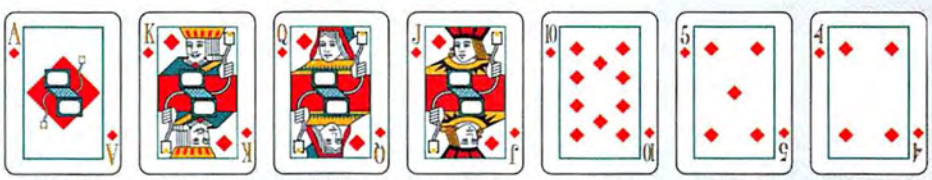

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Quicken *Versus* Money

Now with scads of online banking links, the two Windows 95 heavyweights go head-to-head. Which should you trust with your finances?

By Theresa W. Carey

ALLEN WALLACE

Personal finance software has found its killer application: online banking, which provides interactive access to your bank, credit cards, and other financial concerns. All you need is your PC, a modem, and one of the two programs with the most online links: Intuit's Quicken, the market leader, and Microsoft Money. They aim to make it as easy to check your bank account as it is to send e-mail—and, of course, to use their services to do it.

We reviewed only Money and Quicken because they surpass the rest both in standard features and in online capabilities. They were also the only two packages with Windows 95 versions available in time for review (Quicken works with Windows 3.1 also). The program Managing Your Money, owned by a consortium of banks, did not have any online links ready in time for review. Microsoft Money for Windows 95, available on floppy disk or CD-ROM (we reviewed the latter), costs $34.95; Quicken Deluxe 5 for Windows on CD-ROM costs $59.95.

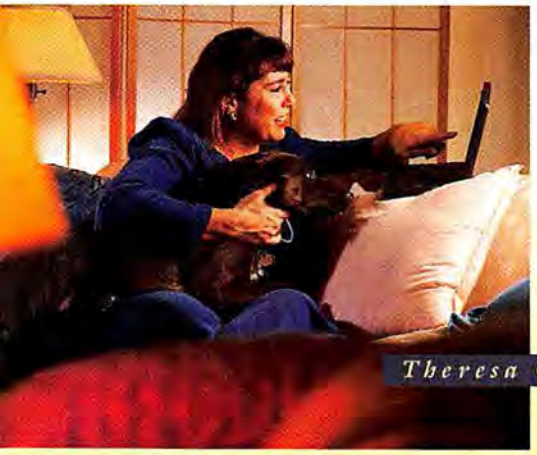
To test them, we set up checking and savings accounts, a 401(k) plan, several investments, and a mortgage. We entered transactions, set up loans and savings plans, developed budgets, and generated financial reports. And we asked for help from the programs and the telephone and online support representatives. To test online banking, we opened accounts at First Interstate Bank and Union Bank, two California institutions accessible from both Money and Quicken. We balanced the checking account and paid bills electronically. Our test system was a DX4-100 PC with 16MB of RAM and a 14.4-kbps modem with the Rockwell RPI chip set.

Microsoft Money has improved to the point where it offers real competition for Quicken, and both earn Best Buys. Quicken Deluxe 5 for Windows on CD-ROM offers more help and financial advice and a few more online perks, but it also costs more and hogs 24MB of hard disk space, compared to the 8MB needed for Money. The breadth of investment management features in Quicken makes it a better choice for investors.

Online Banking: Beyond the ATM

Proprietary online banking software has existed for the last decade, but only Money and Quicken have broadened the field by offering access to a long (and growing) list of institutions, including large banks like Wells Fargo and Chase Manhattan, credit card company American Express, and investment firm Smith Barney. For a current list, call Intuit at 800/224-1047 or check its World Wide Web site (**http://www.intuit.com**); call Microsoft at

Online Banking: One Author's Experiences



The author assures her good friend Hershey that she paid the dog food bill on time.

It involves a lot of forms, a little wait, and some extra fees, but ultimately, signing up for online banking has made my life much easier.

Some patience (not my strong suit) helps. I filled out lots of forms, but then had to wait up to two weeks to get my account started. Finally, I received a letter with the information I needed.

Using my personal finance program's bank setup, I selected my bank from a drop-down list. The institution's logo appeared on screen. I typed in the routing number and password from the letter, along with my account and Social Security numbers. The bank cued me to change my passwords, then I logged on to get my first statement. The amount of past data available may vary by bank.

I downloaded the information from the bank and then logged off. I just dial the bank again to post transactions or get an updated account statement. For easier access, Money labeled its Online Services button with my bank's name, while Quicken made a new QuickTab.

Since then it's been a breeze. I don't have to enter most bank account transactions. I can generate account statements just by clicking a button. When a bill arrives in the mail, I enter it into my electronic check register, set the transaction date for the day before the bill is due, and get on with my life.

Banks' fees for online services vary widely; unless you want to stick with your existing bank, it pays to shop around for the best deal. One institution I signed up with, Union Bank, was running a one-year "sale" on checking account charges, but the other, First Interstate Bank, charged up to $12.95 per month depending on the account options.

If only I could get cash from my PC like I can from an ATM. Now there's an application for a good color laser printer!

800/200-7622, or visit the Money Forum on the Microsoft Network.

Before they added online banking, even Money and Quicken could only be as good as your own habits. But now you can download your transactions anytime. You can also transfer funds, check your balance, and verify deposits or check cashing via your PC instead of an ATM, labyrinthine phone system, or in-person visit. You can access your bank's credit cards just like you do any other account. And you can pay bills electronically or have a check printed and mailed for you.

Online banking doesn't completely free you from visiting your bank branch (see "Online Banking: One Author's Experiences"). But needing cash or depositing the occasional check may be the only reasons left. For everything else, you can go online.

But Will It Manage My Finances?

The latest versions of both Money and Quicken make managing your finances easier than ever. Money's wizards and Quicken's EasySteps provide step-by-step help through major functions, such as setting up a loan. Specialized calculators in both programs help you analyze loans, college savings, and mortgages. You can keep an eye on your potential tax liability by associating income and expenses with specific tax forms.

If you enter a similar transaction three times—your phone bill, for instance—Money will ask to put it on the Payment Calendar and guide you through the setup. Quicken can memorize a transaction, but it doesn't track your entries and prompt you the way Money does.

The rudimentary retirement calculators in Quicken and Money can determine how much you need to set aside now to have a certain sum later, but for more complex issues like assets allocation you'll have to turn to programs that focus on it, such as Ernst & Young LLP's Prosper, DataTech Software's Rich and Retired for Windows, and Reality Online's WealthBuilder 4.0.

Money and Quicken are the best bets for helping you track your expenses, plan your budget, and analyze your financial status. Online banking is the next evolutionary step, making these programs the conduits through which you can interactively manage all your accounts. More control over your money? More tools to make better money decisions? We like the sound of that.

Theresa W. Carey is the founder of Alta Business Solutions and frequently writes about financial management software.

For more information about all products in this article, circle reader service no. 909.

Best Buys

Intuit's Quicken Deluxe 5 for Windows on CD-ROM and Microsoft Money for Windows 95 both win Best Buys. Money is now Quicken's equal both in features and in ease of use. Quicken's financial planning advice, particularly on investment management, may make it a slightly better buy for some users, but it costs $25 more than Money, and it takes up quite a bit more room on your computer's hard disk.

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Microsoft Money for Windows 95

PROS: Easy installation and account setup, greatly improved interface

CONS: Limited budgeting functions

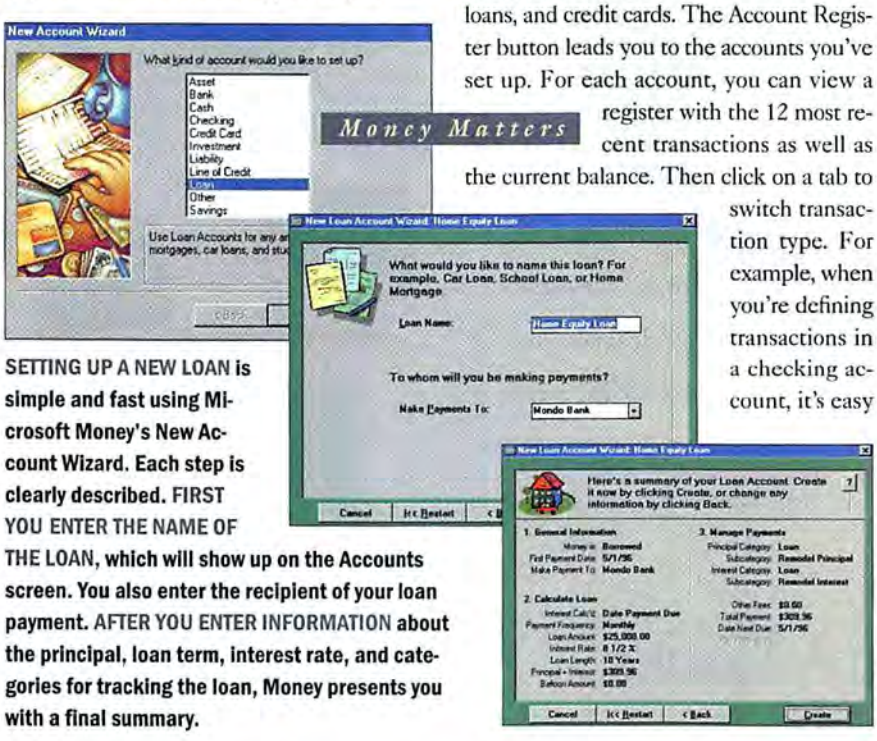
Money does almost everything that Quicken Deluxe 5 for Windows on CD-ROM can for almost half the street price ($34.95 compared to Quicken's $59.95). But unlike Quicken, Money for Windows 95 does not work under Windows 3.1, and its budgeting features are a little limited compared to its rival's. But unless you want the extra financial advice that comes with Quicken, Money can do the job with equal aplomb.

Money's installation process is a breeze: You just launch the installer and choose a destination for the files, and the program does the rest. Its completely overhauled user interface is now soothing sepia tones with a marbleized desktop pattern. The opening screen displays large buttons organized by task. In the middle of the screen, a Chart of the Day presents a graphical snapshot of one component of your finances—your expenses for last month, for instance. Every time you start the program, Money randomly picks one of five chart types, or you can instruct it to display only your favorite type.

Setting up a checking account is easy, too. If you're not sure which expense categories to use, Money can create a set of categories automatically. The program's long list of budget categories includes 'Books' and 'Food: Dining Out', two of our favorites; others include 'Leisure: Sporting Goods' and 'Healthcare: Prescriptions'. You can easily create new categories on the fly, too.

Money's desktop gives you push-button access to all the program's major functions, including account maintenance, reports and charts, online banking, and bill payments. In its Account Manager area, Money handles your account setup chores for checking, savings, investments, real estate holdings, loans, and credit cards. The Account Register button leads you to the accounts you've set up. For each account, you can view a register with the 12 most recent transactions as well as the current balance. Then click on a tab to switch transaction type. For example, when you're defining transactions in a checking account, it's easy to choose withdrawal, check, deposit, transfer, or ATM. Another button gives you access to online banking, and the Reports and Graphs section is just a click away.

MONEY'S ACCOUNT REGISTER DISPLAYS your most recent transactions for easy scanning.



SETTING UP A NEW LOAN is simple and fast using Microsoft Money's New Account Wizard. Each step is clearly described. FIRST YOU ENTER THE NAME OF THE LOAN, which will show up on the Accounts screen. You also enter the recipient of your loan payment. AFTER YOU ENTER INFORMATION about the principal, loan term, interest rate, and categories for tracking the loan, Money presents you with a final summary.

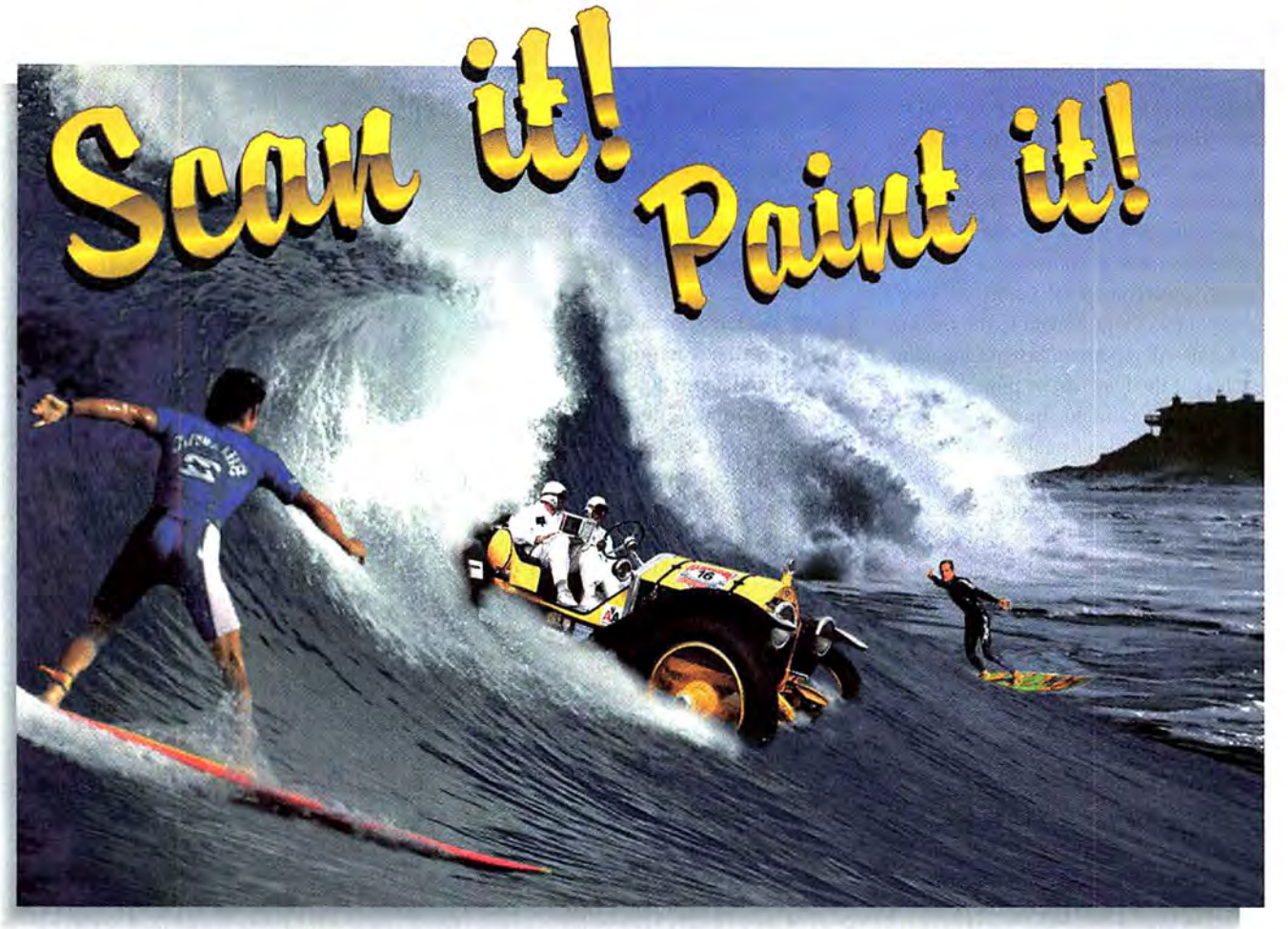
Wizards Simplify Big Tasks

To support Money's comprehensive new set of features, Microsoft built into the program a wealth of thoughtfully placed cues, prompts, and at-a-glance summaries to help you work faster and smarter. Money's wizards provide step-by-step guidance through complex procedures. For example, the Loan Payment Setup Wizard automatically generates an amortization schedule. The Mortgage Setup Wizard prompts you for insurance and property tax fees, then it automatically puts the payment on the Payment Calendar. Users who prefer to go their own way should note that Money's wizards can't be turned off.

When you're ready to go online, the program guides you through a simple, three-step procedure. First, you log on to your bank's service using your modem. Then you download the new transactions. The third step is to move those transactions into your electronic checkbook register, which involves assigning a category to each transaction. Money remembers which payees are associated with specific categories, so you don't have to repeat this step ad infinitum; for instance, Cable Co-op is associated with 'Bills: Cable TV' after you assign it the first time. If you have a credit card account at your bank, you can use the same process to keep track of your charges.

The program's on-screen help is context sensitive and very complete, although some users may miss having a printed manual at hand—Money has none. Our calls to tech support involved tolerable waits; once, we connected right away, and the next time we waited just a few minutes. The technicians who answered our calls were friendly and knowledgeable. You can also get help online through the Money Forum on the Microsoft Network, but you must be an MSN member to access the forum.

Microsoft has beefed up the capabilities and expanded the breadth of Money's Reports and Graphs section, which has 26 preformatted reports and 15 charts, including 4 that help you do your taxes. More reports are available throughout Money, providing



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on-the-spot information. It was easy to select the data we wanted to include and format the report to our preferences. Mini-charts available in other parts of the program provide snapshot views of specific items. You can also click on an item in a chart and view the underlying data; double-clicking a chart item takes you straight to the transaction details. All reports and charts, including the Chart of the Day, can be printed.

The budget module, though generally helpful, has a couple of weaknesses. You can use the Auto-Budget Wizard to create monthly budgets based on current spending habits, but if you have payments scheduled on a semiannual or quarterly basis—for instance, auto insurance or estimated taxes—you have to make those entries manually. Also, budgets can be set up for the current calendar year only.

More Features for Investors

Prior versions of Money were weak in tools for investment management, but now the program handles more types of transactions, including reinvestment of dividends and capital gains. You can manage investment portfolios that include money market accounts, CDs, bonds, and discounted bonds, along with stocks and mutual funds. You can get updated stock prices through Quotes On-Line, an optional service available through your bank or via CompuServe (the cost varies by provider).

After years of mediocrity, Money now matches Quicken in the personal financial management arena nearly feature for feature. Granted, Money's budgeting features still lag a bit, it doesn't offer quite as many financial institutions for online banking, and it lacks the pile of supplementary financial advice that Quicken Deluxe 5 offers in the CD-ROM version we reviewed. But with an updated interface that simplifies navigation, and copious reports and charts to keep you informed, it's now so easy to use that we can readily declare it a winner.

System requirements: 386DX or higher, Windows 95, 4MB of RAM, 8MB of free hard disk space, VGA or compatible graphics accelerator card, CD-ROM drive, Microsoft-compatible mouse. A 2400-bps or faster modem required to access online services. Microsoft Corp., 800/426-9400, 206/882-8080. **Reader service no. 763**

Quicken Deluxe 5 for Windows on CD-ROM

PROS: Packed with help and solid financial advice, extensive online resources

CONS: Some EasyStep processes are laborious, full installation takes 24MB of hard disk space

TRACK YOUR INVESTMENTS with Quicken's Portfolio View. Update prices online, then track performance on the easy-to-read tables.

Version 5 of market leader Quicken enhances its investment management and report formatting, and offers a cornucopia of online services. It also takes up a lot of hard disk space. The basic program, Quicken 5 for Windows, takes up about 13MB and has a street price of $39.95; Quicken Deluxe 5 for Windows adds investment features and needs 20MB. Quicken Deluxe 5 for Windows on CD-ROM, the version we reviewed, includes more guides and references. A full install takes 24MB. Both Deluxe versions have a $59.95 street price. Basic Quicken and Money are equally good, but Quicken's Deluxe version on CD-ROM is worth the extra money for novice users or those with investments to track.

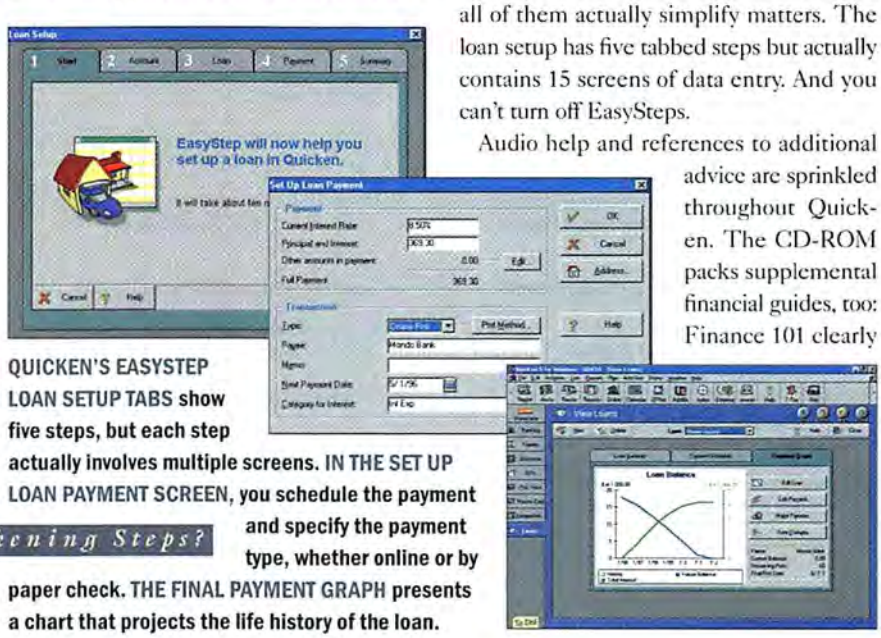
In the March issue we reported on a number of bugs in Quicken 5 (*Bug Watch, Top of the News*) ranging from strange error messages to transactions erroneously reported missing. Most of these problems were fixed by version 5.0e (which we looked at), and Intuit has patches available for earlier versions. Quicken 5 still slows down too much when handling very large files because of enhancements made to the database engine; but apparently, our test files weren't big enough to cause trouble. Intuit plans to correct that problem with version 6.

Easy Installation, Lots of Help

Installation went smoothly except for one glitch: Quicken didn't have the correct setup string for our test modem, which uses the Rockwell RPI chip set. At press time, Intuit was working on a patch.

Quicken's opening screen, HomeBase, displays an overview of the program's main functions. You can develop your own list of often-used features by adding them to the QuickTabs menu along the left-hand side of the HomeBase screen. An EasyStep series of dialog boxes helps you enter basic information about your checking account. Throughout Quicken, EasySteps guide you through standard processes—although not all of them actually simplify matters. The loan setup has five tabbed steps but actually contains 15 screens of data entry. And you can't turn off EasySteps.

Audio help and references to additional advice are sprinkled throughout Quicken. The CD-ROM packs supplemental financial guides, too: Finance 101 clearly



QUICKEN'S EASYSTEP LOAN SETUP TABS show five steps, but each step actually involves multiple screens. IN THE SET UP LOAN PAYMENT SCREEN, you schedule the payment and specify the payment type, whether online or by paper check. THE FINAL PAYMENT GRAPH presents a chart that projects the life history of the loan.

Quickening Steps?

WHAT TO PACK FOR A POWER TRIP.

TravelMate 5200

- 120MHz Pentium® processor with PCI bus and 256KB L2 Cache
- Brilliant SVGA TFT Screen
- 2MB Video memory
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- 1.2GB Hard Disk Drive
- Multimedia package: Built-in 16-bit sound, internal speaker and dual mode microphone
- Two Lithium ion battery packs
- Serial infrared port for wireless connectivity
- Windows 95 and Windows for Workgroups pre-installed

intel inside pentium processor

Designed for Microsoft® Windows®95

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explains how you can better manage your assets and expenditures. You fill out a profile and get answers that are specific to your situation. The Ask the Experts guide features advice from financial whizzes Jane Bryant Quinn and Marshall Loeb. The Quicken Index lets you search for a topic across all the programs on the CD-ROM.

Quicken can be customized in more ways than previous versions could, from the fonts and colors used on screen to the printed reports. The EasyAnswers feature in the Reports section lets you create your own report by using checklists that explain, in short phrases, what you want to show—for example, 'What I Owe' on a selected loan.

FEATURES COMPARISON Money and Quicken Run Neck and Neck

● = Yes ○ = No

	Microsoft Money for Windows 95	Quicken Deluxe 5 for Windows on CD-ROM
Standard features		
Street price [1]	$34.95	$59.95
Tutorial/financial advice	○/○	●/●
Calendar/calculator	●/●	●/●
Multimedia setup help	○	●
Online resources		
Banking/bill paying	●/●	●/●
Credit card account status	●	●
Stock quotes/financial news	●[2]/○	●[2]/●[2]
Number of subscribing institutions	31	37
Checkbook management and bill paying		
Reconciles against bank statement	●	●
Deposits checks into multiple accounts	●	●
Check printing/cost of 250 checks	●/$46.95 [3]	●/$39.95
Schedules regular payments/reminders	●[4]/●	●/●
Debt management		
Tracks credit card expenses/loans	●/●	●/●
Financial calculators	●	●
Budgeting and financial planning		
Predefined categories	●	●
Automatic budget calculation	●	●
Savings goals	●	●
Cash flow tracking/forecasting	●/○	●/●
Tax planning	●	●
Manages portfolio/measures return on investment	●/●	●/●
Reporting		
Customizes reports	●	●
Compares actual to budget/period to period	●/●	●/●
Overview report accessible at start-up	●	○
Service and support		
Toll-free technical support	○	○
Weekday phone support (hours)	12	12
Automated fax support	●	●
Online support sites	BBS, MSN, WWW	BBS, AOL, CIS, Prodigy, WWW

BEST BUY

[1] Vendor estimate.
[2] Cost extra.
[3] For laser printer checks; $42.95 for continuous-feed checks.
[4] Monthly only.

Online Banking, Investment Tracking

Intuit's online links extend beyond your bank account. Investor Insight, available in Quicken Deluxe, tracks your investments via resources such as the *Wall Street Journal* and Dow Jones News Service and creates a personalized newsletter. The newsletter fee depends on the number of companies you want to follow: $9.95 a month for up to 10 securities, $19.95 for up to 50. A built-in version of Netscape offers free access to Intuit's Web page (**http://www.intuit.com**), where you'll find program updates, tips and tricks, and personal finance news. Concentrix Network Corporation, Intuit's Net access provider, offers Internet access for an extra fee.

Calling Intuit for support usually involves a wait, but the representatives are helpful. Online, Intuit promises a 24-hour response time, but we sometimes waited 3 or 4 days.

Quicken's yearly bug list aside, it's the market leader for good reason. However, the program's real edge over Money lies in the extras it offers in the Deluxe versions. If you want them and are willing to pay the extra $25, then Quicken Deluxe 5 for Windows on CD-ROM is best for you.

System requirements: 486 or higher, Windows 3.1 or Windows 95, 8MB of RAM, 24MB of free disk space, MPC-compatible CD-ROM drive, sound board, and speakers. Modem required to use online services. Intuit, Inc., 800/624-8742, 415/944-6000.

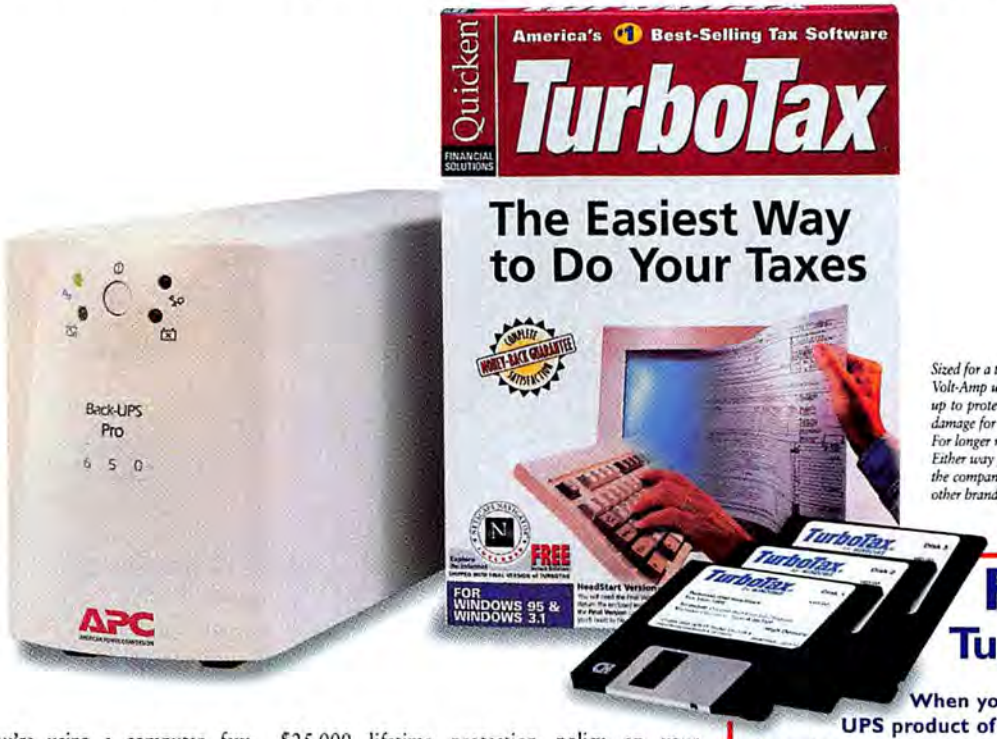
ALLEN WALLACE

Where to Buy

- **Prosper** $69.95; Ernst & Young LLP; 800/776-7737 **Reader service no. 764**
- **Rich and Retired for Windows** $59.95; DataTech Software Inc.; 800/556-7526 **Reader service no. 765**
- **WealthBuilder 4.0** $49.95; Reality Online; 800/521-2475 **Reader service no. 766**

DEATH. TAXES. POWER PROBLEMS.

Manage two of these inevitable facts of life with one easy investment. Buy an APC UPS before March 30th and get TurboTax FREE*.*



Sized for a typical 486/Pentium system, a 400 Volt-Amp unit provides instant battery back-up to protect against data loss or hard drive damage for approximately 13 minutes. For longer runtime opt for a 600VA model. Either way you can't make a bad choice with the company that protects more PCs than all other brands combined: APC.

If you're using a computer, few things are more certain than power problems. If you haven't lost a few hours of work due to a sudden blackout, crashed a hard drive in a brownout, or had a surge toast your modem, you will. It's almost a statistical certainty.

If you're breathing, few things are more certain than taxes. Each April the ultimate deadline looms, and trying to explain to your friendly IRS agent that a power sag ate your tax return could produce some dastardly dividends.

Now you can provide the world's best protection against the inevitable blackout, brownout, or power surge with an award-winning Uninterruptible Power Supply (UPS) from APC. With more awards than all other brands combined, APC provides the most reliable protection you can buy. Units such as our exciting new Back-UPS PRO provide complete protection against any problem your computer is likely to face—including surges on your modem line—and are backed by a 2-year warranty and up to a $25,000 lifetime protection policy on your protected equipment.

Best of all, from now until March 30, you can get a FREE copy of Intuit's award-winning TurboTax when you purchase an APC UPS 400 Volt-Amps or higher.

TurboTax won every major award given to tax preparation software in 1995. TurboTax reviews your return thoroughly double-checks for errors, points out missed deductions, and alerts you to possible audit flags. Print your IRS approved forms right from your printer, sign, drop in the mail, and you're done.

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Name _____
Address _____
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Country _____ Phone _____
E-Mail _____ Fax _____ (in case of problem with order)
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I am an End-User: ❑ Home ❑ Small Office ❑ Corporate
How many computers at your location? _____
Where did you purchase this APC product? _____
_____
Please check one: ❑ DOS ❑ Windows ❑ Mac

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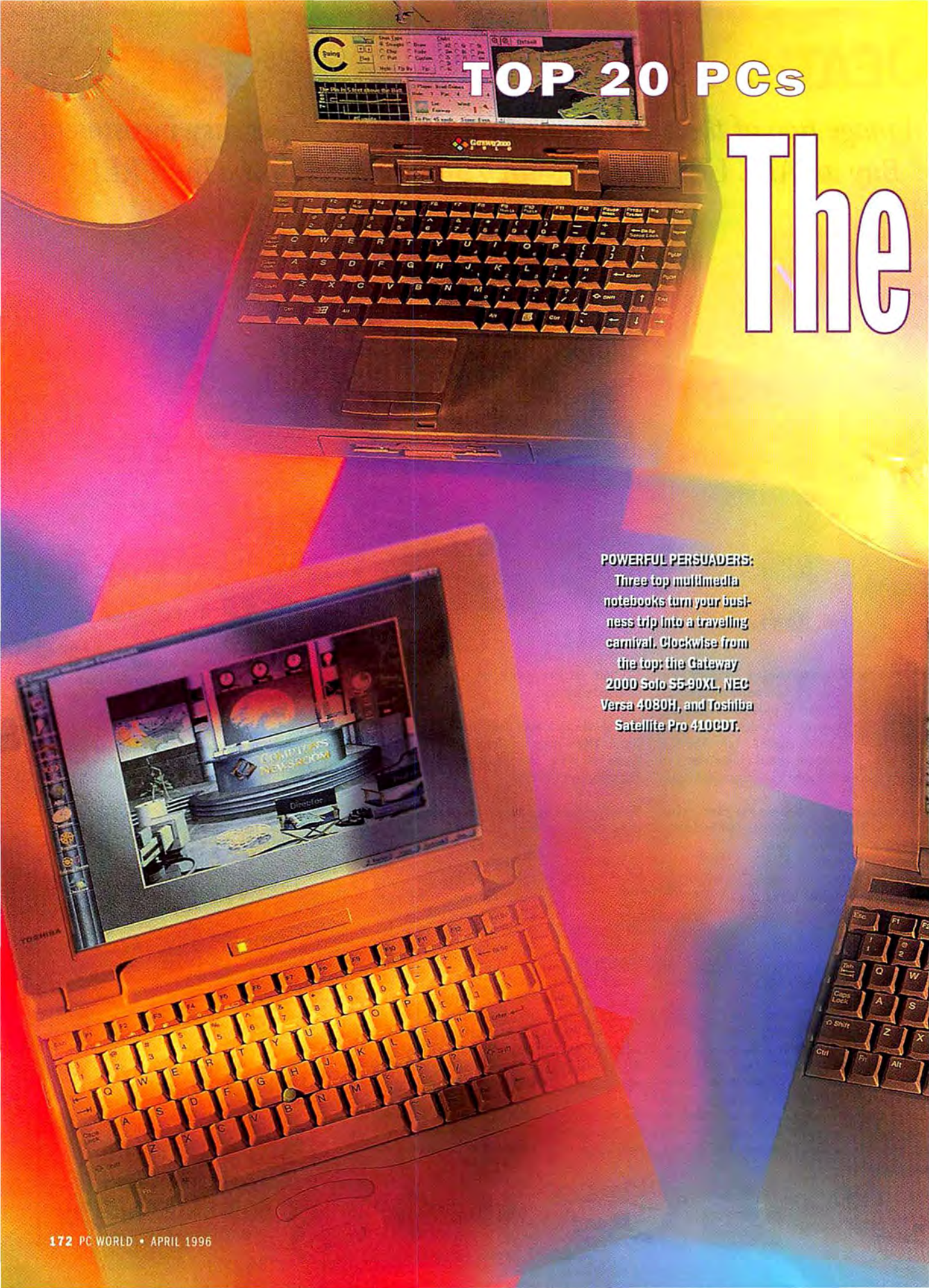
TOP 20 PCs

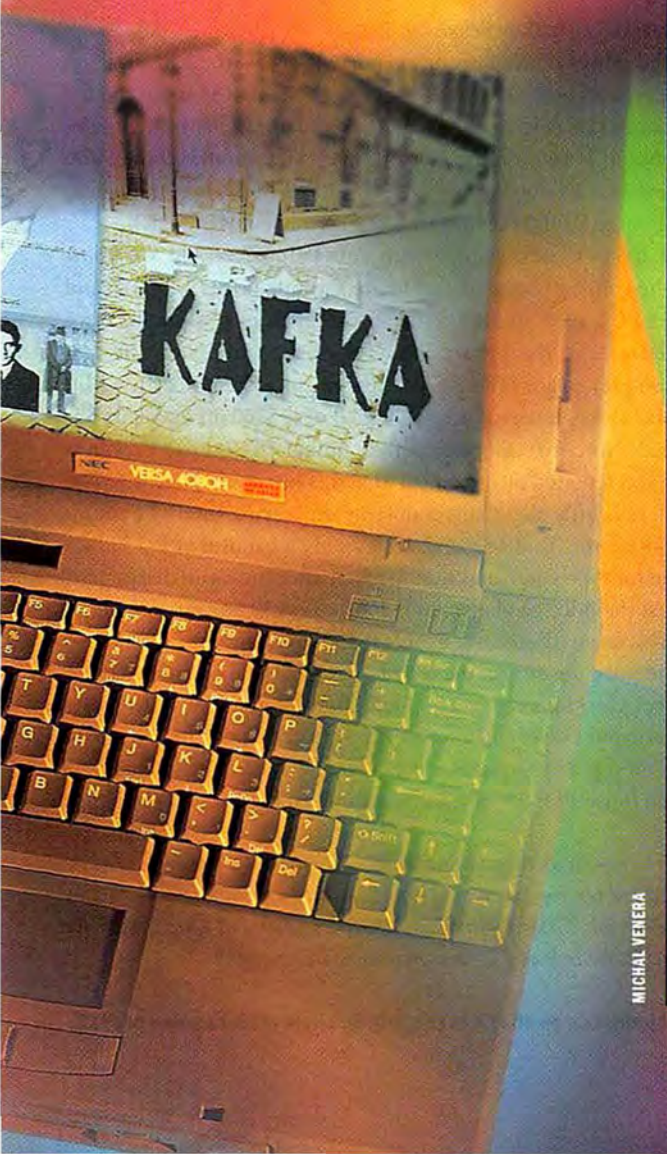
The



POWERFUL PERSUADERS: Three top multimedia notebooks turn your business trip into a traveling carnival. Clockwise from the top: the Gateway 2000 Solo S5-90XL, NEC Versa 4080H, and Toshiba Satellite Pro 410CDT.

Show Must Go On

New multimedia notebooks from Gateway, NEC, and Toshiba hit the Top 20, and price cuts secure Dell's hold on the desktop charts.



MICHAL VENERA

THE TOP 20
PC WORLD
Power pg. 176
Budget pg. 182
Notebooks pg. 188

YOU WANT YOUR NOTEBOOK to do everything your desktop can, and that includes showing video clips and playing music. You want to create a dazzling business presentation, replete with sights and sounds, and take it on the road. But packing the power required for multimedia into a small, lightweight PC can be a challenge, and keeping the cost down can be even harder.

Full multimedia, which includes a CD-ROM drive and built-in sound and speakers, adds a pound or so to a portable's traveling weight. You can leave your floppy drive at home to ease the burden, but then you have no easy way to share files with other users. And a notebook with a quad-speed CD-ROM drive can cost over $1000 more than one without (but otherwise similarly configured). Until prices drop dramatically, notes are unlikely to follow the example of desktops, where a CD-ROM drive and a sound card have almost become standard. But

By Brad Grimes

if your business calls for it and you have the money, a multimedia note can be a valuable tool for sharing information. It can even take the place of your desktop PC.

Of the 13 notebooks we tested this month, six featured full multimedia capabilities, and of these, three—the Gateway 2000 Solo S5-90XL, the NEC Versa 4080H, and Toshiba's Satellite Pro 410CDT—earned spots on our Power Notebooks chart. Each has its own merits, but all three are expensive. The S5-90XL, the best "bargain" of the trio, rings up at $4399. The Versa 4080H and Satellite Pro 410CDT go for $4899 and $5378, respectively. But for real sticker shock, check out two multimedia notebooks that were way too expensive to make the charts. The $6428 Compaq LTE 5100 with a double-speed CD-ROM drive and the $8134 IBM ThinkPad 760CD with a quad-speed CD-ROM drive are two of the best mobile PCs we've ever seen, but few people can afford them. The ThinkPad 760CD is the most feature-rich notebook to date, with a huge 12.1-inch active-matrix screen and an MPEG playback chip. It even has video in and out ports for video editing.

Separating the Brawn From the Bargains

Each month we divide our Top 20 lists of desktop and notebook PCs into "power" and "budget" machines. You can probably tell at a glance that our Power charts include some of the most expensive, high-quality PCs you can buy, and that the Budget charts are a more suitable place for bargain hunters to start looking. But how did we come up with these lists? What's our price cutoff for budget PCs and how did we pick it? Good questions, all.

Our research has shown that budget-minded PC buyers don't want to pay more than about $2550 for a desktop or $2800 for a notebook. So those are our cutoff prices for the Budget Desktop and Budget Notebook charts. Logically, any PC priced higher is automatically a candidate for the Power charts. But every once in a while, a budget-power machine comes along—a PC that's priced incredibly low for what it offers. To showcase these rare values, we've introduced a small overlap ($100) in budget and power price ranges: Desktops priced $2450 or above have a shot at the Power Desktops chart, and notebooks $2700 or more are candidates for the Power Notebooks chart. As a result, a PC with just the right balance of price, features, and performance can appear on both Power and Budget charts simultaneously, as do this month's $2499 Gateway P5-120 desktop and $2728 Dell Latitude LX 4100T notebook. Pay special attention to these chart straddlers: Fully decked out yet priced to move, they're the best of both worlds for users who want the most PC for the least amount of money.

The Best of the Rest—for Less

Of course, there are still many excellent new notebooks for people who don't require multimedia. Cases in point are two new Pentium WinBooks that made the Power Notebooks chart this month based on their attractive prices, outstanding performance, and long battery lives. Each has built-in sound and can be equipped with a CD-ROM docking station for an extra $399. The new $3799 WinBook XP5 P120 joins the top-ranked Toshiba Satellite Pro 400CDT as a power Best Buy. Its PC WorldBench score of 146 is the highest we've seen from a portable. The $3399 WinBook XP5 P90 was also fast and landed in the middle of the Power chart. Both units come with a 14.4-kbps internal fax-modem, an extra on most notebooks.

THE IBM THINKPAD 760CD has miniature legs that tilt the keyboard toward you.

The top two budget portables are both from Dell. The $1928 Latitude LX 4100D with a dual-scan display claimed the top spot, while the number two–ranked Latitude LX 4100T with an active-matrix display made the Budget chart for the first time after its price dropped to $2728. The Latitude LX 4100T made both the Power and Budget charts because it's fast and has lots of hardware (16MB of RAM and an 810MB hard drive), yet is very affordable (see "Separating the Brawn From the Bargains").

Pentium-166s: The Calm Before the Storm

On the power desktop front, two new P-166s—the Micron P166 Millennia and the Gateway P5-166XL—claimed spots on the list thanks to fast performance and strong feature sets, bringing the number of P-166s on the chart to five. The number three P166 Millennia is a faster, less expensive version of the eighth-ranked, SCSI-based P166 Millennia Plus that we reviewed in March.

We haven't been flooded with new P-166s yet, but we know they're coming because vendors are slashing prices on P-120 and P-133 PCs. Dell slashed $420 off the price of the number two power system, the Dimension XPS P133c, and $90 off its top-ranked Dimension XPS P120c. Micron cut $250 off its P133 Millennia, while Hewlett-Packard lopped over $700 off its Vectra VL 4 5/133. Note that the price of the number 16 Compaq ProLinea 5120 was reported incorrectly in March. The correct price is $3448.

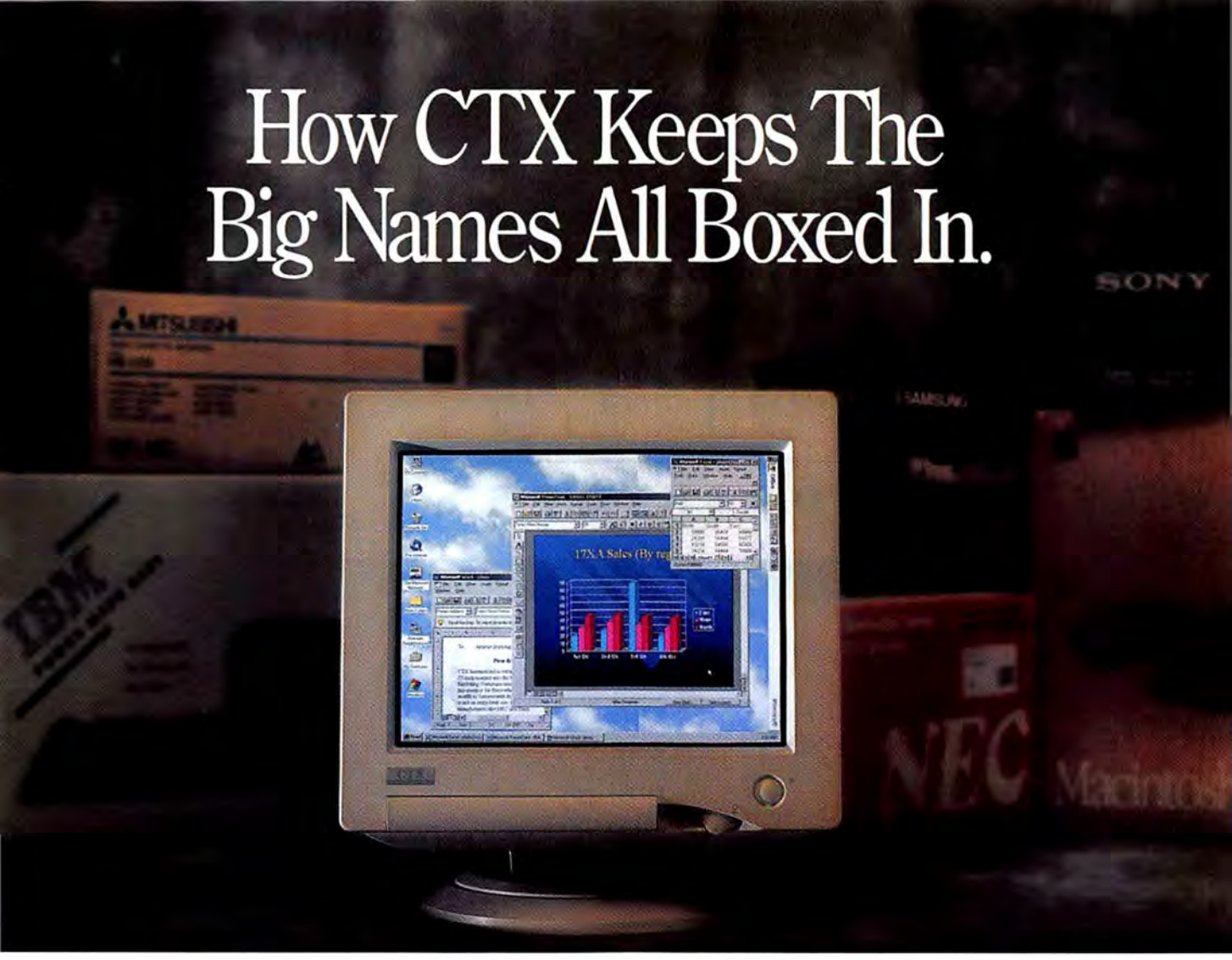
There is little sign that vendors are embracing Intel's Pentium-150 processor. To date we've tested only a handful of P-150 PCs (none for this issue), and their performance has been disappointing. As the price gap between P-166 and P-150 processors narrows (it's now around $200), we expect P-150s to disappear.

The price pressure at the top of the CPU chain also affected our Budget Desktops chart: The Dell Dimension XPS P100c, previously on our Power chart, took over the top spot this month after a price drop to $2549 qualified it as a budget system. In addition, the Austin PowerPlus 75 seized a Best Buy thanks to a $139 price cut.

Brad Grimes is an associate editor for PC World. *He can be reached on PC World Online (see page 14 for contact information). Testing by Dave Casini, Ulrike Diehlmann, Andrew Hawn, Jeff Kuta, and Mike Salayko; research and support by Julian Weatherby.*

For information on all PCs in this article, circle reader service no. 912.

How CTX Keeps The Big Names All Boxed In.



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1765GMe Monitor June 1995

1765GMe Monitor September 1995

1785GM Monitor March 1995

1785GM Monitor May 1995

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THE TOP 20

PC WORLD POWER DESKTOPS

1 Dell Dimension XPS P120c
More bang for your buck.

		Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Dell Dimension XPS P120c	1	8	Mar 96	90	177	75/76	$2879	Pentium-120	16	1080
2	Dell Dimension XPS P133c	3	6	Mar 96	90	193	75/76	$2929	Pentium-133	16	1080
3	Micron P166 Millennia	–	1	current	90	200	78/72	$3148	Pentium-166	16	1280
4	Micron P133 Millennia	2	9	Mar 96	90	182	78/72	$2848	Pentium-133	16	1624
5	Dell Dimension XPS P166c	9	2	Mar 96	90	208	75/76	$3679	Pentium-166	32	1080
6	HP Vectra VL 4 5/133	10	3	Mar 96	87	181	82/76 [3]	$3197	Pentium-133	16	1080
7	Micron P120 Millennia	5	11	Mar 96	87	171	78/72	$2798	Pentium-120	16	1275
8	Micron P166 Millennia Plus	4	3	Mar 96	87	198	78/72	$4746	Pentium-166	16	2150
9	Micron P100 Millennia	7	9	Mar 96	87	168	78/72	$2748	Pentium-100	16	1275
10	Digital Celebris GL 5166	8	2	Mar 96	86	188	79/76 [3]	$4528	Pentium-166	16	1624
11	Dell OptiPlex GXMT 5133	–	1	current	86	184	75/76	$3803	Pentium-133	16	1624
12	NEC PowerMate P133	12	3	Mar 96	85	185	74/70 [3]	$2999	Pentium-133	16	1624
13	Compaq DeskPro XL 5133	13	2	Mar 96	82	173	77/76	$4698	Pentium-133	16	1080
14	Compaq ProLinea 5100	14	2	Mar 96	82	161	77/76	$3194	Pentium-100	16	1080
15	Gateway 2000 P5-166XL	–	1	current	81	200	67/71	$3964	Pentium-166	16	1624
16	Compaq ProLinea 5120	11	2	Mar 96	81	169	77/76	$3448	Pentium-120	16	1075
17	Compaq DeskPro 5133	15	2	Mar 96	81	161	77/76	$4198	Pentium-133	16	1080
18	AST Bravo MSP/133	–	1	current	80	156	71/71	$2696	Pentium-133	16	1624
19	Gateway 2000 P5-133	16	2	Mar 96	80	186	67/71	$2799	Pentium-133	16	1624
20	Gateway 2000 P5-120	17	3	Mar 96	80	176	67/71	$2499	Pentium-120	16	1083

BEST BUY

[1] Percent contribution to overall rating: performance (25); price (15); features (20); reliability (25); service and support (15).

[2] Call 800/434-4495 (for payment by Visa or MasterCard) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95; available March 21). Touch-tone phone required.

2 Dell Dimension XPS P133c
High speed, low price.

3 Micron P166 Millennia
An affordable Pentium-166.

4 Micron P133 Millennia
Solid all-around Best Buy.

5 Dell Dimension XPS P166c
Unsurpassed performance.

	CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments (Recommended as home system)
	4X	ISA, PCI	17"/.28	800/613-3355	3281	680	$90 cheaper than last month, fast PC is great for all apps including multimedia.
	4X	ISA, PCI	17"/.28	800/613-3355	3299	681	Big $420 price drop makes this the perfect P-133; it's ultrafast and loaded with extras.
	6X	ISA, PCI	15"/.28	800/223-6571	3336	682	If you can get by with a 15-inch monitor, this is the best deal we've seen on a fast P-166.
	4X	ISA, PCI	15"/.28	800/223-6571	3268	683	Quality system from a reputable vendor, great features and design; but 15-inch monitor.
	6X	ISA, PCI	17"/.28	800/613-3355	3337	684	Fastest desktop we've tested; big price drop brings it more in line with other P-166 PCs.
	4X	ISA, PCI	17"/.28	800/752-0900	3329	685	$700 price drop brings it close to a Best Buy; HP rates tops for system reliability.
	4X	ISA, PCI	15"/.28	800/223-6571	3242	686	Well configured despite smaller 15-inch monitor; good alternative to top-ranked Dell.
	6X	ISA, PCI	15"/.28	800/223-6571	3331	687	Good P-166 with SCSI storage system; lop off $400 if you don't need the Jaz drive.
	4X	ISA, PCI	15"/.28	800/223-6571	3267	688	Decent speed, good price, fast CD-ROM drive; but small monitor.
	4X	ISA, PCI	15"/.28	800/722-9332	3338	689	Expensive and a little slow for its processor class, but amply configured; built-in networking.
	4X	ISA, PCI	17"/.28	800/613-3355	3339	690	Should catch the eye of network administrators; but you pay a bit more for built-in connectivity.
	6X	ISA, PCI	15"/.28	800/632-4636	3330	691	Nice price for speedy PC with fast CD-ROM drive and big hard drive.
	4X	EISA, PCI	15"/.28	800/345-1518	3340	692	Solid, but you pay extra for built-in SCSI, networking features, and EISA expansion slots.
	–	ISA, PCI	17"/.28	800/345-1518	3341	693	Though well built, it costs a lot for what you get. Lacks a CD-ROM drive.
	6X	ISA, PCI	17"/.25	800/846-2000	3342	694	Has everything we'd expect in a top-speed power system, but costs more.
	–	ISA, PCI	17"/.28	800/345-1518	3343	695	Expensive, slow, no CD-ROM drive; but good monitor, high quality.
	4X	ISA, PCI	17"/.28	800/345-1518	3344	696	Less expensive version of network-oriented no. 13 XL sibling, but still quite pricey.
	4X	ISA, PCI	15"/.28	800/876-4278	3345	697	Finally priced closer to competition; well designed, but very slow for a P-133.
	4X	ISA, PCI	17"/.26	800/846-2000	3346	698	Lot of machine, but Gateway lags behind other power vendors in service and reliability.
	4X	ISA, PCI	15"/.25	800/846-2000	3309	699	Very inexpensive for a P-120; reasonably fast. Only power system to make Budget chart.

[3] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service
responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 906.

Top 20 Power Desktops

DELL SOLIDIFIES ITS HOLD ATOP THE CHART this month after yet more price cutting in its Dimension line. The XPS P120c holds on to number one, while the XPS P133c slides up behind it. Dell's third Best Buy is the Dimension XPS P166c (the fastest PC we've seen)—a huge $790 price drop makes it number five. Other Pentium-166 systems also move into the power ranks: the Micron P166 Millennia (a Best Buy) and the Gateway P5-166XL. Also new to the Top 20 are Dell's network-ready OptiPlex GXMT 5133 and the AST Bravo MSP/133. We tested the AST last month, but it was too pricey; an $879 cut boosts it to number 18.

1 Dell Dimension XPS P120c

LAST REVIEWED: March 1996

PROS: Fast, 512K of secondary cache, 28.8-kbps fax-modem, great support

CONS: On/off button looks like the floppy eject

A $90 price cut to $2879 keeps this system on top. It posted a PC WorldBench score of 177—the fastest of any P-120 we've tested—and has 16MB of Extended Data Out RAM, a 1080MB hard drive, a quad-speed CD-ROM drive, a 17-inch monitor, a Number Nine 9FX Motion771 video board, and Dell's highly rated service.

2 Dell Dimension XPS P133c

LAST REVIEWED: March 1996

PROS: Fast, 512K of secondary cache, 28.8-kbps fax-modem, great support

CONS: On/off button looks like the floppy eject

The $2929 XPS P133c is selling for $420 less than last month. Though its processor is different, it sports the same 16MB of EDO RAM, 1080MB hard drive, quad-speed CD-ROM drive, and 17-inch monitor as its P-120 sibling. In our WorldBench test suite, the XPS P133c scored 193, the highest so far for a P-133.

3 Micron P166 Millennia

NEW THIS MONTH

PROS: Good price, ultrafast, roomy hard drive, 6X CD-ROM drive

CONS: Poor 15-inch monitor, no modem

This $3148 model costs about $1600 less than the superpowered, SCSI-based P166 Millennia Plus (ranked eighth). Its 1280MB Enhanced IDE hard drive is more than ample, as is its six-speed CD-ROM drive. And with 16MB of EDO RAM and 256K of burst secondary cache, it scored an ultrahigh 200 on PC WorldBench.

Micron P166

Driving the graphics is a Diamond Stealth64 Video card with 2MB of VRAM, and audio comes via a Sound Blaster AWE32 wavetable sound card. About the only thing missing is a fax-modem. The monitor, at 15 inches (13.6-inch viewable diagonal), is undersized for such a muscle system, and it has a lot of flicker. But the company's new warranty is impressive: It covers the CPU and main memory for five years and the rest of the system for three. Readers responding to our fax survey give Micron good marks for system reliability.

4 Micron P133 Millennia

LAST REVIEWED: March 1996

PROS: Well built; roomy hard drive, full multimedia, strong warranty

CONS: Other similarly priced systems have larger monitors

Our unit came with a quad-speed CD-ROM drive, but Micron currently sells the system with a six-speed drive. It also still sells mostly 15-inch monitors while Dell hits the same price point with a 17-incher. Still, at $2848 (Micron shaved about $250 off) this high-powered system is a solid Best Buy. With its 16MB of EDO RAM, 256K of secondary cache, and large 1624MB hard drive, it posted a PC WorldBench score of 182—decent for a P-133.

5 Dell Dimension XPS P166c

LAST REVIEWED: March 1996

PROS: Fastest PC we've tested, 6X CD-ROM drive, 32MB of EDO RAM

CONS: Still expensive, on/off button looks like the floppy eject

This P-166 scored 208 on PC WorldBench—the highest so far. And Dell slashed $790 off. For $3679 you get 32MB of EDO RAM, 512K of secondary cache, a 1080MB hard drive, a six-speed CD-ROM drive, an Imagine128 video card with 4MB of dual-ported VRAM, a wavetable sound card, and a 28.8-kbps fax-modem.

6 HP Vectra VL 4 5/133

LAST REVIEWED: March 1996

PROS: Big price drop to $3197, 3-D acceleration, high reliability score

CONS: Limited expandability with one free drive bay and room for two extra cards

7 Micron P120 Millennia

LAST REVIEWED: March 1996

PROS: Speedy performance, big 1275MB hard drive, multimedia, Microsoft Office

CONS: Other similarly priced systems have larger monitors

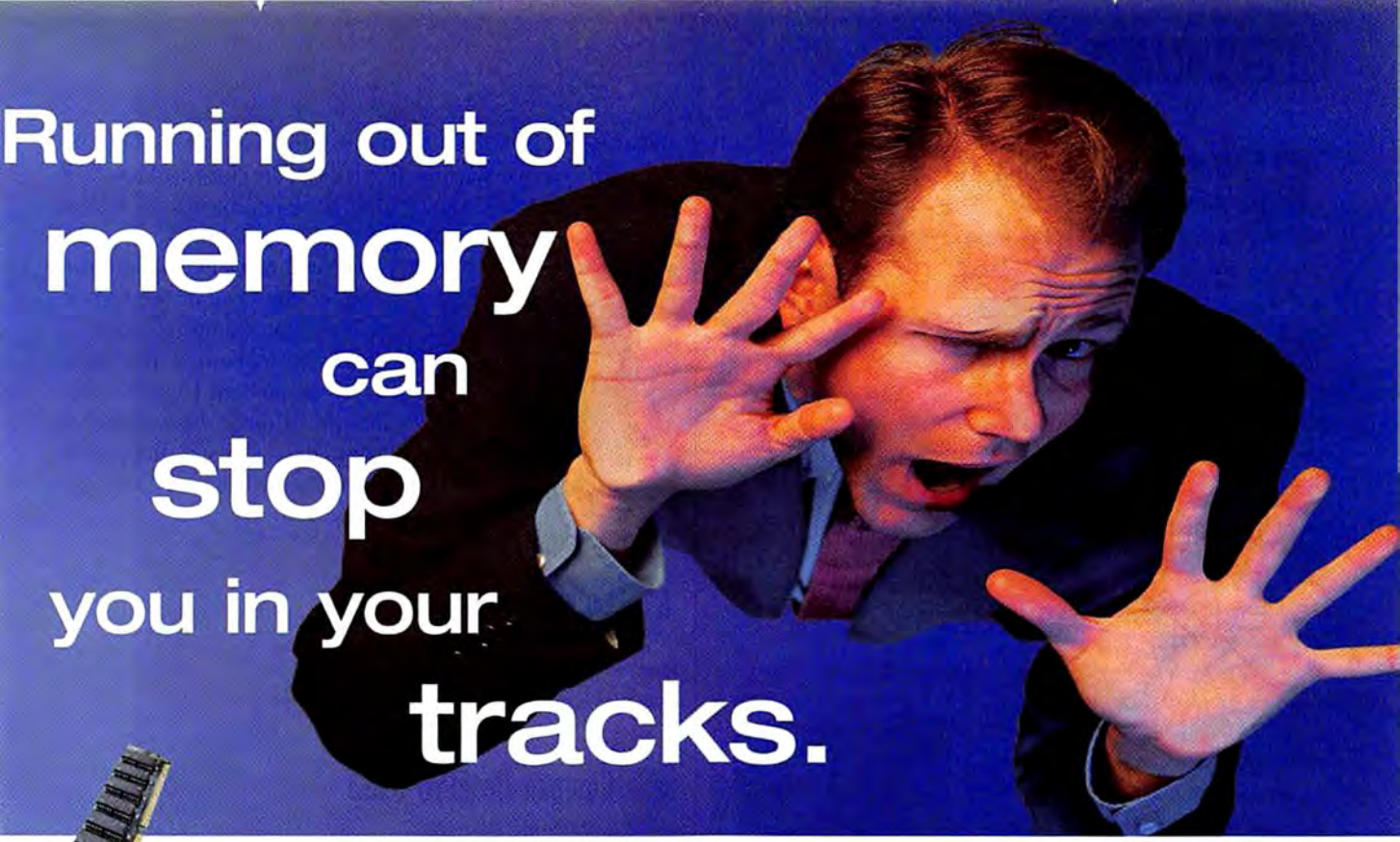
8 Micron P166 Millennia Plus

LAST REVIEWED: March 1996

PROS: 2150MB SCSI hard drive, 1GB removable storage drive, 6X CD-ROM drive

CONS: With all those extras, system should have a bigger monitor

Running out of memory can stop you in your tracks.



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9 Micron P100 Millennia

LAST REVIEWED: March 1996

PROS: Good performance, full multimedia, Microsoft Office Professional

CONS: None significant

10 Digital Celebris GL 5166

LAST REVIEWED: March 1996

PROS: Integrated sound and video, built-in networking, big 1624MB hard drive

CONS: Expensive; slow for a Pentium-166

11 Dell OptiPlex GXMT 5133

NEW THIS MONTH

PROS: Network ready, strong performance, multimedia, good support, three-year warranty

CONS: Pricey for a P-133

This $3803 system supports most network standards, and it's even a good stand-alone PC with 16MB of EDO RAM, 256K of pipeline-burst secondary cache, a roomy 1624MB hard drive, a quad-speed CD-ROM drive, and a nice 17-inch Dell monitor. The graphics and 16-bit sound controllers are integrated on the motherboard.

Dell OptiPlex

The unit scored 184 in our PC WorldBench suite—below the number two Dimension XPS P133c, but ahead of most other Pentium-133s that we've tested.

12 NEC PowerMate P133

LAST REVIEWED: March 1996

PROS: Good performance, 6X SCSI CD-ROM drive, big 1624MB hard drive

CONS: Other similarly priced systems have larger monitors

13 Compaq DeskPro XL 5133

LAST REVIEWED: March 1996

PROS: SCSI hard drive, built-in networking, full multimedia, industry-leading support

CONS: Very expensive

14 Compaq ProLinea 5100

LAST REVIEWED: March 1996

PROS: Well built; good 17-inch monitor, industry-leading support

CONS: Expensive ($3194) with no CD-ROM drive and just 1MB of graphics RAM

15 Gateway 2000 P5-166XL

NEW THIS MONTH

PROS: Fast, big hard drive, great monitor, full multimedia, fax-modem, Microsoft Office

CONS: Pricey, lowest score for system reliability on Power chart

This $3964 Pentium-166 has 16MB of EDO RAM, 256K of secondary cache, a 1624MB EIDE hard drive, and a 6X CD-ROM drive. The 17-inch Sony monitor is crisp; the video card has 2MB of dual-ported WRAM and 3-D acceleration. You get a 28.8-kbps fax-modem and a wavetable sound card.

Gateway P5-166XL

The unit had a PC WorldBench score of 200—one of the highest so far. The company offers a three-year warranty and around-the-clock support. Its service ratings in our survey have improved lately, but its marks for system reliability trail those of the Top 20's leaders.

16 Compaq ProLinea 5120

LAST REVIEWED: March 1996

PROS: Well built; good 17-inch monitor, industry-leading support

CONS: Sluggish, expensive ($3448), no multimedia components

17 Compaq DeskPro 5133

LAST REVIEWED: March 1996

PROS: Well built, good expandability, quad-speed CD-ROM drive, three-year warranty

CONS: Slow, expensive at $4198

18 AST Bravo MSP/133

NEW THIS MONTH

PROS: Lots of expandability, big hard drive, full multimedia, three-year warranty

CONS: Slowest PC on the Power chart

AST Bravo

We tested this model last month with PC WorldBench, but it didn't score high enough to make the chart. The difference now is that AST has slashed the price of this P-133 by about $880, to $2696. It's well built, with 16MB of RAM, a 1624MB hard drive, a quad-speed CD-ROM drive, and a 15-inch monitor, but its PC WorldBench score of 156 is among the lowest we've seen for a P-133. Readers responding to our fax survey do give AST good marks for reliability and service.

19 Gateway 2000 P5-133

LAST REVIEWED: March 1996

PROS: Attractive price, moderately fast, roomy 1624MB hard drive

CONS: Company has lowest score for system reliability on Power Top 20

20 Gateway 2000 P5-120

LAST REVIEWED: March 1996

PROS: Budget-level price, good P-120 performance

CONS: Company has lowest score for system reliability on Power Top 20

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THE PC WORLD TOP 20

BUDGET DESKTOPS

1 Dell Dimension XPS P100c
Best deal for the money.

		Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Dell Dimension XPS P100c	–	1	Mar 96	98	174	75/76	$2549	Pentium-100	16	1080
2	Dell Dimension P75t	1	5	Mar 96	97	100	75/76	$1979	Pentium-75	8	540
3	Vektron Multimedia P-100	3	4	Mar 96	95	171	[3]	$1695	Pentium-100	16	850
4	Gateway 2000 P5-100 Family PC	–	1	current	93	146	67/71	$2139	Pentium-100	16	1083
5	Austin PowerPlus 75	13	2	Mar 96	93	127	66 [3]/[3]	$2169	Pentium-75	16	850
6	ZDS Z-Station VP	–	1	current	92	91	75 [3]/[3]	$1860	Pentium-75	8	850
7	Gateway 2000 P5-75	2	5	Mar 96	91	98	67/71	$1659	Pentium-75	8	850
8	CompuTrend Premio 5x86-100	5	4	Mar 96	91	126	[3]	$1649	Cx5x86-100	16	1080
9	DTK Quin 54M/P100	6	2	Mar 96	91	148	74 [3]/65 [3]	$2350	Pentium-100	16	1080
10	Compaq ProLinea 575e	12	5	Mar 96	91	96	77/76	$1788	Pentium-75	8	400
11	Quantex QP5/100 M-3	–	1	current	90	167	61/63	$1949	Pentium-100	16	1083
12	Dell OptiPlex GL+ 575	4	2	Mar 96	90	121	75/76	$2238	Pentium-75	16	540
13	Diamond DT-100	7	2	Mar 96	90	156	[3]	$1785	Pentium-100	16	1080
14	Tempest Pentium Giga Media P5-100	9	4	Mar 96	89	132	[3]	$1988	Pentium-100	16	1270
15	Polywell Poly 4120P8	14	5	Mar 96	89	73	[3]	$1650	AmDX4-120	8	1080
16	Digital Venturis 575	17	5	Mar 96	89	100	79/76 [3]	$2228	Pentium-75	8	850
17	Gateway 2000 P5-120	10	4	Mar 96	88	176	67/71	$2499	Pentium-120	16	1083
18	Netis N4100	18	2	Mar 96	87	83	[3]	$1468	DX4-100	8	1220
19	Swan Family 75	11	3	Mar 96	87	87	67 [3]/[3]	$1898	Pentium-75	8	850
20	Micro Express MicroFlex-PCI/5133	–	1	current	87	190	59 [3]/[3]	$2399	Pentium-133	16	1280

BEST BUY

[1] Percent contribution to overall rating: performance (15); price (25); features (20); reliability (25); service and support (15).

[2] Call 800/434-4495 (for payment by Visa or MasterCard) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95; available March 21). Touch-tone phone required.

2 Dell Dimension P75t
Great entry-level PC.

3 Vektron Multimedia P-100
Fast; multimedia on the cheap.

4 Gateway 2000 P5-100 Family PC
Equipped for home or office.

5 Austin PowerPlus 75
Well-rounded budget PC.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments (Recommended as home system)
4X	ISA, PCI	17"/.26	800/613-3355	3347	700	Thanks to a big $250 price cut, it's the best PC you can buy for less than $2550.
4X	ISA, PCI	17"/.26	800/613-3355	3313	701	Not especially fast or well loaded, but well built, has a big monitor, low price, and great support.
4X	ISA, PCI	15"/.28	800/725-0026	3325	702	One of the best deals on chart, but company lacks support record.
4X	ISA, PCI	15"/.25	800/846-2000	3348	703	Decked-out budget system is good for home but slow for a Pentium-100.
4X	ISA, PCI	15"/.28	800/752-1577	3349	704	Price cut earns a best buy; fast for a P-75 and packed with features.
4X	ISA, PCI	15"/.28	800/533-0331	3350	705	$500 price drop makes this roomy, well-built PC competitive with other P-75s; slow, though.
4X	ISA, PCI	15"/.25	800/846-2000	3317	706	So-so features and speed, but one of the cheapest, best-built systems on chart.
4X	ISA, PCI	15"/.28	800/677-6477	3323	707	Pentium-75 performance at a 486 price; fully loaded, but no weekend support.
6X	ISA, PCI	15"/.28	800/289-2385	3351	708	Well decked-out for a budget PC with large hard disk and fast CD-ROM drive.
—	ISA, PCI	15"/.28	800/345-1518	3352	709	Doesn't normally have cache (ours did). Quality at a good price for basic computing.
4X	ISA, PCI	15"/.28	800/896-4898	3353	710	Price cut propels fast multimedia PC into budget ranks; low reliability, service scores.
4X	ISA, PCI	15"/.25	800/613-3355	3354	711	Good as a low-power, networked PC; you pay extra for the connectivity.
6X	ISA, PCI	14"/.28	800/989-7253	3355	712	Very inexpensive for hefty set of features, but monitor is small and documentation sparse.
4X	ISA, PCI	15"/.28	800/818-5163	3356	713	Incredible price for a multimedia PC considering all the RAM and storage space.
4X	ISA, PCI	15"/.28	800/999-1278	3357	714	$200 price drop makes this multimedia PC a steal, but it's slow and has a poor monitor.
4X	ISA, PCI	14"/.28	800/722-9332	3358	715	Up one spot on strength of company service and reliability, plus $219 price drop.
4X	ISA, PCI	15"/.25	800/846-2000	3309	699	Very inexpensive for a P-120, reasonably fast. Only budget system to make Power chart.
4X	ISA, PCI	15"/.28	800/577-7526	3359	717	Nice features, bargain-basement price, but early returns suggest reliability is sporadic.
4X	ISA, PCI	15"/.28	800/554-6748	3360	718	A PC you can talk to (with its voice-enabled fax-modem), but slowest P-75 we've tested.
4X	ISA, PCI	15"/.28	800/989-9900	3361	719	Fastest system we've tested for under $2500; has everything but a solid reliability record.

[3] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 907.

Top 20 Budget Desktops

THERE'S A NEW NUMBER ONE, AGAIN FROM Dell. The Dimension XPS P100c moves from the Power to the Budget chart after a price drop to under $2550—one of the best bargains around. Only two new systems claim spots this month on the Budget chart: the Gateway 2000 P5-100 Family PC and the Micro Express MicroFlex-PCI/5133, the sole Pentium-133. The ZDS Z-Station VP and the Quantex QP5/100 M-3 were both tested with PC WorldBench but didn't make the Top 20 in March because of high prices. The most notable mover is the Austin PowerPlus 75: After a $139 price drop, it jumped eight spots to a Best Buy.

1 Dell Dimension XPS P100c

LAST REVIEWED: March 1996

PROS: Great price, top P-100 performance, 17-inch monitor, strong support

CONS: On/off button looks like the floppy eject, no sound

The $2549 XPS P100c—number six on the Power Top 20 last month and now priced as a budget PC—is loaded with 16MB of EDO RAM, 256K of secondary cache, a 1080MB hard drive, a Number Nine 9FX Motion771 video card with 2MB of VRAM, and a quad-speed CD-ROM drive. With a WorldBench score of 174, it's the fastest P-100 we've tested under Windows 95.

2 Dell Dimension P75t

LAST REVIEWED: March 1996

PROS: Low price, nice 17-inch monitor, great service and support

CONS: On/off button looks like the floppy eject

That "t" in the name means it's a value-line PC. It's still high quality, but not as feature-rich as the Dimension XPS line. The P75t is priced at just $1979 (down $70), but comes with only 8MB of RAM and a small 540MB hard drive. A decent performer, it probably could do better with a secondary cache and extra memory. Our unit did have full multimedia, including a quad-speed CD-ROM drive, sound, and speakers, as well as a good 17-inch monitor.

3 Vektron Multimedia P-100

LAST REVIEWED: March 1996

PROS: Fast Pentium-100 performance, great price, full multimedia

CONS: One-year warranty, no weekend support

The Vektron Multimedia P-100 is the cheapest P-100 on the Budget chart. Now selling for $1695 (down $300 from last month), this fast minitower comes with 16MB of RAM, an 850MB hard drive, a quad-speed CD-ROM drive, and a 15-inch monitor. Helping drive the multimedia experience are a Diamond Stealth64 Video 2201 video board with 2MB of EDO DRAM and a 16-bit Sound Blaster–compatible sound card. The only drawbacks are Vektron's one-year warranty and lack of weekend support.

4 Gateway 2000 P5-100 Family PC

NEW THIS MONTH

PROS: Great value, good monitor, 28.8-kbps fax-modem, lots of software

CONS: Mediocre P-100 performance, no secondary cache

A robust multimedia hardware and software bundle makes this $2139 PC perfect for the home office or family room. Lacking a secondary cache, it lags a bit behind other systems in its processor class, but otherwise it's a strong Best Buy. It features 16MB of RAM, a 1083MB hard drive, a quad-speed CD-ROM drive, and a good 15-inch Sony monitor. Its Windows 95 keyboard has special keys to access Start menu items.

Gateway Family PC

For that home office, the unit comes with a 28.8-kbps fax-modem and software like Microsoft Works, Money, and Publisher. For fun, there's a 16-bit sound card, Altec Lansing speakers, and CD-ROMs like Microsoft Encarta, Golf, and Cinemania 96.

5 Austin PowerPlus 75

LAST REVIEWED: March 1996

PROS: Great Pentium-75 performance, full multimedia, fax-modem

CONS: None significant

Austin recently lopped $139 off the price of its fully loaded PowerPlus 75. Armed with 16MB of RAM, an 850MB hard drive, and a 15-inch monitor, this $2169 minitower hit 127 in our WorldBench test suite—the highest score yet for a P-75. For multimedia apps, it comes with a quad-speed CD-ROM drive and a 16-bit sound card. Austin's three-year warranty and around-the-clock support are commendable, but readers responding to our fax-back survey give the company only average marks for system reliability.

6 ZDS Z-Station VP

NEW THIS MONTH

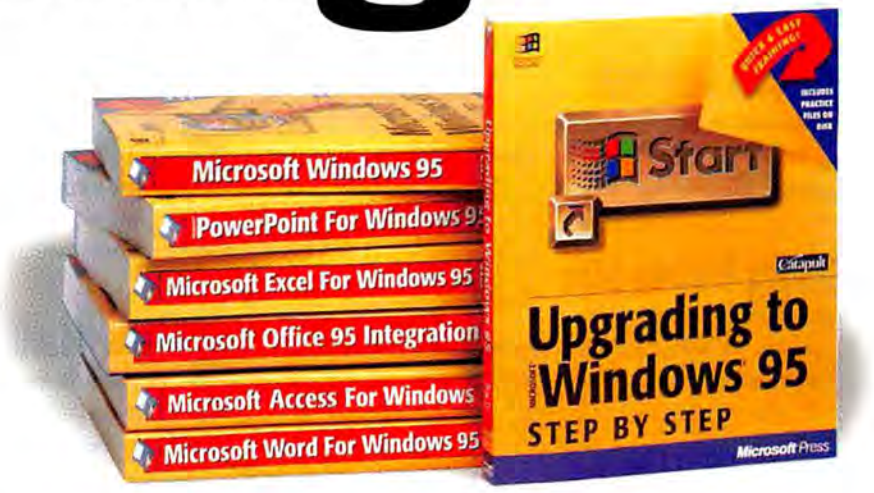
PROS: Well built, lots of room for expansion, three-year warranty

CONS: Sluggish P-75 performance, no sound

A dramatic $500 price drop puts the $1860 Z-Station minitower from Zenith Data Systems among our budget elite (the unit failed to make our chart last month). Our test system came with 8MB of RAM, 256K of secondary cache expandable to 1MB, an 850MB

ZDS Z-Station

Sure footed **training.**



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Designed for Microsoft® Windows® 95

hard drive, and a quad-speed CD-ROM drive. Like most ZDS systems we've seen, this one was well designed, but its performance lagged behind that of most other PCs in its processor class.

7 Gateway 2000 P5-75

LAST REVIEWED: March 1996

PROS: Low price, good 850MB hard drive, quad-speed CD-ROM drive

CONS: No secondary cache, no sound

8 CompuTrend Premio 5x86-100

LAST REVIEWED: March 1996

PROS: Great price for fully loaded PC with multimedia, performs like a fast P-75

CONS: No weekend support

9 DTK Quin 54M/P100

LAST REVIEWED: March 1996

PROS: Good P-100 performance, 6X CD-ROM drive, big 1080MB hard drive

CONS: Most expensive P-100 on the chart

10 Compaq ProLinea 575e

LAST REVIEWED: March 1996

PROS: High quality, new low $1788 price, 256K of cache, great reliability and service

CONS: Sluggish P-75 performance, small hard drive, no CD-ROM drive

11 Quantex QP5/100 M-3

NEW THIS MONTH

PROS: Fast, new low $1949 price, roomy hard drive, quad-speed CD-ROM drive

CONS: Low marks for system reliability and service

Like the number six ZDS Z-Station, the Quantex QP5/100 M-3 failed to make the chart last month, but after a $200 price drop it now debuts on the Budget list. It's fast and loaded with 16MB of RAM, a 1083MB hard drive, full multimedia, and a 15-inch monitor. Unfortunately, readers responding to our fax survey give Quantex low marks for service and system reliability.

Quantex

12 Dell OptiPlex GL+ 575

LAST REVIEWED: March 1996

PROS: Well built, network ready, 16MB of RAM, quad-speed CD-ROM drive

CONS: Small 540MB hard drive, limited expandability, no sound

13 Diamond DT-100

LAST REVIEWED: March 1996

PROS: Fully loaded, low price, solid performance, 6X CD-ROM drive

CONS: Small 14-inch monitor, poor documentation, one-year warranty

14 Tempest Pentium Giga Media P5-100

LAST REVIEWED: March 1996

PROS: Inexpensive, big 1270MB hard drive, full multimedia, fax-modem

CONS: Relatively slow Pentium-100 performance

15 Polywell Poly 4120P8

LAST REVIEWED: March 1996

PROS: New low $1650 price, 1080MB hard drive, full multimedia

CONS: Slowest on Budget chart, poor 15-inch monitor

16 Digital Venturis 575

LAST REVIEWED: March 1996

PROS: High quality, price drop to $2228, great scores for service and PC reliability

CONS: Small 14-inch monitor, limited expandability, no sound

17 Gateway 2000 P5-120

LAST REVIEWED: March 1996

PROS: Fast; 16MB of RAM; 1083MB hard drive; quad-speed CD-ROM drive

CONS: Expensive compared to other top budget PCs

18 Netis N4100

LAST REVIEWED: March 1996

PROS: Superlow price ($1468), big 1220MB hard drive, full multimedia

CONS: Fairly slow, one-year warranty on parts

19 Swan Family 75

LAST REVIEWED: March 1996

PROS: Integrated voice-enabled fax-modem, full multimedia

CONS: Slowest Pentium-75 we've tested, one-year warranty

20 Micro Express MicroFlex-PCI/5133

NEW THIS MONTH

PROS: Power system with a budget price, great performance, full multimedia

CONS: Poor scores for system reliability

Micro Express delivers the only Pentium-133 on this month's Budget Top 20—for just $2399. This system keeps up with the fastest P-133s that we've tested—its PC WorldBench score of 190 is just three points shy of that of the Dell Dimension XPS P133c (number two on the Power Top 20). The unit has 16MB of EDO RAM, 256K of secondary cache, and a 1280MB hard drive. For multimedia apps it has a quad-speed CD-ROM drive, a 16-bit wavetable sound card, and an STB Velocity 64 Video card with 2MB of dual-ported VRAM. However, the company gets low marks for system reliability in our fax survey.

Micro Express

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THE TOP 20

PC WORLD NOTEBOOK PCs

1 **Toshiba Satellite Pro 400CDT**
Quality multimedia to go.

POWER SYSTEMS

	Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Multi-media
1 Toshiba Satellite Pro 400CDT	1	4	Mar 96	89	124	85/71 [4]	$3999	Pentium-75	16	810	sound/CD
2 WinBook XP5 P120	–	1	current	89	146	61/80 [4]	$3799	Pentium-120	16	1295	sound
3 Dell Latitude LX 4100T	2	2	Mar 96	88	109	78 [4]/69 [4]	$2728	DX4-100	16	810	–
4 Gateway 2000 Solo S5-90XL	–	1	current	88	139	72 [4]/70 [4]	$4399	Pentium-90	16	720	sound/CD
5 WinBook XP5 P90	–	1	current	88	133	61/80 [4]	$3399	Pentium-90	16	814	sound
6 NEC Versa 4080H	–	1	current	87	132	77 [4]/ [4]	$4899	Pentium-120	16	1080	sound/CD
7 Dell Latitude XPi P90T	5	6	Mar 96	86	118	78 [4]/69 [4]	$4098	Pentium-90	16	810	–
8 WinBook XP5 P75	3	2	Mar 96	86	124	61/80 [4]	$2999	Pentium-75	16	814	sound
9 Austin Business Audio P-90	4	3	Mar 96	86	133	70 [4]/ [4]	$3496	Pentium-90	16	720	sound
10 Toshiba Satellite Pro 410CDT	–	1	current	86	126	85/71 [4]	$5378	Pentium-90	16	814	sound/CD

BUDGET SYSTEMS

1 Dell Latitude LX 4100D	2	6	Mar 96	89	84	78 [4]/69 [4]	$1928	DX4-100	8	420	–
2 Dell Latitude LX 4100T	–	1	Mar 96	87	109	78 [4]/69 [4]	$2728	DX4-100	16	810	–
3 Toshiba Satellite T2130CS	1	2	Mar 96	85	65	85/71 [4]	$1999	DX4-75	8	503	–
4 NEC Versa 2000D	3	3	Mar 96	81	49	77 [4]/ [4]	$1888	DX4-75	8	360	–
5 AMS SoundPro DX4-100	4	3	Mar 96	77	67	[4]	$2040	DX4-100	8	516	sound
6 Compaq Contura 430C	5	2	Mar 96	77	65	71/72 [4]	$2499	DX4-100	8	720	–
7 Acom Patriot 4000F	6	6	Mar 96	77	71	[4]	$2120	DX4-100	8	543	sound
8 Sharp PC-3050	7	3	Mar 96	76	57	[4]	$2599	Cx486DX2-66	8	543	sound
9 Compaq Contura 420CX	–	1	current	76	64	71/72 [4]	$2699	DX4-75	8	420	–
10 NEC Versa 2000C	9	2	Mar 96	76	59	77 [4]/ [4]	$2599	DX4-75	8	540	–

BEST BUY

[1] Percent contribution to overall rating for power notebooks: performance (22); price (14); battery (8); weight (8); features and design (16); reliability (22); service and support (10). Percent contribution to overall rating for budget notebooks is the same except performance (14) and price (22). [2] CA = color active, CD = color dual-scan, CP = color passive. [3] Call 800/434-4495 (for payment by Visa or MasterCard) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test

2 **WinBook XP5 P120**
As fast as a notebook goes.

1 **Dell Latitude LX 4100D**
Best bet for the cost-conscious.

2 **Dell Latitude LX 4100T**
Both a budget and a power note.

Weight (pounds)	Battery life (hours)	Screen type/ size [2]	Vendor contact number	Fax reprint number [3]	Reader service no.	Comments
9	4:21	CA/10.4"	800/334-3445	3728	720	Fast, feature-laden notebook now costs under $4000; perfect as primary computer.
7.4	6:19	CA/10.3"	800/468-1037	3738	721	Fastest note we've tested; reasonable price, but reliability score is low.
7.2	4:26	CA/10.4"	800/613-3355	3736	722	Superb choice for a tight budget. Fast, has ample storage and bright screen.
8.2	5:19	CA/10.4"	800/846-2000	3739	723	High price, but reasonable for multimedia note with excellent performance and battery life.
7.4	5:42	CA/10.3"	800/468-1037	3740	724	Fast, loaded, but no CD-ROM drive. CD-ROM docking station is $399 extra.
8.2	3:35	CA/10.4"	800/632-4636	3741	725	Costly, but easy to use and customize; battery life on the short side.
7.2	3:33	CA/10.3"	800/613-3355	3712	726	Pricey, shortish battery life, but fast, light, and backed by Dell's reputation for reliability.
7.2	5:01	CA/10.3"	800/468-1037	3742	727	One of the fastest, longest-lasting, most decked-out notebooks under $3000.
8.2	3:35	CA/10.3"	800/752-1577	3733	728	Reasonable price, fast, loaded notebook, but company gets low early marks for service.
9.0	5:03	CA/10.4"	800/334-3445	3743	729	Expensive, not much faster than a P-75; lots of features and top-ranked system reliability.
7.2	5:11	CD/10.3"	800/613-3355	3716	730	Inexpensive, fast, well built, long lasting.
7.2	4:26	CA/10.4"	800/613-3355	3736	722	Powerful yet affordable; a good all-around choice.
7.2	3:01	CP/10.5"	800/334-3445	3744	732	Short battery life, but inexpensive; should be reliable, good for basic work on the road.
7.2	5:09	CD/10.4"	800/632-4636	3734	733	Slowest on chart, but also cheapest; long battery life, good screen, built to last.
8.2	3:53	CA/10"	800/980-8889	3735	734	Decent performer, very affordable, but hefty; pointing device is hard to use.
7.4	4:46	CD/10.4"	800/345-1518	3745	735	Good price for well-made note backed by highly rated service and system reliability.
7.8	2:42	CP/10.3"	800/898-2665	3719	736	Fast, priced to move, but don't take it too far—battery life is awfully short.
7.4	3:17	CD/10.3"	800/237-4277	3737	737	Neither fast nor especially cheap, but very well built with good screen.
7.4	5:21	CA/10.4"	800/345-1518	3746	738	Expensive for what you get, but performs well and built by an industry leader.
7.8	3:16	CA/9.5"	800/632-4636	3722	739	Expensive, slow for budget note, but built to last; nice, if small, active-matrix screen.

Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95; available March 21). Touch-tone phone required. [4] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 908.

Top 20 Notebook PCs

HALF THE POWER NOTES ARE NEW THIS month. Two are from WinBook, which has three systems on the chart. The more expensive new entries from Gateway, NEC, and Toshiba sport CD-ROM drives for enjoying multimedia on the road.

On the budget side, a price cut makes Dell's Latitude LX 4100T the only portable on both charts. It still costs $800 more than the top-ranked Latitude LX 4100D, but it proves you can now buy a loaded notebook with the best color for under $2800 (our ceiling price for budget notes). The sole new notebook here is the Compaq Contura 420CX. A faulty battery prevented our testing it last month.

Power Notebooks

1 Toshiba Satellite Pro 400CDT

LAST REVIEWED: March 1996

PROS: Fast, good battery life, top-notch system reliability, quad-speed CD-ROM drive

CONS: Expensive

The Satellite Pro 400CDT fended off a challenge by the number two–ranked WinBook thanks to a recent price drop to $3999. That's still a lot for a P-75 portable, but since you get 16MB of RAM, an 810MB hard drive, built-in sound and speakers, and a quad-speed CD-ROM drive, it's worth the extra money.

The keyboard and eraserhead-style pointing device are comfortable, and the bright 10.4-inch active-matrix screen supports 16.8 million colors. With all essentials in tow—AC adapter, floppy drive, and CD-ROM drive—the Satellite Pro weighs 9 pounds. In our battery run-down test, it lasted a good 4 hours and 21 minutes.

2 WinBook XP5 P120

NEW THIS MONTH

PROS: Fastest notebook yet, huge hard drive, nice keyboard, fax-modem

CONS: One-year warranty, low marks for system reliability

WinBook makes great portable PCs. This fast new Pentium-120 unit shot straight to a Best Buy on our Power Notebooks chart. And even loaded with 16MB of RAM, a huge 1295MB removable hard drive, a bright 10.3-inch color active-matrix screen, and a 14.4-kbps internal fax-modem, it sells for a low $3799.

The 7.4-pound WinBook's keyboard is sleek and comfortable, with good key responsiveness. You have a nice choice of three pointing devices: an IBM-style track point embedded in the keyboard, a touchpad built into the wrist rest (both preinstalled), and an optional trackball. The touchpad, however, is oversensitive, causing you to double-click instead of single-clicking.

In our PC WorldBench test suite, the P-120 WinBook XP5 posted the fastest score (146) of any Windows 95 notebook we've tested. Like other WinBook XP5 portables, the P120 also turned in great results in our battery run-down test, lasting over 6 hours. It has no CD-ROM drive, but does feature a quality ensemble of built-in sound, speakers (with an external volume control), and microphone. There's also an infrared port for wireless communications.

WinBook P120

You don't get much application software beyond a Delrina communications suite. However, you do get a clearly written manual. WinBook backs its notebooks with a short one-year warranty.

3 Dell Latitude LX 4100T

LAST REVIEWED: March 1996

PROS: Fast DX4-100, inexpensive ($2728), big 810MB hard drive, 4.5-hour battery life

CONS: None significant

4 Gateway 2000 Solo S5-90XL

NEW THIS MONTH

PROS: Fast performance, great pointing device, long battery life, CD-ROM drive

CONS: Mediocre keyboard, expensive

The $4399 Solo S5-90XL is a sleek, sturdy multimedia portable. It's also the fastest Pentium-90 notebook on our Power chart: With a PC WorldBench score of 139, it's bumping heads with P-120 notes.

Our model featured 16MB of RAM, 256K of secondary cache, a 720MB removable hard drive, sound, speakers (with an external volume control), and a double-speed CD-ROM drive. Its 10.4-inch active-matrix color display is easy on the eyes and supports 800 by 600 resolution. A notable design feature of the unit is its GlidePoint—a square touchpad that you run your finger over to move the cursor. Gateway's pad is one of the best because it gives you just the right amount of control. But we found the keyboard somewhat uncomfortable.

Gateway Solo

The system's battery lasted over 5 hours in our test, though extensively running the CD-ROM drive on battery power will cut that time dramatically. Traveling weight is 8.2 pounds, but you can shave a pound off that by leaving either the CD-ROM drive or the floppy drive at home.

The S5-90XL comes with Microsoft Office Professional Edition; combined with Windows 95, the suite hogs a huge chunk of disk space, but it does give you applications for almost any business chore. Gateway backs its Solo notebooks with a standard one-year warranty. Extending that to three years costs an extra $100. Tech support is available around the clock.

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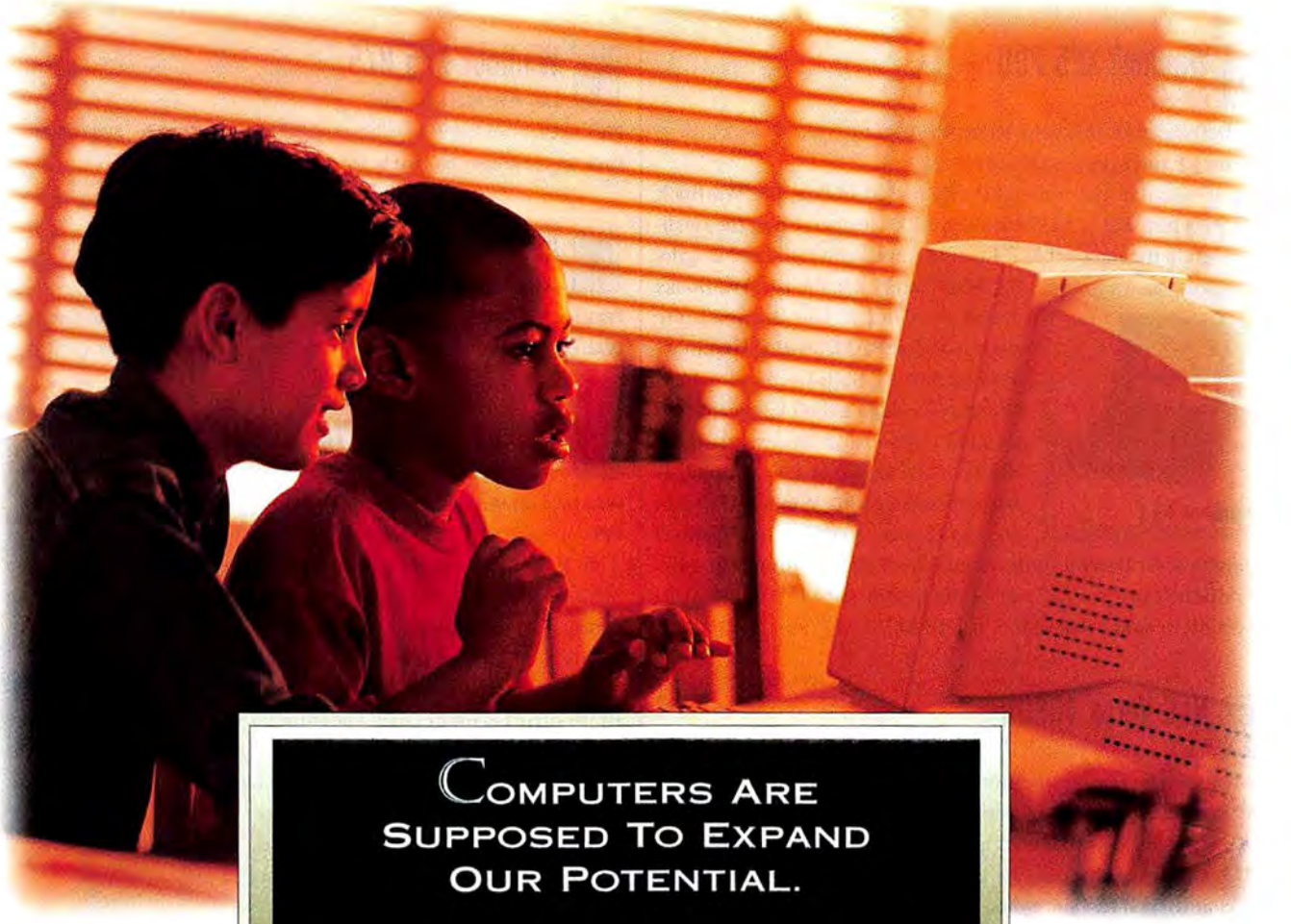

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*Ziff-Davis study, *PC Computing*, November 1994. Kingston Technology Corporation, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699.

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5 WinBook XP5 P90

NEW THIS MONTH

PROS: Well built, fast P-90 performance, big hard drive, fax-modem

CONS: One-year warranty, low marks for system reliability

Like its number two–ranked Pentium-120 sibling, the WinBook XP5 90 is fast, and at $3399, it's also $400 cheaper. From the quality design to the reasonable 7.4-pound traveling weight and lengthy 5.7-hour battery life, the two WinBooks are nearly identical. Our test unit came with 16MB of RAM, an 814MB removable hard drive, built-in sound, a 14.4-kbps fax-modem, a good keyboard, and a bright, 10.3-inch active-matrix color display. The optional $30 trackball is better for navigating Windows 95 than the touchpad, which doesn't afford enough cursor control to the user. The XP5 P90 turned in a PC WorldBench score of 133, one of the highest for a P-90 and just 10 percent lower than that of the XP5 P120.

WinBook P90

6 NEC Versa 4080H

NEW THIS MONTH

PROS: Good performance, comfortable keyboard, big hard drive, CD-ROM drive

CONS: Expensive; dull screen; 3.5-hour battery life on short side these days

The NEC Versa 4080H, with its Pentium-120 processor, 16MB of RAM, and 256K of secondary cache, posted good numbers in our PC WorldBench test suite. At $4899, however, it's the second most expensive notebook on the Power chart. Although its keyboard feels roomy and responsive, its 10.4-inch active-matrix super-VGA color display looks dull next to some of the brilliant screens we've seen on other units.

But the Versa 4080H offers a lot: It comes with a huge 1080MB removable hard drive; a quad-speed CD-ROM drive; built-in sound, speakers, and microphone; and *two* infrared ports. Its VersaGlide touchpad is responsive, and its modular VersaBay II lets you easily swap the CD-ROM drive for a floppy drive, a second battery, or an additional hard drive.

NEC Versa 4080H

The Versa 4080H is surprisingly light—just 7.6 pounds with the CD-ROM drive installed. Carrying the floppy drive along makes the traveling weight 8.2 pounds. Battery life is over 3.5 hours.

The Versa 4080H's few apps include the Co/Session remote control and TranXit wireless communications programs, and Taxi, a mapping guide to New York, Chicago, and Los Angeles. NEC offers a standard three-year warranty and around-the-clock support.

7 Dell Latitude XPi P90T

LAST REVIEWED: March 1996

PROS: New $100 price drop, big 810MB hard drive, 16.8 million–color screen, strong support

CONS: 3.5-hour battery life shorter than we've come to expect from top notebooks

8 WinBook XP5 P75

LAST REVIEWED: March 1996

PROS: Fast for a P-75, long 5-hour battery life, 814MB hard drive, fax-modem, good keyboard

CONS: One-year warranty, low marks for system reliability

9 Austin Business Audio P-90

LAST REVIEWED: March 1996

PROS: Fast; well built; 720MB hard drive; fax-modem; built-in sound, speakers, and microphone

CONS: Heavy (8.2 pounds), uncomfortable trackball, shortish 3.5-hour battery life

10 Toshiba Satellite Pro 410CDT

NEW THIS MONTH

PROS: Excellent system reliability score, good battery life, quad-speed CD-ROM drive

CONS: Very expensive

This P-90 model is well built and has multimedia extras like a quad-speed CD-ROM drive, built-in sound and speakers (with an external volume control), and a microphone for annotating documents. Its PC WorldBench score of 126 is good for its processor class, and its battery life of over 5 hours (without running the CD-ROM drive) is impressive—beating its 400CDT sibling by some 40 minutes. But at $5378 for a P-90 notebook with 16MB of RAM and an 814MB hard drive, the 410CDT is among the most expensive multimedia portables we've tested. Toshiba's aggressive pricing of the 400CDT, however, suggests the cost should drop soon.

Toshiba 410CDT

The unit's keyboard and eraser-style pointing device are comfortable. Its 10.4-inch color active-matrix display is perfect for image editing programs because it supports over 16.8 million colors, albeit at a standard 640 by 480 resolution. With its external floppy drive, the 410CDT's traveling weight is 9 pounds, a bit on the hefty side. Leaving this drive at home shaves off a pound.

Toshiba provides some of the most extensive service in the business, including a three-year warranty; around-the-clock support; and two-day factory repairs for $50 per year.

Budget Notebooks

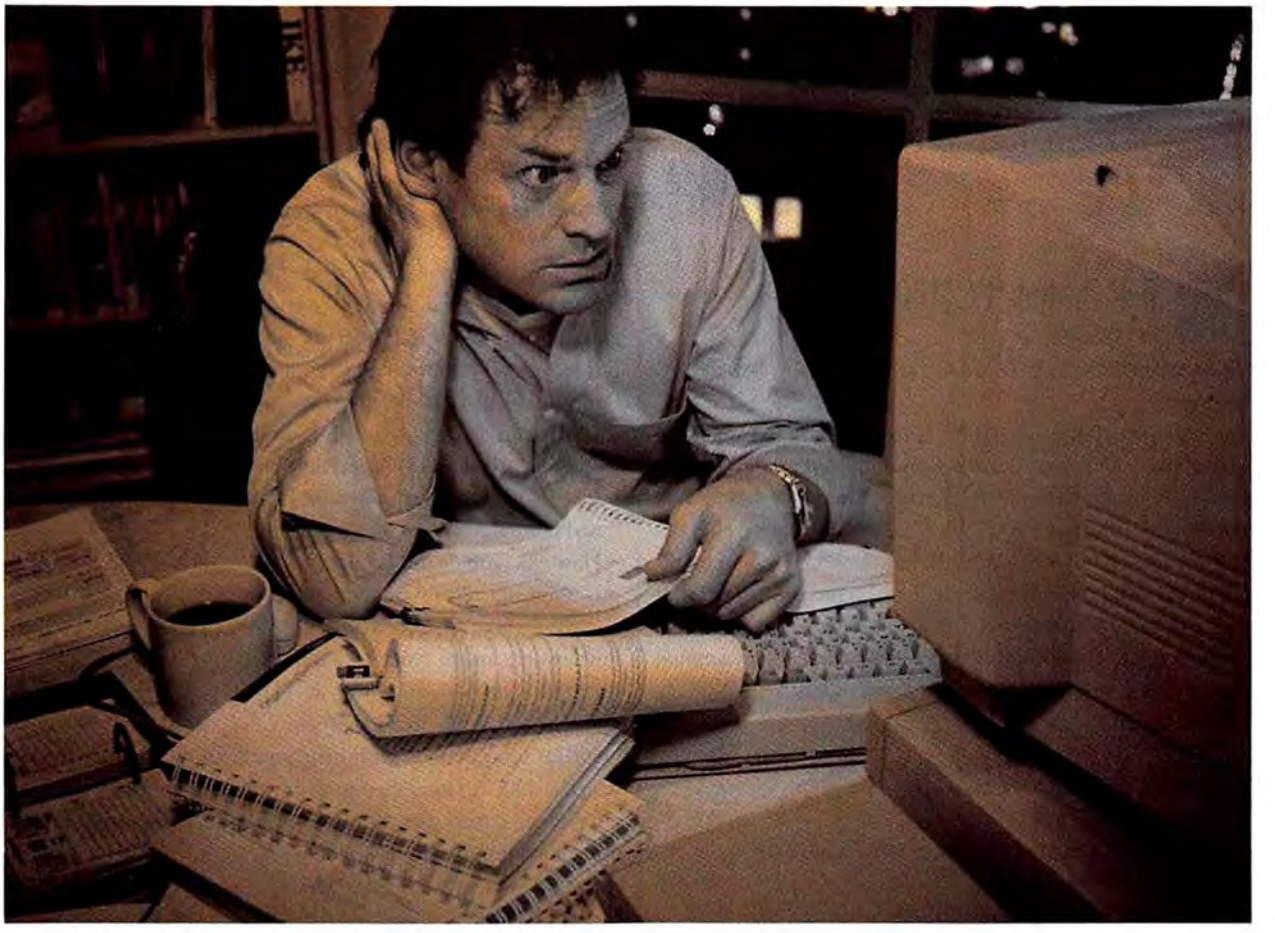
1 Dell Latitude LX 4100D

LAST REVIEWED: March 1996

PROS: Inexpensive, fast for a DX4-100, long battery life, good reliability and service

CONS: Dull screen, cramped keyboard

The Latitude LX 4100D is back on top of the Budget Notebooks chart thanks to a $370 price cut. The $1928 LX 4100D garnered a PC WorldBench score of 84, second only to Dell's LX 4100T among DX4-100 portables, and its battery lasted over 5 hours in our run-down test. The LX 4100D isn't as loaded as its second-ranked sibling—it comes with just 8MB of RAM, a 420MB hard



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drive, and a 10.3-inch dual-scan color screen—but it's an excellent value if you want a quality color note for under $2000. The price includes a three-year warranty. If you can do with one-year coverage, the price drops to just $1799.

2 Dell Latitude LX 4100T

LAST REVIEWED: March 1996

PROS: Fast DX4-100, inexpensive, big 810MB hard drive, 4.5-hour battery life, good support

CONS: None significant

The beefed-up Latitude LX 4100T is loaded enough to rank on the Power Notebooks chart (where it's number three), but now, at $2728, it's also inexpensive enough to earn a Best Buy as a budget system. With its 16MB of RAM and 128K of secondary cache, the LX 4100T cranked out a PC WorldBench score of 109—remarkable for a DX4-100 note and easily the best on the Budget chart. It weighs 7.2 pounds and ran for 4.5 hours in our battery test. Like the top-ranked LX 4100D, its price includes a three-year warranty; cutting this to one year brings the price down to $2599.

3 Toshiba Satellite T2130CS

LAST REVIEWED: March 1996

PROS: High-quality DX4-75, low $1999 price, excellent service and reliability

CONS: Mediocre 3-hour battery life

4 NEC Versa 2000D

LAST REVIEWED: March 1996

PROS: Excellent $1888 price, nice dual-scan color screen, 5-hour battery life

CONS: Slow DX4-75 performance, small 360MB hard drive

5 AMS SoundPro DX4-100

LAST REVIEWED: March 1996

PROS: Low $2040 price, built-in sound, 10-inch color active-matrix screen

CONS: Hefty (8.2 pounds), poor trackball and mouse buttons

6 Compaq Contura 430C

LAST REVIEWED: March 1996

PROS: Good $2499 price for well-built notebook, nice keyboard, long 4.8-hour battery life

CONS: A little slow for a DX4-100

7 Acom Patriot 4000F

LAST REVIEWED: March 1996

PROS: Fast for a DX4-100 notebook, built-in sound

CONS: Short 2.7-hour battery life, poor sound, subpar documentation

8 Sharp PC-3050

LAST REVIEWED: March 1996

PROS: Built-in sound, 14.4-kbps fax-modem, lots of extra software

CONS: Slow Cyrix 486DX2-66, stiff keyboard, short 3.25-hour battery life

9 Compaq Contura 420CX

NEW THIS MONTH

PROS: Well built, good DX4-75 performance, long battery life, three-year warranty

CONS: Pricey; smallish 420MB hard drive

This sturdy notebook offers a comfortable keyboard and a responsive trackball; has a bright 10.4-inch color active-matrix display; and runs through Windows 95 in our new suite as well as the best DX4-75 notes that we've tested, though that's slow compared to Pentiums. But at $2699 for a system with 8MB of RAM, just a 420MB hard drive, and no application software or built-in sound, it's awfully expensive—especially since the DX4-75 is the least powerful Intel-based portable you can buy.

Compaq Contura

However, you do get Compaq's high-quality design. At 7.4 pounds, this unit is easy to take on the road. Its large keys won't make you feel fumble-fingered, and its wrist rest is close enough to the keyboard that you can work for long periods with little strain. In our battery run-down test, the 420CX lasted an impressive 5 hours and 21 minutes.

Compaq covers the Contura with a three-year warranty and offers technical support 24 hours a day.

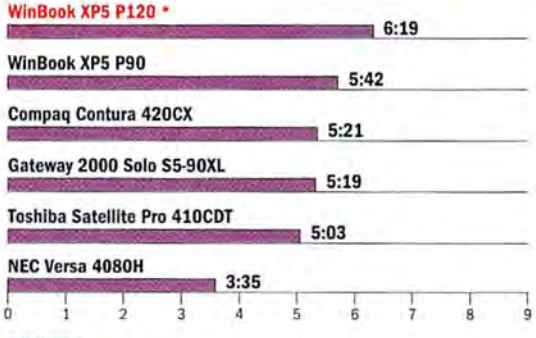
10 NEC Versa 2000C

LAST REVIEWED: March 1996

PROS: Nice 9.5-inch active-matrix color screen, internal fax-modem

CONS: Sluggish DX4-75 performance, short 3.25-hour battery life

TEST REPORT Battery Life



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Time in hours:minutes.

Methodology
We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows 95 applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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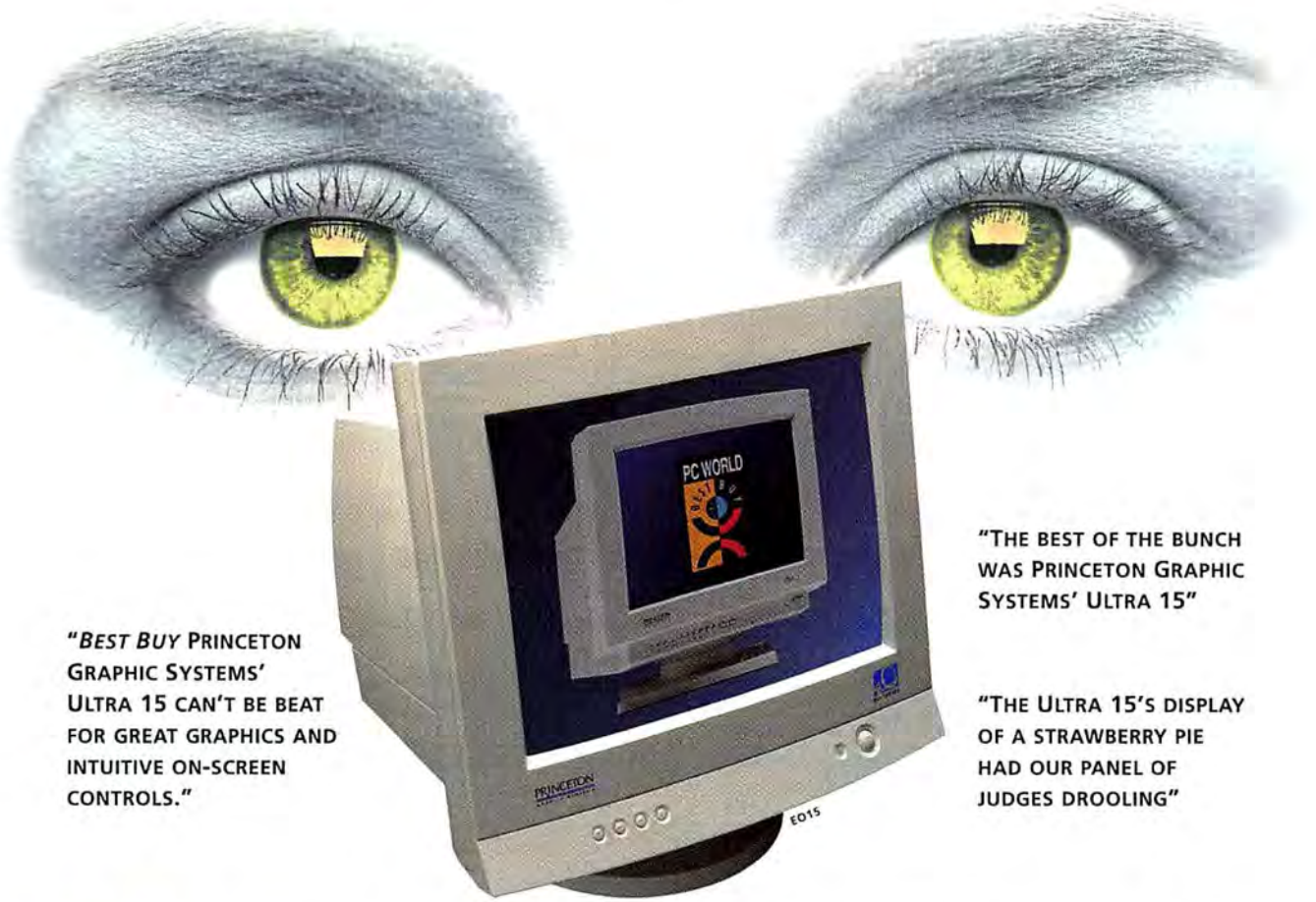

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Circle 151 on reader service card

This Month's Contenders—Desktops

● = Yes ○ = No

n/a = not applicable

Standard features	Dell OptiPlex GXMT 5133	Gateway 2000 P5-100 Family PC	Gateway 2000 P5-166XL	Micro Express MicroFlex-PCI/5133	Micron P166 Millennia
Street price as of 2/4/96 [1]	$3803	$2139	$3964	$2399	$3148
CPU	Pentium-133	Pentium-100	Pentium-166	Pentium-133	Pentium-166
CPU or upgrade socket	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF
BIOS	Phoenix v1.01 BIOS Plus	AMI v1.00.03 3/6/95	AMI v1.00.01 9/18/95	Award Plug and Play v1.0A 8/30/95	Phoenix v4.04 10/27/95
Installed/maximum RAM (MB)	16/128	16/128	16/128	16/128	16/128
SIMM sockets/number free	4/2	4/2	4/2	6/2	4/2
Secondary RAM cache installed/maximum (K)	256/256	0/0	256/512	256/512	256/256
Case style	minitower	compact	compact	minitower	minitower
Free externally accessible 3½-inch/5¼-inch drive bays	0/2	0/2	0/2	1/2	0/2
Free internal 3½-inch/5¼-inch drive bays	1/0	0/0	2/0	1/0	0/0
Free 16-bit ISA expansion slots [2]	6	2	1	4	3
Free 32-bit PCI expansion slots [2]	2	2	3	3	1
Hard disk	WD Caviar 31600	WD Caviar 21000	WD Caviar 31600	Quantum Fireball	Quantum Fireball
Size (MB)	1624	1083	1624	1280	1280
Adapter	integrated EIDE	integrated EIDE	integrated EIDE	integrated EIDE	integrated EIDE
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44
Graphics adapter	integrated	STB Powergraph 64 Video	Matrox MGA Millennium	STB Velocity 64 Video	Diamond Steath64 Video
Installed memory (MB)/type	2/DRAM	2/DRAM	2/WRAM	2/VRAM	2/VRAM
Monitor	Dell 1728DL5	Sony CPD-15F23	Vivitron 17 CPD 17F23	GVC M1566	Micron 15Gx
Tube/viewable diagonal (inches)	17/15.5	15/13.6	17/15.8	15/13.6	15/13.6
Dot pitch (mm)	.28	.25	.25	.28	.28
Modem speed for fax/data (kbps)	n/a	14.4/28.8	14.4/28.8	n/a	n/a
Sound board	integrated 16-bit	Creative Technologies Vibra 16S	Ensoniq Soundscape	SB AWE32	SB AWE32
CD-ROM drive	NEC CDR-273	Mitsumi CRMC FX400L	Wearnes CDD-620	Toshiba XM-5302B	Teac CD-56E
Data transfer rate (K/sec)	600	600	900	600	900
Parallel/serial/mouse/SCSI ports	1/2/1/0	1/2/1/0	1/2/1/0	1/2/0/0	1/2/1/0
Service and support					
Warranty for parts/labor (years)	3/1	3/1	3/3	2/2	5 [3]/1
30-day money-back guarantee	●	●	●	●	●
On-site service first-year price	free	free	free	free	free
Repair turnaround policy (days at service center)	○	○	○	2	2
Daily toll-free phone support (hours)	24	24	24	10 [4]	24
Weekend support	●	●	●	●	●
Online support sites	BBS, WWW, AOL, CIS, Prodigy	BBS, WWW, AOL, CIS, Prodigy	BBS, WWW, AOL, CIS, Prodigy	○	BBS, WWW
Automated fax support	●	●	●	●	○

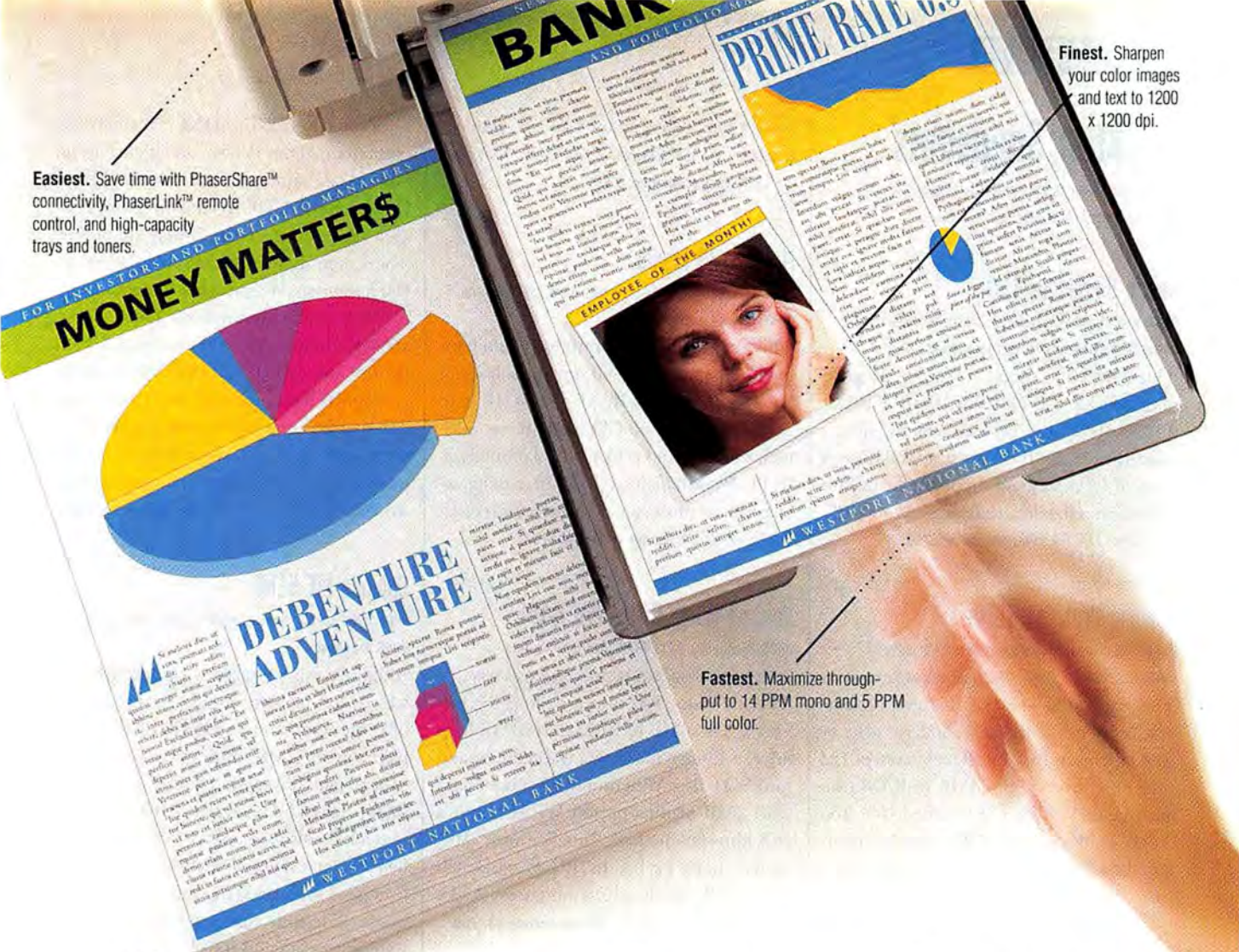
BEST BUY

[1] All systems priced as configured with Windows 95, VGA and color monitor, keyboard, and mouse. Price is direct or based on vendor estimate.

[2] One less 16-bit slot ISA available when all PCI slots are filled, and vice versa.

[3] On CPU and main memory; three-year warranty on all other parts.

[4] Toll support available remainder of day and on weekends.



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Desktop Snapshots

These systems were tested along with the others but didn't score high enough to reach the Top 20 charts.

Austin PowerPlus 120

PROS: Robust, full multimedia, 28.8-kbps fax-modem

CONS: Mediocre reliability score for a power system

This $2788 PC landed in striking distance of the Power Top 20. It has 16MB of RAM, a 1275MB hard drive, a 17-inch monitor, a quad-speed CD-ROM drive, a WorldBench score of 170, and good support policies. But its system reliability score lags. *Austin/IPC, 800/752-1577* **Reader service no. 750**

Compaq ProLinea 5120e

PROS: Well built; outstanding service and reliability

CONS: Expensive for a "value" PC, painfully slow, no sound

This $3060 PC—part of Compaq's lower-cost "e" series—has no secondary cache or EDO memory. Its WorldBench score of 122 is terrible, even with 24MB of RAM (the mainstream ProLinea 5120 scored 169). You do get a 1060MB hard drive and a quad-speed CD-ROM drive. *Compaq Computer Corp., 800/345-1518* **Reader service no. 751**

MidWest Micro P5-120 Office PC

PROS: Decent price, MS Office Standard and Encarta

CONS: Poor P-120 performance, no sound

This $2199 tower PC lacks a fax-modem but offers 16MB of RAM, a 1083MB hard drive, and a quad-speed CD-ROM drive. Its 15-inch monitor flickers, and you'll find cable clutter inside. Its WorldBench score of 133 was lower than those of most P-100 systems we've tested. *MidWest Micro, 800/203-3012* **Reader service no. 752**

MultiWave Pro MPEG P133

PROS: Good monitor, voice-enabled modem, 6X CD-ROM drive

CONS: Poor documentation, one-year warranty

Despite the name, there's no MPEG video hardware, just MPEG playback software, plus an STB Powergraph 64 Video card. This $2650 multimedia minitower is well designed (good keyboard, 15-inch Acer monitor, 16MB of EDO RAM, and 1080MB hard drive). Even its PC WorldBench score of 193 is top-drawer. Drawbacks: limited support, a one-year warranty, and poor documentation. *MultiWave Technology, 800/234-3358* **Reader service no. 753**

Netis 5120 Media

PROS: Low price for a P-120, big hard drive, full multimedia

CONS: One-year parts warranty

This $2290 P-120 minitower was held back by the company's limited support policies. It has 16MB of EDO RAM, a 1624MB hard drive, a quad-speed CD-ROM drive, a 15-inch monitor, and a 14.4-kbps fax-modem. Its PC WorldBench score of 170 is about average for its processor class. *Netis Technology, 800/577-7526* **Reader service no. 754**

Vektron Home Office Pro P-166

PROS: Great price, 6X CD-ROM drive, lots of software

CONS: Poor documentation, cluttered, one-year warranty

This Pentium-166 tower, selling for just $2895, has 16MB of RAM, a 1624MB hard drive, a 15-inch monitor, a wavetable sound card, a Matrox Millennium graphics board with 2MB of dual-ported WRAM, and a 28.8-kbps fax-modem. But even with 256K of secondary cache, its PC WorldBench score of 196 barely edged our fastest P-133. *Vektron, 800/725-0026* **Reader service no. 755**

Xi P166 MTower SP

PROS: 17-inch monitor, 6X CD-ROM drive, MS Office Pro

CONS: One-year warranty, limited support hours

This $3499 system comes with 16MB of EDO RAM, 512K of secondary cache, a 1280MB hard drive, a wavetable sound card, and a Millennium graphics board with 2MB of WRAM. Its P-166 performance was decent. *Xi Computer Corp., 800/432-0486* **Reader service no. 756**

Notebook Snapshots

These notebooks were tested along with the others but didn't score high enough to reach the Top 20 chart.

Canon InnovaBook 1100 P120T, Canon InnovaBook 1100 P90T

PROS: Big hard drives, nice screens and keyboards

CONS: Slow, short battery lives, one-year warranties

Besides costing a steep $6299, the InnovaBook 1100 P120T is slow—even the Dell Latitude LX 4100T (a DX4-100 notebook) outperformed this P-120—and it ran only an hour in our battery test. It has just 8MB of RAM, but the 1160MB hard drive and 11.3-inch active-matrix color display are pluses. The screen supports 65,536 colors at 800 by 600 resolution. Weight is just 7.6 pounds.

The 7.4-pound InnovaBook 1100 P90T—a P-90 system—also is slow, with a 1-hour battery life. At $4199, it has 8MB of RAM, an 810MB hard disk, and an 11.3-inch active-matrix super-VGA color display. Both units have an auto-resume feature, so you pick up where you left off. *Canon Computer Systems, 800/848-4123* **Reader service no. 758**

Compaq LTE 5100

PROS: Blazing P-90 speed, excellent design, CD-ROM drive

CONS: Expensive

Although this portable is among the best we've seen, its hefty $6428 price takes it out of contention. You get 16MB of RAM expandable to 72MB, 256K of cache, a roomy 810MB hard drive, and a double-speed CD-ROM drive. Its exceptional 10.4-inch active-matrix display supports 65,536 colors at 800 by 600 resolution; built-in speakers deliver good sound; and the battery lasts over 3 hours. The unit comes with a three-year warranty and around-the-clock tech support. It's the fastest P-90 note we've tested—but oh, that sticker shock. *Compaq Computer Corp., 800/888-9525* **Reader service no. 757**

IBM ThinkPad 760CD

PROS: Spectacular display, keyboard, and multimedia

CONS: Way too expensive, short battery life

Once again, IBM has built the absolute best notebook almost no one can afford. The 12.1-inch active-matrix super-VGA color display sets a new standard for quality; the keyboard is as good as they come; and the multimedia features—a quad-speed CD-ROM drive, sound and speakers, MPEG, video in and out ports, MIDI ports, game port, and a 14.4-kbps voice-enabled fax-modem—are second to none. You also get 16MB of RAM, 256K of secondary cache, and an 1160MB hard drive. Just don't choke on the $8134 price tag. The unit's P-90 performance is strong but not stellar, and battery life is only about 2 hours. *IBM Personal Computer Co., 800/426-2968*

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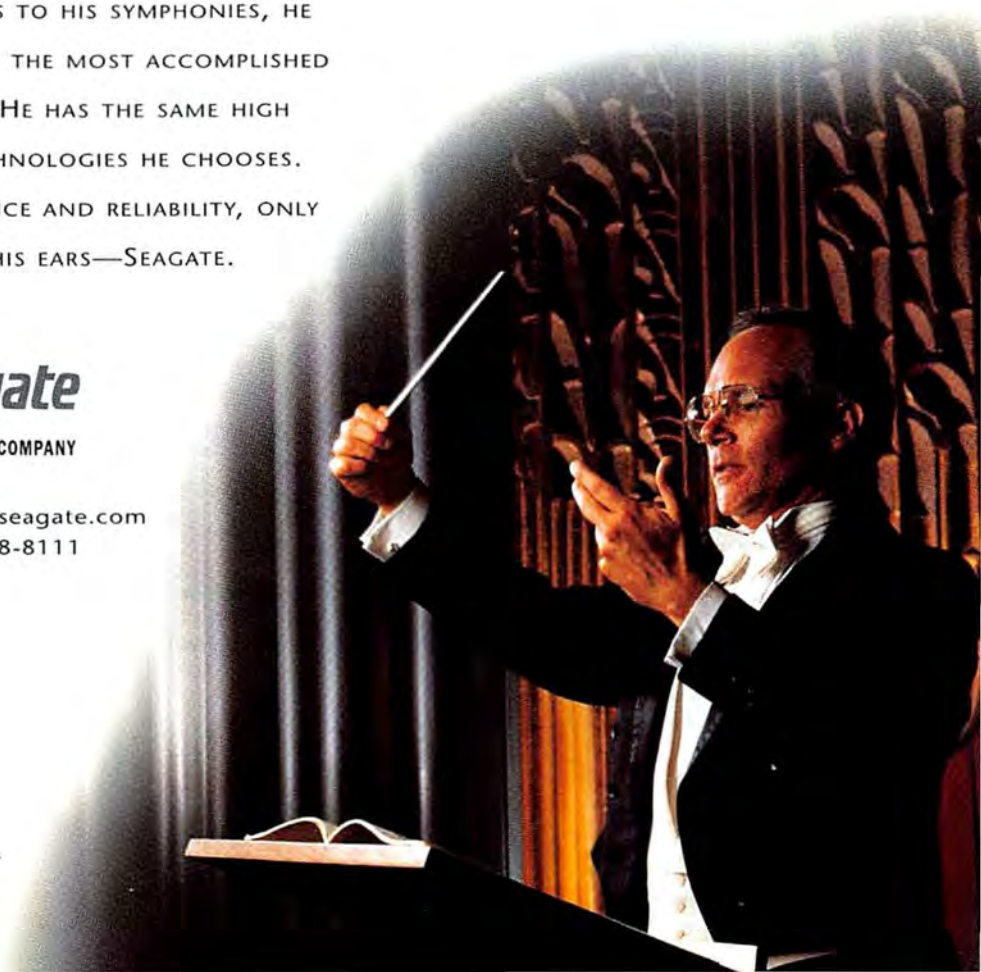

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This Month's Contenders–Notebooks

● = Yes ○ = No

n/a = not applicable

Standard features	Compaq Contura 420CX	Gateway 2000 Solo S5-90XL	NEC Versa 4080H	Toshiba Satellite Pro 410CDT	WinBook XP5 P90	WinBook XP5 P120
Street price as of 2/4/96 [1]	$2699	$4399	$4899	$5378	$3399	$3799
CPU	DX4-75	Pentium-90	Pentium-120	Pentium-90	Pentium-90	Pentium-120
Traveling weight (pounds) [2]	7.4	8.2	8.2	9	7.4	7.4
Width x depth x height (inches)	11.9 x 8.9 x 2	11.6 x 8.7 x 2	11.7 x 9.4 x 2.1	11.8 x 9.2 x 2.2	11.4 x 8.8 x 2.1	11.4 x 8.8 x 2.1
Installed/maximum RAM (MB)	8/32	16/40	16/40	16/40	16/32	16/32
Secondary RAM cache installed/ maximum (K)	0/0	256/256	256/256	0/0	256/256	256/256
Installed/maximum hard disk (MB)	420/720	720/1200	1080/1080	814/814	814/1295	1295/1295
Removable hard disk	●	●	●	○	●	●
Screen type	color active	color active	color active	color active	color active	color active
Viewable screen diagonal (inches)	10.4	10.4	10.4	10.4	10.3	10.3
Maximum screen colors	65,536	256	256	16.8 million	65,536	65,536
Simultaneous LCD and external monitor	●	●	●	●	●	●
Highest resolution of external monitor	640 x 480	800 x 600	800 x 600	640 x 480	640 x 480	640 x 480
Mouse/keyboard ports	●/● [3]	○/○	●/● [3]	●/● [3]	●/● [3]	●/● [3]
Cursor keys in inverted T	●	●	●	●	●	●
Dedicated page-control keys	○	●	●	●	●	●
All 12 function keys dedicated	●	●	●	●	●	●
Standard <Ctrl> and <Alt> layout	●	●	○	○	○	○
Built-in pointing device	trackball	touchpad	touchpad	track point	track point/ touchpad	track point/ touchpad
CD-ROM drive speed	n/a	2X	4X	4X	n/a	n/a
Built-in sound	○	●	●	●	●	●
Fax/data modem speed (kbps)	n/a	n/a	n/a	n/a	14.4/14.4	14.4/14.4
Docking station available	●	○ [4]	●	○ [4]	●	●
PC Card slots Type II/III	2/1 [5]	2/1 [5]	2/1 [5]	2/1 [5]	2/1 [5]	2/1 [5]
Power management						
Type of battery	NiMH	lithium ion	lithium ion	lithium ion	lithium ion	lithium ion
Suspend button	●	●	●	●	●	●
Suspends when case closed	○	●	●	●	●	●
Service and support						
Warranty for parts/labor (years)	3/3	1/1	3/3	3/3	1/1	1/1
30-day money-back guarantee	●	●	●	○	●	●
On-site/replacement service first-year price	$149	free	free	n/a	n/a	n/a
Repair turnaround policy (days at service center)	2	○	1	[6]	3	3
Daily toll-free phone support (hours)	24	24	24	24	13	13
Weekend support	●	●	●	●	● [7]	● [7]
Online support sites	BBS, WWW, AOL, CIS, Prodigy	BBS, WWW, AOL, CIS, Prodigy	BBS, WWW, AOL, CIS	BBS, WWW, CIS	○	○
Automated fax support	●	●	●	●	●	●

BEST BUY

[1] All notebooks priced as configured with Windows 95, color VGA display, and mouse or other pointing device. Street price is direct or based on vendor estimate.

[2] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one.

[3] Mouse port doubles as keyboard port.

[4] Port replicator available.

[5] Type III slot alternatively accepts two Type II devices.

[6] $50 per year for 2-day turnaround.

[7] Saturdays only.

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MidWest Micro SoundBook II p

PROS: Great price, good P-75 performance, built-in sound

CONS: Poor-quality touchpad pointing device, dull display

This $2399 P-75 note with 8MB of RAM had good WorldBench scores. But its passive color display is dull, and its touchpad is hard to handle. The warranty is for one year; tech support is available on Saturdays. *MidWest Micro, 800/203-3012* **Reader service no. 759**

NEC Versa 4050C

PROS: Big, comfortable keyboard; full multimedia

CONS: Dull color display, short battery life

This $4199 P-90 unit tested well, but battery life was under 3 hours. It has 16MB of RAM, an 814MB hard disk, a 4X CD-ROM drive, and audio. The screen supports over 16.8 million colors at 640 by 480. *NEC Technologies, 800/632-4636* **Reader service no. 760**

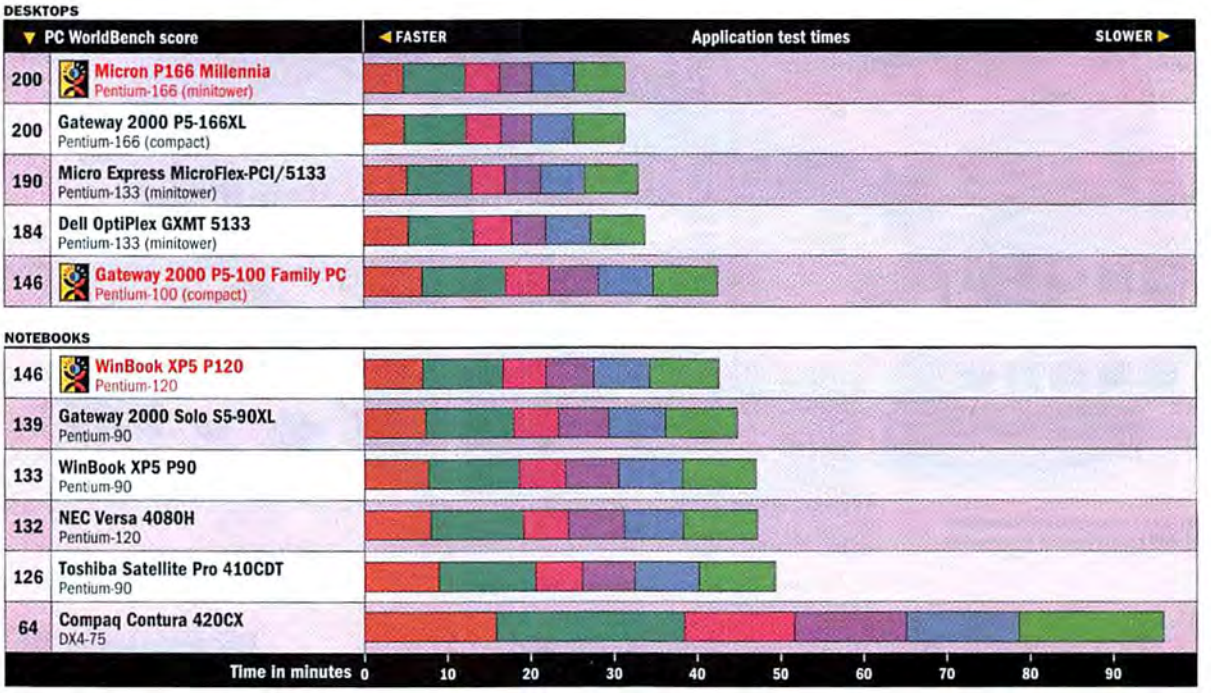
Texas Instruments Extensa 450

PROS: Good price, dazzling dual-scan color display

CONS: Slowest notebook we've tested under Windows 95

This well-built, no-frills $1998 note has a DX4-75 processor, 8MB of RAM, a 340MB hard drive, and a terrific 10.3-inch dual-scan color display. The warranty is for one year, with 24-hour tech support. *Texas Instruments, 800/848-3927* **Reader service no. 761**

This Month's Contenders



BEST BUY

Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from six tests.

Methodology We test each system as supplied by the manufacturer. All tests are performed under Windows 95 configured with an HP LaserJet IV as the default printer. We disable any power-saving features. We set the video resolution to 800 by 600 in 256 colors, using the supplied video driver where possible. We load the test applications and files and the test automation software and scripts.

Word 7.0 for Windows 95 (25 percent of weighting)
We open multiple documents, format text, copy and paste, close files, scroll, and save files. We also change document views, insert text, check spelling, repaginate, count words, print preview, and mail merge.

Excel 7.0 for Windows 95 (20 percent)
Using a variety of worksheets including an automobile statistics sheet, a multisheet federal income tax workbook, a variable-rate mortgage worksheet, and an analysis of life insurance policies, we perform common functions and tasks including opening a file, formatting, data entry, sorting, recalculation, data query, print preview, printing, and saving the file.

Picture Publisher 6.0 for Windows 95 (15 percent)
Using an assortment of graphics, we perform functions including opening and saving files, zooming, scrolling, palette changes, posterization, image masking, hue shifting, feathering, and copying and pasting.

WordPerfect 6.1 for Windows (15 percent)
We open different-size files, search for text, change fonts, enter text, save files, and jump to a particular page. We also check spelling, copy and paste, scroll, change document views, and insert one file into another.

1-2-3 release 5 for Windows (10 percent)
Same functions as the Excel test.

Paradox 5.0 for Windows (15 percent)
We simulate an order entry system. We import tables and post a series of orders, looking up customer and product data in the process. We perform a variety of queries, edit data, and create reports.

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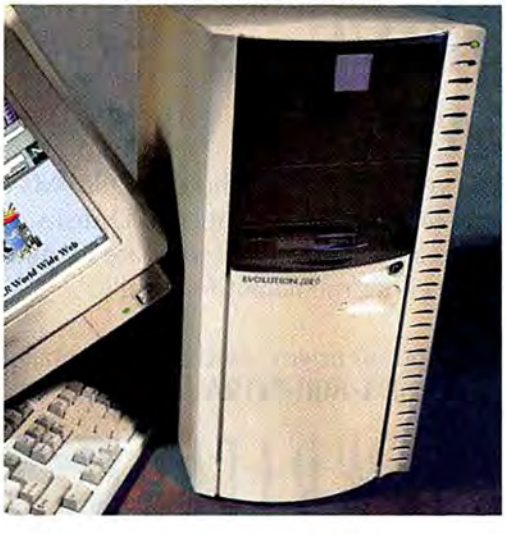
150-MHz Pentium Pro Processor

Mini Tower Model
16-MB Memory
128-MB Max Memory
256-KB Integrated L2 Cache
PCI/ISA Bus Architecture
Six Total Storage Bays
Six Total Expansion Slots
200 Watt Power Supply
5 Year/ 36 Month Warranty
First Year On-Site Service*

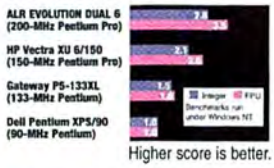
$3495 MSRP

Trying to fit Pentium Pro technology into a tight budget? Then check out the ALR EVOLUTION 6. This value-packed PC offers a 150- or 200-MHz Pentium Pro chip and 16-MB of RAM for as little as $3495 MSRP. Yet even at this low price, it takes full advantage of the Pentium Pro chip's most advanced features, including Dynamic Execution.

ALR EVOLUTION DUAL6



BYTEmark 32-bit CPU/FPU Benchmarks



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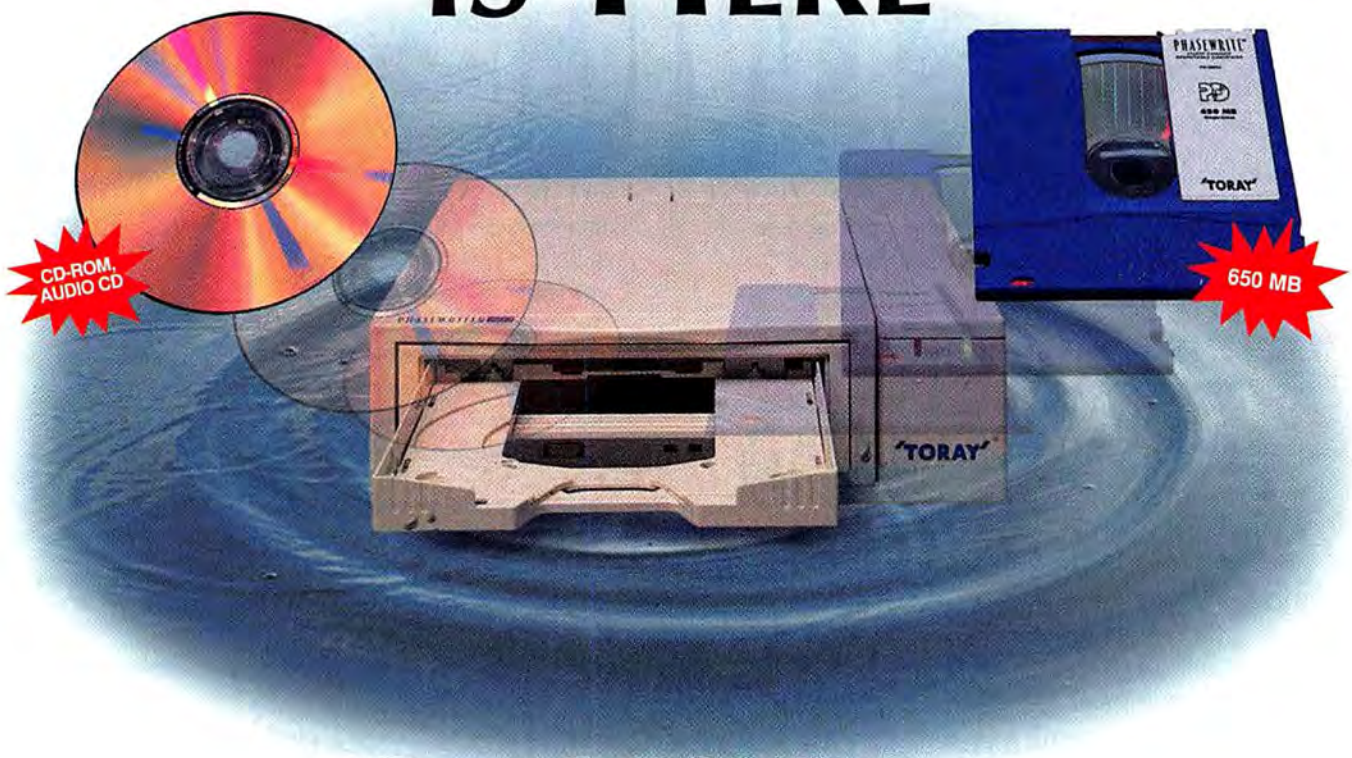
Circle 9 on reader service card

Windows 95 Compatible

THE NEW PD STANDARD IS HERE



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It's the Phasewriter Dual™ with PD technology from Toray and it transcends existing standards with more flexibility than any other optical drive. Phasewriter Dual reads CD-ROMs at quad speed and reads or writes to optical disks at a blistering .87 MBytes/second transfer rate. Just drop a CD-ROM into our new Phasewriter Dual or switch to a 650 MByte single-sided rewritable disk for portable data exchange. The Phasewriter Dual is setting new standards with higher capacity and CD-ROM compatibility at a much lower cost.

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RELIABILITY AND SERVICE MONITOR

Win a Gateway 2000 P5-75

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below–even if you have no problems to report, and even if you have responded to this survey before–and we'll enter you in a drawing to win a Gateway 2000 P5-75, a Pentium-75 PC in this month's Top 20.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to Fax Survey, Box 4-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107-1496. Surveys must be received by April 30.
PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.
HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer	○ Compudyne	○ Future Tech	○ MIS	○ Swan
○ Acma	○ Computrend	○ Gateway 2000	○ NEC	○ Tangent
○ ALR	○ Comtrade	○ Hewlett-Packard	○ Netis	○ Texas Instruments
○ Apple	○ Cornell	○ HiQ	○ Packard Bell	○ Toshiba
○ AST	○ CTX	○ Hyundai	○ Panasonic	○ Twinhead
○ AT&T (NCR)	○ Dell	○ IBM	○ PerComp	○ USA Flex
○ Austin (IPC)	○ Diamond	○ Insight	○ Pionex	○ VTech (Expotech, Laser)
○ Axik	○ Digital (DEC)	○ Intelesys	○ Polywell	○ WinBook
○ Blackship	○ DTK	○ Leading Edge	○ Quantex	○ Zenith (ZDS)
○ Canon	○ FPS	○ Micro Express	○ Robotech	○ Zenon
○ Compaq	○ Epson	○ Micron	○ Samsung	○ Zeos
○ CompuAdd	○ Everex	○ Midwest Micro	○ Sharp	○ Other

What size is this PC?
○ Desktop
○ Notebook/laptop
○ Handheld

What is the CPU?
○ PowerPC
○ Pentium
○ 80486
○ 80386
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ Value-added reseller
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1–2 weeks
○ 3–4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 91	○ 93	○ 95
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 92	○ 94	○ 96

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ Three
○ One ○ Four
○ Two ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Please answer for the most recent problem–*other than DOA*–not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 91	○ 93	○ 95
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 92	○ 94	○ 96

How long was this after you purchased your PC?
○ Less than 1 month ○ 4–6 months ○ More than 12 months
○ 1–3 months ○ 7–12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Wrong configuration ○ Device conflicts ○ Other
○ Incorrectly installed software ○ Faulty peripheral ○ OS problem ○ Don't know

If a component failed, which one was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ System swap
○ On site ○ Component swap
○ In store ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ 1–2 minutes ○ 6–10 minutes ○ More than
○ Less than 1 minute ○ 3–5 minutes ○ 11–20 minutes 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 2–5 hours ○ 11–24 hours ○ 3–5 days
○ 15 minutes–1 hour ○ 6–10 hours ○ 1¹/₂–2 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ More than 1 month
○ 3–7 days ○ Never resolved
○ 8–14 days ○ Awaiting resolution
○ 15–30 days

Was the problem resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

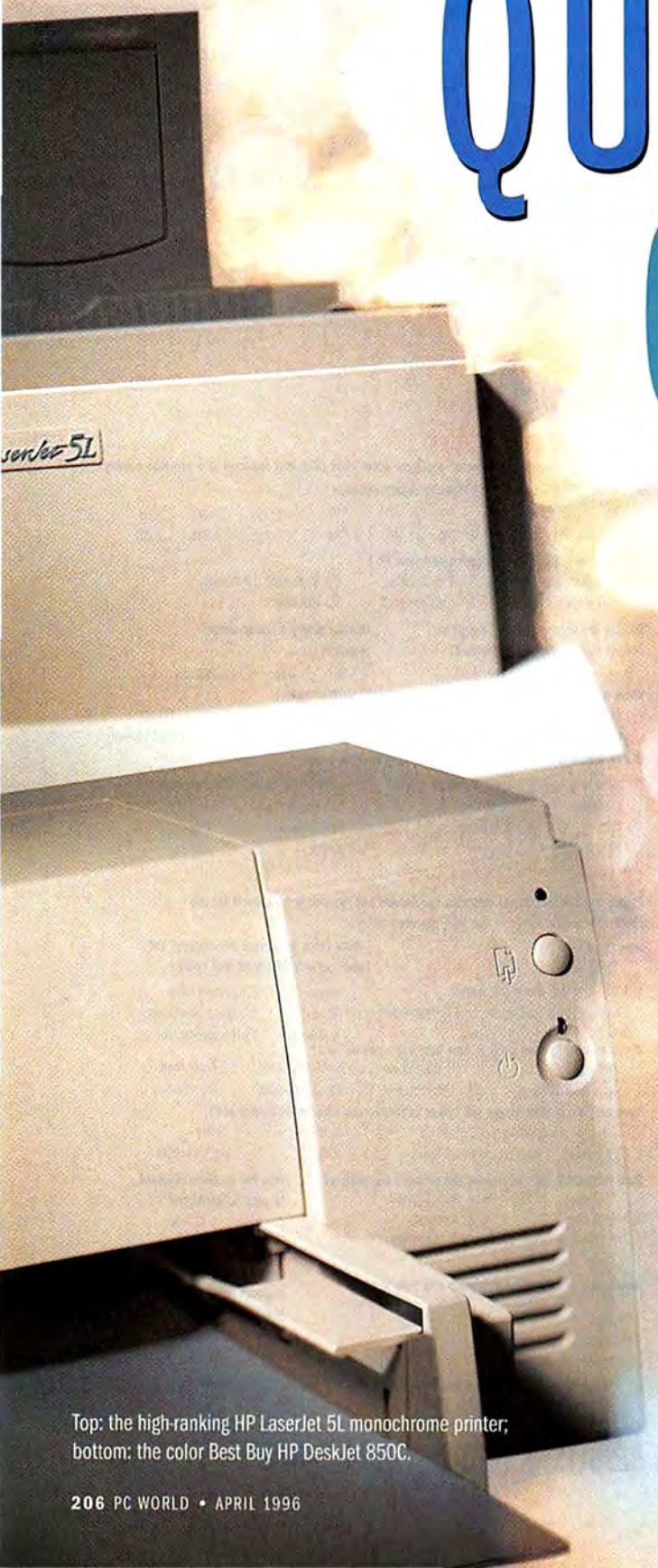
Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

PLEASE FAX TO 415/357-4522. FOR BEST RESULTS, PHOTOCOPY THIS PAGE.

PERSONAL PRINTERS

QUICK, CHEAP, AND



Top: the high-ranking HP LaserJet 5L monochrome printer; bottom: the color Best Buy HP DeskJet 850C.

JAIME BIONDO

Printer buyers tend to split into two camps: those who need quick performance and sharp monochrome output and those who have more colorful goals. If you need professional-quality printouts of reports, worksheets, and correspondence, you'll be most satisfied with a personal laser. But if your budding artist just has to print that Kid Pix masterpiece in living color—or if you want to add spice to your presentations—you're looking for a color ink jet. Then again, maybe you want a printer that can do it all.

New printers tend to hit the market in waves, so every six months or so we do an expanded edition of our Top 10 Personal Printers to give you a more in-depth look at the best of what's available. This time we tested a total of 17 monochrome and color printers. The Top 10 products have street prices ranging from $249 to $499. Our two Best Buys: Panasonic's KX-P6100, a very quick laser printer with fine monochrome output, and HP's DeskJet 850C, a color ink jet that combines fast performance, good text output, and excellent plain-paper color printouts.

PC World tests 17 laser and ink jet printers priced from $249. **Our Best Buys:** the businesslike **Panasonic KX-P6100** laser and the brilliant **HP DeskJet 850C.**

By **Harry McCracken**

COLORFUL

If all you want is fast, economical, crisp-looking text, personal lasers are for you. Only a handful of ink jets rival the text quality of even low-end, 300-dots-per-inch lasers. And although some ink jets can now keep up with lasers, laser printers on our Top 10 are on average 20 percent faster than the ink jets. Consumables are also more expensive for ink jets, with typical text pages averaging 5 cents, while laser pages run about 3 cents each. And color output's not cheap. Printers on our chart print typical color pages at an average cost of 17 cents each, but if you print a heavily saturated presentation or photo image, you could easily pay a dollar or more—especially if you use the expensive coated paper that ink jets require for their best results.

Personal laser prices are hard to resist: For example, you can buy the 300-dpi Panasonic's KX-P6100 Best Buy for less than $400, and for $450 to $500, you'll be able to get 600-dpi lasers with engines rated at 6 pages per minute.

But buyer beware. Lasers claiming "600-dpi class" output are actually 300-dpi printers that use smoothing tech-

Top: the monochrome Best Buy Panasonic KX-P6100; bottom: the highly rated Epson Stylus Stylus Color II.

niques to improve image quality to *near* 600-dpi quality at best. Also, a printer boasting a 6-ppm engine doesn't guarantee faster printing: NEC's 6-ppm SuperScript 600 performed only about as fast overall as Texas Instruments' 4-ppm TI microLaser Win/4. We also have a product safety alert: Panasonic tells us some of its KX-P6100 and KX-P6500 printers that were sold before November 15, 1995, could pose a shock hazard if they are not properly grounded. Printers that have already been inspected for safety have a colored dot on the outside of the box and on the underside of the printer. If your printer lacks the dot, Panasonic will inspect your printer and correct any problem for free (call 800/328-6394).

Windows 95 Meets the Test

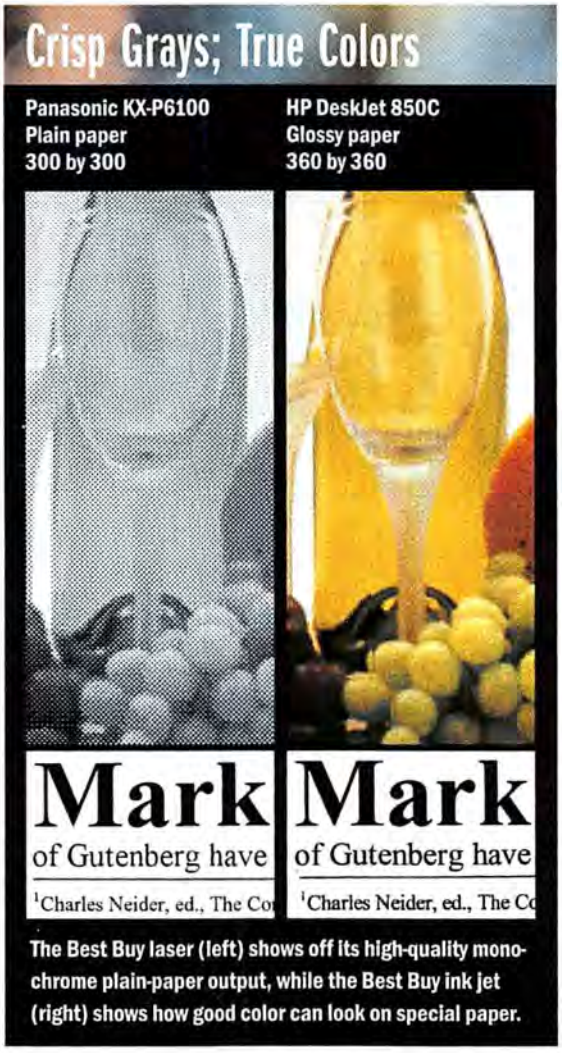
This month marks the introduction of *PC World*'s Windows 95–based printer benchmarks, which use typical business tasks such as printing ten text pages and a two-page newsletter in Word 95 and a five-page worksheet in Excel 95. Other tasks add color, such as a table and graph from Excel 95, a Harvard Graphics 4.0 presentation, and a CorelDraw 6.0 page with photos, graphics, and different fonts.

Personal printer output quality and speed keep improving. But many manufacturers are keeping costs down with lasers that rely heavily on your PC's CPU, memory—and often Windows itself. The TI microLaser Win/4, for instance, requires a Windows PC with at least a 486SX CPU and 8MB of RAM. If you have an aging PC, your printing will be noticeably slower than the times we got with our Pentium-90. And if you spurn Windows, check out the printer's DOS support before buying. Some models support DOS apps only from within Windows or can't take advantage of their maximum resolution from DOS programs.

Does Windows 95 ease use of your printer? Its ability to sense a Plug and Play printer certainly simplifies installation, but manufacturers' drivers and software still play the greatest role. Always make sure a compatible driver is available for your printer before taking the plunge with Windows 95.

A Splash of Color

Color ink jets are ever more popular—and no wonder: They're useful for business or pleasure, whether they are being employed to make eye-catching presentations and overheads at work or as an outlet for your kids' creativity at home. If you've decided to go with a color ink jet, buy one that can handle black, cyan, yellow, and magenta inks simultaneously if you can afford it. Crank the best of these up to its highest resolution and use special coated paper, and you can get stunning, near-photographic images. The Canon BJC-70, BJC-610, and BJC-4100, Epson Stylus Color II, and HP DeskJet 660C and DeskJet 850C are in this category, and their prices start at around $350. The cheapest color ink jets begin at about $250 but force you to use a black cartridge to print monochrome pages and to swap it out to print color. Aside from the hassle, these printers often do a poor job combining text and color graphics, as they must mix colored inks to form a greenish "black." This category includes the Canon BJC-210, HP's portable DeskJet 340, and Lexmark's Jetprinter 1020. Their limitations and general mediocrity kept all except the BJC-210 off the Top 10. We tried to review the Epson Stylus Color IIs this month. Despite its nearly identical name, this product is a faint shadow of the Epson Stylus Color II. Because of a weak design, the print heads failed on both test units that Epson sent. The company couldn't send a replacement, so we bought one. Although testing wasn't complete at press time, we noted good output but slow printing.



The Best Buy laser (left) shows off its high-quality monochrome plain-paper output, while the Best Buy ink jet (right) shows how good color can look on special paper.

Personal Liabilities

One final consideration: Personal printers are designed to satisfy a single person's needs and must be judged as such. Their monthly duty cycles (the number of pages they're designed to output) run fairly low, typically 1000 pages for ink jets and up to 2500 for lasers; paper trays rarely have capacities over 100 sheets; and support for platforms other than DOS and Windows is scarce. Lightweight plastic cases and fold-out paper guides that feel all too easy to snap off are common. If what you really need is a monochrome or color printer that can satisfy a whole workgroup, consult our Top 10 Workgroup Printers, which alternates with the Personal Printers each month.

Harry McCracken is a senior associate editor for PC World. *Testing by Dave Casini and Ulrike Diehlmann. Associate Editor Melissa Riofrio and freelance writer Bill Underwood contributed to this article.*

For more information about all products in this article, circle reader service no. 904

TOP 10

PERSONAL PRINTERS

	Last ranking	First reviewed	Type	Street price [1]	Overall rating	Output rating: Monochrome	Output rating: Color	Speed rating: Monochrome	Speed rating: Color	Features, ease-of-use rating	Reader service number	Comments
MONOCHROME												
1 **Panasonic KX-P6100** 800/742-8086	1	Dec 95	laser	$399	92	85	–	90	–	76	653	Fast, fine output, but limited paper handling.
2 **HP LaserJet 5L** 800/752-0900	5	Feb 96	laser	$479	87	88	–	80	–	83	654	Excellent print quality and paper handling, but fairly slow.
3 **Panasonic KX-P6500** 800/742-8086	2	Feb 96	laser	$449	86	85	–	84	–	79	655	Terrific output, space-efficient tower design.
4 **NEC SuperScript 660** 800/632-4636	3	Aug 95	laser	$499	79	84	–	83	–	77	656	Has PostScript, but gray-scale output is mediocre.
5 **TI microLaser Win/4** 800/848-3927	—	current	laser	$449	76	87	–	83	–	69	657	Tiny, easy to use, but gray-scale printing is only so-so.
COLOR												
1 **HP DeskJet 850C** 800/752-0900	1	Dec 95	ink jet	$499	91	77	85	86	90	90	658	Excellent output on plain paper, fast, easy to use.
2 **Epson Stylus Color II** 800/289-3776	—	current	ink jet	$450	85	73	80	84	90	83		Outstanding color output on coated paper, fast.
3 **HP DeskJet 660C** 800/752-0900	4	Oct 95	ink jet	$399	81	75	77	77	81	85	660	Excellent monochrome text, three-year warranty, but slow.
4 **Canon BJC-4100** 800/848-4123	5	Feb 96	ink jet	$349	78	68	74	84	81	86	661	Fast monochrome printing, slow color, nice software.
5 **Canon BJC-210** 800/848-4123	—	current	ink jet	$269	73	63	77	47	80	74	662	Fine software, but can't hold color and black at same time.

[1] Based on vendor estimates and PC World research.

BEST BUY

Methodology The overall rating includes ratings for output (27 percent), price (20 percent), features and ease of use (20 percent), performance (15 percent), service and support (13 percent), and consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 905.

Monochrome Printers

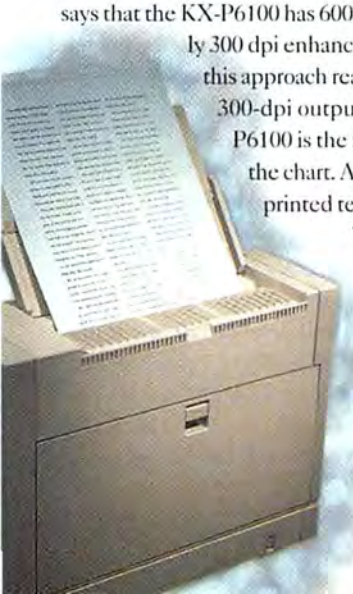
1 Panasonic KX-P6100

PROS: Fast, terrific 300-dpi output, low page cost, space-efficient tower design

CONS: Limited paper-handling features

At $399, this is the best low-cost personal laser we know of. Panasonic says that the KX-P6100 has 600-dpi–class print quality, but it's actually 300 dpi enhanced by image-smoothing. Fortunately, this approach really works, yielding some of the nicest 300-dpi output we've seen. Furthermore, the KX-P6100 is the fastest monochrome printer of any on the chart. And at an average of 3 cents per page of printed text, it's also economical.

With its unusual tower design, the KX-P6100 is very space-efficient, as long as you have room in your work area for the fold-out input and output trays and don't mind the fact that it won't fit under most shelves. Panasonic's driver offers useful extras like the ability to do manual duplexing. The printer has somewhat limited paper-handling capabilities, though: It has no manual feed slot for envelopes and no straight paper path option.

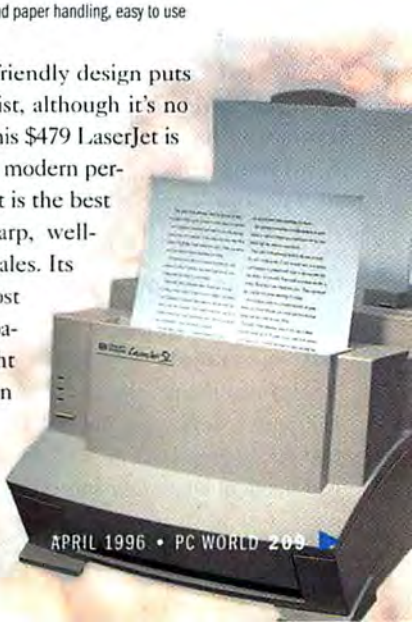


2 HP LaserJet 5L

PROS: Commendable print quality and paper handling, easy to use

CONS: Slow

Excellent output quality and friendly design puts the LaserJet 5L high on our list, although it's no speed demon. In many ways, this $479 LaserJet is the very model of an affordable modern personal printer. Its 600-dpi output is the best of any printer here, with sharp, well-defined text and subtle gray scales. Its paper handling easily beats most other personal lasers, with a separate envelope tray and a straight paper-path mode that you can select with just the flick of a switch. The printer itself is very easy to use, except for



fold-out paper guides that have a tendency to flop down unexpectedly. Its first-rate driver and on-screen help are also very intuitive. If only this likeable laser were a little quicker!

3 Panasonic KX-P6500

PROS: Excellent print quality, low page cost, space-efficient

CONS: Limited paper-handling features

Visually, Panasonic's $449 KX-P6500 laser is a near twin to its Best Buy sibling. But this former Best Buy ups the KX-P6100's ante with a 600-dpi engine and print enhancement to claimed 1200-dpi–class. Its gray-scale output is outstanding—crisp, detailed, and free of streakiness. Of course, 600-dpi resolution cuts printing speed somewhat. But if your output is limited to basic business documents such as worksheets and correspondence, you can save time and money by opting for the 300-dpi KX-P6100.

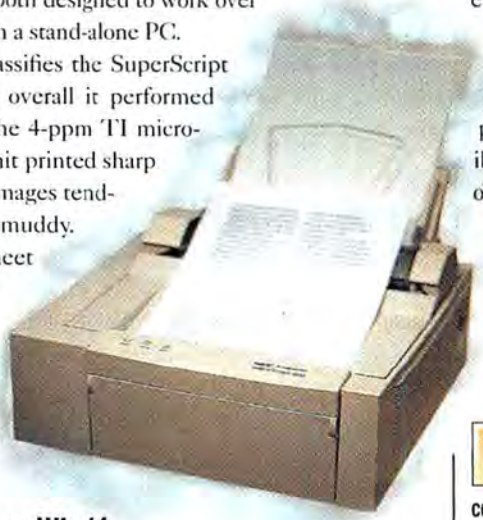
4 NEC SuperScript 660

PROS: PostScript, two-year warranty, includes a high-quality cable

CONS: Mediocre gray-scale output, large footprint

Most personal monochrome printers seem primarily designed for the needs of small-office and home-office users, but this bulky $499 laser has a buttoned-down, corporate feel. It includes a software PostScript interpreter to complement its 600-dpi output, and office users should be pleased that the printer's installation and spooler program are both designed to work over a LAN as well as with a stand-alone PC.

Although NEC classifies the SuperScript as a 6-ppm printer, overall it performed about the same as the 4-ppm TI microLaser Win/4. The unit printed sharp text, but gray-scale images tended to be a little muddy. A good-size, 200-sheet paper feeder is optional, and the company provides a two-year warranty, a relative rarity for a low-cost laser.



5 TI microLaser Win/4

PROS: Petite, easy to use

CONS: So-so gray-scale output, skimpy documentation

Texas Instruments wins the cuteness sweepstakes with this sleek, Lilliputian device that looks a bit like a high-tech toaster. For a 600-dpi, 4-ppm laser printer, the $449 TI microLaser Win/4 is a real standout on performance. It's also easier to set up and use than most personal lasers; its toner cartridge pops into place effortlessly and you can select straight paper path mode with the flick of a switch.

The TI would have ranked higher if not for a few faults: Text quality is quite good, but gray-scale output is gritty. In addition, at 5 cents, its cost per page is 2 cents higher than that of any other laser on the Top 10. This printer has no RAM and relies entirely on your PC to process pages; it generally worked well, but on rare occasions we got error messages that the PC was too busy to complete a print job.

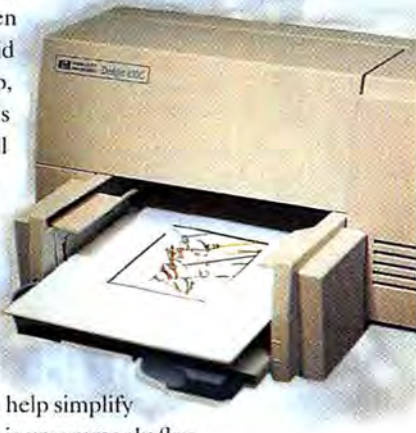
Color Printers

1 HP DeskJet 850C

PROS: Excellent overall print quality, very fast, easy to use

CONS: Driver doesn't allow much manual adjustment

The $499 HP DeskJet 850C produces smashing output: Even on plain paper, colors are vivid and complemented by crisp, black text. And its speed is impressive—it is faster overall than some of the lasers on the chart. In addition, the 850C's average cost of 11 cents per color page is lower than that of any other Top 10 color printer.



The fine on-screen documentation and diagnostics help simplify printing, and paper handling is uncommonly flexible, with a manual slot that can accommodate either an envelope or a sheet of letterhead. The 850C is not without weaknesses, however: For one, it doesn't reproduce photos with quite the fidelity of Canon's BJC-610 and Epson's Stylus Color II. Also, its driver offers fewer options for precise color tweaking. The widely available HP DeskJet 855C is virtually the same printer, except for an additional economy-mode printing option.

2 Epson Stylus Color II

PROS: Outstanding output on coated paper, fast performance for an ink jet

CONS: Print quality on ordinary paper is less impressive, could use more on-screen documentation

Epson's new $450 Stylus Color II made a strong run at number one this month. When you use Epson's special coated paper (which costs about 10 cents a sheet) and print at 720 dpi, it produces better color output than the DeskJet 850C, especially with photographs. It's fast, too, almost matching the 850C in color performance and beating it in our color CorelDraw test. The Stylus also has stronger support policies than the HP (including a two-

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INK REFILLS: SAVING MONEY CAN BE MESSY

When you start using your first ink jet, it's a rude awakening to discover how quickly it can suck up an ink cartridge. But the real eye-opener comes when you have to plunk down from $20 to $45 for a replacement. Printer vendors—who realize substantial profits from selling new cartridges—generally advise you to use only their brand. But with most printers you can save plenty by refilling your cartridges with a third-party kit. In our experience, print quality is generally comparable and cartridge printheads, depending on the type, are good for up to ten refills.

To see what's available, we went to our local office supply store and bought one color and three black kits, all designed to work with popular HP 500 series printers and the DeskJet 660C. New HP 51626A high-capacity cartridges cost approximately $29, but we paid a mere $12.99 each for the Parana Ink Jet Refill and Pelikan Ink Jet Refill Kit, both of which include *two* black refills. The Nu-Kote Ink Jet Cartridge Refill Station is more expensive at $15.90 for only one black refill, but its nifty cylindrical plastic housing contains spills. Pelikan also sells the $59.99 Ink Jet LongLife Kit, which comes with a full refillable color cartridge and two more refills for each of the three colors.

But cheap refills can mean more work: The Parana and Pelikan black ink kits provide a tiny plastic tool for creating an opening in the top of the cartridge. You then stand your empty in a cardboard receptacle and inject ink carefully from a syringe into the tiny hole. It's hard to avoid a mess: We successfully refilled and sealed our cartridges, but we got ink on our hands and our desk.

With the Nu-Kote system, you snap your empty cartridge inside the housing and rotate it to successive stations, pressing plungers to open the fill hole, inject ink, and reseal. The Pelikan color refill works much like the company's black refill, but the modified refillable cartridge requires no other tool except the syringe to open or seal it.

Don't care to fool with messy refills but still want to save money? Some companies let you send in empty cartridges for refilling. The cost is higher than refilling your own, but your hands will thank you. **—Bill Underwood**

year warranty and toll-free support).

So why does the Stylus wind up second? First, it lacks the 850C's manual paper slot and bountiful on-screen help. Second, its per-page cost is a good bit higher. Finally, plain-paper color printing is at 360 dpi and monochrome output as well is noticeably less crisp and bold than what the 850C achieves.

3 HP DeskJet 660C

PROS: Excellent monochrome text, manual feed slot for envelopes, three-year warranty

CONS: Slow, midrange color print quality

Think of HP's $399 DeskJet 660C as a cheaper, much slower cousin of the Best Buy 850C, with monochrome text that's nearly as good and a warranty that's three times longer. Like the 850C, it produces attractive color for text, charts, and relatively simple graphics. But the 660C doesn't reproduce photos and elaborate graphics with the fidelity of costlier ink jets, such as the 850C.

Like the 850C, this printer is as simple to use as ink jets get, with plenty of on-screen help. Its manual-feed slot will accept envelopes but not other types of media. Home users who like the 660C should seek out the 660Cse—a twin product that costs the same but comes with the useful Print Shop from Broderbund.

4 Canon BJC-4100

PROS: Fast monochrome printing, easy to use, includes printing software

CONS: Slow color printing, middling color output quality

At $349, this new Canon color ink jet is an appealing choice for budget-minded buyers. Canon's slick printer driver has lots of customization options, can spot potential problems, and allows you to save multiple print setups. And like this Canon's sibling products, the BJC-210 and 610, the BJC-4100 comes with Canon Creative, a CD-ROM cornucopia of nifty family-oriented applications that are useful for printing everything from stationery to stickers and from coloring books to cross-stitch patterns.

Although its output isn't bad for a budget model and is generally better than its less-expensive BJC-210 sibling, the BJC-4100 can't compete with the printouts from the more costly ink jets: Banding was apparent in graphic images, and its black text output lacks the richness of HP's ink jets. It was a close third among ink jets in our monochrome speed tests but lagged when printing color.

5 Canon BJC-210

PROS: Relatively easy to use, includes printing software, inexpensive

CONS: Slow, no output tray, no true black in color mode

No low-cost color ink jet printer can match the speed, output quality, and convenience of the best higher-priced models. Still, this entry-level, $269 ink jet is worth considering if

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FEATURES COMPARISON Crisp Colors, Sharp Text for Less Than $500

● = Yes ○ = No

n/a = not applicable

Standard features	HP LaserJet 5L	NEC SuperScript 660	Panasonic KX-P6100	Panasonic KX-P6500	TI microLaser Win/4	Canon BJC-210
	MONOCHROME PRINTERS					COLOR PRINTERS
Printer type	laser	laser	laser	laser	laser	ink jet
Street price as of 1/12/96	$479	$499	$399	$449	$449	$269
Maximum black resolution (dpi)	600 x 600	600 x 600	300 x 300	600 x 600	600 x 600	720 x 360
Maximum color resolution (dpi)	n/a	n/a	n/a	n/a	n/a	360 x 360
Installed/maximum RAM	1MB/9MB	256K/4.25MB	512K/4.5MB	512K/1.5MB	0/0	62K/62K
Rated engine speed (pages per minute), color/black or black only	4	6	6	6	4	.27/3.3
Resolution enhancement	●	●	●	●	○	●
Cost of consumables						
Street price of black ink or toner	$84	$100	$29.95	$29.70	$69	$25
Street price/page life of drum or printhead [2]	n/a	n/a	$69/15,000	$152/15,000	$99/20,000	n/a
Black ink or toner life (pages) [2]	2500	4000	2000	2000	2000	500
Street price of color ink	n/a	n/a	n/a	n/a	n/a	$35
Color ink life (pages) [2]	n/a	n/a	n/a	n/a	n/a	200
Cost for standard black, text-only page [3]	3¢	3¢	3¢	3¢	5¢	5¢
Cost for standard color page [3]	n/a	n/a	n/a	n/a	n/a	18¢
Design						
Specified width x depth x height (inches)	13.2 x 12.3 x 8.9	14.6 x 14.1 x 4.7	5.2 x 14.9 x 11.3	5.2 x 14.9 x 11.3	12 x 11 x 8	13.7 x 8.2 x 6.9
with output tray, or stack, cables	13.2 x 12.3 x 9	14.6 x 19 x 12	11.5 x 14.9 x 18	11.5 x 14.9 x 18	12 x 11 x 12	13.7 x 9.4 x 11
Weight including ink or toner (pounds)	15.7	17.6	14.4	14.4	11	5.8
Monthly duty cycle (pages)	2500	2500	2000	2000	1000	not rated
Reset button/incoming data indicator	●/●	○/●	○/●	●/●	○/●	●/●
Paper-out/low-toner indicator	●/●	●/●	●/●	●/●	○/●	●/○
Energy Star–compliant	●	●	●	●	●	●
Printing power consumption (watts)	100	400	480	480	470	28
Ink or toner saving mode	●	●	●	●	●	○
Paper handling						
Standard/maximum paper capacity (pages)	100/100	50/200	100/100	100/100	100/100	100/100
Maximum paper size	legal	legal	legal	legal	legal	legal
Output tray capacity (pages)	100	50	50	50	50	100
Standard/maximum envelope capacity	10/10	1/5	10/10	10/10	10/10	10/10
Service and support						
Warranty (years)	1	2	1	1	1	2
Money-back guarantee	○	○	○	○	●	○
Toll-free tech support	○	●	●	●	●	●
Weekday tech support (hours)	16	12	24	24	12	18
Weekend tech support/on-site service	●/○	●/○	●/○	●/○	●/●	●/○
Repair turnaround policy (days)	1	1	n/a	n/a	3	1
Fax-back tech support	●	●	●	●	●	●
Online support sites	AOL, CIS, WWW	AOL, BBS, CIS, WWW	BBS	BBS	AOL, BBS, CIS, WWW	CIS, WWW

BEST BUY

[1] 720 by 720 with coated paper.

[2] Based on vendor estimates.

[3] For U.S. letter-size documents at 5 percent page coverage (black cartridges) or 7.5 percent page coverage per color.

	Canon BJC-4100	Epson Stylus Color II	HP DeskJet 660C	HP DeskJet 850C
	ink jet	ink jet	ink jet	ink jet
	$349	$450	$399	$499
	720 x 360	720 x 720	600 x 600	600 x 600
	720 x 360	360 x 360[1]	600 x 300	300 x 300
	34.5K/34.5K	56K/56K	512K/512K	1MB/1MB
	.8/4	1/4	.7/2.5	1.5/6
	●	●	●	●
	$7.40	$25	$25.99	$31.95
	$50/2000	n/a	n/a	n/a
	100	620	650	840
	$21	$38	$28.99	$34.95
	100	320	960	460
	6¢	4¢	4¢	4¢
	23¢	18¢	17¢	11¢
	14.4 x 8.8 x 7.8	17 x 9.8 x 7.8	17.2 x 16 x 7.9	17.5 x 15.6 x 8.9
	14.4 x 18 x 11.6	17 x 25.1 x 12.5	17.2 x 18 x 7.9	17.5 x 15.6 x 8.9
	7.1	11	11.6	14.3
	not rated	1000	1000	1000
	●/●	●/●	○/●	●/●
	●/●	○/●	●/●	●/●
	●	●	●	●
	30	20	12	12
	●	○	●	●
	100/100	100/100	100/100	100/150
	legal	legal	legal	legal
	100	100	100	50
	15/15	10/10	1/20	1/15
	2	2	3	1
	○	○	●	○
	●	●	○	○
	18	14	16	16
	●/○	●/○	●/●	●/○
	1	2	1	1
	●	●	●	●
	CIS, WWW	BBS, CIS, WWW	AOL, CIS, WWW	AOL, CIS, WWW

you're on a cinched-tight budget. It includes the same powerful and easy-to-use print driver and CD-ROM bundle as the more costly BJC-4100. Text output is fuzzier than the BJC-4100's, but the BJC-210 actually showed less banding in its color output.

You'll have to be patient with the BJC-210: It is by far the slowest printer on the chart. And like many of the cheapest ink jets, it makes you juggle cartridges and does a disappointing job printing black text combined with color graphics. Business users will probably be troubled by these limitations, but many home buyers with basic needs may accept the tradeoff in return for the BJC-210's very low price.

Printer Snapshots

These printers were tested and reviewed along with the others, but didn't score high enough to reach the Top 10 Printers chart.

Monochrome Printers

Brother HL-630

PROS: Fast, excellent paper handling

CONS: Mediocre image quality, noisy

A Top 10 perennial and former Best Buy, the $389 HL-630's print quality suffers in comparison to newer printers when it is run under our updated tests. It produces text that's noticeably more jagged than the lasers on our chart. The 300-dpi HL-630 is quick, however, and its paper-handling features are terrific, with a 200-sheet input, a manual-feed slot, and a straight paper path. For basic office use, it's still a viable option. *Brother Int'l, 800/276-7746. Reader service no. 663*

Okidata OL600e

PROS: Fast, good paper handling

CONS: Windows 95 driver not ready at press time

Quick performance, versatile paper handling, a sturdy feel, and a low $399 price come close to earning Okidata's large-footprint OL600e a spot on the monochrome printer chart this month. While its performance and output are much like a laser's, technically it's a 300-dpi LED printer that claims 600-dpi quality. Okidata provides only a one-year warranty on the printer, but a five-year warranty on its LED printhead. Paper handling is good, with a manual slot for envelopes and letterhead, a straight paper path mode, and room for an optional secondary 250-sheet paper tray. The Okidata is a good performer, but its output quality could have been better. Its Windows 95 driver wasn't finished in time for our evaluation, so we had to test it with Windows 95's LaserJet IIP driver, which doesn't take advantage of the Okidata's 600-dpi-emulating resolution enhancement. Okidata says it expects to release its own Windows 95 driver by time you read this; look for an updated evaluation soon. *Okidata, 800/654-3282. Reader service no. 664*

Color Printers

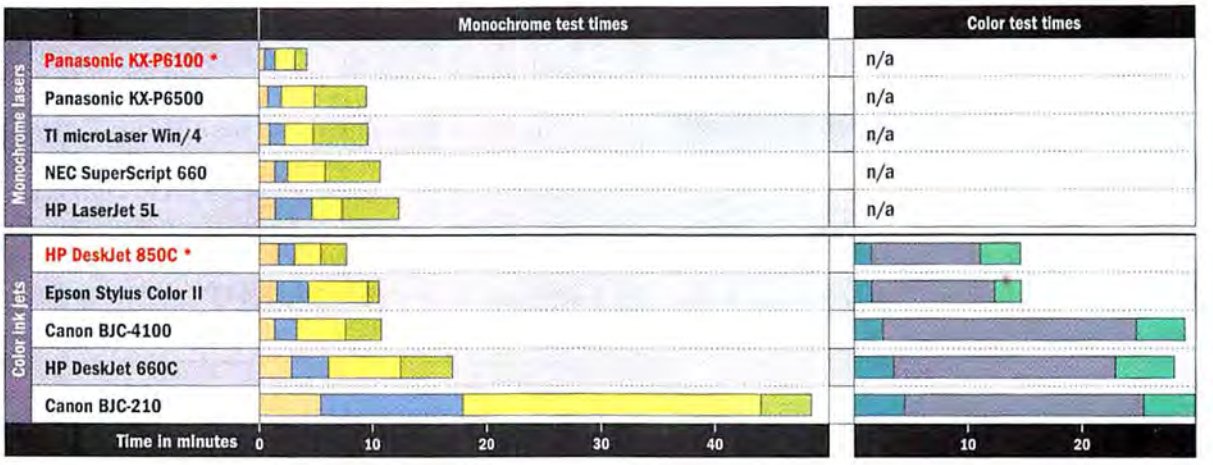
Canon BJC-70

PROS: Portable, fast monochrome printing

CONS: Slow color printing, small ink cartridges

Portability is the strength of this $359 color ink jet, which offers

TEST REPORT Some Ink Jets Print Monochrome as Fast as Lasers



*** Best Buy**

Printers are arranged within each category in order of overall performance from best to worst.

Methodology All printers tested in default mode under Windows 95 using a Micron P90 Millennia with 16MB of RAM. Times measured from the point the print command is issued until the last sheet is out of the printer.

Word 95 newsletter We print a two-page newsletter with text and graphics.

Excel 95 We print a five-page Excel worksheet in monochrome.

Word 95 text We print a ten-page text document once in normal and once in draft mode and average the times.

CorelDraw 6.0 We print a color CorelDraw page with photos, graphics, and a variety of fonts in gray scale.

Excel 95 We print a two-page numerical table with a color pie chart.

Harvard Graphics 4.0 for Windows 95 We print a five-page presentation, with each page heavily saturated with color.

CorelDraw 6.0 color We print our CorelDraw page in color.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

an optional battery pack. But its tiny ink tanks can run out after just a few pages, and replacement is tricky and messy. Harvard Graphics and CorelDraw output was also bedeviled by garbled sections, a problem that Canon was unable to immediately solve. *Canon, 800/848-4123. Reader service no. 665*

Canon LBP-460

PROS: Good 300-dpi print quality, three-year warranty, includes font and clip-art CD-ROM

CONS: No output tray, no power-on indicator

This $379 300-dpi personal laser almost matched the Best Buy Panasonic KX-P6100's output, but it's slower. It has no paper tray, so instead of a neat stack, you get your printouts dumped onto your desk, and it sorts print jobs in reverse order by default. We also had problems printing in CorelDraw 6.0, even after three calls to Canon's tech support. In addition, the LBP-460 has no buttons or indicators: A power-on LED would make it easier to confirm that it's functioning properly. *Canon, 800/848-4123. Reader service no. 666*

Canon BJC-610

PROS: Top-notch output, good printing software

CONS: Painfully slow, clumsy envelope handling

If superb color output is all you want, you'll like Canon's top-of-the-line, $569 personal ink jet. Its output on coated paper is among the best, and it also produced admirable results on plain paper at full 720-dpi resolution. The big reason why this printer misses the Top 10 chart is poor performance: It was the slowest printer in our tests by a wide margin, taking more than five times as long to complete our speed benchmarks as the Best Buy HP DeskJet 850C. And although it's easy to use in most other respects, printing envelopes requires opening up the printer's case to flip a switch. *Canon, 800/848-4123. Reader service no. 667*

HP DeskJet 340

PROS: Portable, optional infrared link

CONS: Can't print envelopes, may damage paper

This $340 portable ink jet is aimed at travelers. Too bad its snap-on sheet feeder is so bulky. Print speed and quality lagged behind that of the BJC-70's, its paper-path rollers tended to create faint vertical perforations in some documents, and it's the only printer here that can't handle envelope printing. *Hewlett-Packard, 800/752-0900. Reader service no. 668*

Lexmark Jetprinter 1020

PROS: Low price, includes CorelDraw 3.0

CONS: Slow, no output tray

Since it can't print both color and black at once, you have to swap cartridges on this this $249 ink jet—a job made difficult by a hard-to-unlatch door. Print quality and speed are respectable , and the inclusion of CorelDraw 3.0 is a nice bonus. *Lexmark Int'l, 800/891-0331. Reader service no. 669*

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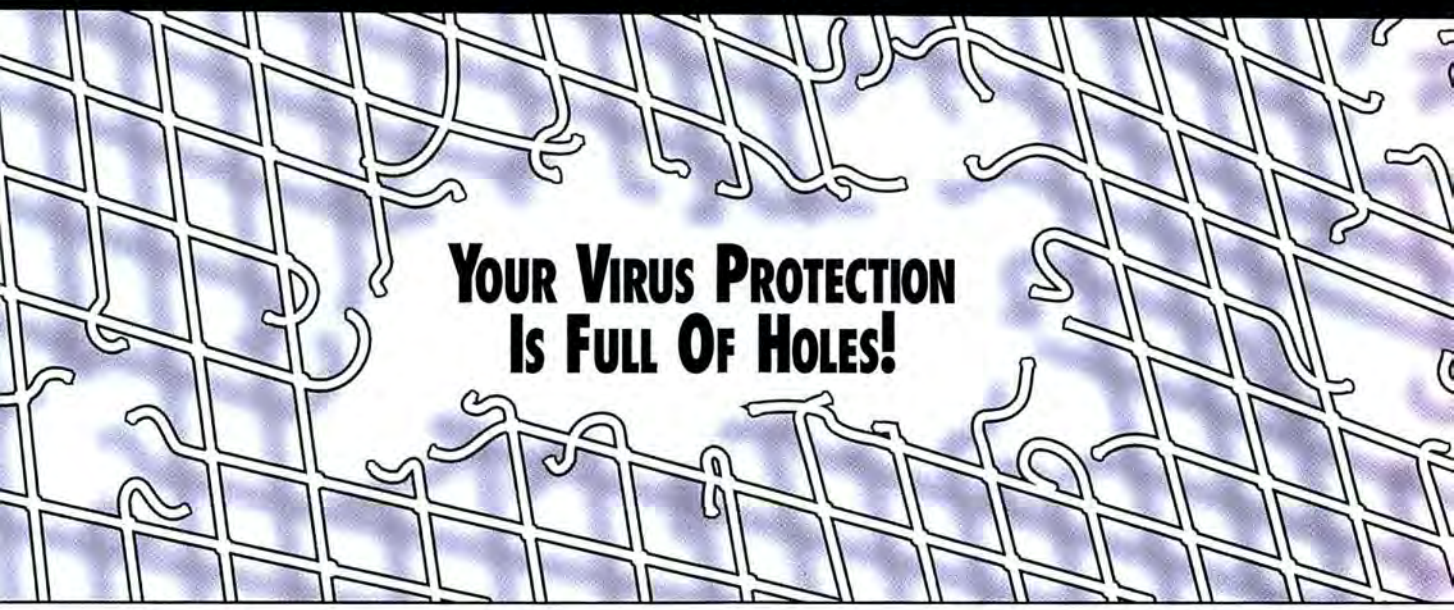

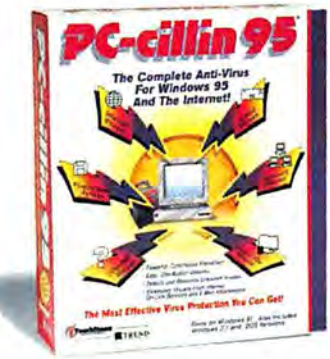

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Checks Internet E-mail Attached Files	YES	NO	NO	Pegasus Mail only
Detects & Removes Unknown Viruses	YES	NO	NO	NO
Easy, One-Button Virus Pattern Updates	YES	NO	NO	NO
Monitors Shared Files	YES	NO	NO	NO
Includes Windows 3.1 & DOS Versions	YES	NO	NO	NO
No. of Compressed File Types Scanned	6	2	2	2

Complete And Continuous Protection is what this new environment demands, and that's what PC-cillin 95 delivers. It monitors every possible virus source – all the time. Whether it's your modem, network connection, CD-ROM or floppy drive, PC-cillin 95 will keep a keen eye on it and automatically adjust your system's level of protection to match the threat – so you don't have to think about it – unlike yesterday's products that only monitor your floppy drive.

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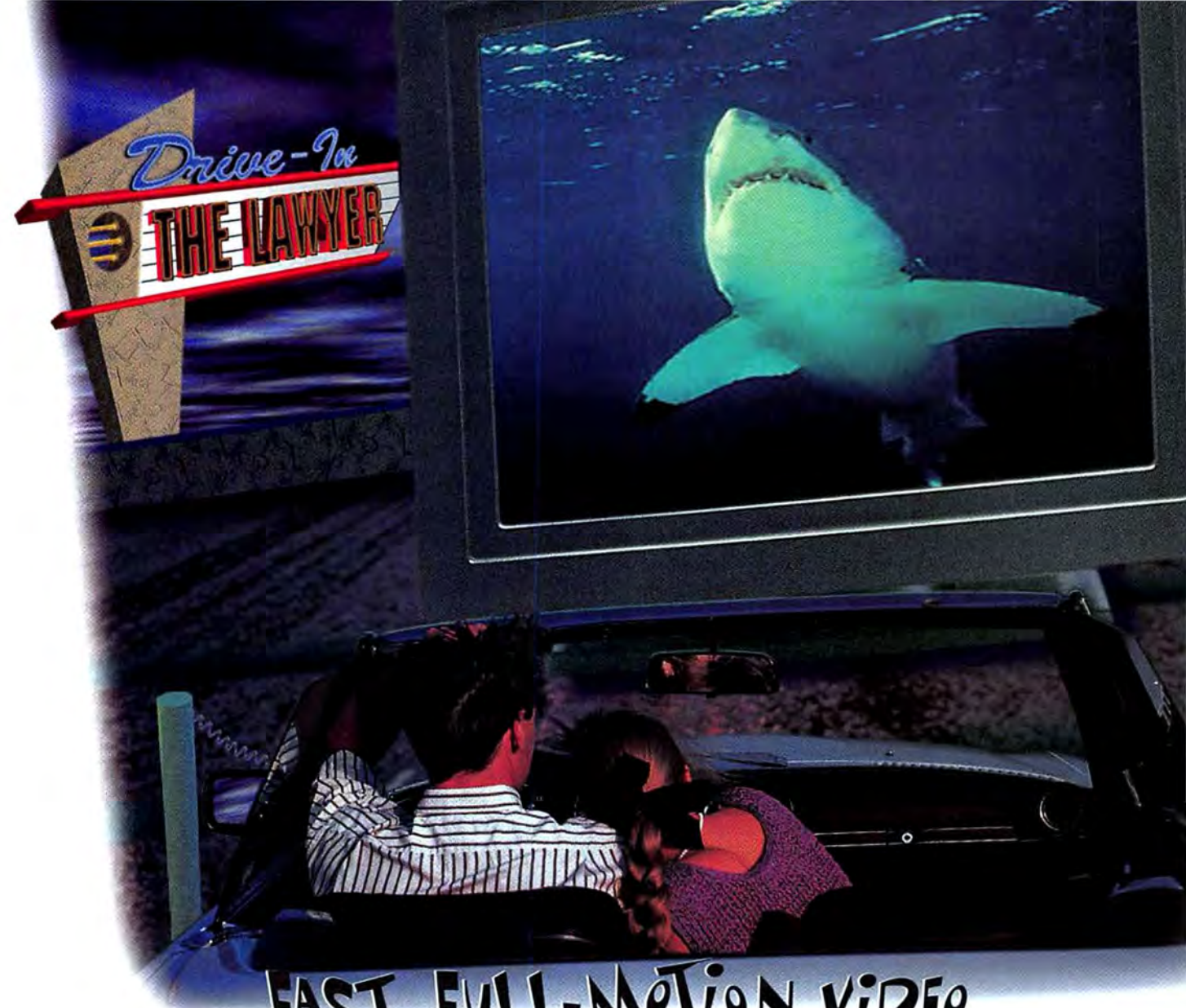

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Circle 210 on reader service card

Sony and Princeton Do Plug and Play

Complete Control
Sony's new on-screen menu makes the Multiscan 15sfII a breeze to adjust. Touch a control panel button to call up a menu showing the precise level of adjustment.

You might be surprised to learn that Windows 95 can't use all the Level 2b Plug and Play features on today's newest monitors. Not until the next version of Windows will the operating system be able to set your monitor and graphics card for optimal display and let you switch resolutions without rebooting. But that isn't stopping vendors from adding Plug and Play to their monitors. Two leading Top 10 monitors from February—the Sony Multiscan 15sf and the Princeton Graphic Systems Ultra 15—have been replaced with newer Plug and Play models. A third monitor, Panasonic's PanaSync C-1591E, was also discontinued. As a result, NEC's MultiSync XV15 and the ViewSonic 15G move into Best Buy positions. Sony's new Multiscan 15sfII follows in third place, with Princeton's EO15 taking seventh.

For $529—$30 more than the old 15sf—the Sony Multiscan 15sfII gives you Level 2b Plug and Play and the most intuitive combination of control buttons and on-screen menu we've used yet. Simply push a button, and the menu shows the exact adjustment level. Text scores were not letter-perfect like those of the sf series, but the 15sfII is still very good for on-screen reading and working with graphics.

Princeton's $375 EO15 is only $25 more than the Ultra 15 and supports Level 2b Plug and Play, but the graphics quality doesn't match the Ultra 15's.

None of the other three new monitors we tested—the $379 Orchestra French Horn II, the $399 Tatung Audio 15, and the $429 CTX 1565D—made the chart, due to mediocre displays. Noteworthy: The 1565D supports Level 2b Plug and Play, and like the French Horn II it has a big 14-inch viewing area. The Tatung Audio 15's built-in speakers save space, but sound tinny even at normal volume.

TOP 10
15-INCH MONITORS

Last ranking	First reviewed	Street price	Overall rating	Text quality rating	Graphics quality rating	Features, ease-of-use rating	Dot or stripe pitch (mm)	Max. refresh rate at 800 x 600 (Hz)	Reader service number	Comments
1 **NEC MultiSync XV15** 800/632-4636	2	Oct 95	$460	82	76	79	70	dot 0.28	75	643	Excellent text and graphics, Level 1 Plug and Play[1], low refresh, but no visible flicker.
2 **ViewSonic 15G** 800/888-8583	3	Oct 95	$425	80	79	68	63	dot 0.28	90	644	Large 14-inch viewing area, great spreadsheet detail from edge to edge.
3 **Sony Multiscan 15sfII** 800/352-7669	–	current	$529	79	72	76	74	stripe 0.25	90	645	Very good graphics, Level 2b PnP, easy on-screen menu; faint line across screen, pricey.
4 **Dell UltraScan 15TX** 800/289-3355	6	Feb 96	$459	79	71	71	70	stripe 0.25	75	646	Level 2b PnP, easy analog controls, acceptable refresh; faint line across screen.
5 **Samtron SC-528 UXL** 800/726-8766	7	Oct 95	$360	79	67	68	59	dot 0.28	75	647	Budget price, Level 2b PnP, acceptable refresh, no visible flicker.
6 **ADI MicroScan 4V LM-1564** 800/228-0530	9	Oct 95	$409	79	68	67	67	dot 0.28	100	648	High refresh, Level 2b PnP; two-year warranty is shorter than others.
7 **Princeton Graphic EO15** 800/747-6249	–	current	$375	79	61	61	67	dot 0.28	90	649	Low price, Level 2b PnP, good refresh, okay on-screen menu controls, average display.
8 **ViewSonic 15GA** 800/888-8583	8	Oct 95	$525	79	72	62	85	dot 0.27	108	650	Speakers and microphone, Level 2b PnP, sharp text, large 14-inch viewing area; pricey.
9 **Gateway 2000 Vivitron 1572** 800/846-2000	10	Dec 95	$379	78	65	65	60	stripe 0.26	75	651	Easy analog controls, acceptable refresh; faint line across screen.
10 **Samsung SyncMaster 15GL** 800/993-4110	11	Oct 95	$425	78	65	66	70	dot 0.28	100	652	Level 2b PnP, good text and graphics, fast refresh; small 13.4-inch viewing area.

[1] Plug and Play Level 1 sends monitor settings to graphics card; Level 2b adds a bidirectional capability between graphics card and monitor.

BEST BUY

Methodology We tested the monitors at a resolution of 800 by 600 dpi, set at 65,536 colors and a vertical refresh rate of 72 Hz. We used a Pentium-90 PC with 16MB of RAM and a Diamond Stealth 64 PCI graphics card with 2MB of DRAM. The overall rating includes ratings for price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), and service and support (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 903.

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One More Hercules, One Less Diamond

Back Where it Belongs
The affordable Hercules Stingray 64/Video excels in graphics applications but lags behind most of the Top 10 in business apps.

The Hercules Stingray 64/Video is back on the chart this month at number ten thanks to a price drop, fast memory, and speedy drivers. At just $180, the Stingray 64/Video with 2MB of EDO DRAM (previously it used plain DRAM) is a terrific buy—especially if you want to run graphics applications like CorelDraw on the cheap.

None of the four other boards that we tested this month made the Top 10 chart, but the $359 Diamond Stealth64 Video 3240XL, a pricier version of the top-ranked Stealth64 Video 3200 board, came closest. It can be upgraded to 4MB of VRAM (the Video 3200 cannot), and it comes with an abundance of extra software. Although it performed well in our tests, it was not able to match the speed of the 3200, and its high price makes it difficult to recommend.

We also put three established VRAM boards through our tests—the $407 Diamond Viper Pro Video, the $375 Matrox MGA Impression Plus, and the $299 Matrox MGA Impression Lite. These boards are widely available through retailers but can't compare with other products from their respective vendors. The Viper Pro Video produces some of the best video playback you'll find, but it's expensive and painfully slow in business apps. The MGA Impression Plus and MGA Impression Lite are good in graphics but poor in business apps. Like the number five–ranked MGA Millennium, both include 3-D acceleration, but neither is as feature rich overall.

Two notable changes in this month's Top 10 are a $20 price drop on the number two STB Powergraph 64 Video and Windows 95 Plug and Play certification for the number six VideoLogic GrafixStar 700. Also, Diamond recently discontinued its Stealth64 Video 2200XL, which ranked number eight last month.

TOP 10 GRAPHICS BOARDS

Last ranking		First reviewed	Street price	Overall rating	Performance ratings: Business applications	Performance ratings: Graphics applications	Max. refresh rate at 1024 x 768 (Hz)	Chip/installed RAM (MB)/type	Reader service number	Comments
1	**Diamond Stealth64 Video 3200** 800/468-5846	1	Sept 95	$269	84	80	85	120	S3 Vision968/ 2/VRAM	618	Fastest in Top 10, great price for VRAM; less software than XLs. ◪
2	**STB Powergraph 64 Video** 214/234-8750	2	Jan 96	$229	83	76	78	120	S3 Trio64V+/ 2/DRAM	619	Uses EDO DRAM to deliver speed in business apps for less than VRAM. ◪
3	**Diamond Stealth64 Video 2201XL** 800/468-5846	3	Nov 95	$233	81	72	85	100	S3 Trio64V+/ 2/DRAM	620	Outstanding speed in graphics; uses EDO DRAM; no VL version.
4	**Hercules Terminator Professional** 800/532-0600	4	Jan 96	$279	81	78	81	120	S3 Vision968/ 2/VRAM	621	Great performance, excellent utilities, but poor install routine.
5	**Matrox MGA Millennium** 800/361-1408	5	July 95	$329	80	72	87	120	MGA-2064W/ 2/WRAM	622	Tops in graphics; 3-D acceleration, great software; no VL version. ◪
6	**VideoLogic GrafixStar 700** 800/578-5644	7	Oct 95	$249	80	78	79	100	S3 Vision968/ 2/VRAM	623	Uses fast but nonstandard VESA Media Channel for add-in cards. ◪
7	**STB Velocity 64 Video** 800/234-4334	6	July 95	$279	80	74	81	120	S3 Vision968/ 2/VRAM	624	Better score in graphics than no. 2 STB due to high-speed EDO VRAM. ◪
8	**ATI Graphics Xpression** 905/882-2600 ext. 1	9	Sept 94	$174	79	65	78	75	ATI Mach64/ 2/DRAM	625	Good overall value, strong software utilities; slow in business apps. ◪
9	**Number Nine 9FX Motion771** 800/438-6463	10	July 95	$290	79	78	78	150	S3 Vision968/ 2/VRAM	626	Fast in business apps; high refresh rates, top-notch software utilities. ◪
10	**Hercules Stingray 64/Video** 800/532-0600	12	July 95	$180	79	70	83	75	Ark2000PV/ 2/DRAM	627	Super value, EDO DRAM, great in graphics apps; two-year warranty.

Windows Integrated Test Suite was developed by Jon Peddie Associates, a PC graphics consulting firm.

BEST BUY

Methodology We tested boards at 1024 by 768 resolution at 256 colors and at 800 by 600 resolution at 16.8 million colors. The business applications rating consists of WITS scores for Word 2.0 for Windows, Excel 4.0, and Freelance Graphics 2.01 running in 8-bit mode, and for Freelance running in 24-bit mode. The graphics applications rating consists of WITS scores for CorelDraw 3.0, PhotoStyler 1.1, and QuarkXPress 3.11 running in both 8-bit and 24-bit modes. The overall rating includes ratings for performance (40 percent), features (30 percent), price (20 percent), and support (10 percent). For all ratings, higher is better.

◪ Windows 95–certified Plug and Play.

For more information about all products in this table, circle reader service no. 901.

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Microcom, Motorola Tie for the Top

Little Big Modem: ***Microcom's petite DeskPorte 28.8P outruns two-thirds of the modems we've tested, is cellular capable, and sells for a very affordable $215.***

A parallel port connection and the MNP-10 cellular protocol are two of many extras you get with Microcom's DeskPorte 28.8P, which shares the external model Best Buy title with Motorola's ISG Lifestyle 28.8. The $215 DeskPorte outdid two-thirds of the modems we've tested on the standard serial port connection (we didn't test the reportedly faster parallel port connection). Microcom's support is among the best, including a toll-free number. Policy and feature enhancements help Microcom's DeskPorte Fast and Practical Peripherals' PC288LCD V.34 modems hold their positions on the chart.

Three other new external modem contenders missed the chart. AT&T's Comsphere 3825 Plus is one of the best performers we've seen, but at $575 it's too pricey. Ditto for Hayes's Optima 288 Business Modem, which sells for a budget-stressing $419. Cardinal's MVP288XF costs only $179, but it's slow.

Zoom's V.34C Model 520 remains the Best Buy PC Card modem. It's still the cheapest and best-performing PC Card on the chart, and Zoom backs it with long support hours. Of the four new PC Card modems we tested this month, only MultiTech's MultiModem LT made the chart. It's aggressively priced, a decent performer overall, and a breeze to install. Motorola's ISG Lifestyle 28.8 PC Card is the best-performing PC Card we've tested and is painless to install, but we'd like to see Flash ROM for easy upgrading. U.S. Robotics' Courier V.Everything PC Card is fast and even has status lights, but its $385 price isn't pocket change. ActionTec's DataLink 28.8 Cellular comes with lots of software and a decent price, but it's otherwise short on features (no FlashROM, for example) and has mediocre support.

TOP 10 MODEMS

		Last ranking	First reviewed	Street price external/internal (ISA)	Overall rating	Throughput rating	Connect rating	Features, ease-of-use rating	Reader service number	Comments
DESKTOP MODEMS	1	—	current	$215 / —	89	78	90	79	767	Reasonably fast, easy on your budget, toll-free support, serial and parallel port connections.
	2	1	Mar 96	$200 / $175	89	85	97	69	768	Connects at 28.8 kbps nearly all the time. Basic features, but nice price and toll-free support.
	3	2	Mar 96	$219 / $199	88	83	90	78	769	Excellent performance, affordable; manual volume control, but otherwise sparse features.
	4	4	Nov 95	$391 / —	86	75	90	88	770	Not cheap but very easy to use. Plain-language display. Now has toll-free tech support.
	5	5	Nov 95	$349 / —	85	85	82	83	771	Pricey but fast, and one of the easiest-to-use modems we've tested. Now has distinctive ring.
PC CARD MODEMS	1	1	Mar 96	$199	88	74	90	77	772	Installation likely to require support call; but best price and performance on PC Card chart.
	2	2	Feb 96	$274	87	77	80	78	773	New toll-free support helps keep excellent performer in the runner-up spot.
	3	—	current	$249	86	68	87	74	774	Alluring price on truly Plug and Play modem. High connect rate, too.
	4	3	Feb 96	$309	85	76	69	85	775	Excellent documentation, pop-out phone jack. Great for technophobes.
	5	4	Feb 96	$269	84	79	72	77	776	Pricey, but a terrific performer and has pop-out phone jack. Now detects calling card tone.

Microcom DeskPorte 28.8P	800/822-8224	
Motorola ISG Lifestyle 28.8	800/566-3266	
U.S. Robotics Sportster V.34 Faxmodem	800/342-5877	
Microcom DeskPorte Fast V.34	800/822-8224	
Practical Peripherals PC288LCD V.34	770/840-9966	
Zoom V.34C Model 520	800/631-3116	
Microcom TravelCard 28.8P	800/822-8224	
MultiTech Systems MultiModem LT	800/328-9717	
Megahertz XJ2288	800/527-8677	
Hayes Optima 288 V.34+Fax for PCMCIA with EZjack	770/840-9200	

BEST BUY

Methodology We tested each modem using a pair of identical units, one at each end of a simulated public-service telephone network from Telecom Analysis Systems. We tested throughput and connect rates using a variety of file types and line conditions outlined in the Telecommunications Industry Association's TSB-37A and 38 specifications. We used vendor-supplied initialization strings. The more expensive a modem, the more importance we give price in the unit's overall rating. The overall rating includes ratings for price (3 to 20 percent), features and ease of use (32 to 38 percent), performance (40 to 46 percent), and support (8 to 13 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 910.

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Edited by
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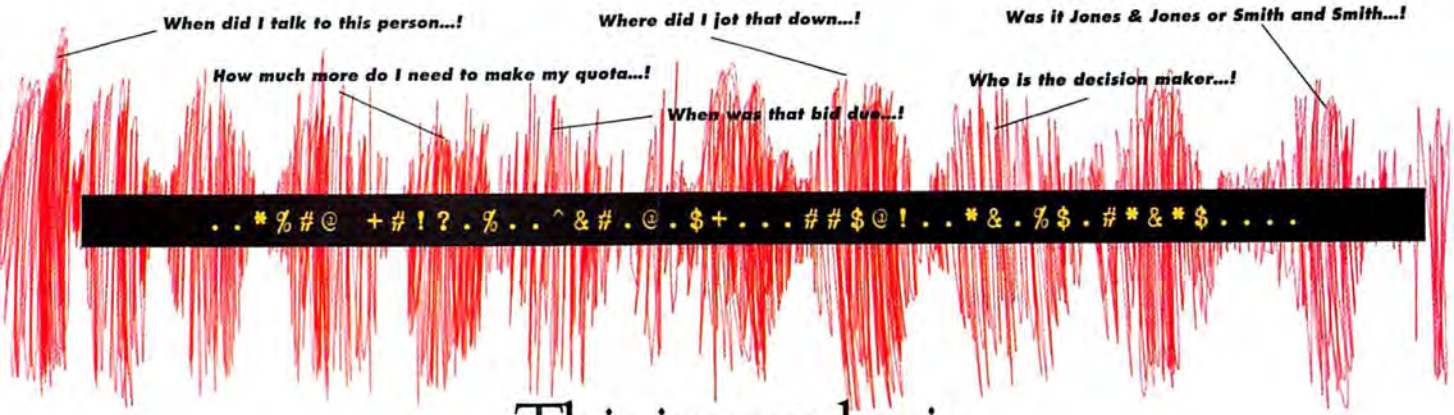

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Communicating With Newton

If you thought you had to be plugged in and sitting down to send e-mail, receive a fax, check out a CompuServe forum, or surf the Web, it's time to think again.

BY NICK WINGFIELD

A computer without communications features is like a cat without its meow. Like it or not, we're knee-deep in modems, e-mail, Web surfing, and network computing, thanks in part to the radical growth of e-mail and the Internet.

With mobility as their raison d'être, the newest generation of personal digital assistants are really two-part computing devices: part personal information manager, part intelligent communicator. For these purposes, PDAs like Newton are far superior to laptops for on-the-go users (see sidebar, page 4). Instead of lugging a $2,000 laptop along on business trips just so you can check e-mail and your schedule, you can get a PDA with the same capabilities for a third of the price and an eighth of the weight. "E-mail and scheduling are exactly the kinds of applications I expect my Newton to replace," says Sandy Smallens, senior director of multimedia at Atlantic Records, based in New York. "Laptops are a pain in the ass to check in at airports."

To this end, Apple built its radically improved Newton 2.0 operating system from the ground up with mobile communications in mind, and its resident e-mail, fax, and desktop connectivity facilities show several marked improvements. Yet many of the most useful of Newton's communications-centered applications aren't coming from

ILLUSTRATIONS / JOYCE HESSELBERTH

REAL PEOPLE

Michael Dorf: Timing the Music

"In the music business, you gotta be cool," says Michael Dorf. As president of the Knitting Factory, Manhattan's avant-garde jazz club and record company, Dorf found that carrying a laptop backstage–where he does most of his concert and festival scheduling–was not only awkward, but decidedly uncool. "I'm on the business side of things, but I still have to look hip."

Dorf, who has used a PowerBook since day one, says that his recent conversion to an Apple Newton 2.0 MessagePad 120 from a laptop has not only upped his hipness factor, it's given him greater flexibility. "When I'm at a club, I don't want to be carrying around a PowerBook or, for that matter, a briefcase. Now, because of my PDA, I don't need either. I'm hands free."

Dorf relies primarily on the calendar program Now up to Date! (Now Software, 800/275-1669) which runs on his PDA as well as the networked Macs in the main office. "To have the Knitting Factory's complete calendar right at my fingertips is a big advantage," says Dorf. "Now, no time is wasted. If I've had a conversation with someone backstage–whether it's in Tokyo, Zurich, or uptown New York–I'm able to relay that information immediately back to the company and synchronize calendars."**–Leslie Crawford**

Cupertino, Apple's home town, at all. Independent software and hardware developers are driving much of the innovation behind Newton communications, from two-way wireless PC cards to LAN e-mail clients to World Wide Web browsers.

On the E-Mail Trail

With Newton 2.0, Apple succeeded in making all of the PDA's resident applications a kinder, gentler experience. (The new operating system even won the Fall Comdex '95 Best of Show award.) For example, handwriting recognition, which so limited the original Newton's usefulness, is radically improved. But nowhere is the benefit more obvious than when you compose e-mail.

Out of the box, Newton 2.0 does include some basic networking capabilities in the form of AppleTalk, Apple's LAN protocol software. Through the serial port, you can plug into a networked printer or synchronize your Newton data with Newton Connection Utilities (see sidebar, page 10) running on a server. But if you want to send or receive e-mail or faxes, you'll need a modem. For some mysterious reason, Apple refuses to put an internal modem in the MessagePad (Apple's Newton hardware, of which there are a few versions). This forces Newton users who want e-mail or fax capability to purchase a separate modem, which is about the size of a KitKat candy bar, or a more sleek PC card fax modem.

Once you've got the modem, however, Newton's resident fax and e-mail communications capabilities get you moving right along. For example, its built-in e-mail client for Apple's eWorld online information service allows you to exchange text messages with other eWorld members on Macs, Windows PCs, and Newtons. With eWorld's Internet gateway, subscribers can also send e-mail to Internet users, as well as to

Newton Versus the Laptop: Which Is Better?

Like other PDA devices, Newton is clearly a cousin to another kind of mobile computer: the laptop. The two devices support the same basic communications applications: fax, e-mail, and information access through software such as Web browsers or database clients. As with Newton, laptop users rely on synchronization software to keep their mobile applications in touch with desktop computer applications. With Apple's recent release of a midsized keyboard that plugs into Newton's serial port, it's even tempting to call Newton a pint-sized laptop of sorts. And if you're ready to put down around $90, you get an input device that never has handwriting-recognition problems.

But, when choosing a communications platform, it helps to align expectations with reality. Newton isn't designed to deliver the kind of horsepower, graphics capabilities, and overall flexibility that laptops can. Nor can PDA users plug into a network like the Internet as full and equal peers to desktop and computer users. While your cohorts with PowerBooks and ThinkPads are opening e-mail with attached Microsoft Word documents, you and your PDA-using sisters and brothers are limited to ASCII text e-mail.

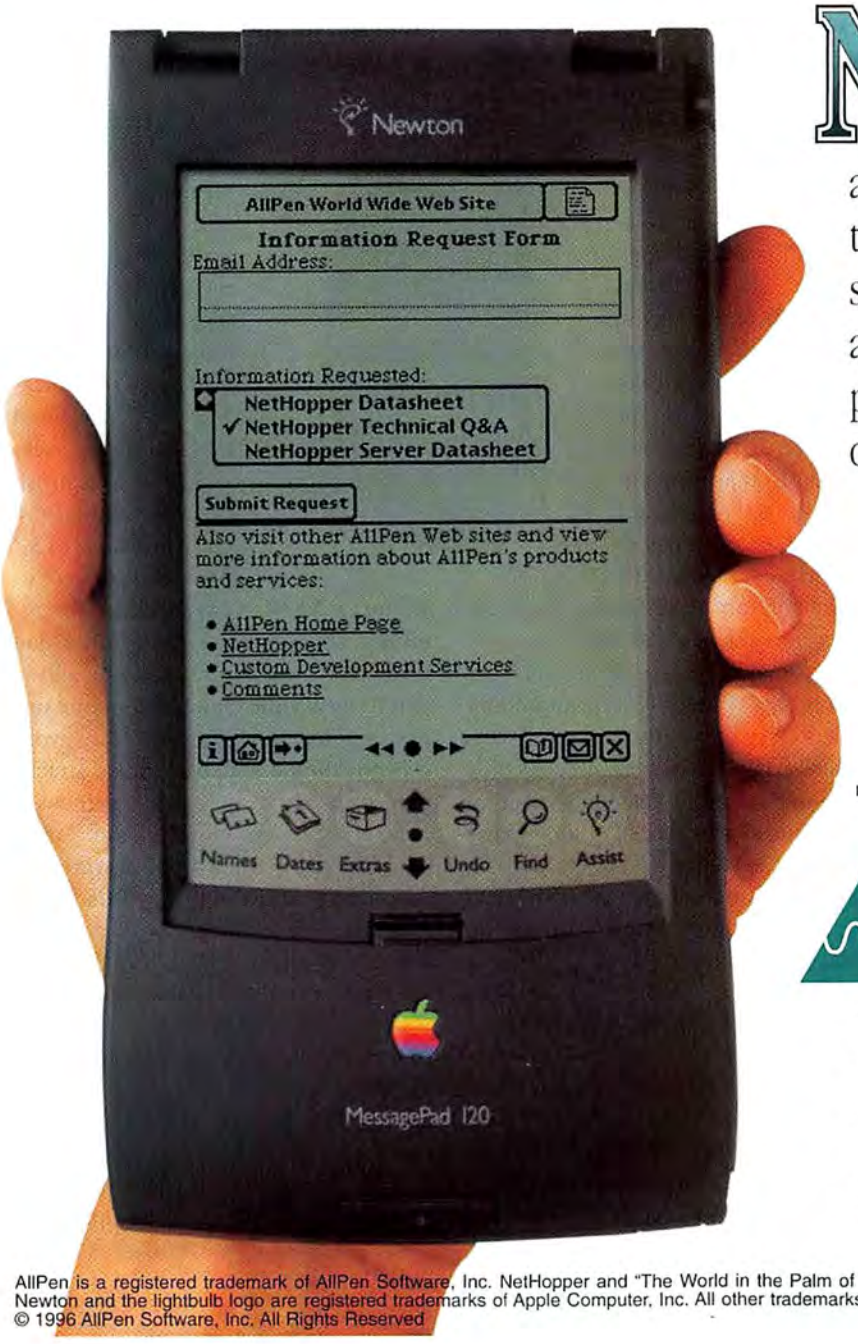
Also, contrary to what you were taught as a teenager, size does matter. Newton's smallness is its chief asset, but smallness also means sacrifices in screen quality. Some experts say Newton's tiny screen seriously limits its appeal as a platform for e-mail and other communications applications.

Still, if all you really need is a personal information manager that can let you talk to the outside world–and it with you–you may find Newton an intelligent investment. And it sure relieves the pressure on that sore lower back.**–N.W.**

PHOTO / PETER GREGOIRE

NetHopper

The World Wide Web Browser for the Newton



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Victor Zauderer: Breaking Out of Books

Victor Zauderer's life may be wrapped up in the paperbound world of book design and publishing, but he spends most of his working hours reading and writing with a Newton. A director for The Understanding Business, a publishing and book design firm located in San Francisco, California, Zauderer is virtually bound to his Newton 2.0 MessagePad, using it to send and receive faxes, send and receive e-mail, take notes, make call logs, track his time, and schedule appointments. "It's never out of my hands," he says. "I can write up an entire contact in less than a second."

The Understanding Business publishes graphical, easy-to-understand books such as the Access Travel Guides (recently sold to HarperCollins). In addition to using the Newton all day long to manage their business, Zauderer and his colleagues test-drive their publications through other people's PDAs. From an address on the World Wide Web (http://www.info.apple.com/newton), Newton users can download general information about a book's contents, a sample of writing, and information about and how to purchase it. The company also plans to ship its publications in both print and electronic MessagePad form via Newton online interest groups and Web sites and Understanding's own Web site.

Zauderer thinks the MessagePad is a logical way to market and publish sophisticated information. "People who buy Newtons are already a very specific group who are interested in complicated topics," he says. "It's a perfect communications vehicle."—**Marie D'Amico**

subscribers to commercial online services, such as America Online, CompuServe, and Prodigy. The resident e-mail software also allows you to exchange any Newton object—for example, a business card from Names, a calendar appointment from Dates, or a NotePad drawing—with other Newton users. (Unfortunately, Mac and Windows PCs can't receive Newton objects, just plain text.)

In addition, Newton 2.0 lets you send a fax or e-mail to multiple recipients through a batch transmission feature. (Beaming, which allows Newton to wirelessly exchange objects with other nearby Newtons, also supports batch transmissions, as well as the exchange of software packages.)

Newton 2.0's built-in communications capabilities aren't perfect: though Newton's In Box makes it easier to receive faxes, Newton's resident e-mail client still lacks some basic filtering capabilities, for example, that would allow you to reject incoming messages over a certain size before they're downloaded or to file messages automatically from a particular sender into a designated folder.

Fortunately, independent software vendors (ISVs) aren't waiting around for Apple to take care of these issues. A host of third-party developers now provide add-on applications that fit a range of communications needs. (Indeed, the breadth of third-party products available really demonstrates how far Newton has come as a platform.) Here's a roundup of the chief offerings.

ONLINE SERVICE APPLICATIONS If you're not an eWorld fan, there's no reason you can't use your favorite online service. America Online aficionados can use Catamount Software's (802/863-5256) Aloha, a simple $50 program that allows you to send and receive e-mail from your AOL account via modem. Another firm, Black Labs (303/938-8580), has created a Newton client for the CompuServe Information Service (CIS) called CIS Retriever ($99), which allows users to access CIS discussion forums, news, and stock quotes, in addition to e-mail. The company offers a similar software program for First Class bulletin board systems, called FirstClass Retriever+ ($99). There's also a more generic, less graphical communications program from Ex Machina (212/843-0000), PocketCall ($119), which lets users access CIS e-mail and forums, as well as text-only BBSs and Internet UNIX-shell accounts provided by companies such as Netcom.

LAN E-MAIL Newton's success as a personal communicator for mobile professionals depends, at least partly, on how well it integrates with office information systems. For users of QuickMail, a LAN-based e-mail software package for Macintosh and Windows PCs, CE Software (515/221-1801) offers EnRoute, a $129 Newton client for remotely accessing e-mail on QuickMail systems via modem. EnRoute allows you to view your QuickMail in box online so, for instance, you can avoid downloading e-mail with bulky attachments. It also integrates nicely with Newton's resident NotePad and Names applications, with a cool feature for simplifying addressing of QuickMail messages. CE Software also offers a wireless e-mail client, called MobileVision ($875 for five users). Designed for use with Motorola's Marco wireless communicator, the software forwards mail from QuickMail, Microsoft Mail, and cc:Mail systems to Marco, employing user-defined criteria to filter messages.

Users on Microsoft Mail and Lotus cc:Mail LANs have a wired option to chose from as well: River Run Software

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BEST OF BYTE COMDEX Fall '95

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The New Apple MessagePad 120

Newton

REAL PEOPLE

Dr Steve Labhoff: Walking the Wards

Two years ago, when Dr. Steve Labhoff took charge of implementing computer technology to make physicians' jobs easier, he went straight for the Newton. "The doctors I work with need drug dosage, medical records, and other information quickly," says Labhoff, a research associate of internal medicine at the Decisions Systems Group of Harvard Medical School's Brigham Women's Hospital. "But this information is stored usually somewhere else—in a library, say, or in the medical records department."

Believing that PDAs have great potential for accessing this data, Labhoff launched the Constellation Project, a study conducted at Brigham Women's Hospital and Massachusetts General Hospital. Labhoff approached K2 Consultants (603/551-5544), a New Hampshire–based software design company, to design a custom medical reference package.

The K2 software includes a drug information handbook from the Texas electronic publishers, Education Research Laboratories, and the Medical Knowledge Self-Assessment Program from the American College of Physicians. It also includes a manual the residents wrote for interns, a medical calculator designed by Labhoff, and a phone book of residents in five local hospitals."K2 created an indexing scheme that allowed the software to function quickly," explains Labhoff. That way, a doctor can look up a drug in ten seconds or less.**–L.C.**

Group's (203/861-0090) Mail on the Run! ($129). Instead of connecting directly to an e-mail server, Mail on the Run! provides remote access to LAN e-mail by connecting to a user's Windows 3.1 or Windows NT workstation back in the office. That means you need to have a modem attached to your office workstation and to have your computer turned on at all times. Businesses with multiple Mail on the Run! users will probably want to dedicate a Windows NT. Qualcomm's (800/238-3672, ext. 6087) Eudora Light for Newton (free with the desktop version of Eudora, which costs $89) connects via modem or serial connection to a Mac workstation (a Windows version is on the way) running the desktop version of Eudora. This enables users to transfer messages between PC and Newton. While useful, the product isn't really a full-fledged e-mail client, but rather an offline e-mail browser.

THE WEB E-mail may be the killer application of the Internet, but the Web is definitely the sexiest one. Enter AllPen Software (408/399-8800) with its NetHopper Web browser for the Newton ($50). The company has wisely chosen to create a text-only browser so that Newton doesn't get clogged by Web page graphics, though users will still have an interface and features similar to the Mosaic and Netscape Web browsers, including the ability to follow hyperlinks. The software comes in two configurations: a client-server package that enables up to 20 Newtons to surf the Web through a Macintosh Internet server and a more consumer-oriented version that connects directly to the Internet through what's called a SLIP/PPP account. This last version is contingent on Apple's February release of a Newton version of TCP/IP.

Newton TCP/IP software will definitely benefit more applications than NetHopper and allow a greater degree of access to the Internet. In fact, some people think this could be Newton's calling. "An application that taps into the Web would sell more Newtons than anything else," says Steven Erde, director of the Office of Academic Computing at Cornell University Medical College in New York. "One of the things that's imperative is the ability to do a direct connect to the Internet, and Apple already has this fantastic appliance in the Newton."

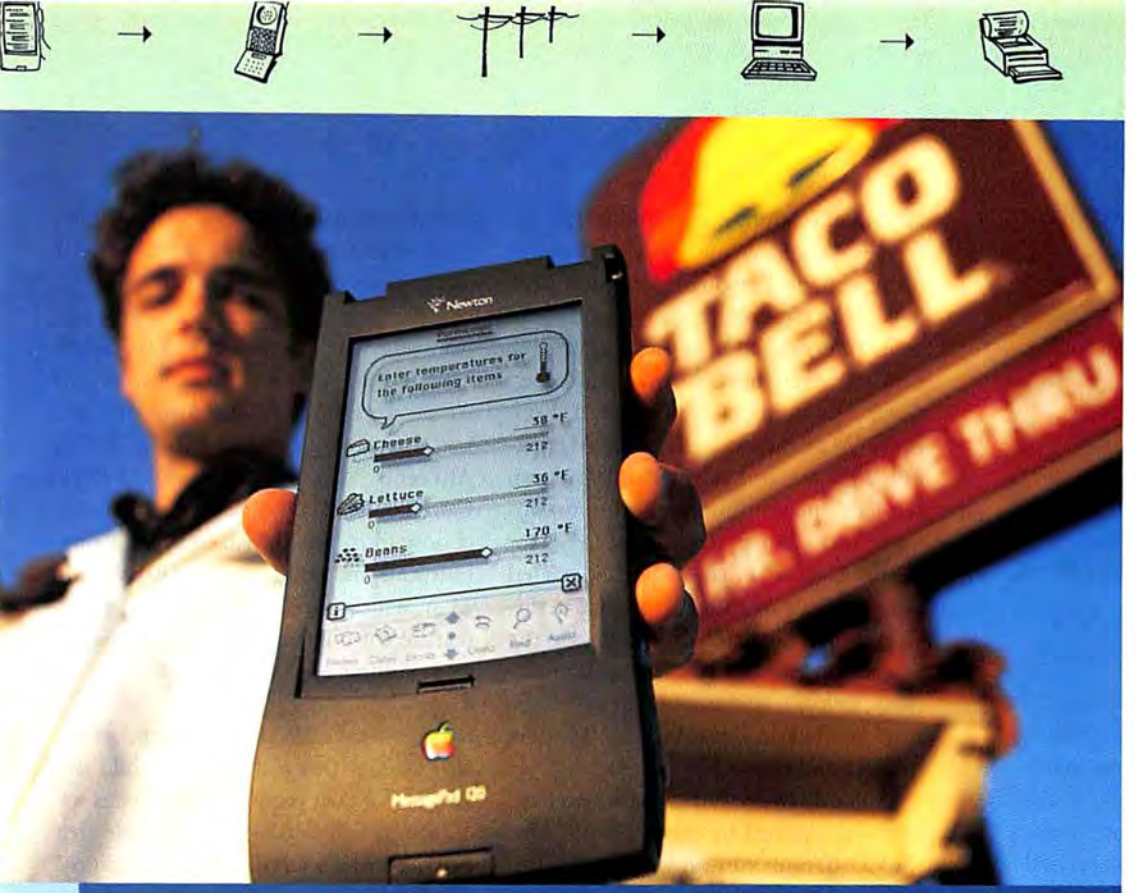
Newton Unplugged

Given their druthers, most users would like access to e-mail or the capability of sending a fax whenever they please, wherever they are—in an elevator, in a car, walking down the street. For Newton users who prefer to have no strings attached, here are some options.

TWO-WAY COMMUNICATIONS For those who want two-way wireless communications from their Newton in a tightly integrated package, the obvious choice is Motorola's Marco (800/894-7353). In addition to all of the standard features of Apple's MessagePad products, including PC card slot and serial port, Motorola's Newton comes with a built-in radio modem for connecting to Ardis, a nationwide wireless data network. (Unfortunately, Motorola has no plans to see a Newton 2.0 version of Marco—the device currently runs on Newton 1.5—nor does it have any plans to offer a Newton 2.0 upgrade for existing Marco users.)

For users willing to stick with the older Newton operating system, Marco offers writers two e-mail options to choose from. The first, Radio Mail (free with Marco; 800/597-6245) gives users

PHOTO / SETH RESNICK



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Jacquelyn Baas: Art History in Your Hand

In most art museums, human tour guides–some more interesting than others–explain the history and technique behind the paintings and sculptures to tour groups and school kids. But you can get a personalized guided tour on your hand-held Newton at the University Art Museum at the University of California, Berkeley, where museum director Jacquelyn Baas says that the technology "represents our commitment to making art accessible."

The University Art Museum's "pocket curator," developed by Visible Interactive (415/433-7781) of San Francisco, lives in a Newton 2.0 MessagePad 120 with specially added backlighting, a fingertip user interface, headphones, heaps of memory, and a handy pouch. Turn it on, and you get a personal, interactive audio guide of the museum as you walk through it. The pocket curator discusses the exhibits in which you're interested, when you want, for as long as you want.

The MessagePad's IR port detects your location, and the unit can display choices based on the specific room into which you've wandered. The device describes a museum space, a room, or a painting, while you are touring; it can also schedule a tour for available time and print out the tour later.

"Now the tour can follow you instead of you following the tour," says Richard Rinehart, information systems manager for the University Art Museum.**—Marie D'Amico**

an e-mail account connected to the Internet. Targeting mainly Marco workgroups, Ardis Personal Messaging (free with Marco), on the other hand, provides an e-mail address that is accessible only to other subscribers to Ardis Personal Messaging. Besides e-mail, both Radio Mail and Ardis Personal Messaging offer fax and selected information services, including stock and news updates, though there are extra charges for both. Motorola has also kick-started development of other Ardis-based services aimed at vertical markets (see the sidebar on desktop to Newton connectivity, below), and some mail packages, such as Mail on the Run!, also support Ardis connections.

Apple MessagePad owners also have two-way options to choose from. Motorola offers an add-on wireless modem for the Ardis network, called the Personal Messenger 100D ($750). This device is a type II PC card that slides snugly into the MessagePad's card slot. With it, users can access Radio Mail and vertical applications developed for Ardis. Just to complicate things, there's another nationwide wireless data network, RAM Mobile Data, that is virtually identical to Ardis. To tap into the RAM network, you'll need Megahertz's (800/527-8677) AllPoints Wireless PC Card ($499). Once you're riding the airwaves, you can choose from Radio Mail or Wynd Communications' (800/549-6000) WyndMail, which includes e-mail, fax, and a feature for converting e-mail messages into synthesized voice phone calls.

THE VERTICAL CLIMB Hardware vendors are also setting their sights on vertical markets with Newton-compatible devices for creating wireless local area and wide area networks. With Dayna Communications' (800/443-2962) Roamer PC card and serial devices, Newton users can wander wire-free within 150 feet of a LAN access

Desktop to Newton Connectivity

There are two "Cs" crucial to Newton as a platform: communications and connectivity. The latter enables Newton's resident applications to stay in touch with desktop PC applications such as personal information managers and databases. Without desktop connectivity, many Newton users' lives would effectively become schizophrenic, with data in parallel PC and PDA applications growing gradually more dissimilar.

Apple's answer to this problem is Newton Connection Utilities, a set of software programs for Macintosh and Windows PCs that provides file synchronization capabilities between Newton and popular Mac and Windows PIM applications, such as Claris Organizer, TouchBase Pro, and NetManage's Ecco. Newton Connection Utilities also provides data backup capabilities so you have a copy of Newton's data on your computer hard disk. With Newton 2.0, users can perform synchronization and backup one of three ways: serial cable, LocalTalk, or modem.

Ultimately, Newton Connection Utilities may be eclipsed entirely by direct synchronization features between desktop applications and Newton. Seeing NCU as an extra step to linking both platforms, Apple is encouraging developers with software tools to embed "Synchronize With Newton" capabilities in their desktop applications. Already some have started, including Team Coordination (514/481-4647) with its TeamAgenda Mac scheduling software ($549 for five users) and Now Software (800/275-1669) with Now Contact and Now Up-to-Date, two Mac PIM applications ($150 plus $30 for a synchronization module).**—N.W.**

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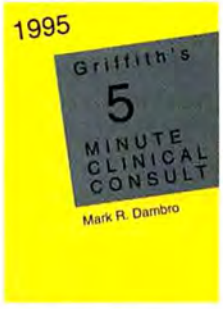

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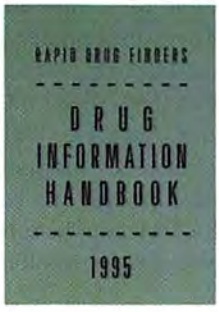

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Friends in Need: Where to Get Support

With Best of Comdex kudos and glowing press reviews to back them up, Apple's MessagePad 120 loaded with the Newton 2.0 operating system "has been selling itself," according to George Giakouminakis, a sales representative for J and R Computerworld, a large retail outlet in New York City. "A lot of people come in and say, 'Give it to me,' without asking any questions. With the older one you had to do a lot more explanation."

While the new Newton is unquestionably easier to use, the hardware and software can take some getting used to. In most cases, purchasers can receive rudimentary support and training from the dealer to get over the learning hump. But chances are that if you purchase a Newton from a store that also sells stereos and vacuum cleaners, you might not be getting the technical expertise that you need to answer tough questions.

Apple already provides a one-year warranty on the hardware along with telephone support (800/767-2775) for the $699 product. Though getting through on Apple's 800 line may make you wish you had taken up a time-passing hobby like knitting, the support comes straight from the horse's mouth.

Another excellent alternative is to purchase a Newton from one of the four Newton Source stores (in San Francisco, Los Angeles, New York, and Chicago; call 800/639-8661 for information). These stores specialize in Newton and nothing but Newton, and their staffs know everything about both hardware and application software. Newton Source will preload the software you want and provide training; you can also sign up for lifetime on-site and telephone support. If something goes wrong, you can send your PDA in and receive a replacement within 48 hours while your unit is under repair.—**Bronwyn Fryer**

point indoors, 700 feet outdoors. The device uses the unlicensed radio spectrum, so businesses don't have to pay a monthly service fee. Digital Ocean (913/888-3380) has taken the integration between Newton and wireless communications a step further, introducing in January of this year a product called Seahorse. This is a ruggedized device based on the Newton 2.0 operating system with the option of wireless LAN, cellular digital packet data, global positioning satellite, or other wireless modules. A similar program, KPMG Peat-Marwick's (610/995-4400) SaleMate, enables wireless access to SAP R/3 Systems, a corporate sales automation system.

CELLULAR For a more versatile two-way wireless option, you may want to consider a cellular phone instead of a specialized data modem and service. With a cellular phone, Newton users can dial into the same services accessible via ordinary telephones, including online services, with the added bonus of being able to make voice calls. Connecting to AOL via cellular isn't as dependable as a regular phone connection, though; prepare yourself for fluctuations in transmission speed. You will need a cellular phone, a PC card cellular modem, and a cable for connecting the two devices. There are a number of PC card cellular modems for Newton, including Toshiba's (800/959-4100) NoteWorthy card and Motorola's (800/472-6242) Cellect card, which cost around $230. The cellular modem may come with a connector cable, but be sure it fits your cellular phone before you buy it.

PAGERS Finally, if you don't have to respond to that e-mail anytime, anywhere, a great alternative to two-way communications is paging. Newton works with several receive-only PC card pagers, including Socket Communication's (800/552-3300) PageCard, priced at around $399. The PageCard will store messages received when outside of Newton, but it also has some added smarts for assembling longer messages that have been split into multiple pages. It even has its own tiny LCD screen for reading messages, though viewing pages on Newton's screen is infinitely easier. Apple's Newton Systems Group is working on a Motorola NewsCard paging solution for 2.0, which should be available before summer.

Needless to say, you'll want to familiarize yourself with service charges before forking over for a wireless solution. Although pricing varies, you can expect to pay anywhere from $40 to $60 a month for average usage on the Ardis and RAM networks. Users on both networks are charged by the data packet sent and received. If you're not careful, those packets can add up to a big Alka Seltzer Moment at the end of the month when you get your bill. Cellular phone users are charged by the duration of their calls, so data calls cost the same as voice calls; as an example, expect a two-page fax to take a couple of minutes to send over cellular.

With Newton 2.0 riding in tandem with some encouraging third-party development, the platform is picking up its pace as an intelligent communicator. Who knows? Within a few years, we may see commuters checking e-mail on their PDAs instead of talking into cell phones. Let's hope their cars are equipped with automatic guidance systems. ■

Nick Wingfield (nick_wingfield@infoworld.com) is an editor at Infoworld *who covers wireless communications.*

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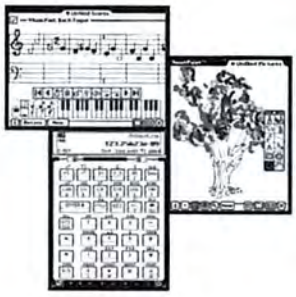

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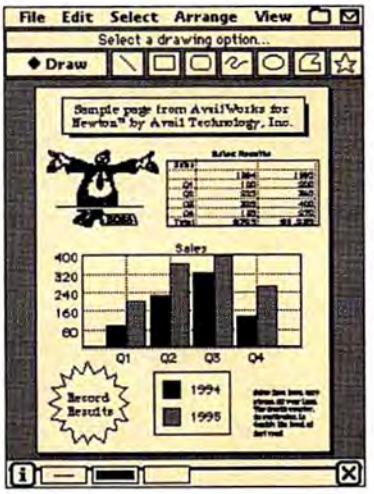
Mobileware Takes Off

Whether you're on the ski slopes or on the treadmill, here's a selection of Newton 2.0–based software that will let you take your business—and pleasure—with you.

BY BRONWYN FRYER

For the mobility-minded computer user, there are lots of applications out there for Newton 2.0 that can help make working on the go a bit easier—and even a little more fun. Here are just a few.

A SUITE DEAL On the desktop, all-in-one packages like Microsoft Works are an answer to word processing, spreadsheets, and graphics. But when you're in an airport working on a PDA, it's generally pretty tough to cut and paste together a reasonably nice-looking document. Enter AvailWorks, a $79 software package that lets you create a WYSIWYG document complete with text, graphs, and spreadsheet elements, then shoot it off to a recipient through an included fax modem utility.



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AvailWorks: Avail Technology, 408/730-6855

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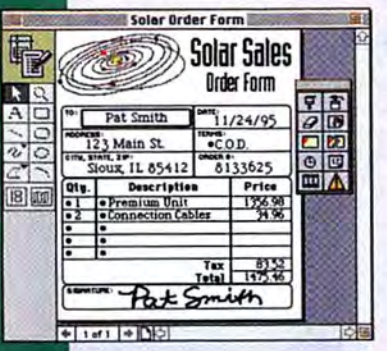

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*Dave MacNeil, *Pen Computing* Nov/Dec 1995 review of v2.2

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Leverage: Balcones Software, 512/353-7259

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integrated time and expense tracking, reporting, and billing application, you can keep track of your time and business expenses on the go. With links to Newton's Names, To-do, Calendar, and call entries, the package even includes a stopwatch so you can bill down to the minute.

TimeReporter 3.0: Iambic Software, 800/730-5370 ■

Just for Fun

Ready for a break? Try these seriously fun applications for your portable pal: Gold Tee at Bighorn (around $35), a golf game that you can play with up to four people (Apple Computer, 800/708-7827); MusicPad, a $40 music-composition app that plays back your songs from the PDA speaker (Landware, 800/526-3977); and Pocket Chef, a $100 mobile meal-planning tool that lets you create a grocery-shopping list by aisle (Forest Software, 970/923-3572).

Easter Egg Hunt

Tap your way to the mysterious and funny surprises hidden in Newton 2.0.

BY MARIE D'AMICO

Editor's note: *All work and no play makes anyone dull. Apple's Newton team had fun working on the new operating system, even plugging in a few hidden surprises. Freelance writer Marie D'Amico prevailed on her husband, Apple Fellow and Chief Programmer Steve Capps, to show her where all the so-called Easter Eggs lie in Newton 2.0. An Easter Egg is a hidden sound or picture placed in code by a programmer with a wacky sense of humor. Here's D'Amico's list for some of the tastiest Eggs in Newton 2.0. Enjoy.*

EGG FRECKLES Around the time that comic-strip artist Garry Trudeau made fun of the original Newton in Doonesbury, reporters often asked me, "how does your husband feel about his invention being ridiculed in Doonesbury?" To show what good sports we were, I wrote to Trudeau asking for an autographed

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print of the complete strip for Capps's birthday. Trudeau sent me not only the signed strip but also an explanation of its creation. "I know a lot of people took my Newton strips to be a full-blown consumer review pan, but I was just writing about guys and their toys." He added, "The only thing I don't own is a Newton. I've never even laid eyes on one." To show what a good sport *he* was, Trudeau even drew a special Easter Egg for new 2.0. You can find Trudeau's Egg in 2.0 by writing "egg freckles" and tapping the "Assist" button.

GEOGRAPHY LESSON Feel like going on a wild world tour? Fun cities on the Newton 2.0 world map (tap Extras, tap Time Zones) include "Titanic," "Newtonmore," and "Newton, Iowa," the home of Maytag.

THE X-FILES If you believe in UFOs, the Bermuda Triangle, and the X-Files, you'll love this one. Area 51, AKA Groom Lake, is a top-secret military installation that lies about 90 miles north of Las Vegas, Nevada. Area 51 is where the government tests spy planes like the U-2 and the Stealth bomber (legend has it that Area 51 is also home to captured aliens from distant planets). Newton programmers placed their own Top Secret Area 51 Easter Egg in 2.0, to the displeasure of the CIA. And though Apple disavows any knowledge, you can find the Area 51 Easter Egg in Newton 2.0 by following these steps: Tap Extras, tap Unfiled Icons folder tab, choose Storage, tap Time Zones, tap Delete, tap OK, tap Storage folder tab, choose Unfiled Icons, tap Time Zones, tap on map near Nevada, and Area 51, NV will appear in the list of cities. ET and UFO icons appear in the Calendar. (For more mysteries, check out the following Web site: http://ww.cris.com/~psyspy/ area 51/desert_rat.)

CUCKOO NAMES If you want to go cuckoo, tap Dates, tap i, tap Prefs, tap in any corner without the X.

KNOCK THREE TIMES Write any of the following three times and you'll get a surprise: larryy, Brandyn, lesv, stafford, lyon.

SHADE YOUR EYES Power up Newton 2.0 on the day of a solar or lunar eclipse. Instead of the Newton light bulb icon, you'll see an eclipse you can view without sunglasses. ■

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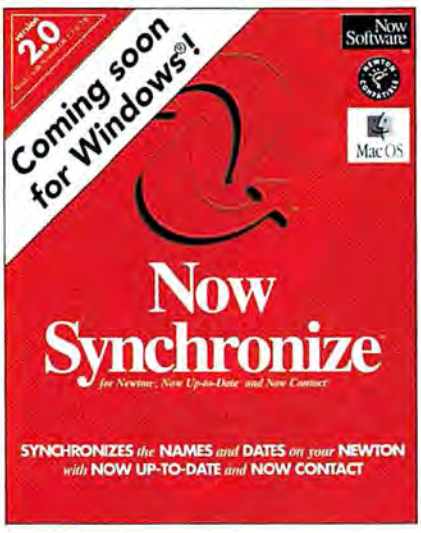

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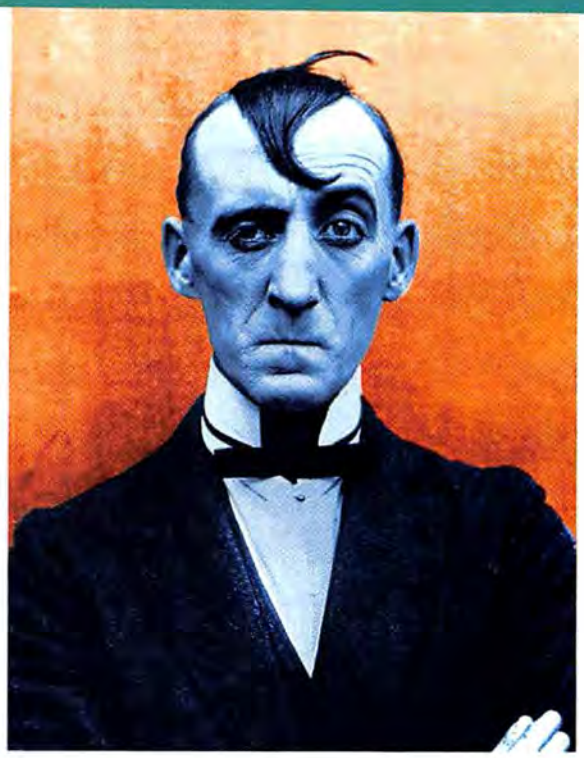

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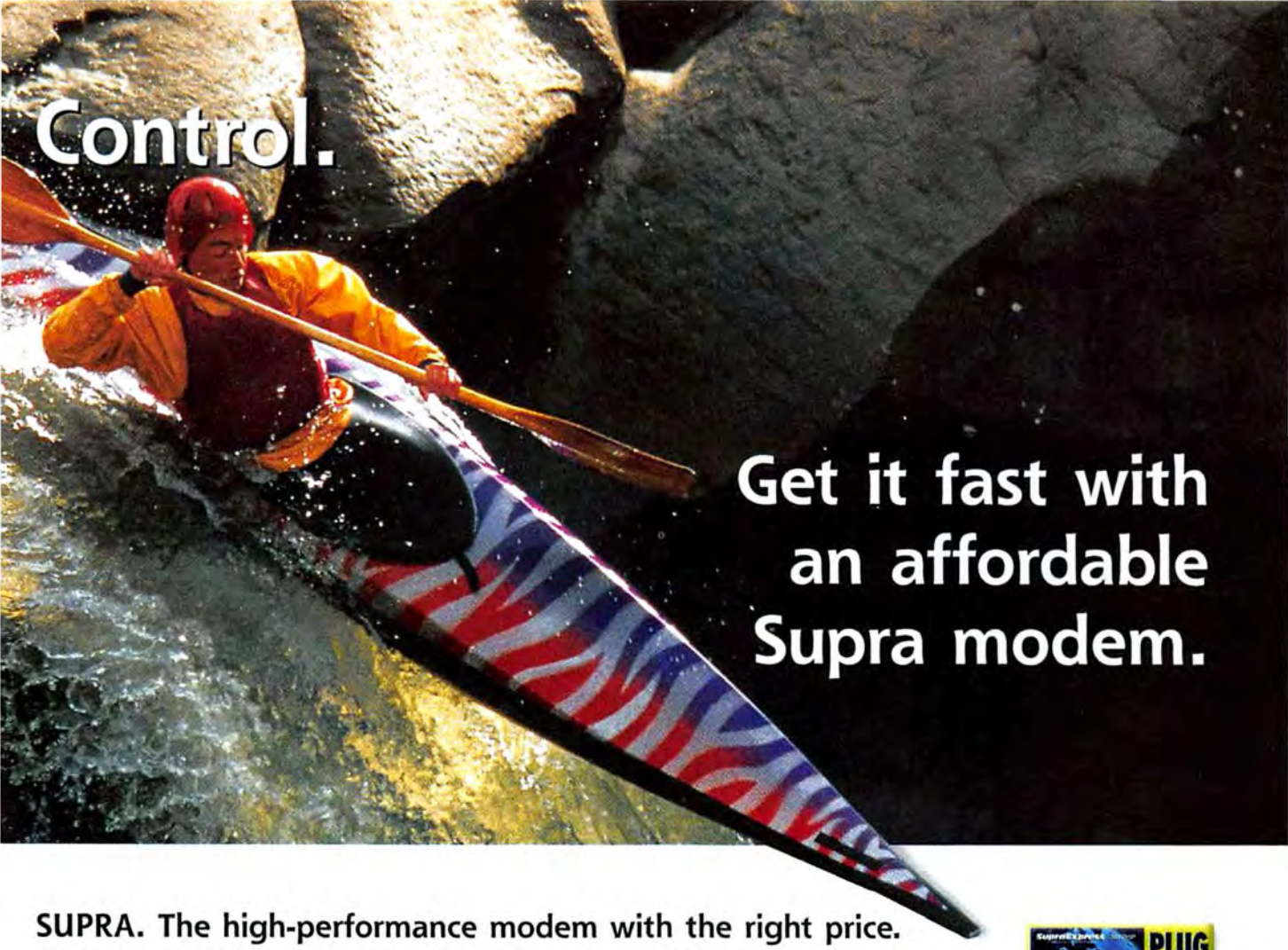

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HELP LINE Q&A

Honey, I Shrunk the Taskbar!

Q This one has me stumped. Recently, I fooled around with some Registry settings and discovered afterward, to my dismay, that Windows 95's Taskbar had disappeared. It's not completely gone—I can still see the thin gray bar you get when you enable the Auto hide feature in the Taskbar properties sheet—but I can't make it pop back up. Short of completely reinstalling Windows 95, how do I get the Taskbar to reappear?

G.E. Norr, Denver

A This is one of those cognitive black holes that swallow even the experts. Because you were fooling around in the Registry, you're afraid you changed a crucial setting. As you know, Windows 95 and compatible applications store most of their configuration settings in the Registry. The Registry *is* sensitive, but in this case you probably just accidentally resized the Taskbar. To restore it, place the pointer over the first couple of pixels of the gray bar until it turns into a double-headed arrow, then left-click and drag until the Taskbar is the size you want.

Curse Microsoft all you want for allowing such an idiotic user-interface setting, but it can actually be useful. I use the Auto hide feature, accessed by right-clicking a blank area on the Taskbar and selecting *Properties*, to squeeze the maximum usable area out of my 15-inch monitor (see **FIGURE 1**). But no matter where I place the Taskbar, it pops up whenever I attempt to use a window control near the edge of the screen (such as scroll bars or the Close button). I size it down to nothing during intensive editing sessions to avoid frustration. I've also shrunk the Taskbar on my three-year-old's computer to keep him from launching programs on the Start menu. Now, I just need to figure out how to keep him from putting dried fruit in the VCR.

Pulling System Files From Cabinets

Q Back in the good old days of Windows 3.1, there was an easy fix for those times when a corrupted Windows file kept the system from running right. All you had to do was grab your installation disks, look for the needed file (the last letter of each was replaced

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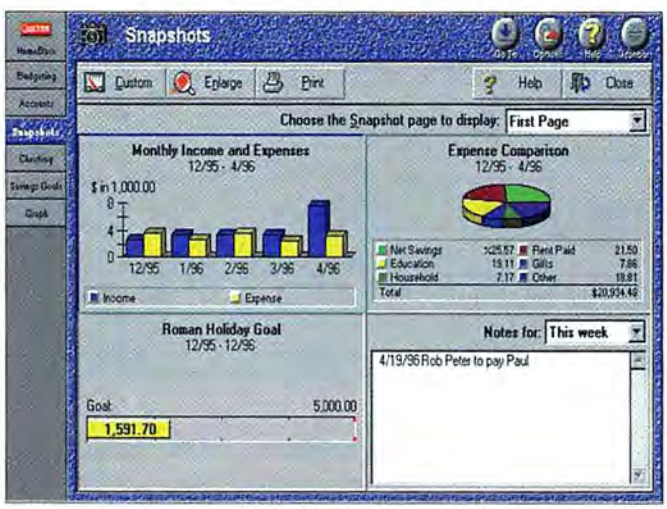
snapshot. Quicken displays six snapshots. Click the *Custom* button to change the number of snapshots per page, the types of snapshots, and their placement. Save a page of snapshots by clicking the *New* button in the Snapshot Page section of the dialog box, entering a page name, and clicking *OK*.



HANK OSUNA

FIGURE 1: AUTO HIDE THE TASKBAR temporarily. It reappears when you move the cursor below the app window.

by an underline, signifying the file's internally compressed format), use the extract command and *voilà!* there was your file ready to copy into your Windows directory.

Windows 95 has changed all that by encasing its system files in .cab (cabinet) archive files. Unfortunately, some of my utilities have modified or replaced .dll files in ways that Windows 95 doesn't like. How do I find and extract a file (comdlg32.dll, for example) from these things called cabinets?
Michael Earl, Salt Lake City

A The extract tool in the c:\windows\ command directory knows how to retrieve files from cabinets. If you happen to know which cabinet a specific file is stored in, and where you want to copy that file to, you can do the whole operation with just one command:

FIGURE 2: EXPLORE WIN 95'S CABINETS using the free CabView Explorer add-on.

extract /y /l *destination cabinet filename*. *Destination* is where you want the file to end up, and *cabinet* is the .cab file that contains *filename*. The command to overwrite your installed version of comdlg32.dll (assuming that Windows is installed in the c:\windows directory and that your Windows 95 CD-ROM is in drive d:) is: **extract /y /l c:\windows\system d:\win95\ win95_10.cab comdlg32.dll**.

Of course, unless you're on the Windows 95 development team, you have no idea which .cab file comdlg32.dll is stored in. Use the command **extract /d** *cabinet filename* to check each cabinet for a particular file, or **extract** *cabinet* for a complete listing of the .cab file's contents. If that seems too labor-intensive, there's a tiny Explorer add-on called CabView that lets you browse .cab files as if they were folders and copy or drag files (see **FIGURE 2**).

CabView is one of ten quick-and-dirty Windows 95 add-ons known collectively as Power Toys. Though they were written by Microsoft engineers, they're not officially supported, and some are buggy, so use them with caution. (CabView seems rock-solid, however.) You can download specific utilities or the whole set from Microsoft's Power Toys World Wide Web page at **http://www .microsoft.com/windows/software/powertoy.htm**.

Drive Your Modem From DOS

Q I'd like to send AT commands to my modem from DOS or Qbasic and read the resulting output. Is there a way, for example, to connect to a bulletin board directly from DOS?
Ehimare Idiahi, Metairie, Louisiana

A You can do a lot with your modem from DOS—even dial out, send data, and hang up. Remember, though, that you can opt to use free- and shareware communications programs to han-

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```
open "com1:" for random as #1
i% = 1
print #1, "atz"
do while i% < 4
   line input #1, in$
   print in$
   i% = i% + 1
loop
system
```

FIGURE 3: THIS QBASIC PROGRAM sends an ATZ command to your modem and displays the results on your screen.

dle these chores instead of the often arcane commands I'll describe. Unless you bought your modem at a yard sale, it probably came with one of these bare-bones workhorses. If it didn't, you can find one almost anywhere online (including PC World Online).

There are occasions, however, when you need to reset or query the modem manually from the DOS prompt or a batch file. Modems and communications programs don't always work as expected and may leave your modem off-hook or configured in a way you don't want. Or you may want to reset the modem after a failed connection, incomplete hang-up, or other snafu.

You can reset your modem with the command echo **at***command***>com***x*, in which *command* is the specific AT command and *x* is the COM port number. For example, echo atz>com1 sends the reset command to a modem on COM1. Unfortunately, you won't be able to see the modem's response, as you would on a communications program's terminal screen.

Qbasic, however, lets you treat the COM port as if it were a file, so you can use it to send commands to the modem and display the results as well. I've written a program that sends the ATZ command to a modem on COM1 and echoes the modem's acknowledgment to the screen (see **FIGURE 3**). You can replace 'atz' on the third line with the AT command of your choice.

Every modem behaves somewhat differently, so the program may need some tweaking to work correctly with yours. In particular, you may need to adjust the number of loops specified in the DO WHILE statement to match the total number of lines your modem spits back in response to a specific AT command—too few and you're likely to miss the message; too many and the program might grind to a halt. Still, if you've been wondering what Qbasic is good for, this exercise might jump-start your imagination.

Save Custom Icons in Library Files

Q I create many custom program icons using an icon editor. I would like to store these icons in .dll files (as Windows itself does) for convenience and better compatibility with Windows 95. The only way I've found to do this is to copy an existing icon library and replace individual icons with my own (which my icon editor supports). Is there a simpler way to move a group of icons into a new .dll file?
Chuck Allen, New Orleans

A You're in luck. James M. Curran wrote a simple command-line utility, called icondll.com, that does nothing more than copy .ico files into a .dll file. You can find the free program on PC World Online. Enter **icondll /?** for usage instructions.

More Ways to Browse Offline

In your answer to reader Ryan Heaton ("Reading Local Web Pages," *Help Line Q&A*, October 1995), you left out the simplest way to view HTML documents using Netscape Navigator. All you do is associate files that have the .htm extension with Navigator. Then, when you double-click an .htm file in File Manager or Explorer, the browser will open the file without attempting to make a network connection. I use this technique to save online charges as well. Instead of reading lengthy Web pages online, I save them to my hard disk as .htm files, then launch them from Explorer after disconnecting.
Luiz Pozzobon, Beijing

Your October solution for reading Web pages offline works, but there is an easier way. Navigator has a dummy winsock replacement (mozock.dll) that was created for this purpose. It creates the winsock interface Navigator wants, but it doesn't dial out. To use mozock.dll, copy it to the Navigator directory and rename it **winsock.dll**. Just don't mistake the renamed file for the real winsock and overwrite it (wherever it is). You can find mozock.dll on Netscape's Web site (**ftp://ftp.netscape.com/unsupported/windows**).
Vernon L. Brooks Jr., Internet

Editor's note: It's good to have options. My tip makes sense if you're using Trumpet Winsock, or another dialer that lets you disable dialing. Pozzobon's tip is perfect if you're using Netscape Navigator with Windows 95's dial-up networking and if you know where your .htm files are. But you may not be able to associate .htm files with another browser: I couldn't get the trick to work with Microsoft's Internet Explorer 1.0, for example.

Brooks's suggestion of renaming multiple winsock.dll files seems like more work to me than simply disabling dial-out. But it's a lifesaver if you use Windows 95's dialer, or if you need to view .htm files on a system that lacks a modem or direct Internet connection. Placing the dummy winsock.dll in the browser's directory (instead of in a directory in your path) also means you can trick just that one program into using it without disrupting your other browsers' access to the real winsock.dll.

Here's one more no-dial option: Make your browser's default home page a file on your hard disk.

By Scott Spanbauer

PC WORLD online *The files mentioned in this article are available on PC World Online. Scott Spanbauer is a contributing editor for* PC World *and coauthor of* The PC Bible, *second edition (Peachpit Press, 1995, 510/548-4393).* Help Line *welcomes your questions and tips and pays $50 for published items.* *See page 14 for contact information.*

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SPREADSHEETS Q&A

Keep That Average Moving, Partner

Q I produce a report of weekly statistics, with a column for each week's data over a year. In column A, I want a formula to calculate the average of the preceding four weeks, but I don't want to have to modify the formula every time I add the data for a new week. Should I use a macro to set this up?
Paul Lang,
Berkeley Heights, New Jersey

A There's no need for a macro: You can use a moderately tricky formula to accomplish your purpose, and it will work in any spreadsheet.

Let's say your first week's numbers are in column B, as shown in **FIGURE 1**.

In 1-2-3 for Windows, you can enter the following (rather awkward) formula in cell A2 to calculate the average of the last four filled-in cells in row 2:

```
@avg(@index(B2..BA2,@count(B2..BA2)-1,0),
@index(B2..BA2,@count(B2..BA2)-2,0),
@index(B2..BA2,@count(B2..BA2)-3,0),
@index(B2..BA2,@count(B2..BA2)-4,0))
```

The @count function determines the number of weeks of data you've already entered. Working off that number, the first @index gets the last filled cell in the row; the second @index gets the next to last value, and so on. The @avg yields the average.

In Quattro Pro, you can simplify the procedure with an array formula:

```
@avg(@index(A2..BA2,@count(A2..BA2)
-{1,2,3,4},0))
```

The array {1,2,3,4} causes the @index function to produce a series of values: the last four filled-in cells in row 2.

A similar formula would work in Excel, but that program's offset function lets you dispense with the array:

```
=average(offset(B2,0,count(B2:BA2)-4,1,4))
```

	A	B	C	D	E	F	G
1	Last Four Average	First Week	Second Week	Third Week	Fourth Week	Fifth Week	Sixth Week
2	22.5	10	15	20	25	30	

FIGURE 1: CALCULATE MOVING AVERAGES in 1-2-3, Quattro Pro, and Excel with a formula.

```
Sub DeleteRows()                                                    '1)
    'Select the cells in column B that contain data values:
    Range("A1").CurrentRegion.Columns(2).Select                     '2)
    For Each Cell In Selection                                      '3)
        If Cell.Value < 1 And Cell.Value > 0 Then Cell.EntireRow.Delete  '4)
    Next Cell                                                       '5)
End Sub                                                             '6)
```

FIGURE 2: FIND AND DELETE ERRANT WORKSHEET DATA with this Excel macro. The macro deletes rows containing values that are greater than 0 and less than 1.

Here, the offset function finds a range beginning on row 2, four cells from the rightmost filled-in cell, one row high and four columns wide.

Note: You must enter data for every week. Missing values will throw off the count functions.

Truncating (Not Rounding) Values in Any Spreadsheet

Q Is there a way in 1-2-3 to truncate a number without rounding it? For instance, how do I get 1-2-3 to change 14.156667 to 14.15?
Vaughn Scala, Easton, Pennsylvania

A Actually there are several ways. Say the number you want to truncate to two decimal places is in cell A1. The following no-frills formula will work in any spreadsheet: **@int(A1*100)/100**.

The round-down function in 1-2-3 for Windows, **@rounddown(A1,2)**, does the same thing. Excel has a similar function: **=rounddown(A1,2)**.

Or you could use 1-2-3 for Windows' @trunc function: **@trunc(A1,2)**.

Cleaning Up Data in Excel

Q How do I selectively delete rows in Excel? We store data from instruments in our plant in an Excel worksheet, averaging values over 15-minute intervals. Occasionally the averaging process fails, and values that should be 0 or 1 come out as decimal fractions. I need a macro that will delete rows containing values that are greater than 0 but less than 1. Can you help?
Jason Mohammed, Point Lisas, Trinidad, West Indies

A Sure. Let's say your list of instrument names begins in cell A1 of the worksheet, and the averages are in column B. The macro in **FIGURE 2** will delete the rows in which column B values are greater than 0 and less than 1.

To set up the model, select *Insert•Macro•Module* and enter the code in Figure 2. Select *Tools•Macro*, select *DeleteRows* in the Macro Name/Reference list, and click the *Options* button. In the Macro Options dialog box, click *Shortcut Key*, enter **D** in the 'Ctrl+' box, click *OK*, then click *Close*. To execute the macro, press **<Ctrl>-D**.

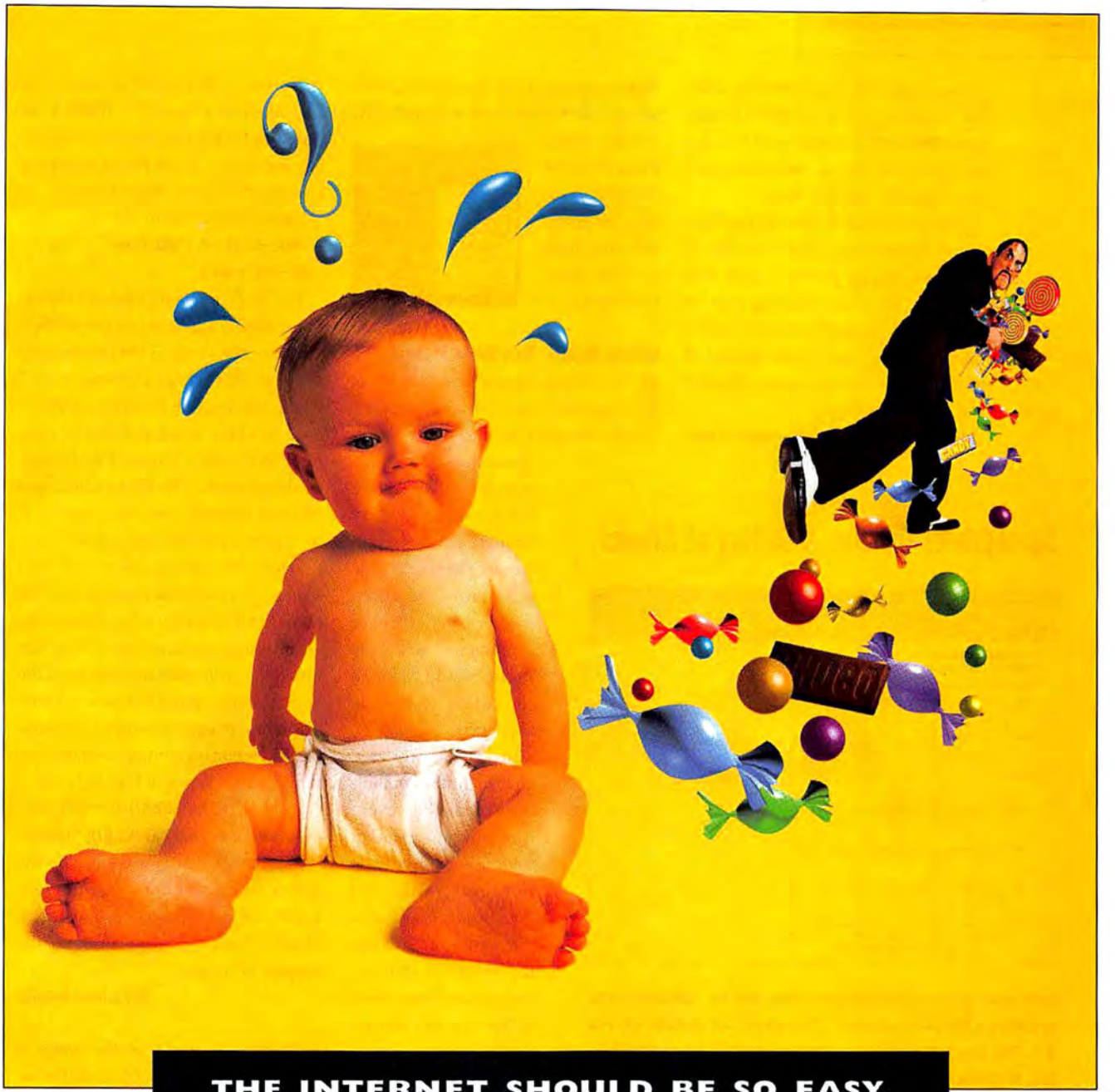
The macro is fairly self-explanatory. In step 2, note the use of the CurrentRegion command to identify the cells (beginning at cell A1) that contain data, then the Columns command to denote the second column within that region.

Deleting Empty Rows in Excel Worksheets

Q After importing text data from a mainframe report into my Excel 95 worksheet, I find that every other row is blank. How do I eliminate the blank rows from my worksheet?
Sindey Wasch, Sarasota, Florida

A The macro in the preceding answer, which selectively deletes rows, will work, but since you just want to delete blank rows, Excel's AutoFilter is the way to go. Say your data looks like this:

	A	B	C	D	E	F
1	ID	Birth Date	Admit Date	Zip Code	Cost Ctr	Spec
2						
3	58582107	8/6/24	9/13/94	27253	221	INT
4						
5	16256943	10/21/47	6/5/94	27704	214	INT
6						
7	16260787	1/3/30	6/6/94	27217	217	INT
8						
9	16262089	5/17/11	6/6/94	27215	249	INT



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First, select all the imported data: The best way is to select cell A1, then press **<Shift>-<Ctrl>-<End>**. Excel extends the selection to the last filled cell at the lower right corner of the sheet.

Now, select *Data•Filter•AutoFilter* to turn filtering on. Click any one of the scroll buttons in row 1 (but first make sure there's no missing data in that column, or you'll delete the other columns' data), scroll to the bottom of the drop-down list, and select *(Blanks)*, as in the figure at right.

Now, select A2, press **<Shift>-<Ctrl>-<End>** to select all the empty rows, then select *Edit•Delete Row* and click *OK*. Finally, select *Data•Filter•AutoFilter* to turn off filtering, and that's all—no more blank rows.

Display Negative Time Values in Excel

Q I'm a meteorologist who uses Excel 5.0 to track the performance of my weather forecasters. We issue a variety of warnings and watches to the public, and we need to record how accurate we are in predicting the exact time of a storm—the difference between when we announced that the storm would happen and when it actually happened.

In my worksheet, one column contains the predicted event date and time, another column contains the actual event date and time, and formulas in a third column subtract the values in the second column from those in the first to calculate timing error.

My problem is that Excel won't display negative time values. Is there a way to get around this?

John Galliano, State College, Pennsylvania

A Certainly. You might arrange your worksheet as shown in **FIGURE 3**. Be sure to enter the full date and time values in columns A and B and assign the columns the *m/d/yy h:mm* format.

Enter this formula in cell C2:

=if(A2−B2<0,"−","")&text(abs (A2−B2),"h:mm")

The abs() function calculates the absolute difference between the predicted and actual times (if the difference is negative, abs() yields a positive value). The text() function converts the difference to a text string and displays the result in the *h:mm* format, Excel's regular time format. The if() function tests whether the difference is negative. If so, it pastes a minus sign in front.

Since the timing errors are text strings, you can't use them in calculations. But if you want to summarize the error values, you can create array formulas that will work directly from the original values, using the same trick for displaying negative results. For example, the following formula averages the timing errors shown in Figure 3:

{=if(average(A2:A7−B2:B7)<0,"−","")
&text(abs(average(A2:A7−B2:B7)),"h:mm")}

Remember that you don't type the braces when you enter the formula. Excel adds them when you press <Ctrl>-<Shift>-<Enter> to enter the formula as an array.

By Richard Scoville

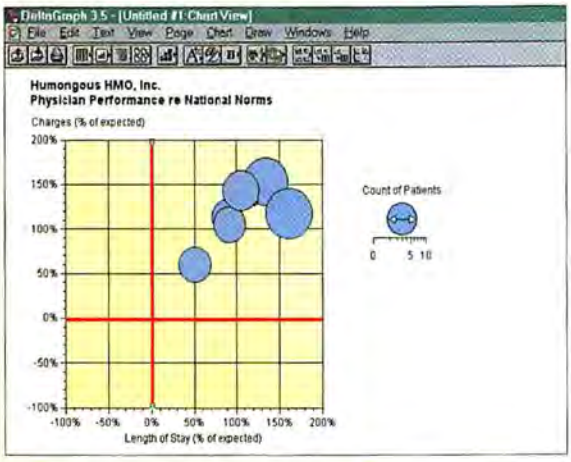
PC WORLD online *The model in this article is available on PC World Online. Richard Scoville is a contributing editor for* PC World *and a software training consultant in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

C2 =IF(A2-B2<0,"-","")&TEXT(ABS(A2-B2),"h:mm")

	A	B	C	D	E	F
1	Predicted	Actual	Timing Error			
2	3/4/96 21:55	3/4/96 13:04	8:51			
3	3/15/96 5:28	3/15/96 8:28	-3:00			
4	3/27/96 22:17	3/28/96 4:22	-6:05			
5	4/1/96 9:47	4/1/96 20:52	-11:05			
6	4/10/96 17:34	4/10/96 8:46	8:48			
7	4/15/96 15:28	4/15/96 10:36	4:52			

FIGURE 3: MAKE TIME NEGATIVE in Excel with a simple formula that combines an if() function with abs() and text() functions.

Spreadsheet Toolbox: A Gallery of Graphs



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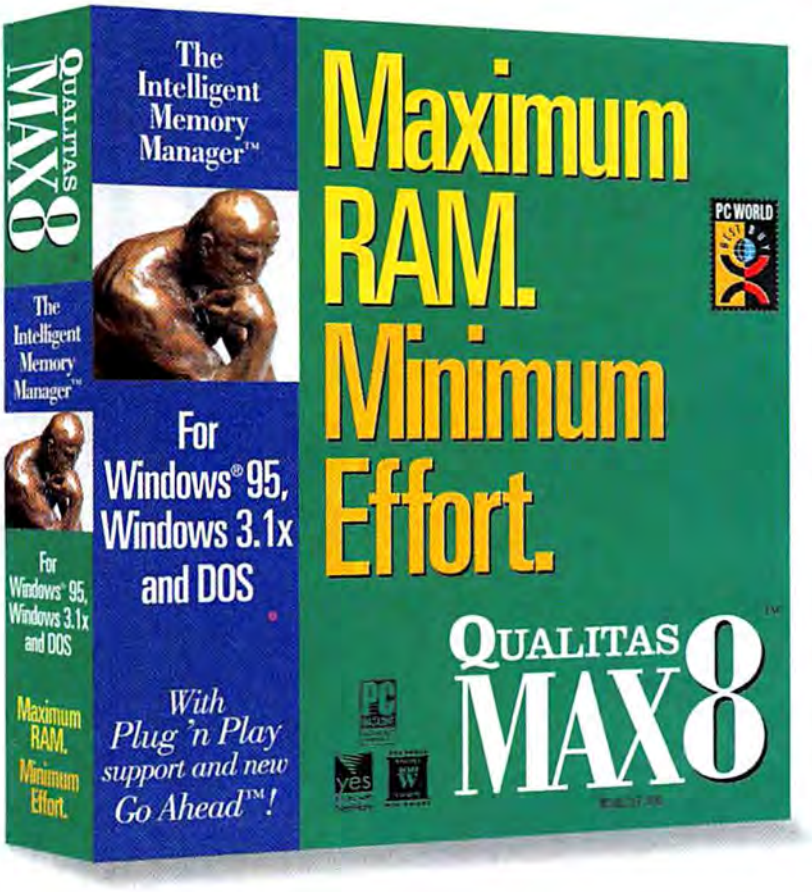

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WORD PROCESSING Q&A

Stamp WinWord Files for Easier Tracking

Q I work on a large network and often print long Word for Windows 6.0 documents that are stored in various places on the network. If I need to find a document later, even if I have a printed copy, it can be difficult. Is there a way I can print the path and file name on the last page?

Wayne Camp, Millington, Tennessee

A That's easy enough to do. When you get to the end of the document, position the cursor where you want the path and file name to appear, then select *Insert•Field*. In the Field dialog box (**FIGURE 1**), select *Document Information* in the Categories list, and select *FileName* in the Field Names list. In the Field Codes edit box, type a space and **\p** after 'FILENAME'. Click *OK* to insert your field into the document.

Move Return Addresses in WinWord 6.0

Q The preprinted envelopes my company uses have a graphic in their upper left corner. When I use WinWord to print envelopes, my name and return address print on top of the graphic. Can I move the return address about an inch to the right and make this the default setting?

Mel Kuhlbander, PC World Online

A Yes, but you don't in fact make the adjustment in the Envelopes and Labels dialog box. Instead, you adjust the indentation by modifying the Envelope Return style.

Select *File•New*, choose your letter template, then click *OK*. Select *Format•Style*. In the Style dialog box, choose *All Styles* in the List list, highlight *Envelope Return* in the Styles list, and click *Modify*. In the Modify Style dialog box, select *Format•Paragraph*.

Type your desired indentation in the Left edit box of the Paragraph dialog box, or select it with the arrows. Click *OK* twice, then click *Close*.

Finish the job by selecting *File•Save All*. That will store your changes in the current template. From then on, whenever you use this template, your envelopes will print as you want them to. One caution, though: The preview envelope in the Envelopes and Labels dialog box won't show the indentation you specified. The printed envelope will be correct, however.

FIGURE 1: INSERT A DOCUMENT'S NAME AND PATH in WinWord printouts to make them easier to track.

Stop Shooting Blanks

Q Often, when I create a one-page document in WordPerfect 6.1 for Windows, two pages print out. The first one prints just right, but the second page is blank. This seems like a waste of paper, and I'd like to figure out why it's happening.

Mike Twaddle, Columbia, Missouri

A This common question has an easy solution that applies to all word processors. You've probably caused blank lines to spill onto the second page by pressing <Enter> at the end of the text. Your program doesn't care that the lines are blank, so it prints out a blank page.

To stop this behavior, press **<Ctrl>-<End>** before starting your print job. If the cursor moves to page 2, backspace until the cursor returns to page 1. You can see the page number on the status line at the bottom of the document window. After you do this, the program will print just the page you want.

WinWord Text Selection Shortcuts

To select	Do this
Sentence	<Ctrl>-click in sentence
Line of text	Click in left margin next to line
Paragraph	Double-click in left margin next to paragraph
Entire document	Triple-click (versions 6 and 7 only), or <Ctrl>-click in left margin

Selecting Large Text Blocks in WinWord

Q As I work in Word for Windows 6.0, I often need to select more than just a word or two for formatting. Normally I just click and drag the mouse over the text, but this is not a very efficient way to select whole sentences, paragraphs, or even the whole document. Are there any good shortcuts to speed up this job?

Donald P. Goodman, Fort Worth, Texas

A There are indeed several shortcuts for selecting portions of a document, as shown in the table at the top of this page. Most of these shortcuts work in all versions of WinWord, from 2.0 to 7.0 for Windows 95.

With all these techniques except for selecting the entire document, you can extend the selection one increment at a time (one sentence, one line, or one paragraph) by continuing to hold down the left mouse button and dragging over additional text.

Make WordPerfect Show Its Underscores

Q When I work in WordPerfect 6.0 for Windows, something strange often happens. If I type the underscore character to draw a line, the underscore

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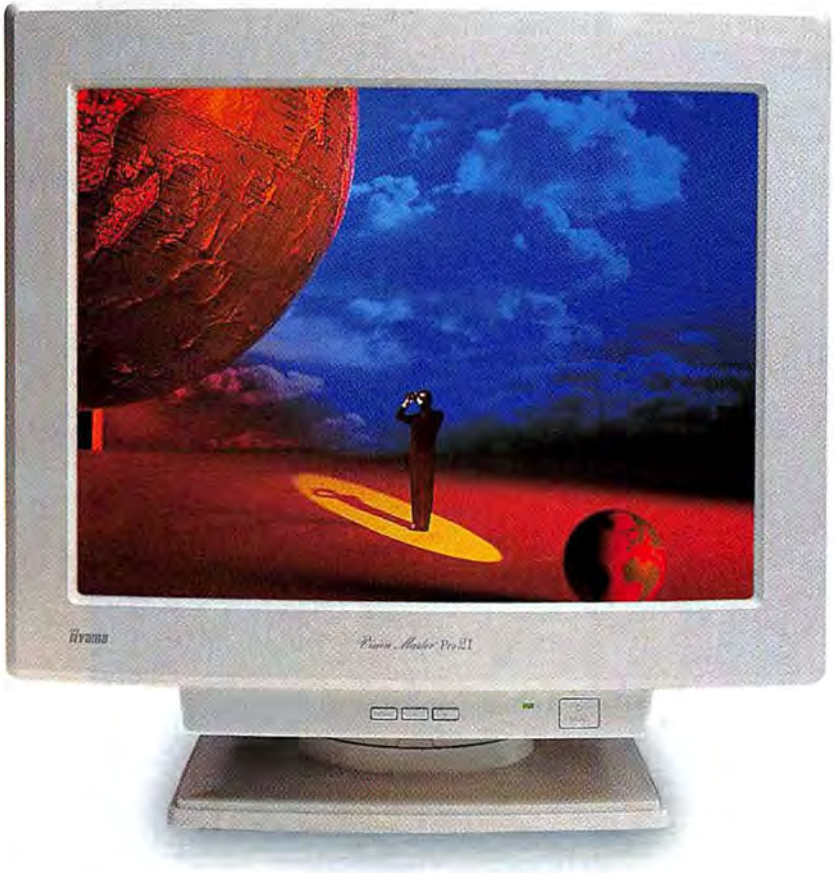

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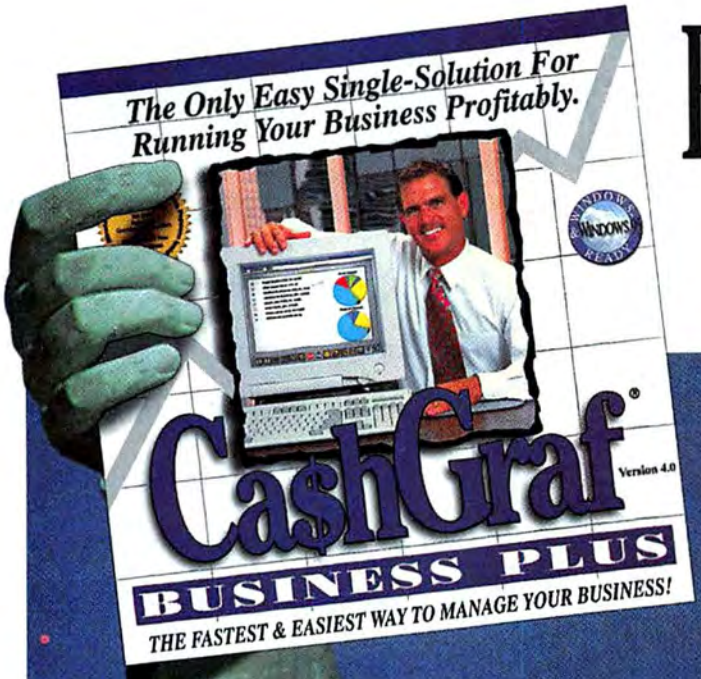

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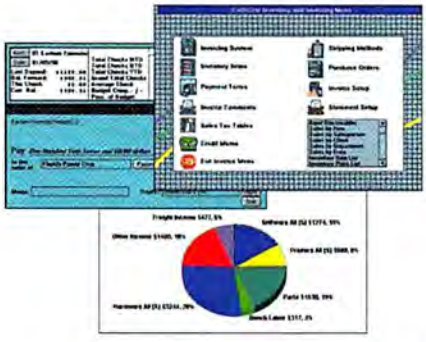

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doesn't show on the screen, although it prints properly. This doesn't happen consistently, even within one document. Some lines show, others do not. I can see the embedded codes for the underlines when I select View•Reveal Codes, but they still don't always appear on the screen.

This seems to happen whenever I'm viewing the document at any zoom level other than the standard 100 percent. How can I fix this problem?

John Rebers, Marquette, Michigan

A You don't need glasses; you just need to upgrade to WordPerfect 6.1. The problem occurred in the initial release of version 6.0 on some monitors at some resolutions with some fonts. The upgrade costs $99, but it's worth it, since version 6.1 fixes a number of the previous release's problems and offers a wealth of new features.

If you'd rather not upgrade, you can fix the problem by switching to a standard 640 by 480, 16-color video driver.

- **WordPerfect 6.1** $99; WordPerfect; 801/451-5151

Reader service no. 630

Create See-Through Frames in Word Pro 96

Q I recently upgraded from Ami Pro 3.1 to Word Pro 96 for Windows 3.1. In Ami Pro, I often made transparent frames to put a watermark on the page behind my text. I can't locate this feature anywhere in Word Pro, though. Surely Lotus hasn't removed transparent frames?

Radford Bean, Wilsonville, Oregon

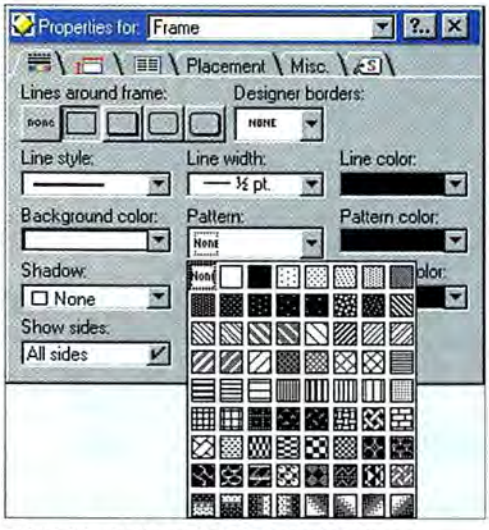

FIGURE 2: MAKE A FRAME TRANSPARENT by converting its background color and pattern to None.

A Not quite. Lotus moved a lot of things around in Word Pro, including the transparent frames feature. In fact, it's so hard to find, it's almost not there. Here's what to do:

1. Right-click the frame and select *Frame Properties*.
2. Click the *Colors and Lines* tab in the Frame InfoBox.
3. Click the *Pattern* box, and choose *None*, as in **FIGURE 2**.

That will convert this frame's background to no color—creating a transparent frame you can use as before.

To speed up this process for future frames, click the *Style* tab in the InfoBox after you first set this up, and click the *Create Style* button. In the Create Style dialog box, type **Transparent** in the Style name field, leave the *Create in all divisions* check box marked, and then click *OK* (see **FIGURE 3**). This adds the new Transparent frame style to the current SmartMaster.

Don't forget to save the SmartMaster. In the Save As dialog box, select *Lotus Word Pro SmartMaster* from the *Save as type* drop-down list.

Now, you can easily add a transparent frame to any document created with the current SmartMaster.

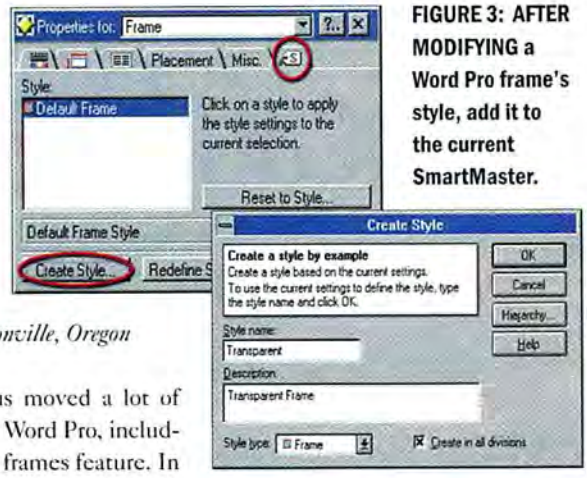

FIGURE 3: AFTER MODIFYING a Word Pro frame's style, add it to the current SmartMaster.

Print From Two Bins in Ami Pro

Q Most of the Ami Pro 3.1 files I print are two-page letters. The first page is printed on letterhead loaded into the upper paper tray on my laser printer, and the second prints on plain paper in the lower tray. Ami Pro won't let me save this printer setup with the document or style sheet, so I have to select *Options* in the Print dialog box for each letter. Is there a way to force Ami Pro to print the way I want as a default?

Amy Wear, Rochester Hills, Michigan

A There's no direct way, but you can record a simple macro to do the job. You can then assign the macro to a keystroke and print two-bin jobs instantly.

The next time you have one of these letters ready to print, do this:

1. Select *Tools•Macros•Record*.
2. In the Record Macro dialog box, type **altbin.smm** for the macro file name.
3. Click in the Playback shortcut keys edit box, and press a shortcut-key combination—**<Ctrl>-<Shift>-P**, for example. Click *OK* to start recording.
4. Select *File•Print*, then select *Options*. Change the settings in the Bin Options frame of the Print Options dialog box to match your usual settings. Click *OK*, then click *OK* in the Print dialog box as well. Your current document will print.
5. Select *Tools•Macros•End Record* to store your macro permanently.

Whenever you want to print a two-page letter using separate bins, just press **<Ctrl>-<Shift>-P**.

By George Campbell

George Campbell is a contributing editor for PC World *and a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Word Processing *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

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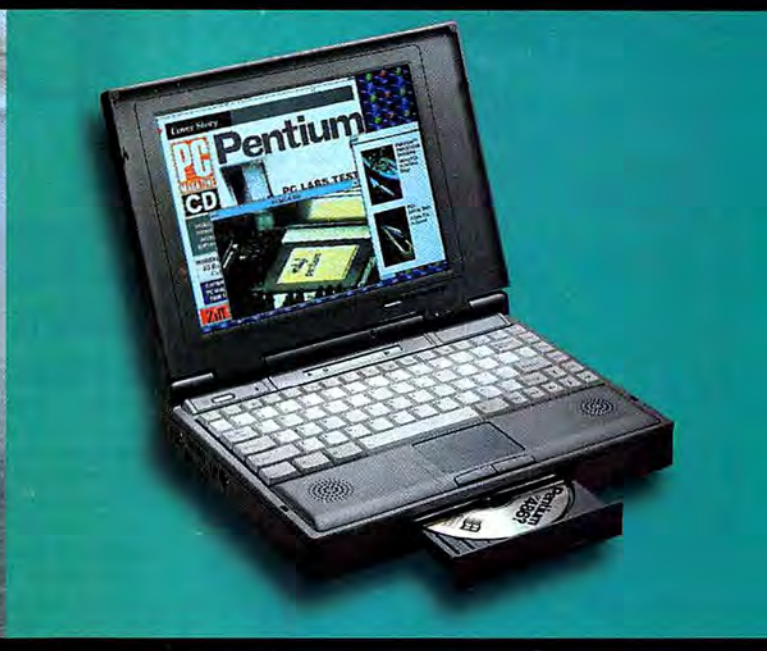

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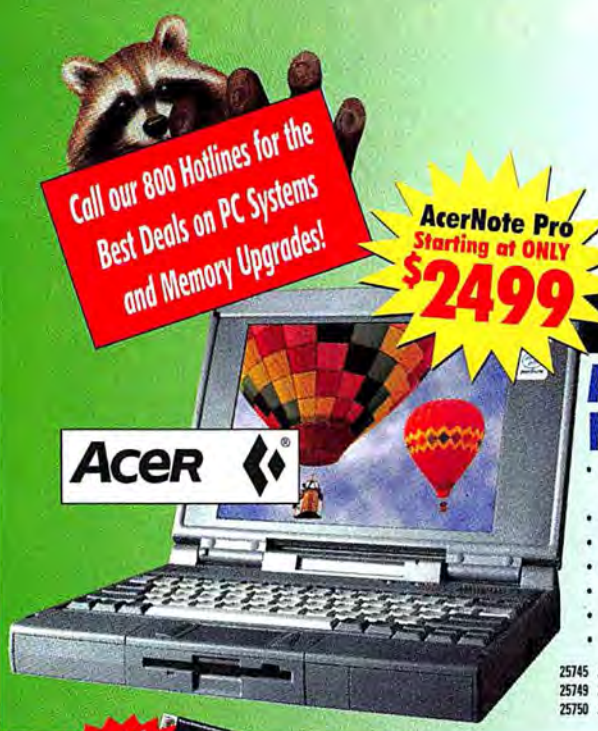

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WINDOWS Q&A

Making a Fresh Winstart in Windows 3.x

Q I'm running low on conventional memory. Someone told me I could save some conventional memory by using winstart.bat. What is it? Can it solve my memory problems?
Yvette Tran, Lake Forest, California

A Winstart.bat is a special DOS batch file you create. Windows runs it on start-up to load into memory any DOS device drivers or TSRs needed for Windows applications.

The advantage of loading drivers and utilities in winstart.bat is that they consume no conventional memory. The disadvantage is that those drivers and utilities will be available only to Windows applications and not to any DOS applications or DOS prompt windows that you may open while in Windows.

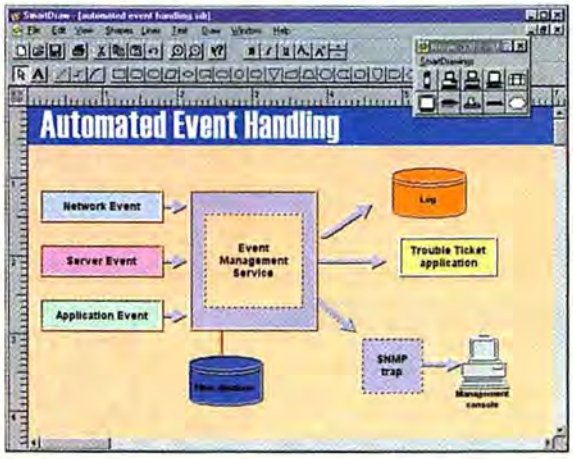
Therefore, you should use winstart.bat to load only those items needed by Windows and Windows applications. A good example is mscdex.exe, the CD-ROM driver. If you never run any CD-ROMs in DOS nor any DOS-based discs, you can move the line that loads this driver from your autoexec.bat file to winstart.bat to save a considerable chunk of conventional memory.

There's no special trick to using winstart.bat. Merely start Notepad or another text editor, open your autoexec.bat file, and then select the line or lines that load drivers or programs needed only by Windows applications. Choose *Edit•Cut*. Create a new text file, and paste the selected lines in. Then save the file with the name **winstart.bat** in the Windows directory.

If you have only one or two seldom-used DOS programs that need access to a driver or utility, you can put them in winstart.bat anyway; then for the needy DOS program, create a batch file that first loads the driver or utility and then starts the DOS program.

Be aware that winstart.bat works only if you're running in Windows' Enhanced mode and may not work with every driver or memory-resident utility.

Windows Toolbox: Draw Smarter



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Passing the Password in Windows 95

Q Win 95 always asks me to sign on when I turn on my computer, ever since my whole family started to create their own identities in the system. After a while, the family just started using mine anyway, and I deleted all the other configurations. However, Windows 95 still asks me to log in when the computer is turned on. How do I get rid of this?
Matthew Smedal, Internet

A It's not clear just what steps you took to revert from multiple configurations to one, so let's just review. Log in to Windows under the identity you want to keep. Then choose *Start•Settings•Control Panel* and double-click the *Passwords* icon. Click the *User Profiles* tab, and select *All users of this PC use the same preferences and desktop settings*. Next, click the *Change Passwords* tab and click *Change Windows Passwords*. Type your old password and leave the remaining boxes blank. Click *OK*, click *Close*, and follow the prompts to restart your computer.

You should not see the log-in prompt again. If you do, you will see it only once, with the reminder that assigning no password will rid you of the password prompt in the future. If that still doesn't do the trick, there's one more thing to check: Open Control Panel again and double-click the *Network* icon. Click the *Primary Network Logon* drop-down list and select *Windows Logon*. Then click *OK* and restart the computer.

You also can clean up your hard disk by deleting the folders and files in the Profiles folder in the Windows folder.

Writing Sticky Notes in Windows 95

Q Your February column discussed a freeware screen saver with a sticky-note–type feature. But the notes go away when the screen saver is terminated. What I need are computerized

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Circle 127 on reader service card

sticky notes for my Windows 95 desktop that stay put—to remind me of meetings, phone numbers, and so forth. Can you recommend a program that can do this?
Bob Hix, Internet

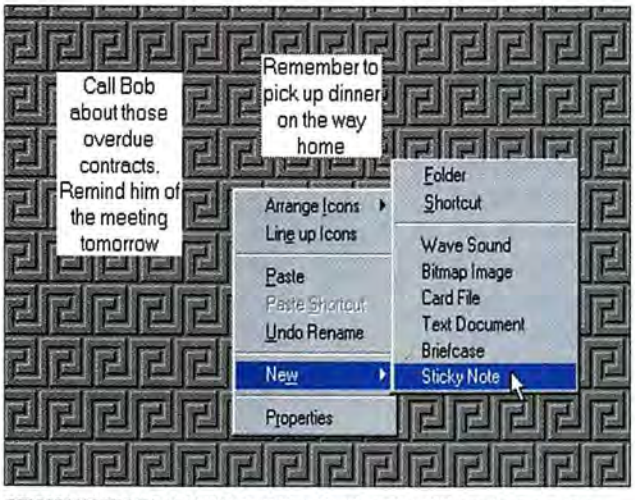
A Many Windows shareware sticky-note simulators work well in all versions of Windows 3.*x*. The reigning champ is the $30 WinPost, which runs without any problems in Windows 95 if you don't mind right-clicking its icon on the Taskbar. It's available on PC World Online (**winpos.zip**).

However, if your notes are short enough, you can add this feature to Windows 95 yourself. Here's what to do: First, choose *Start Programs • Windows Explorer* or double-click *My Computer*. Choose *View • Options*, and click the *File Types* tab. Click *New Type*. In the 'Description of type' box, type **Sticky Note** or whatever description you prefer. In the 'Associated extension' box, type a space.

Click *New*. In the Action box, type **open**, and then in the box below, type **c:\windows\notepad.exe "%1"** (your path to Notepad may differ; you can also type in a different application if you prefer). Now click *OK*. Click *Change Icon*, and in the File Name box, type **c:\windows\explorer.exe** (adjusting the path as needed). Press **<Tab>** or click in the 'Current icon' box, and select the fifth icon from the left (the blank one). Click *OK*, then *Close*, then *Close* again to exit the Options dialog box.

The next step is to edit the Windows Registry. First, make a backup copy of the following important files in the Windows folder: user.dat, user.da0, system.dat, and system.da0. (If you don't see them, choose *View • Options* in My Computer or Explorer, click the *View* tab, select *Show all files*, and click *OK*.) Now start the Registry Editor (choose *Start • Run*, type **regedit**, and press **<Enter>**). Click the + (plus sign) next to 'HKEY_CLASSES_ROOT' to expand that branch. Scroll down to the folder that is named with your new extension (it will appear only as a period). Right-click the folder, and choose *New • Key* to create a new folder. Name it **ShellNew** and press **<Enter>**. Then right-click your new ShellNew folder and choose *New • String Value*. A new icon will appear in the right pane. Name it **NullFile** and press **<Enter>**. The pane should now show two icons, one named (Default) and one named NullFile. Now exit the Registry Editor.

The next time you need to make a note to yourself, just right-click on the Windows desktop and choose *New • Sticky Note*. A note reading 'New Sticky Note' will appear on the desktop. Select it and press **<F2>** (or click on the words), then type your new note (see the figure below).



STICKY NOTES THAT STAY PUT ON YOUR DESKTOP are just a click away, once you make a few tweaks to the Windows 95 Registry.

Your note can be up to 255 characters long and include any characters that file names can have (because your new note is really a file name). You can drag the notes around the desktop and drop them in the Recycle Bin when you're all done with them.

Happy jotting!

• **WinPost** $30; Eastern Mountain Software; 206/391-3483; CompuServe, 71570,533
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Undelete With 32-Bit File Access

Q In the September column, you said that Microsoft Undelete for Windows won't work with 32-bit file access turned on in Windows for Workgroups 3.11 ["Why Undelete Won't Work"]. But I've found a way to get Undelete to work without giving up 32-bit file access: Instead of attempting to undelete a file to its original location, simply undelete it to a floppy disk. Then copy the file back to your hard drive.
Dick Brown, San Antonio

A Great advice! This tip certainly beats the cost of upgrading to a compatible undelete utility.

Here's a quick review of the steps to restore a deleted file:

1. Double-click the *Undelete* icon in File Manager.
2. Click the *Drive/Dir* button, navigate to the directory of the deleted file, and click *OK*.
3. Select the file in the main window and then choose *File • Undelete to*. (Do *not* click the *Undelete* button, or you'll have to exit Microsoft Undelete and start it again.)
4. Double-click the *[-a-]* or *[-b-]* drive in the Directories list. Make sure the 'New Drive and file name' box shows the correct path to your floppy drive, as well as the name you want the recovered file to have. Then click *OK*.
5. Finally, use File Manager to restore the file to your hard drive.

One final note here: If your file is too big to restore to a floppy disk and you have more than one drive on your computer, you can also restore the file to any drive that is not currently set for 32-bit file access.

By Scott Dunn

PC WORLD online *The files mentioned in this article are available on PC World Online. Scott Dunn is a contributing editor for* PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444).* Windows *welcomes your questions and pays $50 for published items.* *See page 14 for contact information.*

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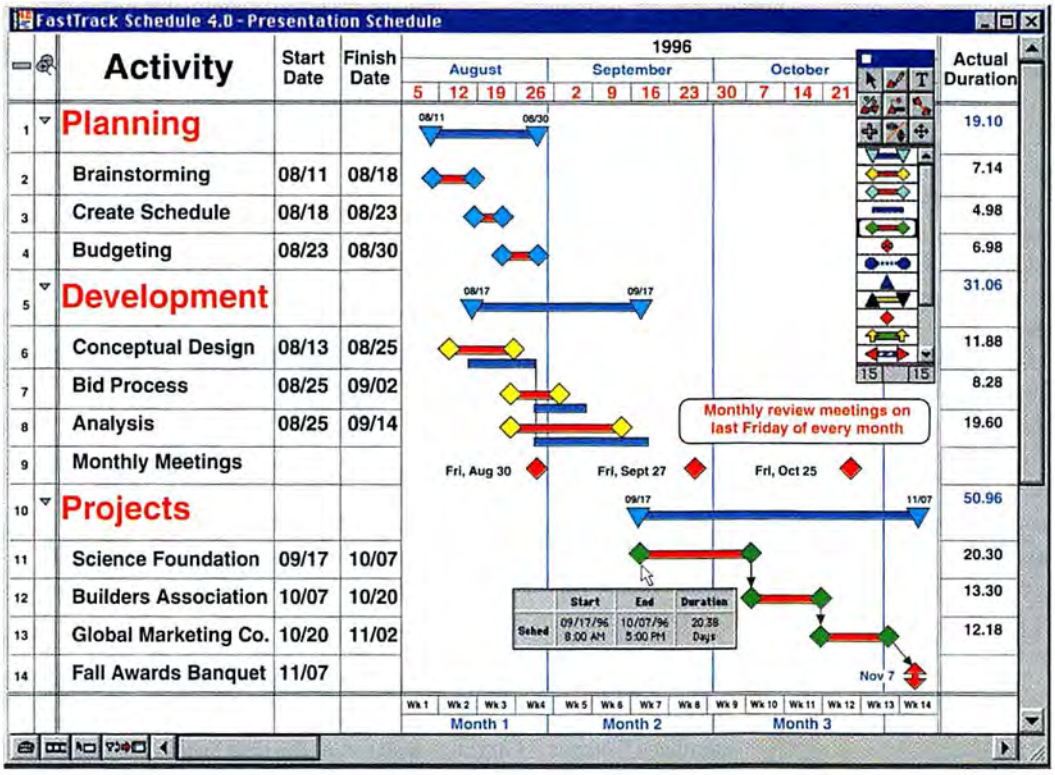

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WINDOWS 95 ADVISER

Run Your Programs in a Batch

After replacing some ancient 286s in my office with Windows-capable PCs earlier this year, I discovered one great thing about the old clunkers: They all booted to a menu. It turns out that some of my users just couldn't cope with the Windows Program Manager or even, once we upgraded, the Windows 95 Start menu. I've concluded that for some people, there's no better interface than a simple 'Press 1 for Peachtree, Press 2 for Word'.

I wasn't able to write such a menu in Windows 3.1 or Windows 95, since neither one of them has a scripting language. But then I had a revelation: I could write a menu in the *DOS batch language*. This sounds Neanderthal, but it works because Windows 95, unlike Windows 3.*x*, can run Windows programs from the command line or from a batch file. And while DOS menus aren't particularly pretty, they are kind of chic in a retro way.

Simple menus are easy to write in the DOS batch language, and the batch file shown here gives one example. When you're creating this file, make sure you establish the correct path to choice.com and to the applications themselves. To generate special characters like the borders in this DOS menu, use Win 95's DOS Edit, not Notepad or Wordpad. To generate, say, the top border (composed of ASCII character 223), hold down the **<Alt>** key while you type **223** on the numeric keypad, then release **<Alt>**.

If you're rusty on the ASCII character set or on DOS editing in general, see Qbasic's on-screen help. If you deleted Qbasic, as I did and as I recommended in September's *Windows 95 Adviser*, you can reinstall it from the Windows 95 CD-ROM. It's in \other\oldmsdos, along with other DOS golden oldies. After running Qbasic, press **<Enter>** to see the Survival Guide, then select *Using Help•Contents•ASCII Character Codes*.

Note that although you can launch a Windows program simply by typing its name, as with Calculator, you can also launch one using a new command called Start, as with Notepad. The option '/max' in the sample batch file starts a program maximized.

To see all the Start options, type **Start /?** at the command line.

When your batch file is done, move it into \windows\start menu\programs. Then, to start making a shortcut for it, right-click it and select *Properties*. This brings up a properties sheet that's specific to DOS applications and that replaces the PIF editor.

Then make these changes in the properties sheet:

Take advantage of Windows 95's new ability to launch Windows programs from the command line or from a batch file.

- On the Program tab, the first line (next to the icon) lists the name that will appear both in the title bar of the menu window and on the taskbar button. Make this name short and clear, like **Menu**.
- Also on the Program tab, make sure *Close on exit* is not checked. You don't want the final instructions in the menu window to disappear when the user chooses to shut down.
- On the Font tab, make the font large and easy to read.
- On the Screen tab, uncheck *Display toolbar* so the user doesn't see it.
- Finally, move the shortcut to the startup folder (\windows\start menu\programs\startup) so that it runs each time Windows 95 boots.

On running the menu for the first time, you can size and position the window to your liking, and these settings will stick. And if you have a few users like mine, I'm sure your menu will be to their liking as well.

By Richard Freedman

Richard Freedman, former group manager on Microsoft's Windows 95 team, is vice president at a real estate investment firm in Stamford, Connecticut.

```
@echo off
:top
cls
echo.
echo
echo    PRESS A NUMBER TO RUN A PROGRAM
echo    *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
echo
echo       1.  Notepad
echo       2.  Calculator
echo       3.  Shut down the computer
echo
echo
choice /c:123 /n "      Please enter 1, 2, or 3      "
if errorlevel 3 goto Exit
if errorlevel 2 goto Calculator
if errorlevel 1 goto Notepad

:Notepad
start /max Notepad
goto Top

:Calculator
Calc
goto Top

:Exit
cls
echo.
echo       Before turning off your PC...
echo.
echo    Press CTRL-ESC, then U, then ENTER.
echo    Then wait until told to shut off the PC.
```

WINDOWS 95 CAN RUN Windows programs from a DOS batch file like this one, which produces a simple DOS menu for launching Notepad and Calculator or shutting down your PC.

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DATA MANAGEMENT Q&A

Merging Records From Two Tables

Q I want to merge two files of contact data in Paradox into one file. But the files have different fields. What's the best way to handle this?
Martha Bay, Columbus, Ohio

A It depends on how the files differ. If the tables have the same structures but one has more fields, you just add the shorter table to the longer one. Select *Tools•Utilities•Add*. In the Add Records From field in the Add dialog box, choose the table with fewer fields; in the To field, choose the larger table.

If the tables' structures don't match, you'll have to go through a few more steps. Say you have two tables like the ones shown in **FIGURE 1**—contacts and phonebk. Here's how to merge them in Paradox, Access, and Approach.

Paradox: Most fields in the two tables are the same, but contacts has a few more fields (Title, Fax, Date Entered), its Phone field is longer, and it doesn't have a Notes field or key fields, which let you check for duplicate records.

You could make a new table with all the fields from both contacts and phonebk, but it's easier to restructure the contacts table. Select *Tools•Utilities•Restructure*, select *CONTACTS.DB* (or click the *Restructure* button), and add a Notes field. Drag the Phone field up under Last Name and First Name, and make these first three fields keys. Then click *Save*.

If any fields in contacts are shorter than those in phonebk, you'll have to lengthen them (or trim the data later). But don't worry about nonmatching field names (for example, Last in one table and Last Name in the other).

Now you can merge. Select *File•New•Query*, or right-click the *Open Query* button. Select *New*. Hold **<Ctrl>**, click *CONTACTS.DB* and *PHONEBK.DB*, then click *OK*.

In the query window, click the blank area under 'contacts.db' and select *Insert* from the menu. Then click the *Join Tables* button for each phonebk field you want to insert into contacts. For example, click *Join Tables*, click the box under the Last Name field in contacts, then click the box under the same field in phonebk. A highlighted *join1* will appear in both fields. When your query looks like the one in **FIGURE 2**, click the *Run Query* button. Paradox displays a temporary table listing the records inserted from phonebk into contacts. Close that table and look at contacts, and you'll see the restructured table and the new records from phonebk.

Access: In Access, you use an append query to add records from one table to another. As in Paradox, you may need to change the structure of the table receiving new records. Open the table in Design mode and add, move, or lengthen the fields as needed.

To merge the tables, click the *Query* tab in the Database window, then *New*. In the resulting dialog box, click *New Query* to open the Add Table dialog box, double-click *Phonebk*, then *Close*.

FIGURE 2: USE PARADOX'S INSERT QUERY to merge dissimilar tables.

FIGURE 3: AN ACCESS APPEND QUERY lets you add records from another table.

In the Select Query window, choose *Query•Append*, select *Contacts* from the Table Name list, and click *OK*. Drag the name of each field in phonebk that corresponds to a field in contacts into the query grid (see **FIGURE 3**), and click the *Run Query* button.

Approach: Open the file you want to add to (contacts.apr). Select *Create•Field Definition* to add or expand fields. Then select *File•Import Data* and double-click *phonebk.dbf*. In the Import Setup dialog box, match up the fields by dragging them; click *OK* when done.

By Celeste Robinson

FIELD NAME	TYPE	SIZE
Last Name	A	20
First Name	A	20
Title	A	30
Company	A	30
Phone	A	20
Fax	A	20
Address	A	30
City	A	20
State	A	2
Zip	A	10
Date Entered	D	

FIELD NAME	TYPE	SIZE	KEY
Last Name	A	20	*
First Name	A	20	*
Phone	A	12	*
Address	A	30	
City	A	20	
State	A	2	
Zip	A	10	

FIGURE 1: MERGE THESE DISSIMILAR TABLES by restructuring the one on the left (contacts) so that it can accommodate records from the table above (phonebk).

Celeste Robinson is a contributing editor for PC World *and author of* The Paradox 5.0 for Windows Handbook *(Random House Electronic Publishing, 1994, 800/793-2665).* Data Management *welcomes your questions and pays $50 for published items (see page 14 for contact information).*

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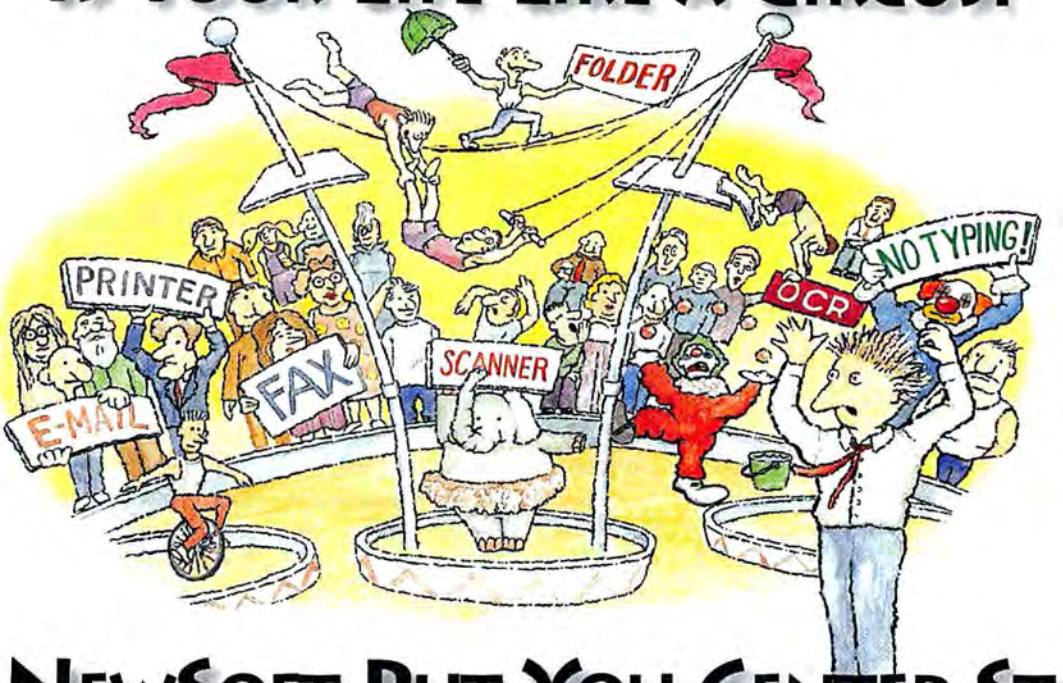

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ONLINE Q&A

Tracking Down Lost Friends and Family

Q Is there any way I can locate online a person I've lost track of?
Warren Carey, Los Alamos, New Mexico

A As private eyes know, most "missing persons" can be found in a phone book someplace. Searches of credit records and motor vehicle registrations are usually a last resort. For a reasonably cheap way of searching all phone books in the United States, try Phone* File on CompuServe (go **phonefile**). It'll cost $15 an hour in addition to CompuServe's $2.95 hourly fee, but most searches take only a few minutes. You can search by name and city, state, or zip code. If a search succeeds, Phone* File will give you the person's address, phone number, and spouse's name.

FIGURE 1: LOOKING FOR LONG-LOST FRIENDS? On the Web's DejaNews page, you can search six months' worth of Usenet newsgroup postings for messages they may have written.

Computrace, also on CompuServe (go **trace**), is a more extensive people-hunting database. It offers about the same information as Phone*File at the same surcharge, but it includes a file of people who have died since 1928. It lists birth and death dates, zip codes of last residences, partial Social Security numbers, and the zip codes of their insurance beneficiaries. (It doesn't provide this data for the living, thankfully.) One note: When I looked for records on dozens of deceased relatives, only one turned up, and it was inaccurate.

Don't rule out searching the Internet if you think your missing person is a denizen. If they have posted a message to any Usenet newsgroup in the past six months—under a real name—you can find it by heading to the DejaNews page at **http://www.dejanews.com/** (see **FIGURE 1**). There you can search past Usenet postings for the person's name, pull up any messages they wrote (or are mentioned in), and get an Internet address. Talk about Big Brother!

And who knows—your missing person may have a World Wide Web page. Try entering the person's name into a Web searcher like Lycos (**http://www.lycos.com/**). I've done this to find previously unknown relatives in places as far away as Australia.

If you want to go one step further, enter the term **birth records**, **death records**, or **military records** into any Web searcher. While few such records exist online, a smattering of sites are popping up. For instance, the Genealogical Guide to Ireland page (**http://www.bess.tcd.ie/roots/prototype/genweb2.htm**) lists references to records on births, deaths, marriages, land holdings, and estate settlements in Ireland back to 1821. In the United States, some military academies, historical societies, and a few states are putting records online.

If these methods fail, there are costlier alternatives. For $290 (plus searching charges), The Nationwide Locator (**http://www.eden.com/~mie/**) gives you software for searching a major credit bureau database (you can't see the credit histories, just names and addresses). For $395 plus search charges ranging from $20 to $150, you can search all kinds of public records online, from civil suit filings to credit reports and property asset records. Or drop The Nationwide Locator a note at **TheLocator@aol.com** and it will track down a person for you, for $30 to $75.

You could rack up quite a few online charges tracking down all your chums from Camp Hiawatha. Instead, you might try a CD-ROM–based phone directory; most cost $50 to $100. See "Directory Assistance on Disc" in the February issue of *PC World* for a review of four packages.

Avoid Clashing Winsocks

Q In the October 1995 issue, you noted that you access the Internet through several different accounts. I can't figure out how to do this. I'd like to use both CompuServe's Internet access and my university's SLIP/PPP connection, but I keep running into conflicts with the different winsocks.
Colin Wells, Issaquah, Washington

A A Windows Socket, or *winsock*, is a small program that provides a standardized way for Windows to communicate over an Internet SLIP or PPP line. If you're running Windows, you need a winsock to get on the Web. Most off-the-shelf Internet packages like Netscape Navigator or Chameleon come with a winsock. You can also download one from the Internet or an online service and install it yourself—a popular one is Trumpet Winsock. Windows 95 has its own, as does CompuServe. You can begin to see where the trouble lies.

Many Internet applications install their own winsock.dll files to the main Windows directory. If you're running Windows 95, the "alien" winsock.dll may overwrite or rename Windows 95's own winsock.dll, disabling Win 95's Internet utilities. One example is CompuServe's NetLauncher, although it may be fixed by the time you read this.

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Also, whenever an application tries to load a file named winsock.dll and that file isn't in the current working directory, your PC will look in the Windows system directory and load the winsock.dll found there.

Windows 95's winsock won't work with certain Internet software, but if you copy a different winsock to the Windows directory, Win 95 will notice that a system file has changed and overwrite it with a new copy of its own winsock. You can't win.

The solution is to keep any proprietary winsocks out of Windows' system directory. Copy them instead into the working directories of your Internet dialer. For CompuServe's NetLauncher, that means copying its winsock.dll to c:\cserve\wincim, c:\cserve\cid, and c:\cserve\mosaic. If you are running Windows 95, NetLauncher will have renamed Win 95's winsock to something like winsock.old. You'll need to rename it winsock.dll.

If your Internet software is 32-bit, you'll also have to move wsock32.dll from the Windows system directory to the appropriate application directories, and restore the original to the Windows 95 system directory—that is, rename it from wsock32.old (in the system directory) to wsock32.dll.

If you run Trumpet Winsock, move its winsock.dll to the working directory for each application containing tcpman.exe.

Finally, if you're running Windows 3.1, delete the locations of your winsock.dll files from autoexec.bat's path statement.

For more on how to configure multiple winsocks, download the files w95sock.rtf and winsoc95.txt from PC World Online.

Getting All the FAQs

TIP

Frequently asked question files are among the best information sources on the Internet. FAQs summarize advice shared in the thousands of Usenet newsgroups. Topics range from solving consumer credit woes to staging a cheap wedding. You can read all the Usenet FAQs by pointing your Web walker to **http://www.cis.ohiostate.edu/hypertext/faq/usenet/top.html**. This wide-ranging repository also includes hypertext links to other Internet files and sources related to each FAQ.

Cool Internet Find: Getting All the Business

TIP

The Internet isn't just games and inline graphics of starships. It offers business information too, but it can be hard to find amid all the cyberschlock.

For the fastest route to everything from tax information databases to overseas business reports, head to **gopher://zeus.nijenrode.nl**. Though located at Nijenrode University in the Netherlands, this gopher will point you to good stuff in the United States too.

Choose *Nijenrode Business Resources* on the main gopher menu, and you'll see another menu with items such as 'Accounting and Taxation', 'Corporate Finance and Banking', and 'Marketing'.

By Judy Heim

PC WORLD online *The files from this article are available via PC World Online. Judy Heim is a contributing editor to* PC World *and the author of* Internet for Cats *(No Starch Press, 1995, 800/420-7240).* Online *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

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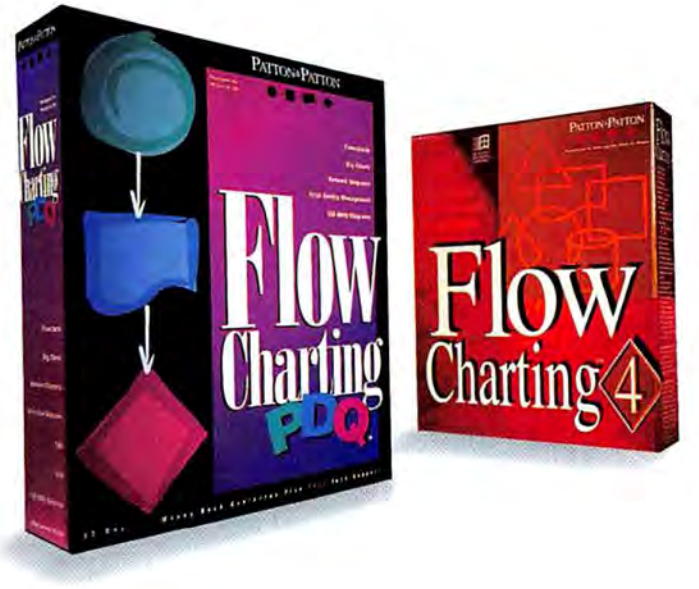

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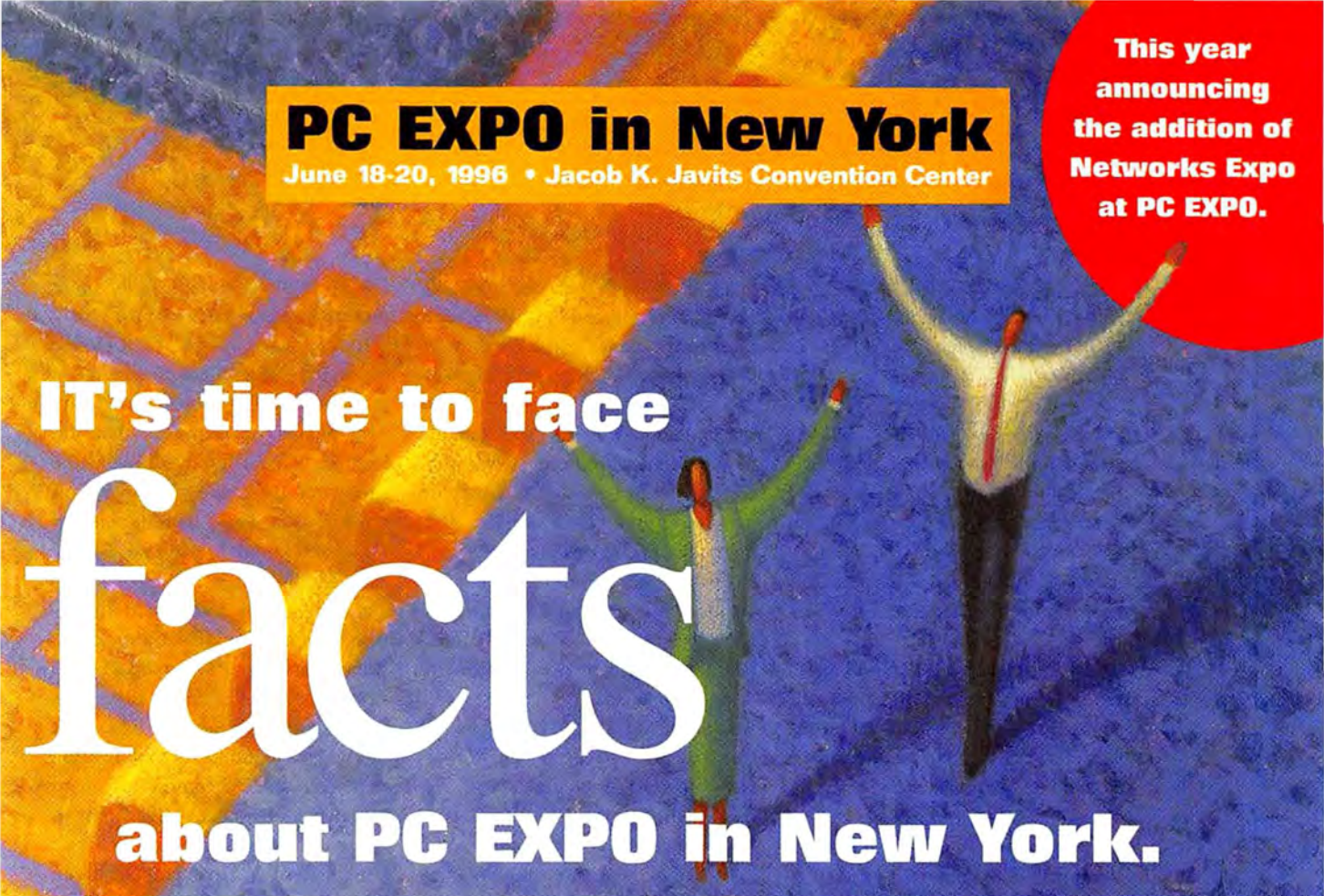

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fact: More than 350 new products were introduced at PC EXPO in 1995, making it the place to see the newest software and hardware products.

fact: PC EXPO is designed for volume buyers from major corporations. Including financial services, health care, manufacturing, utilities, retail, communications, education and entertainment. Plus consultants, dealer/retailers, software developers, VARs, OEMs, service vendors and distributors.

fact: 95% of attendees at PC EXPO '95 visited at least one of its seven technology Pavilions. 78% visited at least three.

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HARDWARE Q&A

Plug and Play Freely, Without BIOS

Q As I understand it, Windows 95's Plug and Play needs three items in order to work: Windows 95 itself, PnP devices, and a PnP system BIOS. My PC doesn't have a PnP BIOS. My system manufacturer told me that no BIOS upgrade is available and so I need a new computer or a new motherboard. Is this really true?

Randy Rowland,
Eden Prairie, Minnesota

A You don't need a PnP BIOS to enjoy the benefits of PnP's automatic configuring, and you shouldn't let the lack of such a BIOS prevent you from upgrading to Windows 95.

As long as you've correctly installed all existing non-PnP hardware under Windows 95, you should be able to plug in a PnP card, turn on your system, and sit by as Windows 95 checks its roster of free resources against those the new card demands (IRQ, I/O address, DMA channel, or whatever).

Usually this works—Win 95 simply assigns the new device the resources it requires. But if the new card needs resources taken by a non-PnP device, you may need to reconfigure that non-PnP device manually, which is a pain.

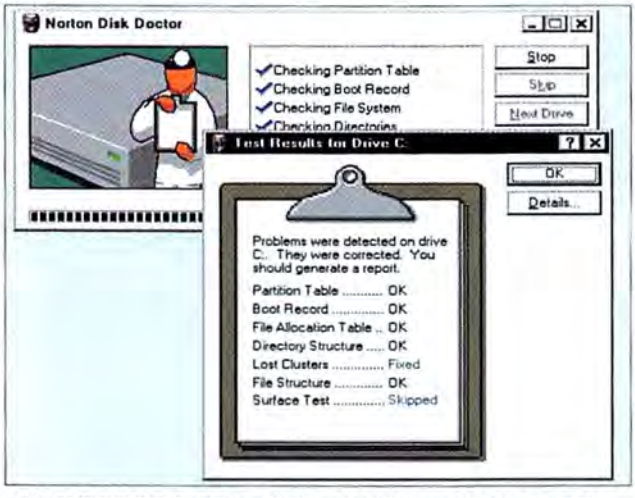
A PnP BIOS also makes it possible for you to add certain PnP devices that must be functional before Windows 95 boots, by temporarily shouldering Windows 95's configuration tasks. For example, Windows 95 can't configure the hard disk interface because the operating system must boot to configure it—one of your classic chicken-and-egg problems. In this instance, a PnP BIOS can hold the information about which resource goes to which device and can configure the hard disk interface and all other devices before Windows 95 boots up.

Additionally, a PnP BIOS ensures that your system will configure PnP devices properly—even if that configuration information is temporarily missing because a hard disk problem forces you to boot from the A: drive. But Windows 95 can always rebuild that information, so even here a PnP BIOS isn't vital.

Crash-Proofing Windows 95

Q I know that Windows 95 comes with its own version of ScanDisk, which repairs minor hard disk problems. Does Windows 95 have any hidden tools that can help me recover from total hard disk crashes?

John Perez, San Antonio



THE DISK DOCTOR in Norton Utilities for Windows 95 can prevent major problems—if you perform regular checkups.

A Well, Microsoft had to leave *something* for third-party companies to do. My favorite all-purpose hard disk recovery package will sound familiar: Norton Utilities for Windows 95. To begin with, this update of the ever-popular utility library comes with Norton Disk Doctor, a program that works much like ScanDisk. It searches for cross-linked files, lost clusters, corrupt FATs (file allocation tables), and other problems and fixes them on the spot.

Run regularly, Norton Disk Doctor (or even ScanDisk) can prevent major problems. But if your hard disk won't boot, you may not recover anything unless you have a floppy disk to boot from. You can create your own Windows 95 boot floppy with the Startup Disk tab found in Control Panel's Add/Remove Programs dialog box—and then, for emergency hard disk repair, copying ScanDisk to the floppy. But on installation, Norton does better: It creates bootable rescue disks containing Disk Doctor plus FAT, boot record, and root directory information to help restore the contents of a hard disk that has been accidentally formatted or badly damaged.

The Rescue Disk program even copies over Windows 95's Registry, the hidden database containing vital hardware configuration information (if the Registry is corrupted, Windows 95 generally resorts to its semidisabled Safe Mode). The program also backs up the contents of your system's CMOS memory—the small, battery-backed memory chip portion that contains your hard disk parameters, memory configuration, and other specs. In my experience, when a system won't boot, either a cable has loosened, or the hard disk parameters have been lost from CMOS memory due to a bad battery. The Rescue Disk restores those parameters so you don't have to enter them manually (and you can do that only if you remembered to write them down).

The Rescue Disk is Norton's most important feature, but it's only part of the package. You also get an enhanced Recycle Bin with undeletion, a disk defragmentation program, a Space Wizard to help clean out unnecessary files, and a dashboardlike readout of Win 95 resources called System Doctor. My favorite extra is System Information, which, among other things, graphically

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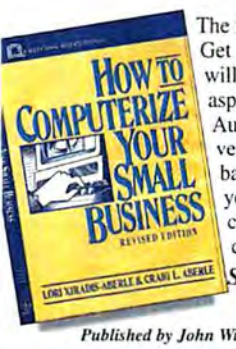

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shows how much memory each active program occupies. For more information, see the sidebar "Why You Still Need Norton" in "Windows 95 at Warp Speed."

- **Norton Utilities for Windows 95** $119.95; Symantec/Peter Norton Group; 800/441-7234, 503/334-6054
  Reader service no. 601

Write Back if You Can

Q In "Best Upgrades for Your 486" in the November issue, you said it's worth considering a Pentium OverDrive only if your system has a write-back cache. Is there any way that I can check to see whether or not my system has one?
Ryan Hudson, Internet

A I can understand how you interpreted my statement that way, but in fact what I said was that your system must *support the write-back caching mode* of the Pentium OverDrive in order to make the upgrade worth the money.

Assuming your system has a Pentium OverDrive socket, the only way to determine if your PC supports the Pentium OverDrive's write-back caching mode is to consult your manual or ask your system vendor. Unfortunately, this question often throws tech support for a loop—and some manuals claim support, while the system itself doesn't deliver. One rule of thumb: If your system is more than a year and a half old, it very likely does *not* support OverDrive's write-back caching mode no matter what anyone says. (The brand new Compaq ProLinea we used for testing worked fine, but it's the only system we've benchmarked for this particular feature.)

The bottom line: Get a money-back guarantee with your Pentium OverDrive, and if the upgrade doesn't give you the performance you hoped for, get a refund.

Virus Alert

Q In the item "Fdisk to the Rescue" last November, you missed one point. You suggested that when Bryan Chan saw the message 'Error reading MBR on drive 81h', he enter **fdisk /mbr** at the DOS prompt. If indeed his master boot record was destroyed due to a hardware failure, the procedure you gave him was correct. But this message also appears when a virus has blown away the MBR. After entering the fdisk command and booting his system, he should run a good antivirus program for detecting and removing viruses.
Bruce Sprangers, America Online

A Thanks for the reminder! Some viruses indeed cause the fatal message Bryan Chan saw. Other virus symptoms include increasingly slow performance, an inexplicably full hard disk, and of course mysterious crashes and reboots. It pays to remind people that viruses may be the cause of many problems that seem to originate with a hardware failure or hard disk data error.

By Eric Knorr

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Hardware *welcomes your questions and pays $50 for published items.* *See page 14 for contact information.*

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It's an election year, and the political process has taken to the Internet in a big way. *PC World*'s map to the online political landscape helps you cast a well-informed vote.

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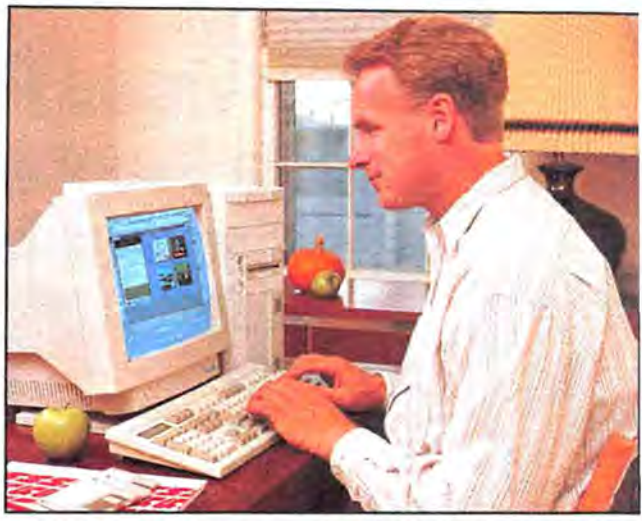

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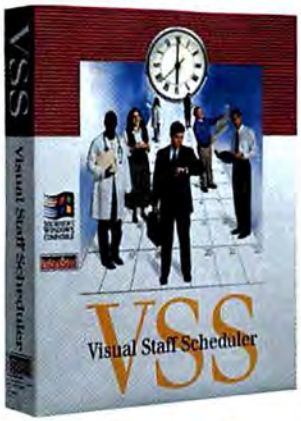

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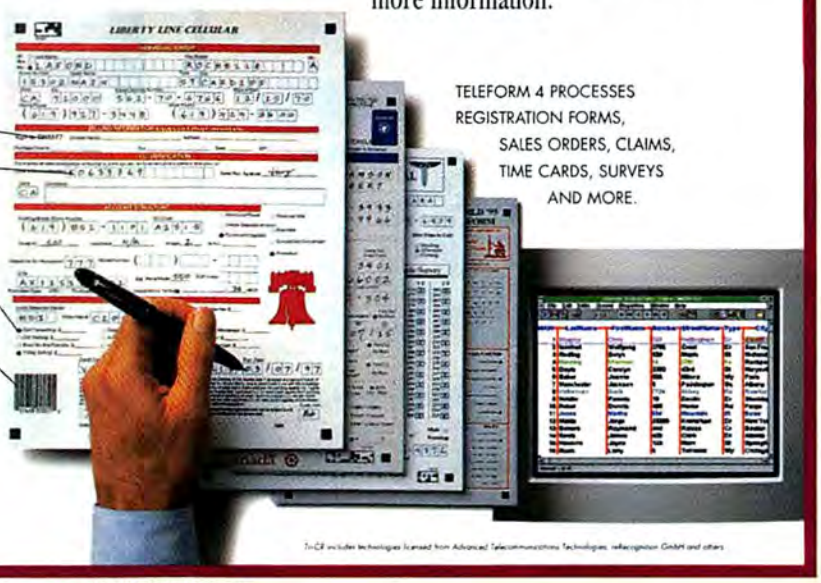

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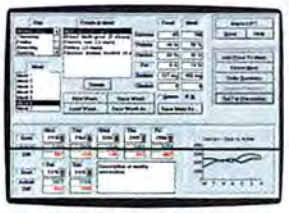

By carefully planning every aspect of your transformation, BodyCraft will help you achieve a strong, lean physique!

BodyCraft Software delivers "computer generated" plans for you to build your own washboard abs!

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No major changes in your life needed. You do not need to join a health club. Ab exercises can be done at home.

THIS PROGRAM IS SO SIMPLE

Try this software. It will bring you washboard abs.

The meal-plan and exercises cannot harm you. They are proven safe.

If the software succeeds, you will have sexy, washboard abs. If it fails...*you have bought nothing.*

WE WILL TAKE A CHANCE ON YOU!

WE TRUST YOU...

We trust you will follow the program exactly--*for it is easy to follow* and requires no great effort or sacrifice on your part.

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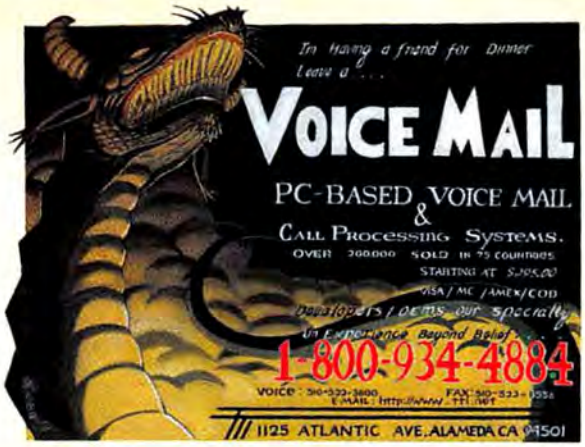

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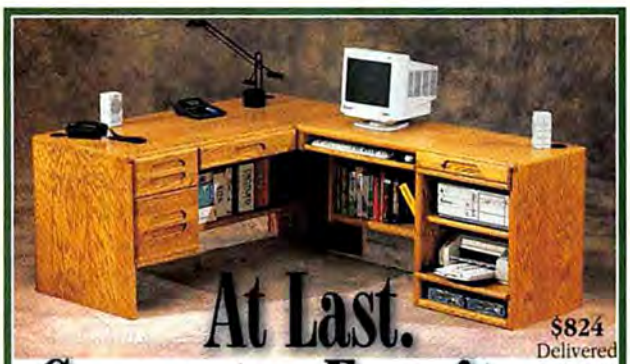

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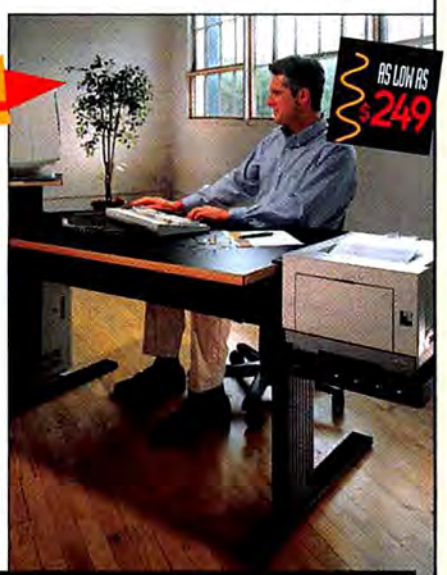

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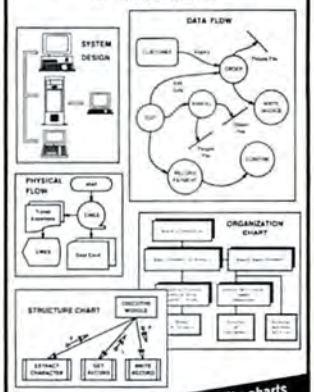

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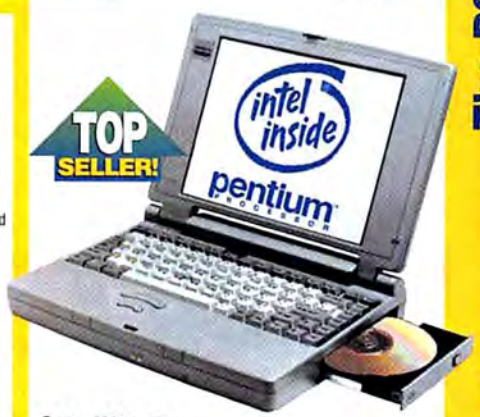

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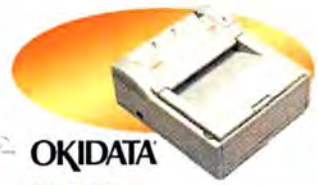

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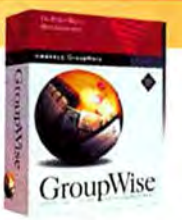

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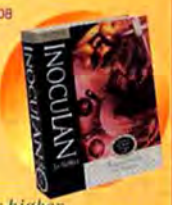

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Link MC5 amber/green/white	273.65
Wyse 55 amber/green/white	219.97
Wyse 60 amber/green/white	336.64
Wyse 160 amber/green/white	333.13

Xircom

PE310BC pocket Ethernet coax	317.26
PE310B2 pocket Ethernet coax	277.51
PE310BT pocket Ethernet 10BT	277.51
PT316CTP pocket Token Ring III	475.83
PPX03 Parallel port multiplexor	77.80

TAPE & REMOVABLE MEDIA DRIVES

COLORADO MEMORY SYSTEMS INC.

Jumbo 350 internal	119.63
Jumbo 1400 internal	228.15
Trakker 350MB parallel port w/tape	176.67
T1000E 800MB parallel port	216.57
T1000 800MB Travan w/tape	179.76
PowerTape 2GB external w/tape	1097.99

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Tape*Stor 800MB Travan parallel	257.15
Tape*Stor 850MB internal	219.87
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Tape*Stor 4GB internal IDE	449.67

iomega

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Zip disks 100MB, 3pk	49.00
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Ditto Easy 800MB Travan tape drive external	149.00
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MICROSOLUTIONS

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EXABYTE

EXB-8700 8MM	1983.75
EXB-8505XL 7GB tape backup internal	1999.87

SyQuest

EZ135 135MB internal IDE interface	194.42
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MULTIMEDIA AND CD

Creative Labs

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Sound Blaster Value CD 4x kit	287.72
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Altec Lansing ACS500 surround system	308.19
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Diamond Multimedia Kit 4400 4X CD int	287.88
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Turtle Beach TBS-3001 4X 3-speed	179.98

INPUT DEVICES

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Desktop Glidepoint	67.19
GlidePoint Windows 95 keyboard	97.12

CalComp

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Drawing Slate II 12X12 4 button cordless	219.81

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ES-1200-ProPC	1122.02

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Scanmaker IIHR color w/Adobe Photoshop	749.98
ScanMaker III color	2024.37
Scanmaker 35T slide scanner	692.56

INPUT DEVICES

Summagraphics.

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Summasketch III 18 X 12 4 button	488.33

UMAX

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Vista-S6 PCLE2	569.27
Vista-S12 PCPRO2	769.89
Vista-T630 PCSoho	439.98

VISIONEER

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Mag Innovision MX1795 PnP 17"	715.70
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Sony 17SFII 17" PnP	877.30
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3243 4.3GB SCSI-2	1005.15

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850MB Fast-ATA	204.75	2.14GB Fast SCSI-2	645.17
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OPTIMA 288 V.34 internal w/fax	366.14
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V.34 28.8 Mini Tower w/fax	174.41

MICROCOM

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U.S. Robotics

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SurgeArrest Pro	29.45
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BC PERS 420	129.74
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BC PERS 500	169.33
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SMART 850 LAN	389.74
SMART 1050 LAN	455.07
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PCMCIA CARDS

3Com Etherlink III PCMCIA	159.11
3Com Etherlink IIIC combo	464.21
Adaptec APA1460 SCSI-2	177.42
Hayes EZJack 14.4 w/fax	159.32
Hayes EZJack V.34 w/fax	219.00
IBM Token Ring 16/4	342.81
Linksys Ethernet combo	139.87
Megahertz XJack 14.4 data/fax	99.48
Megahertz XJack Gold 14.4 data/fax	137.55
Megahertz V.34 data/fax w/ XJack	312.34
Megahertz 10BT Enet adapter w/XJack	142.04
Megahertz cell-ready 28.8 Enet w/XJack	459.86
Motorola Lifestyle 28.8 data/fax	279.75
Motorola Marquis 28.8 data/fax & LAN	467.32
New Media Bus Toaster SCSI-2 host	194.64
New Media Wave Jammer sound card	218.71
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Simple Tech 14.4K modem + voice	97.19
Simple Tech SCSI adapter	99.96
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USR Sportster V.34 with DataView	268.93
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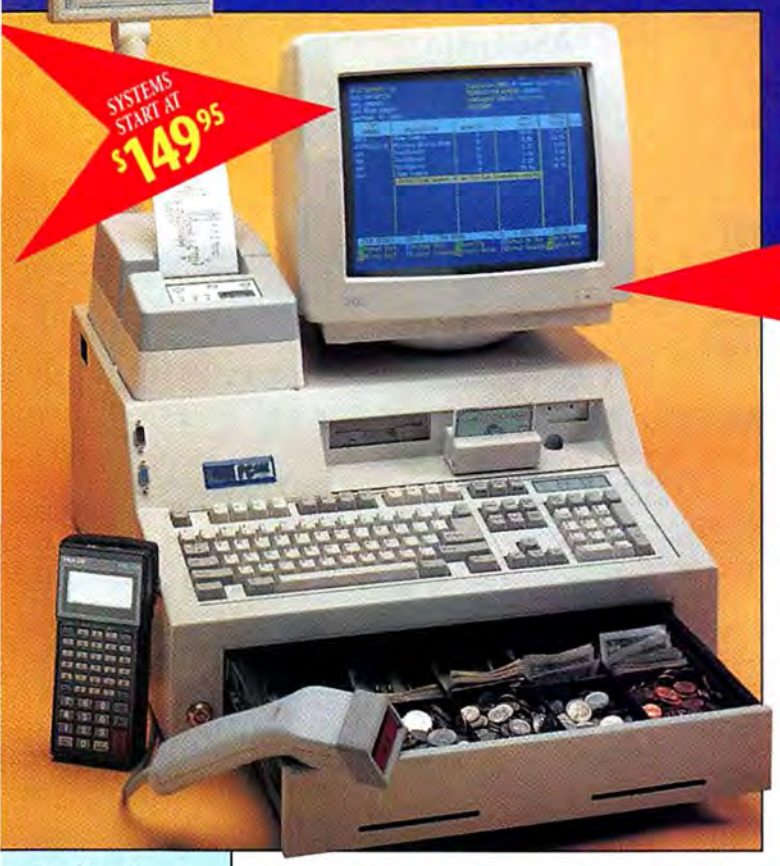

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dry cleaner
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florist
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hardware/locksmith
health/fitness center
janitorial supply
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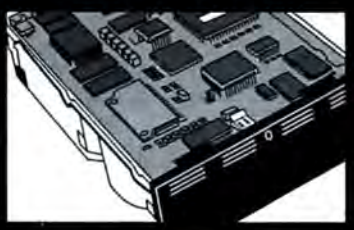

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$899 CD ROM RECORDER

$999 w/ 20 disks, External PC or Mac $1029

Complete kit includes double speed drive, Adaptec SCSI controller, Incat software for PC and Macintosh, and 1 disk.

RECORDABLE CD ROM

PC Internal (w/ controller, software, 2 disks)	$939
PC or Mac External (w/ controller, software, 2 disks)	$1229

4.6Gig OPTICAL DRIVE

PC Internal (w/ controller, software, 1 disk)	$1499
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IDE				
1080MB	3yr	5400rpm	M1606T	$229
1090MB	3yr	4500rpm	M1614T	$209
SCSI				
1080MB	3yr	5400rpm	M1606S	$254
2170MB	5yr	7200rpm	M2932S	$589
4350MB	5yr	7200rpm	M2934S	$909
WIDE SCSI				
2170MB	5yr	7200rpm	M2932W	$619
4350MB	5yr	7200rpm	M2934W	$949

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ExaByte's 8mm EXB-8700 Tape Drive features 7 Gig capacity native and 14 Gig capacity compressed. Blazing fast 60 Megs-per-minute backup rate!

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230MB Optical	$23	$19	$17	$16	$15
1.3Gig Optical	$61	$59	$56	$55	$54
CDR-74	$9	$7.69	$6.79	$6.59	$6.29
SyQuest 270MB	$59	$56	$54	$53	$52

HARD DRIVES

CONNER

IDE			
850MB	14ms	CFS850A	$210
1081MB	14ms	CFS1081A	$225
1278MB	14ms	CFS1275A	$245
1620MB	14ms	CFS1621A	$285
SCSI			
1080MB	11ms	CFP1080S	$245
2147MB	8.5ms	CFP2105S	$609
2147MB	9ms	CFP2107S	$645
4294MB	9ms	CFP4207S	$935

MICROPOLIS

SCSI			
2050MB	8.5ms	MC4221	$609
2147MB	9ms	MC4421	$539
4294MB	8ms	MC3243	$929
9100MB	12ms	MC1991	$1919
SCSI-AV Audio / Visual tuned drives			
2000MB	8.5ms	MC4221AV	$685
4294MB	8ms	MC3243AV	$1025
9100MB	12ms	MC1991AV	$2029
WIDE SCSI			
2050MB	8.5ms	MC4221W	$729
4294MB	8ms	MC3243W	$1029
9100MB	12ms	MC1991W	$1939
WIDE-AV Audio / Visual tuned drives			
2000MB	8.5ms	MC4221WAV	$775
4294MB	8ms	MC3243WAV	$1099
9100MB	12ms	MC1991WAV	$2019

Seagate

IDE			
635MB	14ms	ST3630A	$185
1080MB	11ms	ST51080A	$225
1625MB	10ms	ST31640A	$319
2167MB	10ms	ST32140A	$359
SCSI			
1052MB	9ms	ST31231N	$345
1080MB	12.5ms	ST51080N	$269
2147MB	9ms	ST32430N	$609
2147MB	8ms	ST32550N	$709
4290MB	9ms	ST15230N	$915
4290MB	8ms	ST15150N	$1119
9080MB	11ms	ST410800N	$1989
WIDE SCSI			
2147MB	8ms	ST32550W	$819
4290MB	8ms	ST15150W	$1199

HARD DRIVES

Quantum

IDE			
850MB	14ms	TB850A	$195
1280MB	12ms	FB1280A	$248
SCSI			
850MB	14ms	TB850S	$195
1050MB	12ms	FB1080S	$262
2150MB	8ms	XP32150	$725
4300MB	8.6ms	XP34300	$1009

WESTERN DIGITAL

IDE			
639MB	10ms	AC263S	$185
1080MB	10ms	AC21000A	$235
1280MB	10ms	AC31200	$269
1624MB	9ms	AC31600	$345

Maxtor

IDE			
1.2Gig	<12ms	M71260A	$252
1.6Gig	<12ms	M71626AP	$279

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SCSI	135MB	200MB	270MB
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External	$235	$482	$443
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Parallel Ext	Call	n/a	$489

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44MB	$53/51/49	88MB	$55/51/49
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SCSI				
Sanyo	SH254S	4X	190ms	$147
NEC	CD222	4X	220ms	$159
Pioneer	DRU124X	4.4X	140ms	$185
Plextor	PX43CE	4.5X	130ms	$289
NEC	CDR512	6X	150ms	$299
Plextor	PX63CS	6X	145ms	$375
Toshiba	XM3701	6.7X	120ms	$299
IDE (ATAPI)				
Mitsumi	CRMCFX400	4X	230ms	$119
Toshiba	XM5302A	4X	190ms	$129
Teac	CD56E	6X	110ms	$175
NEW	IDECD8X	8X	150ms	$299
CD ROM CHANGERS				
Nakamichi	7Disc	2X	380ms	$235
Nakamichi	7Disc	4X	340ms	$369
Pioneer	6Disc	4.4X	190ms	$329
Pioneer	18Disc	4.4X	300ms	$1899

NEW! Alps CD ROM Changer w/ 4 disk magazine $269

CD ROM TOWERS

Seven drives in a single enclosure.
Sanyo 4X $1629 NEC 4X $2129
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Save $10 on tape drive with hard drive purchase!
All prices include 1 FREE TAPE, cable, software.

CONNER	Int	Ext	COLORADO	Int	Ext
800MB	$171	$269	800MB	$199	$345
1.7Gig	$219	n/a	1360MB	$269	n/a

-SCSI Kit includes 16bit card & 1 tape.

			Bare	Kit
525MB	Conner	2525	$479	$569
2Gig	HP	C1534A	$709	$799
2Gig	Conner	C4320RT	$779	$879
2-4Gig	Tandberg	3700	$389	$479
2-4Gig	Conner	TSM4000	$399	$469
2-4Gig	Conner	C4324RT	$849	$939
2-4Gig	HP	C1536A	$809	$899
4-8Gig	Conner	C4326NP	$909	$999
4-8Gig	HP	C1533A	$999	$1089
3-7Gig	Exabyte	8205XL	$1269	$1359
7-14Gig	Exabyte	8505XL	$1889	$1979

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CONTROLLER CARDS

IDE	Alone	w/Drive
GSI 16Bit Enhanced IDE		
1533-18 2 IDE	$55	$40
1533-21 2IDE, 4 Floppy	$64	$48
1533-32 2IDE, 4 Floppy, IO	$115	$105
TEKRAM		
DC280E, 4 drive Enhanced VESA, 2 16550 serial ports, 1 EPP parallel port, 1 game port	$60	$50

IDE and SCSI caching controllers - Call.

SCSI	
ADAPTEC (Save $10 with Hard Drive purchase)	
ISA A1522 Basic	$149
ISA A1542 Bare / Kit	$195 / $249
ISA A1542 Basic / Corel	$209 / $199
EISA A2742 Kit / Wide kit	$369 / $359
VESA A2842 Kit	$249
PCI A2940Kit	$259
PCI A2940W Wide SCSI Kit	$309

OPTICAL DRIVES

Fujitsu	
230MB External for parallel port	$439
230MB External SCSI	$479
NEC 1.3 Gig with 1 disk	$1069

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IDE 1 $79 2-9 $76 10+ or w/ drive $73
WIDE 1 $129 2-9 $126 10+ or w/drive $123

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1x32-70 4MEG, 72 PIN–$109

T400, 600
8MEG–$389 16MEG–$634 32MEG–$1529

THINKPAD 755, 750, 360, 355
1.3 GIG HARD DRIVE–$819

CACHE MEMORY

	12NS	15NS	20NS	25NS
8Kx8	-	5.50	6.00	5.50
32Kx8	14.00	9.00	8.00	7.00
32Kx8 (3.3V)	-	14.00	9.50	-
64Kx1	-	11.00	9.00	8.00
64Kx4	-	11.00	9.00	8.00
64Kx8	-	15.00 (5V)	13.00 (3.3V)	-
256x4	-	8.00	7.00	6.00
128Kx8	-	29.50	25.00	24.00
32x8	-	12.00	11.00	9.00

CACHE MODULES

256K (160 pin) Pipeline Burst Cache Module $69.00

512K (160 pin) Pipeline Burst Cache Module $169.00

256K (168 pin) Async Cache Module $69.00

Individual D-RAM Chips

MEMORY FOR IBM & APPLE	50NS	60NS	70NS	80NS	100NS
1Mbyte	-	6.50	6.45	5.95	4.95
1Mbyte	-	45.00	39.00	35.00	-
1Mbyte (Zip Pk)	-	24.00	22.00	21.00	-
256x4/Page Dvg	-	7.25	6.75	6.50	5.95
256 4/Static Dvg	-	-	9.95	-	-
256x4/Page Zig	-	9.25	9.00	8.95	-
256x4/Video Zig	-	-	12.95	11.95	9.95
256x8/SOJ	-	19.00	18.00	-	-
256 x1	-	3.25	2.95	2.75	2.25
64x1	-	-	-	3.75	-
64x4	-	-	-	-	-
256x16 SOJ	-	-	39.00	-	2.00
256x16 Video Zig	-	49.00	39.00	-	-

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80287-XL	39.00
80387-16 DX	39.00
80387-20 DX	44.00
80387-DX (Does All)	39.00
80487-SX (Does All)	199.00
Intel SX (Does All)	69.00
Intel SL Model	39.00
Intel 16SX	29.00
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Clock Doubler

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	40NS	50NS	60NS	70NS	80NS	100NS
256 x 9	-	-	-	10.00	9.00	8.00
1Meg x 9 (3 chip)	-	-	41.00	39.00	36.00	-
1Meg x 9 (9 chip)	-	-	41.00	39.00	25.00	24.00
4Meg x 9	-	-	152.00	149.00	142.00	-
16Meg x 9 (9 chip)	-	-	497.00	497.00	-	-

72 PIN SIMMS (EISA), EDO

	60NS	70NS	80NS
256 x 36 1 mg	-	54.00	49.00
512 x 36 2 mg	89.00	84.00	69.00
1 meg x 36 4 mg	147.00	144.00	139.00
2 x 36 8 mg	309.00	299.00	294.00
4 x 36 16 mg	599.00	549.00	549.00
8 x 36 32 mg	1199.00	1149.00	1139.00
16 x 36 64 mg	2599.00	2549.00	-
1 x 32 4 mg	129.00	124.00	124.00
2 x 32 8 mg	249.00	229.00	229.00
4 x 32 16 mg	499.00	489.00	489.00
8 x 32 32 mg	999.00	979.00	979.00
1 x 32 4 mg EDO	134.00	134.00	-
2 x 32 8 mg EDO	259.00	259.00	-
4 x 32 16 mg EDO	589.00	589.00	-
8 x 32 32 mg EDO	1299.00	1269.00	-

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1 x 64	8Meg	244.00
2 x 64	16Meg	488.00
4 x 64	32Meg	949.00
8 x 64	64Meg	1899.00

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4Meg	164.00
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MODEL	AMT. UPGRADED	AST PART #	PRICE
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	8Meg	500487-003	238.00
	16Meg	500487-004	476.00
	32Meg	500487-005	836.00
Premmia LX P/60 MX4/66d, 4/100T, P/90	8 Meg	500487-002	238.00
	16 Meg	500487-003	419.00
	32 Meg	500487-005	838.00
	64 Meg	501569-001	Call
Premmia 4133, 4133S, 4/50d, 4/60d	8 Meg	501159-005	338.00
Premmia SE 4/33, 4/66d, P/60	16 Meg	501159-003	658.00
Premmia MTE 4/33, 4/66d, P/90	32 Meg	501159-004	1149.00
Manhattan G, V Series Server	64 Meg	501159-005	2298.00
Power Premmia 3/33, 4/33, 4/33S, 4/50d, 4/66d	8Meg	500780-001	378.00
Premium 486/25, 486/25E, 486/33, 486/33E			
Premium 386/33TE, 486/25TE, 486/33TE			
Prem. II 386/25, 386/33, 486/33, 486 SX/20			
Bravo 486/25, 486/33	2 Meg Kit	500780-005	118.00
Advantage 486/25, 486/33, 486/33P, 486 SX/20			
Premium S4/25	8Meg Kit	500780-001	338.00
Premium S4 4/50, d, 66d, P/60	1 Meg	500780-003	59.00
Prem. 386/33T, 386 SX16, Prem II 386SX/20, 386/25	4Meg	500780-004	169.00
Premmia GX P/60, P/100	8Meg Kit/16MegKit	501565-001/501566-001	378/699
	32Meg Kit/64Meg Kit	501567-001/501568-001	1358/2699
AST Clock/ Board	9-32 Meg	500818-001	159.00

AMBRA

Ambra Pentium-60	4/8/16 Meg	144/299/599
Ambra NC 425SL	2/4/8 Meg	109/169/299
Ambra Ni Series	4/8/12/16 Meg	179/319/549/619
Ambra SN Series	4/16 Meg	179/639
Ambra Sprinta SLC II	2/8 Meg	89/319
Ambra N-75, N-100	4/8/16	164/319/619

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286/386SX-16, 386SX-20, 486SX-20 & 386-33 *all are 72PIN SIMM*
1MEG – 59.00 4MEG – 149.00 8MEG – 269.00 16MEG – 499.00

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MODEL	AMT. UPGRADED	MFG. PART #	PRICE
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Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800MK	149.00

We also sell Memory for: Dell, Gateway, HP, DEC, Sun, Zenith, Acer, NEC and Epson

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IBM PS/1, PS/2 MEMORY MODULES

IBM PART NO.	WORKS WITH MODEL NO.	PRICE
30F5348 (512K)	30-286	87.00
30F5360 (2Meg)	30-286, 25-286, 50 MTHR BD.	91.00
6450375 (1Meg)	80-041	79.00
6450379 (2Meg)	80-111, 311-121, 321, 081, 151	84.00
6451090 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	169.00
6450694/92G7199 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	69.00
6450698 (2Meg)	70-A21, A-61, 9-21, 8-61, 35SX, 35LS, 40SX, Val Pt 325T	30.00
79X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 65LS, 65LS	134.00
87H9977/92G7199 (4Meg)	55SX, 65LS, 65SX, 40SX, 35SX, 35LS	134.00
1057935 (512K)	P/S1-286	49.00
92F9695 (2Meg)	P/S1 & P/S1/386SX-2121	109.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	189.00
92G7209 (4Meg)	PSI Expert, Consultant, Willow	134.00
92G7201, 73X3131 (4Meg)	Value Point Performance, PC Server 4/66	134.00
92G7539 (4Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	119.00
92G7541 (8Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	219.00
92G7543 (16Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	419.00
92G7545 (32Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	899.00
73G3132,92G7203 (8Meg)	Value Point Performance, PC Server 4/66	269.00
60G1622/92G7204 (16Meg)	Value Point Performance, PC Server 4/66	489.00
92G7205 (32Meg)	Value Point Performance, PC Server 4/66	1099.00
6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	90.00
6450128/92G7200 (4Meg)	57SX, 90, 95, P-75, 57SLC 56, 56SLC, P/S1, 386SX, Mod-2123, 2133, 2155, Val Pt 77, 486CS2, 486SX, SVR85 Value Point 77 486DX2, 486SX, SVR 85	134.00
6450129/92G7428 (8Meg)	365X, 465X	269.00
6450130/92G7202 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	269.00
6451158/92G7208 (4Meg ecc)	486, 95XP, 95A (install in pairs)	199.00
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90G7209/92G3720 (16Meg ecc)	9595 DPT	719.00

IBM NOTEBOOK & LAPTOP MEMORY

07G1415/07G1420 (4Meg)	Thinkpad 750, C, 700, C, 720, C, CL57SX		169.00
07G1416/07G1421 (8Meg)	Thinkpad 750, C, 700, C, 720, C, CL57SX		299.00
66G0095 (16Meg, 32Meg)	Thinkpad 750 C		609/1159
66G0094 (4Meg)	Thinkpad 755, 360, 355, 340, 450		164.00
66G0094 (8Meg)	Thinkpad 755, 360, 355, 340, 450		299.00
66G0094 (16Meg, 32Meg)	Thinkpad 755, 360, 355, 340, 450		589/1089
81B9094 (4Meg)	Thinkpad 500, 510CS (3.3 volt)		154.00
81B9095 (8Meg, 16Meg)	Thinkpad 500, 510CS (3.3 volt)		319/609
79F9999 (2Meg)	LX40, N33SX, PS Note		103.00
79F1900 (4Meg)	LX40, N33SX, PS Note, Thkpd 350, 350c, PS Note 425		164.00
79F1901 (8Meg)	LX40, N33SX, PS Note		319.00
Hard Drive (52 Meg, 710 Meg, 1.3 Gig)	Thinkpad 755, 755 360, 355		Call/Call/819
(4Meg/16Meg)	Thinkpad 755 Dismi Modules		169/619
(4Meg/16 Meg w/Adap	Thinkpad 755		229/597
60G0378 (8Meg)	Thinkpad 356, 356c, PS Note 425		299.00
60G0379 (16Meg)	Thinkpad 356, 356c, PS Note 425		499.00
92F6804 (2Meg)	N45SL		109.00
92G7259 (4Meg)	Thinkpad 701C, CS, Butterfly		164.00
92G7261 (8Meg)	Thinkpad 701C, CS, Butterfly		319.00
92G7263 (16Meg)	Thinkpad 701C, CS, Butterfly		639.00
4Meg/8Meg/16Meg (730T only)	Thinkpad 730 T/3T		199/339/629
(4Meg, 8Meg, 16Meg)	Thinkpad 760		179/339/639
8Meg/16Meg	Thinkpad 820		390/729
4Meg/8Meg/16Meg/32Meg	Thinkpad 850		199/399/719/1439
4Meg/8Meg/16Meg/32Meg	PC300 Pentium		179/339/629/1259

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Deskpro 386S	1Meg Module/4Meg Module	79/169
	1Meg Board/4Meg Board	149/249
Deskpro 386 25E/20E	1Meg Module/4Meg Module	79/169
	1Meg Board/ 4 Meg Board	149/249
Deskpro 386/25, 20	1Meg Module/4Meg Module	79/169
Deskpro System Pro 386/33, 486/25, 486/50L	2/8/32Meg	99/299/1399
Deskpro 4/66, 4/33I, 4/25iS, 3133I, 3/25I	Expansion Board 0K	69/154/319
Deskpro 1MP Series	Expansion Board 0K	119
Deskpro 4/50, 466, 4100, 575, 590, 5120, 5133	4/8/16/32Meg	159/269/499/999
Deskpro XE 433S, 450, 466	2/4/8Meg	69/154/319
Deskpro XE 560	8/16/32/64/128Meg	356/616/1275/2475/4756
Deskpro XL450, 466, XL560, xl566, XL575, 5100 xl590	4/8/16/32/64Meg	178/308/638/1238/2378
Presario 433, CDS520, CDJV520, CDL524, CDS526, CDTV529	4/8/16/32Meg	119/219/419/899
660, CDS640, CDS720, CD9724, CDS744, CDS560 CDS920, CDTV920, 924, CDS924, CDS954		
Presario 400 Series, 600 Series, 800 Series	2/4/8/16/32Meg	89/134/259/499/949
Presario CDS774, CDS972, CDS982, CDTV976, CDS974 (in pairs)	4/8/16/32Meg	119/219/419/899
CDS982, 715, 716, 718D, 954D, 954E, 9564		
Prolinea 4/25S, 4/33, 4/33S, 4/50, 4/66, CDS	1/2/4/8Meg	59/89/139/269
Prolinea MT 4/33S, 4/50, 4/66 Enhanced 4/33S, 4/50S, 4/66	2/4/8/16/32 Meg	59/139/269/489/949
Prolinea 450, 466, 4100, 575, 590, 5120, 575, 590, 5120	4/8/16/32Meg	134/269/489/969
575 mini, 5100 mini, 5133 mini		
Proliant 1500 5/75, 5/100, 1500R 5/75, 5/100	(install in pairs: 4/8/16/32Meg	119/269/499/969
Presignia 300, 375, 590, 500 5/90, 500 5/120	(install in pairs: 4/8/16/32Meg	119/269/499/969
Proliant 2000 5/60, Presignia 5/60	16/32/64/128/256	616/1276/2475/4756/Call
Proliant 2000 4850 5/66, 5/90, 5/90, 2000R 5/66, 5/90 4000 4850/50, 5/66, 5/90, 5/100, 4000R 5/66, 5/90, 5/100 4500 5/100, 4500R 5/100	16/32/64/128/256	616/1276/2475/4756/Call

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Elite 5000	8Meg/16Meg/32Meg/64Meg		329/539/1249/2599
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LTE LITE/20, 25, 25C	4Meg Module	129769-002	209.00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	439.00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	669.00
LTE LITE 425C/33C/25E/25L	4Meg Module	142337-002	179.00
LTE LITE 425C/33C/25E/25L	8Meg Module	142337-003	319.00
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SLT/286	4Meg Module	111037-001	179.00
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	4Meg	139498-001	159.00
	8Meg	139499-001	299.00
Contura 400, 410	4Meg/8Meg/16Meg		159/299/599
Contura 420, 430	4Meg/8Meg/16Meg/20Meg		159/299/599/699
Contura 4/25, 4/25C, 4/25CX	4Meg	146523-001	159.00
	8Meg	146531-001	299.00
	16Meg	146531-001	599.00
	4Meg	190532-001	149.00
Aero 4/25, 4/33	8Meg	190597-001	299.00

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1.6 GIG —	319	1.6 GIG —	369	1.6 GIG AC31600	349

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MODEL	PRICE	MODEL	PRICE
S-RAM Cards 1MEG	129	SCSI Type II	139
S-RAM Cards 2MEG	189	Audio Card	169
28.8/14.4 Data/Fax Modem	189	Multimedia Combo, Sound/SCSI	499
14.400/14.400 Data/Fax Modem	89	Panasonic KXL-D720 port. CDRom player	349
Readwriter Card (15A Slot)	149	Type III 170 Mg Hard Drive	356
Lan Ethernet (Coax), (10 Base T)	99	Type III 340 Mg Hard Drive	464
Portable CD ROM (4x)	Call	Xircom Combo Ethernet + Modem II 28.8 Adapter	549

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MODEL	AMT. UPGRADED	MANU. PART #	PRICE
T2000SX/C/2200SX/T1800, 1850, C	2Meg/4Meg/8Meg	PC-PA2000U	89/169/319
T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg		164/299/589/899
T4400SX, SXC T6400, T6600	4Meg	PC-PA2004U	189.00
T4400SX, SXC T6400, T6600	8Meg	PC-PA2005U	379.00
T4400SX, SXC T6400, T6600	16Meg	PC-PA2010U	689.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	179.00
T4500, C T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	299.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg	PC-PA2014U	599.00
T4700, 4800, 4850 (Hard Drive)	524Meg/710Meg/1.3 Gig		739/969/1119
T3400CT, T2400, T3600	4Meg/8Meg/16Meg	PC-PA2019U	179/349/619
T3400CT	32Meg		1549.00
T3100SX, T3200SX	2Meg	PC15-PA8308U	109.00
T3100SX, T3200SX	8Meg/16Meg/32Meg	PC15-PA8310U	189.00
T600, 610, CT	8Meg/16Meg/32Meg		389/634/1529
T700	8Meg/16Meg/32Meg		563/1051/2063
T400CS, 400CDT	8Meg/16Meg/32Meg		389/634/1529

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ACER 730, 735C, 750, 780	2Meg/4Meg/8Meg		99/169/319
ACER 760, 765, 782, 784, 786, 787,	4Meg/8Meg/16Meg		169/319/629
ACER 780	4Meg/8Meg/16Meg		169/319/609
ACER Note Pro, ACER Note Lite	4Meg/8Meg/16Meg		189/379/577
AUS Vectra	2Meg	12457980	249.00
AST Ascentia 900N, 800N	4Meg/8Meg/16Meg		169/299/599
AST Ascentia 950	8Meg/16Meg		339/629
AST Bravo & Explorer	4Meg/8Meg/16Meg	501255-001, -002	169/329
AST Notebook Prem Exec 386SX/20,25/25L,	4Meg/8Meg	500814-003	179.00
AST Power Exec 325C, 425E, 425SL	4Meg/8Meg	501168-001, -003	179/619
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	189/299/599
AT&T Globalyst 130 *(Call for other Globalyst)*	4Meg/8Meg/16Meg		179/299/619
AT&T Globalyst 200	4Meg/8Meg/16Meg		179/359/619
AT&T Safari NSX/20	4Meg	PEC 37651	259.00
Austin DX4, DX2, SX2, SX Series	4Meg/16Meg		179/619
Bondwell B312	1Meg	23050-09103	69.00
Bondwell B310V, SX	1Meg/4Meg		109/229
Canon Innova Book 150	4Meg/16Meg		169/619
Canon Innova Book 230LS	4Meg/8Meg/16Meg/24Meg		169/299/599/749
Canon Innova 486	2Meg/4Meg/8Meg		89/179/299
Canon Innova 486-10	4Meg/8Meg		169/509
Canon Notejet 495	4Meg/8Meg		179/359
Canon Notejet DX4/75	4Meg/8Meg/16Meg		189/299/599
DEC HiNote, Ultra HiNote	4Meg/8Meg/16Meg		169/299/599
Dell Latitude LX 4100D, XP 4100D	4Meg/8Meg/16Meg		189/299/589
Dell Latitude M, MC, MCX	4Meg/8Meg/16Meg		169/299/589
Dell Latitude XP, 475, 4100, 4100CX	4Meg/8Meg/16Meg		169/299/589
Dell Latitude 486, 425, 433C, 433CX, 450, 450CX	4 Meg/16 Meg		179/699
Epson ActionNote 650, 550c, 660c, 660cx	4Meg/8Meg/16Meg		169/319/569
Epson ActionNote 700, 700cx, 700cx	4Meg/8Meg/16Meg		179/619
Epson ActionNote 800, 880, 866	4Meg/8Meg/20Meg		169/319/510/799
Epson ActionNote 890	4Meg/8Meg/16Meg		179/299/599
Epson ActionNote 4000 Notebook	8Meg		229
Epson ActionNote 4/C25, 4/C33, 4SLC/2-50	8Meg		229
Gateway Telepath LX, 4/33, Server	4Meg/8Meg	PCA 09051-0001	109.00
Gateway 2000 Colorbook 4/33	4Meg/16Meg		169/619
Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg		179/750
Gateway 2000 486 Handbook or Liberty	4Meg/8Meg/16Meg		179/319/510
Gateway 2000 Solo Series	8Meg/16Meg/32Meg		379/699/1279
HP Omnibook 300, 480, 425	2Meg/4Meg		179/199
HP Omnibook 530, 600	4Meg/8Meg/12Meg		179/319/579
HP Omnibook 4000	4Meg/8Meg/16Meg		169/319/610
HP Omnibook 5000	8Meg/16Meg/32Meg		316/619/1279
Leading Edge Axiva 2000	4Meg/8Meg		179/639
Lexmark SE/10	4Meg/8Meg		179/319
Magnavox Metalis	4Meg/8Meg/16Meg	286, 386SX	169/179
Midwest Micro Elite SX-25, SX33, DX2-50, DX2-66	4Meg/8Meg/16Meg		179/319/510
Midwest Micro Elite Slide SX33, DX2-50, DX4-75, DX4-100	4Meg/8Meg/16Meg		179/319/510
Midwest Micro Elite Slide Plus D, D-75, D5-90	4Meg/8Meg/16Meg		179/319/510
NCR Safari 3180, 3181	4Meg/ 8 Meg		189/369
NEC Ultralite Versa, E, V, MP	4 Meg/8Meg/16Meg/20Meg/24Meg	DF4134	139/319/619/799
NEC Versa Memory Hard Drive	710Meg/810Meg/1.3 Gig		739/769/793
NEC Versa S	4Meg/8Meg/16Meg		179/299/610
NEC Versa 3000C & 2000D	4Meg/8Meg/16Meg		179/299/639
NEC Versa 4000	4/8/12/16/20/32Meg		169/329/549/619/999/1569
Packard Bell 386SX, 286	1Meg, 4Meg	286, 386SX	109/179
Packard Bell Statelite	8Meg/16Meg		189/299
Panasonic CF170, CF270, CF370	1Meg	CF-BA165	59.00
Panasonic CF-M1	2Meg/16Meg/24Meg		119/169/359
Panasonic CF-321P, CF-560	4Meg/8Meg/16Meg		179/619
Panasonic CF-M1	4Meg/8Meg/16Meg/24Meg		179/319/609/1299
Satoya 17, 19	2Meg	MSC-N8MEM2	109.00
Sharp 6781, 6981, 6786, 6700, 6800, 6741	2Meg/4Meg		109/179
Sharp 8150, 8650, 8660, 7700, 7760	4Meg/8Meg/16Meg		179/619
Sharp 8700, 8900	4Meg/8Meg/16Meg		179/319/610
Sharp PC310, PC350, 3010 & 3050	4Meg/8Meg/16Meg		179/319/610
TI Travelmate 2000	1Meg	2568034-0001	79.00
TI Travelmate 3000	2Meg	2566996-1	84.00
TI 4000, TI 4000E	4Meg/16Meg		179/750
TI 4000M	4Meg/16Meg		179/750
TI 5000, 5100	8Meg/16Meg		299/619
TI Extensa, 450, 450T, 455, 455T	4Meg/8Meg/16Meg		179/319/529
Tandy 1510, 2810, 3810	2Meg		89/179
Tandy 2820, 3820, 3830	2Meg/4Meg/8 Meg		119/199/309
Twinhead, Atima, Compudyne, 486SX, DX, Tandy 4860	4Meg/16Meg		179/629
Twinhead Slimnote 3	4Meg/8Meg/16Meg		189/299/619
Ultra 486 TS38	4Meg/8Meg/16Meg		189/369/629
Leo 386SX Notebook (not the + version)	4Meg		99.00
Zenith Master Sport 386SX	2Meg	ZA-300-1	99.00
Zenith Master Sport SL, SLE, 600, 620, 625NL	2Meg	ZA-4-4	89.00
Zenith Super Sport 286, 286E	2Meg	ZA-183-64	99.00
286E, SX	2Meg	ZA-183-84	89.00
SX Alpha/SX Beta	2Meg	ZA-180-86/ZA-180-87	89.00
Zenith Z-Note 425LN, LNC, LNP	4Meg/8Meg/16Meg		179/329/619
Zenith Z-Star 4/33	2Meg/8Meg		109/299
Zenith Z-Star EX	4Meg/8Meg/16Meg		179/329/610

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Brother 630, 631, 641, 645	-	-	89	135	-	-	-	-	-	-	-	-
Canon LBP 430	-	-	69	-	-	-	129	-	-	-	-	-
Canon LBP 860	-	-	-	85	-	-	129	-	-	299	419	899
Canon LBP4, 4plus, 4plus	-	-	129	179	-	-	-	-	-	-	-	-
Epson 6000, Action Laser	-	-	-	129	-	-	229	-	-	-	-	-
Epson Action Laser 1100, 1600	-	-	89	99	-	-	129	-	-	299	419	-
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Epson 8000, 1800, 4000, 4100, 4/50	-	-	89	-	208	-	-	327	-	Call	Call	Call
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HP 3, 3D, 3P, 3P 2P+	-	-	-	89	-	-	149	-	-	-	-	-
HP 4, 4M, 4Si, 4Si/MX	-	-	-	89	-	-	129	-	-	269	-	-
HP 4P, 4PLUS, 4MPlus 1600, 1800CM	-	-	-	-	-	-	119	-	-	219	-	-
HP 4L	-	-	59	-	-	-	-	-	-	-	-	-
HP 3Si	-	-	99	-	-	-	134	-	-	269	-	-
HP 4Si	-	-	-	89	-	-	134	-	-	269	-	-
HP 5L	-	-	59	129	-	-	219	-	-	399	-	-
HP 5P	-	-	-	89	-	-	119	-	-	219	479	-
HP 5Si	-	-	-	89	-	-	134	-	-	269	-	-
HP Design Jet 600, 650, 200	-	-	-	-	-	-	149	-	-	-	-	-
HP Deskjet 500, 500C, 510, 550,550	-	49	-	-	-	-	149	-	-	-	-	-
HP Deskjet 1200C, 1200CP	-	-	-	89	-	-	134	-	-	269	-	-
HP Pagejet XL300	69	-	-	-	-	-	149	-	-	329	599	-
IBM Laser 4019, 4019E	-	-	-	-	-	160	-	-	-	-	-	-
IBM Laser 4029, 4037	-	-	-	-	-	-	169	-	-	-	-	-
IBM Laser 4039, 4079	-	-	-	99	-	-	169	-	-	279	-	-
Konica LP 3110	-	-	119	189	239	-	-	-	-	-	-	-
Lexmark, Optra L, LX, R, RX	-	-	-	-	-	-	129	-	-	219	419	899
Lexmark Laserprinter 600 E/Ki	-	-	59	89	-	-	149	-	-	-	-	-
Lexmark Winwriter 200, 400, 600	-	-	59	89	-	-	149	-	-	-	-	-
NEC 90, 290	-	-	-	119	-	-	-	-	-	-	-	-
NEC

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NEC

All NEW Models Optimized for WIN 95

NEC Ready Multimedia

Ready Multimedia

NEW for Windows 95

- 6X CD-ROM drive
- SoundBlaster compatible chip integrated on the system board
- 28.8 fax/modem, full-duplex speaker phone & answering machine
- Super-fast 64-bit PCI local bus graphics
- Built-in MPEG support for full screen, full motion video
- 32-bit PCI IDE controller – fast disk performance
- LOADS of **FREE** software

* 4X CD-ROM on 7610

Processor	RAM/HD	CD-ROM	Price
Pentium 75	8MB/1GB	4X	CALL
Pentium 100	8MB/1GB	4X	CALL
Pentium 100	16MB/1.6GB	4X	CALL
Pentium 120	16MB/1.6GB	4X	CALL
Pentium 133	16MB/1.6GB	4X	CALL

Monitors priced separately

AST

Authorized Reseller

150&166MHz PENTIUM

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Advantage Adventure Multimedia (6X CD-ROM)

- 6X CD-ROM Drive
- 6X CD-ROM Drive w/3disc CD changer (selected models)
- Advanced Telephony – 28.8 data/fax/modem, telephone answering system, and speaker phone (differs by model, call for details)
- Integrated 3-D surround sound (most models)
- 64-Bit PCI Local bus graphics
- AST Works II navigation software – featuring "SPOT"
- Enhanced IDE interface
- AST Lifeline technical support

All New Models!

Processor	RAM/HD	CD-ROM	Price
Pentium 100	16MB/1.2GB	6X	$2020
Pentium 133	16MB/1.2GB	6X	2150
Pentium 150	16MB/1.6GB	6X	2370
Pentium 100	16MB/1.2GB	6X	2050
Pentium 133	16MB/1.6GB	6X	2300
Pentium 150	16MB/2.1GB	6X+	2640
Pentium 166	16MB/2.1GB	6X+	2830

+w/3disc CD changer, *Monitors priced separately*

AST Advantage Adventure

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High-Fidelity JBL Speakers

Digital Starion

Digital Starion

NEW! Windows 95 Multimedia Computers

- Quad Speed CD-ROM Drive
- Up to Pentium 166 - blazing speed!
- PCI local bus – high speed graphics
- Unbelievable sound - SoundBlaster Pro-compatible, SW WaveTable, Premium JBL speaker system
- 28.8 fax modem and advanced telephony features (differs by model)
- Loads of **FREE** software preinstalled

All New Models!

Processor	RAM/HD	CD-ROM	Price
Pentium 75	8MB/1.2GB	4X	$1599
Pentium 100	8MB/1.2GB	4X	1759
Pentium 100	16MB/1.6GB	4X	2099
Pentium 120	16MB/1.6GB	4X	2299
Pentium 133	16MB/1.6GB	4X	2499
Pentium 150	16MB/1.6GB	4X	2599
Pentium 166	16MB/1.6GB	4X	2799

Monitors priced separately

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HP DeskJet 340 Printer - C2655A
$289.99

or SAVE 10%

HP DeskJet 340 Printer Bundle C2664A
1. DeskJet 340 printer
2. Color kit
3. Rechargeable battery

$329.99

SAVE 30%

DeskJet 320 printer Bundle C2637A#ABA
1. DeskJet 320 printer
2. 60-page sheet feeder
3. Color Kit

$229

HP LaserJet Printers

HP LaserJet 5P printer (IBM, 6ppm, 600dpi) C3150A	$879.99
HP LaserJet 5L printer (IBM, 4ppm, 600dpi) C3941A	479.00

HP InkJet Printers

HP DeskJet 340 printer (portable) C2655A	$289.99
HP DeskJet 340 CV (bundle) C2664A	329.99
HP DeskJet 600 printer C2184A	289.99
HP DeskJet 600C printer C4547A	299.99
HP DeskJet 660C printer C2164A	389.99
HP DeskJet 660Cse printer C4548A	399.99*
HP DeskJet 855C printer C4551A	498.99*
HP DeskJet 1600C printer C3540A	1349.99

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HP OfficeJet C2890A	$599.99
HP OfficeJet LX C2891A	689.99
HP FAX-700 C3530A	509.99

*Includes Family Font Package

Hewlett-Packard Scanners

HP ScanJet 4C scanner C2527B	$949.99
HP ScanJet 4S portable scanner C1127A	319.00

HP Tape Drives

HP T1000 (internal) C4320RB	$179.99
HP T1000e (portable) C4326RB	219.99
HP SureStore, 2GB, DAT, Int C1525F	939.99
HP SureStore, 2GB, DAT, Ext C1520F	1099.99
HP SureStore, 4GB, DAT, Int C1526F	1079.99
HP SureStore, 8GB, DAT, Int C1528F	1329.00
HP SureStore, 8GB, DAT, Ext C1529F	1529.00

HP LaserJet 5L $479.00

C3941A

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YOUR NOTEBOOK

TOSHIBA

120MHz Pentium with PCI bus

BIG! 11.3" Screens

Tecra 700

- Pentium 120MHz processor!
- PCI bus architecture (internal & external)
- 11.3", 800x600 high resolution displays
- Optional 4X CD-ROM Drive (swap floppy & CD-ROM)
- Multimedia docking station with PCI bus (optional accessory, priced separately)
- Built-in 16-bit sound, microphone, **2 speakers** & MIDI
- **HUGE**, 1.13GB hard drives

WIN95 INSTALLED

Processor	Screen	RAM/HD	Price
Pentium 120	11.3" Dual Scan	8MB/1.13GB	$4679
Pentium 120	11.3" Active	16MB/1.13GB	5949

Tecra 700

90MHz Pentium

Portégé 610CT

WIN95 INSTALLED

Portégé 610CT

- Pentium 90MHz processor
- 9.5" True Color display for optimum color
- Built-in 16-bit sound (SoundBlaster Pro compatible), microphone & speaker
- Lithium Ion battery technology
- Accupoint stick for easy control

Processor	Screen	RAM/HD	Price
Pentium 90MHz	9.5" True Color	8/720MB	$3939

Satellite 2130CS/100CS

Satellite 2130CS/100CS

Processor	Screen	RAM/HD	Price
486DX4/75	10.4" Dual Scan	8/500MB	$1599
Pentium 75	10.4" Dual Scan	8/500MB	1969*

*EDO RAM

WIN95 INSTALLED

Satellite Pro 410

Satellite Pro 410

- Built-in 4X CD-ROM Drive (Swap floppy & CD-ROM) (Active models only - optional on Dual Scan)
- Built-in 16-bit sound, microphone, speaker & MIDI
- EDO RAM memory, exp. to 40MB
- Built-in AC adapter - small, sleek design & reduced weight
- Integrated Accupoint - small, accurate & easy to use
- Lithium Ion battery technology
- Built-in infrared for wireless communications

Processor	Screen	RAM/HD	Price
Pentium 90	11.3" Dual Scan	8/772MB	$3199
Pentium 90	11.3" Active	8/772MB	4399

IBM®

SPECIAL ThinkPad® 701 Offer

Call for Details

ThinkPad® 365

- 10.4" Active & 10.4" Dual Scan
- Built-in infrared for no-hassle printer connections
- Multimedia models include built-in 2X CD-ROM, SoundBlaster compatible audio, speaker, microphone & MIDI/joystick port
- MS Windows 95 or Selecta System models available

Processor	Screen	RAM/HD	Price
486DX4/75	10.4" Dual Scan	8/540MB	$1999
486DX4/75	10.4" Active	8/540MB	2599
486DX4/75	10.4" Dual Scan	8/540MB	2499*
486DX4/75	10.4" Active	8/540MB	3099*

*Features built-in 2X CD-ROM drive

ThinkPad® 760

- Up to 120Mhz Pentium with 32-bit local bus
- 12.1" Active displays with 800x600 resolution (selected models)
- 4X CD-ROM Drive, MPEG-2 support, & full motion video (ThinkPad760CD models only *)
- Built-in 28.8 fax/modem
- SoundBlaster-compatible audio & telephony
- Lithium Ion battery technology

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active	8/720MB	$4999
Pentium 90	12.1" Active	8/720MB	5499
Pentium 120	12.1" Active	8/720MB	5699
Pentium 120	12.1" Active	8MB/1.08GB	5999
Pentium 90	12.1" Active	8MB/1.2GB	6699*
Pentium 120	12.1" Active	8MB/1.2GB	6899*

BIG! 12.1" Display

ThinkPad® 760

*Features built-in 4X CD-ROM drive
WIN 95 models available. Call for details.

NEC

Versa 2000

Processor	Screen	RAM/HD	Price
486DX4/75	9.5" Dual Scan	4/350MB	$1899*
486DX4/75	9.5" Active	8/350MB	2399
486DX4/75	9.5" Active	8/540MB	2599

*14.4 fax/modem not built-in

NEC Versa 4000

NEC Versa 4000

- Built-in CD-ROM Drive! (Standard on some models, optional on others)
- Up to 120MHz Pentium processors
- 256KB Level 2 Cache to optimize performance
- Unbelievable displays – 65K color Dual Scan, 16.8 million color Active (High resolution Active Matrix displays available – 800x600 res.)
- Built-in 16-bit sound, microphone, MIDI and **2 built-in speakers**
- Multimedia docking station with outstanding Altec Lansing 4 speaker array (optional accessory, priced separately)

NEW Models with 4X CD-ROM

Processor	Screen	RAM/HD	Price
Pentium 75	10.1" Active	8/810MB	$3799+
Pentium 90	10.4" High Res.	8/810MB	4499
Pentium 90	10.1" Active	8/810MB	4499+
Pentium 120	10.4" High Res.	8MB/1GB	4999

+ Features built-in 4X CD-ROM drive

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- All models 4 lbs. or less - **ONLY 1.2" thick**
- Built-in sound, microphone & speaker
- Lithium Ion battery technology
- Built-in infrared
- 3-year warranty - **FREE** 1-year Passport Service

Processor	Screen	RAM/HD	Price
486DX2/50	9.5" Dual Scan	4/340MB	$2249
486DX2/50	9.5" Active	8/340MB	2829
486DX4/75	9.5" Dual Scan	8/528MB	2899
486DX4/75	9.5" Active	8/340MB	3099
486DX4/75	9.5" Active	8/528MB	3399

HiNote Ultra Shown with 4X Mobile Media Module, optional accessory priced separately

COMPAQ

Contura 430

Processor	Screen	RAM/HD	Price
486DX4/100	10.4" Dual Scan	8/720MB	$2369
486DX4/100	10.4" Active	8/720MB	2939

LTE 5000

LTE 5000 Series

WIN95 INSTALLED

- Up to 120MHz Pentium power w/PCI bus & 256KB cache
- 32-bit PCI Local bus graphics
- 8MB RAM exp. to 72MB
- Built-in 16-bit sound, microphone & **2 speakers**
- MultiBay – holds CD-ROM, 2nd HDD, Floppy, or 2nd battery
- Up to 1.35GB hard drives (2.7GB max. capacity)
- Built-in infrared for wireless communications
- Supports NiMH batteries
- Optional MPEG and TV video adapter

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/510MB	$3799
Pentium 75	11.3" Dual Scan	8/810MB	4439
Pentium 75	10.4" Active	8/810MB	4729
Pentium 90	10.4" Active	8/810MB	5339
Pentium 90	10.4" Active	8/810MB	5599*
Pentium 120	10.4" Active	8MB/1.35GB	6149

*Features Built-In CD-ROM drive

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Ascentia J

AST Ascentia J

- Integrated 14.4/14.4 Data/fax modem
- PCI bus architecture with 256KB L2 cache memory (selected models)
- 10.4" SVGA (800x600) resolution Dual Scan and Active Matrix displays

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan SVGA	8/500MB	$2450
Pentium 100	10.4" Dual Scan SVGA	8/800MB	2840
Pentium 100	10.4" Active Matrix SVGA	8/800MB	3120

Ascentia 950N

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Active	8/800MB	$2560
Pentium 75	10.4" Active	8MB/1.2GB	2880
Pentium 90	10.4" Active SVGA	8/800MB	3430
Pentium 90	10.4" Active SVGA	8MB/1.2GB	3750
Pentium 120	11.8" Active SVGA	8/800MB	4469
Pentium 120	11.8" Active SVGA	8MB/1.2GB	4849

Additional 950N models available. Call for details.

TEXAS INSTRUMENTS

Extensa 560CD/560CDT

- 75MHz Pentium w/PCI bus & 256KB cache
- Built-in 4X CD-ROM drive
- Built-in 16-bit sound, microphone & speaker
- Integrated touchpad pointer
- 10.4" Active Matrix & 10.4" Dual Scan
- Built-in infrared for wireless communications

75MHz Pentium with PCI BUS

WIN95 INSTALLED

Built-In CD-ROM

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	810MB	$2749
Pentium 75	10.4" Active	1.2GB	3699

Extensa 560 Product differs slightly from photo

TravelMate 5100/5130/ 5200/5270

NEW MODELS!

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active	8MB/1.2GB	$3399
Pentium 90	10.4" Active	8MB/1.2GB	3699*
Pentium 120	10.4" Active	8MB/1.2GB	4649*
Pentium 120	11.3" Active	8MB/1.2GB	5079*

*800 x 600 resolution

HEWLETT® PACKARD

HP OmniBook 600 NoteBook PC

HP OmniBook 600

- Weighs **ONLY 3.8 pounds!**
- Built-in 16-bit sound, microphone & speaker (Active model only)
- Built-in infrared for no-hassle printer connections
- Lithium Ion battery technology (Active model only)
- Instant "ON" ready-to-work state – lasts for months on a charge

Processor	Screen	RAM/HD	Price
486DX4/75	8.5" Dual Scan	8/340MB	$2200
486DX4/75	9.5" Active	8/340MB	2500

HP OmniBook 5500

133MHz Pentium processor

- 133MHz Pentium with 32-bit PCI local bus
- 12.1" Active Matrix display with 65,000 colors
- Super VGA-800x600 resolution on notebook
- PCI Local Bus Video, 1.5MB video memory
- Instant on capabilities
- Optional internal 4X CD-ROM available

Processor	Screen	RAM/HD	Price
Pentium 133	12.1" Active	8MB/1.35GB	CALL

HP OmniBook 5500 Product differs slightly from photo

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T2130CS 500MB DX4/75 .**$1549**
- 10.4" color dual scan

Tecra 700 CS or CT .....***CALL***
Intel's Pentium 120MHz processor!!!
- 1.2GB drive
- 11.3" display
- true PCI bus
- optional 4X CD-ROM
- synchronous DRAM
- SoundBlaster Pro

Portege 610CT - A 90MHz ultraportable **$3859**
- 9.5" active
- Sound Blaster Pro
- 720MB drive • 8MB EDO

Toshiba has packed plenty of power into the Satellite Series.

Satellite 100CS
- Fast Intel 75MHz Pentium
- 10.4" color dual-scan
- SVGA, VL bus graphics accel.
- 8MB RAM expandable to 40MB
- 504MB hard disk drive

Satellite 100CS.....**$1939**

Pentium Powered CD-ROM color notebooks: the new Satellite Pro 410 series.
- Quad-speed CD-ROM (optional on 410CS)
- Powerful Pentium 90MHz processor
- 8MB EDO RAM
- 11.3" color dual-scan or color TFT active matrix display
- 24-bit true color support (410CS: CRT only; 410CDT: LCD or CRT)
- Advanced graphics accelerator
- 810MB hard disk drive
- Integrated sound
- Lithium Ion battery

Satellite Pro 410CS.....**$3099**
Satellite Pro 410CDT **$4279**

Satellite Pro 400CS **$259**
Satellite Pro 400CDT.....**$385**
•75MHz Pentium •810MB drive
•Quad CD std. on CT/option on CS

Targus Universal Case.....**$6**
Targus Leather Case.....**$9**
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PRICE & PERFORMANCE

MultiModem 2834LTE $179
- 28.8 V.34 PCMCIA modem
- serial accelerator
- Cool Jack

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MultiTech is one of the world's leading modem makers. But what you may not know is that MultiTech offers much more than data/fax modems. They also are one of the leading manufacturers of statistical multiplexers and have introduced muxes that can handle data, fax and voice traffic. In addition, MultiTech makes central site rack-mount modems.

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- internal V.34 data fax modem
- **serial accelerator card** with 2,000 character buffer compared to one character buffer on standard modems
- 10-year warranty

MultiModem MT2834ZDX....**$169**
- external V.34 fax modem
- adaptive line probing
- EIA extended auto mode
- 10-year warranty

MultiModem MT2834ZDX-C..**$219**
- V.34 fax modem
- **simultaneous voice**

TEXAS INSTRUMENTS

Extensa 450/450T ....$1449/$1929
Extensa 560CD/CDT$2689/$3649
Extensa 565 .....$3179
TM5100/5200 .....$3359/$4599

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Microtek E3 **or** IIHR.....$369/$699
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Relisys Taurus - 30 bit.....$679
Summasketch 12 x 12.....$269
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NEW...WITH VOICE!!!
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US Robotics

Sportster 28.8 Int/Ext....$179/$189
Sportster Vi 28.8 Int/Ext$189/$219
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Laserjet VL/OfficeJet ....$519/$579
Laserjet IV V/MV.....$1989/$2799
Laser 5SI **or** MX.....$2849/$3899
2MB/4MB/8MB upgr..$99/$149/$259
DeskJet 600/660C.....$239/$379
DeskJet 850C/1600....$509/$1399
4S/4C Scanner.....$329/$929

Canon

Canon BJC-610 ..*PRICE DROP-CAL*
Canon BJC-4100 ....*BEST PRIC*
BJC-30 **or** BJC-70.....$259/$33
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OL1200 ...	$1059	ML591	$58
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ML321	$429	ML3410..	$124

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Netware 3.12 5/10-user $619/122
Net 3.12 25/50-user..$1799/$239
Net 3.12 100/250-user$3399/499
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Net 4.1 50/100-user .$2249/$339
Lantastic Starter 6.0 .....$21
Lantas 6.0 5/10-user ....$319/$56
3 Com EtherLink III.....$9
3 Com Ether 5/20-pack .$399/$141
Intel Pro TP 5/20-pack..$349/$124
Intel Pro Flash 5/20-pack .$399/141
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DX1795.....$669

GREAT VALUE

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- 1600 x 1280 non-interlaced
- .28mm dot pitch
- auto-synch 50-120Hz vertical
- auto-synch 30-82KHz vertical

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The most vivid color and black and white printing of any office printer in its class .....*NEW LOWER PRICE!*

720 dpi color **resolution** produces the finest color images which are difficult to distinguish from a photographic image.

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- 720 x 720 dpi with Microdot technology.....*CALL*

New lower prices!!!

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- 360 dpi color resolution.....$239

Stylus Color XL.....*CALL*

Thousands of printers in stock!

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FX2170/LQ2170.....*CALL/CALL*
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Action Laser 1400.....$469
- True 600x600 dpi resolution
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- 540MB removable drive

Epson scanners!!!
Photo PC.....*CALL*
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- 30-bit color • 1600 dpi

ES-1200 Professional.....$1069
- 30-bit color • 2400 dpi

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NOKIA

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47X.....$979 445X.....$1859

NANAO

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A 64-bit graphics accelerator delivering full-screen video playback
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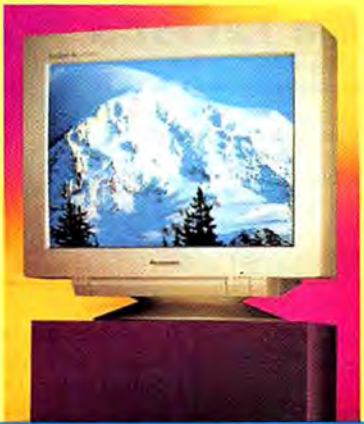
- 1280 x 1024 ni
- MPRII
- .27mm dot pitch

PanaSync S17.....$689
- 1280 x 1024 ni
- MPRII
- .27mm dot pitch
- 3-year limited warranty & 1-year on-site replacement



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PanaSync/Pro C2192P $1669
- 21" flat square
- 1600 x 1280 ni
- .25mm dot pitch
- Agras coating
- DQ-DAF gun
- 3-year limited warranty & 1-year on-site replacement

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21" MultiSync XP21	$2137

SONY

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15" CPD-15SX1	$429
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Multiscan 17SFII	$879
Multiscan 17SEII	$1079
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PGS 17"	$649

CTX

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14" 1451CLR-1	$255
15" 1565D1-1	$369
17" 1765GME-1	$669
17" 1785GME-1	$739
20" 2085-1	$1199

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17" PanaSync 1792P	$849
21" PanaSync 2192P	$1679
17" PanaSync S17	$699

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15" DX1595	$379
17" DX1795	$709
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Stealth 64 Video DRAM* 2001 Series 2MB	$225
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ATI TECHNOLOGY

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Graphics Pro Turbo 2MB ISA/VLB/PCI	$329
Graphics Pro Turbo 4MB ISA/VLB/PCI	$459

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Graphite Terminator 64 DRAM 2MB VLB/PCI	$169
Graphite Terminator Professional2MB VLB/PCI	$279
Graphite Terminator Professional4MB VLB/PCI	$429

Modems/PC Cards

HAYES

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PC Card Optima 28.8 V34 +FAX 14.4 with EZJack™	$289
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ACCURA 288V.FC+FAX int/ext	$169/$199
OPTIMA 288 V.FC+FAX int/ext	$369/$429
OPTIMA w/Voice Mail 14.4/28.8	$369/$429
ESP Communications Accelerator	$75

US ROBOTICS

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Sportster 14.4 PC Card	$175
Sportster 28.8 int/ext	$185/$199
Sportster 28.8 PC Card w/Data View	$289
Courier 28.8 PC Card w/Data View	$399

CREATIVE LABS

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ModemBlaster 28.8 External	$175
ModemBlaster 28.8 PC Card	$239

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PC Card 28.8/14.4	$28
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NetSurfer 28.8 Modem	$21
WeSurfer 14.4 Fax Modem	$9
.Wav Jammer 16-bit Stereo Sound	$21
Bus Toaster SCSI-2 Adapter Card	$18

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V.34 28.8/14.4 Data/Fax int/ext	$155/$16
ProClass PC Card 14.4/14.4	$14
ProClass PC Card 14.4/14.4 w/EZ Port retractable connector	$14
ProClass PC Card 28.8/14.4	$27
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DFX-5000+/8000	$1395/$2399
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BJC-70	$354
BJC-4100	$379

BROTHER

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HL-960/HL1260	$989/$1219
MFL-4500 ML	$959

LEXMARK

Winwriter 150C	$315
Color Jetprinter 1020	$219
Color Jetprinter 2070	$499
Optra E	$569
Optra E Plus	$1129
Optra R+/OptraR+	$1449/$1649
Optra Lx+	$2249
Optra Lxi+	$2929
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KX-P3124	$315
KX-P3626	$389
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NEC

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MultiSpin 6Xi	$345
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CREATIVE LABS

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SoundBlaster Value CD 4X	$299
Discovery CD 4X PNP	$279
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DIAMOND

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SONY

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SRS-PC40 Speakers	$7
SRS-PC91	$13
SRS-PC3000 Speakers	$19
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CSD 760S (Quad SCSI) CD-ROM	$28
PRD 150 Portable CD-ROM	$34

ADS

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5000C Pentium 90, 10.4" Dual Scan, 810MB	$3349
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EDITED BY CHRISTINA WOOD

Consumer Watch

In Search of PC Bargains

BY ROBERTA FURGER

When was the last time you went shopping for a new PC? I don't mean just reading reviews or thumbing through the ads in computer magazines. I mean actually getting in your car and driving around town to check out the selection, price, and service at local stores. Well, I did it recently—and let me tell you, it's gotten pretty wild and woolly out there.

I visited six retail stores in the San Francisco Bay Area representing a cross section of the retail establishments selling PCs today: home electronics stores Circuit City and The Good Guys, computer superstores CompUSA and Computer City, and office supply superstores Office Depot and OfficeMax. Pen and notepad in hand, I took an inventory of the stores' offerings and prices, quizzed their sales staffs for information and recommendations, and asked about important extras like extended warranties, optional service plans, and credit options.

The results were surprising. I'll offer detailed critiques of each emporium a little later, but first some general observations: Selection varies *considerably* across stores. Even when two outlets carry the same line—say, Digital's Starion PCs—they may not offer the same models. This makes it tough to compare prices, and next to impossible to take stores up on their touted price-protection guarantees. And thanks to spifs (special cash premiums that are given to salespeople for selling certain goods) or other special deals, the store with the best price on one product doesn't necessarily offer a great deal on another. Some examples: Circuit City sold an NEC Ready 7022 (Pentium-75, 8MB of RAM, 1.08GB hard drive, 4X CD-ROM drive) for $200 less than CompUSA but charged $100 more than that computer superstore for Hewlett-Packard's Pavilion 7050. An IBM Aptiva M71 (Pentium-133, 16MB of RAM, 1.6GB hard drive, 4X CD-ROM) was $100 more at Office Depot than at The Good Guys, but Office Depot had the lowest price on Compaq's Presario 7180 (Pentium-100, 8MB of RAM, 1.2GB hard drive, 4X CD-ROM).

I was most surprised by the deals that a shopper could pick up at the two office supply superstores I visited. Although the selection was not always as good—or as nicely displayed—as it was in other stores, the prices were very competitive. And if you're a small-business owner or work out of a home office, you can get just about anything else you'll need for your office at the same time.

Though I spent more than an hour in each store, I had to ask for help—several times in some cases—in all except Circuit City. The knowledge level of the salespeople varied considerably—from the clerk at Office Depot who recommended an IBM Aptiva but couldn't say why, to the salesperson at CompUSA who spent 15 minutes coaching me on how to be a smart consumer ("If there's anything wrong with

WILLIAM DUKE

the computer when you get it home, take it back—chances are it's a lemon").

For some general advice on handling this daunting shopping experience, see my checklist below. Now on with the store-by-store evaluations.

CIRCUIT CITY

The first thing you're struck by when you walk into the store is its huge selection of computers—26 different models, from Apple, Compaq, Digital, Hewlett-Packard, IBM, NEC, and Packard Bell. The second thing you notice is the hungry salespeople, who hover around the displays like piranha. With a few exceptions, prices were comparable to those of other stores. One in-store special was particularly attractive—buy any PC system, including monitor, and you get a free low-end color printer or $150 off the printer of your choice. The biggest plus: Unlike many other stores, Circuit City had fairly complete displays. Most computers were on and usable, and manufacturer spec sheets were available, providing detailed information about the warranty, hardware, and software.

THE GOOD GUYS

This home electronics store hasn't been selling computers for as long as competitor Circuit City—and it shows. There were fewer PCs to choose from, and the displays were cramped and often bereft of supporting materials. It was sometimes difficult to figure out pricing, since the tags were often hidden by the PCs themselves. As it turns out, though, the store had the cheapest price on just about every model it sold in common with other retail outlets: an entry-level Presario for $200 less than CompUSA, Computer City, or Circuit City, an Aptiva for $100 less than Office Depot or CompUSA, and an Aspire for $50 less than Office Depot. It's too bad the selection was so limited: two Compaq Presarios, two IBM Aptivas, five Acer Aspires, and eight Packard Bell Legends (including a huge tower unit—a Pentium-133 with 32MB of RAM for a whopping $3299).

COMPUSA

As expected, selection was good at this computer superstore. Acer's Aspire was the only major brand not represented. Unlike many other stores, CompUSA organizes its displays by brand, rather than by processor. Unless you're set on buying from a particular manufacturer, this makes it harder to compare prices across brands. Prices were all over the map: a Pavilion for $100 less than Computer City; a Presario for $200 more than Office Depot. Every store offers extended warranties—it's where they make the big bucks—but CompUSA really pushes its plan, prominently posting the warranty costs with just about every PC sold. My biggest complaint: Literature was available for only 5 of the 27 PCs on display. I had writer's cramp by the time I left.

COMPUTER CITY

Though the Computer City I visited was not as big as CompUSA, it had a larger selection of systems, including several from

CHECKLIST

Some suggestions for PC shopping:

✓ If you're serious about comparison shopping, take a pen and paper with you and prepare to spend several days on the project.

✓ If possible, shop evenings instead of weekends. The stores are less crowded and the salespeople may be more inclined to spend time answering your questions.

✓ Collect all available literature. With the proliferation of brands and models, it can take more than an hour at one store just to write down prices and specifications. You'll save yourself a lot of time—and will have more information with which to evaluate offerings—if you bring an envelope along for product spec sheets. Just write the name of the store and the price on the sheet; you can sort things out when you get home. Unfortunately, not all stores maintain their displays, so be prepared to take notes on at least some products.

✓ Research your purchase ahead of time. Read reviews; call the PC manufacturers' product information lines and ask questions about the

(continued on page 306)

UPPER RIGHT: MARC ROSENTHAL; RIGHT: JAMES F. KRAUS

Feedback

Rough Times

Owners of Compaq Presarios flooded Compaq's America Online forums in January complaining of trouble getting through to the company's tech support department. And when they did get through, customers were required to fork over a credit card number to get any service. It seems that on January 1, Compaq began insisting on a credit card number from all callers to its tech support line—though not all callers are actually charged. Owners of Compaq's new line of computers—the 7200, 9200, and 9600 models—will be charged for all tech support questions that aren't directly related to a hardware defect.

Hefty Fees

Joseph Levy of Apopka, Florida, wrote to tell us about an unpleasant experience he had when purchasing a laptop PC from Maximus Computers. When he got his laptop, it didn't work correctly; a technical support person suggested replacing the hard drive. Levy was scheduled to leave the country with his new computer, so he told the technician that if the new hard drive didn't arrive in time for his trip, he would have no choice but to return the laptop. The hard drive did not arrive; Levy returned the computer.

TAKE NOTE: QVC online! Home shopping addicts can now get their fix via computer and iQVC—the digital arm of the QVC Shopping Network. It's available via the Microsoft Network.

Only after Maximus had gotten the system back was Levy told that he would have to pay a $570 restocking fee.

According to a Maximus representative, the firm's ad states that the 30-day money-back guarantee applies "only to Maximus advertised models." Levy's laptop had a larger-than-advertised hard drive. Because Levy was surprised by the restocking fee, Maximus offered to reduce the amount from 20 percent to 10 percent. Levy is still not happy about the fee.

AST, Compaq, Hewlett-Packard, Packard Bell, and clone maker U.S. Logic. Computers were neatly organized by processor, with signs directing buyers to each class of system (133- or 100-MHz Pentiums, for example). Literature was scarce, though, as was the sales staff. The salesperson who ultimately helped me kept apologizing for not knowing the inventory or pricing very well, noting that she had been traveling to other stores and was not up to speed on her store's offerings. I appreciated the honesty but would have preferred someone who could answer my questions. Prices weren't great, either. None of the PCs were priced lower here than identical units at other stores.

OFFICE DEPOT

This was the most crowded and least appealing store that I visited. PCs were packed into one narrow aisle—as were the customers trying to shop for them. There were three HP Pavilions, but I almost missed them entirely because they were in a different area. Literature was spotty, and the salespeople seemed uninterested in selling computers. I had to request that someone be called to the PC section twice before anyone showed up to answer my questions. There was one positive note, though: Prices were good. This store, in some cases, matched or beat the price listed for identical computers sold at all the other stores I visited. Too bad it was such an unpleasant place to shop.

OFFICEMAX

All in all, the selection here was unremarkable: There were only 14 PCs to choose from, 7 of which were from just one brand —Packard Bell. The salesperson seemed to know his stuff, but he didn't seem particularly interested in answering my questions. Displays were relatively complete, however, and prices were comparable to those of OfficeMax's competitors. The best deals here were the prices for peripherals. The store sells all the major printers, fax machines, and combination units. And the prices were better than those of just about anyone in town.

IT'S NOT EASY...

If it sounds like shopping for a new PC is hard work, it is. I left each store feeling exhausted and a little confused. It wasn't until I'd finished all my shopping and compiled a fairly detailed spreadsheet on each store that I knew where I could get the best deal. I haven't spent this much time researching a purchase since I bought a new car two years ago—and even that seems easier in retrospect.

As always, you can contact Consumer Watch *with questions or problems. See page 14 for contact information.*

CHECKLIST
(continued from page 305)

models you're interested in. Armed with that information, your store visits will be shorter and more productive.

✓Get to know the store. As PC companies begin charging more for support and shortening the warranties on their home PCs, your relationship with the store will become more important. Does it have its own repair facility? Does it have tech support staff? Does it offer an extended warranty? Is the warranty price competitive? Some stores will negotiate the price of the extended warranty in order to make a sale. Don't be bashful about haggling.

✓Most stores offer a 30-day price-protection guarantee. Use it. Watch the ads, make a few calls to check on prices, even after you've bought your PC. It's a hassle, but you could save a couple hundred dollars—a nice down payment on that color printer you've been eyeing.

TOP: WILLIAM DUKE; RIGHT: MARC ROSENTHAL

FEEDBACK CONTINUED

Down for the Count

Our Reliability and Service Monitor (see "PC Reliability and Service: Homeward Bound or Bound for Trouble?" in the March issue) repeatedly reports outstanding customer satisfaction with Micron computers. So when we got two letters in the same week complaining of a complete lack of service from Micron, we wondered what was up. Raymond Jones, Micron senior marketing manager, told us that before and during the Christmas season, there was a huge spike in hold times. The reason? People had lots of questions about upgrades and their new "toys." Jones assured us the hold time is back down to 4 minutes. When we called to confirm this, though, we waited over 20 minutes before getting through to technical support.

Home Page

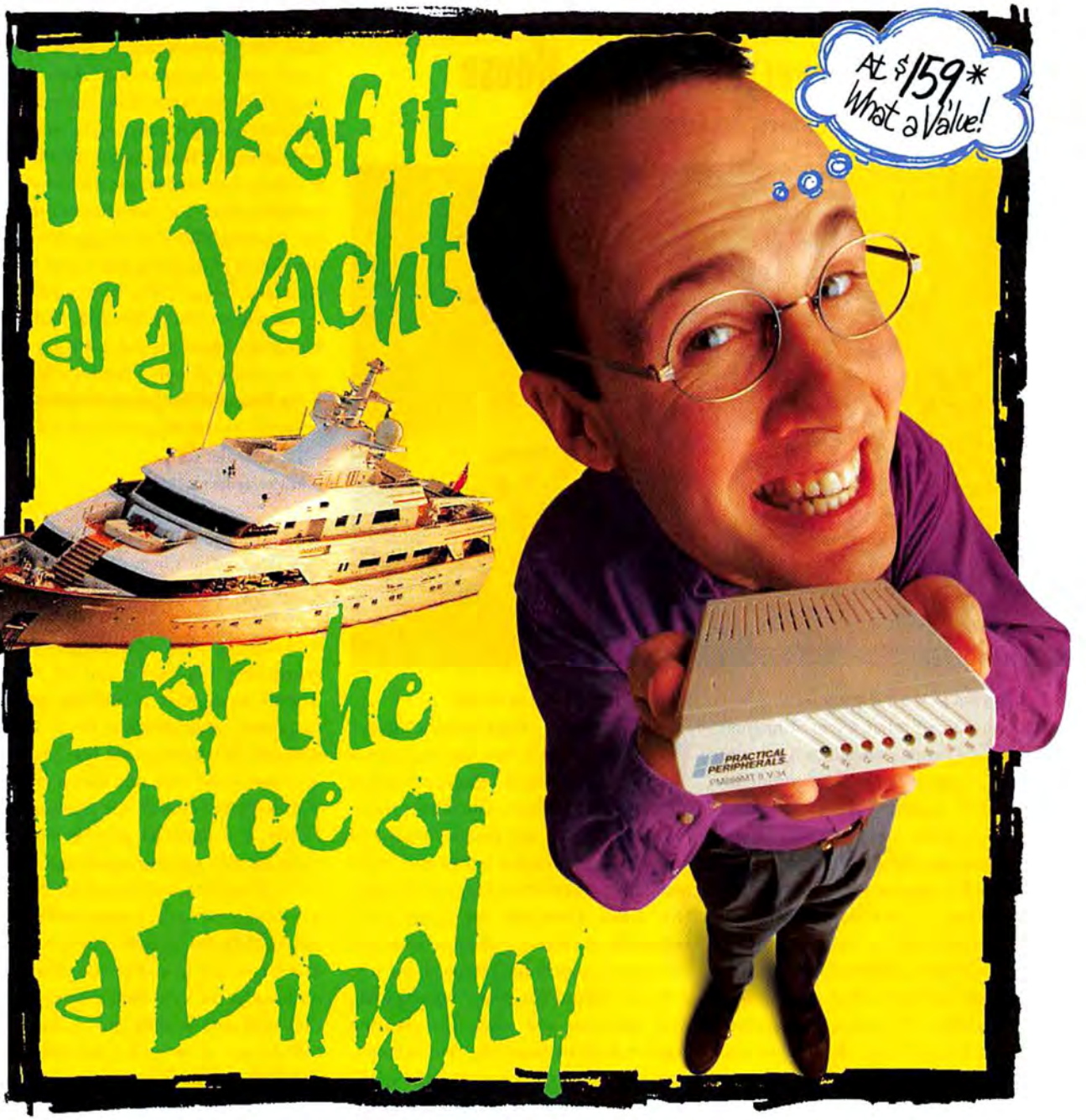
A new World Wide Web page from Hearst New Media gathers together a host of great home magazines—*Popular Mechanics, Country Living, Redbook, Good Housekeeping*—as well as new content that's updated daily. It's very complete. Check it out at http://homearts.com/.

Multimedia Frustration

Anyone who's bought a CD-ROM package with the idea of enjoying a little educational R&R, only to spend hours trying to get the thing to work, knows that there is a rampant compatibility problem with multimedia. In an effort to stem the flow of product returns and ease consumer frustration, the Interactive Multimedia Association has launched an industrywide campaign to help people match CD-ROMs to their computers. The CD Match campaign will offer free software that enables you to determine the capabilities of your multimedia computer. The campaign also promotes a uniform labeling system for CD-ROM packages. The idea is that you will take a printout of your computer's capabilities—determined by the software—to the store and match it to the label on the title's package. The software is available at ftp://ftp.ima.org/pub/cdmatch. Let's hope it works.

By Christina Wood

Isn't It Time You Bought The Value Priced Practical Class 288 Modem?



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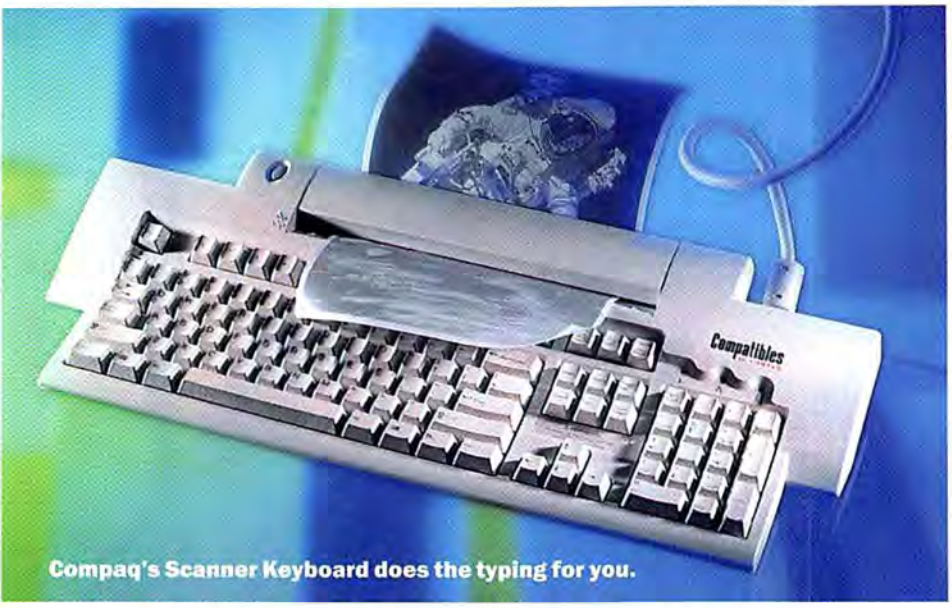

Compaq's Scanner Keyboard does the typing for you.

A RADICAL KEYBOARD

Need relief for tired fingers? Compaq's Scanner Keyboard can do the work of getting information off paper and into a PC. It has a built-in gray-scale scanner based on the same technology as the Best Buy Visioneer PaperPort Vx scanner that's reviewed in this issue (see "Low-Cost Scanners: Up Close and Personal"). The keyboard—which is included with Compaq's Presario 7232 system as well as sold separately—plugs into both a PC's keyboard port and serial port. Once I've fed documents into the scanner, its slick software lets me easily organize scanned files into on-screen folders, fax them, or convert them into editable text. The Scanner Keyboard is only a little bigger than a typical keyboard, and it puts the scanner right at my fingertips. Scanner feature aside, this keyboard has a pleasing feel that's much more solid than that of the bargain-basement one that came with my PC. —*Harry McCracken*

- **Compatibles by Compaq Scanner Keyboard** $349; Compaq Computer Corp.; 800/345-1518. Grade: A

Reader service no. 789

HISTORY THAT LIVES

Every high-school student knows a time line can turn a roomful of inquisitive minds into a den of flat-liners. Our Times transforms that linear tool into a virtual 3-D prism for exploring the recent past. With mellifluous narration by James Earl Jones, Our Times transcends the "great men" and politics-and-government perspectives that kept history boring. Science, the arts, and pop culture get nearly equal billing with elections and wars. Eye-pleasing graphics facilitate searches. This inclusiveness, however, sometimes results in a *USA Today*–style surface skimming that entertains but avoids deeper questions and answers. —*Derk Richardson*

- **Our Times Multimedia Encyclopedia of the 20th Century** $69.95; Vicarious Inc.; 800/465-6543, 415/610-8300. Grade: B+

Reader service no. 790

THIS AIN'T DISNEYLAND

Enter the Midway, a bizarre collection of attractions hosted by some of the freakiest freaks around. In this second CD-ROM from cult band The Residents and artist Jim Ludke, you'll travel through a dark place. In this beautifully rendered, broken-down playland, something is amiss, and you have to find out what it is and fix it—and the clock is ticking. You take on the roles of various weirdos, switching characters to unravel the mystery. This is an antigamers game, the *X-Files* of the computer world. It's not clear what you're doing, why you're doing it, or where you're headed, but keep switching characters, and you'll get somewhere (or die trying). —*Gabrielle Mitchell*

- **The Residents Bad Day on the Midway** $49.95; Inscape/WarnerActive; 800/693-3253. Grade: A+

Reader service no. 791

WACKY WORD FUN

The Great Word Adventure did the impossible—it got two 6-year-old girls to sit still for over an hour. They sang and played word games with Lil' Howie and his friends. There's no shortage of language software for primary-grade children, but this title is different. It's funny—and fun, thanks in large part to the irreverent humor of comedian Howie Mandel, the voice of Lil' Howie. But don't let the fun fool you. Eight learning activities cover such skills as word recognition, categorization, rhyming, synonyms, and more. Parents will appreciate the ability to set each activity to one of five levels and to add to the vocabulary. And just for the kids: After signing in using their real names, they can choose to be called one of several nicknames. My daughter and her friend chose Angel. My son's choice? Barf Head. My only criticism: Animations and transitions were choppy on my Pentium-75. —*Roberta Furger*

- **The Great Word Adventure** $39.99; 7th Level; 800/884-8863. Grade: B+

Reader service no. 792

MIND READING MADE EASY

Want to figure out what makes your boss tick or what ticks off your spouse? It's easy: With Human Dynamics: The Ultimate Voyage, you can discover how your personality in-

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teracts with four other personality types. Helping people gain insight into the way they behave is hard work (it's also my stock-in-trade—I'm a marriage and family therapist). But with this CD-ROM, you too can learn how we view and respond to the world. After the program determined my personality type, I checked out five worlds, where I got to watch personalities interact. The disc is free of psychobabble, instead using sharp dialogue with rock-solid advice. I was so impressed I'd recommend it to couples who want to learn more about themselves. —*Steve Bass*

- **Human Dynamics: The Ultimate Voyage** $49.95; Edudare; 800/779-4504, 310/822-8615. Grade: A

Reader service no. 793

LAWYER IN A BOX

While the eighties produced a frightening glut of lawyers, the nineties have been spawning an equally scary excess of legal advice software. If you're feeling litigious but don't want to spend big bucks on a lawyer, Home Legal Advisor offers a wealth of sound counsel. Besides the handy Kiplinger's Handbook of Personal Law and in-depth Home Legal Topics Handbook, there are over 65 legal documents and letters. You get clear explanations on tackling prickly legal topics like employment, estate planning, and even marriage (or more accurately, divorce). Home Legal Advisor touches on some subjects other software packages ignore, such as the legal and financial obligations of running a home office. But I do have a few complaints: There is no legal dictionary or list of addresses of key agencies such as the Better Business Bureau. Plus, it isn't clear when it's safe to rely on the software and when it's prudent to hire a lawyer. Home Legal Advisor is no Johnnie Cochran, but it is a handy and reliable legal primer. —*Leslie Crawford*

- **Kiplinger's Home Legal Advisor** $29.95; Block Financial Corp.; 800/813-7940, 816/751-6000. Grade: B+

Reader service no. 794

SAY CHEESE!

Most CD-ROM titles for young children fit into one of several categories: early learning, music, art, or animated storybooks. But Marty and the Trouble With Cheese defies categorization. It's for very young children—2- to 4-year-olds who can't read and haven't mastered mouse or keyboard. Kids travel through a story about a young mouse in search of a hunk of cheese, by talking and blowing into a microphone. Holler "Wake up, Marty!" and the little mouse pops up his head. Blow into the microphone and send Marty sailing on a small boat. Only two (minor) criticisms: The sound was spastic at times and the story is short—only 11 sequences. Still, my kids laughed their way through Marty's adventure, starting the story over at least half a dozen times. —*Roberta Furger*

- **Marty and the Trouble With Cheese** $34.95 (includes microphone); Maxis; 800/526-2947. Grade: A+

Reader service no. 795

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Useless Stuff at Your Fingertips

Some tasks aren't worth doing on the Internet.

BY LINCOLN SPECTOR

It's amazing what you can do on the Internet! But why would you want to? As often as not, it's faster, easier, and cheaper to turn off your computer, pick up the phone or a newspaper, and get a job done the old-fashioned way.

At least that's what I found as I struggled to do various tasks on the World Wide Web, and I was getting paid for my troubles. If you're not, don't waste your time trying to do the following on the Net.

ORDERING PIZZA

In the movie *The Net*, Sandra Bullock orders pizza by modem. I set out to see if I could do the same, preferably without stumbling upon a homicidal corporate plot for world domination.

But how do you find a local pizza place on the Net? Using various search tools, I looked for anything containing the words *pizza* and *Berkeley* (my hometown), and found enough useless information to fill the Congressional Record. There was a restaurant review from Boston (where there's a Berkeley Street), an article on "The Coming Software Shift," virtual pizza parlors waiting to send you mouthwatering bit maps, and countless links to the same list of lame pizza-ordering jokes ("Tell them to put the crust on top this time"). I had to dig deep for real pizza parlors and then check to see what cities they would deliver to. Walking your fingers through the Yellow Pages is easier.

When you order pizza online, it will probably be delivered that way.

READING A BOOK

If you suddenly want to read *War and Peace* but loaned your copy to a precocious preschooler, you can go to **http://solar.rtd.utk.edu/friends/literature/war_and_peace**, where you'll find all 363 chapters on separate pages. Also on the Web are *Huckleberry Finn*, *Silas Marner*, and other classics.

These online masterpieces may be great study tools for students (you can, after all, search them), but if you truly enjoy literature, experiencing it online will squelch your enjoyment more thoroughly than the worst eighth grade English teacher.

Where do you like to read a good novel? In an easy chair? In bed? On the train to work? At your desk staring at a monitor? Okay, you can download and print the book, but think about what that will cost you in time, paper, and toner cartridges.

BUYING MOVIE TICKETS

Thanks to a service called MovieLink (**http://www.movielink.com**), you no longer have to wait in line at the box office to buy your movie tickets. For an extra charge, you can instead wait to pick them up.

You can also use MovieLink to check local theaters and show times, although a newspaper takes much less time. And MovieLink won't give you all the information that a paper will. It won't, for instance, tell you which theaters have digital sound.

Once you've selected a movie and time, you can buy your tickets, with MovieLink charging your admission—plus a $1.25-per-ticket service charge—to your credit card. After you wait for computers around the world to check your credit rating, you print a confirmation page to take to the theater, where you're to "Pick up your tickets at the ATM machine or will-call window."

My local multiplex didn't have an ATM or will-call window, so I had to wait in line at the box office after all. The ticket seller was mystified that the paper I gave him didn't look like money, and left me waiting three times while he retreated to the back office. In the end, I was permitted to see the movie, but MovieLink billed me for three tickets—plus three service charges—instead of one. And no one knew who I should call for a refund. (Lest you think my experience was unique, the only other person I know who bought tickets through MovieLink was also overcharged.)

Okay, if you absolutely must go to the big show when it's likely to sell out, an extra $1.25 and a hassle can guarantee you tickets—even if you may get overcharged for them. Otherwise, check the newspaper and buy your tickets at the door.

The Internet lets us do things with our computers that once required a pencil. But don't throw away that sharpener just yet.

Lincoln Spector is a senior associate editor for PC World. *See page 14 for contact information.*

MARC ROSENTHAL

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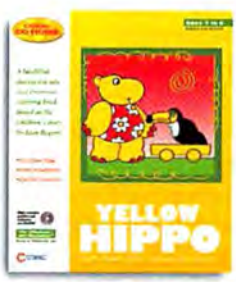

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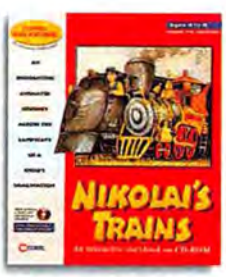

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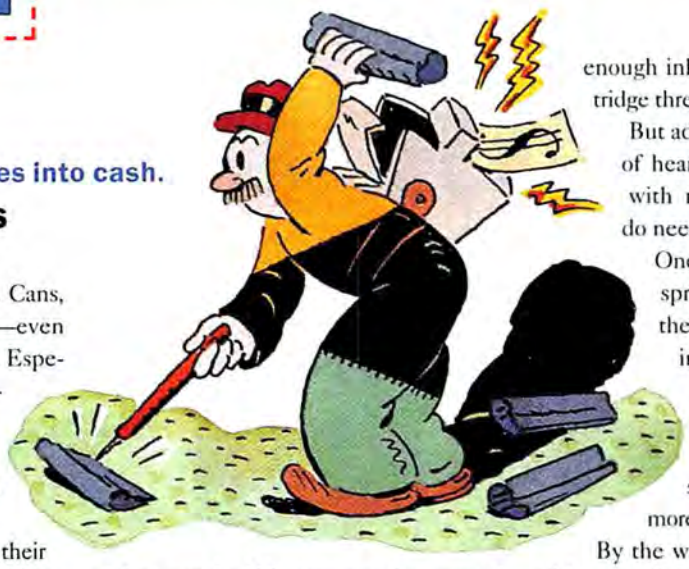

Okay, I'll admit it: I recycle. Cans, bottles, newspapers, paper—even laser and ink jet cartridges. Especially laser and ink jet cartridges, because aside from being good for the environment, recycling printer consumables can save me a good deal of money.

I thought everyone was recycling their cartridges, but a recent straw poll of Pasadena IBM Users Group members indicated otherwise. Many people worry that recycled cartridges might leak and damage their printer, or that ink jet refill kits are messy and hard to use. Worse, many think that using recycled materials would void their printer's warranty.

Well, as the song goes, it ain't necessarily so. I've been recycling cartridges for years with no ill effects. And I haven't voided a warranty yet.

What about quality? I've compared output from a new Hewlett-Packard cartridge against a printout from a recycled cartridge, and I can't tell the difference.

But boy, can I see the difference in price! A new HP cartridge costs roughly $70, while a recycled one sets me back just $50. Circle Inc., the company I use, ships each cartridge with a prepaid mailing label for returning it when empty. (A quick disclaimer: The owner of Circle was once a member of my user group, but I receive no discount on my supplies.)

Another thing: Judging from my own experience, recycled cartridges last longer. I find that a reused cartridge lasts about four months, compared to three for a new one. Of course, your mileage will vary, depending on how much you use your printer and how your pages look.

Most companies guarantee that if the cartridge doesn't work right, they'll replace it. And the ones I talked with said there's no wait—they'll send a replacement immediately, getting you up and running right away. An HP representative assured me that using a recycled cartridge won't void your warranty, although if a cartridge damages your printer, you're out of luck. Honestly, I wouldn't worry—it's never happened to me. In fact, Circle guarantees that if a cartridge leaks, they'll repair the printer themselves.

If you still prefer new cartridges but feel guilty about the environment, you can always send your spent cartridges to HP for reuse. HP supplies a recycling kit including a guide, box, and prepaid UPS shipping label. There's no financial reward, but it reduces the size of your local landfill.

JETS OF INK

Squirting new ink into a used ink jet cartridge is a lot messier—and scarier—than slipping a recycled cartridge into a laser printer. I decided to test this scientifically—I went out and got guinea pigs. I talked my wife into refilling a cartridge on her HP DeskJet 500, and persuaded my mother to try it on her old Canon BJC-600e color printer. But I didn't get away with much—they both insisted I get my hands dirty along with them.

Was it a rich, rewarding experience? Well, it's no worse than a trip to the dentist—and a good bit cheaper. Renewable Resources manufactures a kit of black ink for the HP DeskJet 500 that sells for around $20 discounted, about what you'd pay for a new cartridge. And there's enough ink in the kit to refill a cartridge three times.

But adding ink isn't for the faint of heart. Unlike experimenting with new software, you really do need to read the instructions. Once you're ready to go, spread lots of newspapers on the kitchen table (don't work in a carpeted area), and wear latex gloves. Don't overfill the cartridge—it may leak. And play it safe; don't refill a cartridge more than four times.

By the way, just using refilled cartridges won't invalidate your warranty—provided they don't cause any damage. But—and it's an important but—if there is damage, the warranty's void. My suggestion? Wait until after your warranty is up before using refill kits.

One last tip: Instead of using new paper for printing rough drafts, print on the blank side of used paper. This won't damage your printer, and it will save you money.

Recycling is worth the time. Besides saving some money, I'm actually putting that "Think globally, act locally" expression into action. And that feels good.

- **Laser cartridges** prices vary; Circle Inc.; 800/635-5858, 800/359-3306 (fax).
  Reader service no. 629
- **Reinking supplies** prices vary; Renewable Resources; 800/734-6548, 718/966-6980, 718/966-8464 (fax).
  Reader service no. 628

Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 14 for contact information.

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ILLUSTRATIONS: TOP LEFT, MARC ROSENTHAL; BOTTOM RIGHT, JOHN HERSEY

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- 256KB Cache
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- 256KB Cache
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PC MAGAZINE EDITORS' CHOICE
December 5, 1995
Dell Dimension P100t

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December 5, 1995
Dell Dimension XPS P133c

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