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WHO MAKES THEM?

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11
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98.11

BREAKTHROUGH PRICING ON COMPLETE 450MHZ SYSTEMS STARTING AT JUST $1,799

Model Name	Millennia® C300	Millennia 350	Millennia 400	New! Millennia 450	New! Millennia 450 MAX
Processor	Intel® Celeron™ processor 300MHz	Intel Pentium® II processor 350MHz	Intel Pentium II processor 400MHz	Intel Pentium II processor 450MHz	Intel Pentium II processor 450MHz
Cache	128KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache
RAM	32MB SDRAM	64MB 100MHz SDRAM	64MB 100MHz SDRAM	64MB 100MHz SDRAM	128MB 100MHz SDRAM
Hard Drive	4.3GB Ultra ATA hard drive	10GB Ultra ATA hard drive	10GB Ultra ATA hard drive	10GB Ultra ATA hard drive	14.4GB 7200 RPM Ultra ATA hard drive
Monitor	15" Micron 700Vx monitor (15.9" display)	17" Micron 700Vx monitor (15.9" display)	17" Micron 700Vx monitor (15.9" display)	17" Micron 700Vx monitor (15.9" display)	19" Micron 900Vx monitor (18" display)
DVD/CD-ROM	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	DVD-ROM drive and decoder card***
Modem	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**
Graphics	nVidia Riva 128, 4MB SGRAM 3D AGP graphics	nVidia Riva 128, 8MB SGRAM 3D AGP graphics	nVidia Riva 128, 8MB SGRAM 3D AGP graphics	nVidia Riva 128, 8MB SGRAM 3D AGP graphics	Real 3D Starfighter i740, 8MB AGP graphics
Sound System	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound
Warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty
	$1,199 $42/mo. TechRefresh Bus. Lease, 36 mos.**	$1,649 $58/mo. TechRefresh Bus. Lease, 36 mos.**	$1,749 New Low Price! $61/mo. TechRefresh Bus. Lease, 36 mos.**	$1,799 New Low Price! $63/mo. TechRefresh Bus. Lease, 36 mos.**	$2,899 New Low Price! $101/mo. TechRefresh Bus. Lease, 36 mos.**

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Model Name	TREK™2 266	New! TREK2 300	GoBook™ 233	GoBook2 266	New! GoBook2 300
Processor	Intel Pentium II processor 266MHz	Intel Pentium II processor 300MHz	Intel Pentium processor with MMX™ technology 233MHz	Intel Pentium II processor 266MHz	Intel Pentium II processor 300MHz
Cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache
RAM	64MB SDRAM	64MB SDRAM	32MB EDO DRAM	32MB EDO DRAM	32MB EDO DRAM
Hard Drive	3.2GB hard disk drive (removable)	3.2GB hard disk drive (removable)	2.1GB hard drive	3.2GB hard disk drive	3.2GB hard disk drive (removable)
Monitor	14.1" XGA TFT display	14.1" XGA TFT display	12.1" SVGA TFT display	12.1" SVGA TFT display	12.1" SVGA TFT display
CD-ROM	24X CD-ROM (dedicated bay)	24X CD-ROM (dedicated bay)	24X modular CD-ROM drive	24X modular CD-ROM	24X CD-ROM (dedicated bay)
Graphics	4MB AGP graphics accelerator	4MB AGP graphics accelerator	2MB/128-bit graphics accelerator	2MB/128-bit graphics accelerator	2MB/128-bit graphics accelerator
Sound System	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	16-bit stereo/Wavetable sound	16-bit stereo/Wavetable sound	16-bit stereo/Wavetable sound
Warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty
Upgrades	128MB SDRAM for $199	128MB SDRAM for $199	Add SuperBase battery for $299	Add SuperBase battery for $299	Add SuperBase battery for $299
	$2,599 $91/mo. TechRefresh Bus. Lease, 36 mos.**	$2,799 $98/mo. TechRefresh Bus. Lease, 36 mos.**	$1,999 New Low Price! $70/mo. TechRefresh Bus. Lease, 36 mos.**	$2,699 $94/mo. TechRefresh Bus. Lease, 36 mos.**	$2,999 $105/mo. TechRefresh Bus. Lease, 36 mos.**

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1. Power users have long known that Micron systems are among the absolute best in the industry. The editors of *PC World* Magazine just ranked Micron's Millennia desktop line as the #1 Power Desktop, #1 Home Desktop & #1 Consumer Desktop while *CNET* just named the Micron GoBook the #1 UltraPortable on the market today.

#1 RANKING FOR CUSTOMER SATISFACTION

2. Micron's customers are really satisfied — just ask them. In fact, the influential readers of industry bible *PC Week* ranked Micron desktops #1 in total customer satisfaction.‡‡ And *Home PC* readers voted Micron #1 in providing the industry's best service and support.

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- *PC World Magazine*, August '98

Pay Less.

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- PC World, "Best Buy," August 98

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But an award-winning computer by itself is not enough. A computer can't work all night unless you do. A computer can't grab opportunity and mold it into success. To do that, you need more than bleeding-edge technology. You need a company that's been recognized for providing both outstanding products as well as fantastic support. Put simply, you need a PC partner that facilitates your success.

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PC WORLD

NOVEMBER

VOLUME 16 ◆ NUMBER 11

COVER STORY

97 PC RELIABILITY AND SERVICE: WHO CAN YOU TRUST?

CONSUMER ISSUES

Did your new PC get delivered DOA? Or did it boot up without a hitch? Was customer service unresponsive? Or did you get quick help from competent support reps? Only a handful of PC makers sell dependable systems and provide effective service and support. Our in-depth survey of over 6800 *PC World* readers tells the real story behind the companies that make your business, home, and notebook PCs.

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FEATURES

122 ONE DESKTOP, TWO BROWSERS, 72 TIPS

HOW-TO We know. Internet Explorer doesn't have everything you need, and Netscape Navigator doesn't always work the way you want. So why pick just one? Follow our advice to get the most from both browsers.

143 BREAKING THE SOUND BARRIER

REVIEW Forget the tinny transistor-radio sound coming out of your computer. New sound card technologies are producing some standout boards for both budget-minded business and high-end entertainment audio.

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154 NOTEBOOKS FOR THE LONG HAUL

REVIEW Given how much laptops cost, shouldn't you insist on one that won't be obsolete or beaten up after a year's use? Nine companies sent us their most durable notebooks so we could find out which ones will truly go the distance.

COVER *Illustrations by Jeff Berlin*

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SPECIAL REPORT

THE WEB AND YOU

169 POINT, CLICK, BUY: THE BEST ONLINE GIFT SHOPS

Web storefronts are ready to sell you CDs, videos, books, food, and wine—without the holiday crush. We report our best and worst online shopping experiences.

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ICONS: JEFFREY PELO

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58 NT 5: RUNNING LATE, WORTH THE WAIT?
The still-unreleased NT 5 promises a lot to like, from a customizable interface to improved security. But you'll have to wait until late 1999.

63 SOFTWARE, NOT CONGRESS, MAY BLOCK SPAM
Antispam bills remain stalled in Congress. But new technology to block junk e-mail may provide relief.

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64 DIGITAL BOOKS
Electronic books hit shelves with high price tags and limited selection.

66 AMD INSIDE YOUR NOTEBOOK
Umax's AMD-based, sub-$1800 notebook beats the price of comparable PII portables. If only performance were better.

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70 TWO MORE REASONS TO KISS YOUR FLOPPY GOOD-BYE
The next generation of floppies—Sony's fast 200MB HiFD and Caleb's $79 UHD144—could give the Zip a run for its money.

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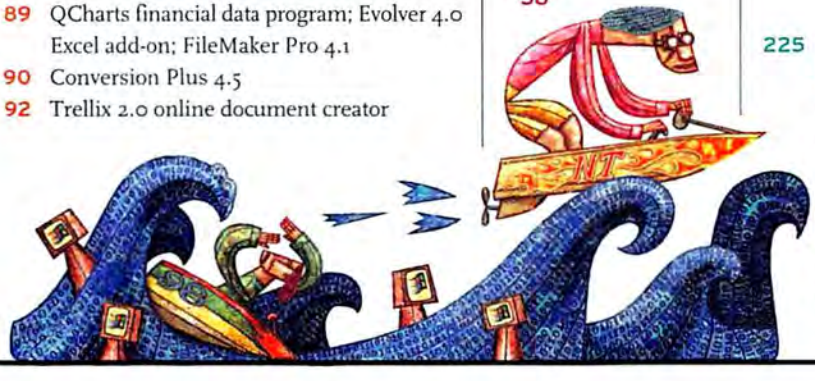

TOP 100

185 PII-450 PRICES: LOWER THAN YOU'D EXPECT
TOP 100 You always have to pay a premium for top-notch power, right? Not this month. The Top 20 charts feature six PCs with Intel's new 450-MHz chip—and not one costs over $3000.

188 POWER DESKTOPS
TOP 20 Led by Dell's feature-rich XPS R450 and Micron's superfast Millennia 450 Max, Pentium II-450s stake out some prime real estate on the power chart.

202 BUDGET DESKTOPS
TOP 20 Celeron-333s debut in two flavors: loaded, like Compaq's Deskpro EP C333, and basic, like Unicent's Avanta E333.

210 NOTEBOOKS
TOP 10 The first systems out of the gate with Intel's mobile Pentium II-300 chip surprised us by performing 10 percent faster than PII-266 notebooks. King of the hill: Dell's Latitude CPi D300XT.

214 HOME PCs
TOP 10 Home PCs with new low-cost processors from Intel and AMD have spawned super deals on surprisingly powerful systems, including CyberMax's $1389 PowerMax H1.

217 WORKGROUP PRINTERS
TOP 10 The latest monochrome workhorses fail to dislodge the last chart's picks. The lone exception: Lexmark's well-rounded $999 Optra S 1625.

223 15-INCH MONITORS
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225 GRAPHICS BOARDS
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227 INTERNAL MODEMS
TOP 10 Archtek's $89 SmartLink 5634BTS voice modem speeds its way onto this month's chart.

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262 **ANSWER LINE**
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270 **INTERNET TIPS**
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Create fancy monograms in Word; make margin notes in Word, WordPerfect, and Word Pro.

280 **SPREADSHEETS**
Store custom number formats in an Excel template, navigate Excel sheets.

284 **HARDWARE TIPS**
Get automated PC maintenance with Windows 98 utilities, find PC resource and configuration info fast.

290 **UPGRADE GUIDE**
Set up your PC to edit video.

@HOME

241 **@HOME PRODUCTS**
Ditch those rinky-dink speakers and crank up the volume. New speakers produce some kick-butt 3D audio.

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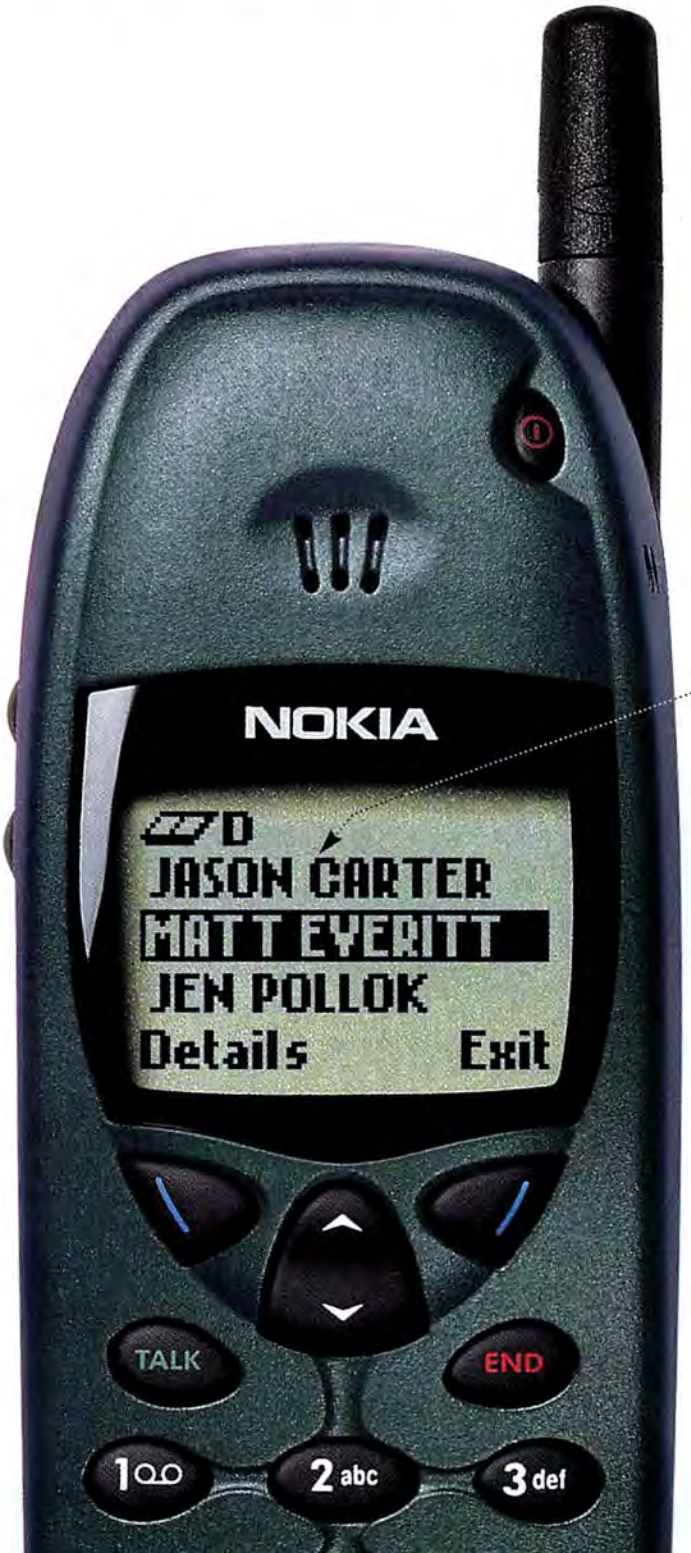

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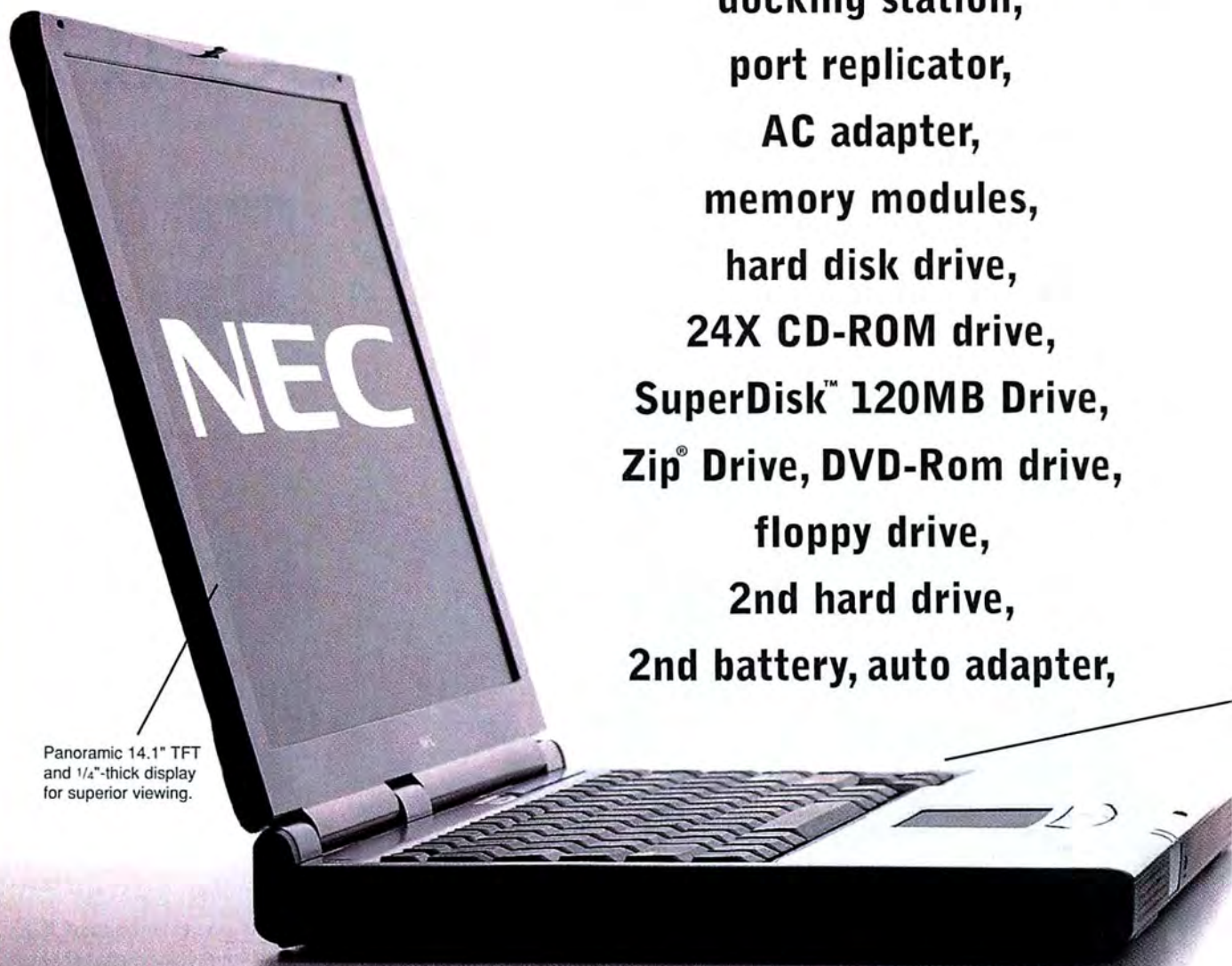

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PC Magazine Editors' Choice, August 1998 Blockbuster Issue.

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Which PC Makers Can You Trust?

AN UNSOLICITED AUDIO .WAV file circulated around *PC World*'s editorial offices recently, and we listened to it in a kind of fascinated horror. Its content (censored appropriately):

"Hello, my name is Stephen [X.], and I sent my [brand-name] laptop computer to you [at PC vendor's tech support]. I just got it back. Everything that I've written on it for two years is gone. I was told that I'd be called if you guys replaced the hard drive. I called [PC vendor], and they said the hard drive didn't need to be replaced. They just said the motherboard needed to be replaced. And [emotion and volume rise] EVERYTHING THAT I'VE BEEN WORKING ON FOR THE PAST TWO [deleted] YEARS OF MY LIFE IS GONE! YOU [deleted]! NOW I WANT YOU TO CALL ME BACK, STOP [deleted] ME AROUND, AND MAKE SURE I GET BACK WHAT I'VE BEEN WORKING ON! DO YOU [deleted] UNDERSTAND ME? I AM TIRED OF YOUR [deleted] AROUND WITH ME! I HAD BETTER GET MY [deleted] HARD DISK DRIVE BACK, OR I'M GOING TO SUE ALL OF YOU [deleted] [deleted] [deleted]!"

No leading PC vendor earns a five-star rating for both reliability and service. We hope that changes.

Obviously, not a great day for Stephen X., the PC vendor, or the support technician cringing on the other end of the phone line. Most of us aren't so unfortunate, but this story—even if apocryphal—gets to the essence of what PC reliability and service are all about. Like it or not, we utterly depend on our PCs.

MUCH ROOM FOR IMPROVEMENT

RECOGNIZING THIS, we at *PC World* spent the past year revamping and expanding our surveys on the reliability of brand-name PCs and the quality of service from major PC vendors. This issue's report, based on readers' responses to an online survey we fielded in late spring, reveals our findings on business PCs, home PCs, and notebooks from 17 major manufacturers. The news is not as dire as Stephen X.'s, but neither is it glowing.

On a positive note, most readers reported that their business PCs worked properly when they first arrived. The troubles typically began later—but not way later. Most of these PCs were less than two years old; the oldest were only three years old. Even so, 70 percent of readers had at least one problem with their work PC. In fact, more than 30 percent reported three or more problems. The source of the headaches varied. Some occurred when readers added new hardware or software. But more often than not, bad components were to blame—with hard drives the main culprits.

Respondents reporting on their home PCs had similar experiences to those with work PCs, except that a full 36 percent of home PC users reported three or more problems.

NO SERVICE HEROES

FEWER THAN SIX out of ten readers were very satisfied with the quality of service they received for their work or home PCs. The reason? First and foremost, delays beset the service process. Though most problems with work PCs were fixed in five days or less, about a quarter of our readers said the process took longer. And all too few readers gave service technicians high marks for having adequate knowledge or for exerting sincere efforts to help solve problems.

Even among PC users whose problems were resolved, about one in six wasn't happy with the resolution. For some, the process became too much of a hassle or took too long, and about one in three reported that their manufacturer simply couldn't fix the problem. Home PC owners fared worse than those with work PCs, facing longer waits and getting fewer problems fixed. Nearly 40 percent of those whose problems weren't satisfactorily resolved reported that their PC vendor failed to fix their computer.

Clearly most readers escaped the fate of Stephen X. On the other hand, all's not well when only six out of ten say they're very satisfied with their PCs overall. As you'll see in our report, no leading PC vendor earns a five-star rating for outstanding reliability and service. In future reports, we hope that at least a handful of PC vendors will achieve that level of excellence. We depend on it.

Cathryn Baskin is editor in chief of PC World. ■

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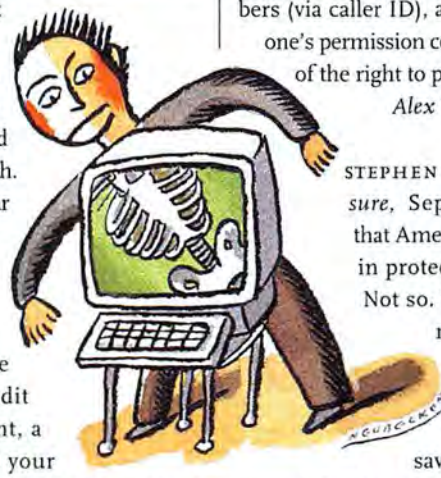
YOUR TAKE ON: Internet privacy • Junk e-mail • CompuServe under AOL

'TRUST NO ONE'? READERS RESPOND TO PRIVACY ISSUE

YOUR SERIES of articles on privacy [September 1998] was paranoid, insulting, and filled with hype! While there is a need to be cautious about the information one makes available, you are luring people into witch-hunts and scaring them to death. "Trust no one"? "Wear a disguise"? "Erase your history"?



People can become victims anywhere. Every time you use your credit card at a restaurant, a waiter could steal your number and signature. And talk about hypocritical. Does *PC World* sell its subscribers' information? Does your Web site give out cookies? Your job is to ease folks into the new age of technology, not send them back into the dark ages of fear.

Troy G. Johnson II
Hayward, California

THERE IS LITTLE or no privacy on the Internet. People's names, addresses, and phone numbers (some unlisted) are often broadcast in open chat rooms, and that is only the beginning. America Online—designed as a place to meet people, exchange ideas, and have a good time—has turned into a place where laws (both state and federal) are broken daily and where people are victimized and harassed.

Robert DeVault
Morgantown, West Virginia

"THE RIGHT OF THE people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated." This is the opening of the Fourth Amendment to the Constitution of the United States. So, while you are technically correct that the word *privacy* does not appear in the Constitution, these words are routinely referred to as the "right to privacy."

What is really needed is a legal challenge on Fourth Amendment grounds that obtaining personal information—IP addresses, e-mail addresses, phone numbers (via caller ID), and so on—without one's permission constitutes a violation of the right to privacy.

Alex Torralbas, New York

STEPHEN MANES [*Full Disclosure*, September] assumes that Americans have a choice in protecting their privacy. Not so. For example, I use my grocery store's discount card. This is not a convenience that lets me save "a few cents off a six-pack," as he says. The card lets me buy the overpriced item of the week at regular price. And yes, I had to give my name, address, and phone number to get the card.

I cherish my privacy more than anything. But I don't sacrifice it for a bargain or for convenience' sake. I sacrifice it to live a decent life.

John Lindquist, Fairfax, Virginia

Editor's response: Privacy is such a huge concern among our readers that we felt it worthwhile to devote an entire issue to the topic. Our goal was to alert readers to the potential dangers and give practical strategies for dealing with them. We also wanted to examine such issues as the safety of Internet shopping and the hazards (real or imagined) of being hacked. We don't expect readers to heed *all* our advice, but to select what works best for them. We also made a sincere effort to balance our coverage. For example, in "Buyer Beware," we noted that most major online commerce sites have good security.

Like most commercial Web sites, PC World Online uses cookies (as a remedy, try one of the utilities on September's page 143). And like most magazines, *PC World* does sell subscriber information to third parties, as noted in a table on page 98 (September), but readers can have their names removed from such lists (see "Mailing Lists" on page 14).

Finally, our job is not, as Troy Johnson suggests, to "ease folks into the new age of technology." It's to give them practical, real-world information to become smarter consumers of PC technology. –Daniel Tynan

SPAMMED? SO WHAT?

ROBERTA FURGER'S article, "Get This #$?* Spam Outta Here!" [*Consumer Watch*, September] made some dubious points.

1. The article implies that everybody with an e-mail address is constantly barraged with spam. As a computer consultant with three ISPs, I live and breathe the Internet, but very rarely (less than once a month) receive spam. I can only guess that this is because I am very careful about where and when I give my e-mail address.

2. The article also says that accord- ▶

CORRECTIONS AND CLARIFICATIONS

THE CURRENT price for the Visioneer PaperPort 3100 USB scanner (*New Products*, October) is $99.

In "The Trouble-Free PC" (October), memory modules in a photo on page 104 were misidentified. The longer, lower module is a DIMM, the other a SIMM.

In October's *Top 20 Budget Desktops*, we should have said that the IDot.com 333LX has four PCI slots, plus one shared PCI/ISA and one ISA slot.

To download a free copy of PGP e-mail encryption software for personal use ("The Defenders," September), point your browser to www.pgp.com/products/pgpfreeware.cgi.

The URL for the Homestead Web page creation service (*New Products*, September) is www.homestead.com/rascomsoftware.

PC World regrets the errors.

Clarification: *PC World* has received letters regarding the illustration on page 184 of our September issue, accompanying a story on the potential dangers of using a credit card on the Internet. The figure in the illustration was not intended to portray African Americans in a negative light. In hindsight, we realize how this image could be misconstrued, and we deeply regret any offense.

ILLUSTRATION: ROBERT NEUBECKER

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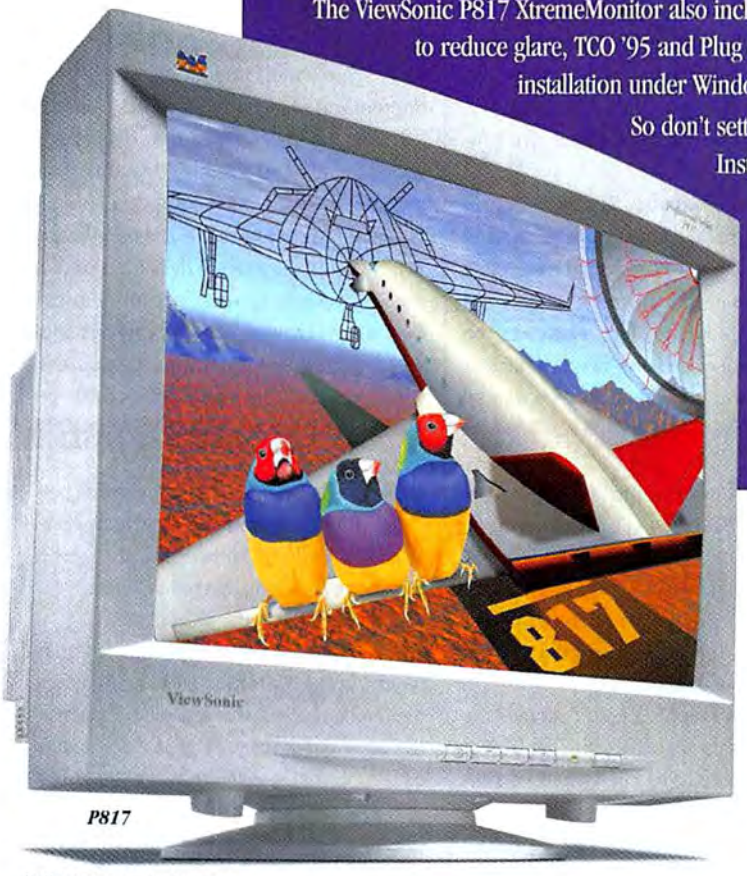

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Family PC Recommended — *GS771 March 1998*

MW Editors' Choice — *G810 January 1997*

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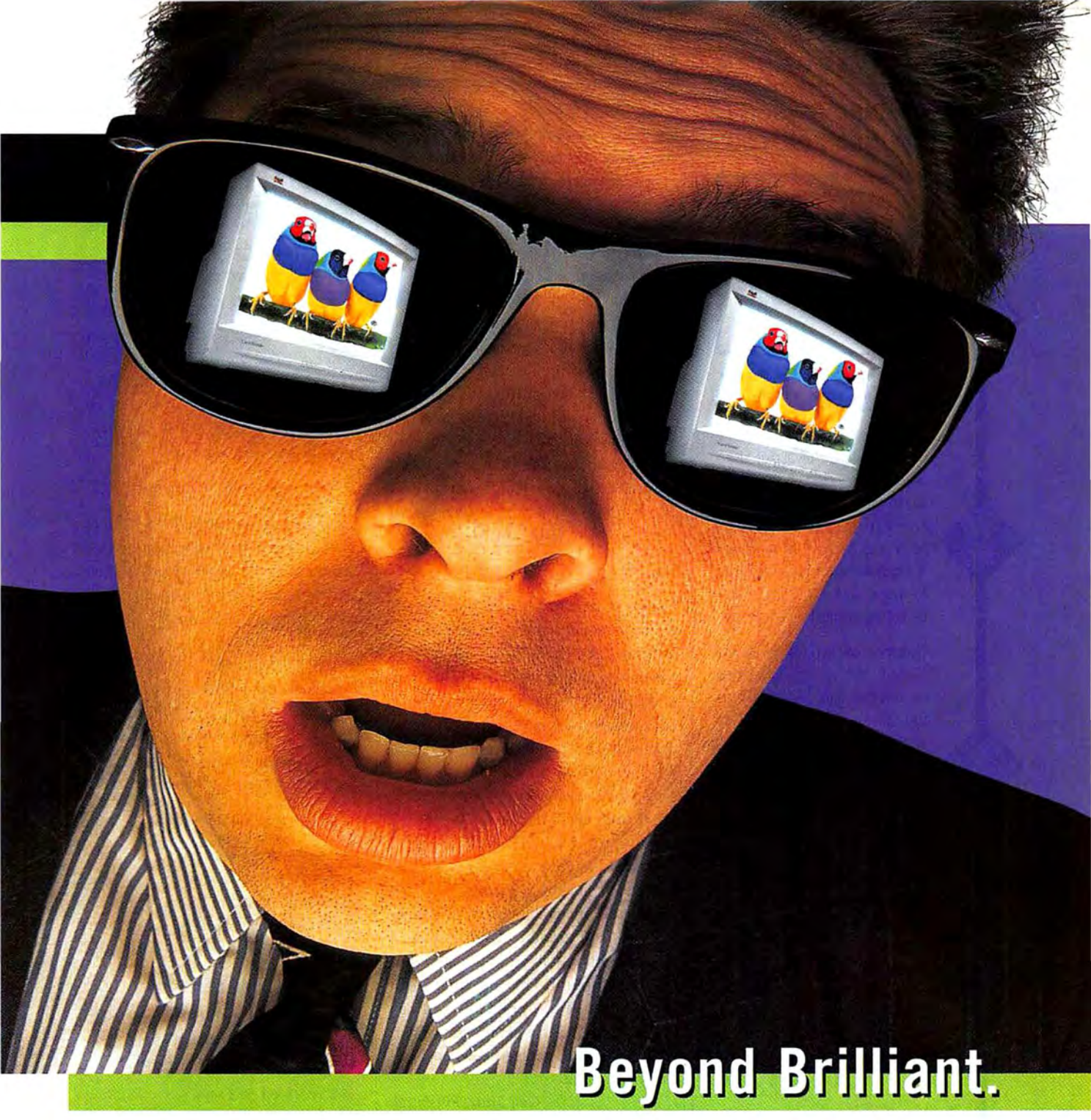

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ing to the Electronic Messaging Association, "Junk mail now accounts for an estimated 10 percent of all e-mail traffic," yet "spam fills our in-boxes and can slow Internet mail traffic to a crawl." How does 10 percent of the traffic clog our boxes and bring a system to a crawl?

3. Finally, the article claims that "junk e-mail violates every Internet user's privacy." How does an impersonal e-mail message sent to a computer violate anybody's privacy? How does spam differ from the tons of third-class mail I receive every day or the telemarketers who call during dinner? Everybody is free to delete or discard unwanted mail, or to hang up the phone.

David Wood
Waltham, Massachusetts

ILL-SERVED BY COMPUSERVE

I FIND IT DIFFICULT to believe that you are still recommending CompuServe [*Internet Tips*, September]. CompuServe was once innovative, and its forums were invaluable for solving hardware and software problems. But all that seems to be changing. The "major software and hardware vendors" you mentioned as sponsoring the service's forums are abandoning CompuServe in droves. Two of my favorite forums, Dell and Hewlett-Packard, have become "user moderated" instead of managed by experts.

The most intolerable aspect of CompuServe is that it has direct, unsurcharged x2 access for only six cities (Pittsburgh is not one of them). This at a time when most ISPs have converted to V.90. I do not see CompuServe getting any better, especially now that it has been bought by America Online.

Gail Titus, Pittsburgh

Editor's response: When I wrote the item on CompuServe, my sources at the firm told me that there were no plans to cut back on the service's popular forums. Apparently, though, many vendors are leaving CompuServe. It is unfortunate that this once-incomparable online service is so quickly leaving its glory days behind. –Judy Heim

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.* ■

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THE BEST COLOR PRINTERS

New ink jets are faster and new color lasers are cheaper. Today, buying color makes sense for all prices and purposes. We pick the best models for home, small-business, and corporate users.

HOME PCs FOR THE HOLIDAYS

The latest home PCs are here just in time for end-of-year shopping. Our seasoned reviewers found a sackful of home-office, family, and game PCs guaranteed to make any grinch smile.

WHAT EVERY OFFICE NEEDS

Ready to outfit your small business with PC, printer, fax machine, phone, and more? Whether it's a start-up or a successful franchise, here's how to outfit offices of different sizes and budgets.

ALSO NEXT MONTH

▶**Top 100:** Power, budget, notebook, and home PCs, plus top printers, monitors, graphics boards, and modems.

▶**Gray Market Software:** Are you using illegal software without knowing it? Programs on your PC could be stolen or illegally copied—and getting support or refunds could be impossible.

▶**Here's How:** *Windows Tips* on optimizing Win 95's System Agent, *Internet Tips* on deleting Active Channels, *Hardware Tips* on keeping the Registry healthy.

PC WORLD

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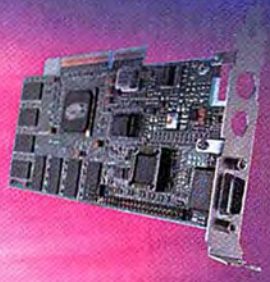

GRAPHICS BY ATi rage 128

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Will Your PC Maker Keep Its Promises?

Federal and state agencies are cracking down on PC companies that fail to provide advertised services.

ILLUSTRATION: VICTOR JUHASZ

FOR YEARS, PERSONAL COMPUTER makers have played a bait-and-switch game with consumers. They advertise on-site service for business and home PCs, then turn around and do just about everything in their power to prevent customers from taking advantage of this service. They ship out thousands of replacement parts and spend hours on the phone walking a customer through the installation process. But only rarely—and usually only as a last resort—do they actually dispatch a technician to a home or office.

The hassles customers must endure to obtain on-site service is just one example of the gap that can exist between advertised service claims of PC companies and the reality. This gap may soon narrow, however, if the Federal Trade Commission and several state attorneys general have their way. In at least two recent cases, PC vendors have been charged with failing to provide advertised services. Both cases send a clear message to the industry: If you're going to promise a service, you'd better be prepared to supply it.

Last July, the FTC settled a case with Gateway, in which the company was charged with misleading consumers by advertising free on-site service when, in fact, the service was not provided until Gateway diagnosed the problem over the phone and determined that the consumer could not make the repair. The suit also charged that Gateway's promise of a money-back guarantee failed to mention that shipping charges were nonrefundable. Under the terms of the settlement, Gateway has agreed to pay nearly $300,000 (roughly the amount of the unrefunded shipping charges) and is prohibited from misrepresenting its money-back guarantee or on-site service policies in its ads.

TREADING CAREFULLY

AS IT HAPPENS, Gateway had already cleaned up its advertising act by the time the five-year-old suit finally came to a close (yes, the wheels of justice do move slowly). In searching through several recent issues of *PC World*, I discovered that Gateway has stopped directly mentioning on-site service altogether. As for the money-back guarantee, Gateway now specifies that shipping charges are not refundable. Gateway wouldn't comment on the FTC case, but judging from its ads, the company has decided to keep its promises to a minimum, and to qualify those it does make. For example, the lengthy warranty statement on the company's Web site notes, *"on-site service and product replacements are considered options of last resort."*

In a case remarkably similar to the Gateway action, the Florida attorney general's office has charged Maximus Computers with failing to provide on-site service or 24-hour telephone technical support as advertised. According to Les Gerringer, Florida's assistant deputy attorney general in charge of the state's economic crimes division, "customers didn't have the ability to get through to a live person in the middle of the night—[and] we don't believe [the company] ever provided any on-site service."

At press time, a spokesperson for the ▶

Florida attorney general said his department was in the process of hammering out a settlement with Maximus. Company representatives did not return our phone calls. (Maximus's customer service was criticized in June's *PCW Advocate* column.)

READ THE FINE PRINT...

MOTIVATED BY government oversight, many PC companies are beginning to include small-print disclaimers in their ads that point to limitations on services or policies. Dell notes in its ads that on-site service is provided by a third party (a common practice among many computer vendors) and that service may not be available in remote areas of the country. Quantex and ProGen even state in their ads that on-site service is provided at the sole discretion of the company.

While these disclosures are a step in the right direction, they are by no means universal. Look at recent ads, including those in *PC World*. Value America and Toshiba ads, for example, promise a year's worth of on-site service—without any stated qualifiers. Both vendors have conditions attached to their on-site service promises, but you have to call a sales representative to find out what they are.

That's why David Corvette of the New York attorney general's office advises consumers not only to read computer ads carefully, but also to make sure that they understand the disclaimers. "It's in a consumer's best interest to determine what exactly a manufacturer or retailer means by on-site service," says Corvette. "If they say there's no service to remote areas, ask them to define 'remote areas'."

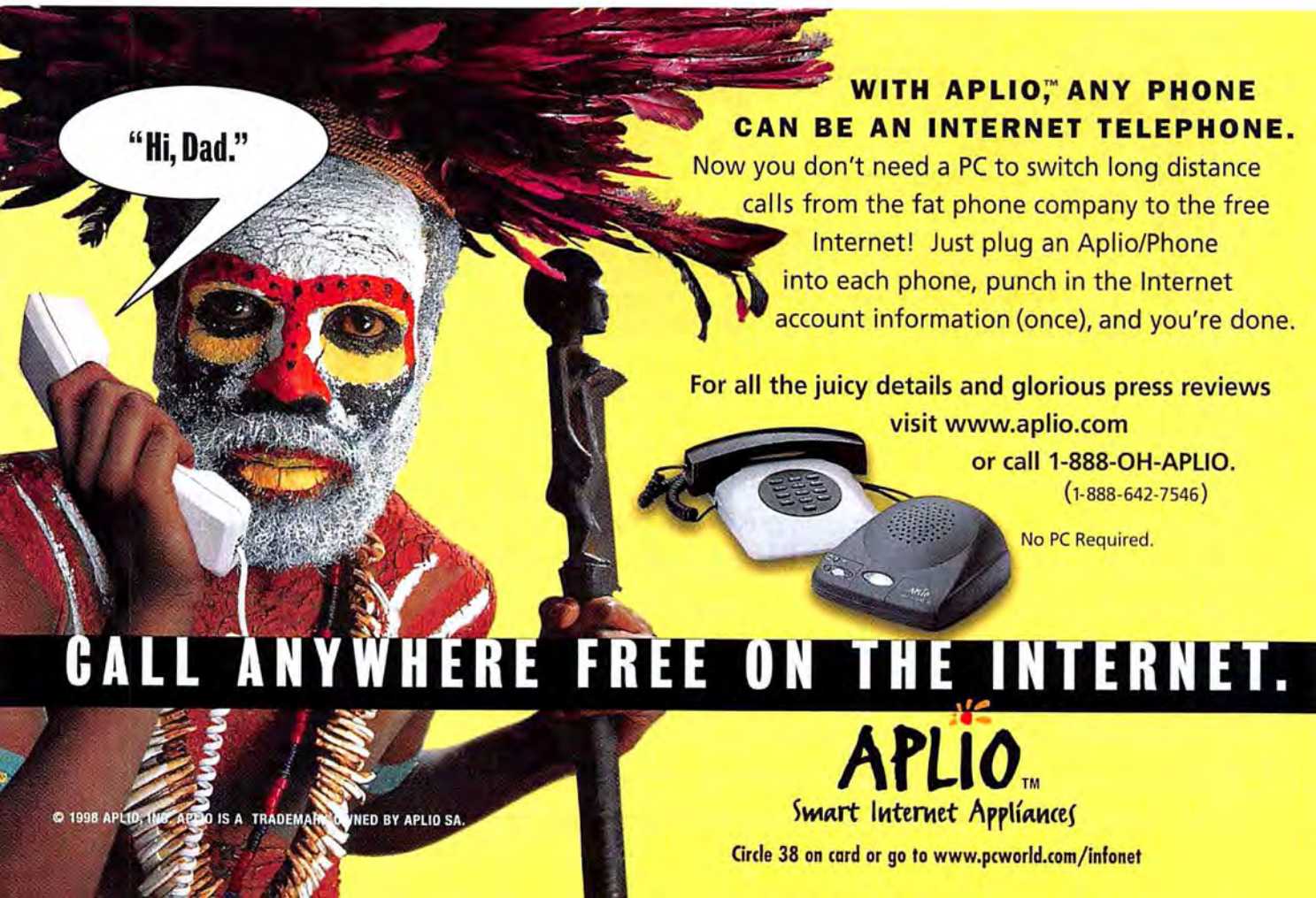
...AND CHECK THE WARRANTY

IN ADDITION TO grilling the sales rep, consumers should read the product warranty *before* purchasing a PC, since it often includes terms and conditions that may not be stated explicitly in an ad. Many direct sales companies now publish their warranty policies on their Web sites. And retailers are required by law to make warranties available to customers before a sale. But it's up to you to request it.

The moral: Don't assume anything—including the specifics of advertised support services. Ask questions, read supporting materials, and buy based on what you know you will get, not on what you think you're entitled to.

And if a vendor fails to deliver on its advertised claims, call them on it. Then call the FTC and your state attorney general's office. Something tells me they'll be listening now—even if the company isn't.

Ever tried—unsuccessfully—to obtain on-site service or get tech support at 3 a.m.? Let us know about it by sending e-mail to consumerwatch@pcworld.com. PC World *Contributing Editor Roberta Furger is the author of* Does Jane Compute? Preserving Our Daughters' Place in the Cyber Revolution *(Warner Books, 1998).* ■



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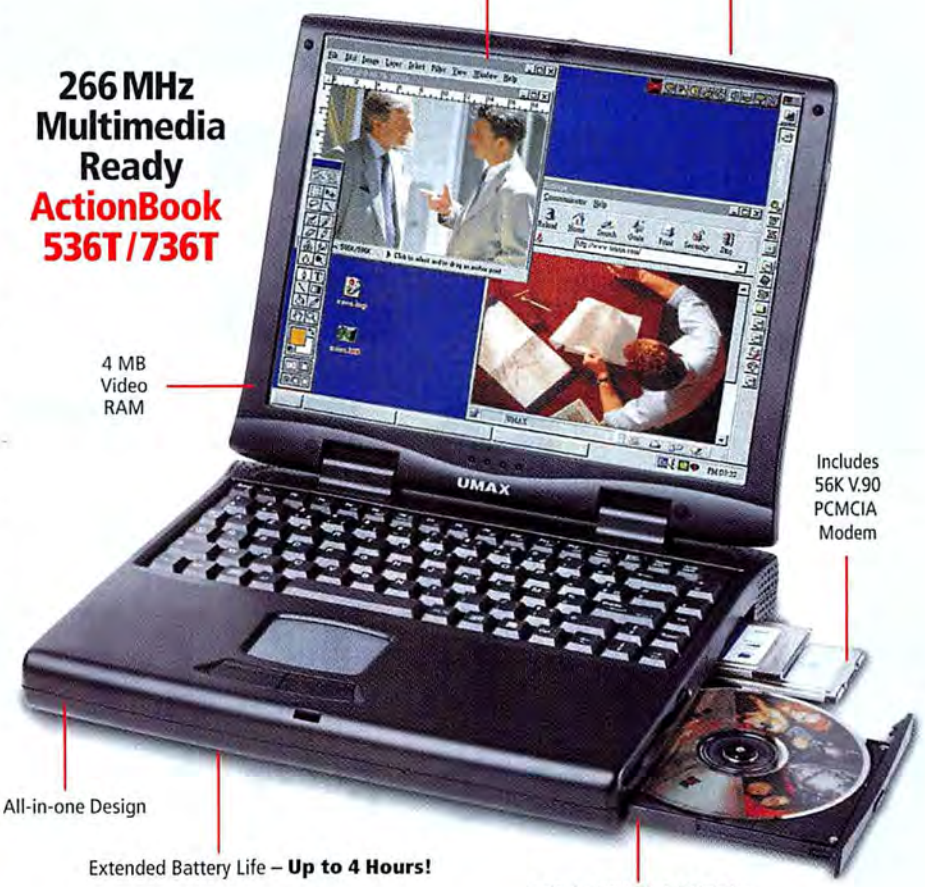

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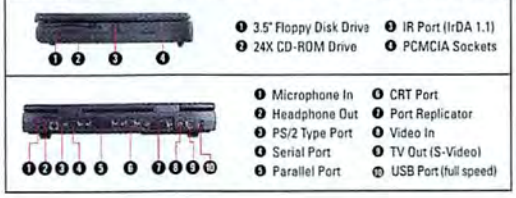

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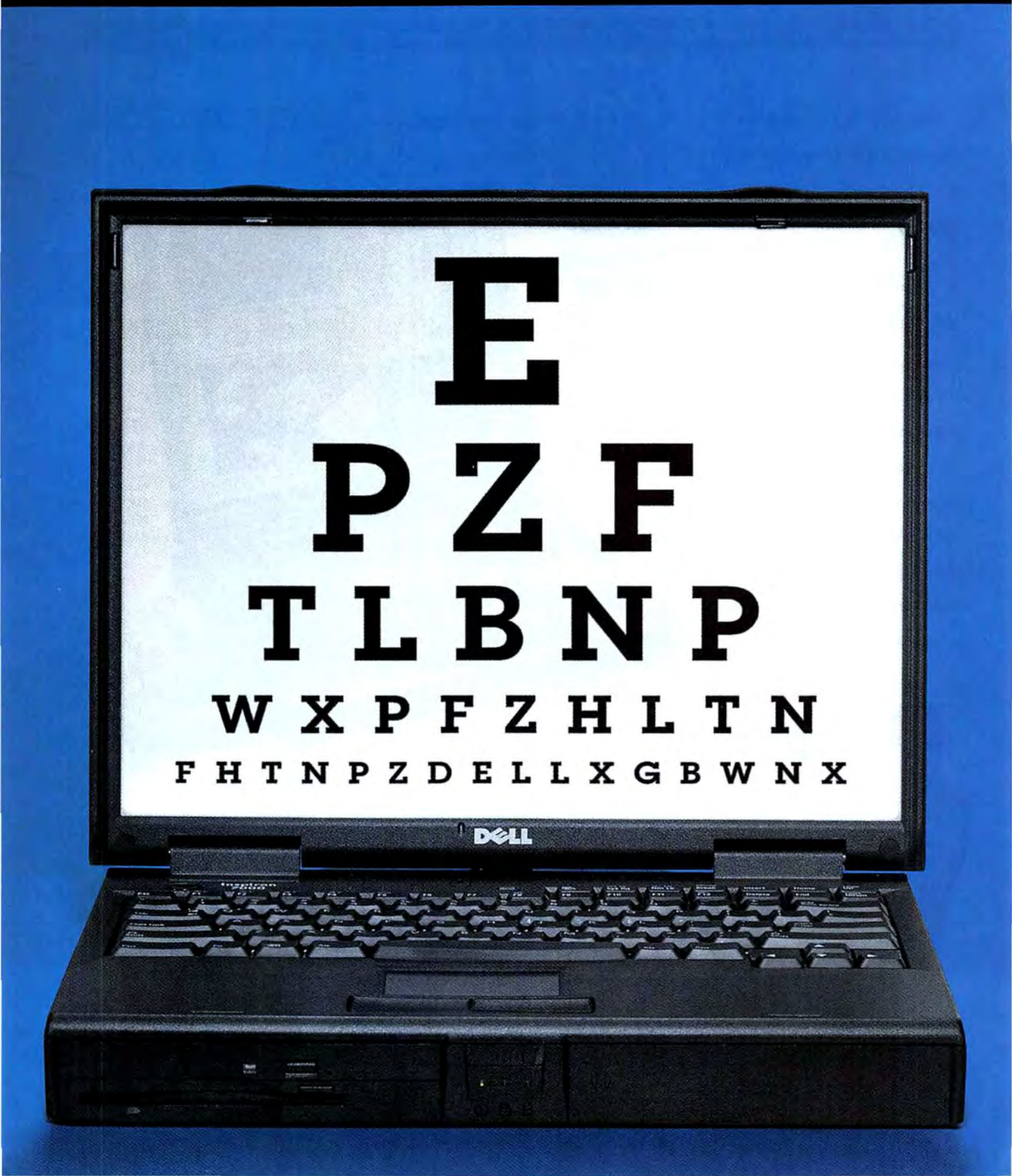

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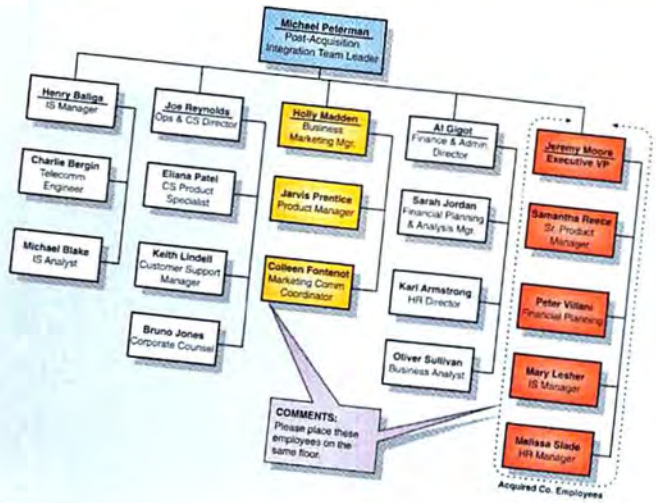
Memorandum

To: Chris Murphy, Facilities Manager
From: Mike Peterman, Post-Acquisition Team Leader
CC: Holly Madden; Jarvice Prentice; Colleen Fontenot; Jeremy Moore
Date: 07/27/98

Re: Acquisition Integration Plan

The following organizational chart shows how my new Post-Acquisition Team is structured. The acquired employees will be working closely with Holly's group. Please make sure there is space to keep the eight of them together on the same floor.

Thanks,
MP



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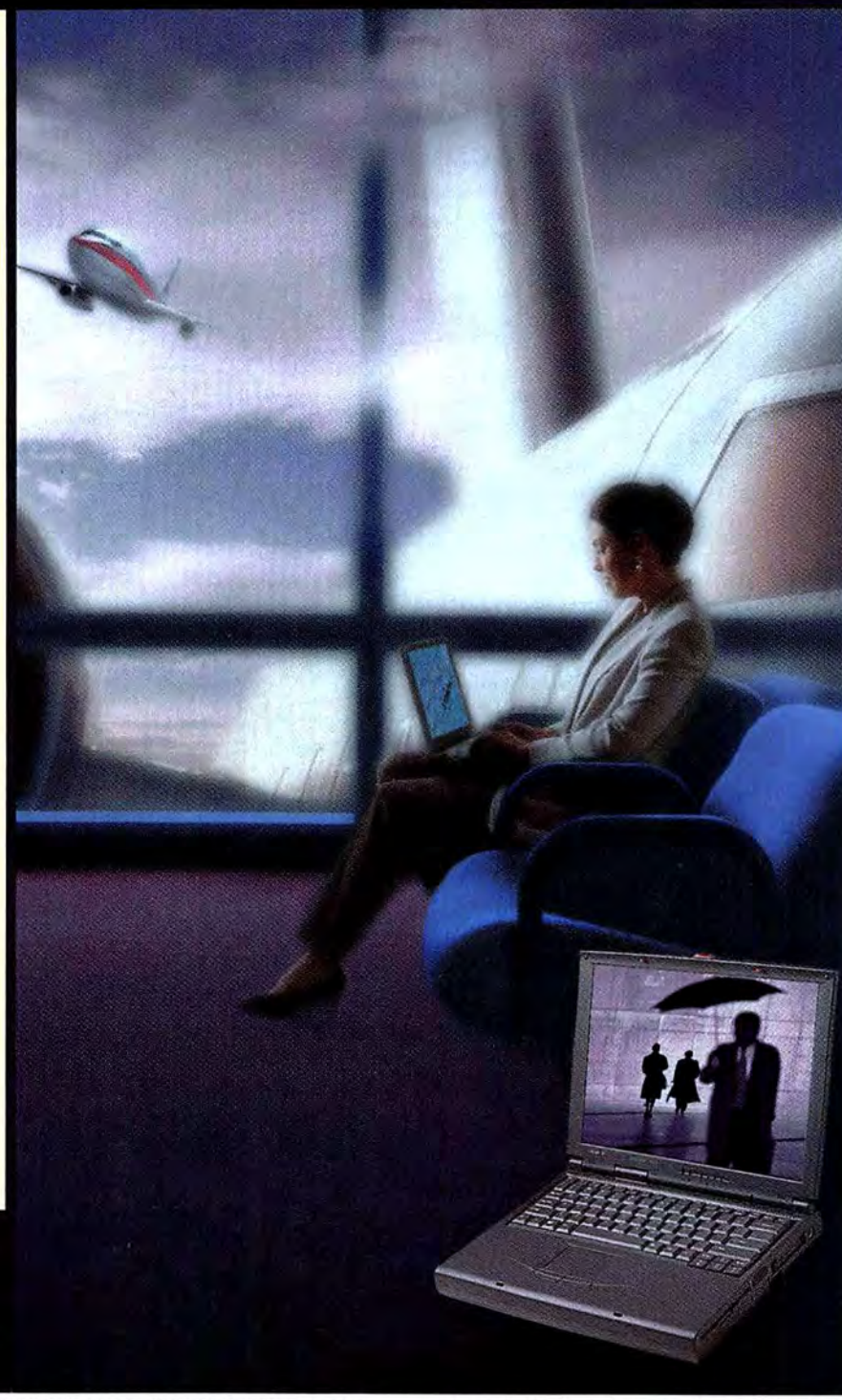

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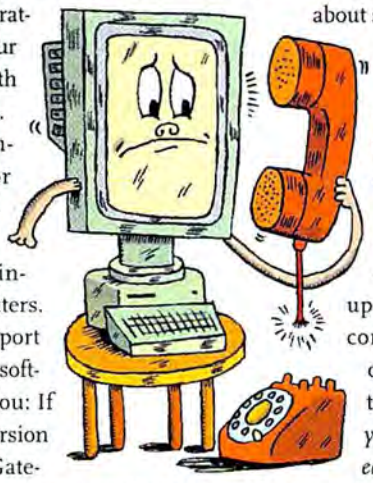
WE HELP WITH: Windows 98 upgrades ◆ Online auctions ◆ Micronix's demise

Can Installing Win 98 Void Your Warranty?

IF YOU LIKE calling your PC maker for all your hardware and software support, be careful where you purchase your upgrade to Windows 98. Installing a retail version of the new operating system may void your support agreement with the PC manufacturer. Some mail-order vendors like Gateway or Quantex, for example, provide lifetime support for software preinstalled on their computers. But you won't get support from any PC maker for software it didn't sell to you: If you install the retail version of Windows 98 on a Gateway machine and encounter a conflict, Gateway will troubleshoot only the hardware. You'll have to call Microsoft for help with the operating system.



The best strategy is to check with your PC maker before you upgrade. Gateway, Micron, Quantex, and other mail-order PC vendors will sell you the Win 98 upgrade themselves, which means you can continue to call them with questions about software and hardware.

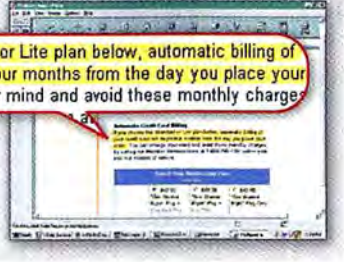
Note for Dell owners: Upgrading to Windows 98 won't affect your Dell warranty because the company supports factory-installed software for only 30 days. But before you upgrade, go to www.dell.com. Once you're there, click on the support icon, then on *Click here to see if your system can be upgraded to Windows 98*. Enter the ID tag number (from the back of your PC) to find out if Dell recommends the upgrade for your machine. If Dell approves the move to Win 98, the site will also provide you with any new drivers you'll need, based on the original configuration of your machine.

ILLUSTRATION: PAUL CORIO

THE FINE PRINT

Online Subscriptions: The Bill You Just Keep Paying

WHEN YOU SIGN up for Intel's AnswerExpress tech support service, you're charged $49.95 for the first three months with its "Get Started Right" package. The fine print (at www.answerexpress.com) clearly states Intel will then bill you $9.95 every month for life until you tell it to stop. This practice is increasingly common among online subscription providers, such as Consumer Reports Online (www.consumerreports.com). It too offers a lifetime sub until you cancel membership. Such automatic billing is convenient if you don't want the hassle of resubscribing. But read the fine print when you sign up for any service online, and keep track of subs so you can cancel those you stop using. (For two perspectives on AnswerExpress, see June *Top of the News*, page 72, and July *Home Office*, page 280.)



Fleeced at an Auction Site?

GETTING RIPPED OFF at an online auction is the number one reason people complain to the National Consumers League's Internet Fraud Watch division (www.fraud.com). Yet Web auctions are increasingly popular. If you love the thrill of shopping this way, beware. There are two types of Yankee auctions: Either the auction site owns the goods for sale or you buy the items from an individual, such as at EBay (www. ebay.com).

The first kind is safer, especially if you stick to the big sites like www.onsale.com and www.firstauction.com. Both offer returns if the product is broken or if it isn't as advertised. And the merchandise comes with manufacturer warranties and support.

When you venture out into the land of person-to-person auctions, however, give up any expectations about customer service, returns, or even the possibility of recourse if your purchase never arrives. At the very least, check out the seller's reputation—before you send any money. Both EBay and Onsale's Exchange site (www.onsale.com/exchange.htm) allow shoppers to rate the people they've bought from. Don't buy from those who've hidden their rating. And remember: This is gambling.

Micronix USA: Belly Up

MICRONIX USA, a Cleveland-based mail-order PC company (and *PC World* advertiser), has apparently gone out of business. One of the company's claims, unfortunately, was lifetime free labor (that would be the company's lifetime, presumably). According to the Cleveland Better Business Bureau, the company went out of business in June, leaving complaints unanswered. Micronix PC owners should check the warranty to see which firm provides the on-site support, and call to see which services it still provides.

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Or a great one? Send PCW Advocate *the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for* PC World. ■

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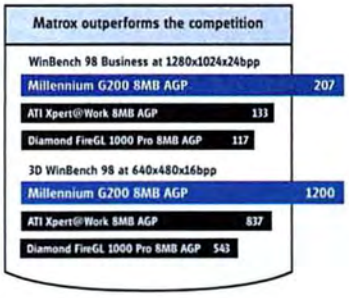

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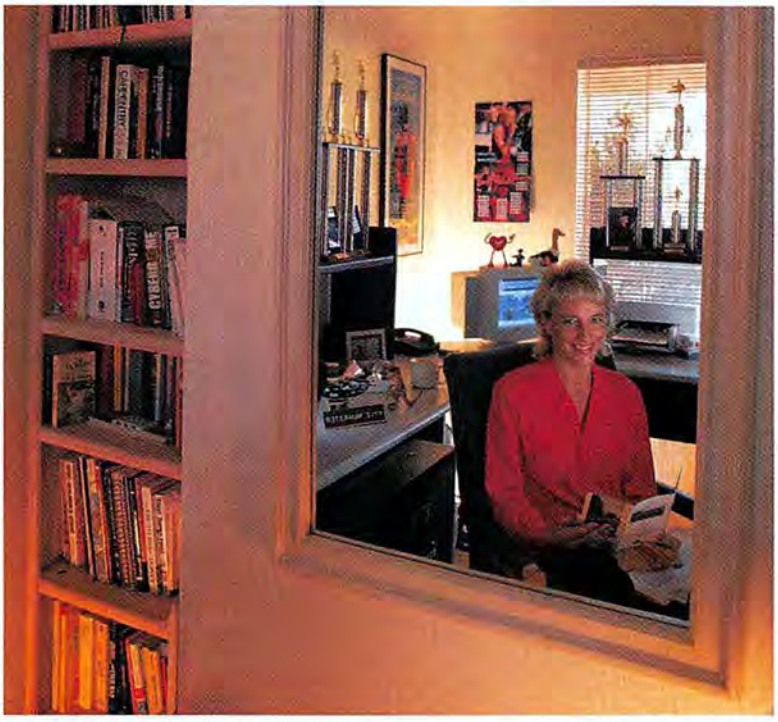


PHOTOGRAPH: REED RAHN

CONSTANT MEETINGS AND interruptions, telephones ringing, deadlines looming ominously—it's all just part of an ordinary day at the office for Kyle McMaster, an operations analyst for the department of planning and development in Chandler, Arizona. "Where I work," McMaster says, "there are generally three or four people coming in and out. With all the distractions, and with the kind of work I do, it can be hard to concentrate."

So McMaster asked her supervisor if she could telecommute some days. Her boss said no at first, concerned that McMaster would be difficult to reach on her telecommute days. But McMaster persevered, arming herself with examples of how teleworking improves productivity. Eventually, her supervisor agreed to let her work from home once a week for a six-month trial period. The trial was a success, and McMaster now works at home every Tuesday.

Telecommuting has become increasingly popular, and for good reason. "You can be at least 15 to 25 percent more effective" when teleworking, says Gil Gordon, president of Gil Gordon Associates, a telecommuting consultancy in Monmouth Junction, New Jersey.

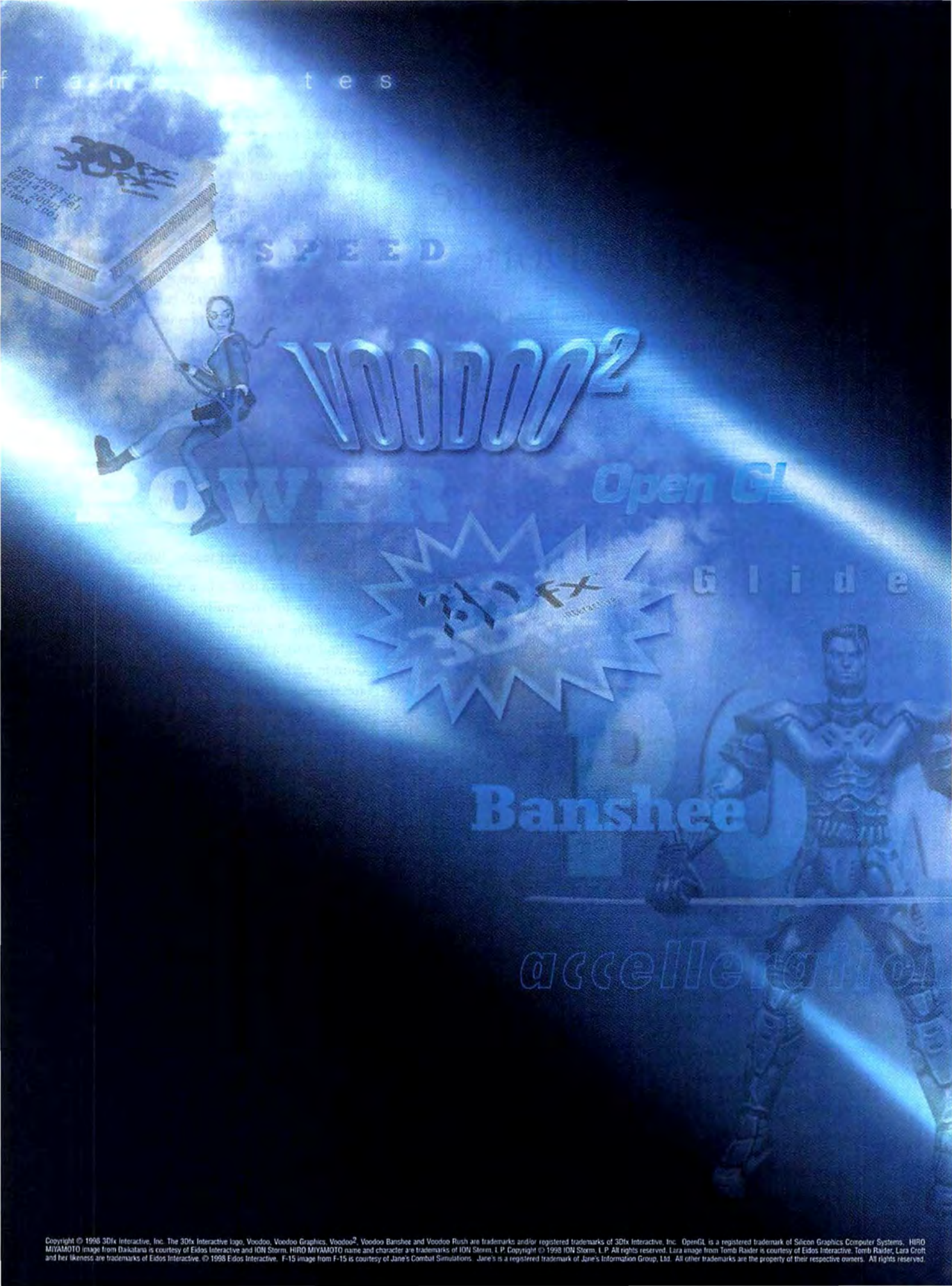
But as McMaster's experience shows, many bosses aren't keen on letting their staff work from home. And workers can end up being *less* productive at home than at the office—thanks to such distractions as children, Home Depot, and *Judge Judy*. To make telecommuting work for you and your boss, you need the right hardware and software, and you need a strategy.

MAKING HOMEWORK WORK

THE FIRST STEP is to write a detailed plan that shows how telecommuting will benefit your boss. Listing the advantages "changes telecommuting from a favor to a business proposal," Gordon advises. "The more professional you are, the more credibility your plan will have." Include data such as productivity improvement statistics and a list of firms with telecommuting programs. You'll find a summary of recent surveys at June Langhoff's Telecommuting Resource Center (www.langhoff.com).

Keep a log of what you do at work for several weeks. Divide the tasks into those that could be done more efficiently at home and those better performed at the office. The longer the home column, the more weight your plan will carry. Also, set clearly defined goals based on your responsibilities; this gives the boss a yardstick by which to measure the success of your plan.

Equipment is a key issue. If you already have a PC and modem at home, you're ahead of the game. If you don't, it's up to you and your company to hash out who writes the check. "There's no single right answer for who pays for what," Gordon explains. "But in general, companies tend to pay for the computer—if it's required in the job—an extra phone line, and business-related phone calls, while the telecommuter usually provides the furniture." And don't forget software—you'll want an e-mail package, a reliable Internet connection, and possibly a ▶



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Be clear about how you can be contacted when out of the office. E-mail your home office number to colleagues, and put it on a note attached to your office PC monitor. And don't forget about tech support. The ideal telecommuter is comfortable getting phone support from his or her PC vendor. If this isn't you, you'll have to work out a solution with your company's IS staff.

If you suspect your boss will be skeptical no matter what you say, propose a trial. Gordon recommends working at home once a week for a month to break the ice.

After you present your proposal, summarize any remaining negotiating points and try to schedule a follow-up conversation. Then recap the final agreement in writing. It's good protection, especially if your boss is replaced by one even less supportive of your teleworking.

STAYING PRODUCTIVE

ONCE YOU HAVE the green light, you need to make the plan work. For starters, schedule tasks for times when you can do them most efficiently. If your job includes lots of Web research, for example, surf at off-peak times to avoid Net traffic jams. If you're groggy in the a.m., start your day handling e-mails, returning calls, and dealing with other routine chores.

But above all, be careful not to be *too* productive. With all that equipment and information at your disposal, it can be hard to shut down at day's end.

"Initially, I felt I had to work twice as hard at home as I did at the office," says McMaster. "I was trying to prove how much more I could get done. But it was worth it. The quality of my work is better—and so is my life."

James A. Martin is a PC World *contributing editor. If you're having trouble resolving a PC-related hardware or software problem, we'd like to hear from you.* *See page 14 for contact information.* ■

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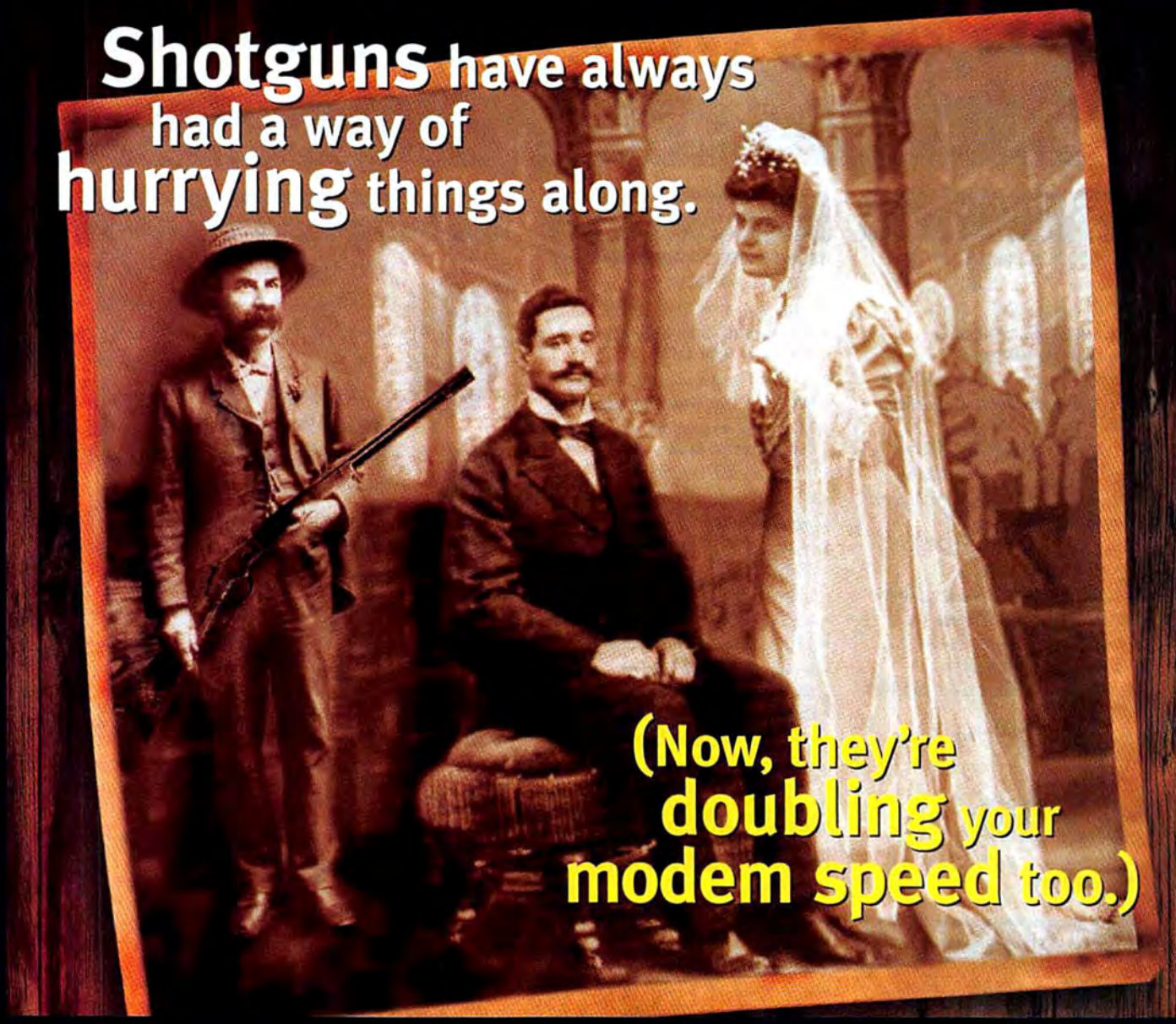

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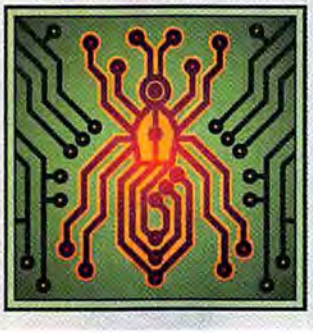
Windows 98 debugged? ◆ Norton nasties in Win 98 ◆ Office 97 Service Release 2

The Real Windows 98 Service Pack



WAS THERE EVER any doubt? Microsoft has confirmed that it will begin testing the first collection of Windows 98 bug fixes by year's end. A Microsoft Web site refers to an upcoming Windows 98 Service Pack—the first public acknowledgment of plans for a Windows 98 bug fix package. The company had denied early reports that the collection of multimedia updates it had posted recently to the Windows Update site contained bug fixes, even though it was identified as a service pack while in beta testing. At press time, Microsoft wouldn't comment on which of the hundreds of documented Win 98 bugs and incompatibilities the pack would fix, nor on when the pack would be available.

MORE SERVICE FOR OFFICE 97

JULY'S *Bugs and Fixes* reported that Microsoft planned to release a second Service Release for Office 97, but that's about all we knew at the time. SR2 is finished at last, and it's a 23MB whopper—downloading it could take hours. Fortunately, Microsoft will send you SR2 and the 7MB SR1 (which must be installed first) on a CD-ROM for free. Find all the details and download links at officeupdate.microsoft.com/Articles/sr2fact.htm.

In addition to several Excel recalculation flaws and a PowerPoint year 2000 glitch, SR2 will fix newly discovered problems in Access, Excel, and Word, along with numerous flaws throughout the Office suite. The Access bug (which also afflicts earlier versions 2.0 and 7.0) is potentially the most destructive, but only if you use the program's Visual Basic for Applications scripting language to automate data entry forms. Data entry forms that use bookmarks to keep track of previously edited records can pull up the wrong record, unbeknownst to the user, which can result in deletion or editing of the wrong data. For the gory details, read support.microsoft.com/support/access/content/datachanges.asp.

NORTON GIVES WINDOWS 98 GRIEF

GIVEN NORTON UTILITIES' checkered past, compatibility with Windows 98 was perhaps too much to hope for. Users report that running NU's System Doctor under Win 98 can disable your floppy drive or prevent you from shutting down Windows. Even if you've installed the most recent patch (Live Update 6, which upgrades NU to version 3.0.7), you should use the program's Live Update feature again to download and install an undocumented Windows 98 compatibility fix. This 360KB fix replaces the .dll file that triggered the problems with shutdown and floppy access. To fix persistent shutdown glitches, Symantec has posted a 4KB troubleshooting utility to its Web site at ftp://ftp.symantec.com/public/english_us_canada/products/norton_utilities/ver3_win95/updates/NSDEBUG.ZIP. One of the archive file's two files (usagedll.txt) tells how to install and use the troubleshooter.

Files from this article are available from FileWorld on PC World Online at www.fileworld.com. Scott Spanbauer is a contributing editor for PC World. ■

IE 4.0: Two More Patches

BUGS The Net is a scary place, especially if you browse it using Internet Explorer. Security-obsessed experts on the NTBugtraq mailing list (ntbugtraq.ntadvice.com) have found two new bugs, both of which work through the Jscript scripting language. The first (described at www.microsoft.com/security/bulletins/ms98-011.htm) allows miscreants to embed malicious programs in a Web page, then run them on your computer after you view the page. The second (www.microsoft.com/security/bulletins/ms98-013.htm) lets hackers read the contents of your hard disk.

FIXES Microsoft released patches for both flaws almost as soon as they were reported. To update your copy of IE 4.0, choose *Help•Product Updates*. You'll also find links to patches on the Web pages mentioned above.

IN BRIEF

DUN 1.3 at Last

AN ERROR in July's *Bugs and Fixes* sent readers on a wild-goose chase for the latest version of Windows' Dial-Up Networking module. The update—which is intended to strengthen the security of and accelerate virtual private networking connections to Windows NT servers—now really is available. The update comes in Win 95 (ftp://ftp.microsoft.com/softlib/mslfiles/msdun13.exe) and Win 98 (ftp://ftp.microsoft.com/softlib/mslfiles/dun40.exe) flavors.

Navigator 4.06

UPGRADED your browser lately? The latest release of Communicator or the stand-alone Navigator fixes a potentially lethal e-mail security hole, and bundles new enhancements. Choose *Help•Software Updates* to upgrade your current version.

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TOP OF THE NEWS

NT 5: Running Late, Worth the Wait?

By Harry McCracken

The new wave: The latest version of Windows NT looks impressive. Which is a good thing, too, because Microsoft has decided that NT 5 is going to be your next desktop operating system—someday.

BETA

"WINDOWS NT Workstation 5," boasts Microsoft's Web site, "is the premier desktop operating system for organizations of all sizes...the easiest Windows yet." Pretty bold claims, given that NT 5 exists only in beta form and isn't expected to ship until 1999. In coming months, you can expect the company's hoopla machine to shift into overdrive, even as the operating system's shipping schedule recedes further into the future.

Feeling a touch of déjà vu yet? We go through this same frustrating ritual each time a new version of Windows appears on the horizon. The stakes have never been higher, though, since Microsoft is already positioning NT 5 as the operating system of choice for business users. Furthermore, it's the only major Windows upgrade in the works: Windows 98, says the company, represents the end of the Windows 3.*x*/95/98 line, and NT is the wave of the future. Which means that someday you'll probably be using NT 5. And if our early look at the desktop OS is any indication, that's not necessarily a bad thing at all: NT 5 could end up melding the best qualities of the 9*x* and NT product lines.

DELAYED ARRIVAL

PROBLEM IS, the product's arrival date remains an open question. Dwight Davis, an analyst at Summit Strategies in Kirkland, Washington, thinks Microsoft will probably get the long-overdue package out the door during the second half of 1999. Microsoft president Steve Ballmer admitted recently that NT 5—once expected to arrive in 1997—would probably ship sometime between May and September of 1999. Microsoft insists the product won't appear until its corporate beta testers say it's ready. "Our customers are saying, 'We don't care if it ships two months late or two months early,'" says Bob Visse, an NT product manager. "'What we want is a quality release.'"

The new operating system inched closer to reality in ▶

ILLUSTRATIONS: RICHARD DOWNS; ICONS: JEFFREY PELO

JUST IN

Notebooks Get Faster

IN THE SECOND half of 1999, industry sources say, Intel plans to introduce new chips and technologies designed to close the performance gap between desktops and notebook PCs. Topping the list: Geyserville, a design that will let mobile processors run at two speeds. When plugged in, a Geyserville notebook will run nearly as fast as a desktop system with a comparable CPU. But when running off its battery, the notebook slows down, saving power and reducing heat. To run at full throttle without overheating, the notebook might use a docking station equipped with a cooling fan. Intel would not comment on Geyserville.

Use Your PC, Win a Prize

PC DATA is offering rewards to households that sign up for @PCData, a service that gathers data for advertisers about application usage and Web browsing. The rewards: 1000 frequent flyer miles a year, three hours of free long-distance phone calls a year, or $15 per month Internet access for the duration of participation. Here's how it works: After registering (at www.atpcdata.com), you download an applet that launches whenever your PC boots. By requiring users to log on, the applet tracks who's ▶

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Windows NT 5: Nicer Looking, Easier to Use, More Secure

Borrowing from previous versions, Microsoft's next operating system could be the most feature-rich Windows yet.

	FEATURE	Windows 95 [1]	Windows 98	Windows NT Workstation 4.0	Windows NT Workstation 5
Look and feel	Web-style interface	● [2]	●	● [2]	●
	Start menu adapts to user preferences	○	○	○	●
	Unified search interface	○	○	○	●
	Thumbnail view of graphics files	○	● [3]	○	●
Hardware support	Plug and Play configuration	●	●	○	●
	File systems				
	FAT16	●	●	●	●
	FAT32	●	●	○	●
	NTFS 4.0	○	○	●	●
	NTFS 5.0	○	○	○	●
	Power management standards				
	APM	●	●	○	○
	ACPI	○	●	○	●
	Universal Serial Bus	●	●	○	●
	DVD-ROM drives	○	●	○	●
Security	Encrypt file system	○	○	○	●
	Password-protect PC	○	○	●	●
	Restrict user rights to specific files and folders	○	○	●	●
	IntelliMirror automated backup [4]	○	○	○	●

● Yes ○ No

[1] OSR2.5 version.
[2] Available when Internet Explorer 4.0 is installed.
[3] Limited support.
[4] Requires NT Server 5.0.

August, when Microsoft released beta 2 versions of both the Workstation and the Server editions of NT. (As the names imply, Workstation runs on individual desktop PCs, while Server is designed to operate a network.) Despite being considerably more polished than the early beta Workstation we tried last year (see *Top of the News*, December 1997), both new versions remain rough drafts, and it's too early to test performance and stability.

Our informal tests of the Workstation version—along with Microsoft's demonstrations of the Server edition's new capabilities—indicate that NT 5 holds a boatload of promise, combining the strongest features of the NT and Win 95/98 product lines. However, Microsoft's slipping schedule and the trepidation with which most companies approach OS upgrades suggest that many of us may be using our current version of Windows—be it 3.1, 95, 98, or NT 3.51 or 4.0—into the next millennium.

THE ENORMITY OF IT ALL

FIVE THOUSAND programmers, 250,000 beta testers, more than 30 million lines of code—even by operating-system standards, NT 5 is a project of epic proportions. Hence the delays in its development: "In some ways, it's a brand-new operating system as much as an upgrade to NT 4.0," says analyst Davis.

Some things will not change: NT 5 will retain the basic 32-bit architecture of earlier versions, sidestepping much of the notorious unreliability of other Windows editions and adding far more built-in security. But NT 5 will also inherit many features from Windows 9*x*, including the Plug and Play hardware configuration and support for new technologies such as Universal Serial Bus. NT will finally get power management for notebooks, too, though only for ones that use the ACPI standard; Win 95 and 98 support the older, more pervasive APM spec. (See www.teleport.com/~acpi/adapt.htm for a list of ACPI adopters.) NT 5 will also come with Internet Explorer 5 built in, unless the Department of Justice puts the kibosh on Microsoft's browser–operating system integration (see "Feds vs. Microsoft: Is NT 5 Next?" on page 62).

NT 5 should have somewhat better hardware and software compatibility than previous versions, as it will work with hardware drivers written to the Windows Driver Model specification, which Windows 98 also uses—and which, as a result, many new peripherals will support. But older, pre-WDM hardware may not be compatible. Microsoft will also help third-party software vendors develop and deliver software updates to make their applications NT 5–compatible—and vendors may write those patches, once the NT 5 blitz starts in earnest.

BETTER SEARCH TOOLS and thumbnail graphic previews are among the most noteworthy improvements in NT 5's spruced-up Explorer.

While most of those improvements merely help NT 5 catch up to Win 95 and 98, the Windows interface will receive a makeover. To reduce Start menu clutter, you can customize the menu to show only your most-used applications. (You can still see the full menu by holding the mouse cursor over the Start button.) File Open and Save dialog boxes will let you jump to recently used folders with a couple of clicks. A browser-style interface for Windows' search tools will let you find files on your hard disk, search the Internet, and query online e-mail and phone directories.

A number of existing tools will be revamped or replaced. Network Neighborhood will be renamed My Network Places, and will use a new wizard to take some of the pain out of such tasks as connecting to a LAN, creating Dial-Up Networking connections, and using the Internet to establish a Virtual Private Network. Security, already a strong point of NT compared to what's available in other Windows versions, will be beefed up with features such as built-in encryption for files and folders.

SERVER REQUIRED

SOME OF Microsoft's most radical plans are reserved for NT Server 5, the network OS version of the product. Its key new feature: Active Directory, an enterprise-wide database of network users and resources that's designed primarily to make life easier for IS staffers who administer large LANs.

Nonetheless, end-users will notice benefits, too. For one thing, the Active Directory will make it easier to find the most appropriate printer for a given job—say, a fast color laser on your floor that can handle that 50-page PowerPoint presentation. Then there's IntelliMirror, a backup utility that will silently copy your system's settings and files across the network. According to Microsoft, this will enable you to recover from a PC disaster in a matter of minutes by restoring your data onto another system.

Although you can use NT 5 Workstation as a stand-alone OS, some promising NT 5 network-oriented features, such as IntelliMirror, will work only if your company uses Server *and* Workstation versions of the new OS. Still, if your firm installs NT Server 5 but leaves an older version of Windows on your PC, don't despair: Microsoft plans to release ▶

ILLUSTRATION: RICHARD DOWNS

Novell's New NetWare

WHILE MICROSOFT delays NT 5, rival Novell has released NetWare 5, the latest version of its once-dominant network operating system. But Novell hopes that nobody outside the IS department will notice.

"Usually, end-users only notice the network when it isn't working," says Novell product manager Michael Wilkinson. "They don't notice when it starts working better."

End-users might notice NetWare 5's speed. For example, because the OS now uses the Internet Protocol (IP), instead of its own IPX as the default network transport mechanism, Novell says access to intranets and the Internet (if connecting via the company LAN) should both be faster. Thanks to an improved Java virtual machine (the program that interprets Java code), the latest NetWare should also be faster at running networked applications written in Java. And NetWare 5 uses a new file system that mounts network drives quickly. The key end-user benefit here: faster recovery from server crashes.

NETWORK TOOLS

BUT MOST of NetWare 5's improvements center on tools that IS departments can use to manage NetWare Directory Services (aka NDS), the centralized database that defines which users have access to which network resources. (Windows NT 5 will introduce its own directory service called Active Directory.) Among these new tools: a utility called Z.E.N.works, similar to NT 5's IntelliMirror, which lets users log in to the network from any workstation (or remotely) and find their preferred desktop settings and applications intact.

Despite their parents' fierce rivalry, NetWare and NT aren't mutually exclusive: You can run NT Workstation on a NetWare network, and Novell has just come out with a version of NDS that runs under NT Server.

—Dan Miller

using the PC and for what. The applet reports to PC Data via e-mail whenever you go online.

Matchbook Hard Drive

IBM, WHICH INVENTED the hard drive in 1956, recently unveiled the smallest hard disk yet. The new microdrive (due for release late next year) will be 1.4 inches wide, 1.7 inches long, and 0.2 inches thick—a bit smaller than a book of matches—and will weigh less than an ounce. Yet its 1-inch disk will store up to 340MB of data. Initially, IBM expects the drive to replace high-priced flash memory cards in digital photo and video cameras. It will fit the CompactFlash II slot—a popular format for digital cameras and other handheld devices. Pricing has not been set.

TidBytes

New Web Portal: Late this year, Infoseek and Disney will launch Go Networks (go.com), a site that will offer content and online shopping, plus links to Disney and non-Disney Web sites. Infoseek will be the featured search engine on such Disney sites as ESPN.com and ABCNews.com.

Symantec Nixes Norton Uninstall Deluxe: Symantec has stopped shipping the product, ceased work on future versions, and pulled it from the Norton SystemWorks suite. The move results from an ongoing battle over patents with Network Associates, makers of the competing Cybermedia Uninstaller. Symantec will continue to provide tech support to Uninstall Deluxe owners.

add-ons to let older Win versions take advantage of some of NT Server's new tools.

Once Windows NT 5 ships, few observers expect it to appear on most corporate desktops right away. For one thing, prospective customers will have their hands full with a once-in-a-lifetime (one hopes) hobgoblin: the year 2000 bug. Then, too, many users may sit back and see how buggy the initial release of NT 5 is before committing themselves to it. That's the consensus among users of Windows NT 4.*x*, who have been subjected to a steady stream of major and minor bug fixes. "We'll try NT 5 after Service Pack 2 or 3," says John W. Naylor, Jr., the president of Naylor Engineering, a civil and environmental engineering firm in Lake Panamoka, New York.

NT 4.0: NOT FOR ALL

ALL THIS leaves an important question: What's the right version of Windows to use now? In Microsoft's view, business users who haven't already done so should move to Windows NT 4.0. To make that upgrade more attractive to small and medium-size businesses, the company is offering a copy of NT Workstation 4.0, plus an upgrade to NT 5 when it becomes available, for $276. (NT 4.0 alone sells for $238.)

> Some features will work only if your company uses **both Server and Workstation** versions of the new operating system.

But realistically, Windows NT 4.0 makes little sense for many PC users. Do you like conveniences such as built-in power management, easy Plug and Play, and wide hardware and software compatibility? Then you should stick with Windows 95 or 98. Besides, NT 4.0 can't be installed directly over Win 95 or 98; the best you can do is install it alongside your old OS, reinstall your apps, and then re-create your personal settings by hand. By contrast, NT 5 will let you upgrade directly from an existing Win 95 or 98 setup, though Microsoft says that moving from NT 4.0 will be simpler. (Users of other versions of Windows are more likely to discover incompatible applications or peripherals when they make the jump.)

One other strike against NT 4.0: It's a poor fit for older PCs (Microsoft's Visse says a Pentium-133 with 64MB of RAM is a good starting point). Not that NT 5 will thrive on a wimpy system. Though Microsoft hopes to keep the same requirements for it as for NT 4.0, Stu Sjouwerman, editor of the NTools e-mail newsletter, anticipates that users may really need a Pentium II–level PC with at least 128MB of RAM to enjoy smooth sailing.

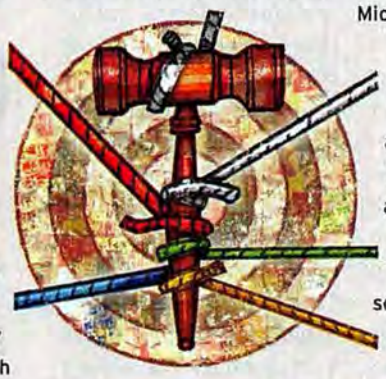
But look on the bright side: The longer it takes Microsoft to ship NT 5, the cheaper such powerhouse PCs will become. Maybe there's something to be said for operating system delays after all.

–Harry McCracken

Feds vs. Microsoft: Is NT 5 Next?

THE ONGOING state and federal antitrust lawsuits against Microsoft may not address Windows NT by name, but that does not mean they won't affect the next-generation OS.

Microsoft president Steve Ballmer has acknowledged as much, saying that, while his company's ongoing legal battles center on Windows 98, the issues pertain equally to NT. Lauren Hall, chief technologist for the industry trade-group Software Publishers Association, agrees. "NT is only involved tangentially, although the larger principles certainly apply," she says.



BUNDLING OR INTEGRATION?

THOSE PRINCIPLES include the legality of incorporating previously separate products into the operating system. The suits, filed last May by the Department of Justice and 20 state attorneys general, originally focused on Microsoft's bundling of its Internet Explorer browser with Windows 98, and how the company used its OS muscle to crowd out Netscape's Navigator Web browser. NT Workstation 5 will include a copy of IE. For its part, NT Server 5 will include a host of network utilities—including a Web server (Internet Information Server)—similar to those sold as stand-alone products by other vendors. But the integration issue may be moot: Though the plaintiffs sought and received an injunction against the inclusion of Internet Explorer in Windows 95, that injunction was rescinded by an appeals court in June.

BULLYING AND STIFLING

SINCE THEN, DOJ has sought to expand its case. Former Department of Justice economist Carl Shapiro says, "The folks at Justice...are now trying to establish [that Microsoft has engaged in] a pattern [of conduct intended] to bully and stifle would-be competitors." As the frequently postponed trial approached, the government tried to shift the focus of its case to the question of Microsoft's relationships with such potential competitors as Intel, Digital Equipment, and Netscape. Such issues are already under scrutiny in a private antitrust case filed against Microsoft by Bristol Technology. The Connecticut company, which makes software development tools, has accused Microsoft of using its control over access to Windows source code as a means to discourage developers from making products for competing operating systems.

In response to DOJ's attempts to broaden its case, Microsoft asked the presiding judge, Thomas Penfield Jackson, to limit the scope of the trial or to delay the trial for up to six months to give it time to craft a detailed response. At press time, Judge Jackson had turned down the motion to limit the trial's scope, but had agreed to delay the proceedings another three weeks.

–Daniel S. Levine

ILLUSTRATION: RICHARD DOWNS

New Software, Not Congress, May Block Spam

UPDATE

IF YOU'RE SICK of being deluged with junk e-mail, don't look to Congress for relief. Only one pending bill is even close to passage, and it might actually increase, rather than decrease, the flow of spam.

But the computer industry may soon offer a better solution. Four of the country's largest Internet service providers are testing a spam-blocking service from San Francisco–based start-up Bright Light Technologies. The ISPs, as well as some industry watchers, are hailing the technology as a breakthrough. Internet service providers may begin offering the service by November.

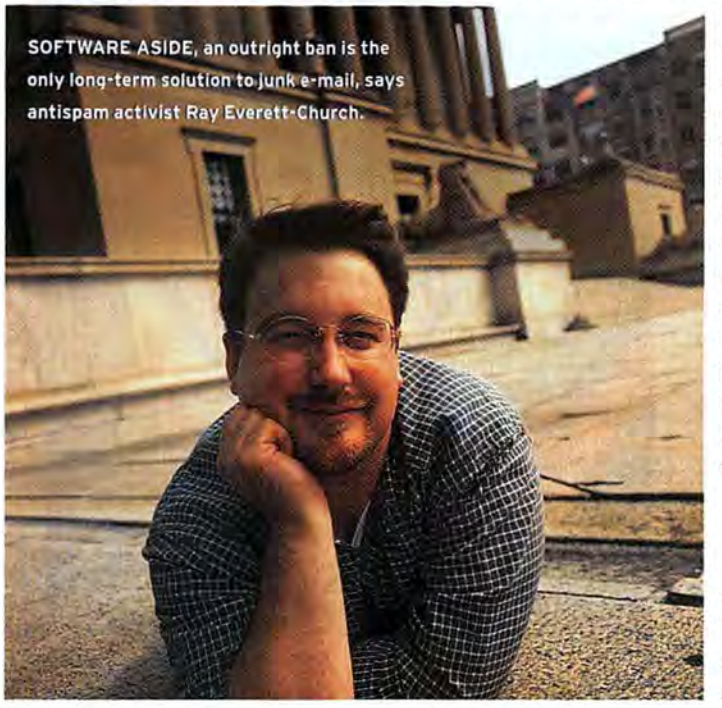
HOW IT WORKS

ISPS THAT USE the service will supply dummy e-mail accounts for Bright Light to use as bait for trapping bulk e-mailers. E-mail received at any of these accounts will be analyzed—first by a set of proprietary tools, and then by Bright Light staffers—to determine whether it is spam. If it is, Bright Light will create a software update designed to block e-mail coming from the spammer. The update will then be dispatched to ISPs that offer Bright Light service.

Many ISPs already have spam-blocking and -filtering technology in place. But because the Bright Light solution uses the resources of multiple ISPs, it has the potential to identify and block more spam than do the solutions offered by individual ISPs, says David Card, an analyst with Jupiter Communications. In addition, the Bright Light system offers consumers more options. You can choose to block all spam or only specific types, such as adult content, says company CEO Sunil Paul.

Though the early news is good, some questions remain. First, who will pay for the spam shield? Though some ISPs plan to offer the service at no charge, Paul says that others may charge consumers a premium for the added protection. Second, how extensively will the industry accept the strategy? For the system to work, Bright Light must maintain tens of thousands of dummy e-mail accounts. If the company fails to attract enough ISPs, it won't be effective. Currently, four key players—AT&T, Concentric Networks, EarthLink, and USA.Net—have signed on, but more are needed.

Despite such questions, the new technology may well be consumers' best hope for combating junk e-mail in the near term. The reason? Though numerous pieces of federal legislation related to controlling spam are under consideration, the outlook isn't good.



SOFTWARE ASIDE, an outright ban is the only long-term solution to junk e-mail, says antispam activist Ray Everett-Church.

While proposed legislation that would prohibit spam languishes in a House subcommittee, the Senate has passed a much weaker bill, SB 1618. But at press time, the House of Representatives' Commerce Committee summarily killed the anti-spam provisions in HR 3888, the corresponding House bill. That action leaves the future of federal anti-spam legislation in doubt.

As it stands, the Senate bill would authorize the Federal Trade Commission to fine bulk e-mailers who forge addresses or fail to provide both street and e-mail addresses and a telephone number of the person initiating the message.

Some critics claim, however, that since it doesn't ban spam, SB 1618 implicitly condones it and could prompt an increase in junk e-mail traffic.

Meanwhile, many states are taking matters into their own hands. One of the first to act was Washington state, which now prohibits spammers from using false headers (a subterfuge that prevents angry recipients from replying) or using misleading subject lines that entice consumers to open junk mail. Pending California legislation would permit ISPs to sue spammers for damages of up to $25,000 per day for sending electronic junk mail. At press time, the bill was on Governor Pete Wilson's desk, and he was expected to sign it.

MORE SPAM IN YOUR FUTURE

ENACTMENT OF THE feeble Senate bill might not mean an end to federal anti-spam legislation, according to Ray Everett-Church, who is cofounder and legal counsel for the Coalition Against Unsolicited Commercial E-mail—one of the most vocal of all anti-spam groups—in Washington, D.C. "If the [Senate] bill goes through as it currently stands, the spam problem will explode," predicts Everett-Church. This result would force Congress to reconsider alternative remedies.

In the meantime, though, consumers and their ISPs can only hope that technological solutions will give them the edge in the ongoing battle to put a lid on spam.

—Roberta Furger ▶

PHOTOGRAPH: MANUELLO PAGANELLI

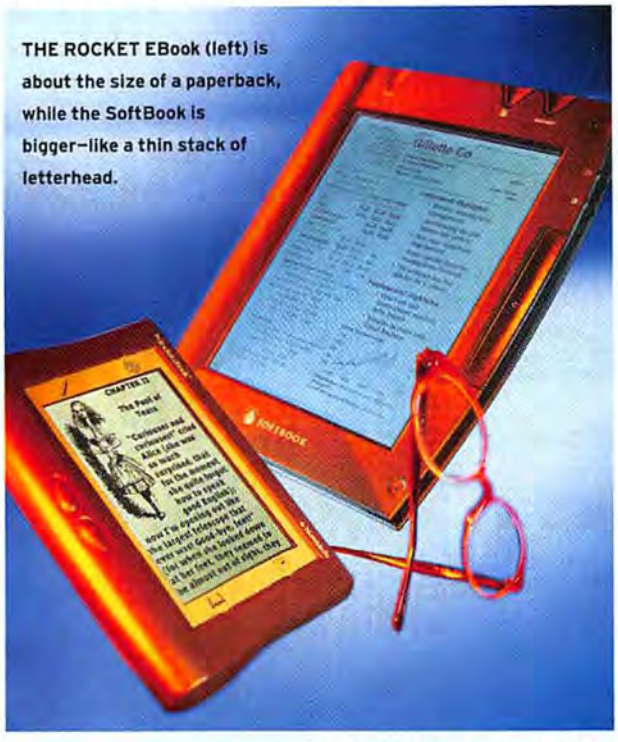
Digital Books: Good Enough to Curl Up With?

MORE SIGNS of the millennium: The first electronic books will hit store shelves this fall. By the middle of next year, consumers should have at least four of these Jetsonian devices to choose from, ranging in price from $200 to $1500.

E-books are basically high-tech reading tablets that hold the equivalent of thousands of paper pages. You download text into them, and they display it on built-in screens. Why would you buy one? Vendors say that instead of lugging a bunch of heavy books on your next business trip or vacation, you can carry the contents of a whole bookshelf in one slim e-book. Titles are expected to range from the latest best-sellers to professional journals—all searchable and annotatable.

It sounds nice, but would you really want to hunker down with your morning coffee and an electronic tablet? After looking at two early e-books, I'd say the reality has yet to catch up with the potential.

I examined prerelease versions of SoftBook's $300 SoftBook and NuvoMedia's $500 Rocket EBook. Both should be commercially available by the end of the year. Two other promised e-books—Librius's $200 Millennium Reader and EveryBook's $1500 EB Dedicated Reader—aren't ready yet: The first should begin shipping by the end of 1998; the second, early next year.



THE ROCKET EBook (left) is about the size of a paperback, while the SoftBook is bigger—like a thin stack of letterhead.

OBTAINING E-TITLES

TO BUY TEXT for the SoftBook, you plug the unit into the nearest phone line, and it then dials into the proprietary SoftBook download server. When you buy the unit, you agree to pay a $20 monthly subscription fee, which is credited toward your text purchases. Buying for NuvoMedia's Rocket EBook is equally easy. All you do is place the Rocket EBook in a Palm Pilot–like cradle, connect the cradle to your PC, and surf over to an Internet bookstore that sells EBook texts. NuvoMedia has signed a partnership agreement with Barnesandnoble.com and expects to make deals with other resellers. Neither company will say how much the e-texts will cost. Both say prices are likely to be cheaper than for the paper equivalents.

Once loaded with text, both the SoftBook and the Rocket EBook act as single-screen tablets that let you use simple buttons and a stylus to select titles, "turn" pages, search and highlight text, and make notes. One big difference between the two: screen quality. The SoftBook uses a fluorescent backlit display, which has a distinct color cast; when you turn the page, you can see a faint ghost-image of the previous page. When I tried to read the SoftBook outdoors, the reflection of my face was as visible as the text. NuvoMedia, in contrast, uses its own "transflective" screen technology. I could read the Rocket EBook in bright sunlight, with no ghosting when I turned pages.

The SoftBook is also much larger than the Rocket EBook: About the size of an inch-thick stack of letter paper, it weighs a hefty 3 pounds. It delivers the same battery life as a standard notebook—roughly 5 hours in our informal tests. By contrast, the Rocket EBook is about the size of a paperback and weighs only 20 ounces. According to NuvoMedia, the battery will let you read for 20 hours between recharges; we couldn't, unfortunately, test this claim.

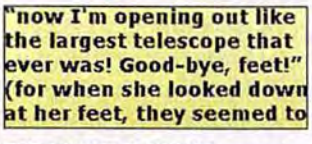
THE WRITING ON THE TABLET

THE BIGGEST question facing e-books: Which technology will have the titles that you want to read? SoftBook and NuvoMedia promise lots of content—including novels, magazines, and professional journals—but at press time neither company could produce a firm list of offerings.

If compelling titles appear, e-books could be an easy way for travelers to keep up with their business (and leisure) reading. But before you rush out to buy one of these digital doodads, check the list of available titles (www.softbook.com for the SoftBook, and www.barnesandnoble.com or other resellers' sites for the Rocket EBook): After all, it doesn't make sense to buy the box until you're sure it'll carry something you want to read.

—Joanne Robb ▶

Eyeball Test for E-Books



THE ROCKET E-BOOK'S screen is easy to read, indoors and out.

THE SOFTBOOK has a slight color cast and a problem with ghosting.

PHOTOGRAPHS: BEVERLEY HARPER

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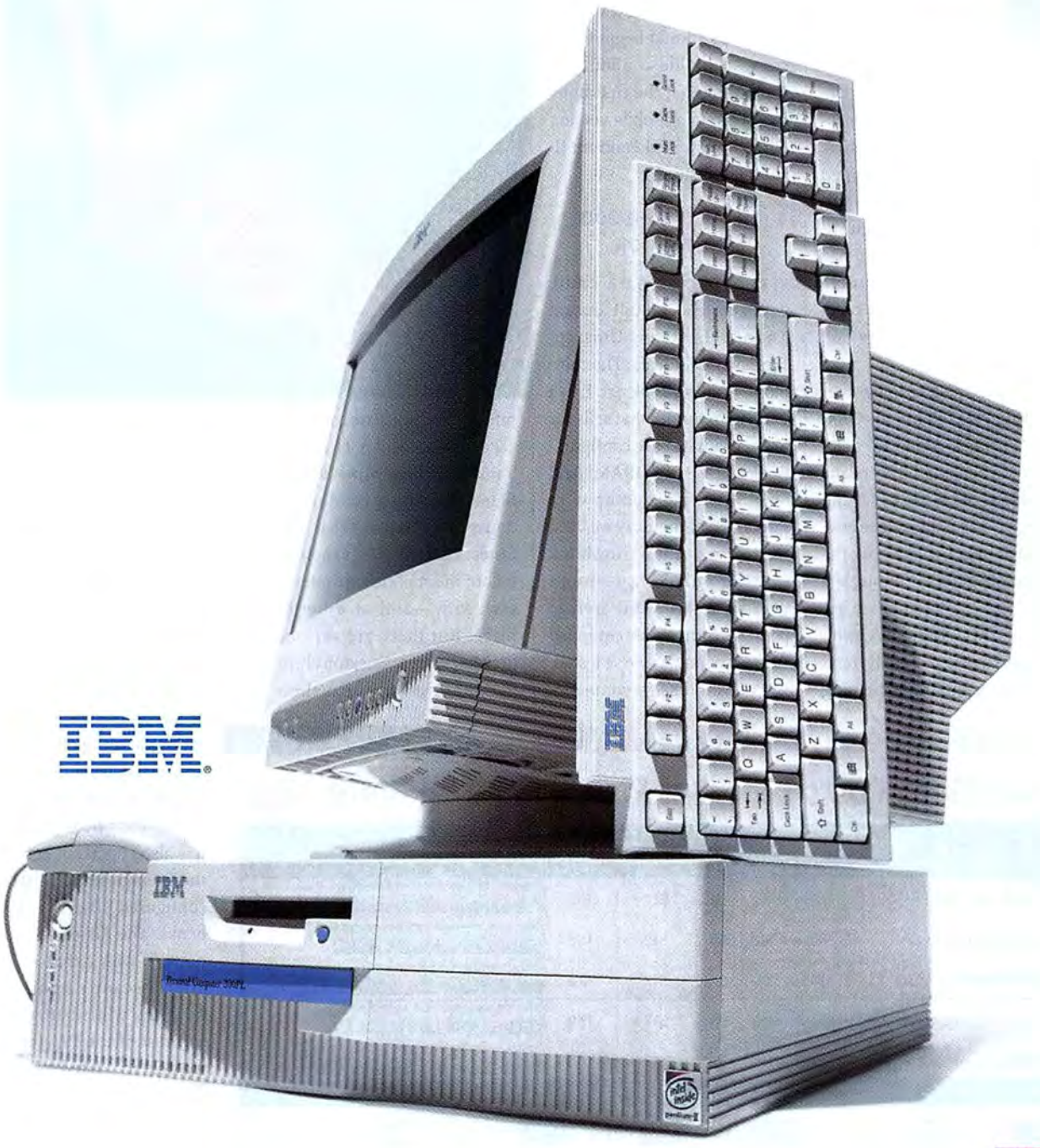

intel inside

pentium II

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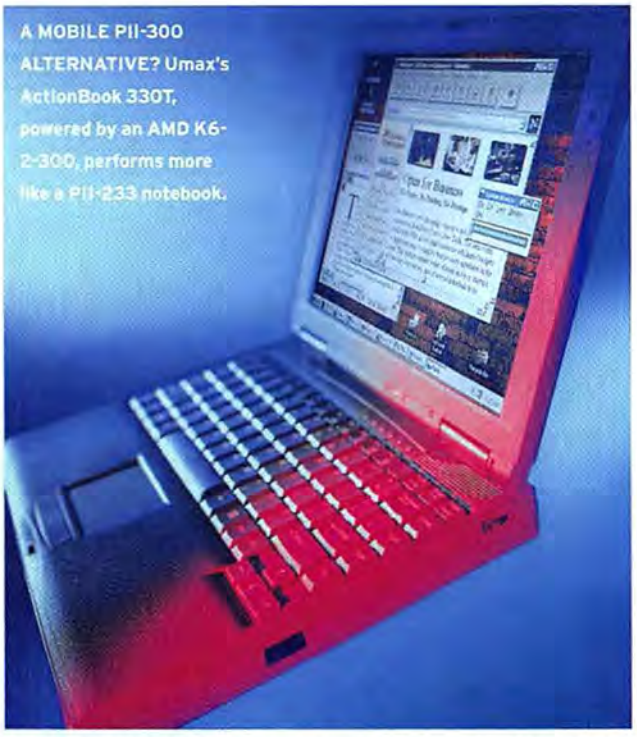
AMD Inside Your Notebook: Wait for Round Two


A MOBILE PII-300 ALTERNATIVE? Umax's ActionBook 330T, powered by an AMD K6-2-300, performs more like a PII-233 notebook.

COMPETITION is a beautiful thing—especially for PC buyers. Competition between Intel and other CPU manufacturers sparked the explosion of sub-$1000 desktops and continues to sink prices for systems equipped with even the newest and fastest processors. But until now, similar competition has been lacking in the mobile arena: When it comes to notebooks, you almost always find "Intel inside."

That may be changing. Earlier this year, Compaq, CTX, and WinBook produced notebooks carrying mobile versions of AMD's older K6 CPU; and Compaq has delivered several Presario notebooks using the Cyrix MediaGX. Though a truly mobile version of an advanced AMD chip won't be on the market until early next year, the company is helping vendors put a desktop version of its K6-2 into affordable notebooks right now. These machines should begin to become available at about the same time that the first notebooks using a mobile version of Intel's powerful Pentium II-300 are released.

UMAX'S K6-2-300 NOTEBOOK

FIRST OUT OF THE chute with a notebook built around a 300-MHz K6-2 is Umax, of Fremont, California. The company's ActionBook 330T is a sturdy 8-pounder that sells for $1699 with its base configuration of 32MB of SDRAM. And even when gussied up with the 64MB of memory we used for testing, the ActionBook sells for only $1749—more than $1700 below the average price for comparably equipped PII-300 portables we've tested. But as you'll see—some significant trade-offs are involved.

Putting a desktop chip into a notebook has some advantages. It allows vendors to equip notebooks with the fastest available CPUs months before the mobile equivalents are ready—and at a better price. But there are serious drawbacks, too. Desktop chips use more power than their mobile counterparts, so batteries tend to conk out sooner and the notebooks themselves sometimes feel warm.

Even after hours of use, the ActionBook 330T doesn't feel warm—Umax wisely gave it a big heat sink—but its performance and battery life leave much to be desired. Not only is its PC WorldBench 98 score of 126 on business applications a very noticeable 20 percent lower than the average for the three Win 98 PII-300s we've tested, it is also 13 percent below the average for similarly configured PII-266 notebooks. The ActionBook's battery was exhausted after a scant 1 hour 35 minutes, while batteries in most of the PII-300s we tested lasted more than twice that long.

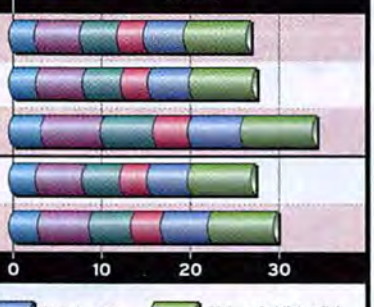
MOBILE ROAD MAP

ALTHOUGH the ActionBook's poor battery life results from Umax's ▶

NOTEBOOK PCs: BUSINESS APPS — TEST REPORT

ActionBook Costs Less, But Runs Behind PII Notebooks

NOTEBOOK PC	CPU	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
Dell Inspiron 7000 PII-300	Pentium II-300	64	512	162
Gateway Solo 2500 LS	Pentium II-300	64	512	158
Umax ActionBook 330T	AMD K6-2-300	64	512	126
Average of three notebooks	Pentium II-300	64	512	159
Average of four notebooks	Pentium II-266	64	512	145



TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench 98 score is better. For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). Data based on testing conducted by the PC World Test Center. All rights reserved.

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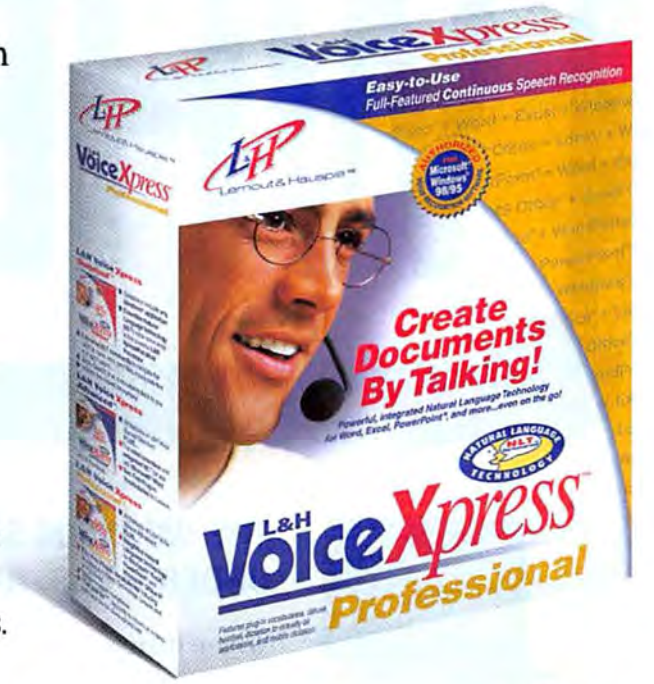

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use of a desktop chip in a mobile system—and its use of a nickel–metal hydride battery instead of a lithium ion one—we don't think the CPU is responsible for this notebook's sluggish performance. In our tests of desktop systems built around the K6-2, the performance on business applications equaled that of PII-based systems running at the same clock speeds. The likeliest (but by no means the only) possible sources of the Umax's performance problems are the drivers, the BIOS, or hidden power management features that users can't turn off.

AMD expects to produce a mobile K6-2 sometime early in 1999. The company anticipates that the chip will appear in notebooks offering other performance enhancements as well, including a 100-MHz system bus and AGP graphics.

By midyear, an even faster AMD chip is slated to arrive: a mobile version of a processor code-named Sharptooth. Likely to be dubbed the K6-3, the new chip is designed to carry integrated secondary cache memory, further improving performance. Though Sharptooth will debut as a desktop chip, Mike Feibus of Mercury Research says the processor should lend itself well to mobile use because its integrated memory saves both space and power—two highly desirable attributes in any prospective notebook CPU.

ActionBook 330T
$1749 street; Umax Technologies, 800/562-0311, www.umax.com
INFONET NO. 751

Having established a beachhead in the desktop market, AMD is ready to launch an attack on the mobile arena. Fast, low-priced mobile K6-2 and K6-3 versions—with good designs by notebook vendors—will almost certainly force notebook prices down. As Feibus puts it: "Competition is good for consumers. It's as simple as that."

—*Yardena Arar*

Sony and Caleb Give You Two New Reasons to Kiss Your Floppy Good-Bye

WANT TO replace that creaky 1.44MB floppy drive with something that offers better performance and more capacity? You're about to get some attractive new options.

At the moment, you can buy Iomega's fast and ubiquitous 100MB Zip drive (downside: can't read old 1.44MB floppies), or you can go with a floppy-reading 120MB SuperDisk from Imation or Hi-Val (downside: moves like a slug). For their part, removable-cartridge devices like Syquest's 1.5GB SyJet can't fully replace a floppy drive because they're not bootable: To recover from a system crash, you still need your floppy drive.

But in the next few months, two new floppy replacement products will appear—first as upgrade kits and (maybe) later as options on new PCs. Sony's $200 HiFD drive will deliver the highest capacity (200MB) and, according to our tests, the best performance in its class, while Caleb Technology's $79 144MB UHD144 will be the cheapest option. Both new products are expected to spur innovation—indeed, a faster SuperDisk should be available from Imation by the year's end—and they may also lower prices of competing products.

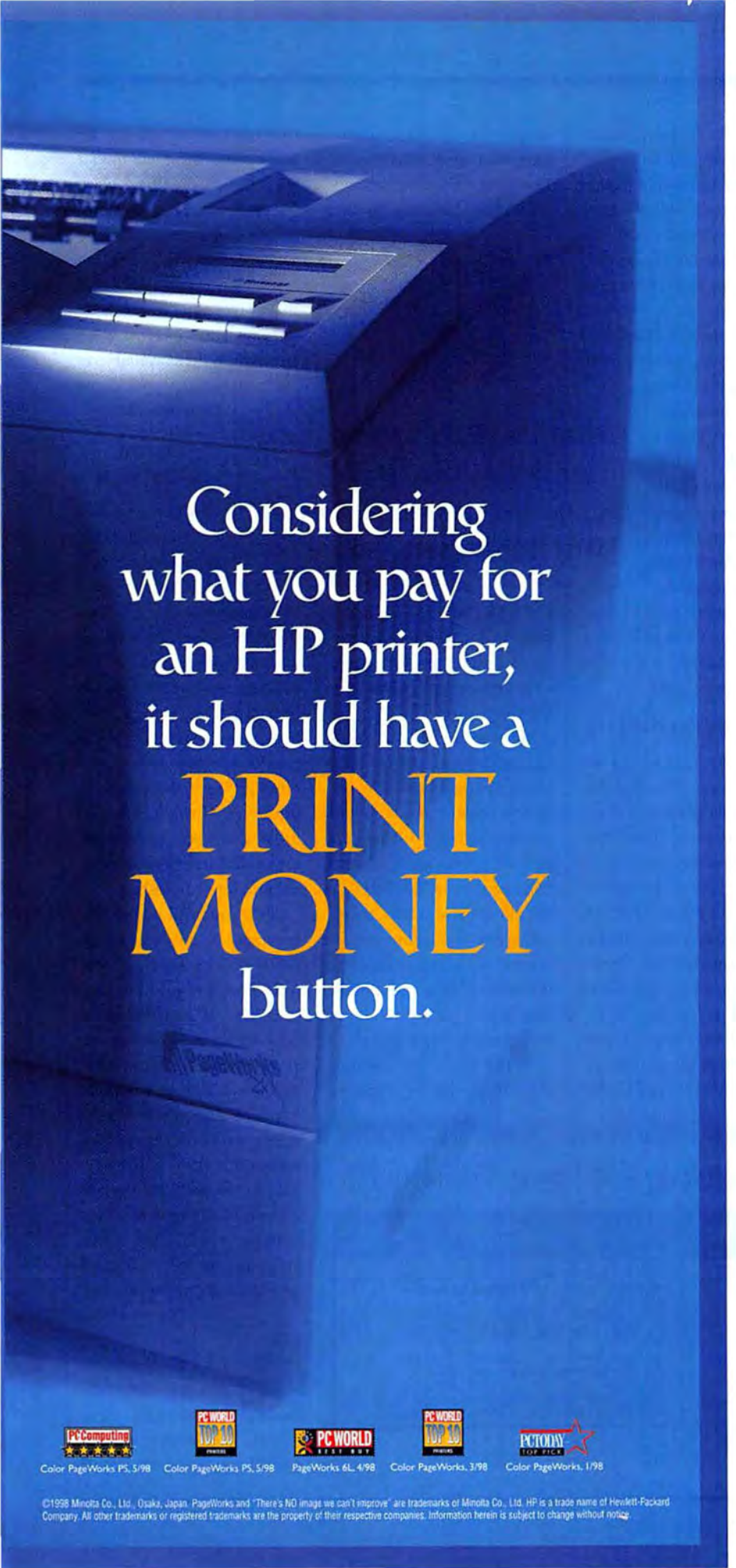
Like the SuperDisk, HiFD and UHD144 combine floppy and high-capacity removable storage into one unit, which saves a drive bay and reduces the number of peripherals that notebook users have to haul around. Owners of older PCs can use floppy-replacement upgrade kits to add removable storage to systems that may have few available drive bays. But because each of the drive types discussed here—Zip, SuperDisk, HiFD, and UHD-144—uses a different proprietary format, compatibility can be a problem. (For example, a coworker who has a Sony HiFD won't be able to read the 80MB presentation you've stored on your Zip disk.) As a result, PC makers may be reluctant to offer machines equipped with hardware that relies on one of the two new storage formats. Since the Zip and the SuperDisk already have footholds in the removable-storage market, such reluctance could seriously impede adoption of the new arrivals. If the HiFD and the UHD144 don't catch on quickly, early buyers could be stuck with an orphan product.

TOP: Sony's speedy HiFD drive. BOTTOM: Caleb's low-priced 144MB UHD144.

PHOTOGRAPH: BEVERLEY HARPER

SWIFT OR CHEAP?

WE COMPARED internal versions of three floppy-replacement drives—preproduction HiFD and UHD144 units and a shipping model of Hi-Val's SuperDisk—as well as a ▶



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shipping model of the Zip removable drive, to see how well they perform common tasks such as extracting compressed files and copying data to and from a hard drive.

Overall, the HiFD simply blew away the Hi-Val SuperDisk and the UHD144, and it was an impressive 60 percent faster than the second-place Zip. For instance, the HiFD completed our text-searching test in less than 4 minutes, while the Zip took about 8½ minutes and the SuperDisk and UHD144 each limped to the finish in about 23 minutes.

Similarly, the HiFD copied files to our test system's hard drive in just over a minute, while the others ran two to five times slower. When you retrieve archived files, you'll obviously spend less time waiting if you're using the HiFD.

Why the speed differences? As with hard disk drives, the performance of removable-storage drives is affected by disk rotational speed. The HiFD spins at 3600 rpm, significantly faster than the other drives. The Zip rotates at 2941 rpm, the UHD144 at 1000, and the SuperDisk at 720.

One caveat: Both the HiFD and UHD144 were preproduction units. A Caleb spokesperson says that the performance of the shipping UHD144 drive will outrun the preproduction unit we tested. Still, it'll have to improve dramatically to catch up with the top drives.

Speed isn't everything, of course. In terms of price per megabyte, the Zip, HiFD, and SuperDisk upgrade kits (each including the drive and one disk) cost about $1 per megabyte, while Caleb's UHD144 costs just 55 cents per megabyte. On top of that, Zip and SuperDisk disks cost roughly $10 each, while the UHD144 sells for about $5 a disk. (Sony hadn't finalized its media prices at press time.)

OTHER FACTORS

BEYOND PRICE and performance, issues of availability and product planning affect buyers. At press time Sony had not finalized its product offerings. The vendor expects to market the HiFD in internal (IDE) and slower external (parallel port) upgrade kit forms by November, and it intends to price each at less than $200. By year's end, you can expect to see a cable for connecting the external drive to a PC Card adapter—a particularly handy innovation for notebook users. Down the road, Sony will consider other interface options like USB and FireWire; and it plans to double HiFD's capacity to 400MB in the drive's next generation, perhaps in the year 2000.

Overall, the HiFD simply blew away the Hi-Val SuperDisk and the UHD144, and it was also 60 percent faster than the second-place Zip.

In December, Caleb's UHD-144 will debut as a $79 internal (IDE) upgrade kit and a sub-$100 external unit that will attach to either a parallel port or a PC Card slot. USB and SCSI versions of the UHD144 should debut in 1999. Caleb also plans to improve performance and increase capacity to over 500MB—and it has a slim-line internal notebook model in the works, as well.

Meanwhile, some existing products are due for upgrades. Imation claims that by the end of the year, it will offer a SuperDisk that delivers twice the performance of the company's current offering. The 2X SuperDisk will be released for desktops first, followed shortly thereafter by notebook versions. The SuperDisk is the only hybrid drive available as an internal drive for notebooks.

DIGITAL DARWINISM

CAN FOUR mutually incompatible drive formats survive? Probably not. Your safest course is to buy the same drive that your coworkers or customers use. For desktop users, that's likely to be a Zip drive; among notebook users, SuperDisk has caught on, with major vendors offering SuperDisk-equipped portables. If you buy one of these notebooks, consider getting an upgrade kit or an external unit for your desktop.

But if you need higher performance or larger capacity, HiFD will be worth a look. And if price is your key concern, the UHD144 should get your attention. External versions of both new products will be available, so you could attach an appropriate drive to your parallel port to read incompatible files. Still, swapping an assortment of external drives is hardly ideal. As in any struggle over formats, a little planning can help you avoid getting caught in the crossfire.

—Dean Andrews

online *For a detailed test report of the drives discussed in this story, visit PC World Online at www.pcworld.com/nov98/storage.* ■

FLOPPY REPLACEMENT DRIVES — PRODUCTS

Sony HiFD Offers More Capacity and Speed Than the Zip

UPGRADE KIT	Street price	Price per disk	Capacity (MB)	Comments	InfoNet number
Caleb Technology UHD144 www.caleb-bldr.com	$79	$5[1]	144	Lowest price, reads 1.44MB floppies, but beta unit ran slow and ability to share data will be limited in the short term.	732
Hi-Val SuperDisk 714/953-3000 www.hival.com	$130	$10[2]	120	Currently only 1.44MB floppy-reading drive widely offered in notebooks, but turned in generally slow performance.	733
Iomega Zip 800/697-8833 www.iomega.com	$99	$10[2]	100	Fast, and widespread use makes sharing data easy, but can't read from or write to 1.44MB floppies.	734
Sony HiFD 800/352-7669 www.sony.com	$200[3]	$5[3]	200	Fastest overall and highest capacity, reads 1.44MB floppies, but for now has limited ability to share data with others.	735

[1] In pack of three. [2] In pack of ten. [3] Not finalized at press time.

ILLUSTRATION: JEFFREY PELO

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- 6.4GB Ultra ATA Hard Drive
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- 3.5" Diskette Drive
- SoundBlaster® AudioPCI™ 64V
- Boston Acoustics® BA635™ Speakers
- U.S. Robotics® 56K[1] Voice Winmodem
- Micro-Tower Case
- MultiFunction Keyboard & Mouse
- Microsoft® Windows® 98 & MS® Home Essentials™ Software
- Canon® Color Printer
- Gateway Gold℠ Service for G-Series PCs*

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- 3.5" Diskette Drive
- SoundBlaster AudioPCI 64V
- Boston Acoustics BA635 Speakers
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[1]Please call for a complete list of software.

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- 16GB Ultra ATA Hard Drive
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- Philips® CD-RW CD-Rewritable Drive
- 3.5" Diskette Drive
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- Boston Acoustics MediaTheater™ 3-Piece Speaker System
- U.S. Robotics 56K[1] Voice Winmodem
- Tower Case
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- 13X min/32X max CD-ROM Drive
- Iomega Internal ZIP Drive
- 3.5" Diskette Drive
- SoundBlaster AudioPCI 64V
- Altec Lansing GCS-100 Speakers
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NEW PRODUCTS

Prints Charming: Epson and HP Improve Ink Jet Quality

FALL COLORS: We tested Epson's Stylus Color 640 (left), and the HP DeskJet 712C (top) and DeskJet 895Cse (right). Best deal: the 712C.

PRINTERS

PRINTER VENDORS love makeovers. Blink, and that sporty little printer you had your eye on may be replaced by something slightly different. The constant shifts can make shopping frustrating. This month, Epson and Hewlett-Packard have made over their Stylus and DeskJet ink jet lines for small and home offices. There are no radical changes in technology. But based on my tests of three shipping models, the switcheroo is a plus: The new units offer noticeably better print quality than their predecessors, two of them at lower prices.

I tested the **Epson Stylus Color 640** and **HP DeskJet 712C,** designed mostly for simple home printing jobs like photos and greeting cards; and the costlier **HP DeskJet 895Cse,** equipped with more business-oriented features and better paper handling. HP's DeskJet 712C is the best of the bunch.

HOME ECONOMICS

WHILE THE Epson Stylus Color 600 debuted at $249, its replacement, the Stylus Color 640 costs a more reasonable $199—and it turns out better-looking prints. The older model's print quality was generally adequate, but the new 640 stands out with smooth, realistic gray-scale graphics—perfect when you don't need color. A letter came out quite readable, if a bit fuzzier than I prefer. A photograph of a pizza lacked depth on standard paper, but on ink jet paper it looked luscious—a real achievement for a printer in this price class.

For printing at home, I liked the Stylus Color 640's straightforward software, colorful and informative manual, easy installation process, and bundled greeting card creator and photo editing applications.

Despite the Epson's charms, the competing $249 HP DeskJet 712C justifies the extra $50. The 712C and the Epson both take about half a minute to print a page of text on plain paper at default settings, and about 1.5 to 2 minutes to print a photo on ink jet paper at top settings. But the 712C delivers better print quality for text and photos on standard paper.

I also preferred the 712C for its more-advanced software, with two-sided printing and color management. HP bundles a photo editor, a photo effects program, and a publishing suite (for cards, calendars, and such).

My only objection to the 712C involves the paper tray. The U-shaped path from input tray to output curls the pages and could cause jams (though I didn't experience any).

POWER AT A PRICE

FOR HOME OFFICE work, HP's new DeskJet 895Cse, which replaces the DeskJet 890C, seems promising—geared toward print jobs like marketing brochures, sales graphs, and presentation handouts. Unfortunately, the new printer's more robust

PHOTOGRAPH: MARC SIMON

design, better paper handling, and more-advanced software inspired Hewlett-Packard to price it at a whopping $399—the same as the old 890C, but too high in today's market. The Lexmark 5700 Color Jetprinter, for example, delivers great quality and strong small-business features for just $249.

You can network the 895Cse via an external print server, and it supports an astounding range of media (envelopes, transparencies, labels, cards, posters, banners, T-shirt transfers). I also liked its print quality—much better than the 890C's—and even its cool case design with purple accents. The new printer includes a USB port. For the moment, however, HP recommends that you stick with the parallel port, warning that the USB port can slow output and degrade print quality.

In the end, the 895Cse isn't worth $399. The Stylus Color 640 and DeskJet 712C are a different story: It's easy to become jaded by claims of "better, cheaper, faster," but these two new units do deliver the goods. If you've got one of the older models, you might not find the incremental upgrade worthwhile. But if you need a new color printer and can spend more than $200, check out the HP DeskJet 712C's blend of print quality, features, and price.

—Karen Silver

Epson Stylus Color 640

PRO: Inexpensive, easy to set up and use.
CON: Color print quality a bit flat on standard paper.
VALUE: Low price, but you'll want ink jet paper for photos.
Street price: $199
Epson America
800/463-7766
www.epson.com

HP DeskJet 712C

PRO: Handles a variety of papers, good software bundle.
CON: Paper-tray setup curls paper.
VALUE: Impressive features, reasonable price, and good print quality on plain paper.
Street price: $249
INFONET NO. 727

HP DeskJet 895Cse

PRO: Increased printing flexibility, can be networked.
CON: Too expensive for its feature set.
VALUE: Useful but overpriced.
Street price: $399
Hewlett-Packard
800/752-0900
www.hp.com
INFONET NO. 728

74 Epson Stylus Color 640; HP DeskJet 712C, DeskJet 895Cse
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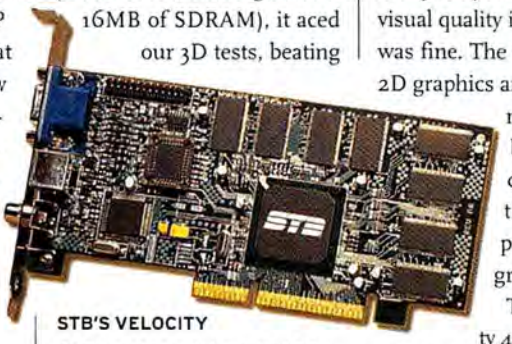
Maximum 3D Velocity: STB's Fast New Board

GRAPHICS

STB SYSTEMS' new **Velocity 4400** board lives up to its name. For viewing 3D images at top speeds, this $199 AGP graphics card makes a great choice, thanks to the new NVidia Riva TNT (Twin Texel) graphics accelerator it carries. A real technology advance, the TNT processes 2 pixels per clock cycle, so the board can render 3D images extremely quickly—and give avid gamers the high frame rates they want.

The Velocity 4400 will also please graphic artists and users of CAD programs, Adobe Photoshop, and 3D modeling applications—all of which require high-resolution support for viewing complex images.

When we tested a preproduction version of the 4400 (which comes with a generous 16MB of SDRAM), it aced our 3D tests, beating even this month's Top 10 Graphics Boards AGP Best Buy, the $149 Matrox Millennium G200. The STB Velocity 4400 produced remarkably fast frame rates in games such as Quake II and Turok Dinosaur Hunter. Although I noted a few poorly lit 3D scenes, the visual quality in games overall was fine. The Velocity 4400's 2D graphics and video performance was good but not great; it did not surpass that of the all-purpose Matrox graphics board.



STB'S VELOCITY 4400 makes quick work of 3D imaging and graphics in games.

The STB Velocity 4400's 250-MHz RAMDAC helps support monitor resolutions up to 1600 by 1200 with 16.7 million colors. And it makes viewing easy on the eyes because it supports an 85-Hz monitor refresh rate.

STB has also added some perks, including a television-out port and business apps for presentations; a video editing tool; and Web graphics.

This board isn't cheap, but the price is fair considering the 16MB of memory and lifetime warranty. The Velocity 4400 is a good value for top 3D power.

—Grace Aquino ▶

STB Velocity 4400

PRO: Extremely fast in 3D; nice support package and lifetime warranty.
CON: Some game scenes were dark.
VALUE: Great choice for games and 3D-intensive work.
Street price: $199
STB SYSTEMS
800/234-4334
www.stb.com
INFONET NO. 729

TEST PC WORLD CENTER

THIS PRODUCT has been evaluated using tests designed by the PC World Test Center.

$1998 Polywell Machine Has 16GB Hard Drive

DESKTOP

IT LOOKS like a Pentium II-350 machine and performs like a Pentium II-350. But this is Polywell's **Poly K6-2-350Gx**—the first system we've tested with AMD's new 350-MHz processor. In our PC WorldBench 98 business application tests, a preproduction Polywell earned a score of 180—an insignificant 2 percent below the average for machines based on the Intel Pentium II-350 chip, and about the speed we expected. What surprised us was the extremely generous configuration on this $1998 PC.

The Poly K6-2-350Gx's standard beige midtower doesn't look like much from the outside, but inside you'll find a gargantuan 16GB hard drive—unheard of in a sub-$2000 PC. With 128MB of system RAM, this PC has twice the usual amount of memory. And while many competitors saddle up unimpressive graphics cards that use older chips, this box has Matrox's impressive G200 AGP card with 8MB of SGRAM.

Polywell Poly K6-2-350Gx

PRO: Huge 16GB hard drive, 128MB of RAM, top-notch graphics card.

CON: Subpar speakers and thin software bundle.

VALUE: Packed configuration makes it a good value for the office.

Street price: $1998

Polywell

800/999-1278

www.polywell.com

INFONET NO. 730

TEST PC WORLD CENTER THIS PRODUCT has been evaluated using tests designed by the PC World Test Center.

You also get most of the basics for a small or home office: a 56-kbps modem, a 17-inch monitor, and a comfortable keyboard. Although the Polywell comes with a 2X DVD-ROM drive and software titles such as PGA Tour Golf, it's better suited to the office than to your living room—unless you're willing to spring for better speakers. The Juster Multimedia Speakers included with this system don't provide strong enough bass to mimic the movies. The only other thing missing is a good office application suite.

Want two other convincing arguments to put this PC on your desk? It's exceptionally easy to upgrade. Although you'll need a screwdriver to remove the chassis, the interior would satisfy Mr. Clean. Also, Polywell includes 24-hour technical support every day of the week, and the unusually long warranty covers parts for three years and labor for five. Overall, this is a whole lot of PC for the price.

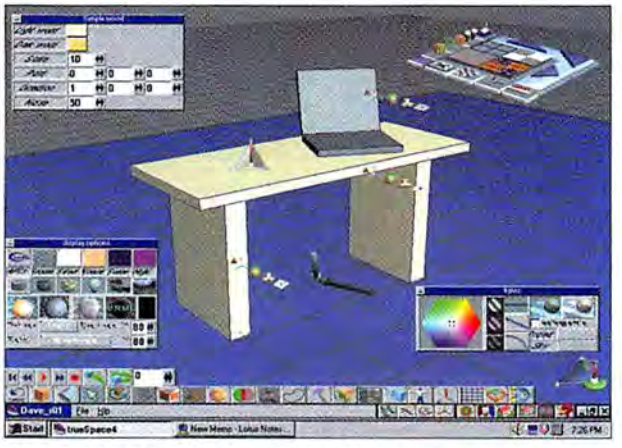
—JoAnne Robb

TrueSpace4: 3D Modeling App Stands Out

GRAPHICS

CALIGARI, maker of the 3D modeling and animation program TrueSpace, has used its 3D expertise to enhance the interface of its new **TrueSpace4.** In addition to the standard Windows 95–style drop-down menus, TrueSpace4 offers *widgets*—3D objects that let you select program options and find what you want more quickly than you can with drop-down menus or toolbars. They also let you navigate, edit, and set object properties. The benefit: You can manipulate a 3D object or scene without sifting through levels and levels of menus. The new interface is one reason TrueSpace4 is a good value for 3D modeling and animation work. The program sells for $595.

In my work with a preproduction version, I easily rotated, moved, and scaled 3D objects using the navigation widget. The edit widgets let me apply different attributes to a 3D object. The global panel widget let me change the modes of my 3D environment, from wire frame to solid rendered scene, for example. I chose not to keep too many widgets on screen at once, though; many widgets perched on top of a complex 3D scene can become distracting.



COOL TOOLS: TrueSpace4's new widget tools allow you to manipulate 3D objects more quickly than you can with menus or toolbars.

Widgets aren't the only additions to TrueSpace4. Another impressive new feature, a radiosity rendering engine, produces realistic lighting in a 3D environment. It calculates the distribution of light that should be reflected by different elements in a scene, creating a look of ambient lighting. A volumetric effect simulates light passing through the atmosphere. For instance, you can create an animation that passes through clouds or fog.

TrueSpace4 provides a lot of 3D capabilities for the price.

—Grace Aquino ▶

TrueSpace4

PRO: Interesting new 3D interface, expanded lighting effects.

CON: Screen becomes cluttered if you use too many tools at once.

VALUE: Solid 3D modeling and animation package for a fair price.

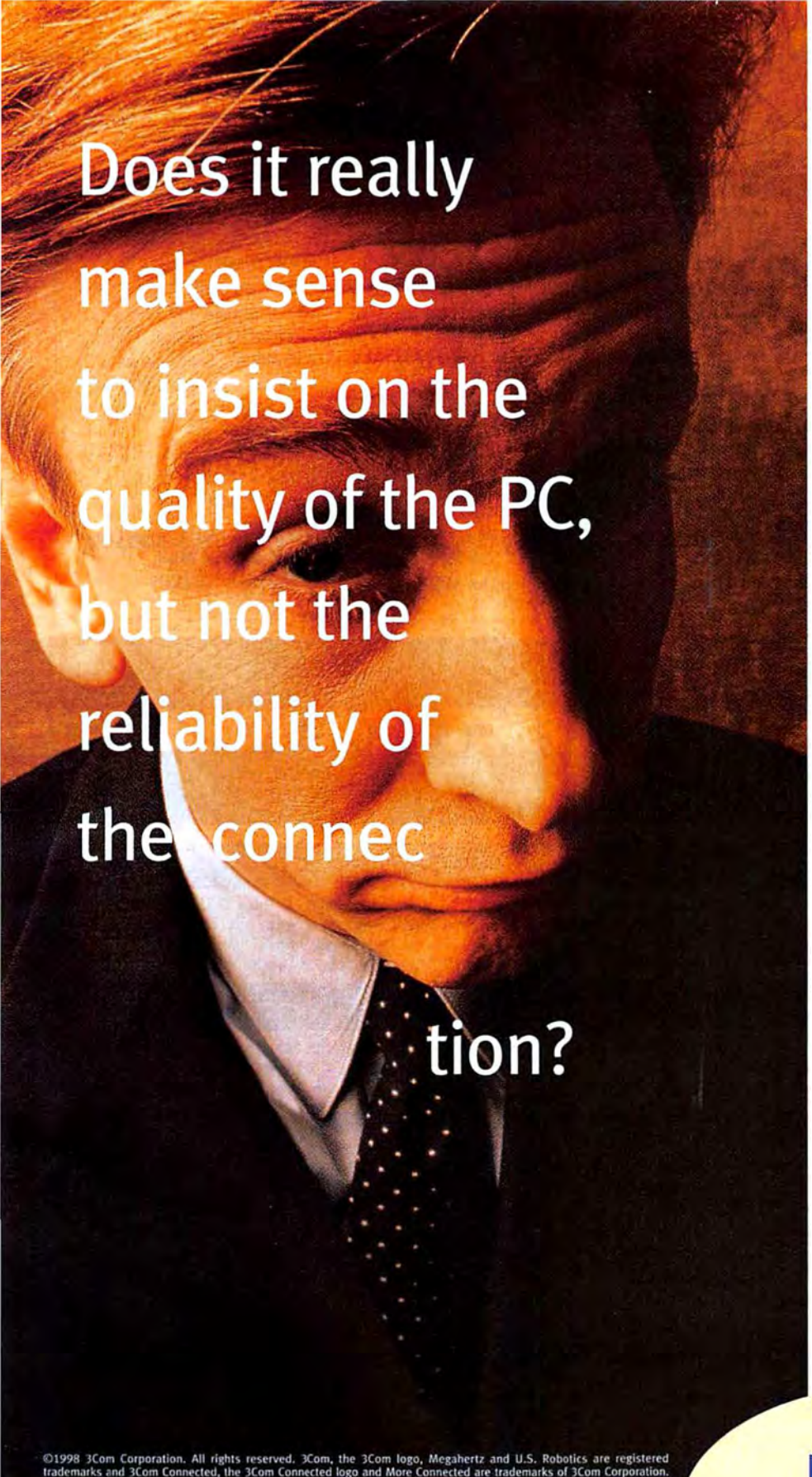
Street price: $595, upgrade $299

Caligari

800/351-7620

www.caligari.com

INFONET NO. 731



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★ *Upgrade to a 6.4GB Ultra ATA Hard Drive, add $10/36 Mos.*

★ *56K Capable^π Gold Card Modem, add $8/36 Mos.*

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WinFax Pro 9.0: Old Program Learns New Tricks

COMMUNICATIONS

I'VE BEEN SENDING and receiving faxes from my computer since Leonardo DiCaprio was a skinny little kid...well, okay, he's still a skinny little kid. Let's just say I've been faxing for a long time. So when I started testing a preproduction version of **WinFax Pro 9.0,** the latest version of the venerable fax program, I wondered: What could be interesting about something so old hat?

EASY DOES IT: WinFax Pro 9.0 can't be beat for faxing. The new Guided Setup Wizard lets you quickly fine-tune features and settings.

WinFax Pro 9.0

PRO: Makes faxing easier than ever; features new setup and calling card wizards and PIM integration.

CON: Full install consumes 60MB of disk space.

VALUE: Best choice; lots of features for little money.

Street price: $119

Symantec

800/441-7234

www.symantec.com

INFONET NO. 736

The answer: plenty. Symantec WinFax Pro 9.0 has added a bunch of tweaks, which together make PC faxing easier than ever. For starters, a new Guided Setup Wizard let me whip up three customized fax cover pages in 5 minutes.

Another improvement, the Calling Card Wizard, is worth WinFax's $119 price all by itself, particularly for telecommuters or travelers: It lets you store a variety of credit and telephone calling card numbers to use before dialing. And WinFax Pro now supports multiple modems. With two phone lines, one modem can send while another receives.

For small businesses or departments, one of WinFax's other benefits is fax sharing. You can configure a PC as a fax host on any network with IP support; the other PCs on the LAN send and receive faxes through the host, eliminating the need for a fax-modem in each client PC. (Each client does need its own copy of WinFax Pro.)

The new WinFax also integrates well with personal information managers—Microsoft's Outlook98 in particular. The interface of WinFax Pro's primary utility, Message Manager, is closely modeled after Outlook98. You can access Outlook98 messages from within Message Manager and choose to receive faxes automatically in your Outlook98 in-box. My Outlook98 contacts were instantly available from within WinFax.

Though a full install takes a notable 60MB of space, you just don't get this much functionality from bare-bones programs like Microsoft Fax.

—James A. Martin

A Slick SOHO Receptionist: TalkWorks Pro 2.0

TELEPHONY

IN A HOME OFFICE or a very small business office, Symantec's $169 **TalkWorks Pro 2.0** will pay for itself in about a year. How? If you currently pay your phone company extra for voice mail and call- or pager-notification services, this souped-up phone-and-fax-management software can perform those tasks and more, cutting your phone bill. I tested a shipping version.

TalkWorks operates with your phone and PC to give your small office a polished presence for callers. The software's wizards guide you through all the various setup options, including creating multiple voice mailboxes. You can also set up announcement messages (including after-hours and holiday messages), company directories, and fax-on-demand systems. Plus, TalkWorks includes all the features of Symantec's well-respected fax application, WinFax Pro 9.0 (see the review at the top of this page).

TalkWorks' sophisticated pager- and call-notification features let you tell the software to call you at another location or page you when it receives new voice messages or faxes. And you can establish elaborate notification rules based on the number of new messages, whether or not they're fax or voice, a time schedule, and even who called (according to Caller ID information).

Still, this program is not for everyone: TalkWorks won't work for offices that have more than five people. And if you constantly surf the Net or have high-volume phone and fax traffic, you might need an extra modem as well as an extra telephone line. But for answering the phones, TalkWorks does the job professionally.

—Dean Andrews ▶

TalkWorks Pro 2.0

PRO: Polished phone management, integrates WinFax Pro 9.0.

CON: You'll want a dedicated modem and an extra phone line for high-volume traffic.

VALUE: Effective and affordable for offices with one to five persons.

List price: $169

Symantec

800/441-7234

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INFONET NO. 737

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Microsoft PhotoDraw: Easy but Slow Graphics

GRAPHICS

YOU CAN'T QUIBBLE with the idea behind Microsoft's **PhotoDraw 2000:** Pack much of the power of pricey professional-strength graphics packages such as $695 CorelDraw, $630 Adobe Photoshop, and $449 MetaCreations Painter 3D into a $149 product that's as easy to learn as a word processor. Aimed at businesspeople who want to create slick visuals for printed documents, presentations, and the Web, PhotoDraw is affordable, innovative, and impressive in many ways. Unfortunately, the prerelease version that I tested is hampered by a cramped interface and sluggish performance.

FANCY VISUALS are easy to create with Microsoft PhotoDraw 2000's galleries of special effects. Unfortunately, speed is lacking.

NOVICES WELCOME

COMPUTER GRAPHICS files come in two very different types: vector drawings (including most clip art) and bitmaps (such as photos). You're not sure what the difference is? No problem—unlike most graphics applications, PhotoDraw handles both with aplomb. You can mix vector and bitmap images on a page and apply nearly any of the special effects to either, as well as to text.

Those dozens of easy-to-use special effects—ranging from fun-house–mirror distortions to styles that mimic the appearance of watercolor paintings and stained-glass windows—give the package much of its appeal. An extensive array of tools lets you create original artwork, and PhotoDraw 2000 makes it simple to perform photo-editing maneuvers such as cropping, tweaking colors, and removing scratches.

PLODDING PACE

UNFORTUNATELY, although PhotoDraw brings point-and-click simplicity to a number of tricky graphics tasks, its interface is confusingly cluttered with icon bars and palettes, and it feels cramped even at 1024 by 768 resolution.

Worse, the software was plodding on both of the PCs that I used—a classic Pentium-166 and a Pentium II-300, both with 64MB of RAM. I seemed to spend half my time waiting for the screen to refresh. Microsoft says the final version will be quicker in some areas but concedes that it will tax many PCs. (At a minimum, Microsoft recommends a Pentium-166 with 32MB of RAM and 1MB of graphics memory.)

Another irritant: PhotoDraw relies on certain files from Microsoft Internet Explorer 4.01. If you don't already use this Web browser (which comes with Windows 98), PhotoDraw forces you to install it. You can then remove IE 4.01 and PhotoDraw will still work, but having to do this is an imposition. Moreover, anyone who has installed and then gotten rid of a Web browser knows the process is not always simple or without problems.

These frustrations aside, PhotoDraw is definitely worth checking out if your graphics ambitions outstrip the capabilities of basic packages such as Adobe PhotoDeluxe. Just be aware that—judging from the beta version I used—this initial release doesn't fully deliver on the considerable potential of the concept.

—Harry McCracken ▶

PhotoDraw 2000

PRO: Makes generating powerful graphics surprisingly simple.

CON: Resource hungry; requires installation of Internet Explorer 4.01.

VALUE: Unique and reasonably priced, but slow.

Street price: $149

Microsoft

800/426-9400

www.microsoft.com

INFONET NO. 738

QUICK TAKES

Adobe Illustrator 8.0

ADOBE'S NEWEST version of its powerful drawing program, **Illustrator 8.0,** adds a few features from its sibling, Adobe Photoshop. We weren't able to test this new $375 version of Illustrator at press time, but it looks promising; the upgrade is $129. Illustrator 8.0 includes an actions palette, which lets you use a single mouse click to apply 160 ready-to-use effects (embossing, drop shadows, and so forth) and textures (such as marble and wood). Or, you can create customized effects. Borrowed from Photoshop, a navigator palette allows you to zoom in and out of an area in an image. Other new features include a gradient mesh tool for creating a shading or watercolor effect; a filter that turns scanned photos into cross-hatched sketches; and smart guides—rulers that appear on screen for precise alignment. Adobe Systems; 800/649-3875; www.adobe.com

INFONET NO. 739

—Grace Aquino

REX PDA Gets Smarter

LIKE THE original REX, Franklin's new $230 **REX Pro PC-Card Organizer** personal digital assistant is no larger than a short stack of business cards. Whereas REX offered no way to input data (you had to transfer appointments and contacts from a PC), REX Pro does. Using three buttons, you can schedule meetings; in a pinch, you can input alphanumeric information, though entering more than a few words was tedious on the shipping unit I tested. The device holds 6000 records. Franklin Electronic Publishers; 888/739-6400; www.franklin.com/rex

INFONET NO. 740

—Harry McCracken

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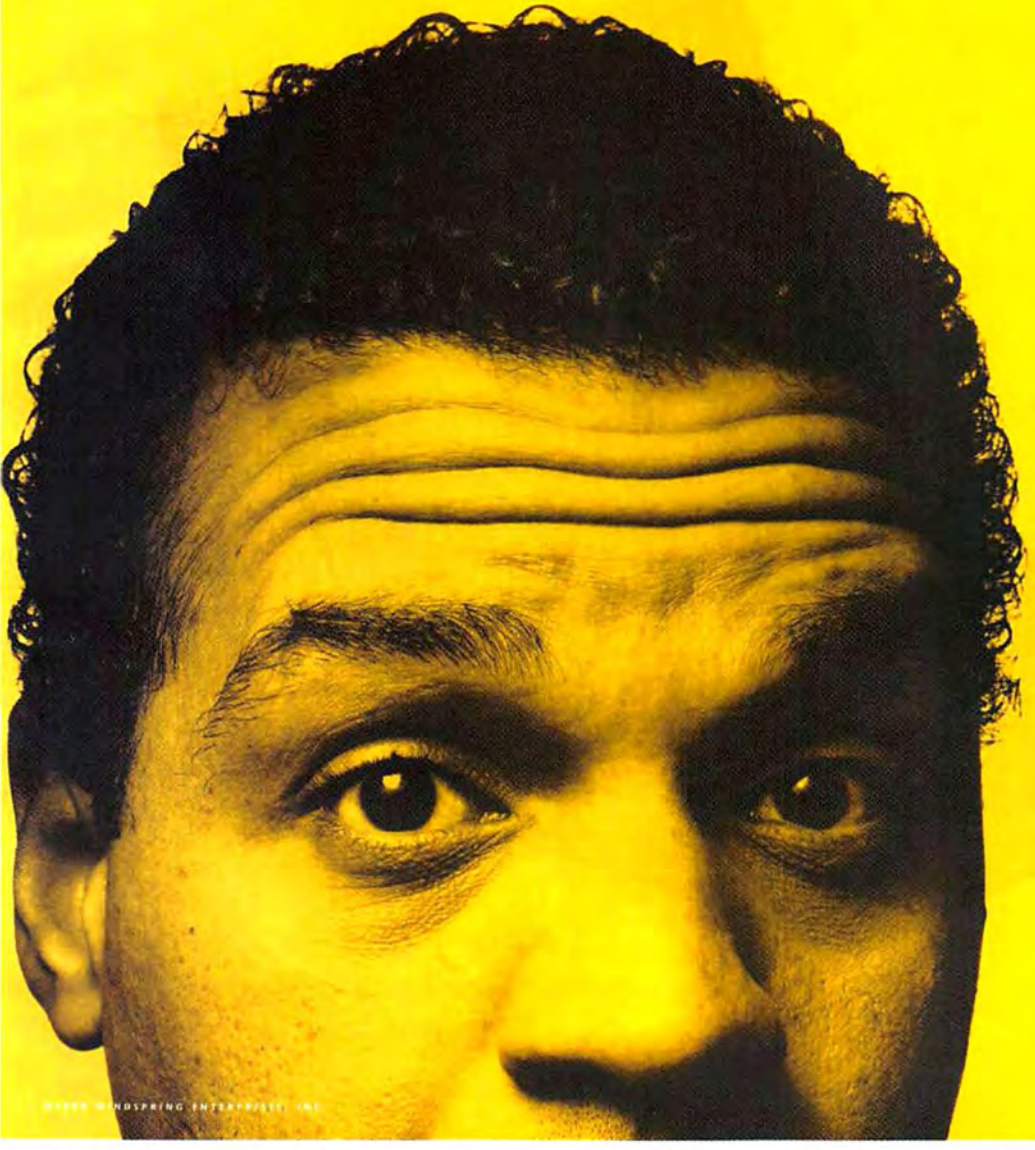

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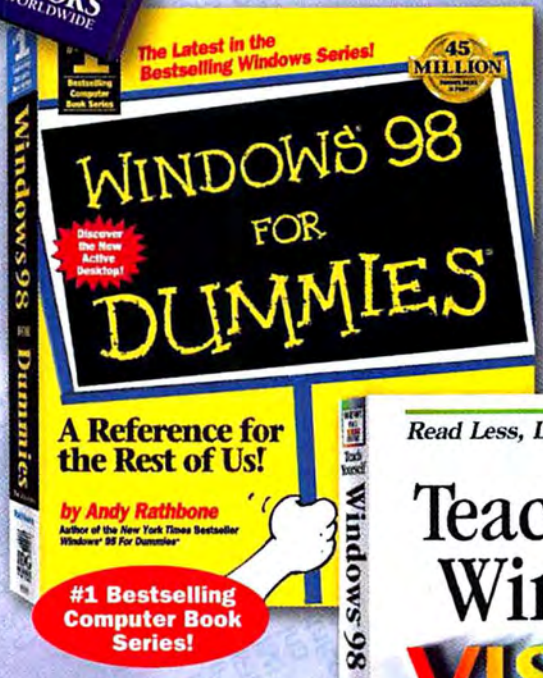

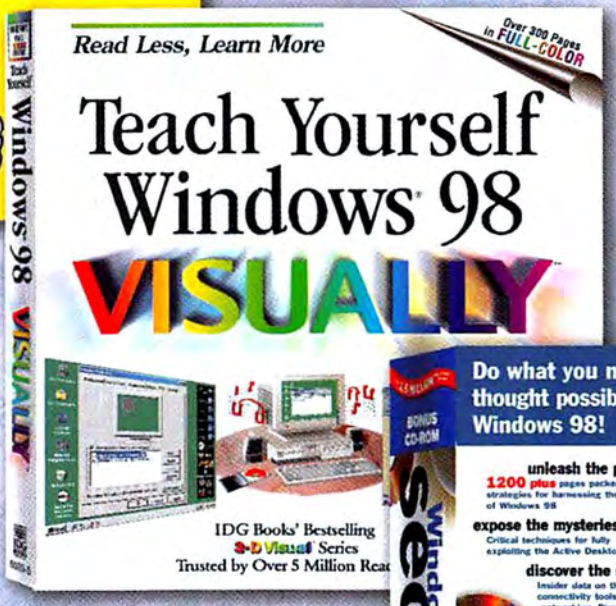

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Casio PhoneMate Monitors Voice and E-Mail

GADGET

AN E-MAIL ACCOUNT may often resemble the proverbial watched pot. When you've got a dial-up account, it's a pain to keep calling your ISP and running your e-mail program to find out if an important message has arrived. **Casio PhoneMate IT-380** handles that chore for you. This combination telephone and answering machine can check two e-mail accounts for new messages.

SPECIAL DELIVERY: Casio PhoneMate IT-380 answering machine-phone combo accepts voice messages and monitors two e-mail accounts.

You can check your e-mail manually by pressing a button, or program the machine to do it automatically, up to a dozen times a day, at times that you choose. The $150 Casio device downloads header information and displays the number of voice and e-mail messages waiting. Since e-mail header information shows on the LCD screen, you won't rush to your PC to download spam. You can also check quantities of all types of messages remotely, using a phone.

To set up, you enter basic info (for example, your ISP log-on name, password, and POP-3 mail server name), using the numeric keyboard to navigate through menus on the LCD screen. I ran into a problem while setting up a preproduction model. The phone didn't like my ISP's primary domain name server number, but worked with the secondary one. After solving my problem, Casio tech support added this solution to the Web site's troubleshooting tips.

The phone can hold only 40 e-mail headers (after which older ones get overwritten). And because it uses a 1200-bits-per-second modem, it's slow—each header took 20 to 30 seconds to download. I also wish the machine could check for mail more than 12 times a day. Given these limitations, the PhoneMate IT-380 is fairly priced and is a good option if you want to know when e-mail from a certain person arrives.

—Yardena Arar

Casio PhoneMate IT-380

PRO: Answering machine also monitors incoming e-mail.

CON: Holds only 40 e-mail headers; checks for e-mail no more than 12 times a day.

VALUE: Useful, fairly priced, but not for everyone.

Street price: $150

Casio PhoneMate

310/212-0752

www.casiophonemate.com

INFONET NO. 741

Sony's Truly Simple Spressa CD-RW Drive

CD RECORDING

SONY'S NEW **Spressa CRX100E/CH CD-ReWritable** drive makes copying CDs, creating your own audio discs, or cutting data CD-ROMs easy.

The $399 Spressa matches the performance specifications of Hewlett-Packard's recently released $399 CD-Writer Plus 8100i drive (see *New Products*, September). It records CD-RW media at 2X speed and CD-R discs at 4X, and it plays back CDs at 10X to 24X speed.

CD-ROM playback speed isn't impressive: In my tests of a shipping version of this Sony drive (on a Dell Dimension XPS Pentium MMX-200 system with 32MB of RAM), TestaCD Labs' CD Tach 98 benchmark rated the Spressa's speed as only 13.4X.

But a more important factor is the Spressa drive's extreme ease of use. Sony created its own premastering software, called CD Right. Upon launch, CD Right displays four simple choices that even novices will understand—CD Copy, Audio CD Compilation, Data CD-ROM, and CD Ditto DJ (for real-time audio recording). With the Spressa's simple installation and friendly software, beginners will be recording in less than an hour.

Even if you forget whether you inserted an erasable CD-RW disc or a write-once CD-R disc, CD Right won't. It displays the disc type in a bold red font on the main screen. As with other recording software, you can quickly drag and drop files from Windows Explorer directly to the CD Right window. Pressing the Record button starts the burn. Experts can access the sophisticated settings—like multisession attributes, recording optimizations, and mixed-mode formats—by selecting the Advanced button or choosing the Tools/Options menu.

As a bonus, Sony includes a CD labeling kit in the box. It sends you the label applicator tool by mail after you register your drive. All in all, the Spressa is a good choice.

—Dean Andrews ▶

Spressa CRX100E/CH CD-ReWritable drive

PRO: Exceptionally easy to install and use.

CON: Slow CD-ROM playback.

VALUE: Good recording package, even for beginners.

List price: $399

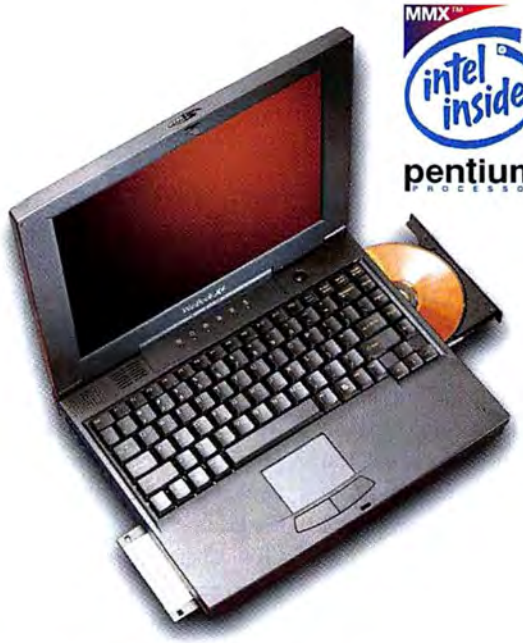
Sony Electronics

800/352-7669

www.sony.com/storagebysony

INFONET NO. 742

Operators Are Not Standing By.



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Logitech's Latest: Three Very Smart Mice

INPUT DEVICES

YOU PROBABLY use the mouse that came with your PC, right? You probably figure you have no reason to go out and proactively seek a new mouse when the one you have works fine, right? Wrong.

Mice are no longer simpleton rodents. Loaded with features such as scrolling, dedicated Windows 95 function keys, customizable navigation controls, and shapes designed to help prevent injuries due to repetitive stress, the latest pointing devices can make computing quicker, simpler, and more comfortable.

Basing an entire product line on its successful wheel mouse technology, Logitech has released three new devices: the **Cordless Wheel Mouse** (see photo, bottom center); **USB Wheel Mouse for Windows 98** (top left); and **MouseMan Wheel** (top right), an updated version of its top-of-the-line MouseMan+. I tested shipping versions. Except for the MouseMan Wheel, the devices work for right- or left-handed users.

WIRELESS WONDER

CORDLESS MICE have always been like Pinocchio: While they've got no strings to hold them down, they also tend to lie about their pointing prowess. That's because most cordless mice use infrared technology, which requires an unobstructed path between the mouse and the desktop IR beam. If your desk looks anything like mine, that could mean big trouble. But Logitech's $60 Cordless Wheel Mouse works differently: Relying on radio frequency technology (see RF transceiver photo, bottom left), it ran without a hitch anywhere within 6 feet of my desk, even from the next cubicle, regardless of line of sight. The setup is quick, as is step-by-step user customizing of the included MouseWare software. And how does Cordless Wheel Mouse stack up to the competition? For my money, no cordless rival matches it. Alas, the price of cordless freedom is the loss of a precious PC serial port (for the receiver unit). So if you're like me and use the serial port for a modem or other peripheral, this mouse's convenience comes at a high price.

But Logitech has a solution for serial port congestion: It's the $40 USB Wheel Mouse. The Universal Serial Bus port is designed to handle dozens of simultaneous peripheral connections with hot Plug and Play capability. Indeed, the moment I plugged the cable of the USB Wheel Mouse into one of the two USB slots on my Dell Dimension PC, the mouse was up and running. I had instant scrolling capabilities with the center wheel, and after installing Logitech's software, I was able to use the special customization features. (USB Wheel Mouse requires a computer with Windows 98.)

Like the cordless device, USB Wheel Mouse has a contoured shape that comfortably positions the hand over the right and left buttons as well as the centered scroll wheel/button.

But for the ultimate in both comfort and function, I will stick with the $50 MouseMan Wheel, an updated, rightiesonly version of Logitech's MouseMan+ (winner of *PC World*'s 1998 World Class award for best input device).

About 5/8-inch taller than its siblings, the device is sculpted to fit your hand like a baseball in a fielder's glove. In addition to the three buttons on top, a customizable fourth button is positioned along the side where your thumb rests (I programmed it to simulate a double-click with one press). That side is now rubberized to offer a better grip (see inset photo above).

Scrolling with the wheel/button is also customizable: You can set the device to scroll in increments of three or six lines, or a full screen at a time.

MouseMan Wheel is similar to Microsoft's $75 IntelliMouse Pro but costs less. In all, Logitech has three mice worth screaming about.

—*Michael S. Lasky* ▶

Cordless Wheel Mouse

PRO: Wire-free for unrestricted placement on desktops.

CON: Requires a serial port, preventing use of other peripherals.

VALUE: The technology is solid, but think carefully about the serial port issue.

Street price: $60

INFONET NO. 743

USB Wheel Mouse

PRO: Hot Plug and Play installation; saves serial ports for other uses; easy to handle.

CON: Works only for PCs that have Windows 98 installed.

VALUE: Comfort and convenience at a very reasonable price.

Street price: $40

INFONET NO. 744

MouseMan Wheel

PRO: Comfort combined with customizable functionality.

CON: For right-handed users only.

VALUE: The mouse I want.

Street price: $50

INFONET NO. 745

Logitech

800/231-7717

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PHOTOGRAPHS: MARC SIMON

Quantex customers are happier than IBM, Gateway, or Micron customers.[1]

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[1]Results based on a Windows Magazine (Aug '97) 'Technical Support Survey' in which Quantex received a 91% 'Buy Again Rating,' higher than that received by IBM, Micron and Gateway and on PC Magazine (July '98) 'Service and Reliability Survey' in which Quantex received the highest ratings for its customers' 'Tech Support Experience' in 4 out of 5 categories including 'tech was knowledgeable, tech tried everything to help, prompt resolution and got a run-around.' Calculations based on 25 vendors evaluated in the survey.

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Toshiba	61%
Compaq	58%
Packard Bell	51%

Windows Magazine, 8/97

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TECH SUPPORT EXPERIENCE

Vendor	Tech was knowledgeable	Tech tried everything to help	Prompt resolution	Got a run-around
Quantex	**57%**	**59%**	**49%**	**9%**
Micron	56%	47%	43%	9%
Gateway	54%	48%	45%	10%
Dell	54%	43%	49%	10%
IBM	41%	33%	36%	15%
Compaq	37%	30%	30%	17%
Average*	**40%**	**33%**	**32%**	**16%**

"Service and Reliability Survey," PC Magazine, July 1998
* calculations based on all 25 PC vendors evaluated in the survey.

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PC PORTABLES Best Buy Award (3/98)

PC COMPUTING 4-star "Torture Test" Survivor (4/98)

PC COMPUTING 4-star Rating (9/98)

'Results based on PC Magazine (July '98) 'Service and Reliability Survey' in which Quantex received the highest ratings for its customers' "Tech Support Experience" in 4 out of 5 categories including 'tech was knowledgeable, tech tried everything to help, prompt resolution and got a run-around.' Calculations based on 25 vendors evaluated in the survey.

intel inside
pentium® II

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Quantex Business Desktops bring enterprise management technology, traditionally implemented by large corporations, to businesses of all sizes–including yours. Built according to industry-standard initiatives such as Wired for Management, DMI 2.0, PC '98, LDCM and ACPI, these desktops are designed to lower your total cost of ownership. They also incorporate capabilities for improved asset management, remote wake-up of systems over the LAN and remote configurations and diagnostics. Plus, our innovative QSentry technology assures unsurpassed confidence and security by constantly monitoring the health of Quantex PCs. If you want to do something more productive, install Quantex Business Desktops. **Starting at just $999**

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Think bigger. Carry smaller.

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For extreme mobile computing power and performance, the Quantex I-Series is as good as it gets. It boasts a big 14.1", 1024x768 display, a fast mobile Pentium® II processor 300MHz, and a built-in dual drive bay design so you can rip through work like spreadsheets, presentations, email and more. With a 2x DVD-ROM drive and AGP with hardware 3D graphics acceleration, the I-Series delivers exceptional multimedia excitement, including movies and 3D presentations complete with sound and animation. With its uncompromising performance and extreme power, it doesn't just replace your desktop. It humbles it. **Starting at just $2399**

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QP6/333 SB-1c $999

Business lease: $35/Mo.

- Intel® Celeron™ Processor 333MHz
- 32MB SDRAM Memory / 128KB Secondary Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 15" Digital Monitor (13.8" viewable)
- 64-bit 3D PCI Graphics Card with 4MB RDRAM
- Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- 3-year limited warranty with 1-year On-Site Service*
- 24-hr./7-day Technical Support
- QSentry Technology (including Intel LANDesk Client Manager V 3.1)
- *Upgrade to Windows NT Workstation 4.0 for $99*

QP6/333 SB-1(w/ Pentium® II Processor) $1099

QP6/350 SB-2 $1499

Business lease: $53/Mo.

- Pentium® II Processor 350MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/ OSD (15.8" viewable)
  Upgrade to 17" Monitor w/NEC CromaClear CRT for $79
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98
- **Microsoft Office '97 SBE Ver 2**
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- QSentry Technology (including Intel LANDesk Client Manager V 3.1)
- *Upgrade to Windows NT Workstation 4.0 for $99*
- *Add 56K V.90 Fax/Modem* for $39*

QP6/333 SB-2(w/ Pentium® II Processor) $1399

QP6/400 SB-3 $1799

Business lease: $63/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- **17" Digital Monitor w/OSD & NEC CromaClear CRT** (16.0" viewable; .25 dp, 1600x1200 max. resolution)
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- **Microsoft Office '97 SBE Ver 2**
  Upgrade to MS Office '97 Professional for $199
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- QSentry Technology (including Intel LANDesk Client Manager V 3.1)
- *Add 56K V.90 Fax/Modem* for $39*
- *Upgrade to 15.0" LCD Flat-Panel Display for $549*

QP6/350 SB-3(w/ Pentium® II Processor) $1599

QP6/450 SB-4 $2199

Business lease: $77/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 10.2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- **19" Monitor w/ OSD** (18.1" viewable), 1600x1200, .26dp
- **#9 Revolution IV 128-bit 3D 2X AGP Graphics with 32MB**
- Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- Microsoft Office '97 SBE Ver 2
  Upgrade to MS Office '97 Professional for $199
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- QSentry Technology (including Intel LANDesk Client Manager V 3.1)
- *Add 56K V.90 Fax/Modem* for $39*
- *Upgrade to 15.0" LCD Flat-Panel Display for $399*

QP6/400 SB-4(w/ Pentium® II Processor) $1999

BUSINESS NOTEBOOKS

OPTIONS: Mini-Docking Station $149 ▪ 2nd Lithium Ion Battery $129 ▪ PCMCIA NIC $129 ▪ Deluxe Carrying case $99

Quantex T-1310 $1999

Business lease: $70/Mo.

- Pentium® II processor 233MHz
- Intel Mobile Module (I.M.M.) Architecture
- 13.3" XGA Active Matrix Display
- 32MB SDRAM
- 512KB Secondary Cache
- 4GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- 56K V.90 Fax/Modem*
- 24X Modular CD-ROM Drive
- 128-bit AGP Graphics Accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
- Corel Office Suite 8
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

T-1310 w/Pentium II processor 266MHz $2199

Quantex T-1311 $2499

Business lease: $88/Mo.

- Pentium® II processor 266MHz
- Intel Mobile Module (I.M.M.) Architecture
- 13.3" XGA Active Matrix Display
- 64MB SDRAM/512KB Secondary Cache
- 4GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- 56K V.90 Fax/Modem*
- 24X Modular CD-ROM Drive
- 128-bit AGP Graphics Accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- **2nd Lithium Ion Battery**
- **Mini-Docking Station**
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
- Microsoft Office '97 SBE Ver 2
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

T-1311w/Pentium II processor 300MHz $2749

Quantex T-1410 $2899

Business lease: $102/Mo.

- Pentium® II processor 300MHz
- Intel Mobile Module (I.M.M.) Architecture
- 14.1" XGA Active Matrix Display
- **80MB SDRAM**
- 512KB Secondary Cache
- 6GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- 56K V.90 Fax/Modem*
- **2X DVD-ROM Drive**
- 128-bit AGP Graphics Accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
- Microsoft Office '97 SBE Ver 2
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

Quantex T-1411 $3099

Business lease: $104/Mo.

- Pentium® II Processor 300MHz
- Intel Mobile Module (I.M.M.) Architecture
- 14.1" XGA Active Matrix Display
- **96MB SDRAM**
- 512KB Secondary Cache
- 6GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- 56K V.90 Fax/Modem*
- **2X DVD-ROM Drive**
- 128-bit AGP Graphics Accelerator
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- **2nd Lithium Ion Battery**
- **Mini-Docking Station**
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
- Microsoft Office '97 SBE Ver 2
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

Quantex I-1400 $2399

Business lease: $84/Mo.

- Pentium® II processor 266MHz
- Intel Mobile Module (I.M.M.) Architecture
- 14.1" XGA Active Matrix Display
- 64MB SDRAM
- 512KB Secondary Cache
- 4GB Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- 56K V.90 Fax/Modem*
- 24X Modular CD-ROM Drive
- **ATI 3D AGP Graphics Accelerator w/8MB**
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
- Corel Office Suite 8
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

I-1400 w/Pentium II processor 300MHz $2599

Quantex I-1411 $3399

Business lease: $114/Mo.

- Pentium® II Processor 300MHz
- Intel Mobile Module (I.M.M.) Architecture
- 14.1" XGA Active Matrix Display
- **128MB SDRAM**
- 512KB Secondary Cache
- **8GB** Ultra ATA HD / 3.5" 1.44MB Modular Floppy Drive
- 56K V.90 Fax/Modem*
- **2X DVD-ROM Drive**
- **ATI 3D AGP Graphics Accelerator w/8MB**
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- **2nd Lithium Ion Battery**
- **Mini-Docking Station**
- USB and Fast IR Ports
- Integrated Personal Touchpad
- MS Windows 98
- Microsoft Office '97 SBE Ver 2
- Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

I-1411 w/Pentium II processor 266MHz $3199

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VALUE MULTIMEDIA

QP6/333 M-1c $1099

Business lease: $39/Mo.

- Intel® Celeron™ Processor 333MHz
- 64MB SDRAM Memory / 128KB Secondary Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 15" Digital Monitor (13.8" viewable)
- 64-Bit 3D PCI Graphics Accelerator with 4MB
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/350 M-1x(with Pentium II processor).....$1299

SOFTWARE: Corel Office Suite 8 • MS Money '97 • Compton's Interactive Encyclopedia • Body Works 6.0 • Amazon Trail II American Heritage Talking Dictionary • Internet the City • Compton's Reference Collection • Dr. Solomons Find-Virus • MS Internet Explorer 4.0

QP6/350 M-2x $1499

Business lease: $53/Mo.

- Pentium® II Processor 350MHz/100MHz Front Side Bus
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD (15.8" viewable)
- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ***New* 3rd-Generation 4.8X DVD-ROM Drive**
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/333 M-2x(with Pentium II processor).....$1399

QP6/400 M-3x $1799

Business lease: $63/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 10.2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD (15.8" viewable)
  Upgrade to 17" Monitor w/NEC CromaClear CRT for $79
- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- **Internal 100MB Zip Drive with one cartridge**
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ***New* 3rd-Generation 4.8X DVD-ROM Drive**
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/350 M-3x(with Pentium II processor).....$1599

QP6/450 M-4x $2099

Business lease: $74/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory/512KB Secondary Cache
- 10.2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- **19" Monitor w/OSD (18.1" viewable), 1600x1200, .26dp**
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ***New* 3rd-Generation 4.8X DVD-ROM Drive**
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**
- *Add Altec Lansing ACS-251 Subwoofer for $39*
- *Upgrade to 15.0" LCD Flat-Panel Display for $399*

QP6/400 M-4X(with Pentium II processor).....$1899

POWER MULTIMEDIA

QP6/350 SM-1x $1549

Business lease: $54/Mo.

- Pentium® II Processor 350MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD (15.8" viewable)
  Upgrade to 17" Monitor w/NEC CromaClear CRT for $79
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE Ver 2
- 3-year limitec warranty with 1-year On-Site Service**

QP6/400 SM-1x(with Pentium II processor).....$1699

SOFTWARE: MS Office '97 Small Business Edition Ver 2 • MS Money '97 • Office Mate • Day Planner Pro • Power Business Plans • Form Designer Pro • Project Manager Pro • Labels Unlimited • Compton's Reference Collection • Dr. Solomons Find-Virus • MS Internet Explorer 4.0

QP6/400 SM-2x $1999

Business lease: $70/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 96MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- **17" Digital Monitor w/ OSD & NEC CromaClear CRT**
  (16.0" viewable; 25 dp; 1600x1200 max. resolution)
- **128-bit 3D 2X AGP Graphics w/16MB**
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-45.1 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE Ver 2
- 3-year limited warranty with 1-year On-Site Service**
- *Upgrade to 15.0" LCD Flat-Panel Display for $549*

QP6/450 SM-2x(with Pentium II processor).....$2199

QP6/400 SM-3x $2199

Business lease: $77/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, .26dp
- **#9 Revolution IV 128-bit 3D 2X AGP Graphics with 32MB**
- **Internal 100MB Zip Drive with one cartridge**
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-45.1 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE Ver 2
- 3-year limited warranty with 1-year On-Site Service**
- *Upgrade to 15.0" LCD Flat-Panel Display for $399*

QP6/450 SM-3x(with Pentium II processor).....$2399

QP6/450 SM-4x $2499

Business lease: $88/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- **16.8GB Ultra ATA HD** / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, .26dp
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ***New* 3rd-Generation 4.8X DVD-ROM Drive**
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- ***New* Altec-Lansing ADA-305 Dolby Surround Sound Speakers with subwoofer**
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE Ver 2
- 3-year limitec warranty with 1-year On-Site Service**
- *Upgrade to 15.0" LCD Flat-Panel Display for $399*

QP6/400 SM-4x(with Pentium II processor).....$2299

SUPER MULTIMEDIA

QP6/450 M-4x SE $2299

Business lease: $81/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, .26dp
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- **Internal 100MB Zip Drive with one cartridge**
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ***New* 3rd-Generation 4.8X DVD-ROM Drive**
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**
- *Add Altec Lansing ACS-251 Subwoofer for $39*
- *Upgrade to 15.0" LCD Flat-Panel Display for $399*

QP6/400 M-4x SE(with Pentium II processor).....$2099

QP6/450 SM-4x SE $2999

Business lease: $105/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- **16.8GB Ultra ATA HD** / 3.5" 1.44MB Floppy Drive
- **21" Monitor w/OSD** (20.0" viewable), 1600x1200
- **#9 Revolution IV 128-bit 3D 2X AGP Graphics with 32MB**
- **Internal 100MB Zip Drive with one cartridge**
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ADA-305 Dolby Surround Sound Speakers & subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE Ver 2
- 3-year limited warranty with 1-year On-Site Service**

QP6/400 SM-4x SE(with Pentium II processor).....$2799

M-SERIES BEST BUY

QP6/450 Best Buy $1999

Business lease: $70/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- **19" Monitor w/OSD** (18.1" viewable), 1600x1200, .26dp
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ***New* 3rd-Generation 4.8X DVD-ROM Drive**
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**
- *Add Altec Lansing ACS-251 Subwoofer for $39*
- *Add a Internal Zip Drive for $ 79*

GAMING BEST BUY

QP6/450 GX-2 $2499

Business lease: $88/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13.5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, .26dp
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- Internal 100MB Zip Drive with one cartridge
- 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ***New* 3rd-Generation 4.8X DVD-ROM Drive**
- **Aureal "A3D" 3D Positional PCI Sound**
- **3Dfx Voodoo2 based 3D Game Accelerator w/12MB**
- MS SideWinder 3D Pro Joystick
- *New* Altec-Lansing ADA-305 Dolby Surround Sound Speakers & subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- Value Multimedia Software Bundle
- ***Activision Game Titles:*** Battlezone, Heavy Gear Interstate 76 w/Nitro Pack
- 3-year limited warranty with 1-year On-Site Service**

QP6/400 GX-2(with Pentium II processor).....$2299

intel inside
pentium® II PROCESSOR

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INFONET NO. 746

While the software is free, the service itself costs $110 per month. A year's subscription will run you $839. Not bad: Comparable services go for $1800 a year.

QChart's claim to fame is a proprietary server technology that highly compresses data, allowing the program to download large amounts of information quickly. You can view a great deal of information about a single security with just one click of your mouse. I was able to run QCharts while Web surfing on a 33.6-kilobits-per-second modem. Built-in browser windows connect to online brokerage firms.

Using multiple windows within QCharts, it's easy to follow the daily gyrations of the market. Color coding helps identify winners and losers at a glance. Programmable alerts show when a stock hits a certain price, and hot lists can be a source of ideas, showing biggest gainers and so forth.

But while the chart features are fine for a quick view of a stock, better chart readers can be found (see www.equis.com/java for such an example).

Also, the program doesn't automatically alert you to breaking news about a company. And the programmable price alerts are easily overlooked when you minimize QCharts. The program wisely makes use of other Web data with built-in preprogrammed browser windows, but I'd rather be able to point the browser windows anywhere I wish.

—Daniel Levine

FileMaker Makeover

ATTENTION Microsoft Access users: You may finally have an alternative—**FileMaker Pro 4.1.** Three years ago FileMaker added some (but not full) relational capabilities along with a Microsoft Excel filter. Now FileMaker 4.1 has finally become a genuine database manager, adding much-needed support for ODBC and SQL. These two protocols enable FileMaker to import standard corporate database formats such as Access and Oracle, and to export to standard desktop databases. I tested a beta copy and easily imported and exported in DBF format. Overall, the new import/export capabilities are the program's primary improvement. Street price is $199, $149 for registered FileMaker or Access 97 users. FileMaker; 408/987-7000; www.filemaker.com

INFONET NO. 748

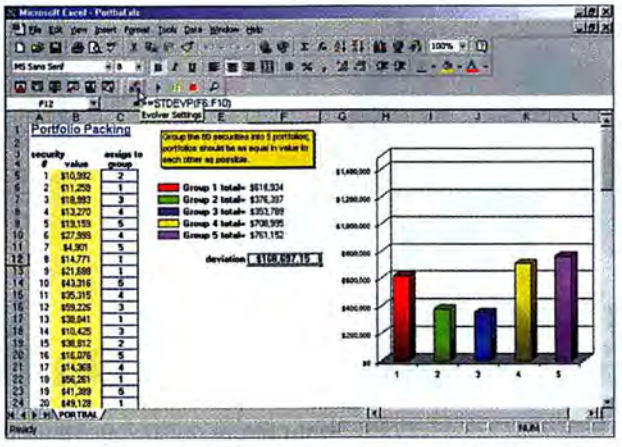
—Yael Li-Ron

Evolver Answers Questions That Excel Can't

ANALYSIS

MICROSOFT EXCEL can't do everything: If you're dealing with what-if situations in production scheduling, work-flow, logistics, and financial modeling, you need more sophisticated tools. Excel's built-in Solver can handle some assignments, such as trying to optimize profits across a product line, but it's generally limited to situations with smoothly varying quantities—it expects you to accept answers like "3.7 trucks" in shipping problems.

On the other hand, **Evolver 4.0,** a $395 Excel add-on from Palisade, is well suited to handling optimization in many real-world problems where the basic information involves many variables, as in shipping and manufacturing. I tested a shipping version.



NUMBER CRUNCHER: For problems like adjusting a profit line or a stock portfolio for best results, Evolver 4.0 can get the job done.

Evolver implements a *genetic algorithm.* The optimizer generates a batch of random inputs as variables for the problem. Then it checks the results that the variables produce, keeps the variables that yield the best results, and creates a new generation of inputs by mixing components of surviving variables. Also, Evolver works impressively fast on big problems (with up to 80 variables). Check this program out if you've outgrown Solver.

—Charles Seiter ▶

Evolver 4.0

PRO: Fast, sophisticated analysis tool for use with Excel.

CON: None significant.

VALUE: Excellent choice for complex profit-optimizing.

List price: $395

Palisade

800/432-7475

www.palisade.com

INFONET NO. 747

File Formatting Whiz: Conversion Plus 4.5

UTILITY

PC AND MAC files get along about as well as cats and water. But some PC users need to read Mac files, and vice versa. And what happens if you're a Microsoft Office user whose colleagues or clients work with Corel WordPerfect Suite? The $100 **Conversions Plus 4.5** from DataViz lets PC users view, open, and print files created on Macs or in popular Windows applications that they don't have.

Perhaps the product's greatest selling point is its versatility. If you need to send a converted file back for editing in the native program, Conversions Plus allows you to save it in one of 18 PC or 9 Macintosh application formats. (One con: The application has common graphics formats, but not a variety to suit high-end graphics work.) Conversions Plus also helps you work with compressed or encoded files and read, write, and format Macintosh disks with your PC.

The shipping copy I tested was easy to use. Right-click on a file on your Win 95 desktop or in Windows Explorer, and a Conversions Plus menu presents several options. You can view an incompatible file or convert it to a file type of your choice, regardless of the program in which it was created.

Conversions Plus can also help with problematic e-mail attachments that appear as gobbledygook at the end of a message. Using the Attachment Wizard, you select the unrecognizable text and convert it to a workable format of your own choosing. Opening e-mail attachments takes fewer steps than it did with the last version of Conversions Plus.

Finally, Conversions Plus 4.5 provides updated support for Windows 98 and the latest versions of Microsoft Office apps. And the new Name Doctor feature lets you automatically correct illegal characters or incorrect extensions when migrating from Mac to PC.

Conversions Plus 4.5 runs on Windows 3.1, 95, 98, or NT. The upgrade price is $40 for registered owners. Overall, this is a handy way to work with myriad file formats.

—Cameron Heffernan

Conversions Plus 4.5

PRO: Versatile; opens a wide range of file formats.

CON: Supports only EPS, TIFF, GIF, JPEG and PICT graphics formats.

VALUE: Convenient for making e-mail attachments readable and converting cross-platform work.

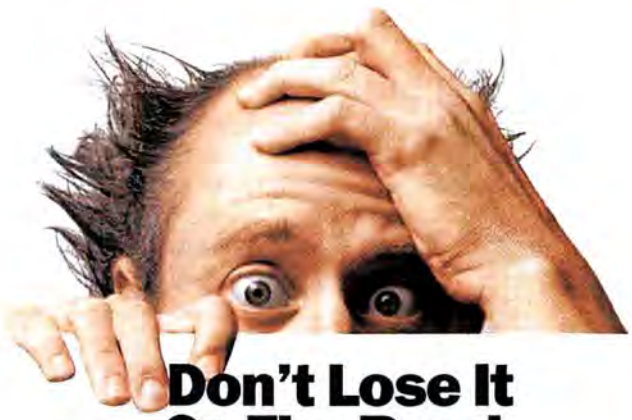
Street price: $100, upgrade $40

DataViz

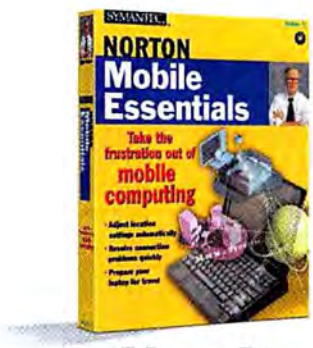
800/733-0030

www.dataviz.com

INFONET NO. 749



Don't Lose It On The Road.



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-Computer Buyers Guide and Handbook, Best Buy July 1998

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-Computer Shopper, May 1998

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- Intel EtherExpress™ PRO/100 LAN Adapter ***OR*** K56Flex PCI Voice/Fax Modem, Speaker Phone V.90 Compatible
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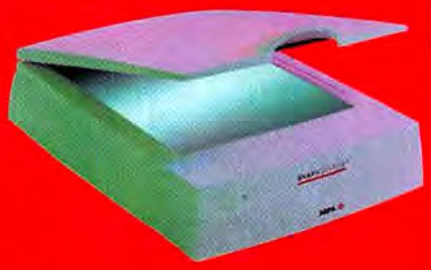

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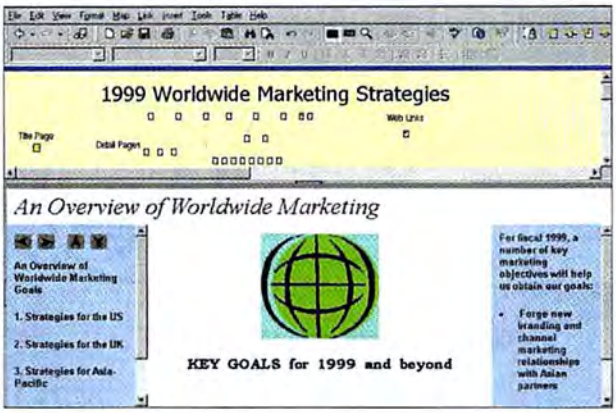
Trellix 2.0: Easy Online Docs

UTILITY

THE $249 UTILITY **Trellix 2.0** is a most unusual program: It contains a sophisticated blend of word processing, page layout, and on-screen presentation design tools in a Web browser–like environment. At the same time, the program makes it a cinch to create a professional-looking Web site, intranet newsletter, presentation, or other multipage electronic document. I tested a preproduction version.



TRELLIX 2.0 creates online documents with graphics, hypertext links, and a map (shown above) that lets viewers jump to pages of interest.

Trellix 2.0 is easier to use than the original version. The new Jump Start feature, for instance, guides you step by step through a typical Trellix document, and then helps you create a publication using any of five design templates, for projects such as presentations.

Pulldown menus and toolbars have been redesigned to resemble those in Microsoft Office 97. You can now import Microsoft Word documents just by clicking and dragging them into a Trellix document's navigational window. Version 2.0 also allows you to create tables directly in the program or to import them as OLE objects.

But one of Trellix 2.0's niftiest new features is the capability to quickly convert a Trellix document into an HTML file called a Trelligram. The Trelligram and all of its related files (such as GIF images) are stored in a folder, which you can send as an e-mail attachment; all the recipient needs is a Web browser. Little or none of the original file's formatting is lost. Indeed, the Trelligram I e-mailed to a friend looked true to the original.

Because it's template driven, Trellix might feel confining to some. And it's not cheap. But it's a good, solid choice.

—James A. Martin ■

Trellix 2.0

PRO: Intuitive tools for generating online documents.

CON: Structured templates limit design flexibility.

VALUE: A good deal.

Street price: $249, upgrade $69

Trellix

800/266-0879 ext. 703

www.trellix.com

INFONET NO. 750

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- 2.1 to 4GB SMART Hard Drive and 20X[1] Max CD-ROM drive give you fast, reliable access to all your data

Armada 1500 Starting at **$1,599**[4]
(model 1573 on last page)

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- Mobile Pentium II Processor up to 300MHz and up to 160MB of memory for demanding applications
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	Armada 1592DMT	Armada 1700	Armada 1700	Armada 1700	New Armada 1700
Pentium Processor	233MHz w/MMX	Mobile Pentium II 233MHz	Mobile Pentium II 233MHz	Mobile Pentium II 266MHz	Mobile Pentium II 300MHz
Std./Max. Memory	32MB/96MB	32MB/160MB	32MB/160MB	32MB/160MB	32MB/160MB
SMART Hard Drive†	3.2GB	3.2GB	4GB	4GB	5GB
L2 Cache	512KB	512KB	512KB	512KB	512KB
Communications	56K[3]	56K[3]	56K[3]	56K[3]	56K[3]
Diskette Drive	3.5" 1.44MB (dual-bay)	3.5" 1.44MB (multi-bay)	3.5" 1.44MB (multi-bay)	3.5" 1.44MB (multi-bay)	3.5" 1.44MB (multi-bay)
CD-ROM	20X[1] Max	24X[2] Max	24X[2] Max	24X[2] Max	24X[2] Max
Display	12.1" CTFT SVGA	12.1" CSTN SVGA	12.1" CTFT SVGA	13.3" CTFT (1024 x 768)	14.1" CTFT (1024 x 768)
Video Support (All Models)	64-bit Local Bus Graphics with 2MB EDO Video RAM				
PC Card Slots	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Compaq PremierSound®	Standard	Standard	Standard	Standard	Standard
IR	4Mbps Compliant	4Mbps Compliant	4Mbps Compliant	4Mbps Compliant	4Mbps Compliant
Battery Type/Life (All Models)	Dual Li-Ion Battery Support, up to 2-3 Hours per Battery[5]				
Pointing Device	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad
Ports (All Models)	Serial, Enhanced Parallel, Keyboard/Pointing Device, Ext. Monitor, Fast IR, Audio In, Headphone Out, Mic, AC and Convenience Base RJ-11, USB				
Intelligent Manageability	Standard	Standard	Standard	Standard	Standard
Preinstalled Operating System*	Windows® 95	Windows 95	Windows 95, Windows 98, or Windows NT® 4.0**	Windows 95, Windows 98, or Windows NT 4.0**	Windows 95, Windows 98, or Windows NT 4.0**
Dimensions/Weight (lbs.)	2.1" x 12.2" x 9.6"/7.49	2.3" x 12.5" x 9.9"/7.8	2.3" x 12.5" x 9.9"/7.9-8	2.3" x 12.5" x 9.9"/8.3	2.3" x 12.5" x 9.9"/8.3
Worldwide Limited Warranty[5]	1-Year, upgradable	1-Year, upgradable	1-Year, upgradable	1-Year, upgradable	1-Year, upgradable
New Low Prices[4]:	**$1,999**	**$1,999**	**$2,499**	**$2,999**	**$3,799**
Lease Price[5]:	**$67/mo.**	**$67/mo.**	**$84/mo.**	**$101/mo.**	**$128/mo.**

*Other operating systems available.
**Ask your operator for Windows NT 4.0 prices.
†For hard drives, GB=billion bytes.

Enhancements & Upgrades

Convenience Base (Pass-Through) **$189**

Li-Ion Battery **$195**

Monitor Stand **$55**

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These new, lightweight notebooks are perfect for executives and sales professionals.

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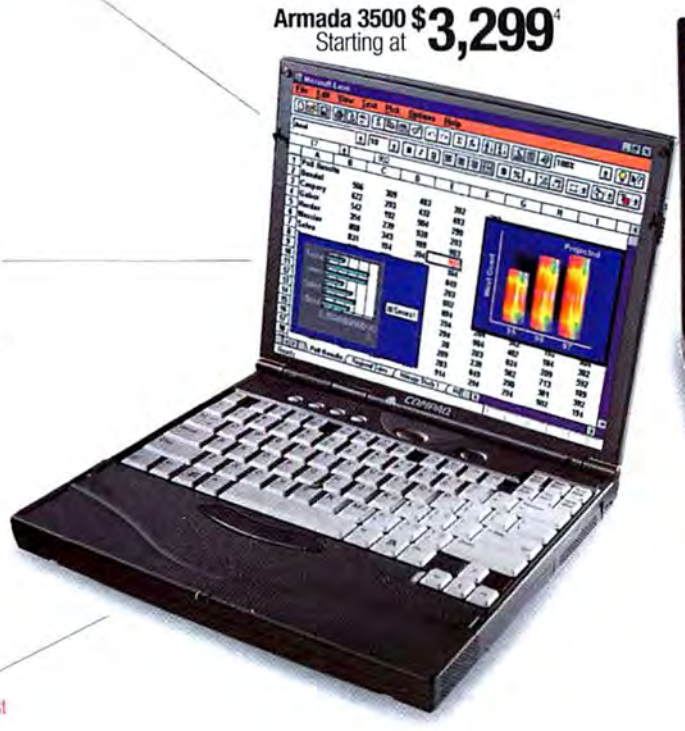
- Mobile Pentium II Processor 266 or 300MHz, up to 192MB memory, and 4.1 or 6.4GB[11] Hard Drive
- Up to 13.3" CTFT screen at 1024 x 768 resolution and 24X[2] Max CD-ROM or DVD in optional Mobile Expansion Unit
- At a mere 4.4 pounds, Compaq's thinnest, lightest notebook also offers cutting-edge technology

Armada 3500 Starting at **$3,299**[4]



Armada 6500 Starting at **$4,999**[4]

- Mobile Pentium II Processor 300MHz, up to 320MB of memory, and 6.4GB Hard Drive
- 14.1" CTFT screen at 1024 x 768 resolution, and slim 5.9-lb. form factor
- Integrated communications: 56K[3] modem and integrated 10/100 Ethernet controller; over 3 hours of battery life[5] with 12-cell Li-Ion battery

	Armada 3500	Armada 3500	Armada 6500
Pentium II Processor	266MHz	300MHz	300MHz
L2 Cache	512KB	512KB	512KB
Std./Max. Memory (SDRAM)	32MB/160MB	64MB/192MB	64MB/320MB
Hard Drive	4.1GB (SMART)	6.4GB (SMART)	6.4GB
Display	12.1" CTFT SVGA	13.3" CTFT (1024 x 768)	14.1" CTFT (1024 x 768)
Video Support	64-bit Graphics	64-bit Graphics	2X AGP w/4MB SGRAM
Diskette Drive	1.44MB External, standard	1.44MB External, standard	1.44MB Module included
CD-ROM	Optional Mobile Expansion Unit	Optional Mobile Expansion Unit	24X[2] Max
Integrated Communications	Optional PC Card	Optional PC Card	56K[3]
Network Controller	N/A	N/A	Integrated 10/100 Ethernet
PC Card Slots	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Compaq PremierSound	Included	Included	Included
Battery Type/Life	Li-Ion/2-3 hours[5]	Li-Ion/2-3 hours[5]	12-cell Li-Ion/over 3 hours[5]
Pointing Device	EasyPoint™ pointing stick	EasyPoint pointing stick	Touch Pad
Ports	Serial, Enhanced Parallel, PS/2 Keyboard/Mouse, USB, Headphone/Speaker, VGA (External FDD: 3500 only; Mic Input: 6500 only)		
Intelligent Manageability	Yes	Yes	N/A*
Dimensions/Weight	1.3" x 9.2" x 11.8"/4.4 lbs.	1.3" x 9.2" x 11.8"/4.6 lbs.	1.36" x 9.7" x 12"/5.9 lbs.
Preinstalled Operating System**	Windows 95 or Windows 98	Windows 95 or Windows NT 4.0†	Windows 95, Windows 98 or Windows NT 4.0†
Worldwide Limited Warranty[6]	3-Year	3-Year	3-Year
New Low Prices[4]:	$3,299	$4,299	$4,999
Lease Price[4]:	$111/mo.	$145/mo.	$168/mo.

*DMI 2.0 compatibility information will be available soon on Compaq's website.
**Other operating systems available.
†Ask your operator for Windows NT 4.0 prices.
††For hard drives, GB=billion bytes

Enhancements & Upgrades

Compaq Global Case
$89

Mobile Expansion Unit
with CD-ROM $199
with DVD $399

Li-Ion Battery (3500) $209
Li-Ion Battery (6500) $199

32MB Memory Module
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Armada 7400 Starting at **$3,299**[4]

- 13.3" CTFT screen, AGP graphics, and 24X Max CD-ROM

- Combines lightweight, compact, and durable design with leading-edge technology

- Mobile Pentium II Processor 266 or 300MHz, up to 256MB of memory, up to 8GB Hard Drive

- 13.3" or 14.1" CTFT screen at 1024 x 768 resolution and 24X Max CD-ROM or DVD

- AGP graphics with 3D acceleration support

Armada 7800 Starting at **$4,399**[4]

	Armada 7400	Armada 7400	Armada 7800	Armada 7800	Armada 7800
Pentium II Processor	266MHz	300MHz	266MHz	266MHz	300MHz
L2 Cache	512KB	512KB	512KB	512KB	512KB
Std./Max. Memory	32MB/256MB	64MB/256MB	64MB/256MB	64MB/256MB	64MB/256MB
SMART Hard Drive	4GB	6.4GB	5GB	8GB	8GB
Display	13.3" CTFT (1024 x 768)	13.3" CTFT (1024 x 768)	13.3" CTFT (1024 x 768)	14.1" CTFT (1024 x 768)	14.1" CTFT (1024 x 768)
Video Support	AGP	AGP	AGP	AGP	AGP
MultiBay Diskette Drive	Removable 3-mode 1.44MB				
CD-ROM/DVD	MultiBay 24X‡ Max	MultiBay 24X‡ Max	MultiBay 24X‡ Max	MultiBay 24X‡ Max	MultiBay DVD
Integrated Communications	N/A	33.6Kbps*	33.6Kbps*	33.6Kbps*	33.6Kbps*
PC Card Slots	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III	2 Type II or 1 Type III
Compaq PremierSound	Included	Included	Included	Included	Included
Battery Type/Life	Li-Ion/up to 2.6 hours§	Li-Ion/up to 2.6 hours§	Li-Ion/over 2 hours§	Li-Ion/over 2 hours§	Li-Ion/over 2 hours§
Pointing Device	EasyPoint III	EasyPoint III	EasyPoint III	EasyPoint III	EasyPoint III
Ports (All models)	Serial, Enhanced Parallel, Keyboard/Pointing Device, External Monitor, IR, USB, Audio In, Headphone Out, Mic, Convenience Base				
Intelligent Manageability	Included	Included	Included	Included	Included
Dimensions/Weight	1.6" x 12.5" x 9.6"/6.3 lbs.**	1.6" x 12.5" x 9.6"/6.3 lbs.**	2" x 12.6" x 10.2"/7.8-9 lbs.	2" x 12.6" x 10.2"/8-9.2 lbs.	2" x 12.6" x 10.2"/8-9.2 lbs.
Preinstalled Operating System†	Windows 95 or Windows NT 4.0††	Windows 95 or Windows NT 4.0††	Windows 95 or Windows NT 4.0††	Windows 95 or Windows NT 4.0††	Windows 95 or Windows NT 4.0††
Worldwide Limited Warranty¶	3-Year	3-Year	3-Year	3-Year	3-Year
New Low Prices‡:	**$3,299**	**$4,199**	**$4,399**	**$5,199**	**$5,599**
Lease Price¶:	**$111/mo.**	**$141/mo.**	**$148/mo.**	**$175/mo.**	**$188/mo.**

*Not available on Windows NT models.
**6.3 lbs. with weight saver.
†Other operating systems available.
††Ask your operator for Windows NT 4.0 prices.
‡For hard drives, GB=billion bytes.

Enhancements & Upgrades

ArmadaStation II **$879**

Compaq Leather Executive Case
$199

Li-Ion Battery (7800) **$199**
Li-Ion Battery (7400) **$189**

64MB Memory Module
$152

Buy direct from Compaq at www.directplus.compaq.com/pcwc or 1-800-888-8230

Deskpro EP Series – Celeron

For superior value and flexibility, get a Compaq Deskpro EP Series desktop.

The Compaq Deskpro EP Series offers long-term value and flexibility in both standalone desktop and networked environments. With your choice of the Intel® Celeron™ Processor 300A or 333MHz, you also get excellent performance. The unique design lets you easily transform it from a desktop to a minitower.

- Outstanding price/performance: has the ability to meet a broad range of requirements in desktop and networked environments
- Versatile towerable design lets you transform from desktop to minitower in seconds
- Up to 256MB of SDRAM memory for performance increases as your business needs grow

- Intel Celeron Processors 300A or 333MHz for industry-leading performance
- Best value for an all-around business desktop
- Fast Matrox MGA AGP Graphics Controller

Deskpro EP Series Starting at **$1,259**[4/7]

	Deskpro EP Series	Deskpro EP Series	Deskpro EP Series
Celeron Processor	300AMHz	333MHz	333MHz
Std./Max. Memory	32MB/256MB	32MB/256MB	64MB/256MB
SMART II Hard Drive**	4.3GB	4.3GB	6.4GB
Secondary Cache	128KB	128KB	128KB
Video Graphics	Matrox MGA AGP Graphics	Matrox MGA AGP Graphics	Matrox MGA AGP Graphics
Video Memory/Max.	4MB/4MB	4MB/4MB	4MB/4MB
Total Slots/Bays	6/5	6/5	6/5
Compaq Color Monitor	S700, 17"/15.7" viewable	S700, 17"/15.7" viewable	S700, 17"/15.7" viewable
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Ports	2 Serial, 2 USB, 1 Parallel	2 Serial, 2 USB, 1 Parallel	2 Serial, 2 USB, 1 Parallel
Sound	Optional	Optional	Compaq PremierSound
CD-ROM	Optional	Optional	32X[6] Max Tray Load
Intelligent Manageability	Standard	Standard	Standard
Keyboard and Mouse	Standard	Standard	Standard
Preinstalled Operating System*	Windows 95	Windows 95	Windows 95
Limited Warranty[1]	3-Year	3-Year	3-Year
New Low Prices[4/7]:	**$1,259**	**$1,299**	**$1,599**
Lease Price[5]:	**$42/mo.**	**$44/mo.**	**$54/mo.**

*Other operating systems available.
**For hard drives, GB=billion bytes

Enhancements & Upgrades

Iomega Zip Plus Drive **$185**

DVD-ROM Drive & Decoder **$399**

S900 Monitor Upgrade **$530**

PremierSound PS110 Speakers **$49**

Buy direct from Compaq at **www.directplus.compaq.com/pcwc** or **1-800-888-8230**

Deskpro EP Series – Pentium II

The fastest desktop performance with a versatile towerable design.

With a Pentium II Processor at 350, 400, or 450MHz, the Compaq Deskpro EP Series is a state-of-the-art desktop. It delivers excellent price/performance and maximum reliability to meet a broad range of business needs. The unique design lets you transform it from a desktop to a minitower in just seconds.

- Fastest desktop performance: Pentium II Processors 350, 400, or 450MHz
- Up to 384MB of SDRAM memory lets you increase performance for demanding network or desktop applications
- Versatile design: towerable CPU lets you easily convert from a desktop to a minitower

- Extremely fast Matrox Millennium AGP Graphics Controller, with up to 16MB of video memory for multi-media and graphics applications
- 4.3 or 10GB** Hard Drives accommodate the demanding storage requirements of growing businesses
- Combination of power and flexibility provides forward-compatible solutions for the long term

Deskpro EP Series Starting at **$1,649**[4/7]

	Deskpro EP Series	Deskpro EP Series	Deskpro EP Series	Deskpro EP Series
Pentium II Processor	350MHz	350MHz	400MHz	450MHz
Std./Max. Memory	64MB/384MB SDRAM	64MB/384MB SDRAM	64MB/384MB SDRAM	64MB/384MB SDRAM
SMART II Hard Drive**	4.3GB	10GB	10GB	10GB
Secondary Cache	512KB	512KB	512KB	512KB
Video Graphics	Matrox Millennium AGP Graphics	Matrox Millennium AGP Graphics	Matrox Millennium AGP Graphics	Matrox Millennium AGP Graphics
Video Memory/Max.	8MB/16MB	8MB/16MB	8MB/16MB	8MB/16MB
Total Slots/Bays	6/5	6/5	6/5	6/5
Compaq Color Monitor	S700, 17"/15.7" viewable	S700, 17"/15.7" viewable	S700, 17"/15.7" viewable	S700, 17"/15.7" viewable
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Ports	2 Serial, 2 USB, 1 Parallel	2 Serial, 2 USB, 1 Parallel	2 Serial, 2 USB, 1 Parallel	2 Serial, 2 USB, 1 Parallel
Sound	Optional	Compaq PremierSound	Compaq PremierSound	Compaq PremierSound
CD-ROM	Optional	32X[6] Max Tray Load	32X[6] Max Tray Load	32X[6] Max Tray Load
Intelligent Manageability	Standard	Standard	Standard	Standard
Keyboard and Mouse	Standard	Standard	Standard	Standard
Preinstalled Operating System*	Windows 95	Windows 95	Windows 95	Windows 95
Limited Warranty[5]	3-Year	3-Year	3-Year	3-Year
New Low Prices[4,7]:	**$1,649**	**$1,979**	**$2,119**	**$2,239**
Lease Price[8]:	**$55/mo.**	**$66/mo.**	**$71/mo.**	**$77/mo.**

*Other operating systems available.
**For hard drives, GB = billion bytes.

Enhancements & Upgrades

Iomega Zip Plus Drive **$185**

DVD-ROM Drive & Decoder **$399**

32MB Memory Module **$79**

S900 Monitor Upgrade **$530**

Buy direct from Compaq at **www.directplus.compaq.com/pcwc** or **1-800-888-8230**

Compaq C-Series Handheld PC

The fastest, easiest, and most secure way to access information while away from your PC.

What can you do when you're out of the office and need access to critical business information? Carry the Compaq C-Series Handheld PC. It's an easy way to access your files, e-mail, or faxes. It offers convenient data synchronization with your desktop or portable through serial or infrared ports. You can even use it to browse the Web.

- Monochrome and color models available. Monochrome version runs on two AA batteries for up to 20 hours of use; color version uses NiMH rechargeable batteries for up to 3 hours[3] of use
- Exceptional security features help protect your data; also includes voice-record capability
- Integrated 33.6Kbps modem lets you connect to e-mail, synchronize your calendar, and view documents, spreadsheets, and presentations from anywhere in the world

C-Series Handheld PC Starting at **$499**[4]

- Windows CE 2.0 operating system — pocket versions of Microsoft Word, Excel, PowerPoint, Internet Explorer, and InBox
- Easy synchronization with your desktop or portable through serial or infrared ports — so you never have to input data twice
- Lightweight and easy to carry — less than 1 pound

	C-Series 810	C-Series 2010C
Screen	Monochrome with multi-level backlight	High-contrast 256-color display
High-Performance RISC-based MIPS Processor	Yes	Yes
Std./Max. Memory	8MB/20MB	20MB/32MB
Resolution	640 x 240	640 x 240
Modem	33.6Kbps	33.6Kbps
Power Supply	Two AA Batteries	NiMH Rechargeable Batteries
Expansion	Type II PCMCIA Slot, 16MB EDO Memory	Type II PCMCIA Slot, 16MB EDO Memory
Dimensions/Weight	1.34" x 7.32" x 3.93"/15.6 oz.	1.61" x 7.32" x 3.93"/18.6 oz.
Limited Warranty®	1-Year mail in	1-Year mail in
Low Prices‡:	$499	$799
Lease Price‡:	$17/mo.	$27/mo.

Cradle

Quick, drop-in-style docking. Connects to serial and battery-charger connections, and includes an additional stylus. It also features a location for a Kennsington lock. $39‡

Memory Expansion

Maximize performance with this 16MB EDO memory upgrade.* It gives you more storage space and increases capacity for running multiple programs. $85‡

NiMH Battery Pack — Monochrome

Save money on batteries with a rechargeable NiMH battery. Depending on use, get up to 20 hours of power on mono C-Series. Battery pack is compatible with monochrome model only. $29‡

NiMH Battery Pack — Color

Get an additional NiMH rechargeable battery for C-Series color units. $29‡

AC Adapter

Plug into an AC outlet and you're all set to go — without using up battery power. Separate models available for U.S., U.K., Europe, and Australia. Each is worldwide-voltage compatible. $29‡

Compaq Carrying Cases

Protect your C-Series Handheld PC and related accessories in any of these attractive, durable carrying cases.

Compaq Slip Case (not shown) $19‡
Compaq Carrying Case (shown top) $49‡
Compaq Portfolio Case (shown bottom) $95‡

In Focus LP420 Presentation Solution

Use the In Focus LP420 with your C-Series Handheld PC to deliver dynamic presentations. At 6.8 pounds, it's the world's lightest full-featured data projector. It projects images at 800 x 600 resolution (up to 1024 x 768 with compression). It also features Digital Light Processing display technology, so you get 500 lumens of brightness.

In Focus LP420 (projector only) $4,335‡

VGA Card

New VGA card turns your C-Series into a presentation tool. Allows projection on full-size monitor or projector. $220‡

Stylus 3-Pack

Misplace your stylus? Keep a spare on hand with this convenient set of extras. $9‡

Auto Adapter

Get things done while you're in traffic, and save your batteries for when you need them. Plugs into cigarette lighter. $29‡

10MB Flash RAM PC Card

Increase your storage or create secure back-ups of data, with 10MB of ATA-compatible Flash RAM storage. $125‡

*The model 810 is standard with 4MB EDO RAM and an additional 4MB in the expansion slot. The model 2010C is standard with 16MB EDO RAM and an additional 4MB in the expansion slot. Both the 810 and the 2010C are upgradable by removing the 4MB EDO RAM standard in the expansion slot and adding the 16MB EDO RAM upgrade.

Buy direct from Compaq at **www.directplus.compaq.com/pcwc** or **1-800-888-8230**

Professional Workstations

Workstation-class performance at desktop prices.

With the AP200, AP400, and AP500, you get everything you've been looking for in an affordable Windows NT-based professional workstation: Pentium II Processors at 350, 400, and 450MHz, fast AGP graphics support, exceptional price/performance, and versatile industrial designs that fit seamlessly into your environment.

- The latest Pentium II Processor technology: 350, 400, and 450MHz with 512KB cache

AP200 Starting at **$2,259***

AP500 Starting at **$3,279***

- High-performance 2D/3D graphics solutions: Matrox Millennium II, ELSA GLoria Synergy+, STB MVP Pro-128, Diamond Fire GL 4000, or Compaq PowerStorm 300

- Integrated Wide-Ultra SCSI or Ultra ATA controllers for faster access to data

- Choice of workstation-class features and options: multiprocessor-capable, high-capacity drives, 10K RPM hard drives, and high expandability

- Innovative designs for optimum flexibility and expandability in your workspace

- Tested and certified with key workstation software applications for compatibility and maximum performance

AP400 Starting at **$2,879***

*Monitor not included in price

	AP200	AP200	AP400	AP500
Pentium II Processor	400MHz	450MHz	450MHz	450MHz
Processors Standard/Supported	1	1	1/2	1/2
Std./Max. Memory	64MB/384MB SDRAM	64MB/384MB SDRAM	64MB/1GB SDRAM	64MB/1GB SDRAM
SMART II Hard Drive*	6.4GB Ultra ATA	6.4GB Ultra ATA	4.3GB Wide-Ultra SCSI	4.3GB 10K RPM Wide-Ultra SCSI
System Bus	100MHz	100MHz	100MHz	100MHz
Video Graphics	ELSA GLoria Synergy+	ELSA GLoria Synergy+	ELSA GLoria Synergy+	ELSA GLoria Synergy+
Video Memory/Max.	4MB/8MB	4MB/8MB	4MB/8MBB	4MB/8MB
Total Slots/Bays	6/5	6/5	6/5	6/7
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
NIC	Fast Ethernet (10/100) NC3121	Fast Ethernet (10/100) NC3121	Fast Ethernet (10/100) Embedded NC3121	Fast Ethernet (10/100) Embedded NC3121
Sound	PremierSound Audio (16-bit)	PremierSound Audio (16-bit)	PremierSound Audio (16-bit)	PremierSound Audio (16-bit)
CD-ROM	32X[6] Max	32X[6] Max	32X[6] Max	32X[6] Max
Intelligent Manageability	Standard	Standard	Standard	Standard
Keyboard and Mouse	Standard	Standard	Standard	Standard
Preinstalled Operating System	Windows NT 4.0	Windows NT 4.0	Windows NT 4.0	Windows NT 4.0
Limited Warranty[3]	3-Year	3-Year	3-Year	3-Year
New Low Prices[†]:**	**$2,259**	**$2,459**	**$2,879**	**$3,279**
Lease Price[5]:	**$76/mo.**	**$83/mo.**	**$97/mo.**	**$110/mo.**

Other configurations also available, including your choice of graphics solution, memory, hard drive, and processor.
*For hard drives, GB=billion bytes.
**Monitor not included in price.

Enhancements & Upgrades

Compaq V75 **$425**

32MB Memory **$154**

Pentium II Processor 450MHz **$1,364**

Compaq PowerStorm 300 Video Graphics Solution **$2,970**

Buy direct from Compaq at **www.directplus.compaq.com/pcwc** or **1-800-888-8230**

ProSignia 200 & ProLiant 800

Easy-to-manage, affordable servers that grow with your business.

The Compaq ProSignia 200 is the affordable file and print server that delivers powerful features for about the cost of a desktop PC. The ProLiant 800 is perfect for Internet/Intranet or file and print applications. It delivers next-generation performance at a price that works with the most demanding budgets.

ProSignia 200 Starting at **$2,219**[4]

- Pentium II Processor 300MHz and up to 384MB ECC memory
- Available on all Compaq servers: Compaq SmartStart makes setup easier and Compaq Insight Manager alerts you to potential hardware problems.
- Available on all Compaq servers: Automatic Server Recovery ensures maximum uptime and high availability; allows system to page for help

- Pentium II Processor 350MHz with dual-processing capabilities and up to 512MB SDRAM
- 100MHz GTL bus architecture with 50% faster memory access for improved throughput and performance
- 6 available drive bays with up to 54.6GB* internal storage; expandable to 1.15TB external storage

ProLiant 800 Starting at **$2,869**[4]

	ProSignia 200	ProLiant 800
Pentium II Processor	300MHz	350MHz Dual Processor capable
Std./Max. Memory	32MB ECC SIMM/384MB	64MB 100MHz ECC SDRAM/512MB
L2 Cache	512KB	512KB
Expansion Slots	5 total: 3 PCI, 1 ISA, 1 shared	6 slots: 2 PCI, 4 shared PCI/ISA
Network Controller	10/100 T/2 PCI UTP/Coax Controller (embedded)	10/100 TX UTP (embedded)
Storage Controller	Integrated Enhanced IDE or Wide-Ultra SCSI-3 Controller	Integrated Wide-Ultra SCSI-3 Controller
Storage and Expansion Bays	5 total: 1.44MB diskette drive, 1 internal 16X[1] Max CD-ROM IDE, (1) 4.3GB hard drive, and 2 available 5.25" removable media bays	8 total: (4) 1" OR (4) 1.6" drive bays, (2) 1/2-height removable media bays available, (1) 24X[2] Max CD-ROM, (1) 1.44MB diskette drive
Maximum Storage	27GB SCSI	54.6GB SCSI
Wide-Ultra SCSI Hard Drive*	4.3GB	4.3GB
External	509.6GB	1.15TB
Interfaces	2 Serial, 1 Parallel, Mouse, Keyboard, RJ-45, BNC	2 Serial, 1 Parallel, Mouse, Keyboard, RJ-45
Graphics	1024 x 768, 256 colors in PCI slot	1024 x 768, 256 colors in PCI slot
Intelligent Manageability	Compaq Insight Manager, Automatic Server Recovery-2 (ASR-2), Pre-Failure Warranty[11]	Compaq Insight Manager, Automatic Server Recovery-2 (ASR-2), Pre-Failure Warranty[11]
Security	Power-on password, keyboard password, diskette drive control, diskette boot control, network server mode, security provision, parallel and serial interface control, administrator password, disk configuration lock	Power-on password, keyboard password, diskette drive control, diskette boot control, network server mode, security provision, parallel and serial interface control, administrator password, disk configuration lock
Server Management	SmartStart, Compaq Insight Manager	SmartStart, Compaq Insight Manager
Power Supply	280 Watts, Power Factor Corrected, CE Mark Compliant	325 Watts, Power Factor Corrected, CE Mark Compliant
Limited Warranty[3]	3-Year On-Site	3-Year On-Site
New Low Prices[4]:	$2,219	$2,869
Lease Price[5]:	$75/mo.	$96/mo.

*For hard drives, GB=billion bytes.

Enhancements & Upgrades

64MB EDO SIMM Memory
ProSignia 200 $215
ProLiant 800 $414

4/8GB DAT Drive $722

SMART 2SL Array Controller
$795

4.3GB Wide-Ultra SCSI-3 Hard Drive (1" high business class)
$399

Buy direct from Compaq at **www.directplus.compaq.com/pcwc** or **1-800-888-8230**

ProLiant 1600 & 3000

High-performance servers that deliver maximum uptime and investment protection.

Compaq's ProLiant 1600 is the ultimate high-performance workgroup server. Run file/print, small database, remote site, Internet/Intranet, and business-critical workgroup applications easily. The Compaq ProLiant 3000 departmental server offers maximum power and expandability for high-volume file services.

ProLiant 1600 Starting at **$3,269**[4]

- Pentium II Processor 300, 350, or 400MHz with dual-processing capabilities makes this an ideal workgroup server
- 100MHz ECC SDRAM memory, expandable to 1GB* for memory-intensive applications (512MB EDO on 300MHz models)
- *Network Magazine* Product of the Year 1998

- Supports up to 3GB of system memory for higher performance and greater expandability (512MB on 300MHz models)
- Pentium II Processor 300 or 333MHz with dual-processing capabilities makes this a great choice as a departmental server
- Both servers offer fault-tolerant features: Hot Plug Hard Drives and optional Redundant Hot Plug Power Supplies

ProLiant 3000 Starting at **$4,829**[4]

	ProLiant 1600			ProLiant 3000	
Pentium II Processor	300MHz	350MHz	400MHz	300MHz	333MHz
Std./Max. Memory	64MB ECC EDO/512MB	64MB 100MHz ECC SDRAM/1GB	64MB 100MHz ECC SDRAM/1GB	64MB EDO ECC/512MB	64MB EDO ECC/3GB
L2 Cache	512KB			512KB	
Expansion Slots	6 slots: 2 PCI, 4 shared PCI/ISA			8 slots: 5 PCI, 3 shared PCI/ISA	
Network Controller	10/100 TX UTP (embedded)			Netelligent 10/100 TX PCI UTP	
Storage Controller	Dual Integrated Wide-Ultra SCSI-3			Dual-Channel Integrated Wide-Ultra SCSI-3	
Storage and Expansion Bays	9 total (7 on 300MHz Model): 1.44MB diskette drive, (1) 24X[2] Max CD-ROM, (2) 1/2-height removable media bays, (5) 1" or (2) 1.6" & (1) 1" Hot Plug Hard Drives (350/400MHz Models) (3) 1" or (3) 1.6" Hot Plug Hard Drives (300MHz Model)			12/14 total bays: 1.44MB diskette drive, (1) 16X[12] Max CD-ROM (2) 1/2-height removable media bays, (6) 1.6" or (8) 1" Hot Plug Hard Drives	
Maximum Storage	45.5GB			109.2GB	
Wide-Ultra SCSI Hard Drive	4.3GB			9.1GB	
External	1.15TB			1.15TB	
Interfaces	2 Serial, 1 Parallel, Mouse, Keyboard, RJ-45			2 Serial, 1 Parallel, Mouse, Keyboard, RJ-45	
Graphics	1024 x 768, 256 colors in PCI slot			1024 x 768, 256 colors in PCI slot	
Manageability	Compaq Insight Manager, Automatic Server Recovery-2 (ASR-2), Pre-Failure Warranty[11]			Compaq Insight Manager, Automatic Server Recovery-2 (ASR-2), Pre-Failure Warranty[11]	
Security	Power-on password, keyboard password, diskette drive control, diskette boot control, network server mode, security provision, parallel and serial interface control, administrator password, disk configuration lock			Power-on password, keyboard password, diskette drive control, diskette boot control, network server mode, security provision, parallel and serial interface control, administrator password, disk configuration lock	
Server Management	SmartStart, Compaq Insight Manager			SmartStart, Compaq Insight Manager	
Power Supply	325 Watts, Power Factor Corrected, CE Mark Compliant			750 Watts, Power Factor Corrected, CE Mark Compliant, Hot Plug Standard	
Limited Warranty[5]	3-Year On-Site			3-Year On-Site	
New Low Prices[4]:	**$3,269**	**$3,269**	**$3,499**	**$4,829**	**$5,169**
Lease Price[3]:	**$110/mo.**	**$110/mo.**	**$117/mo.**	**$162/mo.**	**$169/mo.**

*For hard drives, GB=billion bytes.

Enhancements & Upgrades

64MB EDO DIMM Memory
$369

SMART-2DH Array Controller
$1,780

12/24GB DAT Drive **$1,074**

UPS T1500 **$669**

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Pack more power on the road for less money.

COMPAQ DirectPlus

Our Armada 1573 portable is loaded with value. You get incredible portability with simultaneous access to your hard drive, diskette drive, and CD-ROM drive — plus an integrated modem and AC adapter. And you get it all at a new low price. Check out our portable enhancements that give your Armada 1573 even more power.

Armada 1573: power-packed for value

- Pentium Processor 233MHz w/MMX Technology
- 32MB/96MB Std./Max. Memory
- 3.2GB* SMART Hard Drive
- 512KB L2 Cache
- 56K[2] Communications
- 3.5" 1.44MB (dual) Diskette Drive
- 20X[1] Max CD-ROM
- 12.1" CSTN SVGA Display
- 64-bit Local Bus Graphics with 2MB EDO Video RAM
- 2 Type II or 1 Type III PC Card Slot
- Compaq PremierSound
- 4Mb/s Compliant IR
- Dual Li-Ion Battery Support, up to 3 Hours per Battery[5]
- Convenient Touchpad
- Serial, Enhanced Parallel, Keyboard/Pointing Device, Ext. Monitor, Fast IR, Audio In, Headphone Out, Mic, AC Adapter, Convenience Base RJ-11, and USB Ports
- Intelligent Manageability
- Windows 95 Preinstalled
- 2.1" x 12.2" x 9.6"/7.61 lbs.
- 1-Year upgradable Worldwide Limited Warranty[8]

*For hard drives, GB=billion bytes.

Armada 1573 $1,599[4]
New low price

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[1]*20X Max CD-ROM:* Data transfer rates may vary from 1275KB/s to 3000KB/s. [2]*24X Max CD-ROM:* Data transfer rates may vary from 150KB/s to 3600KB/s. [3]*56K Protocol (Armada 1500):* Designed to allow faster downloads from 56K-compliant digital sources. Maximum achievable download transmission rates currently do not reach 56Kbps and will vary with line conditions. Your modem may only download at the current V.34 standard protocol rates (up to 33.6K) until V.90 ITU standard software upgrade is available. [4]*All Prices:* All prices shown are DirectPlus prices and are subject to change. Prices do not include applicable state and local sales tax or shipping to recipient's destination. [5]*Battery Life:* Actual results may vary with individual usage. When tested in standard configuration, using the Ziff-Davis Battery Mark Test version 2.0, the battery life of the Armada 7800 will range up to 2.3 hours. Standard configuration at the time of announce (4/2/96) is considered to be one battery, a 1024 x 768 (256 colors) panel set at 50% brightness, 64MB RAM, and no drives other than the hard drive active. [6]*32X Max CD-ROM:* Data transfer rates vary up to 4800KB/s. [7]*Monitor included in price.* [8]*Limited Warranty:* Ask for a copy of the limited warranty for any product featured in this catalog or call for details. Certain restrictions and exclusions apply. All warranty periods represent time from initial purchase. Battery packs and certain options are covered by a one-year limited warranty. Standard coverage includes: Compaq Desktop Products EN and EP: three years parts, first year on-site labor. Warranty service for parts in years two and three is provided via Carry-In Service. For Carry-In-Service, you may bring the PC into any Compaq-authorized service provider. Compaq Portable Products Armada 3500, Armada 6500, Armada 7400, and Armada 7800: three years parts and labor with Pick-Up/Carry-In Service. For Pick-Up Service, call the Compaq Technical Support Center. If your portable computer needs hardware repair while under warranty, Compaq will supply packaging, pick up the PC at your location, repair it, and return it to you. Compaq pays for all postage. U.S. only. Armada 1500 and 1700: one year parts and labor coverage with Pick-Up/Carry-In Service. Compaq monitors S700, S900, V75, V900, V1000, P75, P110, TFT 450, TFT 500, TFT 8000: three years parts, with the first year on-site labor. V55: one year on-site warranty which covers parts and labor. Compaq Professional Workstation Products – one-year parts, one-year on-site labor. Compaq C-Series Handheld PC: Certain restrictions and exclusions apply. Compaq 48-Hour Monitor Swap: if your Compaq S700, S900, V75, V900, V1000, P75, P110, TFT 450, TFT 500, or TFT 8000 monitor needs servicing at any time within the warranty period, you can get a replacement monitor directly from Compaq within 48 hours of the time you place your service call. Pick-up service not available for monitor products. Call 1-800-OK COMPAQ if you have a problem with your monitor. [9]*Leasing:* Leasing available through Compaq Capital Corporation ("CCC") to qualified commercial customers, subject to credit approval and execution of CCC lease documentation. Monthly lease payments are based on 36-month fair market value lease, and do not include taxes, fees, or shipping charges. Offering subject to other restrictions and CCC reserves the right to change, alter, or cancel this offering at any time without notice. [10]*16X Max CD-ROM:* Data transfer rates vary from 150KB/s to 3600KB/s. [11]Compaq Server Pre-Failure Warranty: Pre-Failure Warranty is available on all Compaq ProSignia and Compaq ProLiant servers using Compaq Insight Manager 2.1 or higher, also covers Pentium II Xeon processors, ECC memory and server hard drives (except the 535MB Fast-SCSI-2 hard drive) using Compaq IDA, IDA-2, Compaq Smart SCSI Array Controllers, Compaq Smart-2 SCSI Array Controllers or Smart Array 3100ES Controllers. One GB=billion bytes, one TB=1,000,000MB. Products, specifications, and prices are subject to change. Compaq is not liable for pictorial or typographical errors in this catalog. Compaq, the Compaq Logo, Deskpro, Netelligent, Prosignia, ProliantCompaq Insight Manager, SmartStart, QVision, Canon, Visioneer, Iomega, Epson, and Speedpaq are Registered with the U.S. Patent and Trademark Office. DirectPlus and PaqFax are registered service marks of Compaq Computer Corporation. Armada, EasyPoint, MultiBay, and PremierSound are trademarks of Compaq Computer Corporation. Microsoft, Microsoft Excel, Microsoft Word, MS-DOS, Windows, and Windows NT are registered trademarks of Microsoft Corporation. Pentium and Celeron are registered trademarks, and MMX is a trademark of Intel Corporation in the U.S. and other countries. Other product names mentioned herein may be trademarks or registered trademarks of their respective companies. © 1998 Compaq Computer Corporation. All Rights Reserved. Printed in the U.S.A.

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PC Reliability & Service

WHO CAN YOU TRUST?

EDITED BY BRAD GRIMES AND AOIFE McEVOY

Who builds the most reliable systems? And who will support you in your PC's hour of need? More than 6800 readers rated their work, home, and notebook PCs and the companies that made them.

HERE'S A WILD GUESS: You use more than one PC. Perhaps you have one at work and another at home. You might even use a notebook when you're somewhere in between. Each system is different. Your notebook may have more problems than your office machine. And it's certainly easier to get support for your work PC than for your home system—even if they're made by the same company. Wouldn't it be great if you could find the most dependable hardware and the best support no matter where you use your PC?

We thought so too. That's why we've made a radical change in the way we gauge the PC reliability and service of major computer vendors. For the first time in our ongoing survey, we took the information that readers give us ▶

about their PCs and split it into three groups, depending on the type of system they told us about. The three groups are: work PCs, home computers, and notebooks. We then identified the best and worst manufacturers in each group.

The big news? The companies that make the best work PCs aren't necessarily the best choice for your home office or for the road. Still, there are a handful of companies that build dependable systems across the board—and support them as if their corporate lives depended on it.

The big news? The companies that make the best work PCs aren't **necessarily the best choice** for your home office or for the road. Still, **a handful of companies** build dependable systems and support them **as if their lives depended on it.**

READERS TALK BACK

LAST SPRING in an online survey hosted by World Research of San Jose, California, 6861 *PC World* subscribers told us what they thought of their different PCs and the companies that built them. We asked them to rate manufacturers on a wide range of criteria, from the objective ("Over the life of your PC how many faulty components have you had to replace?") to the subjective ("How satisfied are you with the service and support you received from the PC manufacturer or authorized service provider?"). All told, readers gave us enough data to report on 17 makers of desktop and notebook computers. What they had to say ranged from pleasantly surprising to downright disappointing.

Although some companies excel in certain areas, none stand head and shoulders above the rest. That's why you won't find any companies with a five-star, Outstanding rating for overall reliability and service. Still, some fare better than others. Among our findings:

- **No surprise:** Continuing a trend, Dell and Micron share the spotlight, ranking at the top for all three types of computer, while portables pioneer Toshiba consistently earns good marks for its notebooks.
- **Pleasantly surprising:** Two newcomers to our survey—CyberMax and Sony—garner high praise from home PC users. And it's hard to go completely wrong when picking out a PC for your office (unless it's a Packard Bell; see below).
- **Downright disappointing:** Packard Bell desktop owners are equally unhappy at work and at home, Fujitsu notebook users are unimpressed with the company's service, and owners of Acer home PCs give the company our lone Unacceptable rating for overall PC reliability and service.

Winners & Losers

MANY PC MAKERS BUILD reasonably reliable systems and offer serviceable support. But none of the 17 companies we rated were good enough to earn an Outstanding rating for their work, home, or notebook PCs. Dell and Micron come closest, with a Good rating in all three groups, and Compaq exhibits an unenviable consistency with three Fairs. Meanwhile, Acer distinguishes itself as the only manufacturer to be deemed Unacceptable—for its troubled line of home systems.

Work PCs	Home PCs	Notebooks
OUTSTANDING	**OUTSTANDING**	**OUTSTANDING**
none	none	none
GOOD	**GOOD**	**GOOD**
Dell Hewlett-Packard Micron	CyberMax Dell IBM Micron Quantex Sony	Dell Gateway Micron Toshiba
FAIR	**FAIR**	**FAIR**
Acer AST Compaq Gateway IBM	Compaq Gateway Hewlett-Packard NEC	Acer Compaq Hitachi IBM NEC WinBook
POOR	**POOR**	**POOR**
Packard Bell	AST Packard Bell	Fujitsu
UNACCEPTABLE	**UNACCEPTABLE**	**UNACCEPTABLE**
none	Acer	none

Source: PC World Reliability and Service survey, based on online participants' responses recorded between May 1998 and June 1998. Companies are listed alphabetically within each tier. See "A Word About the Numbers" (page 102) for methodology.

WORK MACHINES FARE BEST

WE ALSO FOUND companies whose results vary depending on the type of computer. Owners of IBM home PCs are happier overall than Big Blue's work and notebook users. Conversely, Hewlett-Packard keeps workers pleased at the office but unimpressed at home.

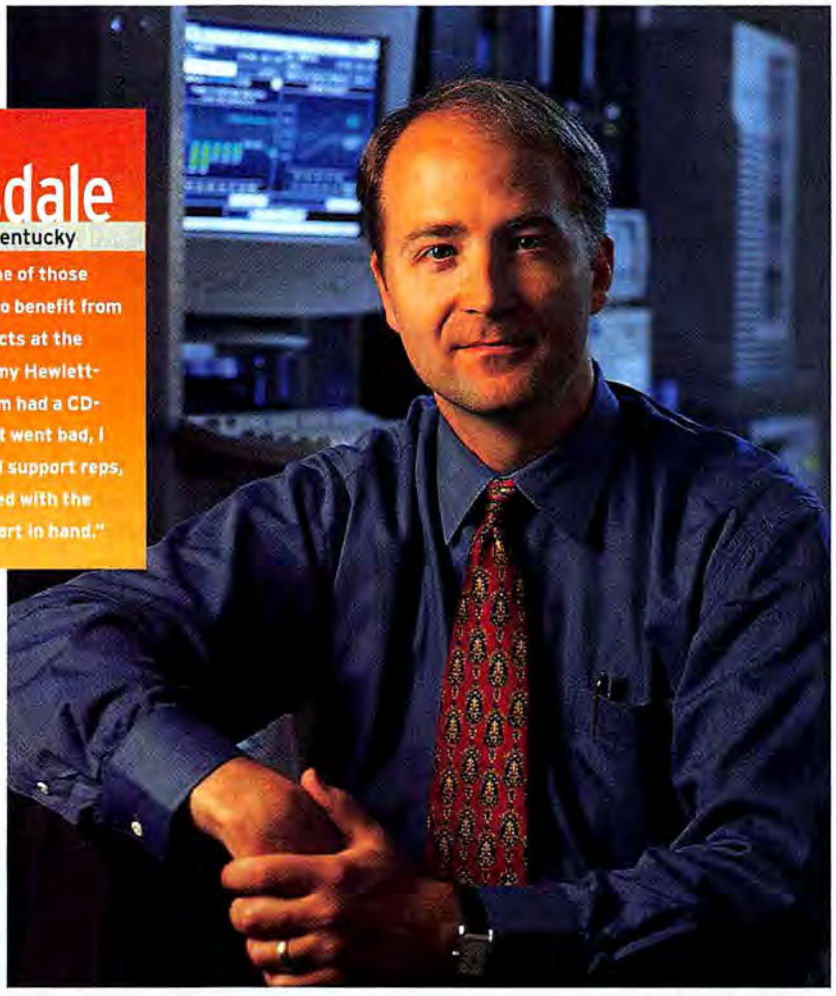
In general, work PC users in our survey tend to be more satisfied than other users. Overall scores for work PCs bunch tightly together in the Good to Fair range. Unlike with home PCs, only one work PC company receives a Poor, and none stoops to Unacceptable. When you look more closely, you see even clearer signs of higher satisfaction. For instance, among rated companies, work PC users reported a lower average rate of systems with one or more problems and fewer average problems per year than home and notebook PC users. People who told us about their office PCs reported that when they did run into trouble, they had an easier time getting tech

support on the phone and had their problems solved more quickly (see our section on work PCs for more information).

Why do people who use PCs at work have fewer problems than those who use them at home or on the road? Aside from the fact that work PC users often have special service contracts with the PC maker, the systems they use are not like home and notebook PCs. Home systems usually include multimedia extras. Configuring such extras adds complexity and increases the chances of a problem. In addition, home PC users usually have no one around but themselves to turn to, so they are more reliant on phone support to troubleshoot problems (see our section on home PCs for additional detail).

JAMES Trousdale
Louisville, Kentucky

Trousdale is one of those lucky enough to benefit from service contracts at the office. "When my Hewlett-Packard system had a CD-ROM drive that went bad, I called our local support reps, and they arrived with the replacement part in hand."



For their part, notebook users constantly risk injury to their PCs when they take them on business trips or simply set them on the edge of the kitchen table. All this jostling leads to more failed components in notebooks. (For more on durable notebooks, see our review "Notebooks for the Long Haul" on page 154.)

FRESH FEEDBACK

BEYOND RATING computers at work, home, and on the road, we've also introduced new scores to give you a better picture of what makes one company's PC reliability and service better than another's. For example, in addition to telling you how likely a system is to have a problem, we want to give you an idea of the average number of problems that PC users have each year. Of all the system makers in all three groups, NEC's work PCs received the best score—users reported an average of half a problem per year. Gateway home PCs brought up the rear with 2.8 problems per year.

We also revised the way we gauge systems that are delivered with broken parts. In addition to measuring the percentage of PCs that were dead on arrival, we added a category called problems on arrival, which covers any type of problem that needed immediate attention but didn't necessarily render the PC useless. Dell's notebooks got the best score in this category—only 4 percent of Dell users said their notebook had a problem when they first got it. Acer notebooks scored the worst, with 15 percent of users reporting such problems. We've also tried to get a handle on the incidence of component failures by asking users if their latest problem was due to a bad part. Less than 8 percent of HP home users said their most recent problem was a failed component, while a whopping 39 percent of Micron notebook users pointed to faulty components as the culprit.

As for scores that rate a company's support, the two most notable additions are subjective measures. To get an idea of users' experiences with technicians, we asked them to rate companies' staffs on their technical knowledge and sincere effort in solving problems. Micron earned an impressive score for knowledge in supporting its home PCs, while Gateway's work users and CyberMax's home customers raved about the effort their vendors made. On the downside, Fujitsu's notebook users gave it the lowest scores for knowledge and effort. (For more details, see the individual charts as well as "A Word About the Numbers.")

ONE SIZE DOESN'T FIT ALL

SO WHEN IT'S TIME to buy a new machine, don't listen to general assertions about who's best or worst. Use this report to drill down to find the company that will give you the best reliability and service for your specific situation.

When all the opinions are tallied and all the scores tabulated, our most important finding remains: One size does not fit all. Nor is one PC maker necessarily the ideal choice for all your computing needs. If you've lived and worked with more than one PC, you've probably already come to this realization. What you want, finally, is for each PC to serve you well—that's just a wild guess. ▶

PHOTOGRAPH: JEAN FRIBERT

WORK PCs

WITH COMPUTERS, some people seem to have better luck than others. Jim Trousdale is one of the lucky ones.

"When my Hewlett-Packard system had a CD-ROM drive that went bad, I called our local support reps, and they arrived with the replacement part in hand," says Trousdale, director of information systems at a 35-person office in Louisville, Kentucky. "In fact, the [drive] they installed was a faster model."

Local support reps? Not everyone has the luxury of dialing the phone and having the computer equivalent of the Maytag repairman show up at their door. But corporate PC users, like Trousdale, often benefit from extended service contracts, dedicated service departments, and outside support representatives.

"We're part of a larger firm," he says, "so we're able to get service contracts on our HPs through a value-added reseller. We pay a flat fee per workstation, covering all the service that we need."

For most PC makers, serving business customers is their bread and butter, so it's not surprising that they spread their resources a little thicker in the office than at home. While all the vendors in our survey build reasonably reliable systems, Dell, HP, and Micron rose above the rest, thanks to the quality of their service.

A BUSTED PC IS A BUSTED PC

IF YOUR NUMBER one concern is getting a machine that keeps going and going and going, NEC may be your best bet. Its scores for reliability are second to none. Our readers gave NEC high marks across the board for low problem rates, few problems per year, and minimal systems dead on arrival. The only glitch: So few readers got service from the company that we didn't have enough feedback to rate its support operations. All PC makers should have such problems.

So what's NEC's secret? According to company spokesperson D. J. Anderson, the firm set up its own build-to-order facility in Sacramento, California, for its PowerMate and Direction PC lines. "This

READERS RATE WORK PCs

IN A WORLD of imperfect PCs and inconsistent service, NEC's dependable systems and Dell's notable technical support stand out.

	Reliability							Service	
	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	Buy again based on reliability	Overall reliability score	Short hold time	Quick resolution
★★★★ GOOD									
DELL Great service, loyal customers.	★★★★★	★★★★★	★★	★★★★	★★★★	★★★★★	★★★★	★★★★	★★★★
HEWLETT-PACKARD Dependable machines, respectable service.	★★★★	★★★★★	★★	★★★★★	★★★★	★★★★	★★★★	★★★★	★★★★★
MICRON Reliable computers help reel in repeat buyers.	★★★★★	★★★★★	★★	★★★★	★★★	★★★★	★★★★	★★★★	★★★★
NEC Best-built PCs; support still a question mark.	★★★★	★★★★★	★★★★	★★★★★	★★★★	★★★★	★★★★★	[1]	[1]
★★★ FAIR									
ACER A reliability roller coaster.	★★	★★★★	★★★★	★★★★★	★★	★★	★★★	★★	★★★★
AST Plagued by trouble-prone PCs and long hold times.	★★	★★★★	★★★	★★★★	★★★	★★	★★★	★★	★★★
COMPAQ Few problems, but not quick to fix them.	★★★★★	★★★★	★★★★	★★★★	★★★★	★★★	★★★★	★★★★	★★
GATEWAY Good help, hard to reach.	★★★★	★★★★★	★★	★★★★	★★★	★★★★	★★★★	★★	★★★
IBM Better service than reliability.	★★★	★★★★	★★	★★★	★★	★★★★	★★★	★★★★	★★★
★★ POOR									
PACKARD BELL Relatively few would buy again.	★★	★★★★	★★	★★★★★	★★★	★	★★★	★★★	★★★

[1] Insufficient number of responses to rate service and support.
Listings within each rating tier (Good, Fair, and Poor) are alphabetical. Five stars is the best possible rating; one star, the worst.

ILLUSTRATION: CELIA JOHNSON

investment in the configure-to-order program has meant that we've been able to build the manufacturing process from the ground up," says Anderson. Unlike Packard Bell's assembly-line process (NEC and Packard Bell are run by the same company), NEC's manufacturing for its commercial PCs is *cell based*: A team of 25 people builds one machine from start to finish. "This process enables us to insist on extensive quality control over component assembly," adds Anderson.

Overall, the most satisfied workers have Dell, Hewlett-Packard, or Micron PCs on their desks. **Dell and Micron excel** at keeping work slowdowns to a minimum. But the **quick-fix champion** is Hewlett-Packard.

HP RISES TO THE OCCASION

ON AVERAGE, work PC users are more satisfied with the service they receive than home PC users, according to our survey. In fact, three companies—Acer, AST, and HP—get better overall service and reliability marks for their work PCs than for their home machines.

There are good reasons for this, notes Kevin Hause, senior analyst at research firm International Data Corporation. One is lower profit margins on home systems.

"The overall investment in supporting home PC users is smaller," Hause says. "There's less money available, so there are fewer technicians staffing phones relative to the number of customers out there." On top of that, he adds, home PC owners tend to ask less-sophisticated questions with more of a how-to angle—eating up the technicians' time on the phone—whereas more technically savvy commercial users ask more directed questions that are easier to answer.

Overall, the most satisfied workers have Dell, Hewlett-Packard, or Micron computers on their desks. Both Dell and Micron excel at keeping work slowdowns to a minimum over the life of readers' PCs, with problem rates of 34 and 37 percent, respectively. And when troubles do arise, the two companies keep users plugging along by ensuring that most problems are resolved quickly.

But the quick-fix champion is Hewlett-Packard. About 80 percent of HP work users got their problems resolved in five days or less. Our readers rate the company's support technicians among the most knowledgeable. And, based solely on the service they received, 89 percent of HP's work users would gladly buy a second machine (compared to only 77 percent of HP's home users). ▶

No resolution	Knowledgeable tech support	Sincere effort by tech support	Buy again based on service	Overall service score
★★★★★	★★★	★★★★	★★★★★	★★★★
★★★	★★★	★★★	★★★★	★★★★
★★★★	★★★	★★★	★★★★	★★★★
1	1	1	1	1
★★★★★	★★	★★	★★★	★★★
★★★★★	★★	★★	★★★	★★★
★★★★	★★★	★★★	★★★★	★★★
★★★	★★★★	★★★★	★★★★	★★★
★★★★★	★★★	★★★★	★★★★	★★★★
★★★	★	★★	★	★★

THE STAR SYSTEM

Stars correspond to companies' relative rankings generated from raw scores in each category. Five stars are best.

Percent of PCs with problems Percentage of PCs that have had at least one problem needing repair. Five stars: 33.6 to 36.9 percent. Four stars: 40.6 to 40.7 percent. Three stars: 45.8 percent. Two stars: 50.9 to 52 percent.

Problems per year Average number of problems per PC per year of age. Five stars: 0.5 to 0.9 percent. Four stars: 1.1 to 1.2 percent.

Problems on arrival Percentage of PCs that did not work properly when first turned on. Four stars: 5.6 to 8.3 percent. Three stars: 9.8 percent. Two stars: 11.2 to 12.7 percent.

Dead on arrival Percentage of PCs that were nonfunctional when first turned on. Five stars: 0.1 to 1.4 percent. Four stars: 2 to 2.8 percent. Three stars: 3.6 percent.

Component failure Percentage of PCs for which the most recent problem involved a component failure attributable to the manufacturer. Four stars: 15.4 to 18 percent. Three stars: 20.1 to 23.6 percent. Two stars: 27 to 28 percent.

Buy again based on reliability Percentage of respondents who would buy again from the same manufacturer based on the reliability of their current PC. Five stars: 96.3 percent. Four stars: 92.5 to 89.5 percent. Three stars: 85.8 percent. Two stars: 80 to 78.7 percent. One star: 74.7 percent.

Short hold time Percentage of phone service recipients who waited on hold for 5 minutes or less. Four stars: 70.7 to 68.2 percent. Three stars: 63.6 percent. Two stars: 56.9 to 52.7 percent.

Quick resolution Percentage of service recipients who got their most recent problem resolved in five days or less. Five stars: 80 percent. Four stars: 78.3 to 74.3 percent. Three stars: 70.6 to 68.2 percent. Two stars: 63.3 percent.

No resolution Percentage of service recipients who indicated their most recent problem was never resolved. Five stars: 1.6 to 4.9 percent. Four stars: 6 to 6.6 percent. Three stars: 8.3 to 9.3 percent.

Knowledgeable tech support Percentage of service recipients who rated the knowledge of the technician who helped them with their most recent problem as Excellent or Good. Four stars: 88.1 percent. Three stars: 84 to 82.2 percent. Two stars: 75.5 to 71.7 percent. One star: 68.5 percent.

Sincere effort by tech support Percentage of service recipients who rated the sincere effort of the technician who helped them with their most recent problem as Excellent or Good. Four stars: 91 to 88.2 percent. Three stars: 85.3 to 82 percent. Two stars: 75.5 to 74 percent.

Buy again based on service Percentage of service recipients who would buy again from the same manufacturer based on the service received from the manufacturer or authorized service provider. Five stars: 91.7 percent. Four stars: 88.9 to 86.6 percent. Three stars: 78.9 to 76.5 percent. One star: 63.6 percent.

Dan Gates, spokesperson for HP's commercial computing division, says one way the company keeps business users happy is by building PCs that don't grow old as technology races forward.

"The idea is to have product life cycles that last from 12 to 18 months," he says. "We want customers to be able to [select] a PC when it comes out, load their software on it, test it, and understand the ins and outs of the platform." Gates says familiarity with a PC breeds good reliability and service. "The drivers don't change, the components don't change, the BIOS doesn't change," he explains.

COMPAQ'S ACE IN THE HOLE

NOT LONG AGO, Compaq used to impress our survey respondents the way HP does now. But then Compaq's scores endured a steady decline from the top of the charts to the middle. Its fall was likely due to the company's unpopular decision to begin charging home users a fee for certain types of support calls. At the time, we did not separate home PCs from work PCs in our survey.

Now we do (and Compaq has stopped charging for support calls), but the computer giant remains mired in mediocrity. Readers give Compaq's work PCs good marks for reliability—there's a low percentage of problematic systems, for example—but they're less complimentary about the company's service. Only 63 percent of Compaq work PC users in our survey said their latest problem was resolved in five days or less—that's the worst figure in our work PCs chart.

Tom Ianotti, Compaq's vice president of worldwide marketing, sales and service, says he doesn't know why readers would

What Will Break First?

In our survey, faulty hard drives gave work users the biggest headaches.

COMPONENT	Percent of problems*
Hard drive	27
CD-ROM drive	15
Monitor/screen	13
Motherboard	9
Modem/fax board	8
Floppy drive	6

*Percentage of responses indicating component that caused most recent problem. Only the top six problematic components are reported.

SOURCE: PC WORLD'S 1998 RELIABILITY AND SERVICE SURVEY

A Word About the Numbers

PC WORLD'S Reliability and Service survey was conducted in conjunction with World Research of San Jose, California, and *PC World*'s sister company IDC Consulting, based in Mountain View, California.

From March through May 1998, 33,775 verified *PC World* subscribers reported on the 81,613 PCs they use at work, at home, and on the road. After filtering out reports on PCs that were more than three years old, we divided the remaining 61,052 reported PCs into groups based on manufacturer, type (desktop or notebook), and location of use (work or home). Any manufacturer with a sufficient number of respondents for a given type and location was included in the study.

By Invitation Only

FROM MAY THROUGH June 1998, we e-mailed individuals who had reported on a PC and invited them to participate in our online survey. They were asked to report on one specific PC that they had described when they registered for our survey.

On average, 50 percent of each brand's invited respondents, or a total of 6861 respondents, participated in the survey. The information they provided on their PC, its reliability, and their experience, if any, in getting service, provides the basis for our rankings.

Using this data, a team of *PC World* editors and research experts evaluated the overall reliability and service of each manufacturer's home, work, and notebook computers.

To rate each company's PC reliability, we measured six categories: (1) percentage of PCs that had at least one problem needing repair; (2) average number of problems per PC per year of age; (3) percentage of PCs that did not work properly when first turned on; (4) percentage of PCs that were nonfunctional when first turned on; (5) percentage of PCs for which the user's most recent problem was a component failure attributable to the manufacturer; (6) percentage of respondents who would buy again from the same manufacturer based on the reliability of their PC.

To rate service, we measured the following six categories: (1) percentage of phone service recipients who waited on hold for 5 minutes or less; (2) percentage of recipients who got their most recent problem resolved in five days or fewer; (3) percentage of recipients who indicated their most recent problem was never resolved; (4) percentage of recipients who rated the knowledge of the technician who helped them with their most recent problem as "excellent" or "good"; (5) percentage of recipients who rated the sincere effort of the technician who helped them with their most recent problem as "excellent" or "good"; (6) percentage of recipients who would buy again from the same manufacturer based on service received from the manufacturer or authorized service provider.

The Star Report

IN EACH OF THE SIX reliability and six service categories, we ranked each company from best to worst to determine its star rating. The reliability score and the service score represent the sum of their respective, weighted categories. We determined a company's overall ranking based on the sum of its reliability and service scores, as well as on the number of stars awarded in individual categories.

ILLUSTRATION: CELIA JOHNSON

rate his company's service as only Fair, but he has a pretty good idea about how Compaq's service is going to get a lot better: through its recent acquisition of Digital Equipment Corporation.

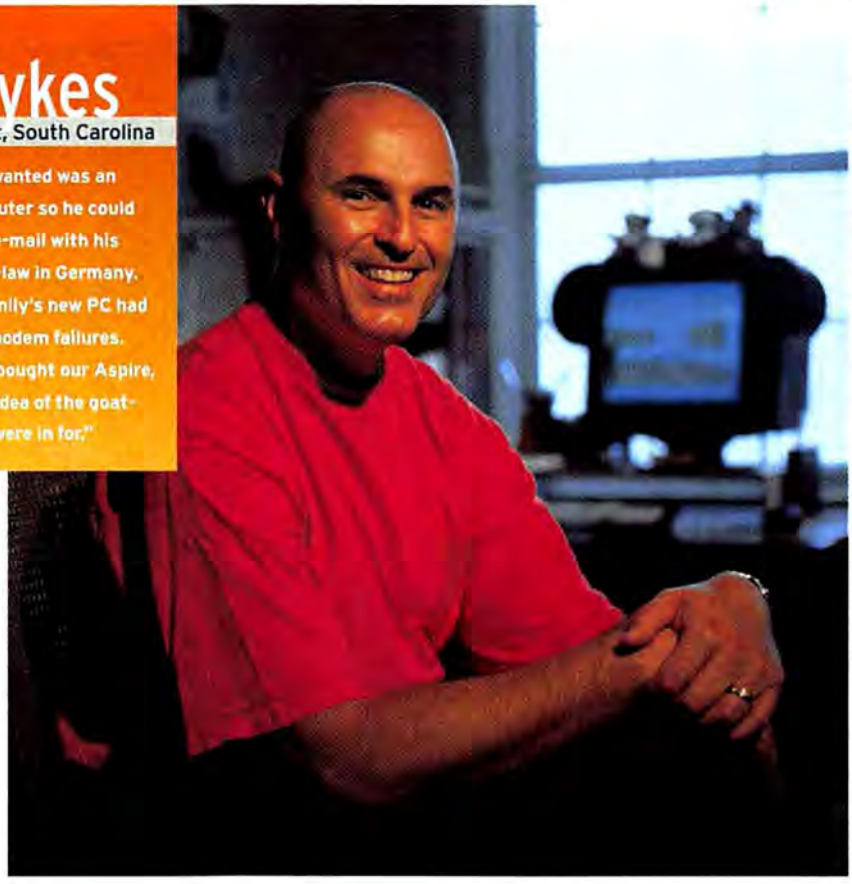
"It's fair to say that Compaq acknowledges it needed stronger service. Part of the reason for acquiring Digital was to get [more] service expertise," says Ianotti, who came over from Digital in the deal.

Judging from what readers had to say, Digital may be just the medicine to cure Compaq's ailing service scores. Although we are not publishing scores for Digital PCs (the machines are no longer on the market), overall, people who used Digital PCs at work were significantly happier than Compaq users, rating Digital higher than Compaq in all service measures except hold time.

JOHN Sykes

Beaufort, South Carolina

All Sykes wanted was an Acer computer so he could exchange e-mail with his brother-in-law in Germany. But the family's new PC had repeated modem failures. "When we bought our Aspire, we had no idea of the goat-roping we were in for."



MURPHY'S LAW

BUT ALL THE SERVICE contracts in the world can't keep a computer system from breaking down. And there's the rub: Although our data shows that work PCs have fewer problems over their lifetimes than typical home systems do, they are nearly as likely to have some type of problem when users turn the machine on for the first time. Just look at the top companies in our work PCs chart: Dell, Hewlett-Packard, and Micron all had a relatively high number of systems that suffered problems right out of the box.

In addition, although problems may not happen as frequently with your work PC, work and home machines endured the same rate of faulty components. An average of 21 percent of work and home users said their most recent problem was due a component failure.

The lesson to be learned? Even work PCs—the most reliable class of machines in our survey—will likely cause you grief at some point. So when you go shopping for your next business workhorse, don't forget about service—in all probability, you're going to need it.

—Naomi Wise

HOME PCs

IT'S MIDNIGHT. The kids are asleep and you've just put the finishing touches on tomorrow's big presentation. With a weary sigh, you open your e-mail program, attach the files to a message, and prepare to send them to your boss. Suddenly, the screen goes blank. Your PC is kaput, and unless you can fix it fast, so is your next promotion.

Who can you call for help? Big offices have a dedicated information services department. Smaller offices usually have at least one computer guru. But when your home computer stops working, a call to your PC manufacturer's tech support line is the best you can do. And sometimes, the best isn't very good.

To be fair, home systems are more likely to break down than are office computers. They are often more complex, with troublesome add-ons like joysticks and multimedia speakers. And vendors may support them differently, giving preference to major business accounts over individual users. We found that no home PC maker earned an overall grade of Outstanding. Several provide Good PC reliability and service; the rest range from Fair to Unacceptable.

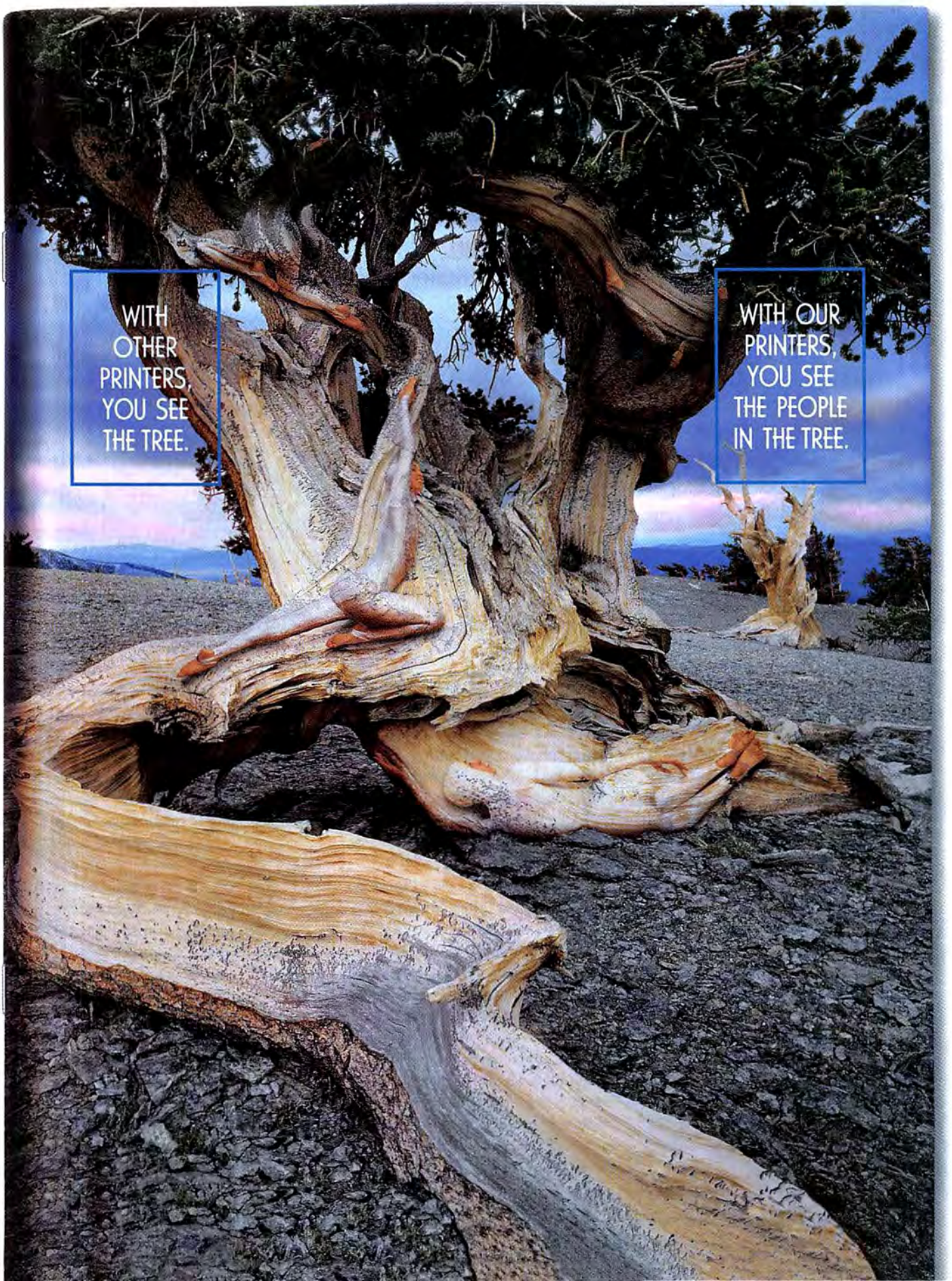
PROBLEMS, PROBLEMS

THE BEST WAY to fix PC problems is to avoid them in the first place. But according to our study, that's not always easy to do: 48 percent of all respondents for our 13 home PC companies reported problems. The best of the bunch, though, was Dell—just 35 percent of Dell owners reported having a problem. Moreover, not a single Dell user told us their home PC was dead on arrival.

So what kept Dell out of the top tier? Inconsistent support—historically, Dell's strong suit. Readers reported long waits on hold and a relatively high percentage of unresolved problems. Nearly 10 percent of Dell customers who got service walked away without a solution (the average for home PC vendors was 8 percent). And respondents rated Dell's support staff only Fair for knowledge and effort.

In fact, earlier this year *PC World* ▶

PHOTOGRAPH: ANN STATES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received an unusually high volume of complaints about Dell from readers. They told of difficulties getting through to tech support and of problems falling through the cracks. Dell acknowledged that there were problems as a result of heavy sales over the holiday season and early in the year. Since then, the company has beefed up its tech support and expanded its e-mail support team. At the time of these improvements, the complaints began to decline (see *PCW Advocate*, July).

The most pleasantly surprising feedback came from CyberMax and Sony home PC users. (For a closer look at CyberMax, see "Vendor Spotlight: CyberMax Unveiled" on page 108.) Both are relative newcomers to the PC game, but they held their own against more established companies, copping top grades. In fact, in some key service measures, CyberMax and Sony rated Outstanding. For instance, only 4 percent of CyberMax users said their most recent problem was never resolved, and a full 80 percent of Sony users told us they got a resolution to their problem in five days or less.

"When I purchased my Sony PC in May of 1997, I was ecstatic. The support was great—and patient," says Wayne Marks of Wynnewood, Pennsylvania, who uses his Sony PCV-90 system for culinary research, managing his bank accounts, and communicating with his son at Penn State University. "I always got a solution to my problem. One time, they even guid-

READER'S RATE

HOME PCs

NO ONE COMPANY dominates, but newcomers CyberMax and Sony steal the show with surprisingly good PCs, backed up by spot-on support.

	Reliability							Service	
	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	Buy again based on reliability	Overall reliability score	Short hold time	Quick resolution
★★★★ GOOD									
CYBERMAX High marks despite many broken parts.	★★★	★★★★	★★★★	★★★★★	★	★★★★★	★★★★	★★★★	★★★★
DELL Well-built systems, though home service has slipped.	★★★★★	★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★	★★★★★
IBM Excellent reliability, but support is only so-so.	★★★★★	★★★	★★★★	★★★★★	★★★★	★★★★	★★★★	★★★★	★★★
MICRON Strong overall–and customers love them.	★★★	★★★★	★★★	★★★★	★★★	★★★★★	★★★★	★★★★	★★★
QUANTEX Shines at fixing problems.	★★★★	★★★	★★	★★★★	★★	★★★★★	★★★	★★★	★★★★
SONY Rookie of the year.	★★★	★★★	★★★★	★★★★★	★★★★	★★★★	★★★★	★★★★	★★★★★
★★★ FAIR									
COMPAQ Reasonably reliable, but technicians fail to impress.	★★★	★★★	★★★★	★★★★	★★★★	★★★	★★★	★★★★★	★★★
GATEWAY Fortunately, the service is first rate.	★★★	★★	★★	★★	★★★★	★★★★	★★★	★★★	★★★★
HEWLETT-PACKARD Technical support needs some help.	★★★	★★★	★★	★★★★	★★★★★	★★★	★★★	★★★★	★★★
NEC Better for business than home.	★★	★★★★	★★★	★★★★	★★★	★★	★★★	★★	★★★
★★ POOR									
AST Help desk gets lots of practice.	★★	★★★★	★★	★★★★	★★	★★	★★	★★	★★
PACKARD BELL No visible means of support.	★★★	★★★	★★★	★★★★	★★★	★	★★★	★★	★★
★ UNACCEPTABLE									
ACER How low can they go?	★	★★★★	★★★★	★★★★★	★	★	★★	★★	★

Listings within each rating tier (Good, Fair, Poor, and Unacceptable) are alphabetical. Five stars is the best possible rating; one star, the worst.

ILLUSTRATION: CELIA JOHNSON

ed me through a BIOS update—no trivial task for a beginner," adds Marks.

How did Sony get a handle on tech support so quickly? By bringing together users with the technicians who can solve their problems, says Maureen Read, director of Sony's Technical Response Center in Fort Myers, Florida. Read says Sony is quick to move a problem up the ladder if the technician who answers the phone can't solve it. "At this point," she says, "specialists can focus on tougher problems and utilize special diagnostics, such as software that allows our technicians to access the customer's PC remotely, to better evaluate the problem."

Quick resolutions aren't Sony's only strength. Sony owners reported short hold times and gave good grades to the company's technicians for their knowledge and sincere effort in solving problems.

Sony's honeymoon with its customers may be short-lived. Due to a **high volume of support calls,** the company started to enforce its **one-year limit** on free technical support. It **now charges $19.95** per incident after the first year.

But the honeymoon may be short-lived. Due to a high volume of support calls, Sony started to enforce its one-year limit on free technical support in June. It now charges $19.95 per incident after the first year. This change has angered many Sony customers, including Marks, who were under the impression that phone support would be free of charge for the life of their machine.

Sony spokesperson Jim Adamson says the consumer electronics giant didn't formally enforce its one-year free-support policy for the first two years that its VAIO desktop computers were on the market. "But then a big increase in call volume made it economically unfeasible to continue" indefinite free support, he says. "To the best of our knowledge, Sony never stated in print that we would offer free lifetime technical support."

Regardless of what led to the service charge, the change could hurt Sony's scores in future surveys, if history is any guide. When Compaq started to charge customers $35 for certain types of support in 1996, the company's service scores slid dramatically (see "PC Reliability and Service: Good-Bye to Good ▶

No resolution	Knowledgeable tech support	Sincere effort by tech support	Buy again based on service	Overall service score
★★★★★	★★★★	★★★★	★★★★★	★★★★
★★	★★★	★★★	★★★★	★★★
★★	★★★	★★★★	★★★	★★★
★★★★★	★★★★★	★★★★	★★★★★	★★★★
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★★★★★	★★★	★★★	★★★★	★★★★
★★	★★	★★★	★★★	★★★
★★★★★	★★★	★★★	★★	★★★
★★★★	★★	★★	★★	★★
★	★	★★	★	★
★	★★	★★	★	★

THE STAR SYSTEM

Stars correspond to companies' relative rankings generated from raw scores in each category. Five stars are best.

Percent of PCs with problems Percentage of PCs that have had at least one problem needing repair. Five stars: 35 to 39.9 percent. Four stars: 43.8 percent. Three stars: 47.4 to 51.1 percent. Two stars: 53.9 to 55.3 percent. One star: 57.9 percent.

Problems per year Average number of problems per PC per year of age. Four stars: 0.9 to 1.1 percent. Three stars: 1.4 to 2.2 percent. Two stars: 2.8 percent.

Problems on arrival Percentage of PCs that did not work properly when first turned on. Four stars: 8.1 to 9.2 percent. Three stars: 9.6 to 10.3 percent. Two stars: 11.9 to 14.4 percent.

Dead on arrival Percentage of PCs that were nonfunctional when first turned on. Five stars: 0 to 1.1 percent. Four stars: 1.5 to 2.3 percent. Two stars: 4.2 percent.

Component failure Percentage of PCs for which the most recent problem involved a component failure attributable to the manufacturer. Five stars: 7.5 to 9.8 percent. Four stars: 13.9 to 17.3 percent. Three stars: 20.8 to 24.5 percent. Two stars: 27.6 to 28.2 percent. One star: 31.1 to 35.1 percent.

Buy again based on reliability Percentage of respondents who would buy again from the same manufacturer based on the reliability of their current PC. Five stars: 96.4 to 95.1 percent. Four stars: 93.2 to 91 percent. Three stars: 86.4 to 86 percent. Two stars: 84.4 to 81.5 percent. One star: 77.9 to 72.5 percent.

Short hold time Percentage of phone service recipients who waited on hold for 5 minutes or less. Five stars: 71.1 percent. Four stars: 67.2 to 63.6 percent. Three stars: 58.8 to 55.8 percent. Two stars: 49.3 to 41.8 percent.

Quick resolution Percentage of service recipients who got their most recent problem resolved in five days or less. Five stars: 80.3 percent. Four stars: 76.5 to 73 percent. Three stars: 70.4 to 65.5 percent. Two stars: 60.4 to 59.8 percent. One star: 48.4 percent.

No resolution Percentage of service recipients who indicated their most recent problem was never resolved. Five stars: 3 to 4.4 percent. Four stars: 5.8 to 6.2 percent. Three stars: 7.6 percent. Two stars: 9.9 to 12.2 percent. One star: 15.2 to 15.9 percent.

Knowledgeable tech support Percentage of service recipients who rated the knowledge of the technician who helped them with their most recent problem as Excellent or Good. Five stars: 90.6 percent. Four stars: 87.3 to 85.6 percent. Three stars: 82.8 to 77.8 percent. Two stars: 76.3 to 71.7 percent. One star: 66.7 to 65.2 percent.

Sincere effort by tech support Percentage of service recipients who rated the sincere effort of the technician who helped them with their most recent problem as Excellent or Good. Four stars: 90.8 to 87 percent. Three stars: 83.6 to 76.6 percent. Two stars: 72.8 to 71.4 percent.

Buy again based on service Percentage of service recipients who would buy again from the same manufacturer based on the service received from the PC manufacturer or authorized service provider. Five stars: 94.1 to 93.8 percent. Four stars: 90.4 to 86.1 percent. Three stars: 82 to 75.6 percent. Two stars: 73.6 to 70 percent. One star: 60.3 to 60.1 percent.

Vendor Spotlight: CyberMax Unveiled

CYBER WHO? Cyber*Max*, recipient of top-notch reliability and service scores, that's who. Seemingly out of nowhere, this little-known company has swept to the top of our home rankings. Where did it come from?

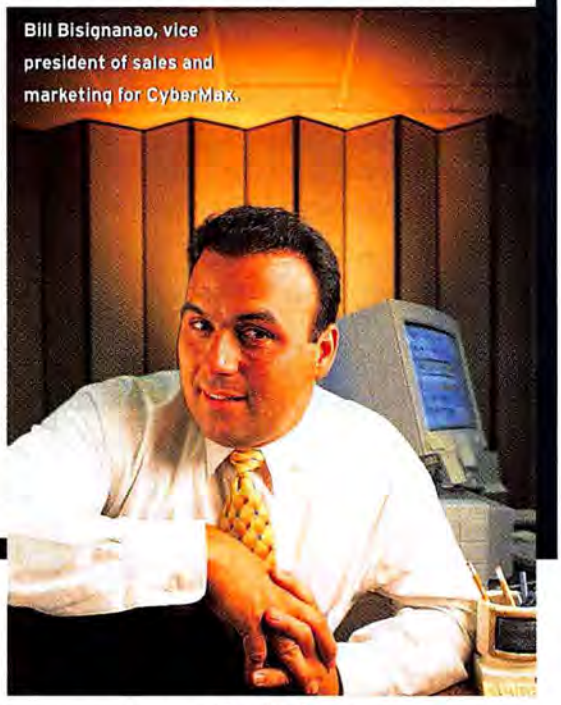
For the last two years, CyberMax has built low-cost PCs based on AMD, Cyrix, and Intel processors. "We're trying to connect with home office and small-business users who have better things to do than worry about their PC. They want great value and service," says Bill Bisignanao, vice president of sales and marketing for the Allentown, Pennsylvania, company.

According to our survey, CyberMax customers seem to be getting it. Just one of 100 machines was reported dead on arrival, and over 95 percent of CyberMax users say they would buy another CyberMax PC based on reliability.

The company's service scores are even more impressive: 94 percent of CyberMax users in our survey said they would buy from the firm again based on the service they'd received. Tom Champagne, CyberMax's service manager, says all technicians receive training in everything from new PC technologies to such touchy-feely topics as how to handle angry customers and how to avoid intimidating a technophobic caller.

The only notable black mark on CyberMax's record is its score for component failures. Roughly 31 percent of CyberMax owners who had a problem said their most recent headache was a component failure (the average for all home PC vendors is 21 percent). A closer look at our data indicates that monitors accounted for almost a third of the company's faulty components. Michael Turnbaugh of Glen Falls, New York, ended up getting two bad monitors but was pleased with the way the company resolved the matter. "After the second monitor failed," he says, "CyberMax apologized and sent me another one fast without any hassle."

No hassle? Now, that's a nice concept for a home PC maker. **-Kirk Steers**



Bill Bisignanao, vice president of sales and marketing for CyberMax.

PHOTOGRAPH: PETER GREGOIRE

Support?" December 1996). Compaq has since stopped charging for support.

SLOW COMEBACK?

OVER THE YEARS, our readers have continually given Packard Bell poor to middling scores for its PC reliability and service. The good news is that the company's efforts to repair its reputation for unreliable PCs seem to be paying off. Investments in quality management and in state-of-the-art production facilities helped it earn a Fair reliability rating, along with a handful of other companies.

The bad news is, Packard Bell's service still has a way to go. Respondents tell us that the company leaves a high percentage of problems unresolved and that its technicians aren't so knowledgeable.

Why hasn't Packard Bell's service improved? Mal Ransom, Packard Bell NEC's senior vice president for marketing, claims that it has. Still, he concedes that one reason for the company's low service scores could be its high proportion of inexperienced users. Over 22 percent of Packard Bell users in our survey rated themselves as novices (13 percent of all home users called themselves novices). Because they're inexperienced, greenhorns may call service centers more often, slowing down service for all users.

What's more, only 77 percent of service contacts about Packard Bell home PCs went to the company directly, and only 37 percent of Packard Bell users actually had their problem solved by the company. Others turned to authorized repair centers, such as those in the stores where Packard Bell computers are sold.

Eric Rocco, principal analyst at research firm Dataquest, is not surprised by low service scores for retail PC makers like Packard Bell. "Some of the bigger manufacturers, like Packard Bell, have thousands of service partners, and it's very difficult for them to have quality control over service," he says. That's why Packard ▶

Where Should You Shop?

The happiest home PC buyers purchased their systems directly from the manufacturer.

PLACE OF PURCHASE	Percent "very satisfied"*
Direct from manufacturer By phone, Web site, or catalog, or through direct sales	79
Mail-order catalog Mass merchant mail-order warehouses like PC Connection and MicroWarehouse	58
Retail Computer stores, mass merchants, consumer electronics and office supply stores	55

*Percentage of home PC owners who said they were "very satisfied" overall with their PC.

SOURCE: PC WORLD'S 1998 RELIABILITY AND SERVICE SURVEY

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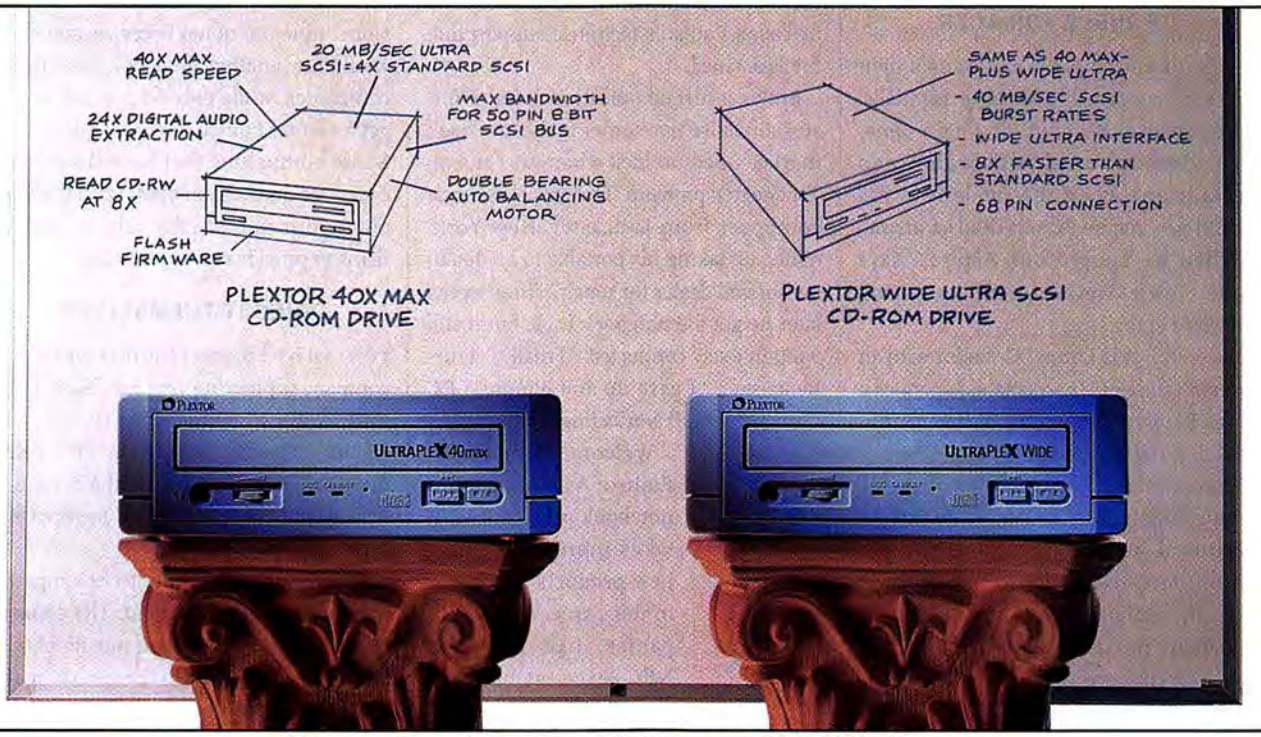

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Bell wants users to call its support line in order to get the best available help.

"We are aggressively trying to attract users with questions to contact our support staff first," says Ransom. "We've tried to make contacting us easy with clearly marked 'box toppers' [instruction sheets for assembling new systems] and quick, one-button keyboard access to all our contact telephone numbers, online help resources, and service policies."

TROUBLE FOR ACER

EVEN CALLING a PC company's own technical support line can have its pitfalls. John Sykes of Beaufort, South Carolina, had a lengthy verbal battle with Acer's technicians when the modem in his brand-new Aspire PC was dead on arrival. "When we bought our Aspire," says Sykes, "we had no idea of the goat-roping we were in for."

Acer, the only home PC vendor with an overall rating of Unacceptable, operates a large support facility in Costa Rica. Michael Griffin, Acer's vice president of customer satisfaction and technical support, admits that the facility recently suffered from "inadequate training and high employee turnover." And because the facility uses local workers, the Acer users and technicians often had difficulty negotiating each other's accents.

Acer owner Peter Kilcommons of Baldwin, New York, says he called Acer's tech support for help with a faulty CD-ROM drive but eventually gave up. "I'm sure [the technician] didn't understand me any better than I understood him," he says. Griffin claims Acer is making changes to address these problems, including starting a training program on language.

Ultimately, though, satisfaction is satisfaction no matter what language you speak. And considering how complex today's home systems tend to be—with modems, DVD drives, and other add-ons—trouble-free PCs are a long way off.

—Kirk Steers

NOTEBOOK PCs

IN MARCH 1998, Stafford Trueheart purchased a notebook computer from Fujitsu PC. But when he tried to go online using the notebook's built-in modem, the connection mysteriously dropped. "The problem wasn't in the phone line," Trueheart reports, "because I hooked up other PCs to it without any problems." So he called Fujitsu's technical support line for assistance.

But as it turned out, the folks at Fujitsu—a relative newcomer to the notebook market—had no idea what was causing Trueheart's problem. The gospel and jazz composer from Lancaster, New York, ended up taking his portable to a Fujitsu-authorized dealer for repair. Three weeks later he got the notebook back, but it still wouldn't stay connected. "Finally," Trueheart says, "I gave up and bought a PC Card modem. It works fine."

STAFFORD Trueheart
Lancaster, New York

For some reason that even Fujitsu could not identify, the built-in modem in Trueheart's brand-new Fujitsu notebook kept disconnecting from the Internet. "Finally I gave up and bought a PC Card modem. It works fine."

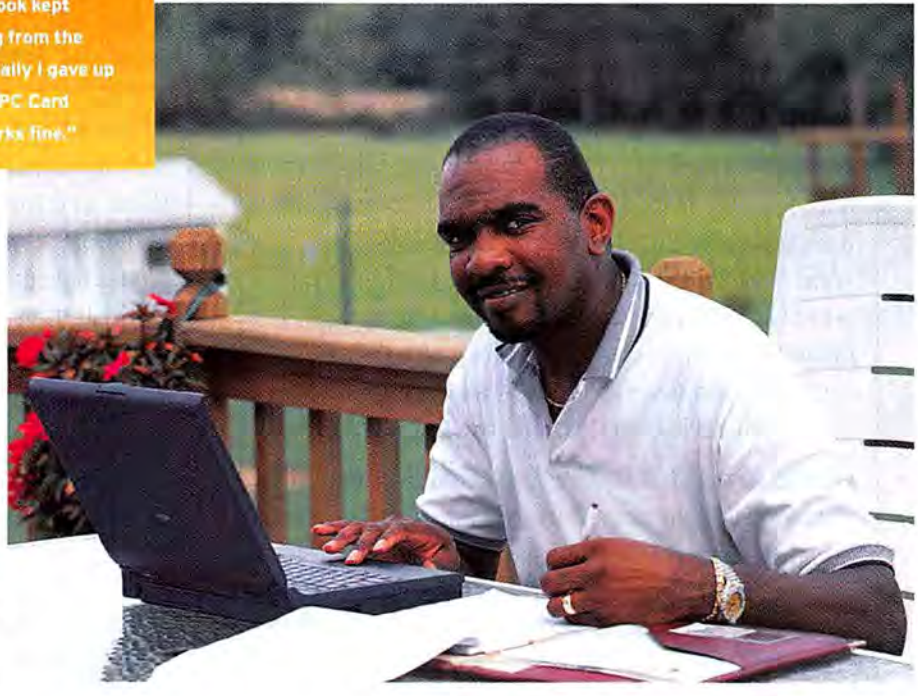
Welcome to the party, Fujitsu. As our survey of notebook users shows, it takes more than flashy new products to make it in this game. Some companies, like IBM and NEC, excel at building reliable machines but often fail to fix problems quickly or provide knowledgeable support. Others, like WinBook, got high praise for solving nearly every puzzle people threw at them—but with more than 52 percent of WinBook users reporting problems, the company gets a little too much practice.

Only a handful of veteran notebook makers earn high ratings for both system reliability and support: Dell, Gateway, Micron, and Toshiba. Based on service alone, nine out of ten users we surveyed would buy another notebook from these companies, while only 62 percent would get a second Fujitsu. One key difference: Some companies that have developed dedicated notebook support specialists far outperformed those that rely on outside firms to provide customer help.

DOING IT THEMSELVES

IT STANDS TO REASON that when the company supporting your notebook is the same company whose name is on it, you should get better service. Three such companies—Dell, Gateway, and Micron—have special staffs dedicated to servicing their notebook lines.

In Gateway's case, the notebook support staff is especially important: The company's raw service scores in our notebook survey were generally better than its scores for work and home desktops. ▶



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Imaging MAGAZINE
BEST BUY
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PC Magazine, May 5, 1998

The latest edition improves the ease-of-use and power of existing functions like setting up schedules, allocating resources, calculating cash flow . . . .
Fortune, Technology Buyer's Guide, Winter 1998

...easy to learn and use, **and offers considerable *control* over even the most complex undertakings.**
PC Computing, May, 1998

The program's **Strength** *lies in its flexible layout and presentation tools.*
Info World, April 6, 1998

. . . a good bet for companies that are looking for basic but ***easy-to-configure*** project scheduling.
PC Week, March 18, 1998

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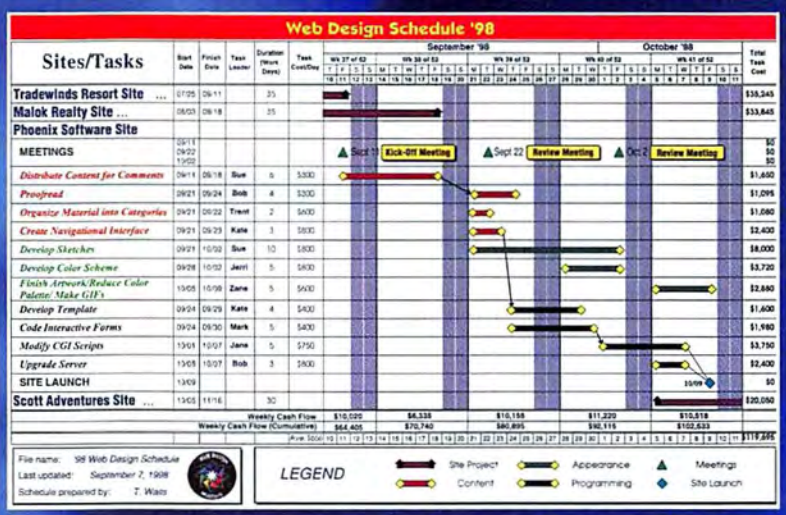

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Circle 14 on reader service card

In particular, Gateway is the only notebook vendor to get a five-star rating for its short hold times—74 percent of respondents who called for service said they were on hold for 5 minutes or less. And just 3 percent of Gateway notebook problems went unresolved, second only to Micron.

"We recently made some major changes in how we reward our service technicians in the notebook group," says Eric Larsen, vice president of global technical support for Gateway. This spring, he says, the company introduced a new program in the notebook support group, giving bonuses to technicians based on how frequently and quickly they resolve problems to the customer's satisfaction.

The only thing that kept Gateway from earning an overall Outstanding rating was its inconsistent reliability record. Users reported an average of less than one problem per year and a low number of systems dead on arrival (1.5 percent), but one in three Gateway respondents with a recent problem said that it was due to a component failure. That's the second-highest incidence of component failures in our notebook survey.

Conversely, Dell's top-notch PC dependability was marred by some service glitches. Roughly 8 percent of the users who received service from Dell said that they never got a resolution to their most recent problem (the average for all rated notebook vendors is about 6 percent), and only

READERS RATE

NOTEBOOK PCs

AS EXPECTED, Dell, Micron, and Toshiba cop three of the top spots. The big surprises: Gateway joins the elite; IBM falls back into the crowd.

	Reliability							Service	
	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	Buy again based on reliability	Overall reliability score	Short hold time	Quick resolution
★★★★ GOOD									
DELL A hair short of five stars.	★★★★	★★★★	★★★★★	★★★★	★★★★	★★★★★	★★★★	★★★	★★★★
GATEWAY Better notebooks than desktops.	★★★	★★★★★	★★★	★★★★	★★	★★★★	★★★★	★★★★★	★★★★
MICRON Dogged by bad components.	★★★	★★★★	★★★★	★★★★	★	★★★★	★★★	★★	★★★★★
TOSHIBA A model of consistency.	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
★★★ FAIR									
ACER Likely to have a rough start.	★★★	★★★★	★	★★★★	★★★	★★	★★★	★★★	★★★
COMPAQ A fair share of problems, but great at recovering from them.	★★★	★★★	★★	★★★★★	★★★	★★★	★★★	★★★	★★★
HEWLETT-PACKARD Solid systems; support unknown.	★★	★★★★	★★★★	★★★★★	★★★	★★★	★★★	[1]	[1]
HITACHI At their best right out of the box.	★★	★★★	★★★★	★★★★★	★★★	★★★	★★★	★★★★	★★
IBM Strong notebooks, weak service.	★★★★★	★★★★★	★★★	★★★★★	★★★	★★★★	★★★★	★★	★★
NEC Laptops mostly trouble-free—good thing, too.	★★★★	★★★★★	★★★★	★★★★★	★★★	★★★	★★★★	★★★	★★
WINBOOK Steady service breeds satisfied customers.	★★	★★★★	★★★	★★	★★★	★★★★	★★★	★★★★	★
★★ POOR									
AST One time is enough for most customers.	★	★★★	★	★★★★★	★★★	★	★★	[1]	[1]
FUJITSU Good help is hard to find.	★★★★	★★★★	★★	★★★	★★★★	★★★	★★★	★★★	★★

[1] Insufficient number of responses to rate service and support.

Listings within each rating tier (Good, Fair, and Poor) are alphabetical. Five stars is the best possible rating; one star, the worst.

ILLUSTRATION: CELIA JOHNSON

64 percent reported a hold time of 5 minutes or less when they called technical support—about average among all the notebook vendors.

Still, the vast majority of Dell notebook users in our survey gave the company's technical support staff high marks for being knowledgeable and making a sincere effort to resolve their problems. Kim Levya, a technical services specialist in Billerica, Massachusetts, is a fan of Dell's WebTalk, an interactive online forum for getting help with Dell's PCs.

"I posted a message asking how to upgrade my hard drive," Levya says, "and in less than a day, I received an e-mail from a Dell technician telling me an answer to my question had been posted. It had great step-by-step directions."

Toshiba admits it was **caught off guard** last year by the volume of service calls for its **now-defunct Infinia line** of home desktops. Because **desktop and notebook calls** were going to the **same call centers,** notebook users suffered.

COMING BACK STRONG

ALONGSIDE the mail-order giants stands longtime notebook leader Toshiba. Our readers gave the company equally high marks in PC reliability and service. But if we'd looked at Toshiba a year earlier, the story might have been different.

From mid-1997 to early 1998, *PC World* received an unusually high number of complaints from Toshiba owners who felt they had been abandoned when they needed support. Then, the grumbles began to subside.

Though our current data shows a couple of chinks in the company's armor, overall, Toshiba remains one of the top notebook makers. Its PC reliability scores are good across the board, and a full 91 percent of Toshiba users in our survey said they'd buy another Toshiba PC based on their notebook's reliability. But the company is merely Fair in a few service scores. For instance, 7 percent of respondents said Toshiba never resolved their most recent problem. Also, Toshiba notebook owners gave the company lukewarm scores for its support technicians' knowledge and effort.

Dan Ludwick, Toshiba's director of service and support marketing, admits the company was caught off guard last year by the volume of service calls for its ▶

No resolution	Knowledgeable tech support	Sincere effort by tech support	Buy again based on service	Overall service score
★★★	★★★★	★★★★	★★★★★	★★★★
★★★★★	★★★	★★★★	★★★★	★★★★
★★★★★	★★★	★★★★	★★★★★	★★★★
★★★	★★★	★★★	★★★★	★★★★
★★★★★	★★	★★	★★	★★★
★★★★★	★★	★★★	★★★	★★★
'	'	'	'	'
★★★	★★	★★★	★★	★★★
★★	★★	★★★	★★★	★★
★★★	★	★★★	★★★	★★★
★★★★★	★★★★	★★★★	★★★★★	★★★★
'	'	'	'	'
★★★	★	★★	★	★★

THE STAR SYSTEM

Stars correspond to relative rankings generated from raw scores in each category. Five stars are best.

Percent of PCs with problems Percentage of PCs that have had at least one problem needing repair. Five stars: 38.6 percent. Four stars: 40.8 to 42.8 percent. Three stars: 44.4 to 49.9 percent. Two stars: 51.5 to 52.3 percent. One star: 56 percent.

Problems per year Average number of problems per PC per year of age. Five stars: 0.7 to 0.9 percent. Four stars: 0.9 to 1.1 percent. Three stars: 1.2 to 1.5 percent.

Problems on arrival Percentage of PCs that did not work properly when first turned on. Five stars: 4 percent. Four stars: 6.5 to 7.8 percent. Three stars: 8.7 to 9.5 percent. Two stars: 11.8 to 12.3 percent. One star: 14 to 14.8 percent.

Dead on arrival Percentage of PCs that were nonfunctional when first turned on. Five stars: 0 to 0.9 percent. Four stars: 1.3 to 2.6 percent. Three stars: 3.4 percent. Two stars: 4 percent.

Component failure Percentage of PCs for which the most recent problem involved a component failure attributable to the manufacturer. Four stars: 20 to 24 percent. Three stars: 26.6 to 29.7 percent. Two stars: 33.5 percent. One star: 38.6 percent.

Buy again based on reliability Percentage of respondents who would buy again from the same manufacturer based on the reliability of their current PC. Five stars: 95.8 percent. Four stars: 94.1 to 90.2 percent. Three stars: 88.2 to 84.7 percent. Two stars: 79.8 percent. One star: 75.8 percent.

Short hold time Percentage of phone service recipients who waited on hold for 5 minutes or less. Five stars: 73.9 percent. Four stars: 70.3 to 67.8 percent. Three stars: 64.4 to 58.3 percent. Two stars: 54.8 to 51.9 percent.

Quick resolution Percentage of service recipients who got their most recent problem resolved in five days or less. Five stars: 78.4 percent. Four stars: 70.3 to 68.9 percent. Three stars: 65.1 to 62.6 percent. Two stars: 58.2 to 52.5 percent. One star: 49.7 percent.

No resolution Percentage of service recipients who indicated their most recent problem was never resolved. Five stars: 1.2 to 4.2 percent. Three stars: 7.2 to 9.1 percent. Two stars: 11.6 percent.

Knowledgeable tech support Percentage of service recipients who rated the knowledge of the technician who helped them with their most recent problem as Excellent or Good. Four stars: 87.7 to 86.2 percent. Three stars: 82.9 to 77.6 percent. Two stars: 72.6 to 69.6 percent. One star: 64 to 59.1 percent.

Sincere effort by tech support Percentage of service recipients who rated the sincere effort of the technician who helped them with their most recent problem as Excellent or Good. Four stars: 89.8 to 86.3 percent. Three stars: 83 to 76.6 percent. Two stars: 71.3 to 68.1 percent.

Buy again based on service Percentage of service recipients who would buy again from the same manufacturer based on the service received from the manufacturer or authorized service provider. Five stars: 93.2 to 91.2 percent. Four stars: 89 to 87.3 percent. Three stars: 81.3 to 80 percent. Two stars: 68.3 to 66.4 percent. One star: 62.2 percent.

now-defunct Infinia line of home desktop PCs. Because desktop and notebook support calls were going to the same call centers (unlike the situation at companies like Dell, Gateway, and Micron), notebook users suffered.

Toshiba has since killed the Infinia line, tripled call-center capacity by adding personnel, and installed an intranet-based knowledge system designed to give technicians quick access to customer records and technical information, Ludwick says. The result, according to Ludwick: Before the changes, the average call to Toshiba tech support lasted over 20 minutes. Calls now average just under 9 minutes. According to our survey, almost 68 percent of Toshiba respondents reported hold times of 5 minutes or less, and more than two-thirds of all problems were resolved within five days.

THE BIG BLUES

IBM, WHOSE ThinkPad series of notebooks consistently earns praise for its design, doesn't get off as easily as Toshiba in its service scores. Big Blue's notebooks are highly reliable, as John Potter, an MIS director in Cypress, California, discovered when his ThinkPad 760ED survived a crash to the floor. But IBM's scores for customer service are just slightly better than Fujitsu's cellar-dwelling marks. For example, survey respondents who contacted the company for support reported a high rate of unresolved problems as well as a high rate of long times on hold.

These results aren't easy for IBM to explain. "All our technicians are monitored regularly," says Dermot O'Loughlin, manager of worldwide operations for IBM's service and support. He says the company's data doesn't show a lack of satisfaction with customer support, but adds that he will be looking at ways it could be improved.

NEW KIDS ON THE BLOCK

AND THEN THERE are the new faces. For the first time in our ongoing study of PC reliability and service, we have a body of data for Fujitsu and Hitachi notebooks, both of which started shipping in 1996.

Why is it that Fujitsu and Hitachi, two large corporations that **have concentrated their PC efforts** solely in the notebook market, **didn't do better** in our ratings? **Inexperience may be** one reason.

Even though Hitachi fared better than Fujitsu in our ratings, thanks in part to a higher percentage of brief hold times and products that worked well right out of the box, neither was a serious threat to veterans Dell, Gateway, Micron, and Toshiba.

Why is it that Fujitsu and Hitachi, two large corporations that have concentrated their PC efforts solely in the notebook market, didn't do better in our ratings? Inexperience may be one reason. "It's easier to come up with and sell a product first and work on your support structure later," says Mike McGuire, former senior mobile computing analyst at Dataquest. In fact, both companies farm out all or most of their support calls to other firms.

Fujitsu's use of outside firms might explain the company's poor service scores, according to Dave Novak, Fujitsu's vice president of service and support. Outsourcing is a common practice, but Novak feels that Fujitsu may not have received the best possible service from these outside companies. "We've been the small kid on the block and didn't always get the same attention from our outsourcers as the larger computer makers," he explains.

Novak says that as Fujitsu grows, the company is developing an incentive program to ensure its outside support technicians "take as much ownership of the customer as we do." Novak says he also plans to work with support technicians to improve their communications skills and to keep a closer eye on unresolved customer problems.

Novak's task is daunting. Only 53 percent of Fujitsu users in our survey said that their problem was resolved in five days or less, compared to an average of 62 percent for all companies on our notebook chart. And just 59 percent said that the knowledge level of Fujitsu's support technicians was good or excellent, compared to 75 percent of respondents regarding all notebook makers.

How Good Is Online Help?

About 23 percent of our survey respondents sent an e-mail or posted a question online, but few got the answers they needed.

RESULT OF ONLINE QUERY	Percent*
Never got a response	13
Got a response, but it didn't help	30
Response helped, but didn't solve problem	34
Response solved problem	22

*Percent of all survey respondents who sent e-mail or posted a message online to their PC manufacturer or authorized representative. Numbers do not total 100 percent due to rounding.

SOURCE: PC WORLD'S 1998 RELIABILITY AND SERVICE SURVEY

STRIKE A BALANCE

IF THERE'S ONE THING our notebook survey data tells us, it's that all portable makers in this report could stand a little improvement. Some companies, it seems, build good systems and fail to support them adequately, while others go the extra mile to help you with a system that keeps breaking down. We maintain that notebook makers need to do both.

In the meantime, as a prospective notebook buyer, you're forced to live with trade-offs. Our advice: Decide which reliability and service factors are most important to you and make your purchase accordingly. Then cross your fingers and hope that, like 25 percent of our notebook respondents, you'll never have to talk to anyone in technical support.

—*James A. Martin*

Brad Grimes is a senior editor, and Aoife McEvoy an associate editor for PC World. *James A. Martin and Kirk Steers are contributing editors. Naomi Wise is a freelance writer. Shane Rau,* PC World *technical editor, and Cheryl Brink, vice president of research at* PC World, *also contributed to this article.* ■

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PCWEEK BEST OF COMDEX

EDITOR'S CHOICE

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Sm@rt Reseller, August 17, 1998

"Right out of the box, Snap! Server instantly connected to the live network providing a multigig volume. It's really a little, but powerful data warehouse."
Manager, Computer Operations, PowerBar, Inc.

"Snap! Server offers a quick, convenient fix for stressed-out file servers."
Small Business Computing & Communications, Hardware Pick: Snap! Server, August 20, 1998

"It installs quickly, is easy to use, and is painless to administer."
Infoworld, Snap! Server Simplifies Small-Network Storage Chores, May 25, 1998

"The easy installation process provided instant storage and eliminated the need for downtime."
Project Coordinator, Frega Associates Ltd. Architects-Engineers

"Snap! Server's small form factor and instant connectivity allows the team to access mission-critical information and provides true file and network portability."
Data Acquisition Engineer, Bettenhausen Motorsports

"It takes five minutes — no exaggeration — to plug in the Snap! Server to a network, power it up and program it for use."
Nation's Business, A Network Storage Product that's true to its name, June 25, 1998

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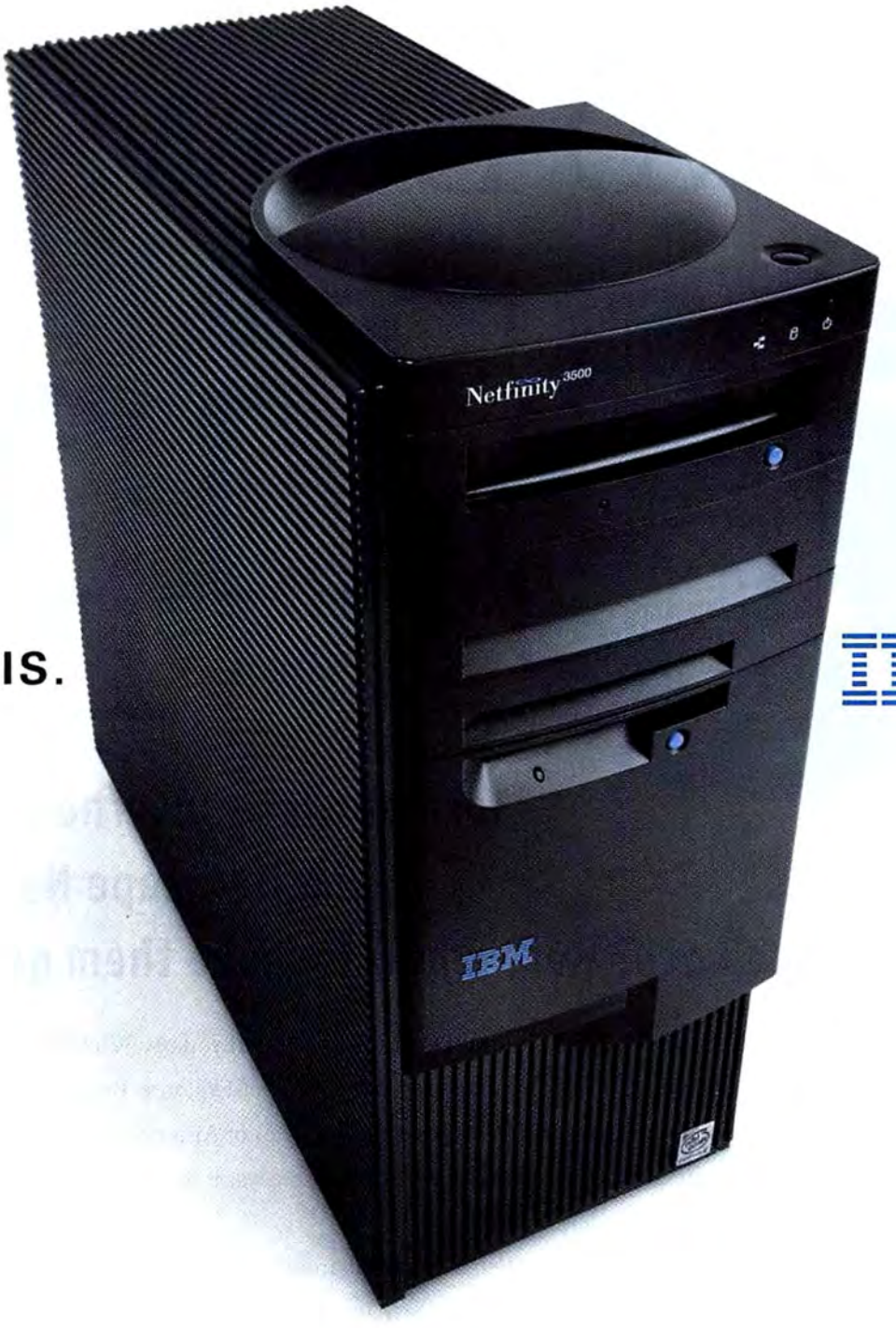


IBM

One Desktop, Two Browsers, 72 Tips

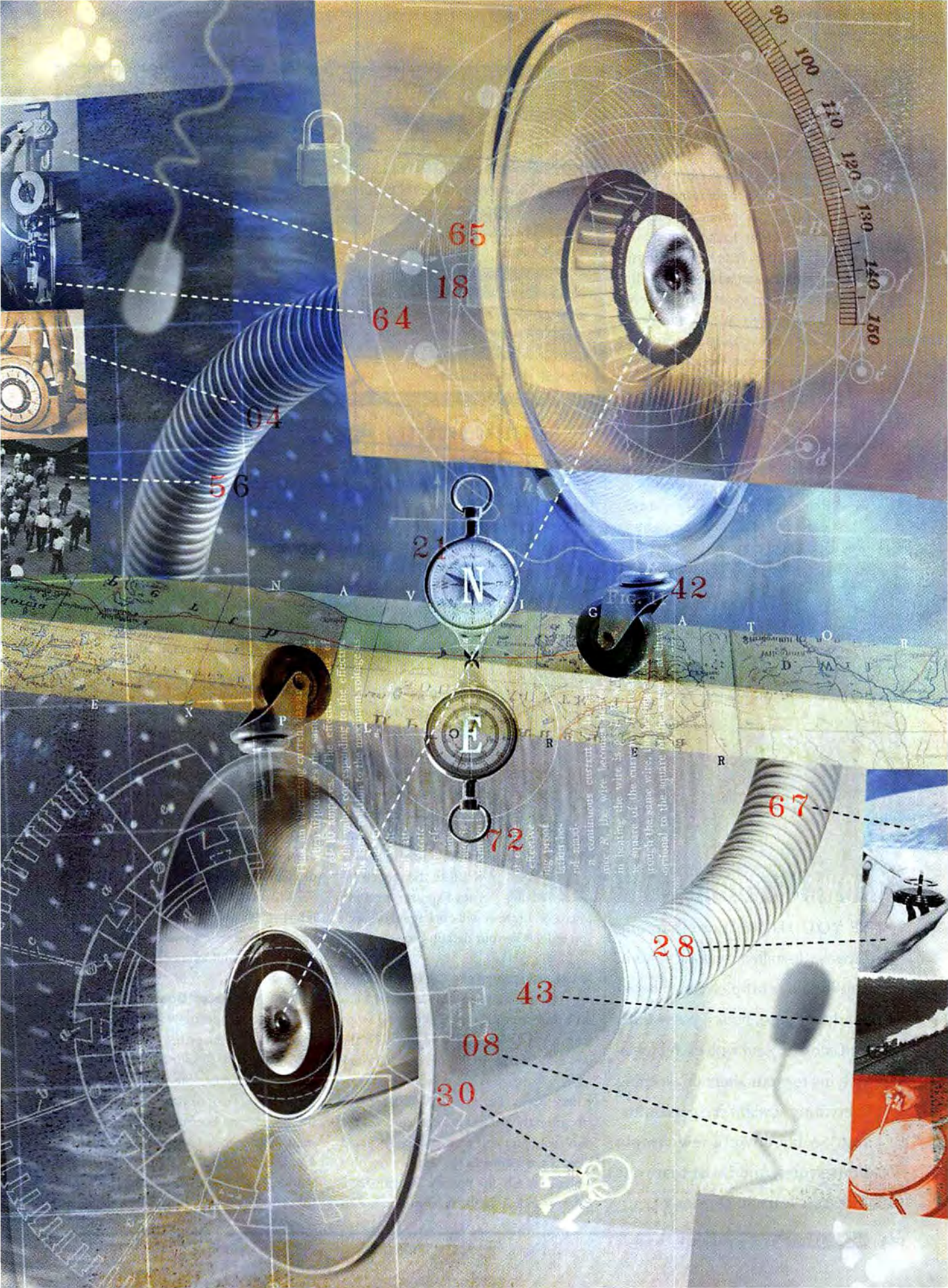
Torn between Internet Explorer and Netscape Navigator? Why not use both? Here's how to make them get along.

BY MICHAEL CAHLIN

QUICK, HOW MANY BROWSERS do you have on your PC? If you use Windows (and we know you do), you probably have at least one—Internet Explorer. But odds are pretty good you also have some version of Netscape Navigator or America Online's browser lurking on your hard drive. And that's okay. These days, it makes sense to have more than one way to wander the Web.

Some browsers are better at certain Web activities than others. IE doesn't always display your file download progress (Navigator does), but it can print a Web page with all the frames displayed (Navigator can't). You might prefer one browser's interface but the other's bundled e-mail program. Some sites claim to be optimized for one ▶

ILLUSTRATIONS BY STUART BRADFORD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browser or the other, so you wonder if you are missing out on some whizzy features by using the wrong one (see "Optimized for Your Browser?" on the next page). And if you create Web pages, previewing them in both browsers is a must, since each has quirks you may have to compensate for.

Unfortunately, browsers are a bit like squabbling children. Each wants all your attention, and they hate to share things (like bookmarks and address lists). But you can train them to get along and even help each other out. We offer browser-rearing advice for versions 3.*x* and 4.*x* of Internet Explorer and Netscape Navigator—ways to make them work better in tandem and on their own (plus a few tips for surfing via America Online). You'll also find a list of common keystrokes for both major packages, some handy right-click shortcuts, and help on what to do when your connection throws a tantrum.

Just don't call us if they start fighting over the channel changer.

COMMON BROWSER KEYBOARD SHORTCUTS

These handy keystroke combos work equally well in Netscape Navigator and Internet Explorer.

<Ctrl>-A	Select all	<Ctrl>-S	Save
<Ctrl>-B	Organize Bookmarks/Favorites	<Ctrl>-V	Paste
<Ctrl>-C	Copy	<Ctrl>-X	Cut
<Ctrl>-F	Find	<Esc>	Stop
<Ctrl>-N	Open new window	<Alt>-<F4>	Close
<Ctrl>-O	Open Address/Location box	<Alt>-<Left Arrow>	Back
<Ctrl>-P	Print	<Alt>-<Right Arrow>	Forward
<Ctrl>-R	Refresh/reload	<F10>	Activate menu bar

BROWSER COHABITATION TIPS

IF YOU HAVE more than one browser installed on your system, you juggle multiple sets of bookmarks, address books, passwords, and cookies. And with each browser vying for your attention, keeping everything straight can get confusing. So lay down a few simple house rules, and insist that your browsers learn to get along.

BATTLING BROWSERS

›› Make Internet Explorer the Default Whenever you install a Web browser, it begs you to let it become your default browser, and it repeats this plea until you make a decision. What if, after using one browser for a while, you want to switch default status? You can change your mind, but it's much easier to do so in Internet Explorer than in any version of Navigator. In **IE 3.*x*** and **4.*x***, select *View•Internet Options*, click the *Program* tab, put a check mark in the bottom box, which says *Internet Explorer should check to see whether it is the default browser*, and then click *OK*. Close and reopen Internet Explorer, and the Microsoft browser will once again beseech you to let it be your default browser.

›› Let Navigator Take the Helm Changing the default in **Navigator 3.*x*** and **4.*x*** is a bit more complicated. Follow the steps from the previous tip, and uncheck the box next to *Internet Explorer should check to see whether it is the default browser*. If you're lucky, restarting Navigator will summon the default browser query—but don't count on it. If Navigator balks, you'll need a text editor like Windows 95/98's Notepad to edit the prefs.js file. Exit Navigator, and click *Start•Programs•Accessories•Notepad*. When it opens, click *File•Open*. Click the drop-down arrow next to 'Files of type' and select *All Files (*.*)*. The prefs.js file is in C:\Program Files\Netscape\Users*yourname*, where *yourname* is your Windows user name. Open it and look for the line 'user_pref("browser.wfe.ignore_def_check", true);'. Carefully change the word 'true' to **false**. Save, exit, and then restart Navigator. The default query should appear, at which point you can give Navigator the top bunk.

SHARING DATA

›› Back Up Your Bookmarks/Favorites You've spent valuable time collecting URLs. Now, before you try any of our fancy tricks, protect yourself by making backups of your Bookmarks or Favorites. No matter which browser you're using, the easiest way to do this is to open Windows Explorer, then hold down **<Ctrl>** and drag a copy of **Navigator**'s bookmark.htm file (it's in the same folder as prefs.js) or **Internet Explorer**'s Favorites folder (it should be in the Windows folder) to a floppy or to another area of your drive.

›› Add Navigator Bookmarks to IE Favorites By adding Navigator's Bookmarks to IE's Favorites list, you'll gain instant access to all your Bookmarks from within Internet Explorer. It's as simple as adding a shortcut to your bookmark.htm file. As you add Bookmarks, they're automatically added to Favorites. In **IE 3.*x*** and **4.*x***, select *File•Open*, choose *Browse*, set 'Files of type' to *All Files*, and use the 'Look in' drop-down box to navigate to book-

mark.htm (see the previous tip for its location). When you find it, double-click the file to load it into the Open dialog box. Click *OK* again, and IE will display Navigator's Bookmarks as active links. On the menu, click *Favorites•Add to Favorites*, name the shortcut **Navigator Bookmarks**, and then click *OK*. Badda-bing! Now you can click Navigator Bookmarks just as you would any other IE Favorite.

On the road without your laptop? AOL's NetMail Service lets you access AOL mail from any browser.

›› Convert IE Favorites Into Navigator Bookmarks Netscape doesn't make it easy to convert Favorites into Bookmarks. The cheapest solution is Microsoft's free **IE Import and Export Favorites Tool** (www.microsoft.com/msdownload/ieplatform/favtool/favtool.asp). This 50KB utility imports Bookmarks into Favorites and saves Favorites as Bookmarks. But beware: In bringing IE Favorites into Navigator, this utility replaces your bookmark file; if you want to keep them synchronized, you'll have to import the Bookmarks into Internet Explorer first (using the preceding tip) and then replace the bookmark file with the merged Favorites.

QuikLink Explorer from QuikLink (www.quiklinks.com/explorer) provides a better and simpler solution. It imports bookmarks from Navigator, IE, Opera, and Mosaic into a centralized bookmark database. Saving a bookmark in the database automatically makes the bookmark accessible from any of these browsers. A free version of QuikLink Explorer organizes bookmarks within one browser, but for multiple browsers you'll need the $20 Standard edition.

›› Mail Conversion Aversion During installation, both Netscape and Internet Explorer import your address book from other browsers (and from previous versions of the same browser). But what if you want to import this stuff after installation? In **IE 3.*x***, select *Go•Read Mail* to open Internet Mail; then click *File•Import*, and choose the appropriate files. To import an address book or e-mail from another program into **IE 4.*x***, open Outlook Express, click *File•Import*, and then choose *Address Book* or *Messages*. Make a selection and click *Import*. **Navigator 3.*x*** users should use a third-party utility like InterGuru's $20 **E-mail Address Book Conversions** (www.interguru.com/mailconv.htm), a program that converts address book files to and from Eudora, Outlook Express, and Netscape Messenger and Mail. Users of **Navigator 4.*x*** have it easier: Open Messenger and then the Address Book by selecting *Communicator•Address Book*. Click *File•Import*. You can then import an address file from Eudora Outlook Express or from any address book in LDIF or Text format. Netscape has more information online about converting IE 3.*x* and 4.*x* to Communicator; point your browser to help.netscape.com/kb/client/970709-1.html.

OPTIMIZED FOR YOUR BROWSER?

BOTH NETSCAPE and Microsoft insist that certain Web sites are optimized for their respective browsers. So are you missing out on cool features if you're not using the right browser? Our search for optimized sites revealed some nifty applets that work only with Internet Explorer—like a certain stock ticker (see top screen, left) or an animated school bus carrying Mickey and friends across Disney's home page. Aside from these, the few differences we found were mostly cosmetic, and we didn't find any sites that had Navigator-specific features. So don't worry about which browser to use—either way, you're not missing much.

WORKING WITH AOL

›› Read AOL E-Mail Without AOL On the road but left your laptop at home? You can still read your AOL mail (and send messages) if you can get to a PC connected to the Internet. AOL's new **NetMail** service is a tiny browser plug-in that, once installed, accesses AOL e-mail from anywhere. Just go to NetMail (www.aol.com/netmail) and download the 1.5MB plug-in. Then click the *Read Your Mail!* icon, type in your AOL screen name and password, and click *Sign On*.

›› Don't Use AOL's Browser AOL has never been known for its browsing capability. The new AOL 4.0 integrates a version of Internet Explorer, but don't ▶

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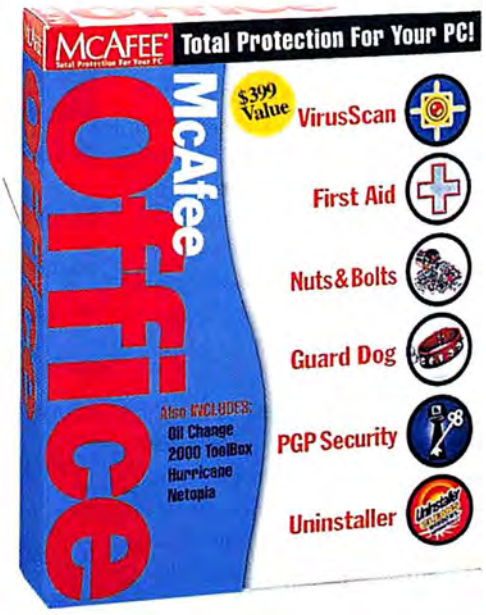

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MAYBE YOU'VE decided that switching between browsers is too much trouble, and you've settled on a favorite. But whether your browser of choice is Navigator or Explorer, you want to get the most out of it. Read on for ways to speed up surfing, ease navigation, share resources, and save time.

PUMP UP YOUR PERFORMANCE

>> No Pictures, No Waiting You've probably heard this one before, but useful information always bears repeating. If faster downloading is your primary goal, you should try turning off graphics, sounds, and animations, and make text-only loading your browser's default. To do this in **IE 3.x**, click *View•Options*, select the *General* tab, and then uncheck the box next to *Show Pictures*. If you are using **IE 4.x**, choose *View•Internet Options•Advanced*, and uncheck all of the boxes under Multimedia. In **Navigator 3.x**, select *Options* and then uncheck the *Auto Load Images* box. In **Navigator 4.x**, click *Edit•Preferences*, choose *Advanced*, and then uncheck the *Automatically load images* box. If you decide that you really want to see the picture after all, don't worry. Just right-click its image icon and then click either *Show Picture* (in **IE 3.x** and **4.x**), *Load Image* (in **Navigator 3.x**), or *Show Image* (in **Navigator 4.x**).

>> Improve Your Image Microsoft's **PowerToys for IE 4.x** (www.microsoft.com/ie/ie40/powertoys/default.htm) has lots of nifty utilities for controlling Web graphics. If switching between text and graphics mode has worn you out, try Image Toggler, which resides on **IE 4.x**'s Link toolbar and lets you download or skip images with a click. Another PowerToy, Zoom In/Zoom Out, can magnify tiny graphics with a right-click, and Web Search injects keywords into your default search engine with a right-click, for instant results.

>> A More Stable Relationship Any browser crash can make Windows unstable. The severity ranges from an app going belly-up to Microsoft's dreaded Blue Screen of Death. In **Navigator**, you can bring up the Close Program dialog box by pressing <Ctrl>-<Alt>-<Delete>, but doing this can cause other open programs to fall like dominoes. It's better to bite the bullet and restart. **IE 4.x** offers another option: Before you crash, click *View•Internet Options•Advanced* and check *Browse in a new process* (see **FIGURE 1**). This makes IE launch a separate version of Explorer rather than feeding off the already-open window that also provides your Windows shell, so next time IE 4.x hits an iceberg, it shouldn't take Windows down with it.

>> Browse Faster By changing two tiny Registry settings called MTU (Maximum Transmission Units) in Windows 95, ▶

>> AOL Address Book Tango Once you outgrow AOL and move on to a full-fledged Internet service provider, you'll want to export your AOL address book to your new e-mail package. Good luck. AOL's Address Book doesn't willingly share information with any e-mail software. Believe it or not, the easiest solution is to send everyone in your AOL Address Book a message asking these correspondents to send future e-mail to your new e-mail address. Both Outlook Express and Messenger can automatically insert incoming e-mail addresses into their address books. In either of these programs, click *Reply*, right-click the sender's e-mail address, and select *Add to Address Book*. If you ask your correspondents to send you their contact information too, you can cut and paste it into the Address Book instead of typing it in.

FIGURE 1: BY CHOOSING the right options in Internet Explorer 4.x, you can make sure a browser crash doesn't set off a chain reaction.

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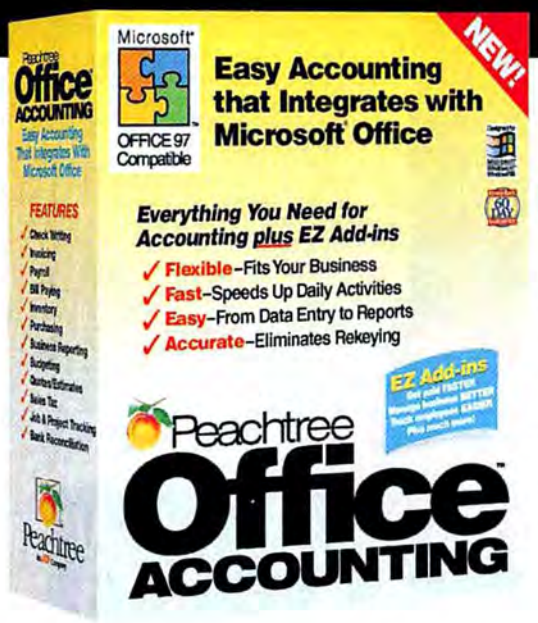

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you may be able to increase browsing speeds dramatically in both Navigator and Internet Explorer. For the complete 411, see the June issue's *@Home Office* (page 278). If just the idea of messing around with the Registry makes you nervous, you can hire a $10 shareware utility to do it for you—**MTUSpeed** (www.mjs.unet.com/mike.htm).

» Shrink Dat File Every time you visit a Web site, Internet Explorer stores history and cache information in files that have .dat extensions. The more data these files have to store, the bigger they get. Though Microsoft won't cop to it, clearing the Cache and/or History folders in **IE 3.*x*** and **4.*x*** doesn't always return these files to their original default size of 8KB, 16KB, or 32KB. You can see for yourself by opening a DOS prompt (select *Start•Programs•MS-DOS Prompt*), navigating to the directory where your cache or history resides (cd c:\windows\tempor~ or cd c:\windows\history), and then looking for the .dat files. If you open them, you'll see all of your "deleted" URLs.

The problem? Aside from the fact that these .dat index files let snoops track where you've been surfing, IE begins to slow down when the files reach approximately 200KB. And once they reach 500KB, the program starts crashing. One solution is to delete both files, but you'll have to do it in DOS, not Windows. Click *Start•Shut Down•Restart in MS-DOS mode.* At the C:\> prompt, type **deltree c:\windows\history**, and then press **<Enter>**. (In **IE 4.*x***, this path could be c:\windows\profiles*yourname*\history.) Then type **deltree c:\windows\tempor~1** and press **<Enter>**. (This process can take up to 15 minutes if the .dat files are extremely large.) The next time you fire up your browser, both files will be rebuilt as empty .dat files.

There's a better solution, but it will cost you. You can manage file size and permanently kill all the private data in cache, ▶

HOW TO TROUBLESHOOT YOUR INTERNET CONNECTION

EVER TRY TO REACH a Web page, only to get a cryptic error message or to find that the page won't load? The source of the problem can be almost anything—a mistyped URL, an unplugged modem, an Internet traffic jam, or the fact that somebody accidentally kicked the power cord out of the machine that hosts the Web site.

The trick is to narrow down where the problem lies—on your end, the Web site's, or somewhere in between. Believe it or not, Windows 95, 98, and NT 4.0 come with most of the tools you need to troubleshoot your disconnection. The following table outlines the most common problems and what you can do about them.

When all else fails, try e-mailing webmaster@*domain*, where *domain* is usually the last two segments of the URL, for help or information. For example, you can reach the Webmaster for PC World Online (www.pcworld.com) at webmaster@pcworld.com. **–Scott Spanbauer**

TYPE OF ERROR	CHECK THIS FIRST	TRY THIS NEXT	IF ALL ELSE FAILS
Whichever URL you try to view, your browser says, 'Connection with the server could not be established', or that the server does not have a DNS entry.	Make sure you have a working Dial-Up Networking connection: If Dial-Up Networking can't connect with your ISP or LAN (or whoever provides your Net access), make sure it's dialing the correct phone number, that your phone and power cords are connected properly, and that external modems are turned on.	Make sure your DNS and Gateway settings in your Dial-Up Networking connection's Properties sheet are correct. Choose *Server Types*, click *TCP/IP Settings*, and check that the DNS server IP addresses in the resulting window are correct (get these from your network administrator or ISP) and that the 'Use default gateway' option is checked.	In an MS-DOS prompt window, try to ping the Web domain name, then its server's IP address (for example, to ping PC World Online type **ping www.pcworld.com**, then **ping 209.1.23.30**). If you can ping the IP address but not the domain name, you have a DNS configuration problem—on either your computer or your ISP's server.
You can't connect to one or two specific Web sites.	Check that you're typing in the URL correctly. Some URLs differentiate between uppercase and lowercase. Sometimes the first attempt to load a page just doesn't take. Click *Stop*, then press **<Enter>** or click *Reload*.	If the URL points to something other than a Web page (such as a file download site like ftp.microsoft.com or a newsgroup like news://alt.baldspot), don't type "http://" in front of it.	Try to ping the Web server's domain name or IP address. If you can ping it but can't load its Web pages, it may just be very slow. Or the URL you're trying to use doesn't exist anymore (usually because it's been changed).
Some or all of the Web sites you view load very slowly.	Check the speed your dial-up connection reports by clicking the taskbar icon. If it's slower than your modem is supposed to be, disconnect and dial again. (Connection speed can also drop while you're connected.)	Ask the phone company to check for line noise. Ask your ISP if its modems support your modem's top connection speed—the ISP may have more compatible equipment at a different phone number. Use an uninterruptible power supply to ensure that your modem is getting good power; even millisecond-long power dips can make data packets vanish.	Ping several different domains or IP addresses. If the pings display time results (showing how long it takes your PC to communicate with the server) in the 200- to 500-ms range, the remote servers are probably just busy. Try surfing at a less busy time of day. If pings consistently return slow times, report the problem to your ISP's tech support department.

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history, and .dat files by using the $15 shareware program **TweakIE 2.0** (www.wizsys.com/tweakie.html). Its IESweep feature clears your cache and history folders and resets the .dat files to their empty size. This utility also alerts you when .dat files have grown big enough to affect your browser's performance.

>> Rewrite History Navigator also maintains a history of recently visited sites, though this doesn't slow down your system. To prevent others from seeing where you've been, you need to clear it. **Navigator 3.*x*** clears the history each time you shut down the program. In **Navigator 4.*x***, select *Edit•Preferences*, choose *Navigator*, and click *Clear History*. Trouble is, Netscape's history file, like IE's .dat files, retains information. To cover your tracks completely, you need to delete this file. Exit Navigator, open Windows Explorer, and press **<F3>**; when the 'Find: All Files' window appears, search for **netscape.hst**. It's usually found in C:\ProgramFiles\Netscape\Communicator\Users*yourname*. Right-click it and select *Delete*.

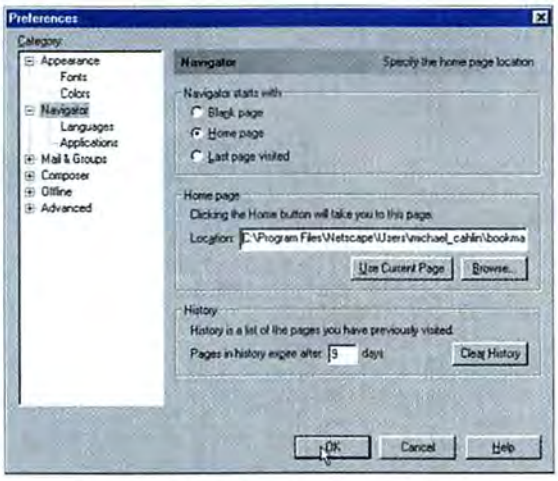


FIGURE 2: YOU CAN KEEP your favorite sites within easy reach by designating your bookmarks file as your home page.

TOP FIVE RIGHT-BUTTON TRICKS

YOU'LL FIND an arsenal of timesaving tricks with the right mouse button. Simply position the cursor over a Web page, graphic, link, or even the URL in the Address bar, and you'll get a dialog box of nifty shortcuts. There are lots to choose from; here are our favorites.

1 Copy That Link In IE 3.*x* and 4.*x*, to quickly copy a URL like www.pcworld.com from a Web page into a document or an e-mail message, right-click on the link and choose *Copy Shortcut*. To copy a URL from Internet Explorer's address window, click once in the window to select the URL, right-click the URL, and then choose *Copy*. In Navigator 3.*x* and 4.*x*, the menu option is *Copy Link Location*. To paste the URL, right-click the spot where you want to drop it and choose *Paste*.

2 Trick Click Don't waste time refreshing an entire page when all you want is what's inside a frame. Instead, right-click in the frame and choose *Refresh*. If you click the Refresh button on the toolbar, you'll reload the entire page. In IE 3.*x* and 4.*x*, choose *Refresh*, and only the frame you've selected will reload. In Navigator 4.*x*, right-click, and choose *Reload Frame* to reload just the content inside the frame.

3 Presto Picture If an image does not appear in IE, or if you have images turned off, right-click the placeholder and select *Show Picture;* the image will magically appear. In Navigator 4.*x*, right-click the placeholder and choose *Show Image*.

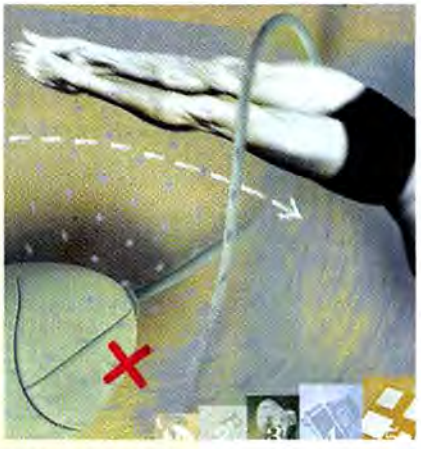
4 Put 'er There To save time, instead of opening a link, you can save it as an HTML file and read it later. In IE 4.*x*, right-click the link and choose *Save Target As*. In Navigator 3.*x* and 4.*x*, right-click the link and select *Save Link As*.

5 Address Book Magic If you've just received e-mail in Messenger or Outlook Express and want to save the sender's e-mail address to your Address Book quickly, right-click the name in the To field and then select *Add To Address Book*. Outlook Express is smart enough to recognize duplicate entries.

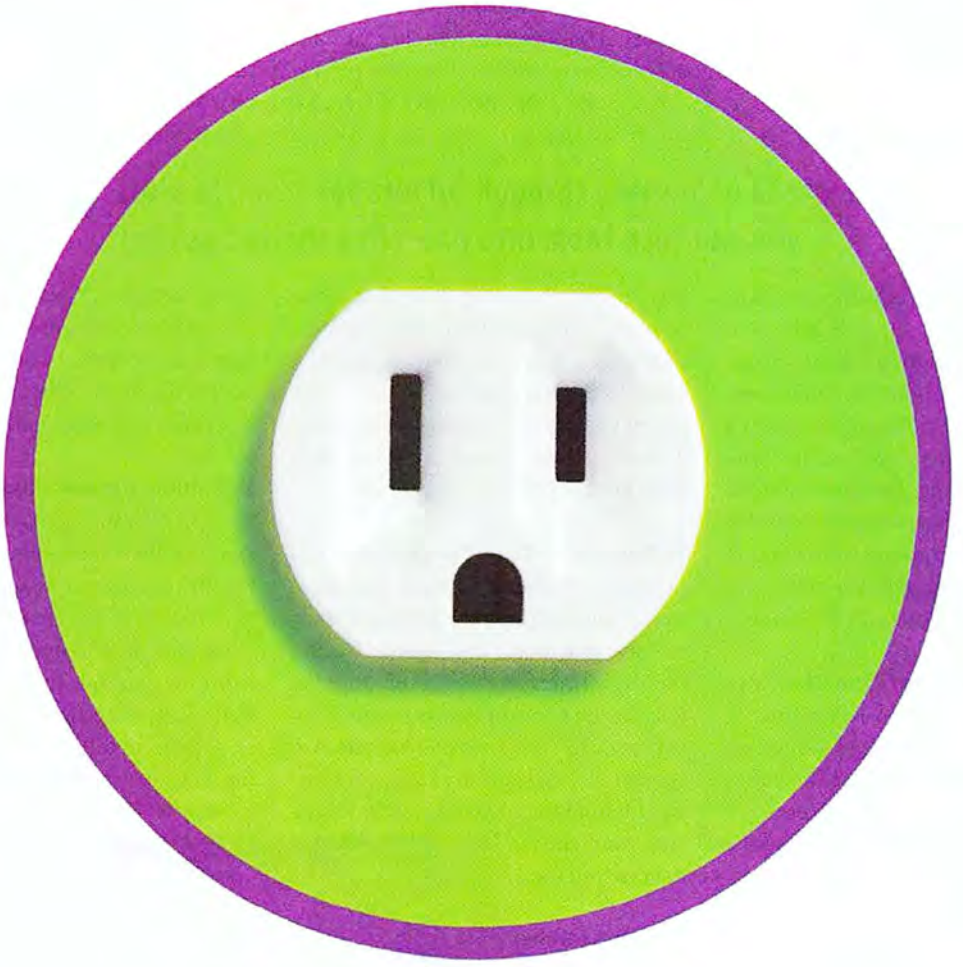
>> Share the Cache If you run **Navigator 3.*x*** and **4.*x*** on the same computer—and if you do any Web page design, you probably do—you can speed up both browsers and save hard disk space by forcing them to share the same cache. In **Navigator 4.*x***, click *Edit•Preferences*, click the plus sign next to *Advanced* to expand it, and click *Cache*. In the Disk Cache Folder box, type in the location of Navigator's 3.*x* cache file (usually **c:\program files\netscape\navigator\cache**). In **Navigator 3.*x***, click *Options•Network Preferences;* and on the *Cache* tab in the Disk Cache Directory box, type in the location of Navigator's 4.*x* cache file (usually **c:\program \files\netscape\users*yourname*\cache**).

NAVIGATE WITH EASE

>> From Windows 98 to the Web Even if you don't have **IE 4.*x*** or **Navigator** running, you can quickly jump from your Windows 98 desktop to the Web by creating an Address Bar in your Windows 98 taskbar. To turn this on, right-click the taskbar and select *Toolbars* and then *Address*. To save valuable taskbar real estate, you can minimize all the open windows by clicking the Address Bar and, when your mouse pointer changes into a four-headed arrow, dragging the bar to the top of your desktop. Type a URL in the Address Box and press **<Enter>** to automatically summon your default browser.



>> Turn Bookmarks/Favorites Into a Home Page By making your bookmarks file your home page, you're never more than one click away from your favorite sites. In **Navigator 3.*x***, click *Options*, select *General Preferences*, and, under Browser Starts With, replace the URL address with the path to your bookmark.htm file. In **Navigator 4.*x***, select *Edit•Preferences*, and under Category, click *Navigator*. Under 'Navigator starts with', make sure that the Home Page button is selected (see **FIGURE 2**), and replace the URL address in the ▶



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Location Box with the path to your bookmark.htm file (usually it's in C:\Program Files\Netscape\Users*yourname*). When you're finished, click *OK* to close the box and save your settings. Exit, restart Navigator, and click away.

Unfortunately, you can't turn IE Favorites into your IE home page, but you can use your Navigator bookmarks instead. Open **IE 3.*x*** or **4.*x***, click *File•Open*, click *Browse*, and find Navigator's bookmark.htm file. Click *Open*, and then click *OK*. When Navigator's bookmarks are displayed, click *View•Options*, and click the *Navigation* tab in **IE 3.*x***, or *Internet Options* and the *General* tab in **IE 4.*x***. In the Startup area, click *Use Current* and then click *OK*. Every time IE loads, so will your Navigator Bookmarks.

Instead of hunting through folders for favorite sites, you can turn them into one-click toolbar buttons.

>> Turn Bookmarks/Favorites Into Buttons Do you have two or three favorite sites you visit daily? Instead of hunting through multiple folders and subfolders for them, you can turn them into one-click toolbar buttons. Both **IE 4.*x*** and **Navigator 4.*x*** have an extra toolbar that you can toggle on and off from the *View* menu. You can slap about six to eight sites on either toolbar before it gets too cluttered and defeats the purpose.

To display the Link Toolbar in **IE 4.*x***, click *View•Toolbars•Links*. In **IE 3.*x***, click *View•Options•General* and check the *Links* box. On the menu, click *Favorites* and drag any URL or folder to the Links bar.

To toggle the Personal Toolbar on in **Navigator 4.*x***, click *View•Show Personal Toolbar* (if the Personal Toolbar is already showing, the menu option will read Hide Personal Toolbar). Press **<Ctrl>-B** to edit your bookmarks, and then drag a bookmark and drop it on the toolbar. Double-click to launch it.

>> View Favorites as Thumbnails You've been surfing for hours, collecting **IE 4.*x*** favorites like gumdrops, when you realize you want to download an image you saw but left behind. Instead of banging on the Back button or staring at your History list, you can preview thumbnails of your Favorites without surfing to them, provided that you haven't cleared your cache and haven't yanked out Active Desktop. From Windows Explorer, click *Favorites•Organize Favorites* and right-click the folder you want to preview. From the pop-up menu, select *Properties*, check the *Enable thumbnail view* box, click *OK*, and close the Organize Favorites dialog box. Now open that folder in Windows Explorer, right-click a blank spot in the right pane and select *View•Thumbnail*. Voilà! Repeat this process for every folder and subfolder you'd like to see—there's no way to select them all at once.

>> Rewind or Fast-Forward Want to jump back (or ahead) six pages in a hurry? Don't keep clicking your browser's Back or Forward buttons. In **IE 4.*x***, clicking the drop-down arrow to the right of either the Back or the Forward button reveals a list of previously visited sites. In **Navigator 4.*x***, you can click and hold the Back or the Forward button for a list of recently visited sites, and choose the one you want.

>> Fast Searches Did you know that your browser is also an easy-to-use search engine? In the Address bar of **IE 3.*x*** and **4.*x***, type **go** or **find** or **?** followed by a space and the word or phrase you want to locate, and IE will search Yahoo. Type two or more words in **Navigator 4.*x***'s location bar and press **<Enter>**. If you want to search on just one word, type a plus sign and a space before the word. (If you simply type a single word, without the plus sign, the browser thinks you want to go the Web site and sandwiches the keyword between 'www.' and '.com'.) **Navigator 4.*x*** searches the Netcenter default search engine. **Navigator 4.5** includes a handy feature called What's Related that enhances your searches by leading you to relevant content.

>> Get Specific **Navigator 4.5** takes searching from the Location bar one step further. Its new Internet Keyword features drill searches down to a specific site. Keywords are matched against a trademark database, so typing "American Airlines," for example, takes you directly to that airline's Web site. If Navigator can't find what you're looking for in the Netcenter database (definitely a work in progress), it goes to the Excite-Netscape Web index at Netscape's Netcenter and searches there.

>> Shhhh, Hidden Password E-mail, Dial-Up Networking, LAN connections, and now Web sites—almost everything requires a password these days, and it can be a real pain to remember them all. Some sites offer to remember your password for you, but that doesn't always work. Sure, you could write them down or stick them in a PIM or word processor file, but a better solution is to store them in **Navigator 3.*x*** or **4.*x***'s Bookmarks. Press **<Ctrl>-B** to open the Bookmarks menu, and right-click the Bookmark for the site requiring a password; then select *Properties*. This opens the Bookmarks Properties dialog box; you can enter passwords or other information in the Description text box (see **FIGURE 3**). Of course, whoever reads this tip (or looks in the Properties dialog box) can see the passwords. If security is an issue, try a utility like the $15 **Password Memorizer** from The Limit Software (www.limitsoft.com).

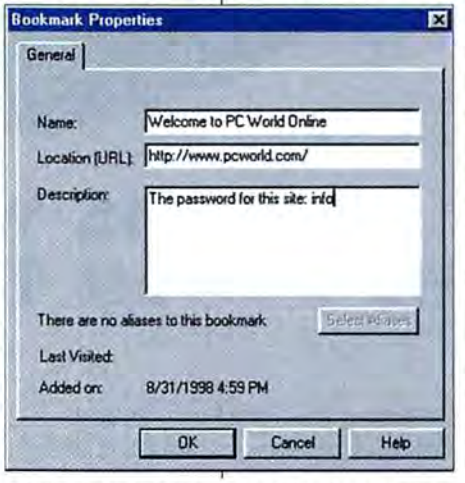

FIGURE 3: FORGET YOUR PASSWORD? Navigator's Bookmark Properties box is a handy place to store such info, unless security is an overriding concern.

Find files from this article on PC World Online (www.fileworld.com). Michael Cahlin is a freelance writer living in Burbank, California. Scott Spanbauer is a contributing editor for PC World. ■

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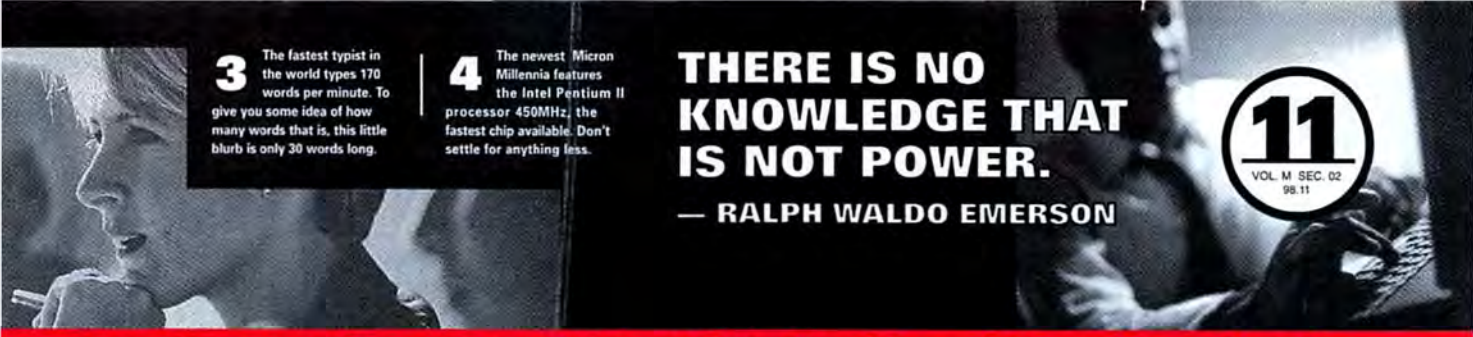

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***—PC World*, Ranked #1, "Best Buy," April '98**

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Experts and industry pundits all agree that Micron makes some of the world's best notebooks. Our product lines have won the coveted *PC Magazine* Editors' Choice award along with a myriad of other prestigious awards. And the new TransPort® TREK™ is no exception. *PC World* ranked the new TransPort TREK the #1 budget notebook available today††. And with a Pentium II processor 300MHz, AGP graphics and a gigantic 14.1" display, the TransPort TREK² is one of the best desktop replacements you can buy. Call Micron today and get a TransPort TREK² custom configured to your specific needs direct from the factory at unbelievably low prices.

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Clients Don't Come To You

Work hard, but leave time for some major goofing off. And with a 24X CD-ROM drive and 3.5" floppy included, whether it's games or work, you'll have access to it all.

Don't be afraid to hug your notebook. Sometimes, nothing is more comforting to the weary road warrior than 300MHz of mobile desktop-replacing power.

Model Name	TREK² 233	TREK² 233	TREK² 266	New! TREK² 300
Processor	Intel® Pentium® II processor 233MHz	Intel Pentium II processor 233MHz	Intel Pentium II processor 266MHz	Intel Pentium II processor 300MHz
Cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache
RAM	32MB SDRAM	64MB SDRAM	64MB SDRAM	64MB SDRAM
Hard Drive	3.2GB hard drive	3.2GB hard drive (removable)	3.2GB hard drive (removable)	3.2GB hard drive (removable)
Monitor	12.1" SVGA TFT display	14.1" XGA TFT display	14.1" XGA TFT display	14.1" XGA TFT display
Extra Storage	3.5" floppy disk drive	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)
CD-ROM	24X CD-ROM drive	24X CD-ROM drive (dedicated bay)	24X CD-ROM drive (dedicated bay)	24X CD-ROM drive (dedicated bay)
Graphics	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator
Sound System	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone
Warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty
Software Included	Microsoft® Windows® 98 System Wizard Mobile Client™* Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™* Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™* Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™* Norton AntiVirus
Also Includes:	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports
Price	$1,899 $66/mo. TechRefresh Bus. Lease, 36 mos.**	$2,399 $84/mo. TechRefresh Bus. Lease, 36 mos.**	$2,599 $91/mo. TechRefresh Bus. Lease, 36 mos.**	$2,799 $98/mo. TechRefresh Bus. Lease, 36 mos.**

New Rules. New Tools.™

intel inside
pentium® II

Micron™ notebooks are among the very best available. Our notebooks have been critically acclaimed by industry pundits and power users alike. And the TransPort TREK is no exception. Call Micron today and order any of our award-winning notebooks custom configured to meet your specific needs.

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FOUR WAYS MICRON'S MPower MAKES OBSOLESCENCE OBSOLETE.

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1. Trade in your current computer systems from leading manufacturers and we'll give you wholesale rebates with the purchase of new Micron systems. We'll even send you boxes to package up your old PCs.

FLEXIBLE FINANCING

2. Micron's competitive financing programs help you optimize your cash flow. TechRefresh business leasing combines low monthly payments with the option to trade in your system after 12 months. Term financing available with one of the most competitive rates in the industry. And our up to 6-month same-as-cash program gives you immediate access to the latest technology.

Be Smart.

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Get More.

"Micron's support policies are first-rate, with a three-year parts and one-year labor warranty and 24-hour toll-free phone support seven days a week."

- *PC World*, "Best Buy," August 98

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INTRODUCING MPower

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Protect your investment

Some companies ask you to buy into their program, but don't offer you a rebate for your existing systems. They may also require you to purchase Internet services you may not need or financing options with rates as high as 25%. MPower, however, allows you to trade virtually any system for a rebate with your Micron purchase. Also, not only are there no restrictions on program qualification other than owning a qualifying system and purchasing a Micron™ computer but MPower offers flexible payment options such as the TechRefresh lease and 6-month same-as-cash payment plan. Then, once you've bought a system, other programs may lock you in for two years before you can trade up. MPower allows trade-ins as early as 12 months. In addition, only MPower includes an option to dispose of obsolete machines in an environmentally safe way.

MPower makes hardware obsolescence obsolete

The more you learn about MPower, the more you'll see that it's really the only program designed to truly maximize your technology investment. By delivering additional benefits other programs overlook, MPower provides the most comprehensive way to keep the latest technology working for you now and in the future.

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A non-refundable up-front freight charge applies for participation in PowerXchange to cover cost of return packaging and processing.

OBSOLESCENCE PROTECTION

3. Other computer companies make you wait 2 to 4 years in their upgrade programs before you can trade up, and many hold you to restrictive finance agreements. With Micron you're eligible to upgrade a system anytime from 12 to 48 months after purchase, regardless of how you finance your purchase. Plus, you can send us your old machines for wholesale trade-in rebates which apply towards the purchase of new machines.

CUSTOM CONFIGURATION

4. Some manufacturers force you to purchase pre-selected software packages to qualify for their programs. Not Micron. We offer unparalleled hardware and software flexibility with all our custom-configured machines.

MICRON ANNOUNCES BREAKTHROUGH PRICING ON AWARD-WINNING SYSTEMS

Model Name	Millennia® C300	Millennia 350	Millennia 400	New! Millennia 450	New! Millennia 450 MAX
Processor	Intel® Celeron™ processor 300MHz	Intel Pentium® II processor 350MHz	Intel Pentium II processor 400MHz	Intel Pentium II processor 450MHz	Intel Pentium II processor 450MHz
Cache	128KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache
RAM	32MB SDRAM	64MB 100MHz SDRAM	64MB 100MHz SDRAM	64MB 100MHz SDRAM	128MB 100MHz SDRAM
Hard Drive	4.3GB Ultra ATA hard drive	10GB Ultra ATA hard drive	10GB Ultra ATA hard drive	10GB Ultra ATA hard drive	14.4GB 7200 RPM Ultra ATA hard drive
Monitor	15" Micron 700Vx monitor (15.9" display)	17" Micron 700Vx monitor (15.9" display)	17" Micron 700Vx monitor (15.9" display)	17" Micron 700Vx monitor (15.9" display)	19" Micron 900Vx monitor (18" display)
DVD/CD-ROM	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	DVD-ROM drive and decoder card***
Modem	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**
Graphics	nVidia Riva 128, 4MB SGRAM 3D AGP graphics	nVidia Riva 128, 8MB SGRAM 3D AGP graphics	nVidia Riva 128, 8MB SGRAM 3D AGP graphics	nVidia Riva 128, 8MB SGRAM 3D AGP graphics	Real 3D Starfighter i740, 8MB AGP graphics
Sound System	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound
Warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty
	$1,199 $42/mo. TechRefresh Bus. Lease, 36 mos.**	$1,649 $58/mo. TechRefresh Bus. Lease, 36 mos.**	$1,749 $61/mo. TechRefresh Bus. Lease, 36 mos.** New Low Price!	$1,799 $63/mo. TechRefresh Bus. Lease, 36 mos.** New Low Price!	$2,899 $101/mo. TechRefresh Bus. Lease, 36 mos.** New Low Price!

Replace your desktop with the Micron TransPort TREK

The #1 Ranked UltraPortable - CNET *June '98*
Just 1.35" thin

Model Name	TREK™2 266	New! TREK² 300	GoBook™ 233	GoBook² 266	New! GoBook² 300
Processor	Intel Pentium II processor 266MHz	Intel Pentium II processor 300MHz	Intel Pentium processor with MMX™ technology 233MHz	Intel Pentium II processor 266MHz	Intel Pentium II processor 300MHz
Cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache
RAM	64MB SDRAM	64MB SDRAM	32MB EDO DRAM	32MB EDO DRAM	32MB EDO DRAM
Hard Drive	3.2GB hard disk drive (removable)	3.2GB hard disk drive (removable)	2.1GB hard drive	3.2GB hard disk drive	3.2GB hard disk drive (removable)
Monitor	14.1" XGA TFT display	14.1" XGA TFT display	12.1" SVGA TFT display	12.1" SVGA TFT display	12.1" SVGA TFT display
CD-ROM	24X CD-ROM (dedicated bay)	24X CD-ROM (dedicated bay)	24X modular CD-ROM drive	24X modular CD-ROM	24X CD-ROM (dedicated bay)
Graphics	4MB AGP graphics accelerator	4MB AGP graphics accelerator	2MB/128-bit graphics accelerator	2MB/128-bit graphics accelerator	2MB/128-bit graphics accelerator
Sound System	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	16-bit stereo/Wavetable sound	16-bit stereo/Wavetable sound	16-bit stereo/Wavetable sound
Warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty
Upgrades	128MB SDRAM for $199	128MB SDRAM for $199	Add SuperBase battery for $299	Add SuperBase battery for $299	Add SuperBase battery for $299
	$2,599 $91/mo. TechRefresh Bus. Lease, 36 mos.**	$2,799 $98/mo. TechRefresh Bus. Lease, 36 mos.**	$1,999 $70/mo. TechRefresh Bus. Lease, 36 mos.** New Low Price!	$2,699 $94/mo. TechRefresh Bus. Lease, 36 mos.**	$2,999 $105/mo. TechRefresh Bus. Lease, 36 mos.**

MICRON RANKED #1 DESKTOP IN CUSTOMER SATISFACTION!‡‡

There's a reason why Micron has fast become the 3rd largest direct vendor of PCs – an uncompromising focus on engineering, building and delivering systems, solutions and support that exceed our customers' expectations. Perhaps that's why the influential readers of industry-bible *PCWeek* recently ranked Micron #1 in desktop customer satisfaction‡‡. Experience the Micron difference for yourself today.

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One super-size comin' right up!

19"
(18" V.A.)

Now listen, hon'. It's not that the 17" monitors on the menu aren't good.

But if you're hungry for a bigger, clearer picture, just super-size your order and get a 19" VL950 from CTX.

Its whoppin' 18" viewable area is more than many 20" monitors. And every inch is scrumptious. With a 0.26-mm dot pitch. 1600 x 1200 resolution. A gazillion colors. And lots of goodies on the side.

And here's something that'll toast your buns—this super-size doesn't cost extra! The VL950 is less than many 17" monitors.

So what'll it be, hon'—kiddie-size or super? Once you decide, call 1-800-888-2120 for your nearest dealer. And hey, you want fries with that?

PCComputing

www.ctxintl.com

VL950 May 98

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CTX

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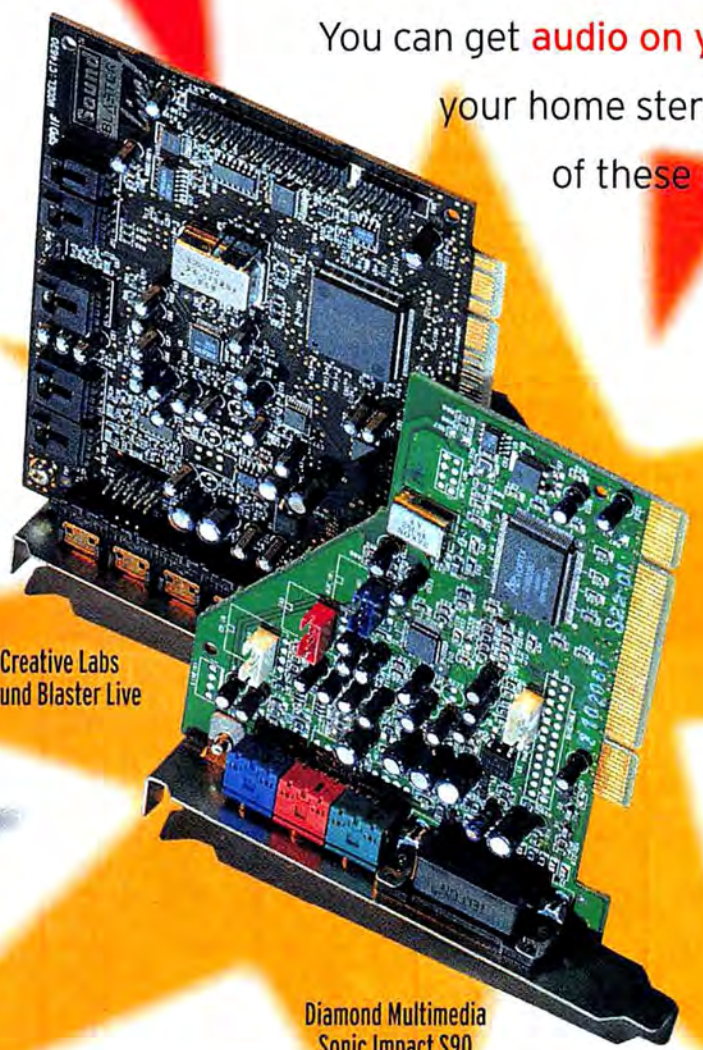
Breaking the Sound Barrier

You can get **audio on your work PC** that rivals your home stereo. **Crank it up** with one of these nine **new sound boards.**



Creative Labs Sound Blaster Live

Diamond Multimedia Sonic Impact S90

BY ADAM LIBERMAN

THE HEAT IS ON: The top brass are all assembled for your presentation. With your PC hooked up to a big screen, you roll a video of happy customers rhapsodizing about your product, set to a jazzy background of sax and drums. Will it come off as a hip endorsement—or, heaven forbid, sound like something emanating from your PC?

If the voices from your computer sound tinny and the music reminds you of a toy radio, it may be time to upgrade your sound board. Not long ago, you had to pay over $100 for most boards and then endure so-so quality. But in the last year, a number of new technologies have revolutionized the indus- ▶

PHOTOGRAPHS BY PIERRE GOAVEC

try, resulting in boards that are easier to install, cost only about half as much as their predecessors, and produce significantly better-quality audio.

The most important development is the migration of sound boards to the PCI system bus. The latest boards install into fast PCI slots on your computer, rather than into older, slower ISA slots. PCI allows the boards to communicate at high speeds with your PC's processor and main memory, so the machine can produce 3D audio and detailed instrument sounds. PCI also simplifies installation—you don't have to call in a technical whiz to put in a new board. Now anyone with a screwdriver and 10 free minutes can do the job.

The recent establishment of new minimum standards for PC audio has also greatly improved sound quality. Intel's AC '97 (Audio Codec) and Microsoft's PC '98 both specify acceptable levels for noise, distortion, and other factors that can degrade sound. Most PCI boards on the market meet one or both standards.

Finally, most new sound boards support positional 3D audio, which currently is found only in computer games. Positional sound changes location as you move through a virtual landscape. In Quake II, for instance, players equipped with a 3D audio sound board can enjoy the realistic—and frightening—effect of having grenades explode all around them.

If you've read much lately about speakers based on the Universal Serial Bus, you may wonder whether you need a sound card at all. USB speakers threaten to make sound cards obsolete by converting digital audio signals directly into sound. But as suggested in the sidebar "USB: A Sound-Card Killer?" (page 152), they aren't for everyone.

HEAR These, Hear THESE

PC SOUND MATTERS most in games, right? Nope. Jazz up any presentation with the **Diamond Multimedia Sonic Impact S90,** our Best Buy for business users. For $50 you get excellent performance, a headphone amplifier, and positional audio that won't overload your CPU. You also get a three-year warranty and strong support, plus bundled utilities and the game Jedi Knight.

Hard-core gamers and musicians will love the $200 **Creative Labs Sound Blaster Live,** our Best Buy for gaming. It's packed with advanced 3D features (such as the ability to add environments, like a cave's echo), support for eight speakers, excellent MIDI quality, and lots of music-oriented software, as well as the game Unreal.

SOUND ADVICE

TO SEE HOW the new generation of PCI-based sound boards stacks up, we tested nine models from Aztech, Creative Labs, Diamond Multimedia, Hi-Val, Turtle Beach, and Yamaha. We evaluated each card for both business use and games, pitting it against Creative Labs' Sound Blaster AWE64 Gold, the standard ISA board.

For business, we concentrated on how well each board played the audio found in PC applications. We based our scores on formal laboratory tests and testing by a jury of listeners. We also paid close attention to affordability, good vendor support, and bundled extras. For games, we considered the same test results, because most of the .wav and Musical Instrument Digital Interface audio found on business apps is also used in games; but we added other important gaming criteria. PCI cards don't work as reliably with DOS games as ISA boards do, so we tested

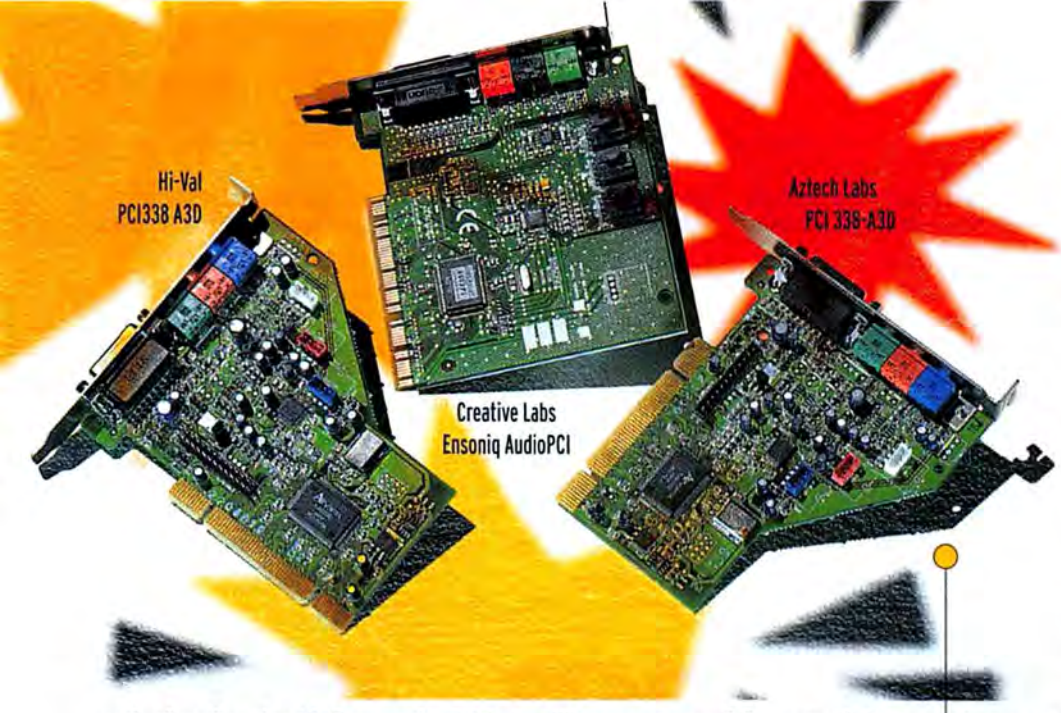
SOUND BOARDS FEATURES COMPARISON

PRODUCT	Street price (8/14/98)	3D Audio[1]			Output		Instruments		Standards[2]	
		DirectSound3D[1]	A3D	EAX	Max. speakers	Headphone	With hardware	With software	AC '97	PC '98 (advanced)
Aztech Labs PCI 338-A3D 510/623-8988 www.aztechlabs.com	$59	●	●	○	2	○	32	32	●	○
Creative Labs Ensoniq AudioPCI 800/998-5227 www.soundblaster.com	$50	●	○	○	2	○	0	32	●	○
Creative Labs Sound Blaster Live 800/998-5227 www.soundblaster.com	$200	●	○	●	4-8[3]	●	64	192	●	●
Creative Labs Sound Blaster PCI128 800/998-5227 www.soundblaster.com	$100	●	○	○	4	●	0	128	●	●
Diamond Multimedia Monster Sound MX200 800/468-5846 www.diamondmm.com	$150	●	●	○	4	●	64	0	○	●
Diamond Multimedia Sonic Impact S90 800/468-5846 www.diamondmm.com	$50	●	●	○	2	●	32	32	●	●
Hi-Val PCI338 A3D 714/953-3000 www.hival.com	$49	●	●	○	2	○	32	32	●	●
Turtle Beach Montego A3D Xstream 800/233-9377 www.tbeach.com	$99	●	●	○	2	●	32	32	●	●
Yamaha WaveForce 192XG 714/522-9011 www.yamaha.com	$99	○	○	○	2	●	64	128	○	●
Creative Labs Sound Blaster AWE64 Gold *(comparison board)*	*$150*	○	○	○	*2*	○	*32*	*32*	●	●

Best Buy ● Yes ○ No

[1] DirectSound3D is from Microsoft. A3D is from Aureal. Environmental Audio (EAX), from Creative Labs, is an extension of DirectSound3D.

[2] According to *PC World* tests rather than vendor specifications.



each of our boards with five popular DOS games. And finally we awarded extra points to boards capable of supporting four or more speakers, which you need for the best positional 3D audio.

Our Best Buy for business users, the $50 Diamond Multimedia Sonic Impact S90, did the best job of balancing sound and price. The Sonic's quality, features, three-year warranty, and support hours (including Saturdays) won the day against some strong competition.

Want great sound for games? Even a basic, inexpensive PCI sound board such as the Sonic Impact S90 provides good output. But for hard-core gamers and multimedia addicts, we recommend the $200 Sound Blaster Live from Creative Labs. Our jury thought the Sound Blaster Live did the best at playing MIDI music, and it supports eight speakers—the most in our test group.

BUSINESS **By our tough standards, a good business board must offer a balance of good audio performance in our lab, strong MIDI sound, top-notch support, and a low price.**

DOING THE .WAV

WHETHER you're listening to Windows' sound effects or catching the 3D sound of a game, your PC's audio quality depends in part on how well your sound board handles .wav files, which store audio as digital sound waves on your hard drive.

To test the .wav performance of each sound board, we conducted formal lab tests using a .wav file consisting of electronic tones. Using an Audio Precision System Two analyzer, we measured distortion, noise, range of audible tones, and other factors that affect sound quality. We also recorded and played back precise tones to learn how a board would fare at recording on a personal computer.

The Hi-Val, the Sonic Impact S90 (our business Best Buy), and Turtle Beach's Montego A3D Xstream—all three based on the Aureal Vortex chip—produced the best overall results playing our .wav files. These boards also did a fine job of recording. Although it has a similar design to the Hi-Val, the Turtle Beach uses 18-bit digital converters instead of 16-bit ones; the company claims that 18-bit performs better (because more bit depth generally translates into truer sound reconstruction). But in our tests, we didn't hear or measure any such improvement.

You'll obtain good overall results with Sound Blaster Live, our Best Buy for gamers, though its performance is not tops in all areas. It didn't reproduce the broadest range of tones, but most listeners shouldn't detect this limitation. Recordings made at over 92 percent of full level, however, suffered from distortion, sounding like a boom box played too loud. Because this sound level occurs only during a small window on most recordings, casual users will rarely encounter it. Nonetheless, musicians and composers might find it frustrating.

We got mixed results from the other Creative Labs boards. The Sound Blaster PCI128 is not as quiet as either the Hi-Val or the Turtle Beach card, but you won't be able to hear the difference over the noise of a PC. Creative Labs' budget Ensoniq AudioPCI produced severe distortion when recording level indicators rose above 72 percent of full level, which you would hear when you played back high sound levels such as the crescendo of a symphony. The Ensoniq also had irregular high-frequency responses; this means that musical overtones, which differentiate one instrument from another, could be diminished or accentuated, making the music sound flat or brassy. ▶

Comments	InfoNet number
Good price and good sound in our jury tests, but you'll get gritty distortion when recording at normal input levels.	690
Poor sound in our jury tests and harsh distortion at higher recording levels make this a bad value, even at its low price.	691
Our Best Buy for gamers—with excellent sound in our jury tests and lots of effects—is a delight, but you'll pay a lot for it.	692
Four-speaker 3D sound is impressive, but performance in our audio lab tests was only average, and our jury found the sound poor.	693
Excellent sound in our jury tests and four-speaker 3D audio; our lab tests encountered some noise, however.	694
Our Best Buy for business produced excellent audio performance in our lab and good MIDI quality in our jury tests, at a budget price.	695
Similar in performance and MIDI quality to our business Best Buy, but support and bundled software are not as strong.	696
Excellent audio performance in the lab and good MIDI quality in our jury tests, but extra features make this board too costly.	697
Skip it. Our jury found that this board's MIDI sound lacked highs, and the card added distortion to our playback tests.	698
Performed well in lab tests and sounded great in our jury tests, but can't compete in features and price.	–

[3] Supports eight speakers with Cambridge SoundWorks multispeaker systems, not yet available.

DELL® DIMENSION® DESKTOPS

Common features: • Mini-Tower Model • 3.5" Floppy Disk Drive • Two USB Ports • MS® Office 97 Small Business Edition v2.0 plus Bookshelf 98 (Includes Word 97, Excel 97, and Expedia Streets 98) • McAfee VirusScan • MS Windows® 98 • Dell QuietKey® Keyboard • 3-Year Limited Warranty† • 1-Year On-site◊ Service • Lifetime Toll-free Hardware

NEW DELL DIMENSION XPS R450 PENTIUM® II PROCESSOR AT 450MHz

- 128MB 100MHz SDRAM
- 512KB Integrated L2 Cache
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TEST REPORT

Sound Blaster Live Makes Excellent Music

PRODUCT	Audio Performance			CPU Utilization		Jury Test
	Noise playback/record-and-play (dynamic range, in dBA)	Distortion playback/record-and-play (percent)	Crosstalk playback/record-and-play (dB)	MIDI hardware (percent)	MIDI software (percent)	MIDI quality
Aztech Labs PCI 338-A3D	95/86	.015/7.8	-83/-83	13	23	good
Creative Labs Ensoniq AudioPCI	86/82	.014/49.5	-94/-84	not applicable [1]	5	poor
Creative Labs Sound Blaster Live	88/86	.012/.014	-98/-97	5	8	excellent
Creative Labs Sound Blaster PCI128	84/78	.009/.02	-87/-78	not applicable [1]	6	poor
Diamond Multimedia Monster Sound MX200	78/76	.015/.026	-64/-64	2	not applicable [1]	very good
Diamond Multimedia Sonic Impact S90	93/82	.016/.021	-85/-84	10	18	good
Hi-Val PCI338 A3D	95/84	.015/.017	-85/-85	12	22	good
Turtle Beach Montego A3D Xstream	93/82	.018/.019	-84/-83	12	19	good
Yamaha WaveForce 192XG	82/80	.087/.09	-87/-75	8	19	good
Creative Labs Sound Blaster AWE64 Gold (comparison board)	81/80	.01/.012	-87/-80	2	12	very good

Best Buy [1] This board produces MIDI sounds only in hardware or only in software.

The Aztech PCI 338-A3D looks just like the Hi-Val, but its recording and playback sounds were severely distorted. Almost any device you use to record to the Aztech will produce distortion, unless you can control its volume (and often you can't).

Diamond Multimedia's Sonic Impact S90 is based on the same card as the Aztech, Hi-Val, and Turtle Beach boards, and its performance is virtually identical to the others'.

The Diamond Monster Sound MX200 produced an excellent range of sounds playing .wav files, but you might hear a little hiss from your speakers; microphone recordings were no better than telephone quality.

Yamaha's $99 WaveForce 192XG produced severe distortion at high frequencies during playback (which sounds gritty) and was a bit noisy. The Hi-Val and Turtle Beach offer better performance for the money.

MIDI CITY

LIKE GOOD .WAV file performance, adept handling of MIDI audio is a must. The MIDI protocol tells a board how to create digital musical instrument sounds, found in app and game sound tracks. MIDI quality indicates how convincing the sound created on the board's synthesizer chip is.

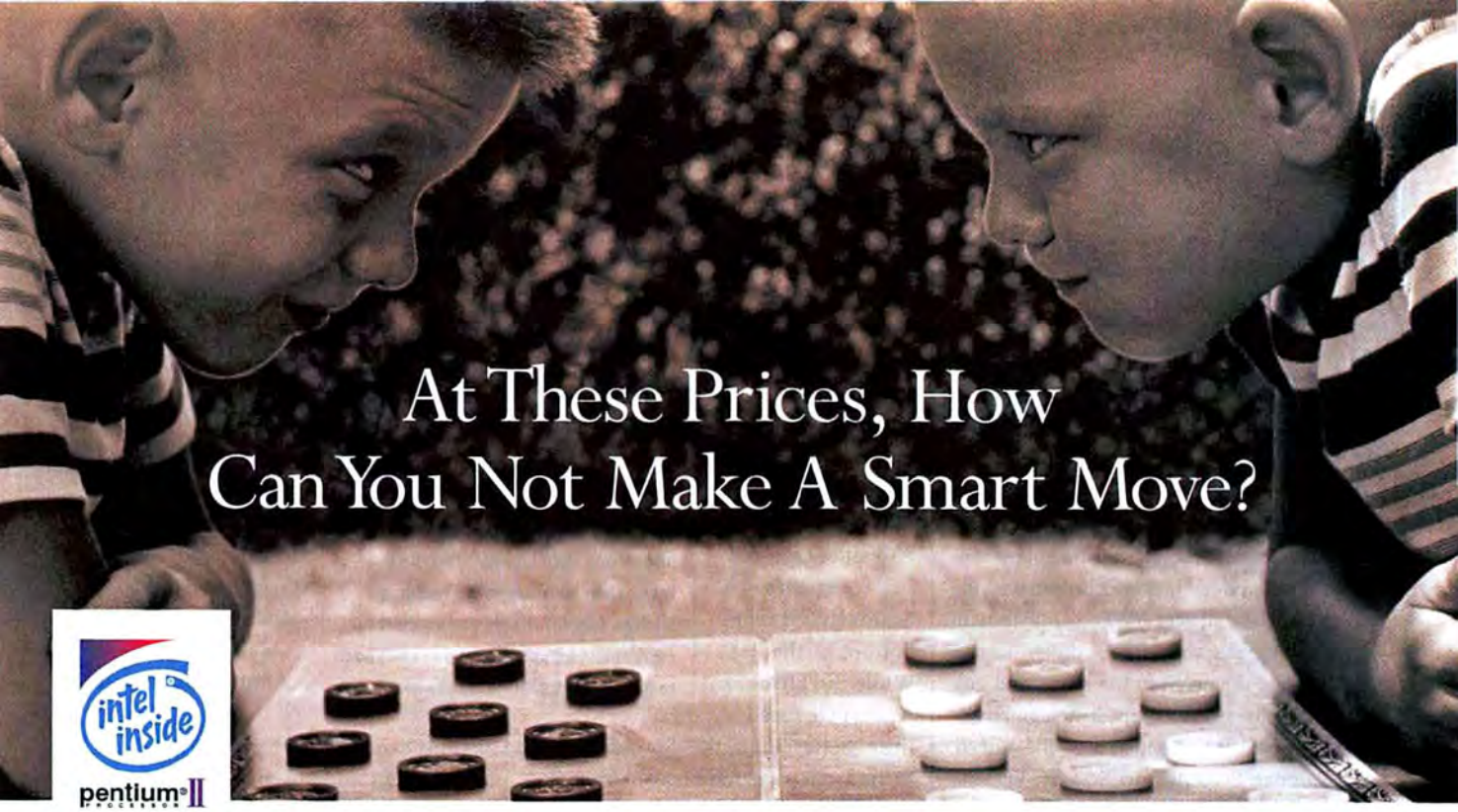
For most people, a sound board that can execute 32 simultaneous instrument sounds (also called voices) is sufficient for playing most games. Composers, however, may require 64 or more voices. All of the boards we reviewed can play at least 32 instrument sounds simultaneously.

Cards that create musical notes using their own hardware synthesizer chip generally sound better than those that rely on software. Why? Making all those complex sounds is grueling work for your CPU. To give your processor a rest, then, software synthesizers compensate by creating simpler, less realistic sounds. If your PC is a P-200 or slower, it's especially important that you choose a card that comes with a hardware wavetable synthesizer, so your CPU will have some oomph left for other tasks. All the boards here except the Ensoniq AudioPCI and the Sound Blaster PCI128 can play at least 32 or 64 voices in hardware.

You can get high-quality MIDI audio for about $50, but be selective. Looking at the box, checking its price, and counting instruments won't tell you whether a card sounds good. Listen before you buy. If you can't, reviews (like this one) are your next best bet.

To test the quality of the boards' MIDI synthesizers, we played four musical selections—from Broadway to coun- ▶

HOW WE TEST Noise, expressed as dynamic range or signal-to-noise ratio, is the scope of volume levels that the boards can produce. A wide dynamic range (roughly, 84 dBA or higher) means you won't hear distracting hiss and other unwanted noises; the board is therefore "quiet." Distortion shows the undesired altering of a signal by the sound board's electronics; under .05 percent is best. We tested the total harmonic distortion plus noise on a test specially filtered to give more emphasis to the frequencies your ear can hear. We measured at 100 percent of recording level. Crosstalk is the unwanted bleeding of signals from one stereo channel into another, impairing the desired dimensional impact of stereo audio; the greater the negative value, the better (below -70 dB is best). CPU utilization measures the hit your processor takes while the board performs a task; less is better. To measure CPU utilization, we played a standard MIDI file on all the cards. While the actual CPU load depends on your PC's speed and other factors, a card's performance in relation to other cards should remain similar. All tests except juried tests were performed on .wav files of test tones; playback was performed on prerecorded tones. Jury tests were performed on MIDI music samples.



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try—on each board and asked our jury of listeners to give us their evaluations. Separating winners from losers was easy. The winners sounded crisp and real, with tinkling pianos and twanging guitars; losers sounded fake or dropped sections of music they couldn't process.

IS IT LIVE?

THE $200 Sound Blaster Live, our gamers' Best Buy, played MIDI music better than any other board we tested, producing realistic piano, guitar, and drums—and thumping bass—in our jury tests.

The $150 Diamond Monster Sound MX200 was another jury favorite, equaling the $149 Sound Blaster AWE64 Gold in richness but sounding slightly duller. Listeners liked the detail in the horns and guitar and the impact of its drums and bass.

The next most popular were the Aztech, Diamond Sonic Impact S90, Hi-Val, and Turtle Beach boards. While they didn't perform as well as the Live or the AWE64 Gold, they provide very good sound for under $100. The boards were similar in general tone: a little scratchy or tinny at the high end, but strong in the bass notes. The Sonic Impact S90, for example, produced pretty good drums and bass, especially for such an inexpensive board.

The Yamaha also falls mid-list. Listeners liked the detail and realism of some instruments, such as the horns and piano, but also noted a dulling lack of strong high notes. Yamaha claims that its XG MIDI technology gives programmers and composers more voices and better instrument control, but few games are created in XG, so only a composer would notice those advantages.

Creative Labs' two less-expensive boards landed at the bottom of the list. While the Ensoniq AudioPCI fared a little better than the Sound Blaster PCI128, our panel rated both of these Creative Labs boards just plain poor. The piano notes sounded fake, and a strange warble accompanied some instruments. During the process of panning, sound from both of these boards jumped jarringly from side to side.

GAMING **A board fits our gaming category if it delivers good audio performance in our lab tests and strong MIDI quality in our jury tests, then adds advanced features such as special effects and support for more than two speakers. You can expect to pay at least $100 for these models.**

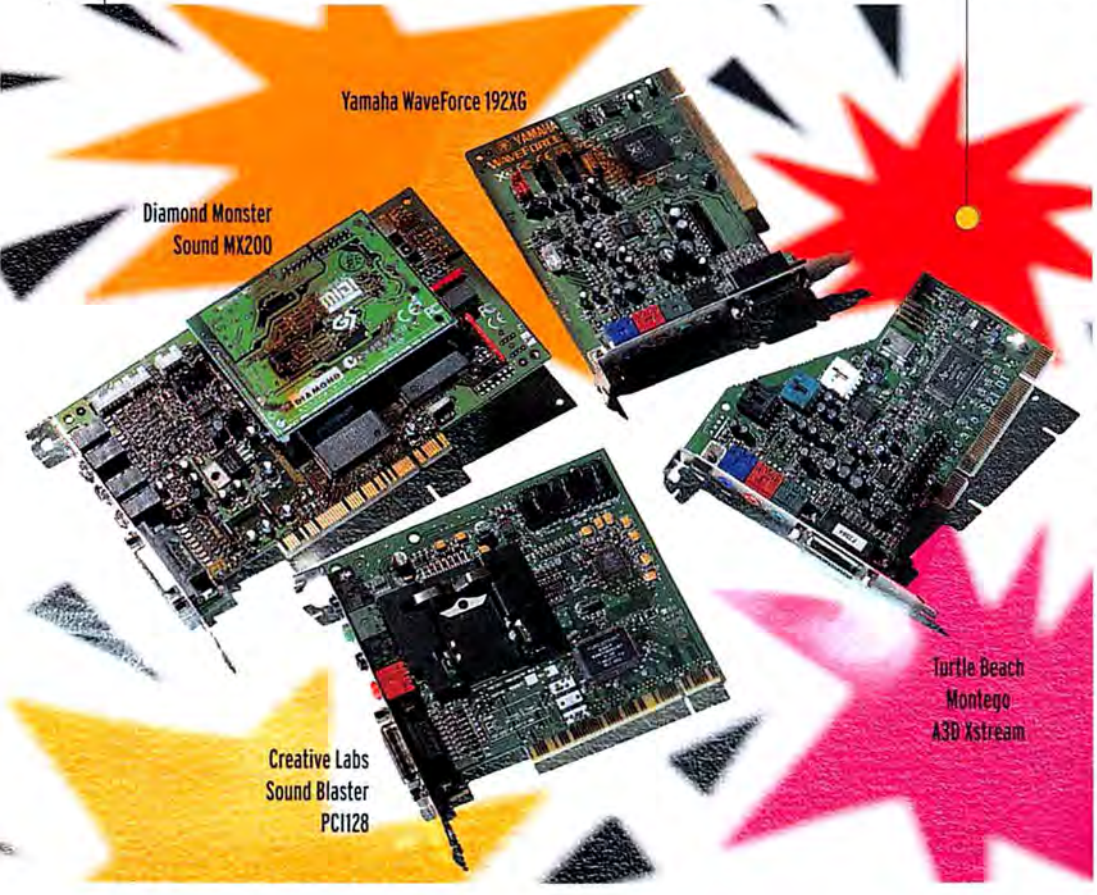
GET INTO THE ACTION

YOU'RE PLAYING Quake II, staring down a menacing opponent. An explosion rips the air behind you. You swing around and hear the blast's echoes in front of you. The secret to this realism? Positional 3D audio, which lets the newest boards vary the direction and quality of sound as you move through virtual space. Unlike Surround Sound, positional 3D is interactive.

Many types of positional 3D are available. Microsoft continues to improve the DirectSound3D capability built into Windows 95 and 98. DirectSound3D enables you to hear sound around you but doesn't permit sounds to interact with each other. Aureal's A3D 2.0 (due in high-end cards by year's end) and Creative Labs' Environmental Audio (or EAX, included in the Sound Blaster Live and as an extension to DirectSound3D) both let sounds interact with their environment. With A3D 2.0 and EAX, for example, when you race your car through a tunnel, you hear the sound of your engine's roar bouncing off the walls. It's too soon to tell how the various standards will sort out, but compatibility should not be a problem.

Drivers for DirectSound3D and A3D—available on the Web by the year's end—will run these technologies in software, so you can have positional 3D audio for free. But software-based 3D audio adds noise and distortion, may not use some advanced features, and can strain your CPU. So for best 3D sound, pick a card that offers hardware acceleration, as our Best Buys do.

Positional 3D audio works best with headphones or with more than two speakers. Both Diamond's Monster Sound MX200 and Creative Labs' Sound Blaster PCI128 can feed four ▶



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USB: A Sound-Card Killer?

AS IF THE NEW features on sound cards weren't confusing enough, you face another audio dilemma: the Universal Serial Bus. You can now buy digital speakers that plug directly into one of your PC's USB ports. Digital audio data streams over the USB wire to the speakers, where the bits are converted into sound. You don't need a sound card—USB speakers replace it. Or do they?

The case for USB speakers is appealing. They ease the PC resource crunch by freeing up an extra ISA or PCI slot. Moreover, they don't require often-limited IRQ lines or DMA channels. And because the digital-to-analog conversion occurs outside the PC case, where stray signals can't distort the signal, USB speakers theoretically should deliver higher fidelity than sound boards.

But USB audio has limitations. For one, you'll need to run Windows 98 to get full use of the products. Also, the 12-megabits-per-second bandwidth limit of USB creates a bottleneck for demanding audio operations (such as 3D positional games), particularly if your speakers share time with other USB devices. Most important, the superiority of USB sound is questionable. In my review of five speakers (see *@Home New Products*), I found that USB speakers couldn't match the quality of our traditional Best Buy speakers.

Given these caveats, who should consider USB speakers? If you want basic, low-cost business audio—and you run Windows 98—these products are terrific. And USB speakers make great sense if you want to output top-notch sound from notebook PCs, which typically provide inferior audio quality. But if you're going to run more complex audio, stick with a sound board. —Michael Desmond

speakers, and the Sound Blaster Live supports eight. Less-fanatical users will be satisfied with a two-speaker card. With two speakers, the three-dimensional effect is apparent, though sound from the rear is subtle, and overhead sound doesn't work as well. The four-speaker 3D performance of the Live was impressive. EAX adds another advantage to the Live, especially in games where the sound changes in relation to its environment, and not just in relation to your position. However, few current games are designed to make use of EAX.

WHEN DOS IS BOSS

ARE YOU STILL playing DOS-based games? That could pose a problem for some PCI boards. While all these boards claim some degree of backward compatibility with DOS games, a few fared poorly in our tests. The Yamaha performed the worst; we couldn't get it to play games either in a DOS box or from the DOS prompt. (Yamaha says future driver revisions will allow both.) The Monster Sound MX200 doesn't claim to run all DOS games, yet it did well in our tests. Diamond Multimedia's Sonic Impact S90 had no trouble with our DOS games and added a bonus: On games with a General MIDI option, the S90 played the full orchestration. Although Creative Labs' own Sound Blaster cards claim near-perfect compatibility with the Sound Blaster DOS standard, both the Ensoniq AudioPCI and the PCI128 behaved problematically. The Ensoniq ran games only from the DOS prompt (you have to exit Windows first), and the PCI128 ran only three of our five games without crashing. Creative Labs' Live, however, played our games flawlessly. The Aztech, Hi-Val, and Turtle Beach cards also handled our DOS games with ease. Unfortunately, the quality of their music was poor in comparison to the Creatives' rich orchestrations.

Don't hesitate to experiment. Some games may run better from a DOS box in Windows, and others better from the DOS prompt. If you have problems, the simplest solution is to leave your old ISA card installed and connect the output of the old ISA card to the line input on your PCI card. Most cards should be able to coexist peacefully.

THE SPECTRUM OF SOUND

Any of these boards will do fine for business and gaming, so base your purchase on your priorities. Need good sound for not much money? Then lean toward the business end. Want more features at a moderate price? Midlevel gaming is the spot for you. Want the best and don't care what it costs? Check out the boards designed for hard-core gamers.

SOUNDS GOOD TO ME

WHETHER YOU'RE a business user or an avid gamer, sound is integral to your PC experience. But among sound board vendors, hype runs amok over details that have little practical importance. Don't get sucked in by fancy specs that cost a bundle; these days you can get great sound for a reasonable price. Bottom line: If you need sound just for the occasional presentation, don't spend over $100. But if gaming is your passion, shell out at least $150 for the extra features. You'll hear the difference.

Adam Liberman is a sound engineer and freelance writer. Michael Desmond is a contributing editor for PC World.

For more information about all products in this article, select InfoNet no. 907 or visit www.pcworld.com/infonet. ■

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If you're going to shell out big bucks for a new portable, you'll want one that'll go the distance—without falling down on the job. We rate nine durable notebooks.

Notebooks for the Long Haul

BY MICHAEL GOODWIN

IT ALL HAPPENED SO FAST. A hurried flight attendant reached into the overhead bin and pulled out a garment bag. In horror, John Marconi watched his notebook computer, entangled in the garment bag, sail out of the overhead and crash six feet to the cabin floor. The damage: a cracked LCD, a broken infrared port, and smashed PC Card slots. Elsewhere, Ann Marie Ferdinand was busily working on a report in her hotel room when she spilled some soda on her laptop keyboard. That was one expensive drink: Repairs took a month and cost $1280. ✻ Such events are daily occurrences. According to a 1998 white paper about notebook damage ▶

PHOTOGRAPHS BY CHIP SIMONS

published by International Data Corporation, U.S. corporations will spend $700 million to repair and replace damaged notebooks this year—and as much as $1 billion annually by the year 2000.

Aside from durable design, subtler issues also determine how long your portable will last. Technical obsolescence is one. Even if a laptop survives the usual on-the-road hazards, technological advances and a dearth of upgrade options can send it to an early grave. Unlike with a desktop PC, upgrading a notebook to a faster CPU or a bigger screen usually means buying a new portable. And every new model may entail a whole new line of accessories.

Notebook vendors claim they are extending the longevity of standard laptops by providing tougher cases, more flexible upgrade options, and accessories that span model lines and generations. To see if those claims hold water, we asked some of these vendors to send us their longest-lasting notebooks. We received models from Compaq, Dell, Gateway, Micron, Panasonic, Quantex, Toshiba, Transmonde, and WinBook, testing nine portables in all. (IBM declined to participate in the review.)

We put the laptops through the same paces we use for our *Top 10 Notebook PCs* chart, and then got rough, pushing them off tables and pouring cups of heavily sweetened coffee onto the keyboard. The resulting Best Buy is, in our opinion, the notebook most likely to outlive the rest, in addition to having a good combination of price, performance, features, and service. Two others were good enough to be ranked with the Best Buy as Longevity Champs.

Our Champs

TOSHIBA'S PENTIUM II-266 TECRA 8000 (right), our Best Buy, is the Volvo of notebooks: It's expensive at $3499, but it promises good service for years to come. Reinforced by a magnesium alloy case, the Tecra escaped our drop tests with just a nick on the screen. To hold off obsolescence, Toshiba offers various upgrade options, including a DVD-ROM drive and up to 256MB of RAM. Our other two Longevity Champs are also praiseworthy: The Dell Latitude CPi D266XT (left) was one of two notebooks that survived our spill test, and the Compaq Armada 7400 (center) offers the fullest range of upgrades.

The Top Three: Longevity Champs

Toshiba's Tecra 8000 earned our Best Buy, in spite of a relatively high price tag of $3499. This Pentium II-266 boasts a good upgrade path—available options include a DVD-ROM drive and a second hard disk. The Tecra 8000's durability is about average among the portables in the group: The notebook suffered a minor screen nick in our drop test, and it failed our spill test—but then, only two of the nine machines survived that one. On the other hand, it ranked at or near the top in performance, features, portability, vendor's system reliability, and service. We were also impressed by the Tecra 8000's huge 6.1GB hard disk, accurate eraserhead pointing device, and desktoplike keyboard layout. (See "Longevity Scorecard," page 158, for configurations of all nine notebooks.)

The Toshiba does have a few minor warts: The keyboard feels flimsy, and you have to connect the floppy drive via an external cable to use the CD-ROM and floppy drives simultaneously. But aside from these minor annoyances, the portable was a joy to evaluate.

Second-place honors go to Dell's Latitude CPi D266XT. At a price of $3328, this PII-266 notebook is the most affordable of our top three choices, though it's still not cheap. Durability is first-rate; it was one of the two machines that survived our deluge of sugary coffee. We also liked the wavetable MIDI samples built into the audio electronics, as well as the flex-free keyboard and the miniature AC converter built into the power cord.

We were less impressed with having to connect the floppy drive to the notebook's parallel port via an external cable in order to use the floppy and CD-ROM drives at the same time. That means you'll need to disconnect your printer. (Only two other systems here—the Panasonic ToughBook 71 and the Quantex H-1331—stick you with this awkward parallel port arrangement.) In addition, Dell doesn't provide a DVD-ROM, Zip, or LS-120 backup drive upgrade. These aren't trivial gripes, but the CPi D266XT's formidable ratings in durability, portability, backward and forward compatibility of peripherals, and platform stability help make it one of our three Longevity Champs.

In third place, Compaq's PII-300 Armada 7400 is hard to resist. At $4199 it's the priciest notebook here, but it's also the fastest, outpacing two other PII-300s. The Armada's upgradability rating is the best among the notebooks reviewed. And thanks to its magnesium alloy case, it can take a beating. (Just don't spill coffee ▶

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on it—our unit didn't survive that test.) Add a big 6.4GB hard drive, the best-sounding speakers in the roundup, a wrist-friendly eraserhead pointing device, and excellent compatibility with older Compaq docking stations, drives, and batteries, and you've got one worthy product.

However, the Compaq has a problem similar to that of the Toshiba and Dell portables: You can't use the CD-ROM and floppy drives at the same time unless you connect the floppy externally. But with the Compaq, you can't even do *that* until you pay extra for an optional floppy disk drive that connects to a dedicated port. The floppy drive that comes with the system only works internally, forcing you to choose between a floppy and a CD-ROM drive. Another complaint: The <Home>, <End>, <Page Up>, and <Page Down> keys are located at the top of the keyboard instead of in the expected lower-right area. But if you can live with these shortcomings, the Armada 7400 is a good option.

Iron Notebooks

Whether the moment of truth is a fall from your desk, a sousing of soda during a moment of flight turbulence, or a rapidly reclining airplane passenger crunching your LCD screen with his seat, your laptop lives in a world of lurking danger. Hardware replacement aside, the cost of lost time, missed business opportunities, and corrupted data is staggering. According to IDC's white paper, the average cost of damage per incident—including hardware, IS support time, and lost user productivity—is about $1200.

Dropping the notebook while in transit or in use, spilling liquids on it, and striking the unit with another object are the leading causes of notebook damage, according to the IDC report. Notebook vendors are thus trying to make laptops tougher by using magnesium alloy cases (the material is 20 times stronger than plastic, but still light), applying special gels to secure hard drives, and protecting the circuits with spill-resistant keyboards.

We subjected each notebook in our review to two nasty tests: a drop from a desk and a dousing of coffee. For the first, we pushed the laptops off a desktop and let them fall 30 inches to a thinly carpeted floor—twice. We then powered them up and checked the screens, keyboards, and hard disks. For our spill test, we poured 2 ounces of our special Java blend (one cup of coffee, plus creamer and sugar) onto the keyboard while the PCs were on. Then we immediately turned them over, shook out the coffee, dried them off with a hair dryer, and tried to get them working again.

As it turns out, you're much safer dropping your notebook than spilling coffee on it. While the falls produced some unnerving sound effects as batteries and disk drives flew out, plastic covers tore loose, screens split open, and latches snapped, there was surprisingly little permanent

NOTEBOOK PCs — LONGEVITY SCORECARD

NOTEBOOK	Street price (8/21/98)	Basic features[1]				Upgradability		
		CPU/PC WorldBench 98 score/ performance	Traveling weight (pounds)[2]/ rating	Hard drive (GB)	Battery life (hours: min)[3]/rating	Maximum RAM upgrade (MB)/ list price	Biggest hard drive upgrade (GB)/list price	DVD-ROM/Zip/LS-120/ docking station upgrade options[4]
Toshiba Tecra 8000* 800/867-4422 www.computers.toshiba.com	$3499	PII-266/ 154/ very good	7.2/ light	6.1	2:42/ satisfactory	256/ $738	8.1/ $300	●/○/○/●
Dell Latitude CPi D266XT* 800/388-8542 www.dell.com	$3328	PII-266/ 147/ very good	7.4/ average	4	2:20/ satisfactory	128/ $399	6.4/ $299	○/○/○/●
Compaq Armada 7400* 800/345-1518 www.compaq.com	$4199	PII-300/ 160/ outstanding	7.9/ average	6.4	1:52/ poor	128/ TBA	no upgrade	●/●/●/●
Gateway Solo 2500LS 800/846-2000 www.gateway.com	$3249	PII-300/ 158/ outstanding	8.3/ average	4	4:09/ very good	160/ $300	6.4/ $100	●/○/included/●
Transmonde Vivanté SE 2300 800/988-2883 www.transmonde.com	$2719	PII-300/ 157/ very good	8.4/ average	4	2:43/ satisfactory	256/ $600	6.4/ $200	●/●/●/○
Micron GoBook 2 266 888/634-8799 www.micronpc.com	$3148	PII-266/ 144/ very good	8.3/ average	3	5:44/ outstanding	96/ $99	4.3/ $59	○/○/○/○
Quantex H-1331 800/896-4898 www.quantex.com	$2599	PII-266/ 145/ very good	7.6/ average	4	2:12/ poor	144/ $240	6/ $199	○/○/○/○
Panasonic ToughBook 71 800/662-3537 www.panasonic.com/toughbook	$3748	PII-266/ 138/ good	7.8/ average	4	0:50/ unacceptable	160/ $799	no upgrade	○[5]/○/●/○
WinBook XLi 266 800/965-9349 www.winbook.com	$2808	PII-266/ 147/ very good	8.5/ heavy	4	1:35/ poor	128/ $500	no upgrade	○/○/○/○

Best Buy

● Yes ○ No

* Longevity Champ

TBA = to be announced

[1] All the notebooks on the chart come with a 13.3-inch active-matrix screen, except the Micron and Panasonic models, which offer 12.1-inch displays. Only the Panasonic comes with 32MB of RAM; the others have 64MB.

[2] Includes computer, adapter, power cord, and floppy or CD-ROM drive.

[3] All batteries are lithium ion. See *Top 10 Notebook PCs*, page 210, for an explanation of our new battery test.

damage. The Quantex H-1331 lost the plastic cover over its RAM slots, exposing circuit boards, and the back of its case became twisted slightly. But it kept working. So did the Panasonic ToughBook 71, in spite of sustaining hinge damage that kept us from closing the lid—until the second drop reseated the hinges properly. Only the Transmonde Vivanté SE 2300 failed to boot after the drop test.

In contrast, seven of our nine PCs crackled, flashed, and then died as our coffee seeped through the keyboard and into the case. Dell's Latitude CPi D266XT quit for 24 hours but came back to life with no sign of permanent damage. Panasonic's ToughBook 71 shook off the spill like a duck in a downpour and kept working.

The appropriately named ToughBook 71 is the most durable notebook we tested: It survived both the drop test and the coffee spill, and includes a unique array of durability features, like a magnesium alloy case, a gel compound to cushion the hard drive, flexible connectors to resist impacts, and a sealed spill-resistant keyboard and touchpad. Its less remarkable ratings in other categories, including upgradability, prevented it from becoming one of the three Longevity Champs.

Within that trinity, the Dell Latitude CPi is the durability leader. Besides its aluminum alloy chassis, it boasts two other protective features. The StrikeZone, a plastic dome built into the case under the hard drive, offers disk protection, while the HyperCool system (a hybrid thermal heat pipe and variable speed fan) keeps the hot Pentium II processor from baking your notebook. Finally, the CPi's comeback after the spill test speaks for itself.

The Armada 7400 places second in durability among the Longevity Champs. It didn't survive the spill, but it hardly noticed the two rapid trips to the floor, thanks to a magnesium alloy case.

Toshiba, in third position, also uses magnesium alloy, but not around the screen. It survived the drop tests pretty well, aside from a tiny screen nick. Unfortunately, such nicks can get larger and may eventually ruin an LCD, though that didn't happen to the Toshiba. We gave the Tecra 8000 an extra point for its optional no-fault screen insurance program, which costs just $180 per year—chump change next to the $1000-plus you'd shell out to replace a broken display.

Easier Upgrades

Notebooks will never be as easy to upgrade as desktop systems, but they're getting closer. RAM upgrades are so simple nowadays that many users buy and install the memory themselves. Hard disk upgrades are becoming almost as effortless; removing the drives (either via a snap-out assembly or by twisting out a few screws) is easy on all the notebooks here, and do-it-yourself kits make installing a new hard drive a ▶

Durability			Service and support					
Drop test results [4]	Spill test results [5]	Durability design extras	Parts/labor warranty (years); extension (years, price)	Guaranteed repair turnaround time (hours)	Tech support (hours/days)	Vendor's support quality	Vendor's system reliability	InfoNet number [7]
damage; small screen nick, but it booted and scanned disks perfectly	died; no boot, no recovery	magnesium alloy case except around the screen	3/3 (1 on battery); no extension	48	24/7	good	good	608
no damage; initially gave odd error message, but after a few hours it booted and scanned disks perfectly	no damage; initially died, but 24 hours later, after drying out, it recovered fully, booting and scanning disks perfectly	aluminum alloy chassis, bubble under hard drive to redirect g-forces, spill protection under keyboard	3/1; 3, $99	24 [8]	24/7	good	good	609
no damage; booted and scanned disks perfectly	died; no boot, no recovery	magnesium alloy case	3/3; no extension	48	24/7	fair	fair	610
damage; plastic cover sprang out a bit at base of screen, but it booted and scanned disks perfectly	died; no boot, no recovery	none	1/1; 3, $100	none	24/7	good	good	611
died; broken plastic screen latch, wouldn't boot	died; no boot, no recovery	none	1/1; 3, $198	48	11/5	[9]	[9]	612
no damage; booted and scanned disks perfectly	died; no boot, no recovery	steel-reinforced multifunction bay	1 (5 on CPU and main RAM)/1; 3, $199	none	24/7	good	fair	613
damage; latch broke off, lid would not lock, keyboard popped out, case bent slightly at rear, but booted and scanned disks perfectly	died; no boot, no recovery	aluminum alloy on back of LCD	1 (3 on CPU and main RAM)/1; 3, $189	72	24/7	[9]	[9]	614
damage; plastic wrist-rest panel warped slightly, but booted and scanned disks perfectly	no damage; booted and scanned disks perfectly	magnesium alloy case, gel-cushioned hard drive, flexible connectors, spill-resistant keyboard and touchpad	3/3; cost of extension varies	48	24/7	[9]	[9]	615
no damage; booted and scanned disks perfectly	died; no boot, no recovery	none	1/1; 3, $299	none	13/5 [11]	good	fair	616

[4] All notebooks come with a port replicator upgrade option.
[5] Notebooks were dropped 30 inches twice.
[6] Two ounces of coffee, with sugar and creamer, were spilled onto the keyboards.
[7] For more about all products in this table, select InfoNet no. 901 or visit www.pcworld.com/infonet.
[8] Next-day turnaround guaranteed during first year of warranty.
[9] Insufficient data to give rating.
[10] Vendor says DVD-ROM upgrade will be available in November (price TBA).
[11] Plus 7 hours on Saturday.

BEFORE YOU LEAVE HOME: Be very careful when cleaning your notebook because liquids can harm it. Never spray anything directly onto the LCD screen—it can run behind the bezel and damage electronic components. Use plain water or a Windex equivalent—don't waste money on a special notebook cleanser—and spray it onto a soft, lint-free cloth. To clean the keyboard, use a vacuum cleaner (with its smallest, softest brush attachment) to suck out debris lodged between the keys. Use a Q-tip dampened (not wet) with plain water or Windex to clean the key tops. Dry each key top with a tissue before moving on to the next. Above all, make sure liquid doesn't run down between the keys and fry your components (see "Longevity Scorecard," page 158).

IN THE CARRYING CASE: Never pack pens, external drives, or any sharp, irregular objects in the same compartment as your notebook—especially next to the screen. You should always remove floppy disks and CD-ROMs from the drives before transporting your notebook. In case of a drop or other shock, your drives (and data) are more likely to sustain damage if the heads are in contact with a disk.

Survival Tips

ON THE PLANE: Get a window seat to avoid having people crawl over you, possibly bumping or spilling a drink on your notebook. Beware of the seat in front of you reclining and crushing your LCD. You can often adjust the screen angle toward you to move it out of harm's way. And it's safer to place your notebook under the seat in front of you than in the overhead compartment, where it can bounce around more easily or end up buried under other luggage. If you must stow your laptop in the overhead bin, stand it upright at the end of the luggage rack and brace the other side of the notebook with a piece of luggage.

AT ALL TIMES: Make a very simple promise to yourself: *Never* allow liquid to come within 2 feet of your machine. As our test results revealed, few things are more dangerous to a notebook than a spill onto the keyboard. It will cost you plenty. —M. G.

breeze. For more information on notebook hard-drive upgrade kits (including a review of three kits), see www.pcworld.com/nov98/notebooks.

All the modems included with the notebooks in this roundup (both internal and PC Card units) connect at 56 kilobits per second. As the V.90 standard becomes more widely available, some of the PC Card modems in these notebooks will be upgradable via manufacturer Web sites. Alternatively, you can always buy a more advanced PC Card modem. None of the internal modems here (in the Toshiba, Compaq, and WinBook portables) can be upgraded, but you can disable them and replace them with a V.90 PC Card model when those versions become available.

In addition, more notebook vendors are starting to build modular bays that accept DVD-ROM, Zip, and LS-120 backup drives. This will make it easier for consumers to upgrade to these devices even if they don't purchase them with the laptop. Among our three favorites, the Compaq stands out; it offers DVD-ROM, Zip, and LS-120 drive upgrade options, as well as a docking station upgrade.

Notebook processors and screens remain difficult to upgrade. If your notebook has Intel's mobile module, you can easily upgrade the CPU—remove four screws and pop the upgrade in. Unfortunately, with the way most notebooks are designed, you practically have to dissect them just to reach the processor. Even when processor upgrades are offered, customers seem to prefer buying new notebooks. Transmonde, the only company currently offering a CPU upgrade (labor-free, to boot), reports that the percentage of its customers who upgrade their laptop's processor is "very small."

Screen upgrades are almost unheard of; attaching a big screen to a notebook designed for a small one is no trivial task. Nonetheless, the technology to accommodate this exists. Among the vendors of our top three picks, only Toshiba promises a screen upgrade (from 13.3 to 14.1 inches).

Of the nine laptops reviewed, the Compaq Armada 7400 is the most upgradable; the only types of upgrades it *doesn't* offer are CPU and screen upgrades. The Toshiba Tecra 8000 also receives high marks in this category, though it offers no Zip or LS-120 drive upgrades. Dell fails to provide *any* drive upgrades.

Peripherals du Jour

Far too often in the past, vendors have neglected to make their new notebooks work with older peripherals. If you bought a new notebook, even from the same vendor that made your last one, you probably also had to lay out cash for a new docking station or port replicator and backup battery. This has been an even bigger problem for companies with lots of employees who use notebooks; the added cost of new peripherals can be a significant burden on a budget. On the other ▶

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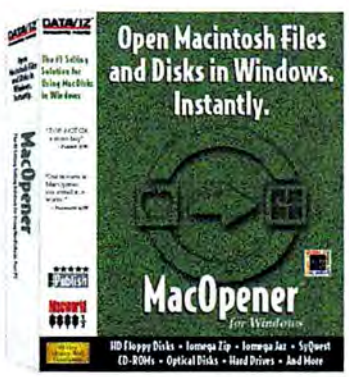

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hand, if a vendor guarantees that its new laptop will use the same batteries, drives, floppies, docks, and power cubes you bought the last time around, your initial investment would still be good.

Naturally, such a guarantee isn't always possible given the pace of technological change. New technology can demand new chassis forms, new electronics, and new kinds of connectors. Fortunately, the majority of manufacturers in this review provide excellent backward and forward compatibility. Five notebooks, including one of our Longevity Champs, Dell's Latitude CPi D266XT, achieved close-to-perfect scores in this department. Dell says it guarantees backward and forward compatibility on hard drives, floppy drives, CD-ROM drives, RAM, AC power adapters, batteries, docking stations, and port replicators for all Latitude models past and future.

Here Today, Here Tomorrow

Once upon a time, most notebook platforms and configurations vanished six months after they hit the market. Many still do. This kind of flash-in-the-pan life span is bad news for corporate buyers with longevity on their minds, since corporations conduct product testing, and if the configuration changes, they have to retest. Corporations would also like vendors to guarantee that parts will be readily available a year or two down the road.

Recently, Dell and other notebook PC vendors have been touting longer ▶

NOTEBOOKS

Tech Support Tips

USING YOUR NOTEBOOK FOR A LONG TIME means you'll probably call tech support at some point. Just the thought of those long waits and bristly reps probably makes your hair stand on end, right?

Well, industry analysts say vendors are beginning to pump more resources into tech support to soothe your frustrations. But good service goes beyond vendors doing a better job. It also depends on you. "I don't think it's too much to ask of users to familiarize themselves a little with the technology," says Rebecca L. Eisenberg, a *San Francisco Examiner* technology columnist who began her technical career in tech support. "It's ridiculous how many folks call thinking their notebook is broken when they have a dead battery."

BEFORE YOU CALL

✳ **DOCUMENT THE PROBLEM:** Write down error messages for the rep. Also, note exactly what you did (for example, opened programs, organized folders, installed apps, connected a peripheral, or downloaded Internet files) before the problem emerged.

✳ **CHECK YOUR HARDWARE:** You'd be surprised how many users call tech support with easy-to-fix problems, such as loose connections between the notebook and a peripheral. Shut down your computer, make sure the cables are properly seated, and try again.

✳ **CRACK THE BOOKS:** Vendors say more than half of their tech support calls could be avoided if users consulted the documentation first. Although the quality of manuals varies, most of them have a section on troubleshooting, help, diagnostics, or frequently asked questions that you should at least take a peek at.

✳ **CHECK THE WEB SITE (IF POSSIBLE):** Most notebook manufacturers have a "Support" button on their home page or, at the very least, a FAQs page. Sites may also contain downloadable BIOS updates, patches, and drivers, but you may need a tech support rep to lead you through the download process and installation. Many sites will also fax or mail you documentation on BIOS updates and much more.

MAKING THE CALL

✳ **GATHER THE GOODS:** Before picking up the phone, have these things handy: your notebook, customer identification number, notes, documentation (especially for added peripherals), and basic system information (type of CPU, amount of RAM, and hard drive size).

✳ **BE PATIENT:** Despite claims that tech support is improving, odds are you'll be twiddling your thumbs for 10 to 15 minutes, based on our experiences. Once you get through, ask for the rep's name and phone extension, in case you have to call back.

✳ **ASK QUESTIONS:** If you don't understand the rep's advice, don't be shy—ask about it. Also, take notes because the information may be useful the next time your notebook goes haywire.

✳ **DON'T HANG UP TOO SOON:** "Try this and call me back if it doesn't work" is a common refrain from busy service reps. "Wait a minute" should be your response, in case the suggestion doesn't work. Try to keep the rep on the line until the problem is solved.

✳ **DON'T TAKE ANY GRIEF:** Service reps can cop attitudes just like anyone else. If this occurs, you can ask for a supervisor, but be prepared to start the process all over again if you do. **—Carla King**

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Dot pitch	0.25mm mask	0.25mm mask	0.26mm dot 0.22mm horizontal	0.28mm dot 0.24mm horizontal
Maximum resolution	1280 x 1024 @ 65Hz	1600 x 1200 @ 65Hz	1600 x 1200 @ 77Hz	1600 x 1200 @ 77Hz

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platform and configuration stability—the length of time the same chassis form and configuration will remain available. But when we tried to get them to guarantee a number of months—whether 8 or 18—most vendors refused to make promises. Many gave only vague estimates that weren't worth printing. Because new laptops are introduced at such an accelerated pace these days, vendors don't want to lock themselves in to offering a portable PC for a defined period of time. Panasonic is one of the exceptions: The company says that the ToughBook 71 will be around for at least another year.

> *"Duration of warranty is as important as the durability of the notebook itself, and an affordable extended warranty can be a lifesaver. Many vendors also offer a guaranteed turnaround time for warranty repairs."*

How Fast Is Fast Enough?

With Pentium II notebook PCs running at speeds that would have seemed like science fiction a couple of years ago, even the slowest notebook in this roundup will run ordinary office software quite rapidly.

Of course, that's today. Software continues to grow bigger and more complicated as software designers build new programs based on their best estimate of what desktop hardware will be able to handle six months from now. And since notebook technology always trails desktop PC technology, if you don't buy defensively you may find yourself slowing to a crawl on software used by desktop-equipped associates. The faster the CPU you buy now, the longer you can put off upgrading to a new notebook.

Among the notebooks we tested, there wasn't a huge performance difference, with the exception of the eighth-place Panasonic, which posted the worst PC WorldBench 98 score on the chart. To be fair, the ToughBook 71 comes with just 32MB of RAM; the rest pack 64MB.

Among our Longevity Champs, Compaq's 300-MHz Armada 7400 took the gold with a PC WorldBench 98 score of 160—14 percent faster than the 266-MHz Panasonic. Toshiba's PII-266 Tecra 8000 tested nearly as fast as the Armada 7400, and Dell's Latitude CPi D266XT lagged slightly behind the Tecra.

But performance isn't the only gauge of how well a notebook will buffet the wave of the future. Our nine competitors come with active-matrix screens, ranging from 12.1 to 13.3 inches, that should give you good value for years to come. RAM ceilings are also comfortably high; the notebook with the smallest amount is the Micron GoBook 2 266, and it can take up to 96MB of RAM. Hard drives are plenty roomy; even the Micron's 3GB disk (the smallest in the roundup) should give most users ample storage space for a while. What's more, hard drive upgrades are fairly standard—and affordable.

Damage Control When You Need It

When accidents happen, your best friend is a solid service and support program. Duration of warranty is just as important as the durability of the notebook itself; our vendors offer one to three years. An affordable extended warranty can be a lifesaver; extensions from our vendors run from $99 to $299 for three years. Many of the vendors also offer a guaranteed turnaround time for warranty repairs. No-fault screen insurance, in contrast, is rarer: Only two companies here, Toshiba and Panasonic, offer it, at $180 and $150 per year, respectively.

A toll-free technical support line that operates 24 hours every day and remains free for the entire life of the product is also a must for most users (see "Tech Support Tips," page 162). Seven of our nine vendors provide such support. And ask if your vendor pays for both ends of warranty mail-backs; Gateway and WinBook pay for only half of the round-trip.

Dell leads our ratings on service and support. It offers lifetime, around-the-clock tech support; a three-year parts, one-year labor warranty; and a three-year extension on that warranty for $99. Our readers rate the quality of Dell's service and reliability as among the best in the business. (See "PC Reliability and Service: Who Can You Trust?" page 97.) Toshiba and Compaq follow closely behind, having lost points for failing to provide a warranty upgrade.

Spend Now, Smile Later

It's always tempting to look for a lowball laptop, like Quantex's $2599 H-1331, the least expensive notebook here. But you can often get greater longevity out of a portable by paying more in the first place. Of course, we can't guarantee that any model won't be obsolete in two years, but it's safe to say that your best insurance is to buy the most advanced (and most durable) notebook you can afford. The real cost savings of our Longevity Champs should come from fewer repairs, fewer new accessories, and lower support costs.

The three Longevity Champs cost from $3328 to $4199, with the Latitude CPi D266XT at the low end and the Armada 7400 at the high end. If the bottom line is your highest priority, Gateway's $3249 Solo 2500LS, which is middle-of-the-pack in price and fourth in terms of overall ranking (just shy of reaching the Champs), is also an excellent value.

The right notebook for you may cost more today, but it's probably worth it. Purchasing something as important (and expensive) as a state-of-the-art portable is tough enough without having to do it every couple of years.

online *Additional information about hard drive upgrade kits for notebook PCs can be found on PC World Online at www.pcworld.com/nov98/notebooks. Freelance writers Michael Goodwin and Carla King are regular contributors to* PC World. ■

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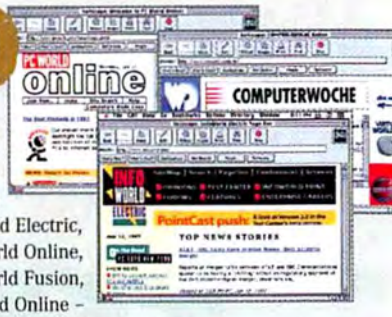

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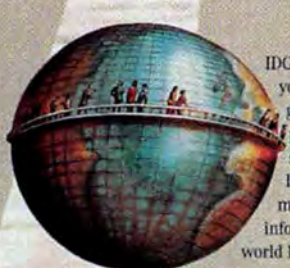

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HP Idea Kits
If you can imagine it, you can print it.

Point, Click, Buy *The Best Online Gift Shops*

Edited by Michael S. Lasky

Dreading the holiday-shopping crowd? Web storefronts are ready to sell you CDs, videos, books, food, wine, and more.

ILLUSTRATIONS BY ISTVAN BANYAI

BY JAMES A. MARTIN

PERHAPS THIS HAS HAPPENED TO YOU: You enter a department store to buy a gift. But before you walk 30 feet, a salesclerk approaches and asks, "Have you visited our new aromatherapy center?" There is no escape as the clerk rushes on with her spiel. "Our eucalyptus oil can be used as a decongestant or as a deodorant," she enthuses, "and our jasmine oil is a fabulous antidepressant." "That's nice," you respond wearily, "but I'm just looking for a pair of bedroom slippers." And when you finally find the slippers, you can't corral a salesperson to ring them up so you can be on your way.

Ah, the joys of gift shopping. It's a time-consuming chore, even without aromatherapy assaults. But it doesn't have to be. There's a convenient 24-hour shopping center on your desktop called the Internet. On the Web, you can find virtually anything for sale, type in your credit-card number, and boom, you're done.

True, you can't inspect the merchandise before you buy it, but for items such as PCs, CDs, books, videos, and packaged food, that's a minor concern anyway. That might explain why these products are among the top purchases on the Net. So with the holiday season upon us, we set out to find the best sites for buying books, CDs, videos, food, and wine. (Where can you buy a computer online? Sadly, most of our friends buy computer goodies for themselves instead of as gifts. Still, if you want to give a high-tech treat instead of slippers, check out last month's article "Where the Buys Are" for the best PC catalogs online and off.)

From the dozens of sites we visited, we selected our favorites based on price, selection, site design, security, customer service (return policies, toll-free phone service, responsiveness to e-mail queries), and our overall satisfaction. We reviewed sites for the products for which they're noted. So, for example, while Amazon.com now sells CDs, we rated it for its bread-and-butter business—books.

The Web is truly one gigantic shopping emporium, not limited just to the types of sites we focus on. To impart a hint of the sheer variety of items for sale, we sprinkle a sampling of more offbeat gift sites throughout this story. And if you want to speed up your gift hunt, check out the sidebar "Get an Agent" on page 172 to read up on shopping agents—Web software search tools that will find your item, along with its selling price, at multiple sites.

The following reviews of our favorite cyberstores reveal the benefits—as well as some of the drawbacks—of shopping online. If nothing else, cybershopping sure beats fighting store crowds or just enduring the obligatory aromatherapy spiel. Besides, what could be more convenient than shopping right from your desktop?

Where to Buy

LATE-NIGHT-TV CONTRAPTIONS

www.telebrands.com

Dozed off before you could order the Water Sweep? Want to review the specs on the Safety Can Opener? Telebrands sells many late-night-TV got-to-have-it gadgets. Some must-haves, like the Mt. Fuji Buckwheat Pillow, are discounted. If you download VivoActive or NetToob video viewers, you can watch the original infomercials.

—Michael Cahlin

CDnow

www.cdnow.com

PRO: Wide inventory, fast searches, compelling promotions

CON: Prices only slightly discounted

Forget drugstore cowboy. I'm a record-shop cowboy. And CDnow is pretty close to a record shop cowboy's nirvana (I'm talking heavenly bliss, not the band). The interface is inviting, searches are fast, and promotions are compelling and offbeat (such as the recent roundup of Celtic music). RealAudio music samples play clearly and quickly, and the background information—right down to original recording date—is usually thorough. My orders for the B-52's greatest hits, a Frank Sinatra anthology, the *Chicago* Broadway cast album, and a New Age collection were immediately confirmed via e-mail, and all arrived within two days by standard Priority Mail. But here's the flip side: You don't know if a disc is in stock until it's in your shopping basket, and except for a wide range of sale items, CDnow's prices are only slightly discounted.

CD Universe

www.cduniverse.com

PRO: Low prices

CON: Can't return opened CDs; spotty product info

Of all the music sites that I visited, CD Universe consistently offered the lowest prices. Among its out-of-this-world bargains, though, lurk a few black holes. CD Universe has roughly the same range of product as the other sites (200,000 titles) but less information. The screen designs are straightforward, though a tad amateurish; there's no energy or excitement—something we record-

Iconography

These icons identify sites that excel at particular features.

Easiest to Navigate *Excellent Product Information* *Top Customer Service* *Best of Breed*

PHOTOGRAPH: MARC SIMON

shop cowboys thrive on. And unlike other online CD shops, CD Universe does not let you return the merchandise if it's been opened. Nor, surprisingly, can you add a message to a gift purchase. If you're a bargain shopper and you know exactly what you want, point your spaceship to CD Universe; otherwise, better orbit elsewhere.

Music Boulevard

www.n2k.com

PRO: Responsive customer service, easy to browse

CON: Some graphics-heavy pages slow searches to a crawl

Like CDNow, Music Boulevard is a fun place to hang. I bebopped between the jazz, classical, rock, and other music channels; checked out the latest industry news; browsed through the 15 music categories; and grooved on the various theme-related promotions. But I ended up hanging here too long, and not by choice: The detailed, graphics-heavy discographies for prolific artists such as Sinatra turn this Boulevard into a two-lane country road. Customer service has the pedal to the metal, however: I e-mailed them after a CD price mysteriously increased by $3 when I added the disc to my shopping cart, and I promptly received credit for that amount. In my shopping comparison, Music Boulevard had the next-to-lowest prices; even better, it's got a standing buy-ten, get-one-free offer.

Where to Buy

GIFT PENS

www.fountainpen.com

At Levenger's Tools for Serious Readers, you'll find thousands of refills for roller-ball, ballpoint, and fountain pens, and mechanical pencils. Furniture, accessories, and even paper are designed for the demanding reader and writer. The classy, easy-to-navigate site is a standout shopping resource with the write stuff for corporate and personal gifts. —*M. C.*

Reel.com

www.reel.com

PRO: Good prices, entertaining pages, easy navigation

CON: None

Here's a cybervideo store that's more entertaining than most Hollywood blockbusters (particularly *Godzilla*). But Reel's 85,000 new and used VHS, laserdisc, and DVD titles for purchase or rent are only the start. The Movie Matches feature is an inspirational thesaurus of cinema: I typed in one of my favorite movies—Alfred Hitchcock's *Vertigo*—and got a list of creative suggestions for other films with similar themes, styles, stars, or directors. Every video title is ranked from 1 (poor) to 10 (tops) on such factors as suspense, sex, violence, and humor—providing welcome guidance, particularly for parents. Reel.com's search engine whisked me quickly to the kinds of movies and formats I like—say, Bogie's film noir classics on laserdisc. Sale prices are among the lowest anywhere (who could miss the ubiquitous advertisements for Reel.com's below-cost, $9.99 on-sale *Titantic* videos?). And with the preprinted labels that ship with your order, Reel.com even makes returns easy.

Tunes.com

www.tunes.com

PRO: Bountiful sound samples, helpful info on artists and CD tracks

CON: Higher prices for titles than at the other music sites visited

After shopping for the same four CDs at numerous music sites, next time I'm in the market for a disc, I will make Tunes.com my first stop. In many cases, I could listen to audio samples of *every* track on a CD—the other sites offer only half a dozen samples per disc, max. You get helpful star ratings from the All-Music Guide, and because Tunes.com is part of the feature-rich Rolling Stone Network, it's easy to get caught up here for more than just a quick shopping trip. Gripes? I have a couple—like why couldn't I find the B-52's greatest hits album when everyplace else had been offering it for weeks? Also, for the three other titles that I shopped for at each music site, Tunes.com's prices were the highest. But I'm willing to pay a bit more if I can hear everything I'm considering buying before I open my wallet.

VideoServe.com

www.videoserve.com

PRO: Multiple ways to search large in-stock inventory

CON: Ambitious search engine sometimes gets in its own way

The search engine is the ambitious star of this video-store Web site. Using a drop-down menu, you can speedily locate VHS, laserdisc, and DVD titles by keyword, name, author, subject/genre, publisher, studio, actor, or director. Unfortunately, the engine tends to choke when you combine any of these criteria for a more detailed search. The 120,000-title inventory features significantly more in-stock laserdiscs than Reel.com; you can also order books, audio books, and video games. But with an interface as dark as Charlie Sheen's sunglasses, VideoServe.com is one of the least alluring video sites I've seen. Also, the information provided on each title can be as skimpy as Bruce Willis's hair. Bottom line: VideoServe is best used as a fallback if you can't get what you want elsewhere. ▶

GOOD ENOUGH TO EAT

FOOD & WINE SITES

BY LESLIE CRAWFORD

Dean & DeLuca

www.dean-deluca.com

PRO: Elegantly designed; wide, mouthwatering selection of foods

CON: Customer service could use some service

For epicureans in the know, Dean & DeLuca—founded in New York's SoHo district—is the last word in designer delicacies. We were tantalized by this upscale market's savory international offerings: Charlemagne Belgian chocolates, Pettigrews chutney from Scotland, Prosciutto di Parma from Italy, English double Devon cream, and—get this—Tasmanian honey. Like the store, the site exudes an air of spare elegance. Its bountiful selection is neatly organized; you can click on everything from caviar and truffles to gourmet gift baskets. But unintuitive design proved irritating more than once. We were stupefied about how to send an e-mail query or find out about return policies (we called Dean & DeLuca's 800 number and learned the company does guarantee customer satisfaction), and shipping prices were difficult to decipher. Unfortunately, the site gives more weight to form than function. Ah, the cost of being hip.

JAMS, CHUTNEYS, & MUSTARDS

The Global MarketPlace

www.globalfoodmarket.com

PRO: Easy navigation, full product info including shipping fees

CON: Photos of items are fuzzy and small

You can bid adieu to humdrum cheeses and holiday fruit baskets. The Global MarketPlace hawks goods from every major continent. Want Lizano salsa from Costa Rica, Israeli couscous, French cornichons, Berbere spice from Ethiopia? *Non problemo!* You can choose from thousands of international foods and hard-to-find exotic ingredients. Navigation is blissfully simple; products are described in straightforward prose; shipping costs are clearly marked with each item; and if you're not satisfied, return your order and obtain credit toward your next purchase or get a replacement. Can't find a specific international food? Send an e-mail, and the reps will try locating it for you. Too bad the visuals are mostly fuzzy photographs. Also, those product shots are small, and order pages are secure but not obviously so. These bellyaches aside, we were virtually sated. ▶

Get an Agent

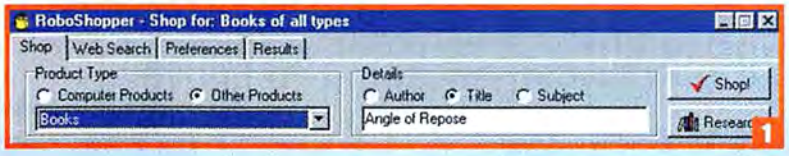
When you hit the local mall, you've gotta go one store at a time. On the Web, you can shop multiple sites simultaneously. The trick? Use a software shopping agent. These Web and desktop-based applets scour the Web for products you want.

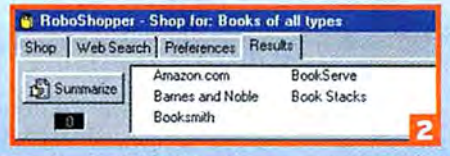
Input, say, the title of Wallace Stegner's classic novel *Angle of Repose*. Faster than you can say *charge it*, the agent will search appropriate sites and produce a hyperlinked list of the ones where *Angle of Repose* is sold and the price at each of them.

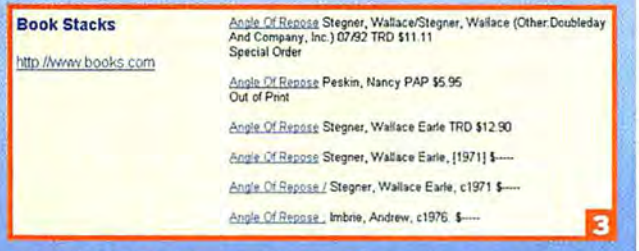
Web-based Bottom Dollar (www.bottomdollar.com), Jango (www.jango.com), and ShopFind (www.shopfind.com) search vendors' sites, while BidFind (www.bidfind.com) focuses on auctions. Desktop-based agents—which use the Web and software you download and install on your hard drive—offer more sophistication. RoboShopper (www.roboshopper.com) has a Research option, which searches for reviews and magazine articles about the products under consideration.

While agents are convenient, be aware that most don't search the entire Web but rather cover a preset group of merchants identified with the various product categories. This setup keeps the searches more manageable but may exclude some worthy sites.

—Gina Preciado



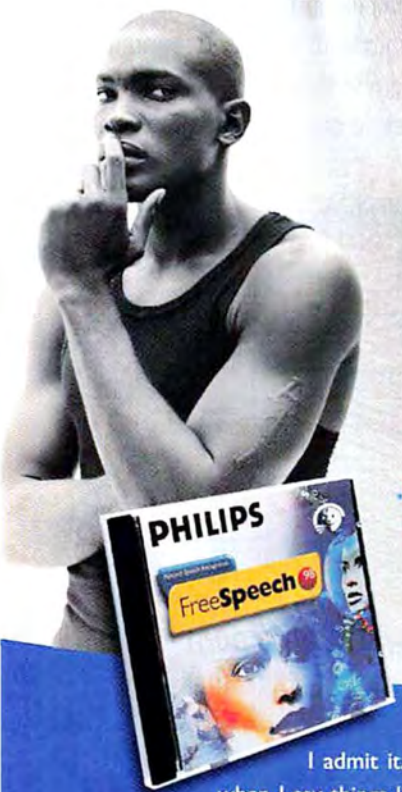




SHOPPING AGENTS like RoboShopper act as dedicated search engines to track down the products you want. (1) You enter the name of the product you're looking for. (2) The agent queries categories of sites most likely to have the item for sale. (3) It then provides a hyperlinked list of sites actually selling the product, and the current prices.

PHOTOGRAPH: MARC SIMON

Just what I need—software that lets me make the most of my big mouth.



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1998 PC WORLD WORLD CLASS

July 1998 VisionMaster 450 $659 ESP

We could talk about how great our monitors are, but all the awards we are winning speak for themselves. Winning the 1998 *PC WORLD* First Class Award proves that in its category, the quality, reliability and performance of our products is unrivaled.

The VisionMaster 450 is unsurpassed for clarity, durability, uncompromising performance, exceptionally low emissions and unparalleled value. As the first monitor manufacturer to offer a full three-year warranty, iiyama clearly illustrates its commitment to consistently high standards that begin with ISO 9001 manufacturing facilities and end with its total quality commitment. Engineering monitors to set the highest standards in the industry . . . its our way to get your attention.

	CRT Monitor Model/ Viewable Area	TCO	Dot Pitch/ CRT Type	Max. Horizontal Scan Rate	Max. Resolution	Est. Street Price
21"	**VisionMaster Pro 502** (19.5" VIS)	TCO '95	0.28mm/AG	110khz	1800 x 1440@74hz	$999
	VisionMaster Pro 501 (19.5" VIS)	TCO '95	0.28mm/AG	96khz	1600 x 1200@75hz	$939
	VisionMaster 502 (19.5" VIS)	TCO '95	0.27mm/dp	110khz	1800 x 1440@74hz	$999
	VisionMaster 501 (19.5" VIS)	TCO '95	0.27mm/dp	96khz	1600 x 1200@75hz	$939
19"	**VisionMaster Pro 450** (18.0" VIS)	TCO '95	0.25mm/AG	102khz	1600 x 1200@80hz	$699
	VisionMaster 450 (18.0" VIS)	TCO '95	0.26mm/dp	102khz	1600 x 1200@80hz	$659
17"	**VisionMaster Pro 400** (16.0" VIS)	TCO '95	0.25mm/AG	96khz	1600 x 1200@75hz	$498
	VisionMaster 400 (16.0" VIS)	TCO '95	0.26mm/dp	96khz	1600 x 1200@75hz	$459
	S702GT (16.0" VIS)	TCO '95	0.28mm/dp	96khz	1280 x 1024@85hz	$369
15"	**VisionMaster 350** (13.7" VIS)	MPR-II	0.28mm/dp	69khz	1280 x 1024@65hz	$239

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PC Computing ★★★★ — May 1998 VisionMaster 450

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★★★★★ ComputerLife — *Perfect Five-Star Rating* November 1997 VisionMaster Pro 17

Performance & Technical Excellence March 1997 VisionMaster Pro 21

MW EDITORS' CHOICE — *Six Time Winner* Jan 1997, Feb 1997, March 1997, April 1997, May 1997, June 1997 VisionMaster Pro 21

PC MAGAZINE EDITORS' CHOICE — October 7, 1997 VisionMaster Pro 17

CADALYST LABS ★★★★★ 1998 — March 1997 VisionMaster Pro 21

PC WORLD — *Twelve Time Winner* July 1996, Jan 1997 March 1997, July 1997, Sept 1997, Jan 1998, March 1998, May 1998, July 1998, Sept. 1998 VisionMaster Pro 17 April 1998, August 1998 VisionMaster 450

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The process is simple: scan your photo with a UMAX Astra 1220 scanner, add your favorite artwork, and print. Suddenly, the scouts are calling. And you've never looked better. That's because Astra 1220 scanners boast true 600 x 1200 dpi optical resolution and 36-bit color quality. Which means you'll see things other scanners can't show. Like the exquisite shades of pine tar on your bat. Every colorful stitch on your team jersey. Heck, you'll even see the hotdog guy in the background. And since Astra 1220 scanners cost under $200, they win M.V.P. honors for quality and value. Our scanner line-up supports both PC and Mac platforms, and with Parallel, SCSI, or USB interfaces, there's a model that's compatible with your computer. They also come with easy to use imaging software, including Adobe PhotoDeluxe. So, if you're ready to be famous, pick up an Astra 1220 scanner at your nearest computer retail store. Or for more information, check out www.umax.com/bar or call 1.800.331.UMAX. After all, your career may depend on it.

UMAX ASTRA 1220

COMPARISON	Astra 1220	HP 6200C
Optical Resolution	600x1200 dpi	600 dpi
Color Quality	36-bit	36-bit
Price	$129-$179	$399

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Great Food Online

www.greatfood.com

PRO: Wide selection with easy navigation to all items; top-notch customer service

CON: None

Great Food Online is a great concept, well executed. Rather than scramble all over the Internet in search of, say, a Maine lobster or a smoked ham from the Ozarks, you can graze from dozens of specialty food companies at this gourmand's emporium. Its so-called award-winning vendors aren't household names, but rest assured, Great Food offers a no-questions-asked guarantee: If you're unhappy with an order, you get a replacement or a refund. We took our chances with Two Buddies BBQ sauce and Stutz Family California olive oil, both of which arrived promptly and passed our exacting taste test. Product descriptions tend to be uninspired, but this wee gripe is eclipsed by the site's merits: Online ordering is secure, navigation couldn't be simpler, shipping costs are posted in a user-friendly chart, e-mail inquiries are answered swiftly, and intelligently designed links make virtual shopping a picnic.

Where to Buy

REINCARNATION

www.departed.com

The Vedic Life Sciences Institute is not the snazziest site on the Net, but it does sell three different Reincarnation Certificates. Starting at 15 bones, the certificate guarantees the designee will be reborn as an animal, vegetable, or mineral at a specified time. Human rebirth costs an extra fiver. Pick your planet for $35. —M.C.

Harry and David

www. harryanddavid.com

PRO: Traditional, reliable site for high-quality gift baskets

CON: Utilitarian design features

Say Gomer Pyle was surfing the Internet, in a pickle over what to send Aunt Bea for her birthday. Where should he go? No question: Harry and David—America's oldest mail-order food business—is a Gomer kind of place. Its no-nonsense (okay, let's just say it—dull) site redeems itself with exceptional customer service (100 percent satisfaction guaranteed) and an offering of 50 of the same items sold in its mail-order catalog—most notably, famous gift baskets of all-American delicacies like Oregon pears, Pacific smoked salmon, and Vermont cheddar. However, navigating the site is a mite tricky. For instance, shipping costs are buried under 'How to Order' on the customer service page. Still, the company's 800 number is prominently displayed, and a chipper sales representative will be standing by should you need help.

Virtual Vineyards

www.virtualvin.com

PRO: Best example of how to run an online store

CON: Perhaps too much product information

Whether you don't know beans about grapes or are a certified oenophile, you will savor this vintage site—probably the best food-and-beverage store in cyberspace. It houses an extraordinary stock of foreign and domestic wines, every label accompanied by helpful wine magazine reviews, the site's own pithy summary ("crisp, dry, and sassy..."), and a tasting chart that rates such qualities as acidity, tannin, and complexity. If you're looking for a bargain, click 'Wines under $15', or choose from hundreds of other wines in a generous range of prices and types. Merchandise isn't limited to the grape; this Palo Alto, California, site also sells first-rate California vinegars, Italian pasta, and more. Service is top rate: Online queries are handled speedily, as are confirmation and deliveries. (The one tricky aspect is winding your way through the wealth of thorough information and products.) And yes, if dissatisfied, you can send the bottle back—if it hasn't been opened, of course.

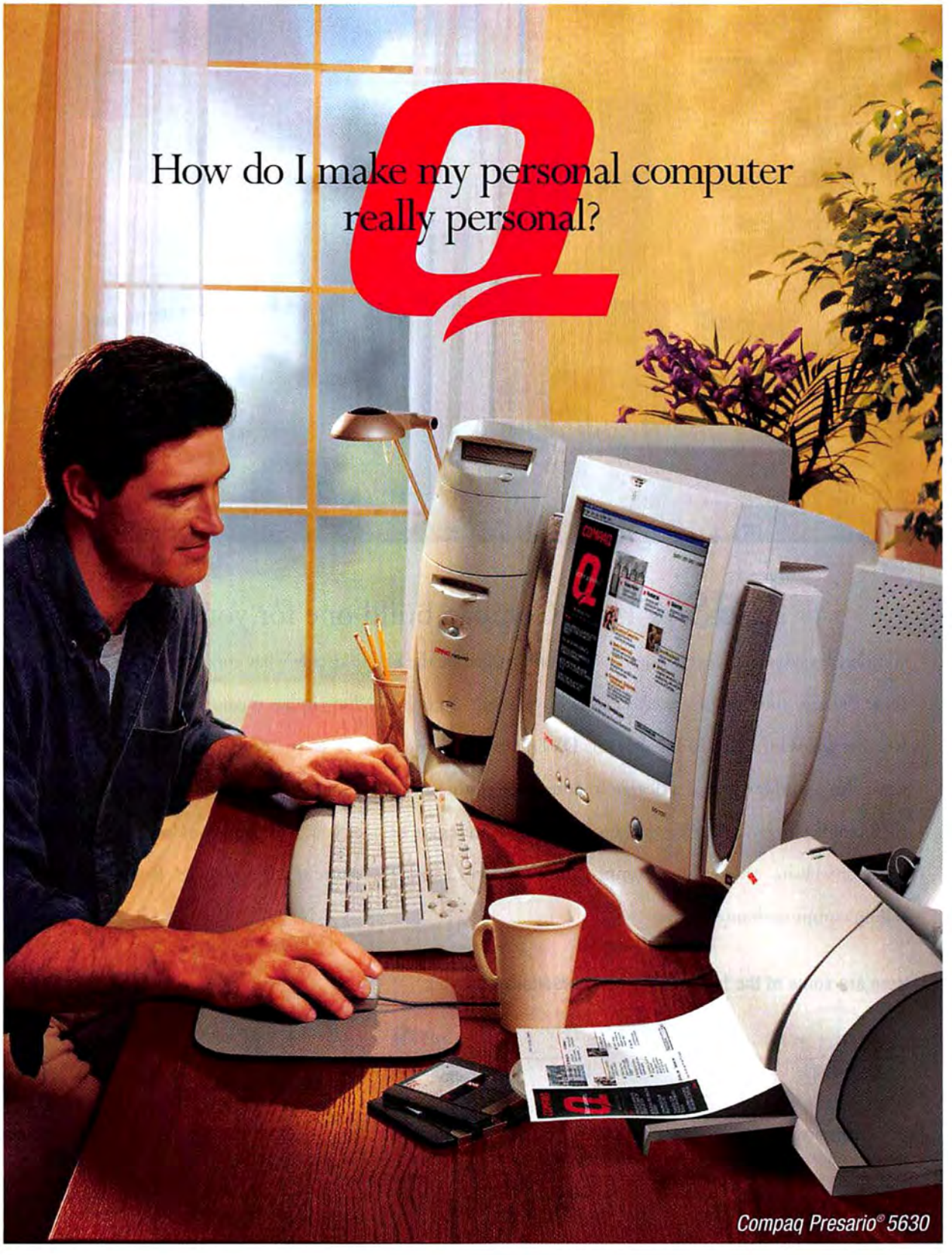
A Wine Store on the Internet

www.awinestore.com

PRO: Mom-and-pop operation offers intelligent selection and personal service

CON: Graphics and photos are conspicuously absent

Talk about friendly service: After placing our order, we received an e-mail from the owner: "Why don't you stop in? You live a mile away!" This personable San Francisco wine store will answer any wine query you post via e-mail, serving up recommendations to suit specific budgets and occasions. The store's selection, though limited, is thoughtfully arranged in a virtual cellar, which includes estate wines at half the retail price. For gifts, we particularly like the preselected wine assortments, such as the Merlot Pack ($50), the Sonoma Pack ($60), and the EconoPak ($29). A special toast is in order: The site gives crystal-clear instructions on ordering (three-bottle minimum), shipping (deliveries take a week), and return policies (just send back if dissatisfied). Graphics and photos are all but nonexistent. Still, the well-written descriptions are so evocative, we were sold. ▶



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$1,799
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$1,699

Base price includes:
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- 32X Max CD-ROM Drive[4]
- 64 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem[2]
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- 10 Mbps Ethernet port, Cable Modem Ready
- Microsoft Office 97 Small Business Edition
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Personalize it by choosing:
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- 2X AGP Graphics w/8 MB SGRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98
- Compaq V910 19" Monitor (18.0" VIA)
- JBL Pro Speakers

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- 5X DVD-ROM Drive:[3] Add $100
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- 5X DVD-ROM Drive[3]
- 128 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem[2]
- 2X AGP Graphics w/8 MB SGRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98
- Compaq V910 19" Monitor (18.0" VIA)
- JBL Pro Premium Speakers w/Subwoofer

Personalize it by choosing:
- 13.5 GB Hard Drive:[1] Add $51
- Internal Iomega Zip Drive w/2 disks: Add $99
- Diamond Viper 550 w/16 MB SDRAM: Add $79

Compaq Presario 5600-450

$2,849
-$100 mail-in rebate**

$2,749

Base price includes:
- Intel Pentium II Processor, 450 MHz
- 16.8 GB UltraDMA Hard Drive[1]
- 5X DVD-ROM Drive[3]
- 128 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem[2]
- Digital Creativity Imaging Center w/1394
- 2X AGP Graphics w/8 MB SGRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98
- Compaq V910 19" Monitor (18.0" VIA)
- JBL Pro Premium Speakers w/Subwoofer

Personalize it by choosing:
- 256 MB SyncDRAM: Add $250
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Compaq Presario FP 500

Upgrade from a Compaq V910 Monitor to an FP 500 Monitor for only $430.
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Compaq Presario 1800-300

$3,099
-$100 mail-in rebate**

$2,999

Base price includes:
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- 13.3" TFT Active Matrix XGA Display
- 64 MB SyncDRAM expandable to 160 MB
- 4.0 GB UltraDMA Hard Drive[1]
- 24X Max CD-ROM Drive[1]
- 56K ITU v.90 Modem[2]
- Smart Lilon Battery
- 512 KB L2 Pipeline Burst Cache
- 256-bit Accelerated Graphics w/2.5 MB VRAM
- Easy Access Buttons
- JBL Pro Audio with Bass Reflex
- Microsoft® Office 97 Small Business Edition
- Microsoft Windows®98

Personalize it by choosing:
- 96 MB SyncDRAM: Add $100
- 6.4 GB Hard Drive:[1] Add $200
- 2nd-Generation DVD-ROM Drive:[6] Add $200

Compaq Presario 1800-266S

$2,699
-$100 mail-in rebate**

$2,599

Base price includes:
- Intel Pentium II Processor, 266 MHz
- 12.1" TFT Active Matrix Display
- 64 MB SyncDRAM expandable to 160 MB
- 4.0 GB UltraDMA Hard Drive[1]
- 24X Max CD-ROM Drive[3]
- 56K ITU v.90 Modem[2]
- Smart Lilon Battery
- 512 KB L2 Pipeline Burst Cache
- 256-bit Accelerated Graphics w/2.5 MB VRAM
- Easy Access Buttons
- JBL Pro Audio with Bass Reflex
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98

Personalize it by choosing:
- 96 MB SyncDRAM: Add $100
- 6.4 GB Hard Drive:[1] Add $200
- 2nd-Generation DVD-ROM Drive:[6] Add $200

Compaq Presario 1800-300S

$2,899
-$100 mail-in rebate**

$2,799

Base price includes:
- Intel Pentium II Processor, 300 MHz
- 12.1" TFT Active Matrix Display
- 64 MB SyncDRAM expandable to 160 MB
- 4.0 GB UltraDMA Hard Drive[1]
- 24X Max CD-ROM Drive[3]
- 56K ITU v.90 Modem[2]
- Smart Lilon Battery
- 512 KB L2 Pipeline Burst Cache
- 256-bit Accelerated Graphics w/2.5 MB VRAM
- Easy Access Buttons
- JBL Pro Audio with Bass Reflex
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98

Personalize it by choosing:
- 96 MB SyncDRAM: Add $100
- 6.4 GB Hard Drive:[1] Add $200
- 2nd-Generation DVD-ROM Drive:[6] Add $200

Compaq IJ 200

$129.99

- Single-head thermal inkjet technology
- Up to 600 x 600 DPI resolution
- Sharp text and sharp color prints
- Print Speeds:
  Up to 3 ½ pages per minute black
  Up to 1 ½ pages per minute color
- Paper tray holds up to 30 sheets

Compaq IJ 700

$229.99

- Dual-head thermal inkjet technology
- 6-color photo-printing capability
- Up to 1200 x 1200 DPI resolution
- Sharp text and sharp color prints
- Print Speeds:
  Up to 5 pages per minute black
  Up to 2 pages per minute color

Compaq IJ 900

$299.99

- Dual-head thermal inkjet technology
- High-speed, high-quality text and graphics, even on plain paper
- Up to 1200 x 1200 DPI resolution
- Sharp text and sharp color prints
- Print Speeds:
  Up to 8 pages per minute black
  Up to 4 pages per minute color

EXTRA MILE SERVICE

Every Compaq product comes with a standard one-year limited warranty[7] and the assurance of our Extra Mile Service, the most comprehensive and flexible PC support available. You'll have access to fast, accurate, 7x24 technical support via the phone or Web.

Buy direct from Compaq, or purchase yours at your favorite retailer.
Call **1-800-888-0161**. Or visit us at **www.athome.compaq.com/ad-pcw**

intel inside
pentium II

[1]For hard drives, GB = billion bytes. [2]ITU v.90 modems are designed only to allow faster downloads from K56flex or v.90 compliant digital sources. Maximum achievable download transmission rates are currently unknown, may not reach 56 kilobits per second (Kbps), and will vary with line conditions. [3]24X Max CD-ROM data transfer rates may vary from 1500 to 3600Kbps. [4]32X Max CD-ROM data transfer rates may vary from 1800 to 4800Kbps. [5]The 5X DVD-ROM Drive transfer rate is up to 6,750 KB/s compared to 1,352 KB/s for 1X DVD-ROM Drives. [6]2nd-Generation DVD-ROM Drives run at a higher maximum transfer rate of up to 2.76 MB/s compared to 1X DVD-ROM Drives which run at a maximum transfer rate of up to 1.348 MB/s. [7]One year parts and labor. Labor for desktop systems is carry-in service with on-site service during the first 90 days of ownership. Labor for notebook systems is pick-up service. Compaq is not liable for pictorial or typographical errors in this advertisement. Compaq, the Compaq Logo, and Presario registered in U.S. Patent and Trademark Office. Microsoft, MS, and Windows are registered trademarks of Microsoft Corporation. Intel, the Intel Inside Logo, and Pentium are registered trademarks of Intel Corporation. Product and company names mentioned herein may be trademarks and/or registered trademarks of other companies. **Call Compaq Monday-Friday 7:00am-11:00pm (CST), Saturday and Sunday 7:00am-7:00pm (CST).** ©1998 Compaq Computer Corporation. All rights reserved.

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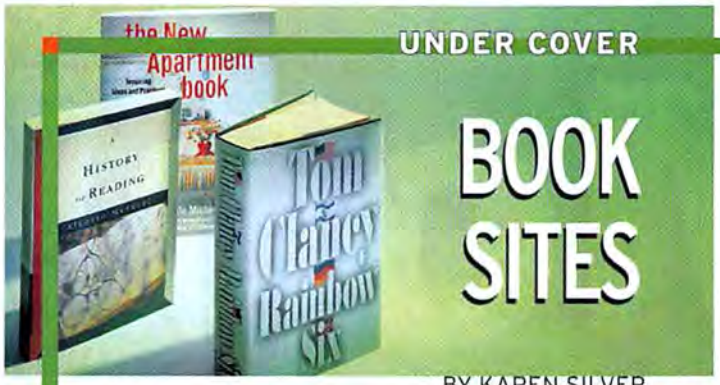

UNDER COVER

BOOK SITES

BY KAREN SILVER

alt.bookstore

www.altbookstore.com

PRO: Competitive prices, broad selection, easy searches

CON: Strict return policy, e-mail question went unanswered

Sometimes I know what I want, and sometimes I want someone to tell me what I want. The latter is especially true when I'm buying a gift. When it's direction I'm looking for, alt.bookstore has me covered. This down-to-earth site houses 2 million new and used books. Its Lists page is a browser's bonanza, with concise customer reviews, a roster of best-sellers and award winners, and various other listings you can mine for suggestions. A quick search among the page's 51 subjects yielded *The New Apartment Book*—just right for my friend with the indecisive approach to decorating. At alt.bookstore, prices and discounts are competitive; I chose the cheapest among the eight shipping methods. A few complaints: Returns for credits are allowed for just a skimpy 15 days; I found it hard to link some books with their reviews and got no answer when I asked via e-mail how to do so. Still, for practical shopping guidance, alt.bookstore is the place to go.

Where to Buy

CLOTHES—THE BASICS

www.gap.com

The Gap Online Store is better than the real thing. A Shockwave fitting room lets you "try on" clothes using models. Clothes look cartoony, but it's easy to change the color of the garment (or even of the model). Virtual Style mixes and matches real clothes. Buy online, or consult the sites' listing of retail stores to find one near you. —*M.C.*

Amazon.com

www.amazon.com

PRO: Huge selection; helpful reviews; gracious customer service

CON: None

Ask your friends if they've ever bought books online anywhere other than Amazon.com. No? Don't be surprised. Amazon.com is tops for a reason: It's smart. For example, when I searched on the vague subject 'reading', Amazon.com supplied a list of clever suggestions, including the popular *A History of Reading*, which I snapped up. The site offers an immense selection of books (2.5 million), from mainstream through obscure, then discounts the heck out of them and ships them faster than you can say bibliomaniac. Like my favorite local bookshop, Amazon.com is elegantly laid out, full of quick links, helpful reviews, and thoughtful recommendations. Customer service is a strong point—I deliberately asked a dumb question, and the response was both quick and gracious. When books are my game, Amazon.com is where I start my hunt.

PHOTOGRAPH: MARC SIMON

BarnesandNoble.com

www.barnesandnoble.com

PRO: Easy searches on large, well-described inventory; attractive design makes shopping fun

CON: Customer service can be spotty

Once I overcame my natural aversion to chain bookstores, I fell for BarnesandNoble.com. The creators of this classy, informative site waited for Amazon.com to figure out what works, then copied it. Best-selling titles like *Angela's Ashes* are remarkably easy to find, voluminously described (including tables of contents, when appropriate), and heavily discounted. Even obscure titles are fun to look for in this bright, lively site, though the surprisingly smaller selection (600,000 books) yields fewer results than other locales. With the dough to back it up, B&N offers generous discounts and policies (similar to Amazon.com's), personalized recommendations, and powerful searching. However, like many slick operations, BarnesandNoble.com falls short in customer service: My simple e-mail query about one book went ignored.

Books.com

www.books.com

PRO: Unique comparison pricing, voluminous product info

CON: Confusing order page

If I were new to the Net, I'd probably look for books by typing 'www.books.com'. And, lo and behold, I'd be rewarded with the heavenly Books.com site. From its airy home page to its link-full Contents page, the site is filled with author interviews, recommendations, and specialty sections ('Cocktail Cool' and 'Love & Romance', to name two). Descriptive reviews and ▶

Autodesk.

Canon
Canon Computer Systems, Inc.

Computer Associates
Software superior by design.

EPSON

ForeLogic

GoldMine
Software Corporation

HEWLETT PACKARD

Inc.
MAGAZINE

intel

MICROGRAFX

Microsoft

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VISIO

WRQ

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a SOFTBANK company

It's Chili Time Mon!

Join us at the Micrografx Chili for Children Cook-Off & Concert at COMDEX/Fall '98

Bring your reggae spirit and appetite for fun to COMDEX/Fall to see what the IT industry's top names are cooking up. Armadillo races and the fabulous sounds of Ziggy Marley & The Melody Makers will spice up your night. All proceeds benefit the National Center for Missing & Exploited Children. Party for a good cause, MON!

Ziggy Marley & The Melody Makers
Tuesday, November 17, 1998
MGM Grand Conference Center, Las Vegas
6 –11 p.m.

Order early! Call 1-800-357-7255 or visit www.micrografx.com/chili98. Tickets also available in the lobby of the LVCC or Sands Expo during COMDEX/Fall '98. Cook-Off & Concert tickets are $50.00 each. Concert-Only tickets (8:30pm admission) are $25.00 each.

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THERE'S A VERY GOOD REASON EUROPEAN MONITORS ARE ENGINEERED TO A HIGHER STANDARD.

IT'S THE LAW.

Granted, it's not easy to build monitors for the world's strictest quality standards. Or to pass the rigorous tests demanded by ISO-9241-3, TCO and NUTEK. But as a result, our monitors come with pinpoint clarity and faster refresh rates, for reduced eyestrain. Remarkably low emissions. And an unsurpassed level of reliability.

While in some corners of the world all this might be considered a luxury, in Europe it's just the way things are done. And it's your assurance that with Nokia, you'll always see a world of difference.

For more information on our full line of 15" to 21" monitors, please call 1-800-BY-NOKIA, or visit us at www.nokia.com/americas.

NOKIA
CONNECTING PEOPLE

Pictured above is a Nokia 21" 445Xpro (20" VIS), the industry's first 121kHz monitor with 1800 x 1440 resolution, up to 80Hz refresh rate and .22mm horizontal dot pitch.

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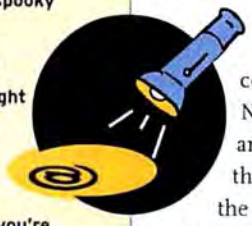
Where to Buy

SPY GADGETS

www.spystuff.com/main.html

You're not paranoid if they really are out to get you. At Spy Stuff get them first with spooky gear like a Mini Bug Detector, Telephone Nullifier, Russian Night Vision Goggles, and the all-important Dark Invader Night Surveillance. When you're done, link to counterterrorism organizations and check your medication. —*M.C.*



zoomable cover shots helped me pinpoint my eventual choice, the best-selling novel *Cold Mountain*. I was particularly impressed with the Compare Prices button—it gave me costs from Books.com, Amazon.com, and Barnesandnoble.com (discounts are about equal among the three). Best of all, the customer service was both prompt and courteous, even though the answer to my e-mail question was obvious. Just one complaint: The order page is confusing and could use step-by-step organization. Otherwise, shopping at Books.com is a simple pleasure.

Borders.com

www.borders.com

PRO: Wide selection of books, CDs, and videos; good prices

CON: Clunky site design

Breadth without depth is the specialty of Borders.com, as it is at the company's retail stores. Given the site's 10 million books, CDs, and videos (books are in 29 subject areas, plus subcategories), I found everything I was looking for. But when I wanted to know more about a particular book, I was on my own: Most reviews and cover images are reserved for "big" titles. When I asked how to find more reviews, customer service responded to my e-mail within a day; unfortunately, the answer was 'search the Web'. Luckily, I knew what I wanted (a novel entitled *Breath, Eyes, Memory*) and ordered it on the idiot-proof order page. Prices are competitive with those of other Web shops, and the return policy is generous. Although the site's content can be somewhat clunky, its numerous recommendations—such as the quirky selections of books on the Essentials list—help make up for that shortcoming.

WordsWorth Books

www.wordsworth.com

PRO: Independent bookstore offers personalized, responsive customer service

CON: Sparse information about backlist titles

If, like me, you're inclined to shop at independent bookstores, the Web site of WordsWorth Books of Cambridge, Massachusetts, is a winner. Its online presence mirrors the real-world store: pleasant and thorough. The site isn't hip, but it'll get you where you want to go, in my case, to a memoir by Elizabeth Wurtzel. I got about the same discount for this best-seller as the other sites offered, though a less-requested backlist title cost more here than it did elsewhere. As with most independents, customer service is key: You can return books within 30 days and sign up for handy services like gift registry (the store e-mails you reminders of upcoming birthdays and anniversaries), and among the sites reviewed, WordsWorth is likely to give you the fastest and most personal response to queries. For friendly service and competitive prices, WordsWorth's worth it.

Where to Buy

COOL SHADES

www.peepsun.com

Peepers Sunglasses discounts your favorite shades by as much as 50 percent off retail. Search by brand, company, or even celebrity (Tom Cruise wore a pair of Arnette Ravens in *Jerry McGuire*). Close Outs discounts are offered on many brand names. Cheeper Peepers delivers knockoffs starting at ten smackers! Now *that's* cool! —*M.C.*

BookServe.com

www.bookserve.com

PRO: Short, no-nonsense descriptions of titles; great prices

CON: Some titles have no product info

It's a dirty secret: I bought a Tom Clancy novel. It was a gift for my dad, but my literary friends would be shocked. I popped onto BookServe.com, clicked through its manly-looking pages, bought the book for 40 percent off, and had it sent to my dad, without having to face some snooty clerk. I didn't get a highfalutin description of my book, just a synopsis, but I did get many titles to choose from, including nearly every domestic book in print, plus over a million international tomes. I vaulted through the step-by-step order page and got my book in about a week. The conspiracy theorist in me loved the site's prominent security policy. Clancy would be proud.

Michael S. Lasky and Karen Silver are senior associate editors for PC World*; James A. Martin is a* PC World *contributing editor; Leslie Crawford and Gina Preciado are San Francisco–based freelance writers. Michael Cahlin is a freelance technology writer based in Los Angeles.* ■

WAIT! THERE'S MORE ONLINE. Find the full text of this article with all noted sites in live hyperlinks on PC World Online (www.pcworld.com/nov98/shopping). As a bonus, help yourself to the online-exclusive Web-savvy shopping tips.

convergence

DEFINED BY SONY, REFINED FOR YOU.

convergence:

VAIO WORLD™

The products that make up VAIO World feature state-of-the-art AV/IT convergence capabilities. Individually, they work exceptionally well. Connected, they enable you to do so much more.

Digital Mavica® Camera

200-Disc MegaStorage™ CD Changer

Digital Handycam® Camcorder

VAIO Digital Studio PC & 17" Trinitron® Multimedia Display (16.0" viewable image size)

50" Wide-Aspect LCD Rear Projection Display (49.1" viewable image size)

36" FD Trinitron® XBR® Television

enter VAIO WORLD

www.sony.com/vaioworld

AN EMPOWERING BLEND OF AUDIO, VIDEO AND INFORMATION TECHNOLOGIES.

Convergence starts with our world-class consumer electronics products and a vision of video-audio integrated operation (VAIO®). The introduction of our distinctively styled VAIO computer products brought us a giant step closer. Now, with the combination of Sony original software, i.LINK™ (IEEE-1394) interface, S-Link™ technology (Control-A1) and digital AV products, you can enjoy the benefits of AV/IT convergence firsthand.

You can experience VAIO World.

See how selected Sony products work together to enable exciting new possibilities. Now you can easily edit digital video right on your desktop, manage your CD collection, edit MiniDiscs, add voice messages to your e-mail and more.

Convergence makes things simpler. More fun. More enriching. And as the only company that has fully converged AV/IT products today, Sony is Defining the Digital Future.™

MD Recording Deck with PC Editing

VAIO Notebook Computer

Portable MiniDisc Player/Recorder

VAIO 505 SuperSlim Notebook

MiniDisc Receiver

D-WAVE Zuma™ Digital Phone

Portable IC Chip Recorder

SONY®

convergence:

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CPD-201VS

PCV-E308DS

DCR-TRV9

If you want to create home videos people will really enjoy, just use a DCR-TRV9 and edit them with our exclusive DVgate Motion software and a PCV-E308DS VAIO Digital Studio PC. Sony's AV/IT convergence gives you a complete, easy-to-use digital video editing solution.

A SOPHISTICATED DIGITAL VIDEO EDITING SOLUTION FOR THE HOME.

"Nonlinear digital video editing" sounds complicated. But thanks to Sony's AV/IT convergence, it's really easy and fun. You get impressive results the first time and every time.

Sony's DVgate™ Motion digital video editing software (included with your VAIO Digital Studio PC) provides an easy-to-use interface from which to control a Sony Digital Handycam® camcorder. It lets you preview digital video on your computer display with onscreen Play, Pause, Fast Forward, Rewind and Stop buttons. Select the best parts of your video by marking the in and out points. Then, click "Capture." DVgate Motion will automatically transfer them to your Sony PCV-E308DS VAIO Digital Studio™ hard drive as a complete, edited movie. Using Adobe® Premiere® LE (included with the VAIO Digital Studio system), you can also select and transfer clips individually to apply spectacular effects.

Sony's DV software codec and i.LINK (IEEE-1394) interface, an amazingly fast connection between the Digital Handycam camcorder and the VAIO Digital Studio PC, let you quickly transfer full-motion video with no loss in quality. In fact, you can download up to 25 MB of razor-sharp digital video in a matter of seconds!

With the Sony DCR-TRV9 Digital Handycam camcorder and the PCV-E308DS VAIO Digital Studio PC, you have everything you need to effortlessly create entertaining videos you, your family and your friends can enjoy.

Sony's 200 MB HiFD floppy disk drive is ideal for archiving up to 20 minutes' worth of full-motion MPEG-1 video.

The Sony DCR-TRV9 Digital Handycam camcorder is easy to use and produces stunning, high-quality digital video. The PCV-E308DS provides the power and an enormous 13.6 GB hard drive that gives you lots of space to be creative with your work. It also processes MPEG-1 video. So, if you want to archive compressed versions of your videos, just add a Sony HiFD™ floppy disk drive. Its 200 MB HiFD media easily stores up to 20 minutes of full-motion video. You can also transfer your videos back to DV tape via i.LINK (IEEE-1394) cable for pristine viewing in their original format or transfer them to VHS for sharing with friends.

Sony's DVgate™ Motion editing software makes it easy to transfer and edit in high-quality digital video.

Sony's innovative video and IT products give you all the necessary elements to bring professional-style editing capabilities into your living room, your family room and your life. And that's just one way Sony defines AV/IT convergence.

KV-36XBR200

convergence: A COMPLETE DIGITAL IMAGING SUITE THAT GOES WHEREVER YOU GO.

Sony's MVC-FD81 Digital Mavica® Camera and PCG-818 VAIO® Notebook Computer help you easily add images to presentations for greater impact. Even better, they're highly portable, so you can work and create wherever you happen to be.

Sony PictureGear™ photo management software, available on all VAIO computers, saves time, enables creative effects and helps you organize your images the way you think of them: visually. Select a folder and PictureGear software will show you thumbnails of each image file. You can also print floppy disk, CD, MD and DV tape labels with pictures and text so you can instantly identify what you've stored.

With PictureGear 2.5 software (available with the PCG-818 VAIO Notebook) you can even create a seamless panorama from a series of overlapping shots, automatically.

The Sony MVC-FD81 Digital Mavica Camera is as easy as a floppy to use with PictureGear software. It uses inexpensive, readily available 3.5" floppy disks to store your digital images so you don't need cables or PC card readers to transfer them to your computer. And for added versatility, it also captures short MPEG-1 videos that can be used in multimedia presentations to grab and hold your audience's attention.

The PCG-818 VAIO Notebook with DVD movie playback, a large, 13.3" XGA active-matrix screen, 2X battery life* and the maximum mobility afforded by its light weight (less than 6 lbs.) and slim design (less than 1.75" thin), make it stand out as a stand-alone digital imaging system.

The Digital Mavica Camera and the PCG-818 VAIO Notebook give you simplicity, power and freedom. They're another example of what AV/IT convergence is all about.

*using optional second battery in removable drive bay.

PCG-818

MVC-FD81

Sony's PictureGear software helps you organize all of your digital images.

www.sony.com/vaioworld

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convergence:

THE ABILITY TO BE HEARD AROUND THE WORLD.

You never know where or when a big idea will come to you. But with the Sony ICD-70 IC Chip Recorder and the PCG-748 VAIO® Notebook Computer, you can capture it as fast as you can say it, store it for future reference, then e-mail it to anyone on the Internet.*

The ICD-70 makes commute time and downtime productive time! The supplied WAV LINK software lets you download your recorded messages to your PCG-748 as sound files. You can then attach them to e-mail, add some text and eliminate a whole lot of typing and transcribing!

The lightweight ICD-70 gives you up to 24 minutes of recording time and lets you access any message in any file so you can easily manage your dictations and reminders. Digital Voice-Operated Recording (VOR) helps conserve recording time.

The PCG-748 provides ample value for business applications—a large, 13" HPA screen with XGA resolution, 2X battery life,** light weight and a slim profile (6 lbs. and 1.9" thin). It also includes a V.90 compatible data/fax modem for high-speed Internet connectivity.

Sony AV/IT convergence at work—redefining "freedom of speech."

*Turn drive time into productive time with the Sony ICD-70! Record your thoughts, then use the Sony PCG-748 VAIO Notebook to e-mail them to others on the Internet.**

* Internet access requires Internet service provider.

** Using optional second battery in removable drive bay.

convergence:

The Sony CDP-CX260 200-Disc MegaStorage™ CD Changer puts your favorite CDs at your fingertips. A Sony MDS-PC1 MD Recording Deck can capture your music in all of its digital glory. And a Sony MZ-R50 Portable MiniDisc Player/Recorder frees your music from the confines of your home so you can enjoy it anywhere.

But how do you keep track of all that music, edit your favorites on MiniDisc and still have time to listen to it?

The answer is Sony AV/IT convergence.

Sony Digital Media Park™ software helps you build a database of your entire CD music collection so you can find your favorite tracks instantly. It lets you enter artists' names and song titles with the computer's keyboard for faster, easier cataloging. It also updates the tables of contents of your existing MiniDisc recordings!

Making new MD mixes with Digital Media Park software is also very easy. Just select the titles and tracks you want to record, arrange them in the proper order and click "Record." Sony AV/IT convergence does the rest automatically!

S-Link™ technology (Control-A1) allows compatible Sony home electronics* to easily share data and communicate intelligently. It's the link that turns your VAIO Digital Studio™ PC into an easy-to-use, "drag-and-drop" interface for managing MiniDisc recording and cataloging the contents of the 200 CDs in your MegaStorage CD changer.

S-Link technology (Control-A1) and the optical digital audio output (shown above) make it simple to record music digitally.

The optical digital audio output enables your Sony CD player,

Get more enjoyment out of your music. Experience Sony AV/IT convergence and the simplicity of Sony S-Link technology (Control-A1) and Optical Digital Audio Out.

THE POWER TO MASTER YOUR MUSIC.

MiniDisc Player/Recorder and PCV-E302DS VAIO Digital Studio PC to transfer music with virtually no loss in sound quality. So, you can record music from CDs, MiniDiscs and the Internet.**

Of course, the Sony VAIO Digital Studio PC is much more than a convenient interface for an all-digital recording studio. Its i.LINK™ (IEEE-1394) interface and pre-installed Sony DVgate™ Motion digital video editing software enable high-quality digital video editing right in your own home. Plus it features outstanding graphics, audio and a fast 5X DVD-ROM/24X CD-ROM (max. performance) drive.

Because of the way Sony's defined AV/IT convergence, you can spend less time finding your favorite songs and more time enjoying them on custom MiniDiscs you've edited yourself.

Sony's exclusive Digital Media Park software makes mixing and recording your own MiniDiscs as easy as "point" and "click."

CPD-204VS

PCV-E302DS

MZ-R50

*Features available on selected models only—please see www.sony.com/vaioworld for compatibility list.
**Always observe applicable copyright laws. Internet access requires an Internet service provider.

convergence: THE CAPABILITY TO FREEZE THE ACTION.

With an ordinary camera, it's easy to miss the perfect shot. They go by so quickly!

Fortunately, Sony AV/IT convergence will change the way you think of photography. Rather than hoping you'll press the shutter button precisely when the perfect moment occurs, shoot some digital video with a Digital Handycam® camcorder instead.

Then, using a VAIO 505FX SuperSlim Notebook Computer with i.LINK™ (IEEE-1394) interface and Sony DVgate™ Still software, you can instantly select your favorite shot or shots from a continuous stream of crystal-clear digital video, then delete the rest. And because it's full-motion digital video, you can capture action at rates up to 30 fps—much faster than you could click a shutter!—virtually guaranteeing that nothing will escape your lens.

The combination of the ultra-compact DCR-PC1 Digital Handycam camcorder, which weighs less than a pound, and the VAIO 505FX SuperSlim Notebook completes an extremely portable digital imaging solution. The VAIO 505FX Notebook weighs just under 3 lbs. and measures less than 1" thin. But it's loaded with DVgate Still software—also available on VAIO Notebooks and Digital Studio Computers with i.LINK (IEEE-1394) interface—to give you instant, out-of-the-box digital imaging capabilities.

At Sony, we're not just defining AV/IT convergence, we're redefining photography.

The Sony VAIO 505FX SuperSlim Notebook includes Sony DVgate Still software and a high-speed i.LINK (IEEE-1394) interface to create a complete digital imaging solution.

PCG-505FX

DCR-PC1

If you're looking for an extremely portable digital imaging/digital video solution, you can't beat the passport-size Sony DCR-PC1 Digital Handycam camcorder with Carl Zeiss lens block and the VAIO 505FX SuperSlim Notebook Computer.

www.sony.com/vaioworld

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convergence: ENHANCED PERFORMANCE FOR VIDEO.

Video is a critical part of the multimedia experience. Yet, its optimal monitor settings don't match those of standard applications.

The Sony CPD-201VS VAIO® Multimedia Display with IntelliLight™ technology and a compatible VAIO Computer let you watch a video clip or a DVD movie in a window optimized for video while simultaneously displaying Internet pages or other applications.

IntelliLight-compatible VAIO Computers recognize the CPD-201VS and automatically enable this feature. When you watch a movie, IntelliLight instantly adjusts the video area to the optimal settings—no buttons to push, no knobs to tweak. The CPD-201VS also provides twin, integrated stereo speakers and a microphone to complete the AV solution.

Let IntelliLight technology, a compatible VAIO Computer and the CPD-201VS define AV/IT convergence right on your desktop.

"The Fifth Element"
©1997 Gaumont
All Rights Reserved
Courtesy Columbia Pictures

When a compatible Sony VAIO Computer and a CPD-201VS display converge, you get IntelliLight—a technology that lets you view video and standard applications, each optimized in their own windows.

CPD-201VS

PCV-E302DS

EXPERIENCE SONY AV/IT CONVERGENCE TODAY!

At Sony, AV/IT convergence is real and available right now. To see how AV/IT convergence is enabling new possibilities, making things easier and more fun and defining the 21st century lifestyle, point your browser to **www.sony.com/vaioworld.**

SONY

SONY

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San Jose, CA 95134
www.sony.com/vaioworld

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PC WORLD

TOP 100

188 Power Desktops

202 Budget Desktops

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227 Modems

A HUGE INFLUX OF NEW SYSTEMS MARCHED onto our *Top 20 Power Desktops* chart this month, all but one of them powered by Intel's new Pentium II-450 processor. While their performance is remarkable—they're about 6 percent faster than an average PII-400 system—their prices are the real surprise. Not one is priced ▶

PII-450 Prices Lower Than You'd Expect

Edited by Andrew Brandt and Grace Aquino

MAXIMUM POWER: The new Millennia 450 Max from Micron breaks all PC WorldBench 98 speed records for systems running Windows 9x.

PHOTOGRAPH: MARC SIMON ICONS: JEFFREY PELO

as much as $3000, and the least expensive, Acma's ZPower 6450 PII-450, is only $2395. At last, the annoying pattern of charging exorbitant prices for the latest CPU appears to be dead.

A year ago, a Micron Millennia XKU 300 with the then-new PII-300 chip had a stratospheric price tag of over $4000, and a Gateway G6 300XL with the same CPU was $3799. Both the Micron and Gateway came loaded with high-end graphics and speakers and the latest 19-inch monitors. Meanwhile, PCs with the slightly older PII-266 chip and less eye-opening configurations averaged around $2800.

Today, vendors throw the latest power processor into all kinds of configurations and keep the price as low as possible. Dell's Dimension XPS R400 and R450, for example, both cost $2579, though one's a PII-400 and the other a PII-450. The difference? The slower PC has a 19-inch monitor and 64MB of RAM, while the PII-450 PC has a 17-inch monitor and 128MB of RAM. It comes out nearly a wash on the configurations (and memory is dirt cheap these days). But picking the right PC isn't getting any easier.

CELERON PRICES GET WACKY

THE PII-450 isn't the only new chip to hit our charts. Three new 333-MHz PCs with Intel's redesigned Celeron processor (from Compaq, Dell, and Unicent) land in the budget category. The Celeron-333 chip sports 128KB of secondary cache (a feature earlier Celerons lacked, crippling their performance).

The Unicent Avanta E333 is a typical Celeron system in terms of configuration. It includes a 15-inch monitor, a 4.3GB hard drive, a 56-kbps modem, and a 12X–24X CD-ROM drive. But it costs just $999—a bargain given that Intel is targeting the Celeron-333 chip for machines that are priced at about $1200 (without a monitor). The prices of Compaq's and Dell's Celeron systems, in contrast, approach $2000, nearly $1000 above the E333's cost.

It may appear at first that this new bargain chip has taken over the role of the high-priced neophyte. But Intel claims that costly Celeron PCs aren't the wave of the future. "[Dell's and Compaq's pricing] is definitely on the high end," an Intel spokesperson tells us. "They tried to put together a Rolls-Royce."

Dell and Compaq justify their higher prices with lots of extras. Dell's Dimension V333c, for instance, has a far better configuration than the sub-$1000 Avanta E333. The same goes for Compaq's Deskpro EP C333, though it owes its higher price mainly to its specialized corporate design.

A CELERON PARAGON, the Dell Dimension V333c is more expensive than expected because of its top-notch configuration.

Given Celeron's tortoise-like track record, it's fair to ask whether the Celeron-333 is worth an $850 premium, even with extras. In this case Intel may have found the right balance of performance and economy. The Celeron-333 systems earned PC WorldBench 98 scores on a par with Pentium II-333s—a far cry from the dog-tired speeds of cacheless Celeron systems, some of which scored around 129. Compaq's Deskpro had the highest score at 176, which is a bit faster than the average of 172 for all PII-333 PCs we've tested.

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. System charts are divided by price. Power desktops cost $2000 or more; power notebooks cost $2750 or more. We compare new products to previously reviewed hardware, updating the charts to reflect price cuts and other changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 80s is among the best and one in the 70s above average.

What does the PC WorldBench 98 score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Gateway PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of *PC World* readers and anonymous support calls made by *PC World* staff. The policies score is based on vendor support policies.

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For instance, we score the performance of Windows NT PCs separately from that of Windows 95 machines. (Based on our PC WorldBench 98 tests, Windows NT machines are faster on average than Win 95 PCs.)

Check out *PC World*'s Top 400 reviews online. Go to PC World Online (www.pcworld.com/top400) to explore our Top 400, which provides comprehensive reviews and ratings for products in 16 categories. You'll also find reviews not available in print.

Although Celeron-333 and -300A CPUs contain a quarter of the secondary cache of Pentium II processors, the cache in these new Celerons runs quicker, approaching Pentium II–like speed. For more on the Celeron-333, see our October *Top of the News* story, "Double Feature," page 54.

POWER SYSTEMS BLITZ THE CHART

OF THE SIX NEW PII-450s that staked claims on the Power Desktops chart this month, two—a Dell and a Micron—became Best Buys. Our second-place power system, Micron's Millennia 450 Max, is more computer than its $2599 price tag indicates. It's also the first PC we've seen with Diamond Multimedia's new, powerful 16MB Viper V550 graphics board.

Three corporate powerhouse PCs also reach Best Buy territory on the power chart. Dell's OptiPlex GX1 400 and Micron's ClientPro 400 are highly manageable corporate PCs that run Windows NT 4.0. Compaq's Deskpro EP 6400X features a component set similar to those of the OptiPlex and ClientPro, but it also has a reconfigurable desktop case.

SHORTCUT GLUT

IT'S COMMON KNOWLEDGE that some hardware vendors keep prices low by using inferior components. But you also have to watch for what PC makers leave out.

For instance, many low-cost PCs with DVD-ROM drives ship with software decoders instead of hardware MPEG-2 decoder cards. Software decoding works okay on powerful PCs (a PII-350 or higher), but video playback almost always gets choppy if you do anything else simultaneously.

Take the $1599 DVD-equipped MicroFlex B2400 from Micro Express, sixth on our budget chart. It seems like a great deal, but it lacks a hardware decoder (typically $100). To obtain smooth DVD playback, you'll have to purchase an add-on decoder card—and run the risk of compatibility problems.

Another cost-cutting example involves integrated graphics and sound adapters. Integrated parts aren't inherently bad, but at upgrade time you'll likely have to buy a new card. On the budget chart, NextPC's 19th-place N6-350 PII 350 integrates both video and audio onto the motherboard.

Software MPEG decoders for DVD video will work okay on powerful PCs, but video playback almost always gets choppy if you try to do anything else while the movie is playing.

A STAND-UP PC: The highly stylized Rock City ST-300/2 is more than just a good-looking cube. This flashy system tested 7 percent faster than the average PII-300 PC.

CRASHED UFO OR NEW PC?

IF SCIENCE FICTION author Arthur C. Clarke, creator of *2001: A Space Odyssey,* had been asked to design a new PC, he might have come up with the new Rock City ST-300/2 from The Panda Project. This new $1154 system, a pure black cube made of brushed aluminum, resembles an alien artifact at first glance. The Rock City makes its debut this month in our *Top 10 Home PCs* chart. Designed to rest with one corner of the cube pointing down, the PC also comes with a wireless keyboard and mouse, a slim 15-inch monitor, and a 12X–32X CD-ROM drive.

But this system isn't all good looks. It posted a competitive PC WorldBench 98 score of 168—slightly faster than the small-business–oriented K6-2-300 systems from Micro Express and other companies, and a good 7 percent faster than the average of PII-300 PCs we've tested. And its price is about $200 lower than those of the same PII-300 systems. At this price, the Rock City might even give Apple's IMac a run for its money. One caveat: Because The Panda Project is new to our charts, we have no data on the quality of its systems or support. We'll report our findings in the coming months.

Andrew Brandt is an associate editor and Grace Aquino a staff editor for PC World. *Senior Associate Editors Vince Bielski, Bryan Hastings, and Karen Silver; Associate Editors Michelle Campanale and Cameron Heffernan; Assistant Editor Mick Lockey; Editorial Assistant Kalai Murugesan; and freelance writers Nancy Canning, James A. Martin, Gordon Meyer, and JoAnne Robb contributed to the* Top 100. *Testing was performed by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, Nancy Miller, and Mike Salayko of the PC World Test Center. See page 14 for contact information.*

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEM	Last month	Month tested	Street price (8/17/98)	CPU	Comments
1	Dell Dimension XPS R450 800/388-8542 www.dell.com	n/a	NEW	$2579	Pentium II-450	Strong performer boasts high system reliability score and very good features.
2	Micron Millennia 450 Max 888/634-8799 www.micronpc.com	n/a	NEW	$2599	Pentium II-450	Fastest Win 98 PII-450 on chart; sibling Millennia 400 is also a good deal.
3	Dell OptiPlex GX1 400 800/388-8542 www.dell.com	7	Aug 98	$2704	Pentium II-400	Powerful corporate desktop sheds $180; modular design makes upgrades easy.
4	Micron ClientPro 400 888/634-8799 www.micronpc.com	12	Oct 98	$2299	Pentium II-400	$524 price drop boosts network-ready Windows NT system up the chart.
5	Compaq Deskpro EP 6400X 800/345-1518 www.compaq.com	8	July 98	$2250	Pentium II-400	Price of corporate speedster with convertible case has been slashed by $311.
6	Quantex QP6/400 SM-4x 800/896-4898 www.quantex.com	n/a	Sept 98	$2199	Pentium II-400	Affordable PII-400 includes 19-inch monitor, great phone support policies.
7	Gateway GP6-400 800/846-2000 www.gateway.com	2	retested	$2783	Pentium II-400	Retested with Win 98; has network card and Iomega Zip drive.
8	NEC Direction SP B400 888/863-2669 www.necnow.com	6	Aug 98	$2704	Pentium II-400	Fast system gets new 19-inch monitor and upgraded hard drive; price jumps $457.
9	Acma ZPower 6450 PII-450 800/786-6888 www.acma.com	n/a	NEW	$2395	Pentium II-450	Second-fastest Windows 98 system on chart features top-notch graphics card.
10	Compaq Deskpro EP 6450 800/345-1518 www.compaq.com	n/a	NEW	$2675	Pentium II-450	Corporate powerhouse is pricey but includes Iomega Zip drive.
11	Quantex QP6/400 SM-4x SE 800/896-4898 www.quantex.com	11	Oct 98	$2499	Pentium II-400	Loaded PII-400 has 19-inch monitor, DVD-ROM and Zip drives, 128MB of RAM.
12	HP Vectra VL Series 8 800/322-4772 www.hp.com	15	July 98	$2750	Pentium II-400	New reliability and service scores are good despite HP's subpar support policies.
13	IBM PC 300PL 800/426-7255 ext. 4750 www.ibm.com	9	Oct 98	$2798	Pentium II-400	Pricey, managed desktop PC with good support quality has cramped interior.
14	CompUSA PII-450 888/226-6772 www.compusa.com	n/a	NEW	$2499	Pentium II-450	PII-450 comes with high-end 3D graphics and audio.
15	Gateway E-4200 400 800/846-2000 www.gateway.com	14	Sept 98	$2823	Pentium II-400	Costly corporate PC includes ethernet card and modem but is slow for a PII-400.
16	PowerSpec PS-6331 PII-400 888/480-3353 www.powerspec.com	n/a	NEW	$2168	Pentium II-400	Cost-conscious PII-400 has high-end graphics and sound hardware.
17	MidWest Micro Office Pro 400 800/728-8582 www.mwmicro.com	16	Oct 98	$2609	Pentium II-400	Office system sheds $160, includes SuperDisk drive; subpar graphics and speakers.
18	NEC PowerMate 8000 888/863-2669 www.necnow.com	n/a	May 98	$2297	Pentium II-333	Aging PII-333 offers ethernet card, outstanding system reliability.
19	HP Vectra VL Series 8 HE 800/322-4772 www.hp.com	n/a	NEW	$2890	Pentium II-450	High End series is the most expensive, multimedia-savvy of HP's corporate PC line.
20	CyberMax PowerMax H3 800/437-4596 www.cybermaxpc.com	19	Aug 98	$2099	Pentium II-333	3D graphics powerhouse comes with 128MB of RAM.

Best Buy

See features chart, page 190; test report, page 194.

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100" on page 186.

[2] For more information about all products in this table, select InfoNet no. 905 or visit www.pcworld.com/infonet.

THE FIRST WAVE OF PII-450 systems takes over the Power Desktops chart this month. Leading the charge is Dell's $2579 Dimension XPS R450, followed closely by Micron's $2599 Millennia 450 Max. The Micron's outstanding PII-450 performance was enhanced by Diamond Multimedia's high-end Viper V550 graphics board with 16MB of video memory. The Millennia 450 Max also has a huge 14.4GB hard drive and a second-generation DVD-ROM player. The only new power system that didn't make the chart was Kingdom's $2597 Pinnacle 400 DVD. This machine earned a below-average PC WorldBench 98 score of 197 yet costs nearly the same as Dell's and Micron's speedier, better-equipped systems.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Performance [1]	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	InfoNet number [2]
87	212/Win 98	outstanding	very good	good	expensive	good/outstanding	651
86	218/Win 98	outstanding	very good	good	expensive	good/outstanding	652
85	244/Win NT 4.0	very good	very good	good	expensive	good/outstanding	653
85	228/Win NT 4.0	good	very good	good	average	good/outstanding	654
85	200/Win 95	very good	very good	good	average	fair/outstanding	655
83	199/Win 95	good	outstanding	[3]	inexpensive	fair [4]/outstanding	656
83	203/Win 98	very good	outstanding	good	expensive	fair/outstanding	657
83	207/Win 95	very good	very good	outstanding	expensive	fair [4]/good	658
83	217/Win 98	outstanding	good	[3]	average	good [4]/outstanding	659
82	214/Win 98	outstanding	good	good	expensive	fair/outstanding	660
82	200/Win 95	very good	outstanding	[3]	average	fair [4]/outstanding	661
80	207/Win 95	very good	very good	good	expensive	good/poor	662
80	207/Win 95	very good	very good	fair	expensive	good/good	–
80	203/Win 98	very good	very good	[3]	average	poor [4]/fair	663
80	190/Win 95	good	very good	good	very expensive	fair/outstanding	664
79	202/Win 98	very good	very good	[3]	inexpensive	[3]/good	665
78	199/Win 95	good	very good	[3]	expensive	good [4]/good	666
77	175/Win 95	satisfactory	very good	outstanding	average	fair [4]/good	667
77	216/Win 98	outstanding	good	good	very expensive	good/poor	668
77	171/Win 95	satisfactory	very good	[3]	inexpensive	good [4]/outstanding	669
Scorecard weightings ▶		Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

[1] Insufficient data to give a rating.

[2] Scores were derived from anonymous support-quality calls due to insufficient data from survey.

This Month's Best Buys

1 DELL DIMENSION XPS R450

PRO: Excellent performance and very good features, including high-quality DVD playback

CON: A bit slower than Micron Millennia 450 Max

If you're venturing away from the corporate fold, Dell's latest Windows 98 midtower is a terrific choice. It's relatively pricey at $2579, but its speed, great multimedia features, and good reliability and support make it one of our top choices for a small or home office, especially for power seekers.

This Dimension sports the fastest processor currently available, the 450-MHz Pentium II, and it shows: The R450 slung bloatware like Microsoft Word and Internet Explorer up on the screen almost instantly, chalking up an outstanding PC WorldBench 98 score of 212. You also get a 10GB hard drive (plenty of space to store bulky files) and an Iomega Zip drive.

Multimedia capability is one of this system's strengths. DVD video played as smooth as silk, thanks to its MPEG-2 decoder board, substantial 128MB of RAM, and 17-inch Trinitron monitor. Even with half a dozen apps churning in the background, playback was flawless. The bundled Altec Lansing ACS295 speaker-subwoofer combo was surprisingly thin on bass, but the sound was still powerful and crisp, and the tone was as clear as a bell. Just make sure you have enough room under your desk—the subwoofer is the size of a small microwave oven.

Dell Dimension XPS R450

Besides price, the only nit we have to pick is with the system's x2-standard 56-kbps modem. Dell needs to get on the stick and upgrade its bundled modems to the global V.90 56-kbps standard, which has been around for nearly eight months. But for the record, none of the Best Buys on the power chart offer V.90 support. In every other respect, the Dimension XPS R450 is a well-built system. It comes with well-written manuals, and Dell backs it with a support policy that includes around-the-clock telephone support. Our readers rate Dell system reliability and support service as good.

2 MICRON MILLENNIA 450 MAX

PRO: Excellent performance; includes DVD-ROM drive, good software bundle; good track record in reliability and service

CON: No MPEG-2 decoder card; so-so audio

Our number two power desktops Best Buy this month, Micron's Millennia 450 Max, breaks all previous PC WorldBench 98 records for Windows 9x systems. Its score of 218—combined with an attractive configuration and a large bundle of business and productivity applications—helped the $2599 Millennia 450 Max surge to second place in its first month on the market. Pushing aside its $2274 Millennia 400 sibling ▶

TOP 20 POWER DESKTOPS

STANDARD FEATURES

	SYSTEM	CPU	Operating system	RAM (MB)	Second-ary cache (KB)	Hard drive (GB)	Graphics adapter (AGP)	Video RAM (MB/type)	Monitor tube/ viewable diag-onal (inches)	Modem speed (kbps)
1	Dell Dimension XPS R450*	Pentium II-450	Windows 98	128	512	10	STB Velocity 128zx	4/SGRAM	17/15.8	56 [2]
2	Micron Millennia 450 Max*	Pentium II-450	Windows 98	64	512	14.4	Diamond Viper V550	16/SGRAM	17/15.9	56 [2]
3	Dell OptiPlex GX1 400*	Pentium II-400	Windows NT 4.0	64	512	6.4	integrated ATI 3D Rage Pro	8/SGRAM	17/15.9	not included
4	Micron ClientPro 400*	Pentium II-400	Windows NT 4.0	128	512	6.4	Diamond Viper V330	4/SGRAM	17/16	not included
5	Compaq Deskpro EP 6400X*	Pentium II-400	Windows 95	64	512	6.4	Diamond Viper V330	4/SGRAM	17/16	56 [2]
6	Quantex QP6/400 SM-4x	Pentium II-400	Windows 95	64	512	11	Real 3D StarFighter AGP	8/SGRAM	19/18	56 [4]
7	Gateway GP6-400	Pentium II-400	Windows 98	128	512	14.4	STB Velocity 128	8/SGRAM	19/18	not included
8	NEC Direction SP B400	Pentium II-400	Windows 95	64	512	14.4	Diamond Viper V330	4/SGRAM	19/18	56 [2]
9	Acma ZPower 6450 PII-450	Pentium II-450	Windows 98	128	512	9.1	Real 3D StarFighter AGP	8/SGRAM	17/16.1	56 [5]
10	Compaq Deskpro EP 6450	Pentium II-450	Windows 98	64	512	10	Matrox Millennium G200	8/SGRAM	17/16	56 [4]
11	Quantex QP6/400 SM-4x SE	Pentium II-400	Windows 95	128	512	11	Real 3D StarFighter AGP	8/SGRAM	19/18	56 [4]
12	HP Vectra VL Series 8	Pentium II-400	Windows 95	64	512	10	Matrox Productiva G100	4/SGRAM	17/15.9	not included
13	IBM PC 300PL	Pentium II-400	Windows 95	64	512	9.1	Matrox Millennium II	8/WRAM	17/15.7	not included
14	CompUSA PII-450	Pentium II-450	Windows 98	64	512	9	Real 3D StarFighter AGP	8/SGRAM	19/17.6	56 [4]
15	Gateway E-4200 400	Pentium II-400	Windows 95	128	512	10	integrated ATI 3D Rage Pro	8/SGRAM	19/17.9	56 [2]
16	PowerSpec PS-6331 PII-400	Pentium II-400	Windows 98	128	512	11.5	3DLabs PM200A	8/SGRAM	17/16	56 [4]
17	MidWest Micro Office Pro 400	Pentium II-400	Windows 95	128	512	14.4	ATI Xpert@Play	8/SGRAM	17/15.7	56 [4]
18	NEC PowerMate 8000	Pentium II-333	Windows 95	64	512	6.4	integrated ATI 3D Rage Pro	8/SGRAM	17/16	not included
19	HP Vectra VL Series 8 HE	Pentium II-450	Windows 98	64	512	10.1	integrated Matrox G200	8/SGRAM	17/16	not included
20	CyberMax PowerMax H3	Pentium II-333	Windows 95	128	512	8.4	STB GLyderMax-2	8/SGRAM	19/18	56 [4]

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.

[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

[3] Five years on CPU and main RAM, three years on other parts.

(last month's number one Best Buy), the 450 Max has multimedia power to please even the most serious business user.

With so much going for the 450 Max, it's hard to complain about the few components that don't quite measure up. For example, Micron made some trade-offs in the sound subsystem. The integrated Crystal sound chip lacks an on-board wavetable, and as for the tinny Advent AV009 speakers, we heard so much muffling that we thought we were in a Midas shop.

Micron Millennia 450 Max

For business applications, the crisp 17-inch Micron 700VX monitor gives the Millennia a wide workspace. The PC also includes the new Diamond Viper V550 AGP graphics adapter, which we'll review in December *Top 10 Graphics Boards*.

But when it came to playing DVD video, the display didn't impress us as much. The picture on the monitor was simply too dark, even after we boosted the brightness setting. And though the system includes a DVD-ROM drive, the absence of an MPEG-2 decoder card (Micron includes a software decoder) means the CPU is grounded while you watch a video.

An appealing departure from the Beige Box Syndrome, the stylish 450 Max is backed by Micron's first-rate 24-hour tech support. Our readers also like the reliability of Micron PCs.

Dell OptiPlex GX1 400

3 DELL OPTIPLEX GX1 400

PRO: Attractively designed corporate system, easy access to interior, excellent monitor

CON: Relatively expensive

The Dell OptiPlex GX1 400 isn't perfect, but it's the top corporate PC on our Power Desktops chart, and a $180 price cut moves the highly manageable system up to third place. This zippy $2704 midtower NT machine features integrated remote management hardware, an easy-access interior, and a faster-than-average PC WorldBench 98 score of 244. Dell's good reliability and service scores make the OptiPlex GX1 400 a great addition to any corporate IS manager's shopping list.

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style[1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
2X DVD-ROM	Turtle Beach Montego	midtower	768	2	2/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	integrated Crystal Audio	midtower	384	1	3/1	4	varies[3]/1	24	Sat., Sun.	BBS, CIS, WWW
14X-32X	integrated Yamaha OPL3	midtower	384	2	2/1	7	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
20X-32X	integrated Crystal Audio	midtower	384	2	3/1	4	varies[3]/1	24	Sat., Sun.	BBS, CIS, WWW
12X-24X	integrated ESS ES1869	desktop	384	2	1/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-32X	Ensoniq AudioPCI	midtower	384	2	3/3	3	3/1	24	Sat., Sun.	BBS, WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	2/2	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	integrated Crystal Audio	midtower	384	2	3/0	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	integrated Crystal Audio	midtower	384	2	0/1	3	3/1	24	Sat., Sun.	BBS, WWW
12X-32X	integrated ESS ES1869	desktop	384	2	0/1	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
2X DVD-ROM	Ensoniq AudioPCI	midtower	384	1	2/3	3	3/1	24	Sat., Sun.	BBS, WWW
12X-32X	HP Audio (AZT 1008)	midtower	768	1	2/1	4	3/1	[6]	none	AOL, BBS, CIS, WWW
12X-32X	integrated Crystal Audio	desktop	384	2	1/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
2X DVD-ROM	Aureal A3D PCI	midtower	384	2	3/1	4	varies[7]/1	24	Sat., Sun.	WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	Aureal A3D PCI	midtower	384	2	2/1	4	1/1	5	Sat., Sun.	BBS, WWW
13X-32X	Aureal A3D PCI	midtower	384	2	3/1	4	varies[8]/3	24	Sat., Sun.	BBS, WWW
14X-32X	integrated Yamaha OPL3-Sax	midtower	384	2	2/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	Aztech AZT2320	minitower	384	2	2/1	4	3/1	[6]	none	AOL, BBS, CIS, WWW
14X-32X	Ensoniq AudioPCI	midtower	384	1	2/3	4	3/1	24	Sat., Sun.	BBS, WWW

[4] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

[5] Downloads only, uploads at 33.6 kbps; uses cross-compatible V.90 standard.

[6] HP's offering of 11 hours of weekday support is not toll-free.

[7] Lifetime warranty on CPU, five years on all other parts.

[8] One year on CPU, RAM, monitor, keyboard, mouse; three years on other parts.

With the OptiPlex's modular case design, every part of the system swivels, glides, or swings open for easy access. Removing the cover is literally a snap: Just press a button on the front and flick the case-lock switch at the back, and the cover swings up out of the way. Expansion cards are mounted on a separate chassis that slides out as you press a lever—no scraped knuckles here. The power supply pivots upward to provide easy access to RAM slots and the motherboard. Although the graphics chip is integrated onto the motherboard, the OptiPlex GX1 400 has an AGP slot, so you can add an AGP graphics board if you like.

But upgrading shouldn't be in the cards for some time, thanks to the hardware Dell already includes. The 6.4GB hard disk is sufficient for most uses (though we're seeing much larger drives on other top-end systems). Dell's bundled UltraScan 1000HS monitor, one of the best 17-inch Trinitron displays currently available, offers excellent image quality.

Dell ships the OptiPlex with the Windows NT 4.0 operating system and covers the system with a three-year warranty on parts and labor. Telephone support lines operate around the clock.

4 MICRON CLIENTPRO 400

PRO: Network ready, comes with crisp monitor, good reliability and service

CON: Smallish hard drive, slow for a Win NT PC

If you had a sweet little old Southern grandmother who was hip to computers, she'd declare that the Micron ClientPro 400 provides "a gracious plenty" for corporate IS and small-business buyers alike. She'd think the $2299 price tag was a bargain, too.

Micron ClientPro 400

This Windows NT 4.0 workhorse comes ready to network, with a preinstalled 3Com Etherlink LAN adapter card and Intel's remote control software for system monitoring. Its 128MB of RAM will handle demanding multitasking without going to slow disk-based virtual memory.

But performance is a bit disappointing: The ClientPro 400's PC WorldBench score of 228 trails the two other NT-based PII-400 PCs we've tested by nearly 10 ▶

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percent, though it has twice the RAM of the other two. The 6.4GB hard disk is also smaller than that in most power systems.

Still, IS types will love the easy access to the PC's interior. Undo a thumbscrew, place the box on its side, pinch in two tabs, pull, and off comes the cover. On the front bezel, the externally accessible drive bays are nicely tucked away behind a pop-off plastic cover. The cover maintains the chassis's curved contours, giving the ClientPro a sleek, attractive appearance. The PC's 17-inch monitor, driven by the versatile Diamond Viper V330 AGP graphics adapter, delivers crisp graphics and text.

For small-business users, the ClientPro ships with Microsoft Office 97 Small Business Edition and Norton Utilities. And Micron's good service and reliability ratings, as well as outstanding support policies, are what your grandma might call "downright neighborly."

Deskpro EP 6400X

5 COMPAQ DESKPRO EP 6400X

PRO: Includes both ethernet card and modem, reconfigurable case design

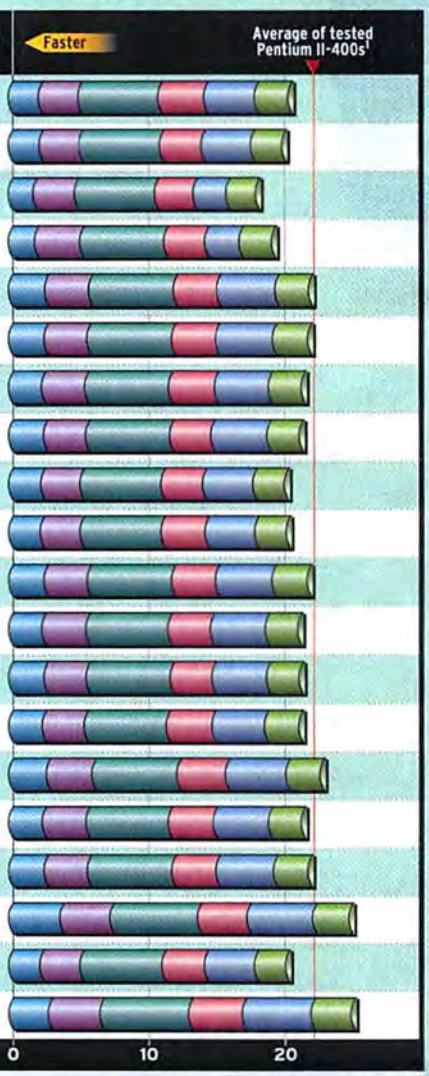
CON: Doesn't come with removable storage; minimal room for expansion

A $311 price reduction (which Compaq attributes to falling prices on the PII-400 CPU) pushes this corporate-minded desktop into the Best Buy category for the first time. The reconfig- ▶

TOP 20 POWER DESKTOPS

TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
1	Dell Dimension XPS R450*	Pentium II-450	Win 98	128	512	212
2	Micron Millennia 450 Max*	Pentium II-450	Win 98	64	512	218
3	Dell OptiPlex GX1 400*	Pentium II-400	Win NT 4.0	64	512	244
4	Micron ClientPro 400*	Pentium II-400	Win NT 4.0	128	512	228
5	Compaq Deskpro EP 6400X*	Pentium II-400	Win 95	64	512	200
6	Quantex QP6/400 SM-4x	Pentium II-400	Win 95	64	512	199
7	Gateway GP6-400	Pentium II-400	Win 98	128	512	203
8	NEC Direction SP B400	Pentium II-400	Win 95	64	512	207
9	Acma ZPower 6450 PII-450	Pentium II-450	Win 98	128	512	217
10	Compaq Deskpro EP 6450	Pentium II-450	Win 98	64	512	214
11	Quantex QP6/400 SM-4x SE	Pentium II-400	Win 95	128	512	200
12	HP Vectra VL Series 8	Pentium II-400	Win 95	64	512	207
13	IBM PC 300PL	Pentium II-400	Win 95	64	512	207
14	CompUSA PII-450	Pentium II-450	Win 98	64	512	203
15	Gateway E-4200 400	Pentium II-400	Win 95	128	512	190
16	PowerSpec PS-6331 PII-400	Pentium II-400	Win 98	128	512	202
17	MidWest Micro Office Pro 400	Pentium II-400	Win 95	128	512	199
18	NEC PowerMate 8000	Pentium II-333	Win 95	64	512	175
19	HP Vectra VL Series 8 HE	Pentium II-450	Win 98	64	512	216
20	CyberMax PowerMax H3	Pentium II-333	Win 95	128	512	171



*Best Buy

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). †Under Windows 95.

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urable Deskpro EP 6400X, priced at $2250, is one of the few corporate PCs we've reviewed to include both a network interface card and a 56-kbps modem. Its PC WorldBench score of 200 is smack in the middle among its peers.

The moderate price does come with a few compromises. The 6.4GB hard drive, while adequate for most apps, is about 4GB smaller than the average drive on a Top 20 power system. And the 12X–24X CD-ROM drive is a bit slower than most. The PC also lacks removable storage, such as an Iomega Zip or SuperDisk drive.

The case opens easily to reveal a spacious interior with a duct that channels blown air directly onto the CPU.

Compaq provides thorough documentation, toll-free 24-hour tech support, and a standard warranty that covers parts for three years and labor for one. Our calls to the support line revealed fairly competent technicians and timely service.

New This Month

The following PCs made our Power Desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/top400).

9 ACMA ZPOWER 6450 PII-450

PRO: Tool-free upgradability, great video card

CON: Limited disk expansion, no software bundle

Acma's corporate-tuned midtower is among the fastest PII-450 PCs on the chart. And at $2395, it costs well below the average for its processor class. Our only gripes: The ZPower lacks bundled software and offers almost no room for extra drives.

Acma ZPower 6450

Equipped with both a 56-kbps modem and a 100-mbps ethernet card, the well-connected ZPower 6450 should be a good fit in any office. You'll appreciate its 128MB of RAM (twice as much as most systems on the power chart) and its Real 3D StarFighter AGP graphics card, a top-rated board that makes 2D and 3D graphics tasks a breeze. In addition, the 17-inch Impression ViennaPro 75 monitor was one of the few bundled displays we've seen that offered extremely sharp images even at 1024 by 768 resolution.

Everything in the ZPower's interior is accessible at the twist of a thumbscrew, and the Zip and CD-ROM drives (both in half-height bays) slide out on rails. But you can't add a third removable-media drive without substantial trouble.

Acma's support policies include a three-year parts warranty and 24-hour phone support. In our anonymous calls, we never waited long on hold, and we received friendly and immediate service on every call, but technicians weren't always thorough and missed a few easy questions.

10 COMPAQ DESKPRO EP 6450

PRO: Outstanding performance, nifty convertible design, top-tier support policies

CON: Doesn't come with software bundle; relatively pricey corporate features

The new Deskpro EP series takes Compaq in a direction not usually associated with the company—it's a high-powered line of corporate-minded PCs priced under $3000. Compaq minimized the price of the EP (though the 6450 is still expensive) by eliminating many of the sophisticated features found in its higher-end EN line (such as the quick-release system board, swing-out drive bays, and pop-out expansion card cage) and by omitting bundled software. Compaq also kept the overall design simple; the EP's case is the typical off-white square steel box.

Still, what you get with Compaq's first PII-450 machine is a blazingly quick, manageable system with a unique feature: Drives can be mounted either horizontally or vertically in the external drive bays, which makes the system easy to modify for use as a tower or a desktop. The 6450's price, $2675, is about average for a PII-450 power system. Its PC WorldBench score of 214 surpasses that of the average PII-400 by 7 percent.

The 6450 comes with a utilitarian configuration: 56-kbps modem, sizable 10GB hard drive, crisp 17-inch monitor, and built-in Zip drive for storage. It also supports DMI 2.0 management, but unlike the EN series systems, a network card is optional and the EP doesn't support Wake-on-LAN. Another important distinction: Compaq doesn't offer Windows NT with the Deskpro EPs.

Deskpro EP 6450

The 6450 may not have all the easy-to-service features of the EN systems, but it's still simple to open up and work in. To remove the cover, turn two thumbscrews and lift the side panel off. The interior is nicely organized, and adding or removing components is painless. Although the Deskpro EP doesn't have oodles of extra room, you get three open PCI slots, two free DIMM slots (for a maximum RAM capacity of 384MB), and one free internal drive bay. Upgrading drives is effortless—push down on a large yellow button inside the machine, and the drives slide out.

Compaq has one of the better support policies offered by a PC vendor, including a three-year warranty for parts, a one-year warranty for labor, and around-the-clock toll-free tech support. The 6450 also comes with a recovery CD that will restore your hard drive to its original state. All of this is good, because our system came with detailed documentation for the monitor and modem, an ergonomic guide that illustrated the proper way to sit at your keyboard—but no system manual.

14 COMPUSA PII-450

PRO: Big and bright 19-inch monitor

CON: Sketchy documentation; lack of MPEG-2 decoder card results in inferior DVD playback

At $2499, CompUSA's latest midtower is a fairly good deal: It's $80 less than Dell's 450-MHz PC, which makes it one of the least expensive PII-450s on the chart. But the CompUSA system's comparatively sluggish WorldBench score of 203 puts it on par with the typical PII-400 machine—plenty of speed for most users, but not as fast as most PII-450 systems we've tested.

Still, the CompUSA system includes a few perks lacking in other similarly priced 450-MHz PCs. For instance, the machine comes with a 19-inch Royal Multiscan X-19 monitor that made pictures look ▶

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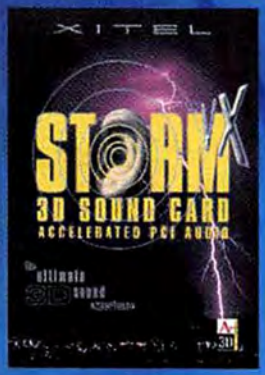

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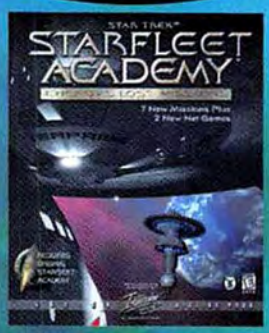

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sharp and bright. (If you buy Dell's Dimension XPS R450, you'd pay a $198 premium for a 19-inch monitor).

The CompUSA's ACS85 speaker ensemble produced rich, full sound across a big room. But if you're at all serious about DVD, you'll probably want to buy an aftermarket MPEG-2 decoder board. The SoftDVD player that comes with this PC had the same problem playing DVD MPEG-2 video as it did on other systems: Video playback was choppy from the start. When we tried to go online using the bundled modem (a PCI model from Aztech that makes heavy use of the CPU), SoftDVD video playback screeched to a halt.

The documentation included with our test system was almost useless, consisting of a thin, badly diagrammed user manual plus a motherboard manual. Unfortunately, the poorly labeled ports and lack of coded cables may have less experienced PC users reaching for these manuals. And while telephone support technicians are available around the clock, we found the support quality acceptable at best. In anonymous calls we waited on hold for 8 minutes on average, and one of the three reps we spoke to was rude and gave us inaccurate information. For these reasons, we recommend this machine to savvy computer users only.

CompUSA PII-450

16 POWERSPEC PS-6331 PII-400

PRO: Good price for its processor class, fast among Pentium II-400 systems

CON: Short warranty, low-quality peripherals

The workmanlike PowerSpec PS-6331 won't win any awards for flashiness, but this high-performance PII-400 certainly gets the job done. Its blistering 202 score on our PC WorldBench tests places the PS-6331 among the quickest 400-MHz PCs running Windows 98 we've tested. And its price of $2168 means it's extremely affordable for a power system.

This midtower sports an above-average configuration, with a roomy 11.5GB hard drive, 128MB of RAM, and an Aztech PCI 56-kbps modem that functions as a speakerphone. The modem uses the K56flex standard, but you can upgrade it to the more universal V.90 standard.

PowerSpec PS-6331

The PS-6331's 17-inch GS771 ViewSonic monitor delivers a crisp picture, and the 8MB ExpertColor PM200 AGP graphics card features the 3DLabs PM200A graphics chip, which provides excellent 2D and 3D performance. However, no hard-core multimedia system is complete without high-quality sound, which the PowerSpec lacks. Though the Aureal A3D PCI sound card seemed to work fine in our tests, the Inland Pro Surround speakers—a bit of a misnomer, since only two speakers are included in the set—lacked bass, failing to produce rich sound even when we pressed the Surround button.

The keyboard also felt somewhat light and flimsy when we first picked it up, but the keys had a surprisingly solid feel. Furthermore, the system's squarish, two-button, wheel-less mouse felt clunky.

The PowerSpec's bundled software lineup is somewhat underwhelming: The machine we tested came with Microsoft Works, Money 98, and Encarta 98—a useful trio, but one that hardly burdens the system's PII-400 processor. Business users can opt for Office 97 SBE instead of the home-oriented bundle.

System documentation is merely sufficient. PowerSpec's support policies aren't up to the industry standard: Parts and labor are covered for only a year, and toll-free technical support is limited to only 5 hours a day. Because this is PowerSpec's first *Top 100* entry, we have no information from readers regarding its systems' reliability. In anonymous calls, tech support representatives said they wouldn't answer our questions unless we had the system right in front of us.

19 HP VECTRA VL SERIES 8 HE

PRO: Extremely fast, includes advanced keyboard

CON: Overpriced, very difficult to upgrade

The HP Vectra VL Series 8 HE looks like the average beige minitower PC, but looks can be deceiving. When it comes to speed, this PII-450 system outpaced all but two competitors running Win 98—Acma's ninth-place ZPower 6450 and Micron's Millennia 450 Max, our number two Best Buy. But at $2890, the HP's price is $200 higher than the average cost of similarly configured PII-450s.

Among the Vectra VL's perks, the monitor is a crisp 17-incher with easy-to-use controls. The network card allows you to connect to a LAN right out of the box. The multifunction keyboard lets you connect to the Internet with a single touch, control volume, and put your machine to sleep (a power-saving feature). Finally, the integrated Matrox G200 graphics chip powers some of the top graphics boards we test for our *Top 10 Graphics Boards* chart. But as with any integrated graphics chip, you can't add video memory as you could with a separate graphics board; to upgrade, you have to buy a new graphics card.

Removing the case seems simple: Just flip two levers and pull. But those levers are designed to look like part of the case, so you may have a hard time finding them. Once you're inside, things don't get much easier. To access either of the two free DIMM slots or the four available card slots, you must first remove the fan—an irritating extra step. Also, loose cables dangled throughout the interior of the PC we tested.

Vectra VL Series 8 HE

To top it all off, HP's tech support is available during weekday business hours only, and the call's on your dime. On the other hand, the phone support we received in our anonymous calls was excellent. After only a brief wait on hold, our questions were correctly answered—and we were even thanked for our business at the end of the call. Good heavens!

BEYOND THE TOP 20

online

We evaluated the following system along with the others, but it didn't score high enough to reach the *Top 20 Power Desktops* chart. For a write-up, go to PC World Online (www.pcworld.com/t20pcs).

- **Kingdom Pinnacle 400 DVD**

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	SYSTEM	Last month	Month tested	Street price (8/17/98)	CPU	Comments
1	Dell Dimension XPS R350 800/388-8542 www.dell.com	n/a	retested	$1999	Pentium II-350	Dell slashes $580 off popular PII-350 system; retested this month with Windows 98.
2	CyberMax PowerMax B2 800/437-4596 www.cybermaxpc.com	6	May 98	$1499	Pentium II-300	$50 cut from well-supported PII-300 system with Zip drive, big 8.4GB hard disk.
3	Micro Express MicroFlex-K6/300A 800/989-9900 www.microexpress.net	5	Oct 98	$1199	AMD K6-2-300	Great price, fast AMD K6-2 PC with DVD-ROM drive; MPEG-2 video is choppy.
4	Micro Express MicroFlex-B350b 800/989-9900 www.microexpress.net	9	Sept 98	$1599	Pentium II-350	$100 drop moves this speedy, DVD-equipped PII-350 into Best Buy territory.
5	NEC Direction SP E333 888/863-2669 www.necnow.com	n/a	May 98	$1748	Pentium II-333	Great reliability scores from readers and $50 lower price turn NEC into Best Buy.
6	Micro Express MicroFlex B2400 800/989-9900 www.microexpress.net	n/a	NEW	$1599	Pentium II-400	Reasonably priced newcomer is the only PII-400 here; has DVD-ROM drive.
7	Gateway GP6-300b 800/846-2000 www.gateway.com	1	Sept 98	$1797	Pentium II-300	Fast but expensive PII-300 system comes network ready.
8	Dell Dimension V333c 800/388-8542 www.dell.com	n/a	NEW	$1849	Celeron-333	Relatively overpriced Celeron-333 system performs like a PII-333.
9	Acma NPower 6333 800/786-6888 www.acma.com	14	Aug 98	$1599	Pentium II-333	Acma's second $100 price cut in as many months keeps quick PII-333 on chart.
10	Quantex QP6/333 SM-3x 800/896-4898 www.quantex.com	2	Aug 98	$1649	Pentium II-333	Lots of room for expansion and $50 trimmed off very upgradable PII-333 midtower.
11	Quantex QP6/266 M-2x 800/896-4898 www.quantex.com	4	July 98	$1299	Pentium II-266	Affordable PII-266 comes with home and office software, good monitor.
12	Unicent Avanta E333 800/308-3614 www.unicent.com	n/a	NEW	$999	Celeron-333	The least expensive new budget system features Celeron-333 CPU, PII-333 speed.
13	Quantex QP6/300 SM-4x 800/896-4898 www.quantex.com	n/a	May 98	$1699	Pentium II-300	Multimedia-ready PII-300 features good 3D video and PCI audio; price drops $100.
14	Unicent Avanta L333 800/308-3614 www.unicent.com	10	June 98	$1649	Pentium II-333	Relatively slow sibling to E333 featuring Pentium II CPU sheds $50.
15	Kingdom Pinnacle 300/P2 800/385-3436 www.kingdomcomputers.com	n/a	May 98	$1397	Pentium II-300	$250 price slash moves multimedia-heavy PC onto chart; has integrated video chip.
16	Compaq Deskpro EP C333 800/345-1518 www.compaq.com	n/a	NEW	$1925	Celeron-333	Despite inexpensive Celeron-333 chip, top-notch components keep price high.
17	ProGen Polaris PII-350 888/776-9595 www.progen.com	n/a	July 98	$1499	Pentium II-350	Cheapest PII-350 here after $70 reduction; poor phone support may nullify value.
18	MidWest Micro Office Pro 350 800/728-8582 www.mwmicro.com	n/a	NEW	$1879	Pentium II-350	Fairly pricey PII-350 has very good performance rating.
19	NextPC N6-350 PII 350 888/838-7827 www.next-pc.com	n/a	Oct 98	$1749	Pentium II-350	Big $384 price drop brings PII-350 onto chart; poor-quality 17-inch monitor.
20	TigerDirect K-Series 300 800/830-0056 www.tigerdirect.com	11	Sept 98	$1100	AMD K6-300	Fast K6-300 PC with terrible phone support quality actually goes up $50 in price.

Best Buy See features chart, page 204; test report, page 206.

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100" on page 186.

[2] For more information about all products in this table, select InfoNet no. 906 or visit www.pcworld.com/infonet.

OF THE THREE NEW Celeron-333 systems that land on the Budget Desktops chart for the first time this month, two surprised us with their high price as well as their high performance: Dell's Dimension V333c, which scored 170 on our PC WorldBench 98 tests, costs $1849; and Compaq's Deskpro EP C333, with an even better score of 176, costs $1925. Only Unicent's Avanta E333 is the truly inexpensive Celeron-333 system here, at $999. It scored 171 on our PC WorldBench tests. Another new Celeron system, Premio's $1295 Apollo Celeron 300, didn't make the chart. Its cacheless Celeron-300 processor earned it a score on par with a Pentium MMX-233—abysmal considering it runs the faster Windows NT 4.0 OS.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Features and design	Price	Performance [1]	Vendor's system reliability	Vendor's support quality/policies	InfoNet number [2]
82	188/Win 98	good	expensive	very good	good	good/outstanding	670
81	152/Win 95	very good	average	good	[3]	good [4]/outstanding	671
81	162/Win 95	good	inexpensive	good	[3]	fair [4]/outstanding	672
80	228/Win NT 4.0	good	average	outstanding	[3]	fair [4]/outstanding	673
80	169/Win 95	good	average	good	outstanding	fair [4]/outstanding	674
80	201/Win 98	good	average	outstanding	[3]	fair [4]/outstanding	675
80	174/Win 95	good	expensive	good	good	fair/outstanding	676
80	170/Win 98	good	expensive	good	good	good/outstanding	677
79	177/Win 95	good	average	good	[3]	good [4]/outstanding	678
79	164/Win 95	very good	average	good	[3]	fair [4]/outstanding	679
79	138/Win 95	very good	inexpensive	satisfactory	[3]	fair [4]/outstanding	680
79	171/Win 98	satisfactory	inexpensive	good	[3]	fair [4]/outstanding	681
78	151/Win 95	very good	average	good	[3]	fair [4]/outstanding	682
78	158/Win 95	very good	average	good	[3]	fair [4]/outstanding	683
78	164/Win 95	very good	average	good	[3]	fair [4]/fair	684
77	176/Win 98	good	expensive	good	good	fair/outstanding	685
77	181/Win 95	good	average	very good	[3]	poor [4]/fair	686
77	186/Win 98	very good	expensive	very good	[3]	good [4]/good	687
76	181/Win 95	very good	average	very good	[3]	fair [4]/good	688
76	153/Win 95	good	inexpensive	good	[3]	poor [4]/good	689
Scorecard weightings ▶		Features 25 percent	Price 22 percent	Performance 18 percent	Reliability 15 percent	Quality/policies 10 percent each	

[1] Insufficient data to give a rating.

[4] Scores were derived from anonymous support-quality calls due to insufficient data from survey.

This Month's Best Buys

1 DELL DIMENSION XPS R350

PRO: Large hard disk, Trinitron monitor, fast

CON: Pricey for a budget system

If you're lusting after a well-built, reliable 350-MHz system but $2000 is your limit, consider the $1999 Dell Dimension XPS R350. It has all the goodies you'll find in its pricier sibling, the XPS R400, and turned in a PC WorldBench 98 score of 188—the fastest of all the PII-350 Win 98 PCs we've tested.

The system also includes a cavernous 14.4GB IBM hard disk—the largest of any IDE drives we've seen—an Iomega Zip drive, and a 2X DVD-ROM drive. Thanks to the DVD-ROM drive, you can enjoy crystal-clear MPEG-2 video as well as the latest multimedia titles. In addition, while you're watching DVD movies on Dell's stunning 17-inch Trinitron monitor, the fast STB Velocity 128zx AGP graphics adapter will help refresh your screen quickly.

Dell Dimension XPS R350

Dell provides good documentation, including a foldout setup guide and troubleshooting manuals. The company also offers 24-hour toll-free technical support, which our readers rate as good. In our anonymous calls to Dell support, we saw a substantial reduction in the long hold times we'd been experiencing recently, though we still waited on hold for as long as 5 minutes on one call.

2 CYBERMAX POWERMAX B2

PRO: Good price, large hard disk

CON: Inadequate documentation

Like a Florida time-share, the CyberMax PowerMax B2 sounds too good to be true. But in this case, your dollars actually go a long way. For $1499, you get a PII-300 CPU that earned this midtower a PC WorldBench 98 score of 152—slow for its processor class, but good for a budget system overall.

The PowerMax comes with the basic hardware elements you'll need to get work done: Its spacious 8.4GB hard disk can hold thousands of pages of documents and spreadsheets, while the 64MB of SDRAM will minimize Windows' use of the performance-killing swap file as you switch between programs. However, the STB Velocity 128 AGP video card (which ships with 4MB of SGRAM graphics memory) is ill suited for detailed, professional graphics work, even though it's quick. Removable-media storage devices include a 13X–32X CD-ROM drive and a built-in Iomega Zip drive.

Skeptics won't scoff at the monitor: CyberMax's 17-inch display is crisp and bright, with a .28mm dot pitch that matches the video card's ability to provide clearly readable text. The monitor's on-screen display controls make it easy to adjust standard settings like contrast, brightness, and color temperature. ▶

PHOTOGRAPHS: KEN SMITH

TOP 20 BUDGET DESKTOPS

STANDARD FEATURES

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter (AGP)	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Modem speed (kbps)
1	Dell Dimension XPS R350*	Pentium II-350	Windows 98	64	512	14.4	STB Velocity 128zx	8/SGRAM	17/16	56 [2]
2	CyberMax PowerMax B2*	Pentium II-300	Windows 95	64	512	8.4	STB Velocity 128	4/SGRAM	17/16.1	56 [3]
3	Micro Express MicroFlex-K6/300A*	AMD K6-2-300	Windows 95	64	1024	6.4	ATI Xpert@Work	4/SGRAM	17/16.1	56 [3]
4	Micro Express MicroFlex-B350b*	Pentium II-350	Windows NT 4.0	128	512	6.2	ATI Xpert@Work	4/SGRAM	17/15.9	56 [4]
5	NEC Direction SP E333*	Pentium II-333	Windows 95	64	512	6.4	Diamond Viper V330	4/SGRAM	17/16	56 [2]
6	Micro Express MicroFlex B2400	Pentium II-400	Windows 98	128	512	6.4	ATI Xpert@Play	6/SGRAM	17/16.1	56 [3]
7	Gateway GP6-300b	Pentium II-300	Windows 95	64	512	8.1	AccelStar II 3D	8/SGRAM	17/16	not included
8	Dell Dimension V333c	Celeron-333	Windows 98	64	128	6.4	integrated ATI 3D Rage Pro	8/SDRAM	17/15.9	56 [2]
9	Acma NPower 6333	Pentium II-333	Windows 95	64	512	6.4	Diamond Stealth 3D 2000	4/SGRAM	17/15.8	not included
10	Quantex QP6/333 SM-3x	Pentium II-333	Windows 95	64	512	6.4	STB Velocity 128	4/SGRAM	17/16.1	56 [3]
11	Quantex QP6/266 M-2x	Pentium II-266	Windows 95	32	512	4.1	STB Velocity 128zx	4/SGRAM	17/16.1	56 [3]
12	Unicent Avanta E333	Celeron-333	Windows 98	64	128	4.3	ATI Xpert@Work	4/SGRAM	15/13.7	56 [4]
13	Quantex QP6/300 SM-4x	Pentium II-300	Windows 95	64	512	6.4	Number Nine Revolution 3D	8/WRAM	19/17.9	56 [3]
14	Unicent Avanta L333	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work	4/SGRAM	17/15.9	56 [2]
15	Kingdom Pinnacle 300/P2	Pentium II-300	Windows 95	64	512	6.4	integrated ATI 3D Rage Pro Turbo	4/SGRAM	17/15.7	56 [2]
16	Compaq Deskpro EP C333	Celeron-333	Windows 98	64	128	10	Matrox Millennium G200	8/SDRAM	17/15.9	56 [3]
17	ProGen Polaris PII-350	Pentium II-350	Windows 95	64	512	8.4	Intel Express 3D	4/SGRAM	17/16	56 [2]
18	MidWest Micro Office Pro 350	Pentium II-350	Windows 98	64	512	11.5	ATI Xpert@Work	4/SGRAM	17/15.7	56 [4]
19	NextPC N6-350 PII 350	Pentium II-350	Windows 95	64	512	8.4	integrated Intel740	8/SDRAM	17/16	56 [2]
20	TigerDirect K-Series 300	AMD K6-300	Windows 95	64	1024	6.2	Matrox Productiva G100	8/SDRAM	17/15.8	56 [3]

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.
[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

CyberMax PowerMax B2

A peek under the PowerMax's hood reveals connector cables that are bunched together nicely and parked out of the way. The expansion slots and RAM sockets are easy to reach. Opening the case requires you to undo two thumbscrews on either side of the back panel and lift off the casing; closing it involves sliding the case precisely back into place.

So what's the catch? The documentation is essentially a rewrite of the Windows 95 manual, geared heavily toward beginners. The system also includes a Pentium II motherboard manual for hard-core techies. But there's not much information, such as instructions for removing the casing, for the average user.

CyberMax may not be a household name, but we found its tech support friendly, responsive, and knowledgeable. Better still, support policies include toll-free 24-hour support. In our latest round of calls, helpful technicians offered ways to attack our toughest problems.

3 MICRO EXPRESS MICROFLEX-K6/300A

PRO: Generous technical support policies, large secondary cache, DVD-ROM drive, inexpensive

CON: Difficult-to-remove cover, generic keyboard and mouse, choppy video playback

Don't think AMD's new K6-2 processor is for real? Check out the MicroFlex-K6/300A. Based on the K6-2-300 chip, this $1199 system combines PII-300–like performance with low cost and great features.

MicroFlex-K6/300A

With its 1024KB secondary cache (twice that of most CPUs), the K6-2-300 processor drove this system to a PC WorldBench 98 score of 162. And on our chart, at least, no other comparable machine equipped with a DVD-ROM drive and 17-inch monitor comes close to the MicroFlex's performance and price.

A 6.4GB hard disk offers copious storage, and the Sound Blaster AWE64 sound card powers a pair of speakers that produce fine sound quality, with plenty of volume and no noticeable distortion.

		EXPANDABILITY				CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
2X DVD-ROM	Turtle Beach Montego	midtower	384	2	3/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq AudioPCI 9752	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	384	4	3/0	0	4/4	24	Sat., Sun.	WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	768	1	3/0	4	4/4	24	Sat., Sun.	WWW
2X DVD-ROM	integrated Yamaha OPL3-Sax	midtower	384	1	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	384	1	3/0	4	4/4	24	Sat., Sun.	WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	Turtle Beach Montego	minitower	384	2	2/1	1	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-32X	Yamaha OPL3-Sax	compact	384	2	0/0	3	3/1	24	Sat., Sun.	BBS, WWW
12X-32X	Ensoniq AudioPCI	midtower	384	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	integrated Yamaha OPL3-Sax	minitower	256	1	2/0	2	3/3	13	Sat.	BBS, WWW
14X-32X	Ensoniq AudioPCI	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
13X-32X	Ensoniq AudioPCI	midtower	384	2	3/1	4	3/3	13	Sat.	BBS, WWW
12X-24X	Ensoniq AudioPCI	midtower	512	3	3/2	4	varies [5]/1	12.5	Sat.	WWW
12X-32X	integrated ESS ES1869	desktop	256	1	1/1	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-32X	Aureal Vortex PCI Audio	midtower	384	2	3/1	3	3/1	12	none	BBS, WWW
12X-32X	Aureal A3D PCI	midtower	384	2	3/1	4	varies [5]/3	24	Sat., Sun.	BBS, WWW
14X-36X	integrated Ensoniq AudioPCI	midtower	768	2	2/3	5	varies [5]/3	24	Sat., Sun.	none
12X-32X	integrated Yamaha OPL3-Sax	midtower	384	2	3/0	4	3/3	15	Sat.	WWW

[3] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[4] Downloads only, uploads at 33.6 kbps; uses cross-compatible V.90 standard.
[5] Five years on CPU and main RAM, three years on all other parts.

Did Micro Express cut corners to arrive at this fantastic price point? You bet. The PC lacks a hardware decoder for MPEG-2 video, yielding choppy video playback. And the 17-inch Impression 7 Plus display had a distinctly bluish cast, even after we adjusted the software/hardware controls.

Moreover, the keyboard and two-button mouse (without thumbwheel) are basic, and the midtower chassis is plain vanilla. Getting inside the PC is an adventure. You must remove four Phillips-head screws, then pull and tug to get the cover off. Putting the cover back on is another challenge. But inside, a well-designed interior offers easy access to memory, sockets, and card slots. Sealing the deal is Micro Express's exceptional four-year parts and labor warranty, and 24-hour telephone support.

4 MICRO EXPRESS MICROFLEX-B350B

PRO: DVD-ROM drive, lots of RAM, excellent video card, excellent technical support policies

CON: Fuzzy monitor image, lackluster speakers

If Bill Gates wants everyone to use Windows NT, he's got to get more vendors to sell systems like the Micro Express MicroFlex-B350b. As the lone budget system running Windows NT 4.0, the MicroFlex-B350b costs only $1599 yet includes 128MB of RAM and a DVD-ROM drive. It's a good value, with a couple of gotchas: The quality of the display and the speakers could be better.

MicroFlex-B350b

Despite its weakness on the multimedia front, there's a lot to like about this generic-looking midtower. Its PC WorldBench 98 score of 228 makes it one of the fastest NT-based systems we've evaluated. Micron's ClientPro 400, a PII-400 machine we first tested in October, scored exactly the same as the PII-350–based MicroFlex-B350b—and costs $700 more.

If you've got presentations to make, the 4MB ATI Xpert@Work AGP video card includes video output jacks to connect it to a TV or VCR. Unfortunately, the picture on our 17-inch Princeton EO17 monitor was fuzzy in the corners. And the speakers on our test unit didn't do justice to the Sound Blaster AWE64 sound board; bass was distorted even at low volume settings. A generic, V.90-stan- ▶

dard 56-kbps voice modem is included, along with the Bitware for Windows communications package.

Micro Express's support policies get top marks; they include a generous four-year parts and labor warranty and a year of on-site service. Toll-free phone support is available around the clock, but Micro Express's impatient phone technicians gave us the bum's rush more than once, hastily referring us to component vendors if another part seemed problematic.

5 NEC DIRECTION SP E333

PRO: Nice monitor, DVD-ROM drive

CON: Basic audio, problems reaching tech support

Following a $50 price cut to $1748 and an upgrade to a second-generation DVD-ROM drive, the Direction SP E333 gets better still. An average performer for a PII-333 PC, the NEC is one of the fastest yet least expensive multimedia systems we've tested.

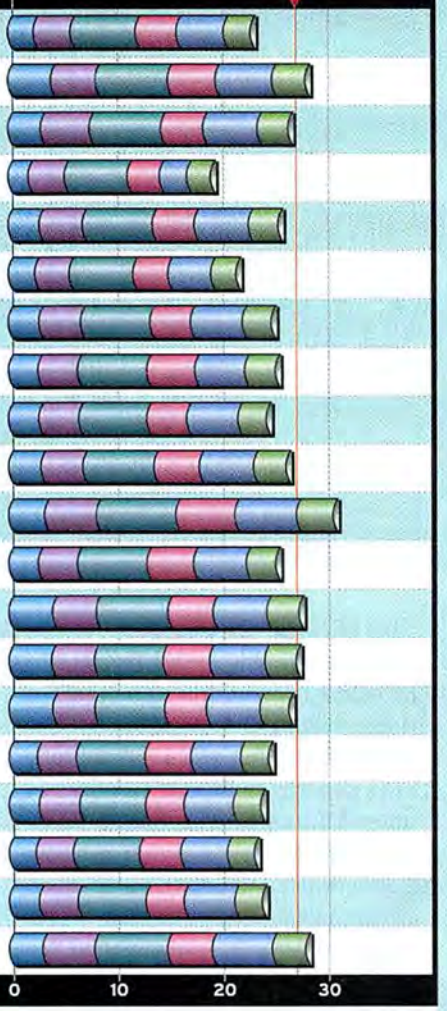
NEC Direction SP E333

With 64MB of SDRAM and a 6.4GB hard disk, this midtower system matches the component specifications of other top-ranked budget desktops. Graphics are provided by Diamond's powerful Viper V330 graphics adapter. The 17-inch NEC C700 monitor has extensive controls and produces a crisp picture. NEC also throws in the Microsoft Office 97 Small Business Edition suite.

TOP 20 BUDGET DESKTOPS

TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
1	Dell Dimension XPS R350*	Pentium II-350	Win 98	64	512	188
2	CyberMax PowerMax B2*	Pentium II-300	Win 95	64	512	152
3	Micro Express MicroFlex-K6/300A*	AMD K6-2-300	Win 95	64	1024	162
4	Micro Express MicroFlex-B350b*	Pentium II-350	Win NT 4.0	128	512	228
5	NEC Direction SP E333*	Pentium II-333	Win 95	64	512	169
6	Micro Express MicroFlex B2400	Pentium II-400	Win 98	128	512	201
7	Gateway GP6-300b	Pentium II-300	Win 95	64	512	174
8	Dell Dimension V333c	Celeron-333	Win 98	64	128	170
9	Acma NPower 6333	Pentium II-333	Win 95	64	512	177
10	Quantex QP6/333 SM-3x	Pentium II-333	Win 95	64	512	164
11	Quantex QP6/266 M-2x	Pentium II-266	Win 95	32	512	138
12	Unicent Avanta E333	Celeron-333	Win 98	64	128	171
13	Quantex QP6/300 SM-4x	Pentium II-300	Win 95	64	512	151
14	Unicent Avanta L333	Pentium II-333	Win 95	64	512	158
15	Kingdom Pinnacle 300/P2	Pentium II-300	Win 95	64	512	164
16	Compaq Deskpro EP C333	Celeron-333	Win 98	64	128	176
17	ProGen Polaris PII-350	Pentium II-350	Win 95	64	512	181
18	MidWest Micro Office Pro 350	Pentium II-350	Win 98	64	512	186
19	NextPC N6-350 PII 350	Pentium II-350	Win 95	64	512	181
20	TigerDirect K-Series 300	AMD K6-300	Win 95	64	1024	153



*Best Buy

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with Windows 95, Windows 98, or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 95.

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21" Models	CRT Pitch	Max. Resolution	Auto-Scan Range
Diamond Plus 100e	0.28 mm	1600 x 1200/85 Hz NI	H: 30-108 kHz V: 50-152 Hz
Diamond Pro 91TXM	0.28 mm	1600 x 1200/75 Hz NI	H: 30-95 kHz V: 50-152 Hz
Diamond Pro 1010e	0.26 mm	1800 x 1440/76 Hz NI	H: 30-115 kHz V: 50-152 Hz
Diamond Pro 1000	0.28 mm	1800 x 1440/76 Hz NI	H: 30-115 kHz V: 50-152 Hz

* DVI: Diagonal Viewable Image. Resolution refers to maximum addressable resolution H x V.

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Circle 144 on card or go to www.pcworld.com/infonet

NEC upgraded its 13X–32X CD-ROM drive to a second-generation DVD-ROM drive this month. But we still have reservations about the integrated Yamaha sound chip, which yields merely adequate 16-bit business audio. Furthermore, the system doesn't come with an MPEG-2 decoder card, so watching movies while you work is out of the picture.

NEC offers an excellent three-year warranty on parts and labor, and is tops in reliability, according to readers. Though tech support quality seems to be improving, we've had more trouble getting through to support lines recently. After we finally made it into the phone system, we waited on hold for up to 10 minutes.

New This Month

The following PCs made our Budget Desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/top400).

6 MICRO EXPRESS MICROFLEX B2400

PRO: Least expensive PII-400 system, includes second-generation DVD-ROM drive

CON: No office software or MPEG-2 decoder card

The lowest-priced PII-400 PC we've seen so far, the $1599 MicroFlex B2400 costs nearly $900 less than the average of PII-400 systems we've seen. And the low price does not come at the cost of speed; the B2400's PC WorldBench 98 score of 201 is on par with that of other PII-400 PCs.

MicroFlex B2400

But Micro Express did cut a few corners to keep the price down. The 2X DVD-ROM drive, for example, includes a software MPEG decoder only, not a hardware decoder card; without a card, DVD video taxes the CPU and plays back jerkily, especially if you run other apps at the same time. You'll also want to invest in a new set of speakers; the MLi-828's bass sounds muddy and the treble tinny.

Unicent Avanta E333

Micro Express offers a long warranty—four years on parts and labor—as well as 24-hour phone support. In our anonymous calls, the support technicians were quick to refer us to component manufacturers; so quick, in fact, that it seemed they'd rather not solve the problems.

8 DELL DIMENSION V333C

PRO: Speed on par with PII-333 machines

CON: Costly Celeron system not a bargain

Dell's Dimension V333c is a small-business machine with multimedia on its mind. The new Celeron-333 chip at the heart of this system helped it achieve a PC WorldBench 98 score of 170, which is competitive with PII-333 systems. But this PC's surprisingly steep $1849 price—only about $100 lower than that of an identical PII-333 system—means that it's overconfigured.

Dell Dimension V333c

Dell's setup and user guides are comprehensive, and color-coded cables that match the well-labeled ports on the back of the case make initial setup a no-brainer. The warranty on this system is the same as for all Dimensions: Labor is covered for one year and parts for three; 24-hour phone support is standard.

12 UNICENT AVANTA E333

PRO: Least expensive budget system

CON: Average components, no office suite

The $999 Unicent Avanta E333 provides Pentium II power, as evidenced by the Avanta's benchmark score of 171. But Unicent shaved some features to the bone, though this machine's target market of first-time home and home-office users probably won't know what they're missing—except for the conspicuously absent office applications suite. On the other hand, the system wouldn't be so affordable without such trade-offs.

The well-organized documentation has good basic FAQs and troubleshooting information. Unicent backs its machines with a three-year parts and labor warranty, but weekday phone support is limited to only 13 hours a day.

16 COMPAQ DESKPRO EP C333

PRO: Fastest Celeron-333 system on chart

CON: Expensive

Deskpro EP C333

Compaq's first Deskpro to incorporate Intel's new Celeron-333 processor is a good performer. The EP C333 claims a PC WorldBench 98 score of 176—slightly faster than other Celeron-333 systems and the average desktop PII-333 PC. But at $1925, it's the second-most expensive system on our budget chart and the costliest Celeron system to date.

Compaq offers a warranty that covers the expense of replacing parts for three years, and labor for one year. It also provides toll-free tech support.

18 MIDWEST MICRO OFFICE PRO 350

PRO: Good phone support and warranty

CON: Average-quality components

The MidWest Micro Office Pro 350 is a good choice for anyone seeking a budget PC. Its PC WorldBench 98 score of 186 is average for its Pentium II-350 processor class. This beige mid-tower, at $1879, gives all the basics—just don't expect top-quality parts throughout.

Office Pro 350

The company's parts warranty covers the processor and memory for five years and all other components for three years. Our anonymous support calls usually met with a friendly and helpful response from the company's technicians. ▶

BEYOND THE TOP 20

online

We evaluated the following systems along with the others, but they didn't score high enough to reach the *Top 20 Budget Desktops* chart. For write-ups, visit PC World Online (www.pcworld.com/t20pcs).

- **CompUSA PII-333**
- **HP Brio 7100**
- **NextPC NW6-K62-333**
- **Premio Apollo Celeron 300**

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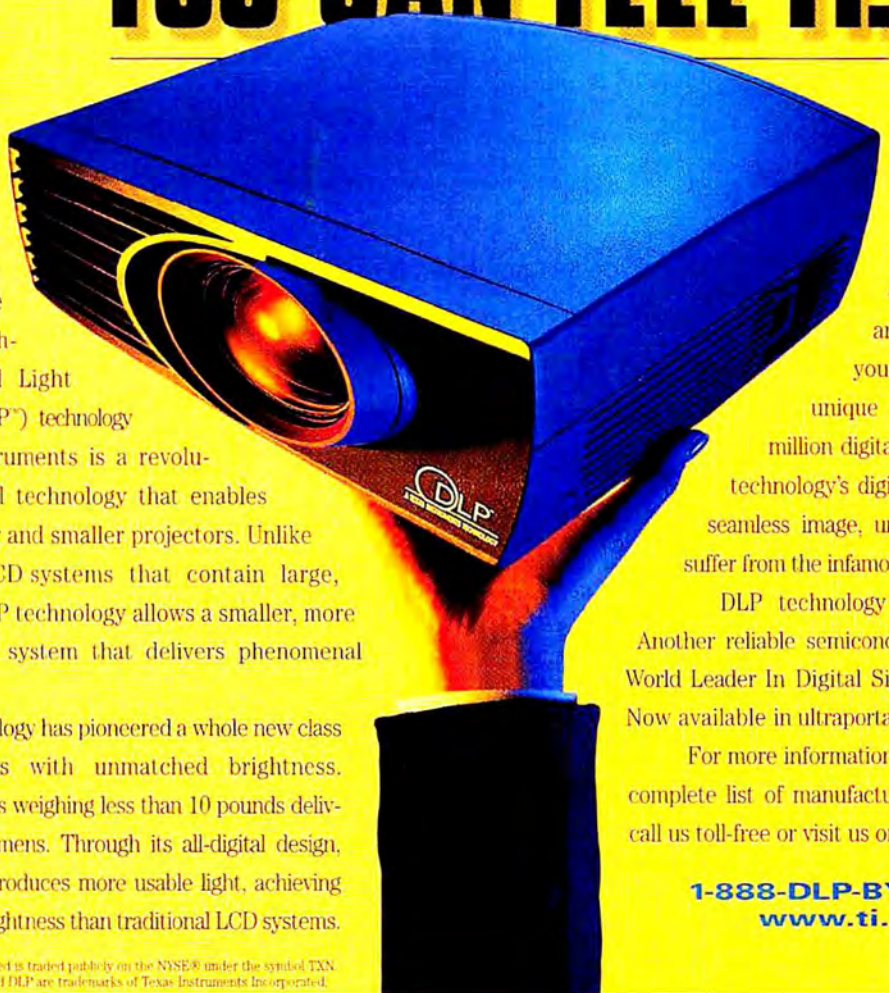

On this hand there is a lighter, brighter choice in display technologies. Digital Light Processing™ (DLP™) technology from Texas Instruments is a revolutionary all-digital technology that enables incredibly lighter and smaller projectors. Unlike conventional LCD systems that contain large, heavy optics, DLP technology allows a smaller, more compact optical system that delivers phenomenal visual impact.

DLP technology has pioneered a whole new class of ultraportables with unmatched brightness. Imagine projectors weighing less than 10 pounds delivering over 600 lumens. Through its all-digital design, DLP technology produces more usable light, achieving higher levels of brightness than traditional LCD systems.

And picture this — the smallest, brightest projection systems on the market deliver graphics so vibrant and film-like you won't believe your eyes. DLP technology's unique digital light displays 16.7 million digitally correct colors. And DLP technology's digital design creates a clearer, seamless image, unlike LCD technologies that suffer from the infamous "screen door" effect.

DLP technology from Texas Instruments. Another reliable semiconductor innovation from The World Leader In Digital Signal Processing Solutions. Now available in ultraportable projectors.

For more information on DLP technology or for a complete list of manufacturers using DLP technology, call us toll-free or visit us on the Web.

1-888-DLP-BY-TI, ext. 2426
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OPENING THE WORLD'S EYES TO THE BRILLIANCE OF DIGITAL IMAGES.

TEXAS INSTRUMENTS

PC WORLD

TOP 10 NOTEBOOK PCs

	POWER NOTEBOOK	Last month	Month tested	Street price (8/21/98)	CPU	Comments
1	Dell Latitude CPi D300XT 800/388-8542 www.dell.com	n/a	NEW	$3499	Pentium II-300	Thin, fast successor to Best Buy of last two months has latest notebook CPU.
2	Dell Inspiron 7000 D300GT 800/388-8542 www.dell.com	n/a	NEW	$3599	Pentium II-300	Fastest notebook on record is ideal as desktop alternative.
3	Micron GoBook 2 266 888/634-8799 www.micronpc.com	n/a	NEW	$3148	Pentium II-266	Traveler's companion has killer battery and flexible design.
4	Gateway Solo 9100LS 800/846-2000 www.gateway.com	5	Sept 98	$3264	Pentium II-266	Multimedia notebook with upgraded RAM and hard drive drops $200.
5	Toshiba Tecra 8000 800/867-4422 www.computers.toshiba.com	n/a	NEW	$3499	Pentium II-266	Durable magnesium case and many optional upgrades extend life span.
	BUDGET NOTEBOOK					
1	Gateway Solo 2500SE 800/846-2000 www.gateway.com	3	Sept 98	$1999	Pentium II-233	Fast, light laptop with built-in CD-ROM and floppy drives sheds $150.
2	Acer Extensa 367D 800/733-2237 www.acer.com/aac	1	Sept 98	$1299	Pentium MMX-200	Light and dirt-cheap notebook with dual-scan screen is great for students.
3	Chem USA ChemBook 5033 800/866-2436 www.chemusa.com	n/a	NEW	$1499	AMD K6-300	Pentium alternative gives PMMX-266 performance for hundreds less.
4	Quantex H-1331 800/896-4898 www.quantex.com	n/a	May 98	$2499	Pentium MMX-266	Big-screen notebook offers monster battery life, good performance.
5	WinBook XL 233 DSTN[4] 800/965-9349 www.winbook.com	n/a	Oct 98	$1483	Pentium MMX-233	Bargain-priced portable has a small hard drive and a dual-scan screen.

Best Buy See features chart, page 212.

n/a = not applicable [1] Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive. [2] For more about products here, select the number on the product information card or visit www.pcworld.com/infonet. [3] Insufficient data to give a rating.

IF YOU'RE SHOPPING for a fast notebook, it usually doesn't pay to get too excited about the latest Intel processor. Most new mobile chips don't significantly boost performance over that of the previous processor. It makes a lot more sense to go with a notebook based on a slightly older chip—the machine won't be much slower, and you'll save hundreds of dollars.

But the mobile Pentium II-300 appears to be different. The five new laptops we tested with Intel's latest notebook CPU chalked up an average PC WorldBench 98 performance score of 159—a notable 10 percent jump over the average score of PII-266 laptops. In other words, you *will* notice the difference in speed, whether you're running basic apps or graphics-intensive programs. It might even be enough to justify the few hundred dollars more you'll pay for one of these new notebooks.

In all, we tested 11 new portables for this month's Top 10 and our roundup (see "Notebooks for the Long Haul," page 154). The two reviews contain different Best Buys because of different rating schemes. Our roundup stresses notebook features that tend to improve longevity, such as construction and upgradability, while the Top 10 emphasizes general features, price, and performance.

Not surprisingly, a new PII-300, Dell's $3499 Latitude CPi D300XT, lands atop the power chart, replacing the PII-266 Latitude CPi D266XT as Best Buy. Our longevity roundup champion—the tough, upgradable Toshiba Tecra 8000—also makes the power chart, in fifth place.

On the budget side, a $150 price drop shoots the $1999 Gateway Solo 2500SE, a plain-looking but fast Pentium II-233 with both floppy and CD-ROM drives built in, to the number one spot.

MORE CHALLENGING BATTERY TEST

IN THIS ISSUE we introduce a new battery test. We've updated the business applications, including Word, Excel, and Paradox, that our testers use as they follow a script. And we no longer count the time notebooks sit in suspend mode. As a result, you'll notice that the average battery life in our charts is shorter. We believe the new times more closely reflect the experience of most notebook users.

This Month's Best Buys

POWER NOTEBOOKS

1 DELL LATITUDE CPI D300XT

PRO: Very fast; excellent keyboard

CON: No modem

Dell's Latitude CPi D300XT snags the power Best Buy this month. It's nearly identical to the Latitude D266XT, except it's faster, has a bigger hard drive, and costs $101 more.

SCORECARD

★ Overall rating	PC WorldBench 98 score/performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/ rating	Traveling weight [1]	InfoNet number [2]
89	159/outstanding	average	good	very good	good/good	3:05/good	average	623
87	162/outstanding	average	good	very good	good/fair	3:37/good	very heavy	624
85	144/very good	average	fair	very good	good/fair	5:44/outstanding	average	613
85	148/very good	average	good	outstanding	good/fair	3:25/good	very heavy	625
84	154/very good	average	good	good	good/fair	2:42/satisfactory	light	608
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	
85	125/good	average	good	good	good/fair	3:15/good	light	626
84	100/satisfactory	very inexpensive	fair	good	fair/poor	2:46/satisfactory	light	627
82	117/good	very inexpensive	[1]	good	[1]/poor	2:28/satisfactory	average	628
81	119/good	expensive	[1]	very good	[1]/good	5:53/outstanding	average	629
79	109/satisfactory	very inexpensive	fair	satisfactory	good/poor	1:33/poor	heavy	630
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	All products: 902

[1] Available only via Web site.

Dell's CPi D300XT has a great keyboard.

The PII-300 chip is the main reason the high-end CPi D300XT is 9 percent faster than its predecessor and is one of the quickest notebooks we've tested. The processor and 6.4GB hard drive—less than 2GB shy of the largest available laptop drive—accounts for the $3499 price, which excludes a modem.

Like its predecessor, the Latitude CPi D300XT is a pleasing charcoal gray. It's 1.75 inches thick, compared to the standard 2 inches, with one modular bay. At 7.4 pounds and with about 3 hours of battery life, the notebook is fine—but not outstanding—for travel. You can lengthen its utility on the road by adding a second battery, which costs an extra $169.

You'll adapt to this notebook's excellent keyboard in virtually no time. All the keys are adequately sized, are located where you'd expect them, and have crisp action.

The Latitude CPi D300XT's multimedia features include a brilliant screen with a smooth image from edge to edge. Basic stereo sound is tinny, but MIDI music sounds good, thanks to the software wavetable synthesizer.

Dell's service and notebook reliability gets good marks from *PC World* readers. In our most recent calls to technical support, we were impressed by the accuracy of the reps' advice but disappointed by the average hold time of 20 minutes.

BUDGET NOTEBOOKS

1 GATEWAY SOLO 2500SE

PRO: Inexpensive for a Pentium II-233 system, light

CON: Poor speaker placement, flimsy keyboard

The Gateway Solo 2500SE wins the top spot on our budget chart this month for good reason: It's the least expensive Pentium II-233 notebook we've seen, with features and performance comparable to those of notebooks that are priced hundreds of dollars more.

This gray, boxy portable is particularly well suited to the road. At 7.1 pounds, it's the lightest Pentium II laptop we've tested, in most cases by at least half a pound. The notebook's 3.3-hour battery life is average for a Pentium II.

Back at the office, you can connect the Solo 2500SE—even while it's still running—to a docking station for use on your desk. For backup and storage, the floppy drive bay also accepts an optional $125 120MB SuperDisk drive, which can read and write to standard 3.5-inch floppies. The CD-ROM drive is fixed.

Gateway's Solo 2500SE: best inexpensive notebook.

The Solo 2500SE is easy to use. It includes a vibrant active-matrix screen as well as a Logitech touchpad with an uncommon feature: You can simulate left and right mouse clicks by tapping on the touchpad with one or two fingers, respectively. ▶

PHOTOGRAPHS: KEN SMITH

TOP 10 NOTEBOOK PCs

STANDARD FEATURES

	POWER NOTEBOOK	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude CPi D300XT*	Pentium II-300	7.4	64	6.4	active	13.3	1024 x 768	262,144	lithium ion	touchpad
2	Dell Inspiron 7000 D300GT	Pentium II-300	9.7	64	8	active	14.1	1024 x 768	16.8 million	lithium ion	touchpad
3	Micron GoBook 2 266	Pentium II-266	8.3	64	3	active	12.1	800 x 600	16.8 million	lithium ion	touchpad
4	Gateway Solo 9100LS	Pentium II-266	9.6	64	6	active	14.1	1024 x 768	16.8 million	lithium ion	touchpad
5	Toshiba Tecra 8000	Pentium II-266	7.2	64	6.1	active	13.3	1024 x 768	262,144	lithium ion	eraserhead
	BUDGET NOTEBOOK										
1	Gateway Solo 2500SE*	Pentium II-233	7.1	32	2.1	active	12.1	800 x 600	262,144	lithium ion	touchpad
2	Acer Extensa 367D	Pentium MMX-200	7.2	32	2.1	dual-scan	12.1	800 x 600	16.8 million	NiMH	touchpad
3	Chem USA ChemBook 5033	AMD K6-300	8.1	32	4	active	12.1	800 x 600	16.8 million	NiMH	touchpad
4	Quantex H-1331	Pentium MMX-266	7.4	64	4	active	13.3	1024 x 768	65,536	lithium ion	touchpad
5	WinBook XL 233 DSTN	Pentium MMX-233	8.7	32	1.6	dual-scan	12.1	800 x 600	262,144	NiMH	touchpad

*Best Buy ● Yes ○ No

[1] Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.
[2] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[3] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.
[4] Five years on CPU and main RAM, one year on other parts.

The Solo 2500SE's keyboard is run-of-the-mill. Typists who tend to pound on the keys will notice excessive flex under the keyboard. In addition, the speakers are located in the wrist rest, so your hands will tend to muffle the sound.

New This Month

The following PCs made our power and budget notebook charts for the first time this month. To find original reviews of previously tested notebooks on this month's charts, visit www.pcworld.com/top400.

POWER NOTEBOOKS

2 DELL INSPIRON 7000 D300GT

PRO: Record-setting speed, large screen, only portable here with a DVD-ROM drive

CON: Weighs a ton, DVD quality could be better

Powered by Intel's latest notebook processor, the Pentium II-300, Dell's Inspiron 7000 D300GT is our new speed king by an eyelash, chalking up an outstanding PC WorldBench 98 score of 162.

You'll love the Dell Inspiron's 14.1-inch screen.

In addition to its speed, this $3599 laptop's multimedia features and weight classify it as a desktop alternative. At 9.7 pounds, and 12.5 inches wide by 10 inches deep by 2.5 inches thick, the bulky Inspiron should spend most of its life on your desk.

Size has its benefits, however. The 7000's body and big screen panel are solid as a rock. The full-size keyboard is a pleasure to type on. Also, components usually relegated to PC Card slots, such as the modem and MPEG-2/DVD decoder board, are built in.

Dell just bumped its labor warranty on this notebook up to three years, a welcome improvement in support. Our only complaint: Movies didn't look as sharp on the 7000's DVD-ROM drive as they have on those of other notebooks we've seen.

3 MICRON GOBOOK 2 266

PRO: Flexible design, long-lasting battery

CON: Heavy with big battery attached

On this month's power chart, the Micron GoBook 2 266 replaces its slower Pentium MMX sibling, the GoBook 266. Micron has increased the hard drive size to 3GB and upgraded the RAM to 64MB while maintaining the rare combination of outstanding battery life and very good Pentium II-266 performance.

The Micron's snap-on layer adds battery life.

The GoBook 2's two-layer design is both a joy and a burden. The ultralight main unit and bottom-mounted battery layer function together to provide exceptional 5.7-hour battery life, the highest score we've seen for a Pentium II notebook. Unfortunately, in this configuration the system weighs 8.3 pounds.

The GoBook 2 also comes with a smaller battery that fits into the modular bay. Using it reduces the weight of the notebook to 6.5 pounds, but battery life is brief (the vendor estimates 1 hour) and you can't use the smaller battery while running the CD-ROM drive. (Micron has announced a new bottom-mounted battery one-fourth the size of the full layer. This $199 option weighs less than the full-size battery and leaves the modular bay free for your CD-ROM drive.)

Micron covers parts and labor on most components for only one year, but extends parts coverage to five years for the CPU and main memory. We were unimpressed by the around-the-clock, toll-free technical support: Twice, we waited for nearly 30 minutes before reaching a rep.

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
12X-24X	not included	128	1	●	●	●	3/1	24	Sat., Sun.	BBS, WWW
2X DVD	56 [2]	192	1	●	○	●	3/3	24	Sat., Sun.	BBS, WWW
10X-24X	56 [3]	96	1	●	●	●	varies [4]/1	24	Sat., Sun.	BBS, CIS, WWW
8X-20X	56 [3]	192	1	○	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-24X	56 [2]	256	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, WWW
8X-20X	not included	160	0	○	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
16X-20X	56 [2]	80	0	●	○	●	1/1	24	Sat., Sun.	BBS, WWW
8X-20X	56 [3]	96	0	○	●	●	1/3	9	none	WWW
12X-24X	56 [2]	144	1	●	○ [5]	●	varies [6]/1	24	Sat., Sun.	BBS, WWW
8X-20X	56 [2]	128	0	○	○	●	1/1	13	Sat.	BBS, WWW

[5] Comes standard with port replicator.
[6] Three years on CPU and main RAM, one year on other parts.

5 TOSHIBA TECRA 8000

PRO: Rugged; multipurpose bay
CON: Can't use floppy and CD-ROM drives at once

Until recently, notebook vendors used magnesium cases only on ruggedized notebooks intended for rough-and-tumble outdoor use. With the magnesium-encased Tecra 8000, Toshiba brings durability to mainstream notebooks—without the added weight that ruggedizing usually adds. At only 7.2 pounds, this portable is the lightest on the power chart.

The Tecra 8000's bay takes a variety of drives.

The Tecra 8000, which takes Best Buy honors in our roundup on notebook longevity, has several other admirable characteristics as well. In addition to being the quickest PII-266 notebook we've ever tested, it's flexible, thanks to its various upgrade options.

The modular bay not only accepts the standard CD-ROM drive, but also handles an optional DVD-ROM, floppy, or second hard drive; or a second battery. Last but not least, if you're a diehard who's always preferred the old eraserhead pointing device over the often-mercurial touchpad, the Tecra 8000 is one of the few new laptops that come with one.

However, we do have a few beefs. To use the floppy and CD-ROM drives at the same time, you have to connect the former externally, an arrangement that robs you of the ability to print. Also, the battery life isn't stellar.

We got quick, helpful advice when we called Toshiba's technical support staff. But the vendor's free tech support is limited to three years, at a time when most notebook makers offer support for the life of the product.

The modest ChemBook 5033 has a low price.

BUDGET NOTEBOOKS

3 CHEM USA CHEMBOOK 5033

PRO: Very inexpensive, good performance
CON: Limited expansion, short support hours

Thanks to its AMD K6-300 processor, the ChemBook 5033 offers hot performance at a very low price.

With a PC WorldBench 98 score of 117, the ChemBook 5033 performs at about the same clip as a Pentium MMX-266. That's plenty of speed for basic work applications. And at $1499, the laptop is a grand less than many PMMX-266 notebooks, such as the Quantex H-1331 just below the 5033 on the budget chart.

But with such a low price come compromises. You don't get a bay for a second battery, and the standard NiMH battery doesn't break the 3-hour mark. You also can't remove the hard drive, and it's hard to get to the RAM slots to add memory.

The portable's keyboard is adequate—the action is a bit clicky, which you may or may not like. The touchpad works well. Perhaps most important: Chem USA's technical support lines are open only on weekdays, and for just 9 hours a day. Carefully consider whether you can accept such limited support before going with this notebook. ■

BEYOND THE TOP 10

online

We evaluated these systems along with the others, but they didn't score high enough to make it onto the *Top 10 Notebook PCs* chart. For a write-up of the Micro Express NP14A, visit PC World Online (www.pcworld.com/top400).

- **Compaq Armada 7400**
- **Gateway Solo 2500LS**
- **Micro Express NP14A**
- **Panasonic ToughBook 71**
- **Transmonde Vivanté SE 2300**
- **WinBook XLi 233**

PC WORLD

TOP 10 HOME PCs

	POWER SYSTEM	Last month	Month tested	Street price (8/21/98)	Comments
1	Dell Dimension XPS R400 800/388-8542 www.dell.com	n/a	NEW	$2179	PRO: Lightning-fast performance, vendor has great reliability rating. CON: Not cheap, limited software package.
2	Micron Millennia 400 888/634-8799 www.micronpc.com	1	Sept 98	$2253	PRO: Fastest home system ever, $120 price drop, good reliability and service ratings. CON: Limited software package, most expensive PC on chart.
3	Quantex QP6/350 M-4x 800/896-4898 www.quantex.com	n/a	NEW	$2049	PRO: Great speed and features for a reasonable price, 19-inch monitor. CON: Mediocre setup, so-so software package.
4	IBM Aptiva E5D 800/426-7235 www.ibm.com	n/a	NEW	$2048	PRO: Keyboard with programmable buttons; headset microphone; voice recognition software. CON: On the slow side for a Pentium II-400, 15-inch monitor.
5	Gateway G6-400h 800/846-2000 www.gateway.com	3	Oct 98	$1999	PRO: Very fast PC, $774 price cut, huge hard drive and big monitor, good support rating. CON: Software package is merely adequate.
	BUDGET SYSTEM				
1	CyberMax PowerMax H1 800/345-8939 www.cybmax.com	n/a	NEW	$1389	PRO: Low price for great performance; good reliability and support ratings. CON: Software package is unimpressive.
2	Dell Dimension V333c 800/388-8542 www.dell.com	n/a	NEW	$1529	PRO: Fastest budget system we've ever tested. CON: On the expensive side for a budget machine, mediocre support rating, scanty software bundle.
3	Quantex QP6/266 M-1x 800/896-4898 www.quantex.com	3	July 98	$1199	PRO: Great price for decent performance. CON: Range of software titles is unremarkable, fair reliability rating.
4	The Panda Project Rock City ST-300/2 800/994-4484 www.rockcity.com	n/a	NEW	$1154	PRO: Unusual and interesting design, good price for great performance. CON: Setup is a little awkward, skimpy software bundle, no data on vendor reliability and service.
5	HP Pavilion 3265 800/724-6631 www.hp.com	5	Sept 98	$1098	PRO: Cheapest system in our Top 10, great for first-time PC owners. CON: No secondary cache and minimal video RAM make this system the slowest on our chart.

Best Buy n/a = not applicable

[1] Insufficient data to give a rating.
[2] For more about products here, select the number on the product information card or visit www.pcworld.com/infonet.

WATCH OUT. The quiet rivalry among budget PC manufacturers has turned into a barroom brawl. Amid the flying beer bottles and broken chairs, innocent bystanders can grab some terrific deals on surprisingly powerful systems. The reason: A new crew of inexpensive yet fast processors has rolled into town.

Just take a look at our charts this month. Of the eight new systems we tested, six cracked the Top 10—and three of those are budget PCs sporting new low-cost processors from Intel and AMD. Even on the power side, the deals aren't bad. Our three newcomers all pack speedy Pentium II punch for less than $2300.

TO THE MAX

TOPPING THE BUDGET LIST is a great new system from CyberMax, the PowerMax H1. The PowerMax's terrific price and the company's impressive reliability and support scores propel the system into the number one spot. (See "PC Reliability and Service: Who Can You Trust?" on page 97 for more on our new ratings.)

Based on the AMD K6-2-300 chip, the nimble PowerMax H1 posted a PC WorldBench 98 score of 168, making it as fast as your average Pentium II-333 machine. Unless you're creating a 3D model of the human brain or digitizing the works of Dali, that's all the speed you'll need to do anything—including playing the latest games. As a matter of fact, the K6-2 processor comes with special 3D capabilities that may even give it a performance edge over the Pentium II chip on some games that support DirectX 6.0, like Microsoft's Baseball 3D 1998 Edition.

With a $1389 price tag, the PowerMax H1 includes a 17-inch monitor, a DVD-ROM drive, and a mediocre software package that includes Corel's WordPerfect Suite 8 and Calendar Creator 5.0. The machine also comes with a token game (Final Four) and an educational CD-ROM (Creativity Workshop for Kids).

PowerMax H1

New at number two this month is Dell's Dimension V333c. The V333c features Intel's latest (and vastly improved) low-cost CPU, the Celeron-333. Early versions of the Celeron lacked secondary cache memory and were dog-slow as a result. But the Celeron-333 processor features 128KB of secondary cache, which helped the V333c post an impressive 169 on our PC WorldBench 98 test suite, an eyelash faster than the PowerMax. (If you're considering other Celeron systems, note that new and old 300-MHz versions of the chip are available. Make sure you get a system with the Celeron 300A—its performance is superior.)

The Dell name will cost you, though. At $1529, the V333c costs $140 more than

SCORECARD

★ Overall rating	PC WorldBench 98 score/rating	Price	Reliability/ support	Setup	Features	InfoNet number[2]
86	203/outstanding	moderate	outstanding/ fair	good	Pentium II-400, 64MB of SDRAM, 10GB hard disk, 14X-32X CD-ROM drive, 56-kbps modem, Iomega Zip drive, 17-inch monitor, AGP graphics card.	631
85	209/outstanding	moderate	good/ good	good	Pentium II-400, 64MB of SDRAM, 10GB hard disk, 2X DVD-ROM drive, 56-kbps modem, 17-inch monitor, Iomega Zip drive, AGP graphics card.	632
82	184/good	inexpensive	fair/ good	fair	Pentium II-350, 64MB of SDRAM, 8.4GB hard disk, 12X-32X CD-ROM drive, 56-kbps modem, 19-inch monitor, AGP graphics card.	633
82	185/good	inexpensive	good/ fair	good	Pentium II-400, 64MB of SDRAM, 8GB hard disk, 8X-20X CD-ROM drive, 56-kbps modem, 15-inch monitor, AGP graphics card.	–
81	205/outstanding	very inexpensive	fair/ good	outstanding	Pentium II-400, 128MB of RAM, 14GB hard disk, 2X DVD-ROM drive, 56-kbps modem, 19-inch monitor.	634
Power scorecard weightings ▶	**Performance 30 percent**	**Price 15 percent**	**R/S 40 percent**	**Setup 5 percent**	**Features 10 percent**	
88	168/outstanding	moderate	good/ good	good	AMD K6-2-300, 64MB of SDRAM, 6.4GB hard disk, 2X DVD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	635
88	169/outstanding	moderate	outstanding/ fair	good	Celeron-333, 64MB of SDRAM, 6.4GB hard disk, 14X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, Harman Kardon HK195 speakers, AGP graphics card.	636
87	141/good	inexpensive	fair/ good	fair	Pentium II-266, 32MB of SDRAM, 3.2GB hard disk, 12X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	637
81	168/outstanding	inexpensive	1/1	fair	AMD K6-2-300, 64MB of SDRAM, 4.3GB hard disk, 12X-32X CD-ROM drive, 56-kbps modem, 15-inch monitor.	638
81	83/poor	very inexpensive	fair/ fair	outstanding	Pentium MMX-233, 32MB of SDRAM, 2.1GB hard disk, 12X-24X CD-ROM drive, 56-kbps modem, 15-inch monitor.	639
Budget scorecard weightings ▶	**Performance 15 percent**	**Price 30 percent**	**R/S 40 percent**	**Setup 5 percent**	**Features 10 percent**	**All products: 903**

CyberMax's machine, even though the two systems' specifications are almost identical. In addition, Dell's software package is scantier (just Microsoft Home Essentials 98 and Greetings Workshop come bundled with the V333c). Nevertheless, it's a great choice for your home office or for a game-crazed family on a budget.

You can also find bargains on low-cost Pentium II systems like this month's third-place finisher, the QP6/266 M-1x from Quantex. This Pentium II-266 machine is a little slower than the Dell and CyberMax systems (by around 16 percent), but it's also considerably less expensive at a price of just $1199.

Cheaper still are Pentium MMX systems—if you can find them. They won't be around much longer, but if your needs are modest and your budget is limited, these systems may be just the ticket. Hewlett-Packard's $1098 Pavilion 3265, for example, is a basic, easy-to-set-up PC that's great for word processing, e-mail, and Internet exploration. On the downside, it's the slowest machine on the chart.

DEBUT FROM PANDA

THERE'S A NEW KID on the block: The Panda Project. We tested the company's brand-new Rock City PC, the ST-300/2, and the home system scored high enough to capture the fourth spot on our budget chart.

Dell Dimension V333c

The ST-300/2 looks like an alien object of worship found at the edge of our galaxy. The case is a black cube decorated with little white lines; it rests eerily on a small metal stand and appears to be balancing on a single corner (see photo, page 187). Unfortunately, the system and stand were fairly cumbersome to assemble, and the setup instructions were only mediocre.

Looks aside, the Rock City is a fully functional PC. The AMD K6-2-300–based machine posted a PC WorldBench 98 score of 168, matching the PowerMax's rating. The $1154 price includes a 15-inch monitor and minimal software.

Because the Rock City ST-300/2 is the first system built by The Panda Project for consumers, we have no information on the quality of the vendor's reliability and support. That means you're on your own.

Our overall impression of the ST-300/2 is that it's really more of a "dorm" system than a home PC; it even comes with a wireless keyboard with built-in mouse controls—great for cramped spaces that are cluttered with empty cans and pizza boxes.

—Kirk Steers

Kirk Steers is a contributing editor for PC World. *Testing was performed by Ulrike Diehlmann of the PC World Test Center.* ■

BEYOND THE TOP 10

online

We also evaluated the following two systems this month, but they didn't score high enough to make the *Top 10 Home PCs* chart. For write-ups, see PC World Online (www.pcworld.com/t10homepcs).

- **Hewlett-Packard Pavilion 8370**
- **Packard Bell Multimedia 850**

PHOTOGRAPHS: KEN SMITH

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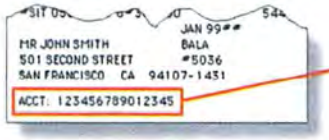

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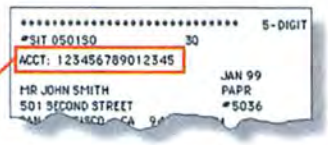

At the registration site you'll need to answer a short list of questions. Simply fill out the survey and remember to leave your name, e-mail address, street address, and phone number for prize notification. (See rules for alternate method of entry.) Good luck!

Cathryn Baskin, Editor in Chief

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TOP 10 PRINTERS

	MONOCHROME WORKGROUP PRINTER	Month tested	Street price (8/7/98)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	InfoNet number
1	HP LaserJet 4000 TN 800/752-0900 www.hp.com	Sept 98	$1599	94	12.4	4.5	**FEATURES:** Laser, rated 17 ppm. Standard 8MB of RAM, 1200-by-600-dpi resolution, 600 sheets input, 300 output. **SUMMARY:** Fast text and graphics, outstanding text quality, and extensive features keep it at the top, though you'll need special settings to achieve the best graphics quality.	699
2	HP LaserJet 5000 800/752-0900 www.hp.com	Sept 98	$1449	93	11.9	5.0	**FEATURES:** Laser, rated 16 ppm. Standard 4MB of RAM, 1200-by-1200-dpi resolution, 350 sheets input, 300 output. **SUMMARY:** The HP LaserJet 500 boasts the fastest graphics speed here and can print 11-by-17-inch documents. But as with the 4000 TN, graphics are mediocre at default settings.	700
3	Lexmark Optra S 1855 800/539-6275 www.lexmark.com	Sept 98	$1129	93	13.8	4.0	**FEATURES:** Laser, rated 18 ppm. Standard 4MB of RAM, 1200-by-1200-dpi resolution, 350 sheets input, 250 output. **SUMMARY:** Newly improved support policies bump it up a notch, and you also get speedy text printing and great paper handling. Print quality can be spotty, especially with gray-scale graphics.	701
4	Lexmark Optra S 1625 800/539-6275 www.lexmark.com	NEW	$999	93	11.7	4.2	**FEATURES:** Laser, rated 16 ppm. Standard 4MB of RAM, 1200-by-1200-dpi resolution, 350 sheets input, 250 output. **SUMMARY:** Low price for its class, strong performance, and good print quality land the 1625 a spot on the chart. Except for print speed, specifications are identical to Lexmark's third-place 1855.	702
5	Xerox DocuPrint P12 800/832-6979 www.xerox.com	Sept 98	$699	92	9.1	3.7	**FEATURES:** Laser, rated 12 ppm. Standard 2MB of RAM, 600-by-600-dpi resolution, 330 sheets input, 250 output. **SUMMARY:** Inexpensive model comes with a three-year warranty and prints outstanding text, but it's the slowest printer on the monochrome chart.	703
	COLOR WORKGROUP PRINTER							
1	Lexmark Optra SC 1275 800/539-6275 www.lexmark.com	Sept 98	$2999	89	7.6	1.6	**FEATURES:** Laser, rated 12 ppm monochrome/3 ppm color. Standard 16MB of RAM, 600-by-600-dpi resolutions, 400 sheets input, 250 output. **SUMMARY:** Improved support launches the 1275 to Best Buy status—but the fastest graphics speed and good text quality don't hurt, either. Colors can be a bit garish.	704
2	Epson Stylus Color 1520 800/463-7766 www.epson.com	Sept 98	$799	87	3.3	1.0	**FEATURES:** Ink jet, rated 6 ppm monochrome/5 ppm color. Standard 64KB of RAM, 1440-by-720-dpi resolutions, 100 sheets input, 35 output. **SUMMARY:** Gorgeous colors and a very low price keep it near the top of the chart, though it's the slowest printer overall.	–
3	Minolta Color PageWorks PS 888/264-6658 www.minoltaprinters.com	Sept 98	$3299	85	5.3	0.9	**FEATURES:** Laser, rated 12 ppm monochrome/3 ppm color. Standard 20MB of RAM, 600-by-600-dpi resolutions, 400 sheets input, 250 output. **SUMMARY:** We like its well-designed paper-handling features, respectable speed, and strong text and color output quality, but graphics are a little coarse.	705
4	Xerox DocuPrint C55mp 800/349-3769 www.xerox.com	Sept 98	$4000	85	7.8	1.0	**FEATURES:** Laser, rated 12 ppm monochrome/3 ppm color. Standard 30MB of RAM, 600-by-600-dpi maximum resolutions, 250 sheets input, 150 output. **SUMMARY:** Strong text speed and great print quality—plus an ethernet card worth $500—help balance high price.	706
5	QMS Magicolor 2 CX 800/523-2696 www.qms.com	Sept 98	$3200	84	9.7	1.5	**FEATURES:** Laser, rated 16 ppm monochrome/4 ppm color. Standard 24MB of RAM, 2400-by-600-dpi color resolution, 600-by-600-dpi monochrome resolution, 250 sheets input and output. **SUMMARY:** Strong print quality and high speeds earn it a spot, but unexceptional features keep it at the bottom.	707

Best Buy — Windows 95-certified Plug and Play — All products: 908

TEST PC WORLD CENTER **HOW WE TEST** The overall rating for both monochrome and color workgroup printers is based on print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (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.

IT MAKES SENSE for a printer vendor to offer a line of models that range from the simple and inexpensive to the sophisticated and more costly. That way, any potential customer can find a unit that fills the bill. But too many options from the same vendor can create confusion for potential buyers, especially when the features of the various offerings are barely distinguishable. So it pays to analyze your choices carefully before buying. This month ▶

we tease out some subtle differences among several new models from Lexmark's Optra S line.

For our September issue, we tested the Lexmark Optra S 1855 and the Okidata OkiPage 10i, the first units the two companies released in their new lines of monochrome workgroup printers. This month we looked at three new monochrome printers from those companies: two from Lexmark, the $950 Optra S 1255 and the $999 Optra S 1625, and Okidata's $999 OkiPage 20. Lexmark's low-cost, quick-performing 1625 debuts on our monochrome chart at number four, while the company's less inspired 1255 falls just short. Okidata's new offering impressed us with its quick speeds and reasonable price, but misses the chart by a hair.

Lexmark's much-improved office-printer support policies—longer support hours, a 30-day money-back guarantee, and free on-site service—improve the company's showing on both of our charts. The Optra S 1855, our fourth-place monochrome printer in September, steps up to the third spot this month. On the color list, meanwhile, the Optra SC 1275 jumps from third to first place.

LEXMARK'S LINEUP

HOW DO LEXMARK'S two new monochrome printers fit in with its other current models? The Optra S 1625 should appeal to buyers who are looking for a good balance of price and performance, while the Optra S 1255 offers similar features but lower print speeds for about the same price as the 1625.

To its credit, the Optra S 1255 offers strong print quality—with crisp, solid text and realistic gray-scale graphics—as well as simple setup and a wealth of management software for network administrators. Rugged design and carefully thought-out control-panel menus make it enjoyable to use, and it comes with an excellent, informative manual. But at $950, it's no bargain for a printer that chugs through text documents at 9.5 pages per minute.

If you can afford to spend just a few dollars more, the $999 Optra S 1625 is a much better deal. The 1625 delivers text documents at 11.7 ppm, a substantial 23 percent faster than the 1255. The printers have the same design and operate in the same easy-to-use manner, come with the same management software, produce the same strong print quality, and support the same add-on paper-handling options. These helpful accessories—a boon for busy offices—include a duplexer (about $300) that enables you to print on both sides of a page, an envelope feeder that can feed up to 85 envelopes at a time (about $250), and various additional paper trays that can expand input capacity to an outstanding 2850 sheets.

DEBUTING AT number four, Lexmark's Optra S 1625 offers high speeds, high-quality output, and lots of paper-handling options.

OKI IS OKAY

OKIDATA HAS produced a long line of quality monochrome printers, many of which have made our chart in the past. Its latest entry, the OkiPage 20, delivers impressive performance for the price, cranking out text at 15.4 ppm—a whopping 32 percent faster than Lexmark's Optra S 1625, for the same $999. Unfortunately, the OkiPage 20's print quality is a mixed bag. It does particularly well on text, but graphics show some banding and tend to print too dark.

The OkiPage 20's design strengths include a 500-sheet paper tray as standard equipment. The toner cartridge clips onto the imaging unit, and the whole assembly drops smoothly into the engine, which makes setup and maintenance simple. And because the toner can be replaced separately—in Lexmark and Hewlett-Packard printers, the toner and imaging unit are a single piece—you'll save some money on toner refills.

The control-panel menus, however, are devilishly difficult to navigate without the manual in hand, and the auxiliary paper tray and rear-exit paper tray are a bit flimsy. Also, Okidata doesn't sell as many lavish paper-handling options as Lexmark—only a duplexer (about $339) and an additional 500-sheet paper tray (around $299). But if you print mostly text, the OkiPage 20 is a printer that can easily keep up with a busy office.

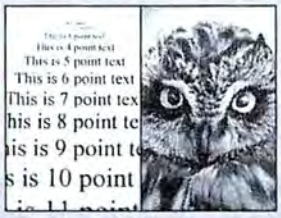
—Dan Littman ■

PRINT QUALITY SAMPLES

Lexmark Is Lord of the Prints

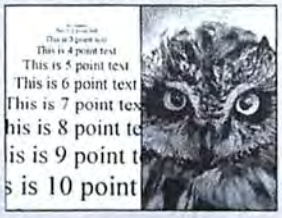
LEXMARK OPTRA SC 1275

New to the number one color spot, the Optra SC 1275 offers clear, sharp text and realistic grays. Our only complaint: Colors can be overbright.



LEXMARK OPTRA S 1625

Dark, readable text and light, detailed gray-scale images a little better than our Best Buy's help make the new 1625 the number four monochrome.



OKIDATA OKIPAGE 20

We appreciate the 20's precise text and high speeds, but its dark, banded graphics leave something to be desired. It misses our chart by a hair.

TheWorkz

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FireGL 1000 Pro	272
Millennium G-200	260
ATI Xpert@Work	205

Viewperf CDRS-03††

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Xpert@Work	18
G-200	12

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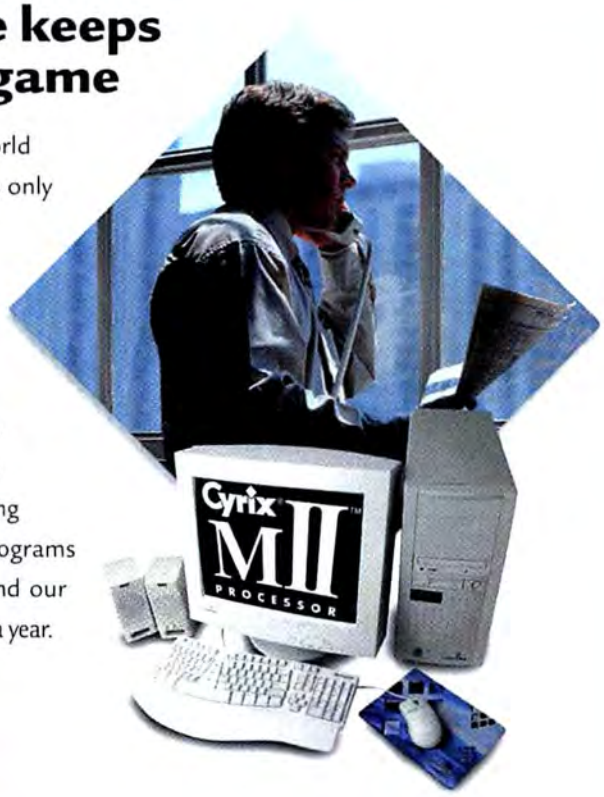

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PC WORLD

TOP 10 MONITORS

	15-INCH MONITOR	Month tested	Street price (9/1/98)	Overall rating	Quality of text/graphics	Comments	InfoNet number
1	Princeton EO500 800/747-6249 www.prgr.com	retested this month	$197	79	very good/ very good	**FEATURES:** 13.6-inch viewable area, .28mm dot pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour weekday toll-free support. **SUMMARY:** With a $102 cut and great colors, newer model jumps over the competition, but on-screen controls require extra button pressing.	640
2	Samsung SyncMaster 500b 800/933-4110 www.sosimple.com	retested this month	$199	79	very good/ very good	**FEATURES:** 13.6-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **SUMMARY:** Contemporary design, fine picture, and another $30 price cut compensate for on-screen submenus that are hard to navigate. Refresh rate drops to 85 Hz.	641
3	Mitsubishi Diamond Scan 15VX 800/843-2515 www.mitsubishi-display.com	retested this month	$219	79	very good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] image correction utility, three-year warranty, 12-hour daily toll-free support. **SUMMARY:** Sharp picture and a hefty $80 price cut make up for missing adjustments like image tilt. It also lacks emissions compliance.	642
4	CLR VisionPro 15 800/611-1555 www.clrusa.com	retested this month	$179	79	very good/ very good	**FEATURES:** 13.4-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Clear text, realistic graphics, and low price put it on the chart, despite a small viewable area and crude on-screen menu icons.	643
5	ViewSonic P655 800/888-8583 www.viewsonic.com	NEW	$259	78	very good/ excellent	**FEATURES:** 14-inch viewable area, .27mm dot pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 11-hour weekday toll-free support. **SUMMARY:** Large viewable area and vibrant colors are strong points, but a steep price and relatively short support hours weaken its rating.	644
6	MAG InnoVision XJ500T 800/827-3998 www.maginnovision.com	NEW	$189	78	good/ very good	**FEATURES:** 13.9-inch viewable area, .25mm stripe pitch Trinitron tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 24-hour toll-free support. **SUMMARY:** Competitively priced; nice graphics and easy-to-adjust on-screen controls. Text isn't as sharp as on models that rank higher.	645
7	CTX PL5+ 800/888-2120 www.ctxintl.com	NEW	$179	78	very good/ good	**FEATURES:** 14-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Large viewable area and fine, focused text outshine weak graphics and tech support hours that aren't as long as some others here.	646
8	AcerView 56c 800/733-2237 www.acerperipherals.com	NEW	$209	78	very good/ very good/	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free tech support. **SUMMARY:** It has a stylish design and displays text and graphics well, but you must press Save before settings take effect, and on-screen controls are hard to decipher.	647
9	MaxTech XT-5862 800/936-7629 www.maxtech.com	retested this month	$142	77	good/ very good	**FEATURES:** 13.9-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 8-hour weekday toll-free support. **SUMMARY:** Cheapest monitor here drops a bit in text score, and picture adjustments lack basics like word descriptions and numeric gauges.	648
10	Philips 105MB 800/835-3506 www.philipsmonitors.com	NEW	$239	75	good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 12-hour daily toll-free support (9 hours on Sunday). **SUMMARY:** Nice colors, integrated speakers and advanced controls help it onto the chart, but a high price and so-so text thwart a higher ranking.	649

Best Buy — For reviews of products that didn't make the chart, visit www.pcworld.com/t10monitors. All products: 904

TEST PC WORLD CENTER **HOW WE TEST** Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] Highest refresh rate at 800 by 600 resolution. [2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

FIVE NEW MONITORS join the Top 10 this month, led by ViewSonic's P655. Although it has the highest price here, it's your best bet if you work mostly with photos or other color graphics. Princeton's EO500 grabs the "most improved" award on our revised tests (see October's roundup of 17-inch monitors, page 119). Slightly better scores on text and graphics and a whopping $102 price cut raise the EO500 from ninth to first place. ■

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TOP 10 GRAPHICS BOARDS

	PCI BOARD	Month tested	Street price (9/8/98)	Overall rating	Mixed-media business rating	3D rating	Features rating	Comments	InfoNet number
1	STB Velocity 128 800/234-4334 www.stb.com	Aug 98	$99	82	average	average	good	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled 3D games and 3D modeling program. **SUMMARY:** The Velocity 128 is a good low-cost option for users who like to dabble in a little of everything.	717
2	Real 3D StarFighter PCI 800/393-7730 www.real3d.com	Aug 98	$219	81	average	excellent	average	**FEATURES:** 24MB of SGRAM (includes 16MB dedicated texture RAM), 220-MHz RAMDAC, Intel740 chip, bundled 3D games and 3D modeling program. **SUMMARY:** Terrific 3D performance and an $11 price cut outweigh scant features and support.	718
3	Diamond Viper V330 800/468-5846 www.diamondmm.com	Aug 98	$80	80	average	good	average	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled 3D games and tools for VRML authoring and photo editing. **SUMMARY:** A great buy, thanks to $40 price drop, but needs updated drivers to run PowerPoint with 3D plug-ins.	719
4	Intergraph Intense 3D Voodoo 800/763-0242 www.intergraph.com/ics	Aug 98	$99	78	average	excellent	average	**FEATURES:** 6MB of EDO DRAM (includes 2MB dedicated texture RAM), 220-MHz RAMDAC, Alliance ProMotion chip and 3Dfx Voodoo Rush chip, bundled 3D games. **SUMMARY:** A low-cost option for gamers, but Intergraph lacks weekend support.	720
5	Hercules Thriller 3D 800/532-0600 www.hercules.com	Aug 98	$99	78	average	excellent	below average	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, Rendition Verite V2200 chip, no bundled software. **SUMMARY:** The Thriller 3D is affordable, fast in 3D, and adequate for standard business use. The company, however, doesn't offer weekend support.	721
	AGP BOARD								
1	Matrox Millennium G200 800/844-8305 www.matrox.com/mga	Oct 98	$149	92	excellent	excellent	excellent	**FEATURES:** 8MB of SGRAM, 250-MHZ RAMDAC, MGA-G200 chip, bundled 3D modeling tool and image editing app. **SUMMARY:** Great speed and 3D image quality make this board a strong candidate for the office and for after-hours gaming.	722
2	STB GlyderMax-2 800/234-4334 www.stb.com	Oct 98	$99	91	excellent	good	good	**FEATURES:** 8MB of SGRAM, 230-MHz RAMDAC, 3Dlabs Permedia 2 chip, bundled 3D games and VRML creator. **SUMMARY:** The GlyderMax-2 is a good pick for the office. It does a nice job with business graphics apps and with 3D games.	723
3	STB Velocity 128zx 800/234-4334 www.stb.com	Sept 98	$149	89	good	excellent	good	**FEATURES:** 8MB of SGRAM, 250-MHz RAMDAC, NVidia Riva 128zx chip, bundled 3D games and VRML creator. **SUMMARY:** This board is a good option for home users. It handles 3D games nicely, and its TV-out port connects to a big-screen TV.	724
4	Matrox Mystique G200 800/844-8305 www.matrox.com/mga	NEW	$149	88	excellent	good	excellent	**FEATURES:** 8MB of SDRAM, 230-MHz RAMDAC, MGA-G200 chip, bundled 3D games. **SUMMARY:** The board's excellent mixed-media graphics performance and extras like a video-out port help outweigh Matrox's short support hours.	725
5	Diamond Stealth II G460 800/468-5846 www.diamondmm.com	Aug 98	$130	85	good	excellent	average	**FEATURES:** 8MB of SDRAM, 203-MHZ RAMDAC, Intel740 chip, bundled 3D games and 3D animation and 3D visualization software. **SUMMARY:** The G460 works well for most graphics tasks. However, it lacks a zoom utility, and support isn't toll-free.	726

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10graphics. All products: 910

TEST PC WORLD CENTER **HOW WE TEST** We test boards under Windows 95. Business tests include PC WorldBench 98, a PowerPoint test, and a Macromedia Director script. Our 3D score is based on four games, each evaluated on frame rate and image quality. For AGP cards, we add a texturing test using Caligari's TrueSpace3. PCI boards were tested in a Micron Millennia Mme with a Pentium MMX-233 and 32MB of RAM. AGP boards were tested in an NEC Direction 333 with a PII-333 and 64MB of RAM. Overall rating is based on performance (PCI 50 percent, AGP 55 percent), features (25 percent), price (PCI 15 percent, AGP 10 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

STB'S VELOCITY 128 PCI board and Matrox's Millennium G200 AGP board retain Best Buy status this month. The $99 Velocity 128 is very affordable, and the G200 provides remarkable all-around performance. Also a good buy, the new Matrox Mystique G200 enters our AGP chart in fourth place. Other AGP boards we tested—Intel's 8MB Express 3D and Elsa's Gloria Synergy—missed the chart due partly to their second-rate features and support. ■

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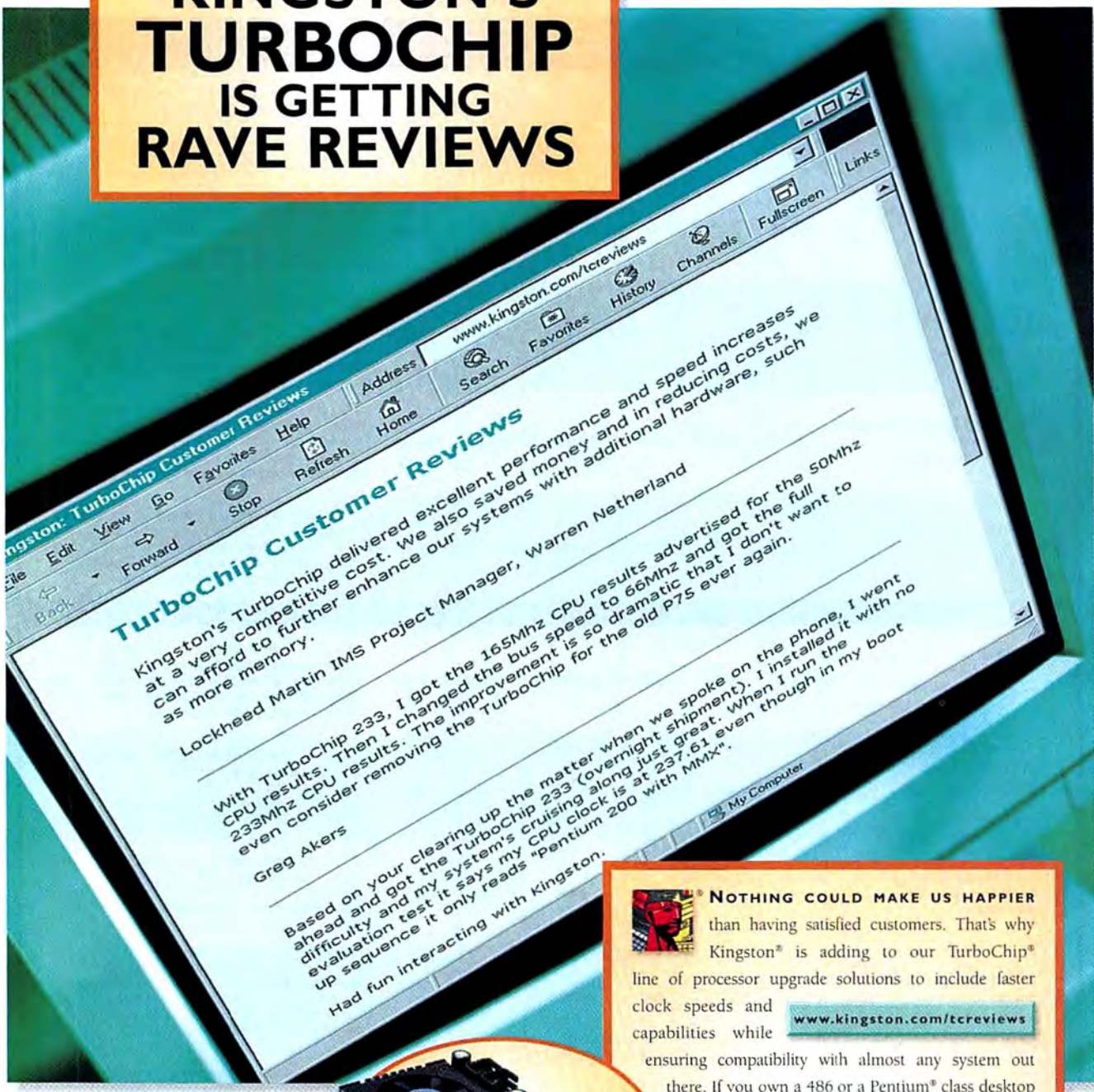

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TOP 10 MODEMS

	INTERNAL MODEM	Month tested	Street price (8/25/98)	Overall rating	V.34 transfers/ 56-kbps downloads (min:sec per MB)	Comments	InfoNet number
1	Diamond Multimedia SupraExpress 56i 800/468-5846 www.diamondmm.com	July 98	$100	80	2:41/3:04	**FEATURES:** Supports V.90 and K56flex, 16-bit ISA card, V.80 videoconferencing support, distinctive ring, COMit and FaxTalk software. **SUMMARY:** The SupraExpress 56i is an excellent choice for people who want a fast, inexpensive modem and don't need voice features. The modem is also backed by long support hours.	708
2	IBM 56K Modem Internet Kit 800/772-2227 www.ibm.com/pc/us/accessories	Nov 97	$99	80	2:39/3:17	**FEATURES:** Supports x2, 8-bit ISA card, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, DSVD, Caller ID, QuickLink Message Center software. **SUMMARY:** This modem's a terrific deal, thanks to a low price, rich features, and around-the-clock technical support.	–
3	E-Tech CyberBullet Modem PC56RVP 888/609-8885 www.e-tech.com	July 98	$99	80	2:47/3:10	**FEATURES:** Supports K56flex, 16-bit ISA card, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, DSVD, ASVD, Caller ID, SuperVoice software. **SUMMARY:** This low-cost modem comes with lots of features. But it's a bit slow, and V.90 upgrade is free only if it can be performed through software.	709
4	3Com U.S. Robotics Courier V.Everything 800/638-3266 www.3com.com	Sept 98	$240	80	2:31/3:00	**FEATURES:** Supports V.90 and x2, 8-bit ISA card, distinctive ring, callback, Caller ID, RapidComm software. **SUMMARY:** Despite the Courier's high price tag, good security features and very fast transfer and download speeds make this V.90 modem the chart's top choice for corporate buyers.	710
5	Zoom FaxModem 56K 800/631-3116 www.zoomtel.com	May 98	$109	79	2:38/3:15	**FEATURES:** Supports K56flex, 16-bit ISA card, MNP-10EC, V.80 videoconferencing support, distinctive ring, COMit and WinFax Lite software. **SUMMARY:** Reasonably priced modem is backed by long support hours and comes with an unconditionally guaranteed upgrade to the V.90 standard.	711
6	Archtek SmartLink 5634BTS 888/912-9800 www.archtek.com	NEW	$89	79	2:44/2:50	**FEATURES:** Supports V.90 and x2, voice mail, speakerphone, QuickLink Message Center software. **SUMMARY:** Good price for a modem that offers voice mail and a speakerphone, and it's the fastest on the chart at 56-kbps downloads. But novices may have a hard time understanding the user manual.	712
7	3Com U.S. Robotics 56K Faxmodem 800/342-5877 www.3com.com	Sept 97	$130	78	2:31/3:16	**FEATURES:** Supports x2, 8-bit ISA card, distinctive ring, Caller ID, RapidComm software. **SUMMARY:** The 3Com 56K Faxmodem is a tad pricey, but its excellent documentation will appeal to novices and experts alike. Plus, the modem still comes with an unconditional free upgrade to V.90.	713
8	NewCom 56K IFX Internal Data/Fax Modem 800/563-9266 www.newcominc.com	Mar 98	$79	78	3:25/3:16	**FEATURES:** Supports x2, 16-bit ISA card, distinctive ring, voice mail, speakerphone, VoiceView, password protection, Caller ID, QuickLink II software. **SUMMARY:** The NewCom, though slow, is a good choice for people looking for a low-cost voice modem. You may have to pay extra to upgrade to V.90.	714
9	Shark Multimedia Leopard 56K 800/800-3321 www.sharkmm.com	Jan 98	$75	78	2:38/3:04	**FEATURES:** Supports K56flex, 16-bit ISA card, MNP-10, V.80 videoconferencing support, distinctive ring, voice mail, speakerphone, VoiceView, ASVD, Caller ID, microphone, DialTone software. **SUMMARY:** This voice modem has a bargain price, but upgrade to V.90 standard is free only if it can be performed through software.	715
10	Wisecom Accelerator Pro 56000 Internal Voice Data Fax Modem 888/947-3266 www.wisecominc.com	Sept 98	$99	78	2:40/3:04	**FEATURES:** Supports V.90 and K56flex, 16-bit ISA card, voice mail, speakerphone, DSVD, ASVD, Caller ID, SuperVoice software. **SUMMARY:** The Accelerator Pro 56000 is inexpensive for a voice modem, but you'll need to be comfortable with installing devices in your PC—the manuals offer little help for novices.	716

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems. All products: 909

TEST PC WORLD CENTER **HOW WE TEST** We test V.34 (limited to 33.6 kbps) modem-to-modem performance using a pair of identical modems on a Telecomm Analysis Systems simulated phone network. It sends one text file over 55 line conditions, and a mix of four files—graphics, text, program, and compressed files—over one line condition. For our x2 and K56flex performance tests, we call a local Internet service provider access number and transfer .jpg, .doc, and .zip files continuously over an 18-hour period. The times to transfer a megabyte of data are usually lower in the TAS test than in the ISP test because the files used in the latter are less compressible. Results for the two tests are not comparable. We currently do not test 56-kbps V.90 modem performance due to lack of ISP support. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

AFTER STEADY drops throughout the first part of the year, modem prices remain the same this month. The only newcomer to the chart is Archtek s $89 SmartLink voice modem, which lands in sixth place. We also tested Aztech s $62 56K PCI modem, by far the cheapest V.90 modem we ve seen. But it s recommended only for 133-MHz or faster Pentium PCs since it relies on the CPU more than most modems do. ■

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The number of mobile professionals in organizations today — 120 million — is drastically increasing. Mobile professionals hold a wide range of jobs, from corridor cruisers who simply spend time away from their desks, to traveling sales people who spend the majority of their time away from the office with customers. All of these mobile professionals have one thing in common: the need to quickly access information anytime, anywhere their jobs take them. The challenge for these users is finding the "sweet spot" in computing that meets their needs.

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These Palm-size PC manufacturers use Windows® CE: Casio, Everex, Philips and Uniden.
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www.microsoft.com/windowsCE/ppc **Microsoft**®
where do you want to go today?®

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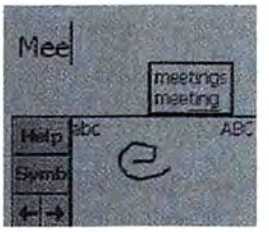
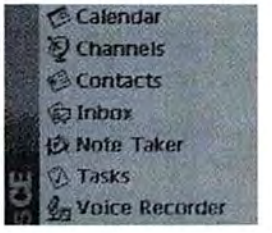


Powered by Microsoft Windows CE



"WE SEE THESE DEVICES AS EXTENSIONS TO THE DESKTOP OR NOTEBOOK PC." Diane Hwang, analyst, IDC

When Microsoft® Windows®-based laptops were first introduced, there was finally a way to bring PC computing power along for the ride, no matter how far you went. Now, savvy users are also equipping themselves with a range of new PC companion devices based on the Microsoft Windows CE operating system that allow even more mobility with quick access to information.

These new PC companion devices have a similar interface to regular Windows-based machines. Anyone with even a passing knowledge of Windows — the home and business computing standard — can immediately use the Windows CE operating system. And like Windows, Windows CE is easily licensed by hardware makers, insuring a wide range of devices and a long life for the operating system and its applications. Maybe that's why International Data Corp. (IDC), a market research firm in Framingham, Mass., predicts that the market for handheld computer devices will experience a compound annual growth rate of 44.8% for 1997-2001!

Also, the Windows CE operating system communicates easily with more powerful members of the Windows family, such as Windows NT®. If your corporation has standardized on Microsoft Office and the Windows NT-based BackOffice® suite of applications, Windows CE devices are a perfect companion. Not only can the devices tap into Microsoft Exchange messaging server, but they can also work with Microsoft SQL Server™, retrieving information and updating the corporate database.

TRUE COMPANION

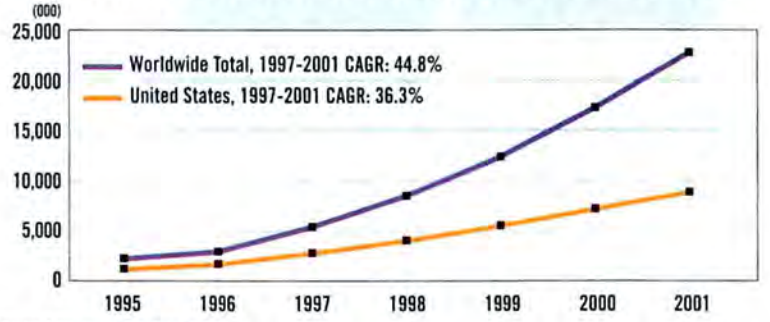
Windows CE's combination of physical connectivity and software compatibility has led to the name "PC companion." So what exactly is a PC companion? Any device that communicates with a PC and smoothly integrates with your desktop software. This way, you can take the essence of your desktop with you when you go, and update your desktop with new information when you return. PC companions are lighter, and offer instant "on" capability and reliability. In fact, they start immediately to give you quick access to information, and remember exactly where you were when you shut down. "IDC thinks the personal companion segment will be the volume growth generator due to the low cost for these devices, and the fact that users are looking for small, pocket-sized devices that synchronize to their desktop or notebook PC," says Diane Hwang, an analyst with IDC.

Once connected, the Windows CE-based machine can keep itself up to date with your desktop. With Microsoft ActiveSync™ technology installed on your desktop, for instance, Handheld PCs and Palm-size PCs can update the desktop so that schedules, contacts, tasks, e-mail, and notes are up to date with Schedule+ 7.0, Outlook, and Microsoft Word. Third-party tools will let Windows CE devices synchronize with Lotus Organizer, from Lotus Development Corp., Cambridge, Mass.; ACT!, from Symantec Corp., Cupertino, Calif.; ECCO, from NetManage Inc., Cupertino, Calif.; Day-Timer Organizer, from Day-Timers Inc., Allentown, Pa.; Maximizer, from Multiactive Software Inc., Vancouver, B.C.; GoldMine, from GoldMine Software Corp., Pacific Palisades, Calif.; and other packages.

"We see these devices as extensions to the desktop or notebook PC," says IDC's Hwang. "On a PC companion side, these devices enable workers to take a subset of the data on the road or at home to do light data manipulation or access their e-mail. In the future, you will see larger PC companions that enable users to perform more data creation capabilities so that they can be more productive when they are away from the office."

There are lots of ways to synchronize. Walk your Windows CE device up to the desktop, and an infrared connection will do the dirty work. Away from your desk? Let your modem or wireless connection

Shipments of Smart Handheld Devices, U.S. and World



SOURCE: INTERNATIONAL DATA CORP., 1998

FREESTYLE

EVEREX

"PalmPilot, beware."

- The Baltimore Sun

There really is no comparison. With the Freestyle PC Companion, we at Everex have officially raised the bar for Palm-size computing to a new level of power and flexibility. Powered by Microsoft Windows® CE, and featuring instant desktop synchronization, a unique vibrating alarm, optional 33.6 Fax / Modem, and nearly limitless storage capabilities, the Freestyle provides the tools to manage your information and stay current. Take a voice note, jot down an appointment in your own handwriting, and check your email on the run - ***with the Freestyle, it's easy to be connected, and stay connected.***

	Everex Freestyle™	Palm III™
Operating System	Windows CE 2.0 - familiar Windows interface which is instantly recognizable to Windows 95 / 98 users and provides seamless desktop integration	Palm OS
Screen Resolution	240 x 320 pixels per inch	160 x 160 pixels per inch
RAM	4 / 8 MB (Upgradable)	2 MB
Backlight	Yes	Yes
One-handed Navigation	Yes	No
CompactFlash Slot	Yes - support for Memory cards (up to 48 MB) Wireless communication Bar Coding, etc	No
Voice Recorder	Yes	No
Infrared Port	Yes - industry standard IRdA Port allows Freestyle to "beam" info to any device (notebook computer, network printer, lor PDA) equipped with standard IRdA	Yes - but proprietary IRdA allows you to communicate only with another Palm III
Vibrating Alarm	Yes - allows for silent notification of appointments	No
Digital Ink Recognition	Yes - allows you to store notes and drawings in your own handwriting.	No
MobileCradle	Yes - a foldable cradle that provides an additional battery compartment for the Freestyle while traveling.	No
Integrated 33.6 Fax / Modem	Yes - housed in the MobileCradle on the Freestyle Executive	No

Feature for feature, the Everex Freestyle is the most powerful Palm-size PC available, putting the power and flexibility of Microsoft Windows CE in the palm of your hand. And now, when you purchase an Everex Freestyle Manager or Executive model between **October 15th and November 30th, 1998**, you are eligible for a $50.00 rebate from Everex. Simply send us your old PalmPilot™ along with the form below, and Everex will send you $50.00.

Powered by Microsoft® Windows® CE

It's that simple.

But act quickly - this is a limited time offer.

$50.00 rebate

Please complete and attach sales receipt along with any model PalmPilot and return to Everex by November 30, 1998.

First Name:
Last Name:
Address:
City: **State:** **Zip:**
Phone: **email:**
Product Serial Number:
Purchase Date:

By signing below, I certify that I have read and understand the Terms and Conditions in this form, and that the information I've provided is true and correct.

Signature: **Date:**

Purchase an Everex Freestyle Manager or Executive Palm-size PC and be eligible to receive a $50.00 end-user rebate.

Everex Freestyle Manager and Executive PalmPilot Rebate Terms and Conditions

1. Complete rebate form, including product serial number, and your signature, and attach sales receipt
2. Please send all rebate requests including completed forms and any model PalmPilot to: Everex Systems, CE Division, Attn: PalmPilot, 5020 Brandin Ct., Fremont, CA 94538
3. Rebate good only on products purchased between 10/15/98 and 11/30/98
4. Rebate forms must be postmarked by December 05, 1998
5. Offer valid to end-user customers only
6. Void where prohibited, taxed, or restricted by law
7. Falsification of information will void this offer
8. Giveaway will not be processed without original sales receipt, a returned PalmPilot, and product serial number
9. Everex is not responsible for lost, late or misdirected mail, incomplete or illegible claims will not be processed
10. Offer valid in US &Canada only
11. Allow 8 - 10 weeks for delivery of rebate; for questions concerning status of your rebate, and if the 8 -10 weeks allowed for delivery have passed, please call 1-877-4-PALM-PC
12. Please make a copy of the completed rebate form and sales receipt to retain for your records

WWW.freestyle.everex.com

WIN 100 WINDOWS MAGAZINE 1998

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PCWEEK BEST OF COMDEX

BYTE

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WINDOWS CE WAS BUILT TO POWER A RANGE OF SMALL DEVICES THAT RUN ON A VARIETY OF MICROPROCESSORS.

handle it. And if your desktop stays in constant contact with your Windows CE system, they can continuously synchronize.

So what makes these little devices so compelling? "Long battery life [days with typical use], light weight, and ease of use," explains Gerry Purdy, an analyst with Mobile Insights, Mountain View, Calif.

Windows CE-based devices come in a variety of shapes and sizes. The smallest fit in a shirt pocket and rest comfortably in the palm of your hand. These Palm-size PCs are easily operated with the touch of a finger, the swipe of a stylus pen, or by voice command.

Palm-size PCs can simplify your life or business in an array of sophisticated ways. Among other things, Palm-size PCs can keep track of your schedule, act as a voice recorder, and let you send and receive e-mail messages, all with the built-in software.

And with Mobile Channels — content that providers adapt for the smaller screens of Windows CE-based devices — Palm-size PC users can subscribe to Web sites and download information to the device automatically when connected to the desktop. This content can then be viewed at your leisure wherever you take your Palm-size PC. Microsoft has jumped on the Mobile Channel bandwagon and has adapted MSNBC Quicknews Channel, Microsoft Sidewalk™ city guide, and Slate® online magazine. Your company can also designate intranet content as a Mobile Channel.

Besides the core Windows CE operating system, Microsoft provides Pocket Outlook™, a package that includes e-mail and calendaring, as well as task and contact management. Pocket Outlook can share information with the Microsoft Outlook messaging collaboration client and Schedule+ 7.0a on the Windows desktop.

Windows CE also provides Note Taker software, which is compatible with Word, for jotting down items to remember, either with a stylus pen using natural handwriting recognition, a software-based keyboard, or RichInk. Palm-size PCs also come standard with a World Clock, calculator, and Solitaire.

Perhaps the most useful aspect of Palm-size PCs is staying connected, wherever you are. The devices can connect through standard analog modems, or via wireless technology. They can also hop onto the Ethernet local area network you most likely have at work. And once the device knows how to connect, it can get information through the Internet, or get to corporate networks using Windows NT® Remote Access Services.

And if that doesn't satisfy your needs, there is a growing library of third-party software applications for the Palm-size PC as well. Just a few of these include: Quicken ExpenseAble, by On The Go Software, Sunnyvale, Calif.; CalliGrapher 5, from ParaGraph PI, San Jose, Calif., a division of Vadem; several applications for the Palm-size PC by BSquare Corp., Bellevue, Wash.; and many more.

Palm-size PCs start at about $299. Suppliers include Casio, Dover, N.J. (U.S.); Everex Systems Inc., Fremont, Calif.; Philips Mobile Computing Group, Campbell, Calif.; and Uniden, Fort Worth, Texas (U.S.).

Today's Handheld PCs come with a variety of user-friendly and high-function features designed for computing on-the-go.

QUITE A HANDFUL

If you need a bit more power and a bigger screen, say for creating documents, doing spreadsheets, or browsing the Web, a Handheld PC may be a better bet. Handheld PCs are a bit bigger than Palm-size PCs, and are generally both keyboard and stylus driven.

These handy little devices can do a wide range of tasks, including data analysis, Web page design, you name it. Applications are launched using the standard Windows techniques like the Start button. And the software that comes generally preloaded — Pocket Word, Pocket Outlook, Pocket Microsoft Internet Explorer, Pocket PowerPoint®, and Pocket Microsoft Excel — should be

Pushing the envelope was easy.

Keeping it the size of an envelope was the tricky part.

Now With Enhanced E-Mail

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Powered by Microsoft Windows CE

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BESIDES PC COMPANIONS, EXPECT TO SEE WINDOWS CE DRIVING THE SET-TOP BOXES FOR INTELLIGENT TVs.

familiar as well. Files can be easily converted between desktop and pocket versions of Office applications.

Maybe this is why Microsoft describes a Handheld PC as a productivity tool for accessing the best of Microsoft Office from the road.

A Handheld PC can also be a convenient presentation device. With the Pocket PowerPoint presentation graphics program, you can hook up to a TV or VGA monitor with 800x600 resolution, and still view your speaker notes on the Handheld PC.

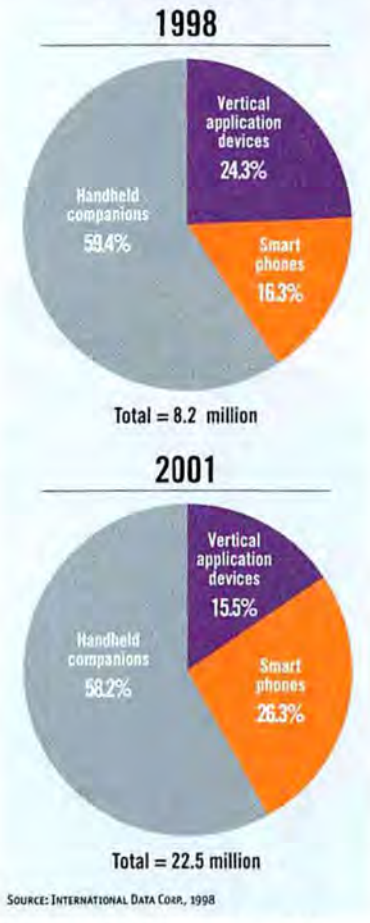
For Scott Kidby, lead programmer/analyst for the National Association of Securities Dealers, Washington, D.C., remote access is one of the biggest advantages to his Handheld PC.

Kidby connects to his company's network with the built-in modem of his Sharp Mobilon HC-4500, and uses Microsoft's Pocket Outlook for e-mail and scheduling. Finally, Kidby snagged Symantec's pcANYWHERE for Windows CE, which lets Kidby remotely control his office PC.

The Sharp has been a lifesaver. When checking his e-mail one day, about 500 miles from the office, he heard about a problem with one of his Web applications. With the little Sharp, Kidby answered the e-mail, accessed the server, fixed the problem, tested it with Pocket Internet Explorer, and restarted the problem program. "So far, I haven't seen anything of importance to me that my Windows CE-based Handheld PC is not capable of doing," says Kidby.

Expect to pay about $499 for an entry-level Handheld PC. Current suppliers include Casio; Compaq Computer Corp., Houston; Ericsson, Stockholm; Hewlett-Packard Co., Palo Alto, Calif.; Japan-based Hitachi (Brisbane, Calif. in the U.S.); LG Electronics, S. Englewood Cliffs, N.J. (U.S.); NEC, Tokyo; Novatel, Calgary, Alberta, Canada; Philips; and Sharp, New York City.

Global Shipments of Smart Handheld Devices, by Form Factor



SOURCE: INTERNATIONAL DATA CORP., 1998

WINDOWS CE MAGIC

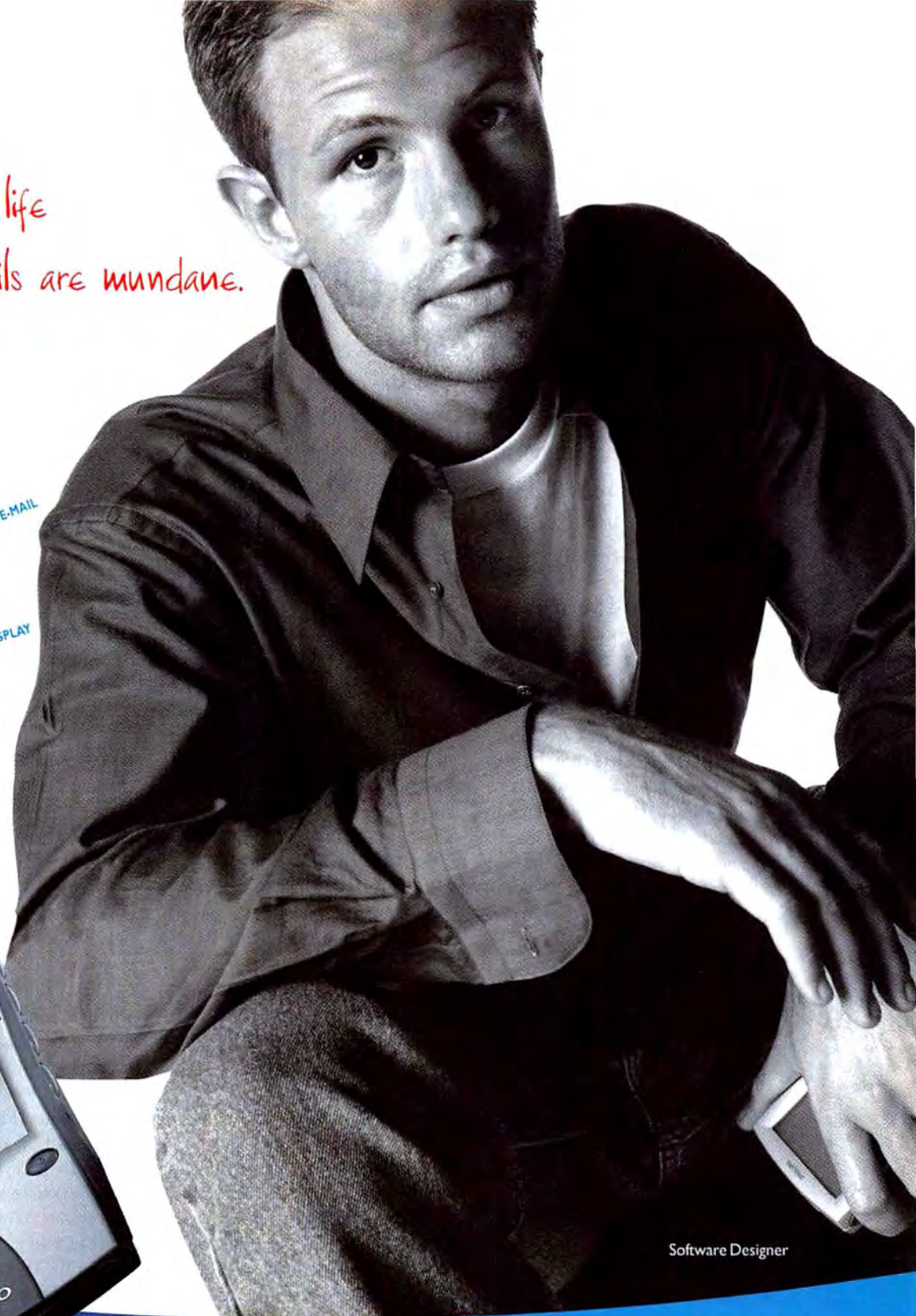
Windows CE is the magic behind both Palm-size PCs and Handheld PCs. Windows CE was built to power a range of small devices that run on a wide selection of microprocessors. Microsoft also designed Windows CE to be modular, so hardware makers can pick and choose exactly what pieces they need. And since Windows CE requires far fewer resources than desktop Windows, Windows CE-based systems can be miniaturized, and consume far less power than their big brothers. One might think this operating system is a little like Windows on a diet.

A key attribute of the Windows operating system that Microsoft was sure to keep was the programming model. This allows software developers to program for Windows CE the exact same way they do for Windows, using the same Win32® API and Visual Studio™ development tools. This means there is already a large and growing selection of applications that look and feel like they do on your PC. And they support the same basic standards, which is why sharing files, getting to the Internet, and handling e-mail is so easy. That is also why applications such as JetForm from JetForm Corp., Ottawa, Ontario; Carbon Copy, from Compaq Computer; and ACT! from Symantec work today on Windows CE.

Besides Palm-size PCs and Handheld PCs, expect to see Windows CE driving the set-top boxes that will give us intelligent TVs; the AutoPCs that will help us keep up with e-mail and find grandma's house; as well as game systems, Web phones, and small devices that today's inventors haven't even thought of yet. Plus, Windows CE drives Windows-based terminals, which are inexpensive devices that run Windows-based applications from a server.

For years, Bill Gates has been talking about information at your fingertips. With Windows CE, that vision is quickly being realized.

Hey, in my life
no details are mundane.



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nino

Software Designer

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PHILIPS

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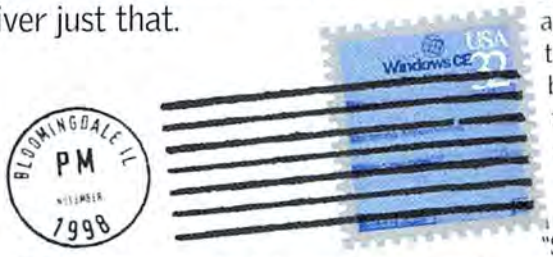
Windows CE Delivers for Great Lakes Mail Carriers

Delivering the mail on time isn't as easy as it looks. An individual postal carrier in the Great Lakes region delivers between 2,000 and 5,000 pieces of mail each day. ✉ Since consistent on-time delivery is the number one customer request, the U.S. Postal Service's Delivery Programs Support Group in Bloomingdale, Ill. began to look at ways to deliver just that.



The group discovered that providing supervisors with better tools to manage their carriers' performance, both in the post office and out on their routes, was the key to achieving more consistent delivery. In the past, supervisors used handheld devices to collect delivery times on each route. That data was later downloaded into a database. The main problem with this system was that, once in the database, the information didn't provide much help on the streets when supervisors made spot field visits on carrier routes.

"Our original intention was to use the data collection device to put the information for all the routes within a delivery zone at the supervisors' fingertips," explains Rich Rooney, delivery programs supervisor for the Great Lakes Region. Since the devices only collected data, supervisors had to carry a printout of the route times. If the carrier had left later or earlier than the time in the database, the supervisor had to manually recalculate the times to try to find out the carrier's location.

Looking for a better solution, Tyrone Daniels, the operations program director and one of Rooney's colleagues, contacted Jeff Chandler of Polaris Technologies in Louisville, Ky. Chandler worked with the Post Office's Great Lakes group to develop a solution, called the Post Office Manager System (POMS), that runs on Handheld PCs powered by the Microsoft Windows® CE 2.0 operating system and on the supervisors' desktop computers. POMS consists of two applications: Street Locator, which tracks carriers' street routes and times; and Office Manager, which records mail volume and estimates processing time for that volume.

WALKING THE WALK

Since January, about 15 supervisors in the Great Lakes area have been beta testing the POMS applications on the 620LX Handheld PCs from Hewlett-Packard Co., Palo Alto, Calif. As with the previous system, supervisors walk the routes gathering all the timing information for delivering mail, as well as for allied functions such as delivering a parcel and taking lunch breaks. That information is then uploaded into a Microsoft Access database on a desktop PC back in the office.

Supervisors can download information on their 30 or 35 routes and pinpoint within a few minutes exactly where any of their carriers are at any point in time. The application adjusts those times instantly based on the actual time the carrier left the office or where the supervisors find the carrier out on the street. "Supervisors are supposed to manage carriers both on the street and in the office. They don't visit every single route every day, but periodically pick certain routes to make sure the carriers are where they're supposed to be," explains Rooney. Carrying the Handheld PC on the street enables supervisors to find the carriers more quickly, and to instantly determine whether or not they're on schedule. Supervisors also can recalculate the expected return time of the carrier based on where he or she actually is on the route. If the Street Locator shows that the carrier won't finish until after dark, the supervisor can bring in help to ensure the mail is delivered on time.

The Great Lakes Area expects to roll out the POMS applications to approximately 2,500 supervisors in its tri-state area in the next several months. Other Postal Service areas have expressed interest in the system as well, which could expand to as many as 25,000 users nationwide.

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With the award-winning *Mail on the Run!*® product, you can easily send, receive, store, forward and reply to e-mail messages on Microsoft Exchange Server, Lotus Notes, Microsoft Mail, Lotus cc:Mail and Novell GroupWise. The *Mail on the Run!* product has sophisticated support for handling file attachments, automatically converting files into native formats and providing control over the amount of information to be downloaded.

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Hot Products from Hot Companies

EVEREX SYSTEMS
Fremont, Calif.
The Everex Freestyle
Looking for a PC companion small enough to slip into a pocket, but big enough to organize your affairs and capture your critical day-to-day information? The Everex Freestyle Palm-size PC may do the trick. Starting at $329, the Freestyle jams more than you'd expect in a 5.3 ounce package. It boasts a 64-bit NEC VR Series processor, backlit screen, 4 megs of RAM, a built-in microphone, and CompactFlash slot so you can add everything from wireless modems to more RAM and gobs of storage. The hardware is nice, but when it comes to Palm-size PCs, software is the key. Besides the standard array of Microsoft scheduling, e-mail, and note-taking software, Freestyle adds a mobile news reader, fax software, and a version of Quicken for personal finance.

LG ELECTRONICS
S. Englewood Cliffs, N.J.
Phenom Express Handheld PC
LG Electronics' Phenom Express features a touch-typeable keyboard, eliminating cramped fingers. It is aimed at those who need e-mail and Web information on the go. Mail and attachments fly over the built-in 56 Kbps modem. The $899 Phenom Express comes with a custom Internet set-up wizard that walks customers through the online configuration process. The battery can

work for up to 12 hours. The Phenom Express has 32 megs of RAM, and includes PC standard VGA and parallel ports so most of your peripherals will work right off the bat.

PHILIPS MOBILE COMPUTING GROUP
Campbell, Calif.
Philips Nino 300
The Nino 300, starting at $399, may be hard to get your arms around, but not your fingers. The diminutive 3.4-inch-wide Palm-size PC comes with quite an array of hardware features. Driven by a 75Mhz MIPS chip, the Nino comes with 4 or 8 megs of RAM standard, and runs Windows CE 2.0. The Nino stands out with its software selection, including the nifty T9 text entry software from Tegic Communications, which guesses words as they are being typed. The Nino includes Expense Manager software developed by Philips, which lets users track expenses by project. And if you tire of using the stylus, the Nino's Pocket Commander software lets you literally tell the device what to do. Nino 300 also includes a backlit touch screen display supporting four shades of gray, and an infrared transceiver to send messages or files to other Windows CE devices.

RIVER RUN SOFTWARE GROUP
Greenwich, Conn.
Mail on the Run!, All in Sync!, Mobile Apps
The products from River Run operate over both wireline and wireless networks. Mail on the Run! provides remote access to LAN-based e-mail systems for users of Windows 95 laptops, Windows CE H/PCs, and Palm-size PCs. All in Sync! targets mobile users' and groups' remote access to calendaring and group scheduling with mail, for Windows CE 2.0 users on Handheld PCs and Palm-size PCs. MobileApps is the ultimate visual GUI builder and database access software for Windows CE application developers. These also provide solutions for Lotus Notes on Windows CE.

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Scotts Valley, Calif.
Image Expert CE
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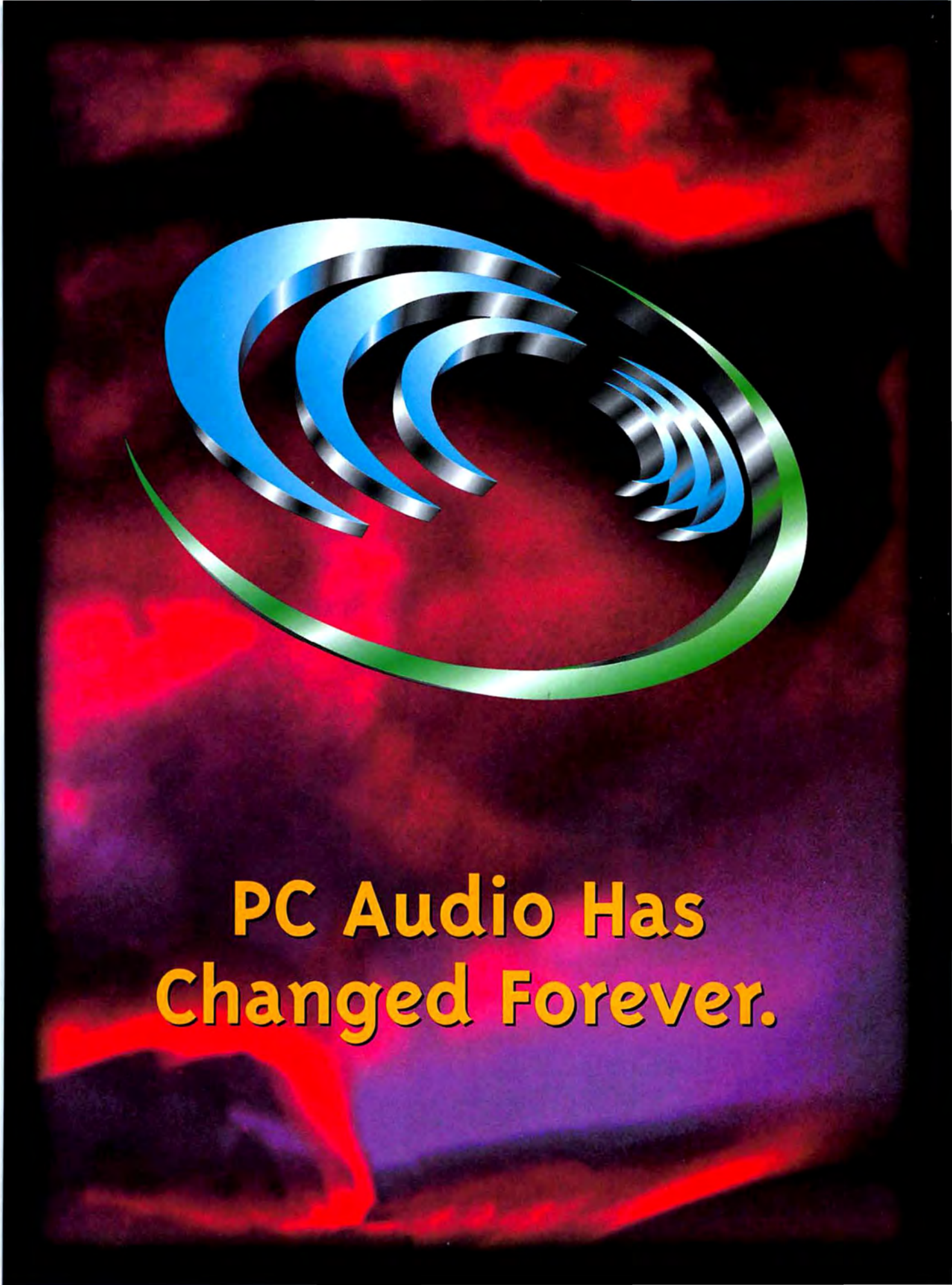
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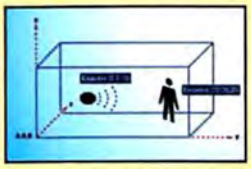
What is Environmental Audio™?

Environmental Audio — the next audio platform by Creative. Its revolutionary technology recreates real-world multi-dimensional audio on your PC. It immerses you in sound so vivid, you experience games, music, and other existing audio applications rather than just hear them.

Environmental Audio™ by CREATIVE®

By nature, the human ear is intolerant of audio imperfections. The Environmental Audio Platform addresses this problem by introducing a system comprised of the following components:

- **Environmental Audio Hardware** powered by the powerful 1,000+MIPS, 2 million transistor EMU10K1™ audio processor chip, Sound Blaster Live! provides the highest possible audio fidelity with multiple digital audio input/output (I/O) capabilities.
- **Environmental Audio Software Technologies** created by E-mu Systems®, Inc., a subsidiary of Creative, that provides high-end audio equipment to Hollywood studios, will change the way you perceive audio forever. They include:

  E-mu Environmental Modeling™, which accurately positions audio objects in a 3D space by rendering audio reflections and; **Creative Multi Speaker Surround™**, which allows real-time panning and mixing of multiple sound sources using two or more speakers. These technologies will greatly enhance audio content from the past, the present, and the future.
- **Environmental Audio Extensions** (EAX) enable game and application developers to easily enhance their software with high-quality Environmental Audio effects. EAX is designed to be a natural extension to Microsoft® DirectSound® 3D API and has received overwhelming support from hundreds of software developers.
- **Environmental Audio Speaker Systems** work well with two-speakers, but Environmental Audio will deliver its full potential with Creative's new line of multi-channel systems.

  The **PCWorks™ FourPointSurround™** speaker system is the best companion for your Sound Blaster Live!. It offers four compact satellite speakers and a powered subwoofer.

  The **Desktop Theater™ 5.1**, a great companion for your PC-DVD™ system, is a five-satellite plus powered subwoofer speaker system with an amplifier and a built-in Dolby® Digital decoder.

*Look for the **Environmental Audio logo** on selected Creative and Cambridge SoundWorks® products, and new supported game titles to ensure you are getting the Live! experience.*

Sound Blaster® Live! Card

Digital I/O Card

Technical Specifications

Wave-Table Synthesis

- E-mu® Systems EMU10K1™ music synthesis engine
- 64-voice polyphony with E-mu's patented 8-point interpolation technology
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- Capable of processing, mixing, and positioning audio streams using up to 131 available hardware channels
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- Full digital mixer maintains all sound mixing in the digital domain, eliminating noise from the signal
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- User-selectable sample rates from 8kHz to 48kHz
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Works with Windows® 98

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Speakers of the House (and the Office)

Ditch those crusty dime-store speakers and prepare to be blown away. ◆ BY MICHAEL DESMOND

I HAVE A CONFESSION. My neighbors think I'm a stable white-collar professional and a good husband and father. What they don't know is that when my wife's not looking and the kids are asleep, I sneak down into the basement office for a quick game of Quake II or a nice helping of Flight Simulator 98. With my fast Pentium II PC, 19-inch monitor, and 3D accelerator, I can seriously indulge myself. I even have a top-flight sound board and a force feedback joystick that kicks around when an enemy fighter makes Swiss cheese out of my flight controls.

Yet with all this kick-butt hardware, I'm still using the same old pair of rinky-dink speakers. I secretly crave chest-thumping bass and mind-boggling directional 3D audio. And anyway, I could use a good set of speakers to improve my business presentations on the road. Yeah, that's the ticket.

With high hopes, I laid ears on five new sets of speakers for the desktop, priced between $150 and $260. All include subwoofers that push shin-shaking bass and add oomph to artillery blasts and bass guitars alike. Two of the packages even offer all-digital Universal Serial Bus connections, which are supposed to provide clearer sound on Windows 98 PCs and simplify installation since you don't have to connect to the sound card (see "Breaking the Sound Barrier," page 143, for more on USB and sound cards).

Armed with a battery of jury-based taste-test results from the PC World Test Center, I decided a little fun was in order. In addition to listening to each set of speakers with everyday business apps that use MIDI and .wav files, like Microsoft PowerPoint and the Windows 95 ActiveMovie Player, I ran each product through informal tests using Microsoft Flight Simulator 98 and LucasArts' Jedi Knight: Pathways to the Force. Time to fly and fry.

GOOD VIBRATIONS

IT'S 10 A.M. ON a Saturday, and my wife Anne has just stepped out with the kids—a perfect opportunity for me to abuse my ear canals. First up, the $150 Altec Lansing **ACS48.** If you want speakers for gaming, I recommend this set over all others. The full-height satellite speakers get up and over desktop clutter to produce a tremendous breadth of sound. Jedi Knight's positional 3D audio effects took on unprecedented realism. Sounds shifted seam- lessly across my field of hearing as my ship turned from left to right. The ACS48's subwoofer is outstanding, turning a gunfight into a symphony and adding a physical element to game play. When I went wheels-up in my Saab ▶

ILLUSTRATION: GORDON STUDER

340B in Flight Simulator 98, I could distinctly feel the low rumble of the gear action in my gut.

What's more, the ACS48 can dish up the tunes. When our jury listened to .wav files and MIDI scores—exactly the kinds of sounds you're likely to use in a business presentation—the ACS48 earned top marks across the board. And Altec Lansing does a nice job of keeping things simple. Cords and ports are color-coded, and connections are kept to a minimum to avoid cable tangles. The only gotcha: I had a hard time finding the controls for adjusting bass and treble, which were on the back of the subwoofer

SMALL BUT MIGHTY

PERHAPS MOST surprising were the $150 **Cambridge SoundWorks.** The tiny box-shaped satellite speakers and compact subwoofer don't look like much, but they produced crisp, clean audio and enough punch to please any desktop PC user. The SoundWorks were excellent at reproducing frequency extremes: In the orchestral *Star Wars* score at the opening of Jedi Knight, these speakers really came alive, producing terrific high- and low-range sounds, from the tinkling of bells to the deep thunder of bass drums. While I came away impressed with the SoundWorks' positional 3D audio output, the little speakers just couldn't match the immersive experience of the ACS48. And there wasn't quite enough boomin' bass to satisfy the hard-core gamer in me.

But my inner businessman thought they were pretty cool. Outstanding MIDI playback makes the SoundWorks a good match for presentations. And the pint-size satellites and compact subwoofer make this set more portable than the others reviewed here. Setup is complicated just a bit by the use of standard speaker wires, which you must twist and stick into pinched contacts at the back of the speaker housings—all the other products use convenient plug-in jacks. But that's a minor complaint about these little speakers that sound large.

BIG DISAPPOINTMENTS

ONE SET of speakers I won't be flying with any time soon is the $180 Advent **Multimedia AV390PL.** The full-height satellite speakers do offer front-panel knobs for bass/treble and volume, plus push-button controls for enhancing normal stereo and Dolby Digital sound tracks. And the attractive, low-profile subwoofer can even be mounted on a wall. But the sound quality was unimpressive in both Flight Simulator and Jedi Knight, and the AV390PL's playback quality trailed that of all the other speakers on our jury's scorecards in both .wav files and audio CDs.

I fiddled with treble controls, subwoofer bass knobs, and the Dolby Digital and stereo enhancement buttons, all to no avail. Positional effects sounded flat—while I could hear sounds coming from the left or right, I had no sense of depth or space—and the subwoofer simply lacked punch. My ears perked up a bit when I played the *Star Wars* score—the AV390PL did a fantastic job with music encoded using Dolby Digital technology, which is found in many movies and audio CDs. Unfortunately, that's scant comfort if you intend to use this speaker set for presentations or games.

THE WINNERS: Altec Lansing's ACS48 rocks (left), while the compact Cambridge SoundWorks should travel well.

F Y I

OF RESPONDENTS to a recent Internet survey, 43 percent hate junk e-mail, while 25 percent find it merely bothersome. But 7 percent claim to love it.

SOURCE: WORLD RESEARCH, INC.

SCORECARD

Advent Multimedia AV390PL
Grade: **C-**; Price: $180 street; Interact Accessories; 407/333-1926; www.poweredpartners.com
INFONET NO. 601

Altec Lansing ACS48
Grade: **A**; Price: $150 street; Altec Lansing Technologies; 800/258-3288; www.altecmm.com
INFONET NO. 602

Altec Lansing ADA70
Grade: **B**; Price: $150 street; Altec Lansing Technologies; 800/258-3288; www.altecmm.com
INFONET NO. 603

Cambridge SoundWorks
Grade: **A-**; Price: $150 street; Cambridge SoundWorks; 800/367-4434; www.cambridgesoundworks.com
INFONET NO. 604

Microsoft Digital Sound System 80
Grade: **B**; Price: $260 street (before $50 rebate); Microsoft; 800/426-9400; www.microsoft.com/speakers
INFONET NO. 605

UNIVERSAL APPEAL

TWO SPEAKERS—the Microsoft **Digital Sound System 80** and the Altec Lansing **ADA70**—don't use a sound card at all; they connect to the PC using the USB. The all-digital connection not only does away with ugly sound-card hookup hassles, but it also promises cleaner audio quality as well. The speakers convert digital signals into analog sound at the speaker housing, instead of inside the CPU case, where a flood of stray signals from the CPU and other components can distort audio signals. But while audio fidelity can theoretically be higher, I found that neither USB speaker set could match the Altec Lansing ACS48 in any area of performance.

Minor glitches plagued these USB speakers. I sometimes had to reboot my computer to get them to work. And when I scanned a document on a USB scanner during game play, the speakers produced pops or pauses, likely due to crowding on the bus—a bad omen for anyone who expects to use lots of USB peripherals. ▶

PHOTOGRAPH: MARC SIMON; ILLUSTRATION: GREG CLARKE

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AMD

www.amd.com

Fortunately, I was able to plug both speakers into a standard line-out jack on a sound card. Because of USB's limited bandwidth, these products are best suited for business use, though both come with audio presets that you can adjust to optimize frequency response for specific types of sound, whether it's bass-heavy gaming or treble-tickling jazz music.

Of the two, the $150 Altec Lansing ADA70 is a better fit for business users, who should like its performance on both MIDI and .wav files. And gamers will get a kick out of the terrific subwoofer, the same model as on Altec Lansing's top-ranked ACS48. While I liked the additional front-panel controls for treble, bass, and volume, I found that the satellites lacked punch. Even cranked full up, the speakers failed to rattle my bones during Jedi Knight. The 3D effects are adequate, but you'll find better in systems like the ACS48 and Microsoft's Digital Sound System 80.

Sounding Off

Altec Lansing's ACS48 speakers excel in every category, while the Cambridge SoundWorks set is good for the business crowd.

SPEAKER SET	MIDI	.wav	Audio CD	3D jet flyby
Advent Multimedia AV390PL	★	★	★	★
Altec Lansing ACS48	★★★	★★★	★★★	★★★
Altec Lansing ADA70	★★	★★★	★★★	★
Cambridge SoundWorks	★★★	★	★★	★★★
Microsoft Digital Sound System 80	★	★	★★★	★★★

★★★ = excellent, ★★ = average, ★ = poor

PC World jury-based tests were performed on a Quantex Pentium II-300 with 64MB of RAM running Windows 98. Rankings for MIDI, .wav, and audio CD clips are based on a combination of scores from the round-robin speaker-versus-speaker test conducted by the author and the *PC World* jury panel. Jet flyby ratings are based on *PC World*'s noncomparative evaluation of realism on a recording of a jet flying directly overhead.

LOOKING GOOD

ONE THING'S for sure: Microsoft knows how to make good-looking peripherals. And the jet-black Microsoft Digital Sound System 80 sounds nearly as good as it looks, producing fantastic 3D audio effects in Jedi Knight. When bad guys jumped out on my flank, I could hear them coming. The speakers also lent crisp, balanced sound to the *Star Wars* score. The subwoofer can really growl, shaking the floor when I raised the gear on my dual-prop Saab as it climbed out of Burlington International Airport. One concern for business buyers: The Digital Sound System 80 placed dead last in our jury's MIDI test.

The speakers are a snap to set up and include volume, treble/bass, and mute control buttons on the top of the right satellite. The set also offers more extensive control software than the ADA70, adding the ability to tweak frequency response. The speakers cost $260, but Microsoft offers a $50 mail-in rebate. Among USB speakers, these are the best, though they are still flawed.

THE SOUND AND THE JURY

AS A GAMING addict in the making, my choice is clear: The Altec Lansing ACS48 delivers top-notch audio quality and immersive realism. But if space is tight—or you need speakers for the road—consider the compact Cambridge SoundWorks, which produced good overall sound. Of course, even the wildest game (or stress-filled meeting) can't match real life. With my ears ringing from hours of jet noise and laser blasts, I stagger out of my basement to come face-to-face with a barking dog, a crying 4-month-old, and a rampaging toddler. Now that's surround sound.

Michael Desmond is a contributing editor for PC World. ■

F Y I

WHAT ARE the favorite Internet activities of American kids and teenagers? E-mail, general Web surfing, homework, and games, in that order, according to a recent report.

SOURCE: JUPITER COMMUNICATIONS

KEEPING UP

Great Software Grab Bag

PLAY'S $50 GIZMOS 98 is what Microsoft's underwhelming Plus 98 should have been: a cornucopia of cool software tools that melds fun and function. Among its 35 offerings are an addictive application for creating multimedia slide shows, an encryption utility, a variety of clocks and calendars, half a dozen card games, and classy desktop themes and screen savers. No need to upgrade your operating system, either: Unlike Plus, Gizmos works with Windows 95 and NT 4.0 as well as Windows 98. Go to www.play.com for info.

Short-Attention-Span Fun

THERE ARE A MILLION ways to kill time while Web pages load, but most aren't as entertaining as Zing, a free software package that flashes quick tidbits like comics, jokes, photos, and an occasional ad. (This content is downloaded during idle times, so it doesn't impede performance.) It's not exactly news you can use, but Zing's eye candy relieves some of the tedium of sluggish Web surfing. Get it from www.zing.com.

Bookmarks to Go

IF YOU'RE LIKE ME, you've got one set of Web sites bookmarked on your home PC, and a different set on your office system. To consolidate, try MURL (www.murl.com). Short for "My URLs," this clever service lets you collect favorite links on the fly and store them on a password-protected Web page that you can reach from anywhere. MURL's fun to use, extremely handy, and free.

The Doctor Is Online

YOU WOULDN'T TAKE medical advice from just any yahoo on the street, so why would you accept it from just any Web site? Fortunately, Dr. Koop's Community (www.drkoop.com) has the seal of approval of former Surgeon General C. Everett Koop. The useful site has news, message boards and forums, a comprehensive medical encyclopedia, a directory of health resources on the Net, daily polls and surveys, and even an online pharmacy. —Harry McCracken

ILLUSTRATIONS: GREG CLARKE

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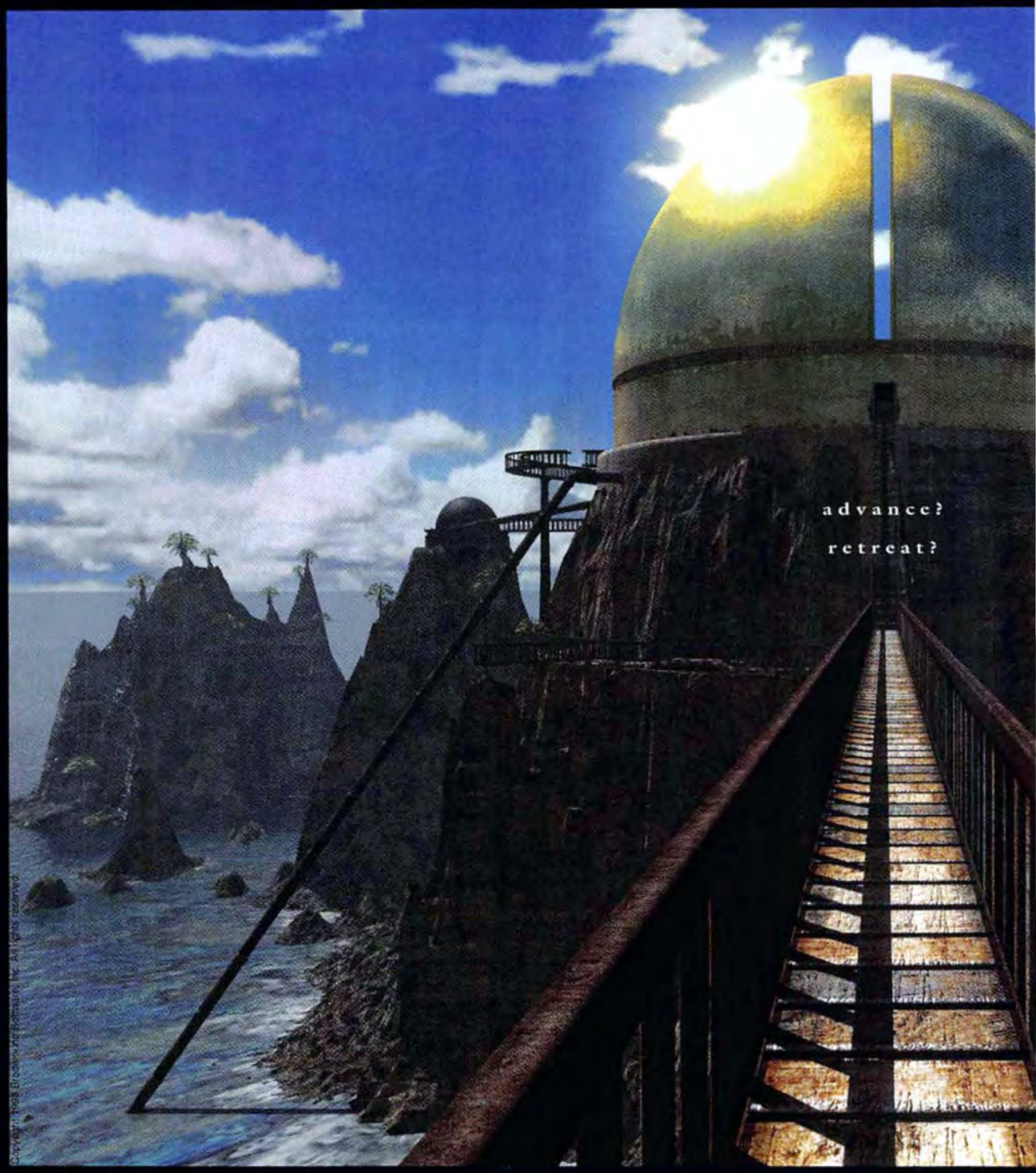
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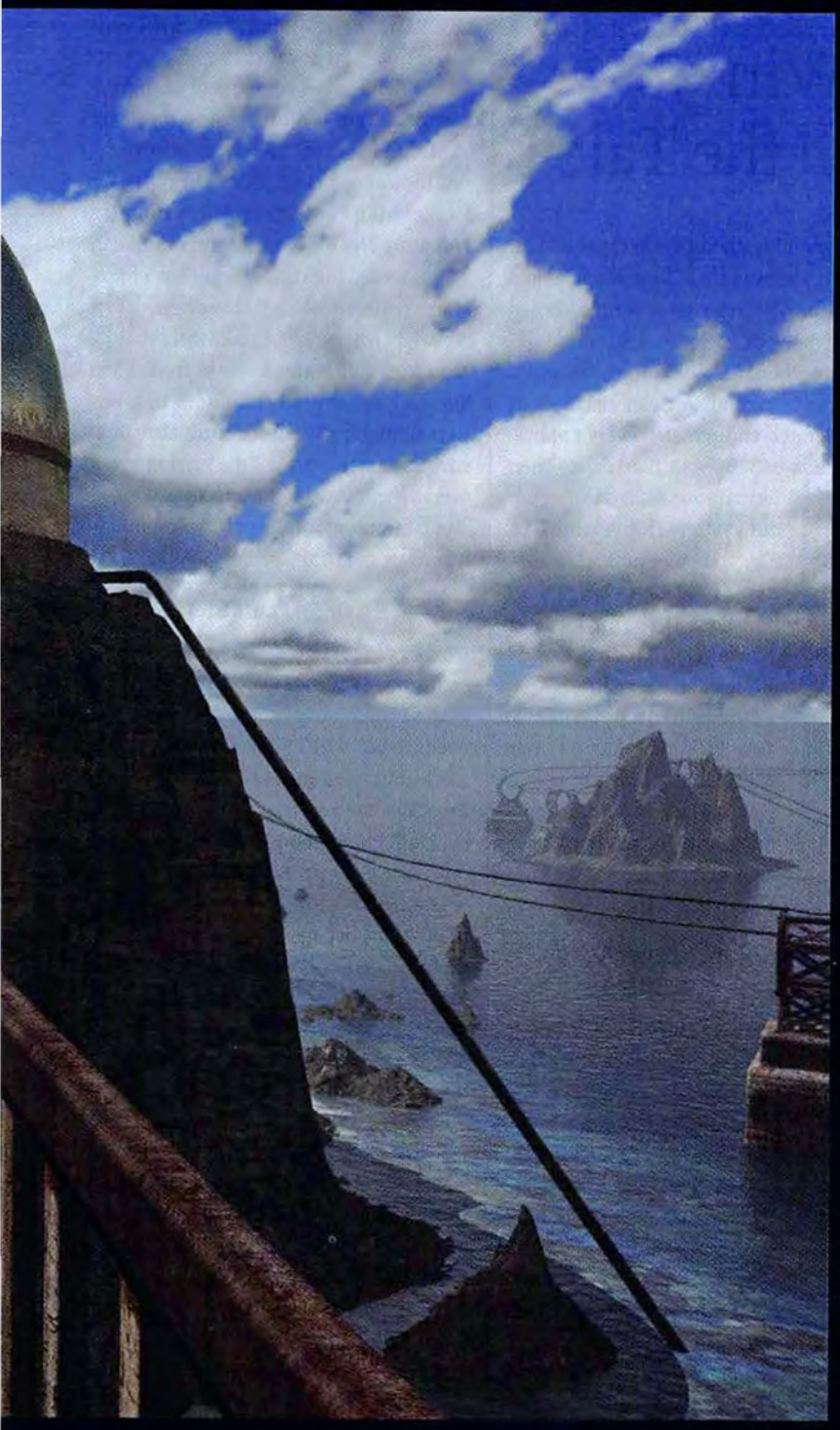

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I Upgraded to Win 98—and Lived to Tell the Tale

PIZZA LONG GONE. Blood sugar dropping. Only 60 percent of files copied so far. Can't hold on much longer. Yep, you guessed it—I'm upgrading to Win 98.

You don't know how good you have it. While I was hosing my system with early versions, you were busy being productive. (You *were*, right?) But after two months of testing the final version of Windows 98, I'm convinced that Win 98 is a better, more stable operating system than Windows 95 overall. I've counted only five system crashes. That's utterly astonishing compared to Win 95's almost daily GPFs. And for me, that alone is worth the upgrade.

I got lucky—my **90-minute** ordeal went **smoothly, though it** felt longer than the O. J. Simpson **trial.**

You may have heard the Windows 98 horror stories. Hey, there's no avoiding it: Strange things happen when you upgrade an OS. I got lucky—my 90-minute ordeal went smoothly, though it felt longer than the O. J. Simpson trial. Windows rebooted nine times, searching for things known only to the gods in Redmond.

My secret for a safer upgrade and a more stable system? A clean install. Start from scratch and reinstall every application. First, back up your hard drive. Then format your disk, clearing out old system-clobbering DLL files and other junk. (See February's *@Home Office*, "Format Your Drive for a Faster Windows 95.") It's more work, but it *will* make a difference.

One potential problem: Your PC's manufacturer may withhold software support if you upgrade to Windows 98 on your own, so check first. (For details, see *PCW Advocate* in this issue.)

WINDOWS 98'S TOOLBOX

I'VE RELIED ON third-party system utilities—mostly Norton—since the DOS days. I still like them, but I'm also delighted with Windows 98's set of tools. For example, I regularly run Disk Defragmenter, ScanDisk, Disk Cleanup, and other utilities through the Win 98 Maintenance Wizard's built-in scheduler (*Start•Programs•Accessories•System Tools•Maintenance Wizard*). At 5 p.m. on Friday, just before I hit the road for the long commute into the family room, Windows 98 takes care of business.

Tucked away on the Windows 98 CD—where no one would consider looking—is another prize: the Windows 98 Resource Kit Sampler Tools. The Clipboard Tool lets you store and organize chunks of text and copy them into text-based files. Use the Link Check Wizard to make sure your Shortcuts are okay. The Quick Tray allows you to add items—programs, documents, or URLs—to the System Tray. Microsoft also includes an updated TweakUI, a marvelous tool for enhancing and customizing the desktop. All these and more are located in the \Tools\Reskit directory.

Windows 98 is better at checking for DLL version conflicts (see this month's *Hardware Tips* for more information) than Windows 95. But if you install lots of programs (which is when DLL problems often occur), play it safe and use SafeInstall98. This $20 shareware program from IWin Software dynamically monitors DLL version changes; checks the time, date, and size; and saves a copy of the version being overwritten. It will either recover the correct DLL automatically or let you manually recover the most recent one.

GET OFF MY DESKTOP

NOT EVERYTHING'S GREAT. Microsoft's sold tons of Windows 98 real estate to anyone willing to pay. The first thing that needs to go? WebTV for Windows, a gimmick that uses my ATI All-in-Wonder Pro's TV feature to show television on my desktop. I have enough distractions without *Days of Our Lives* on my PC.

The next thing I got rid of was Channels, which occupies a wide swath of my desktop and forces me to look at corporate logos. Then there's WaveTop, which was supposed to let me receive data through a TV signal. I never got it to work correctly, despite spending 3 hours on the phone with tech support. And don't get me started on being force-fed Internet Explorer.

So here's my take: Spend the $80, get a more stable OS and some cool utilities. And on that pizza? Extra cheese, please, and hold the pepperoni.

PC World *Contributing Editor Steve Bass is a licensed marriage and family therapist and the president of the Pasadena IBM Users Group in California.* *See page 14 for contact information.* ■

Windows 98 Upgrade
$80; Microsoft; www.microsoft.com/windows98

SafeInstall98
$20 shareware; IWin Software; www.iwinsoftware.com

ILLUSTRATION: GREG CLARKE

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	V75	V73	Q71
Size/Viewable	17"/16.0"	17"/16.0"	17"/16.0"
Dot Pitch	0.26mm	0.26mm	0.27mm
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Optimal Resolution	1280 x 1024 @ 89Hz	1024 x 768 @ 87Hz	1024 x 768 @ 87Hz

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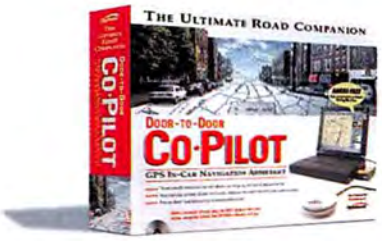

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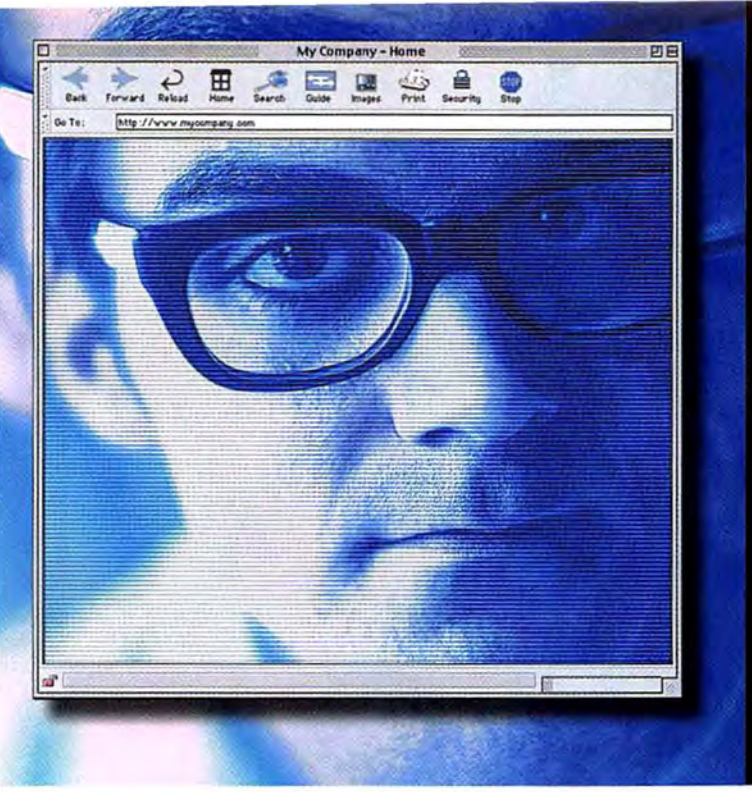

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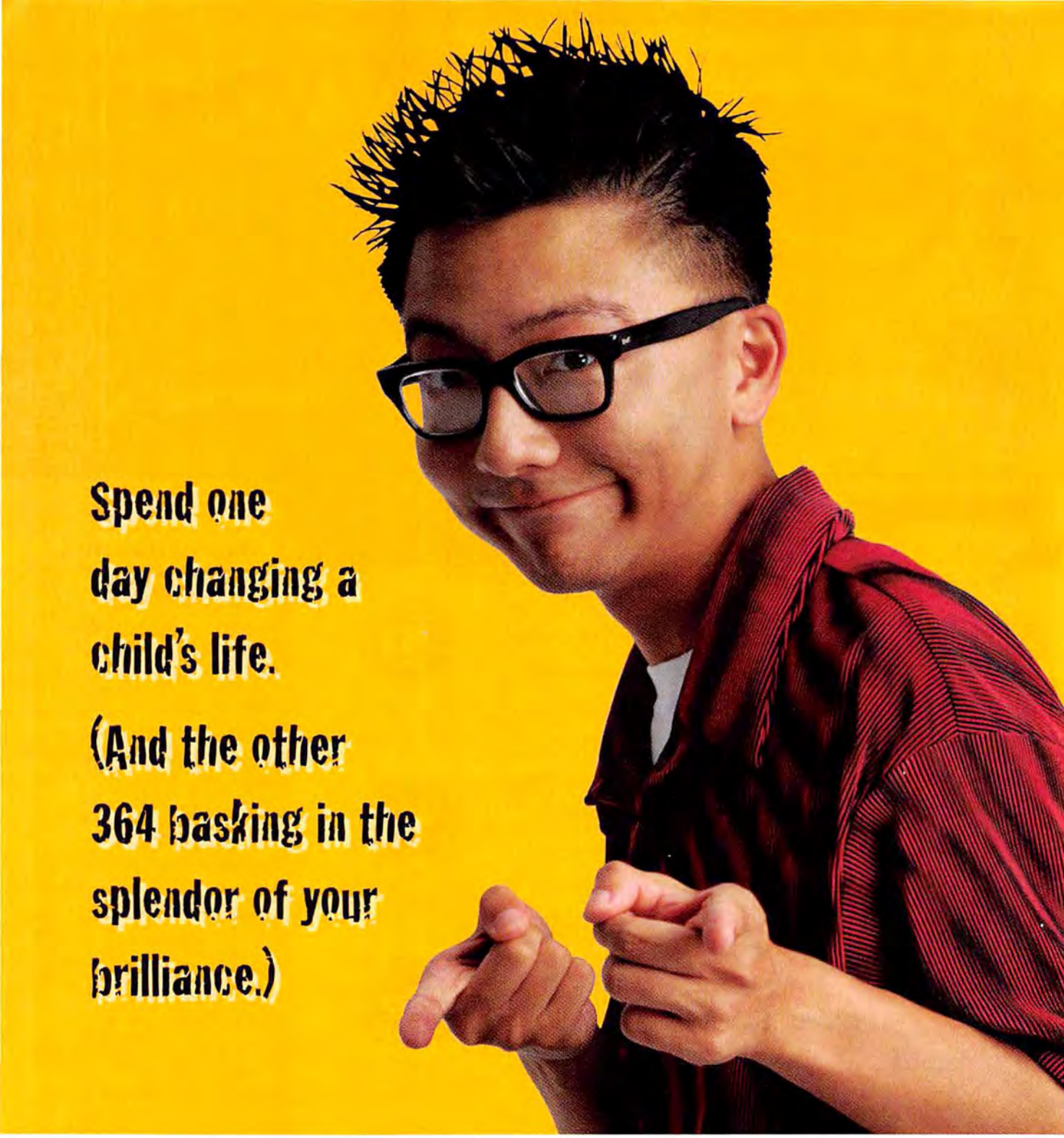

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HERE'S HOW

WINDOWS TIPS SCOTT DUNN

Optimize Your Screen for Presentations

THOUGH WINDOWS' Accessibility tools and settings were designed to meet the needs of people with disabilities, they include some productivity gems of more universal applicability. In particular, Magnifier is a valuable utility for teachers in a classroom, salespeople or marketing professionals giving demos, or almost anyone making a presentation.

If you didn't install this tool when you installed Windows 98, here's what you should do: Make sure your Windows 98 CD-ROM is in your CD-ROM drive, open Control Panel, and double-click the *Add/Remove Programs* icon. Click the *Windows Setup* tab and make sure 'Accessibility' is selected in the Components list. Then click *Details*, check the *Accessibility Tools* box, and click *OK* twice.

To start the Magnifier, choose *Start•Programs•Accessories•Accessibility•Magnifier* (you may want to copy the Magnifier Shortcut to the Desktop or to a more convenient menu in the future). By default, the Magnifier window appears at the top of your screen, enlarging whatever is under your pointer. To make that window larger or smaller, drag the edge of the "regular" window and resize it. Alternatively, position the pointer inside the Magnifier window and drag the window to any edge (to snap it there) or toward the screen's center (to make it free-floating).

The Magnifier dialog box lets you set the magnification level and specify whether the utility should always enlarge what's under the pointer, follow text cursors as you type and edit, and so on (see **FIGURE 1**). Using the Magnifier can be a bit of a challenge to your hand-eye coordination at first, but you should get the hang of it quickly. My advice: Try using the default settings at first; they're especially handy for showing others in a large room what work you're doing with the mouse or what text you're typing. On the other hand, if your goal is to enlarge an indistinct part of the screen (such as a toolbar with tiny buttons), uncheck *Follow keyboard focus* and *Follow text editing*. Then make sure the area you want to display appears in the Magnification window, and press **<Alt>-M** to turn off 'Follow mouse cursor'. Click *OK* to minimize the dialog box.

Naturally, you don't want to be futzing with Magnifier settings during a class or demo. And luckily, if your keyboard has a Windows key, you may not have to. For example, pressing the **<Windows>** key while holding down **<Up Arrow>** will instantly increase the zoom level, and pressing **<Windows>-<Down Arrow>** will decrease it.

FIGURE 1: WIDEN YOUR HORIZONS by magnifying the area under your pointer.

ILLUSTRATION: PHILIP ANDERSON

FIGURE 2: SORT FOLDERS and shortcuts by preceding their names with special characters.

For other such shortcuts, choose *Start•Help*, click the *Index* tab, and type **magnifier**. Double-click *shortcut keys* under the Magnifier entry to obtain a complete list of Windows-key Shortcuts.

A final tip: If you have systems running both Windows 95 and 98, you can make Magnifier run on Windows 95 by copying the Magnify.exe and Mag_hook.dll files to any folder on your Windows 95 machine. Launch the utility by double-clicking *Magnify.exe* or a Shortcut to it. This maneuver can be handy if you have Windows 98 installed on a desktop machine but Windows 95 on the notebook computer you use for demos and presentations.

ARE YOUR SHORTCUTS OUT OF SORTS?

IF YOU'RE VIEWING a folder sorted by name in an Explorer window, and that folder contains both folders and Shortcuts to folders, the folders appear first and are followed by the folder Shortcuts.

How do you sort the folders and Shortcuts so they appear together? The easiest way is by adding a special character to the beginning of the name of each Shortcut. To view folders by name, choose *View•Arrange Icons•by Name*. Then select a Shortcut, press **<F2>** to enable renaming, press **<Home>** to move to the beginning of the name, and type one of the following characters: a comma, a tilde (~), or an accent grave (`) (see **FIGURE 2**). If you want a completely invisible symbol, hold down **<Alt>** as you type **0160** on the numeric keypad. Be aware, however, that some utilities (including Norton Disk Doctor) frown on file names with such special characters and may corrupt these names.

A NOTEPAD REPLACEMENT YOU ALREADY HAVE

NOTEPAD ISN'T MUCH of a text editor. It has no search-and-replace function and can cope only with pathetically small files (around 54KB). Though a number of good shareware replacements are available, you needn't look that far. Just use the MS-DOS Editor (Edit.com, see **FIGURE 3**), a DOS-based text editor that far outshines Notepad and is built into your system.

The *2.x* version of Edit.com that comes with Windows 95 lets you open as many as nine files at once, display files in split-screen format, and even see complete long file names in dialog boxes.

For handy access to the DOS Editor, do this: In Windows *3.x* Program Manager, choose *File•New*, select *Program Item*, and click *OK*. Type a Description and, in the Command Line box, type **c:\dos\edit.com** (your path may differ); you don't need to supply the complete path if Edit.com is in a directory specified in autoexec.bat's Set Path line. For Working Directory, type the path to the directory you want to see when you choose *File•Open* in the Editor.

In Windows *9x* and NT 4.0, right-click the *Start* button and choose *Open*. Find the folder for the menu in which you want your editor to appear, right-click an empty area, and then choose *New•Shortcut*. In the Command Line, type **edit.com**, and click *Next*. You can change the default name of the icon if you like. When you are done, click *Finish*.

Edit.com is not perfect. It lacks Notepad's word-wrap feature, and it won't print page numbers. Consequently, I recommend using it only for some system files (such as .ini or .bat files)—.txt files should remain associated with Notepad or a shareware replacement. To make the association permanent, do the following: In Windows *3.x*, start File Manager and select an .ini file. Choose *File•Associate*. In the Associate With box, type **c:\dos\edit.com** (your ▶

FIGURE 3: EDIT.COM LEAVES NOTEPAD in the dust with features like search and replace, file size limits, and other enhancements.

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I N T E R N E T

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path may differ) and click *OK*. In Windows 9*x* and NT 4.0, press **<Shift>** as you right-click the name of an .ini file, and choose *Open With*. Now click *Other*, and locate Edit.com (in the Windows\Command folder in Win 9*x*, or in the System32 folder in NT). Then click *Open*. Back in the Open With dialog box, check the *Always use this program to open this type of file* box and click *OK*.

Does that procedure seem too cumbersome? If you're using Windows 95, 98, or NT, download the free NoteMaid or Notepad+ from PC World Online's FileWorld (www.fileworld.com).

AUTOMATE DIAL-UP CONNECTIONS

I READ WITH GREAT interest your July article on starting multiple programs with one batch file ["Unclutter Your Desktop," page 285]. It was just what I needed to open Eudora, ICQ, and AOL's Instant Messenger without all the double-clicking. Now I'm wondering if I can make that same batch file open my Dial-Up Networking connection. I realize it would need a built-in delay to wait for the connection to be established—in my case, about 32 seconds (yes, I timed it).

Doug Morgan, Fishkill, New York

SEVERAL OTHER READERS had similar questions. If you still use the DUN software that comes with Windows 95, the answer is no, you can't. But if you have DUN 1.2 or higher, you can connect to your Internet Service Provider in one click. That, combined with a simple DOS command, should solve all your problems.

Get the latest version of DUN from FileWorld (www.fileworld.com).

To make your other Web-related applications wait until you've made the DUN connection, add the following line immediately below the line that launches your browser: **choice /n /t:n,32 Continue waiting?** The Choice command causes your system to pause and wait for a response. The /t switch tells the batch file to use the default choice ("n" in this example) after the specified number of seconds ("32" here). The prompt text ("Continue waiting?") is optional, and you can modify it to say whatever you want. Keep the DOS window out of your way by running the batch file in minimized form (choose *Minimized* from the Run menu on the Program tab of the batch file's Properties sheet).

The only thing this batch file doesn't do is shut down all the applications when you're done; you'll have to do that yourself, and then disconnect from your ISP by right-clicking the DUN icon on the taskbar and choosing *Disconnect*.

A few final tips: If DUN gives you a Connection Established dialog box upon connecting, check *Do not show this dialog box in the future* and click *Close*. If you use Outlook Express for e-mail, you can make it automatically default to your inbox: Choose *Tools•Options*, click the *General* tab, check the box for *When starting, go directly to my 'Inbox' folder*, and click *OK*.

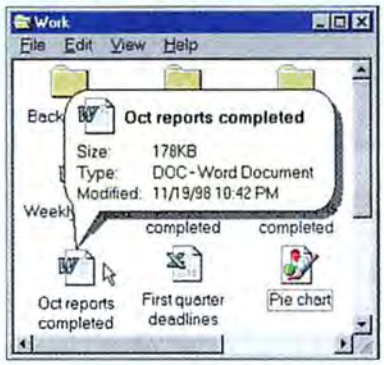
If you use IE 4.*x* (in Windows 9*x* or NT), you can easily automate your DUN connection. First launch IE. A dialog box will prompt you to decide between connecting and working offline. Check the *Connect automatically* box and click *Connect*. The next time you launch your browser, it will automatically dial and connect for you. To combine this process with opening your other online utilities, just add a line launching your browser (for example, **start c:\progra~1\ie\iexplore.exe**) to the beginning of your batch file.

If you use some other browser, start by double-clicking *My Computer* and then double-clicking the *Dial-Up Networking* icon. Next, double-click the icon for the connection you want to automate (your ISP icon). Make sure that your user name and password are entered properly and that the *Save password* box is checked. Full automation requires these settings; without them, you'll be prompted for information every time you try to connect. If all the settings look good to you, click *Cancel*. Otherwise, click *Connect*. Once you connect, the settings will be saved, so you can disconnect immediately.

Now return to the Dial-Up Networking window. With the icon for your ISP still selected, choose *Connections•Settings*. Look for the 'Prompt for information before dialing' check box. If you don't see it, you're using the old DUN, and you need to download and install the latest version.

WINDOWS TOOLBOX

IF YOU LIKE the information that Explorer's Details view provides, but you prefer the larger number of files and folders you get from other views, maybe you should rendezvous with Desktop Informant. Just hold your cursor over an icon in any icon view or on the desktop, and Desktop Informant will display a balloon containing the usual file details. Created by Tom Kier, Desktop Informant is free and works with Windows 9*x* and NT 4.0. Download it from PC World Online's FileWorld.



Once you've installed the latest DUN software, return to the Dial-Up Networking window, select your ISP icon, and choose *Connections•Settings*. Uncheck *Prompt for information before dialing* and click *OK*. To simplify launching this connection from a command line, make a Shortcut: Using the right button, drag the ISP icon to a convenient folder (such as the Command folder in the Windows folder), and choose *Create Shortcut(s) Here*. Then modify your batch file to launch this Shortcut. If your ISP icon is named My_ISP, for example, add the command **start My_ISP** to the beginning of your batch file. (You should add the complete path if your Shortcut isn't on the desktop, in a Start menu, or in the Windows Command folder.)

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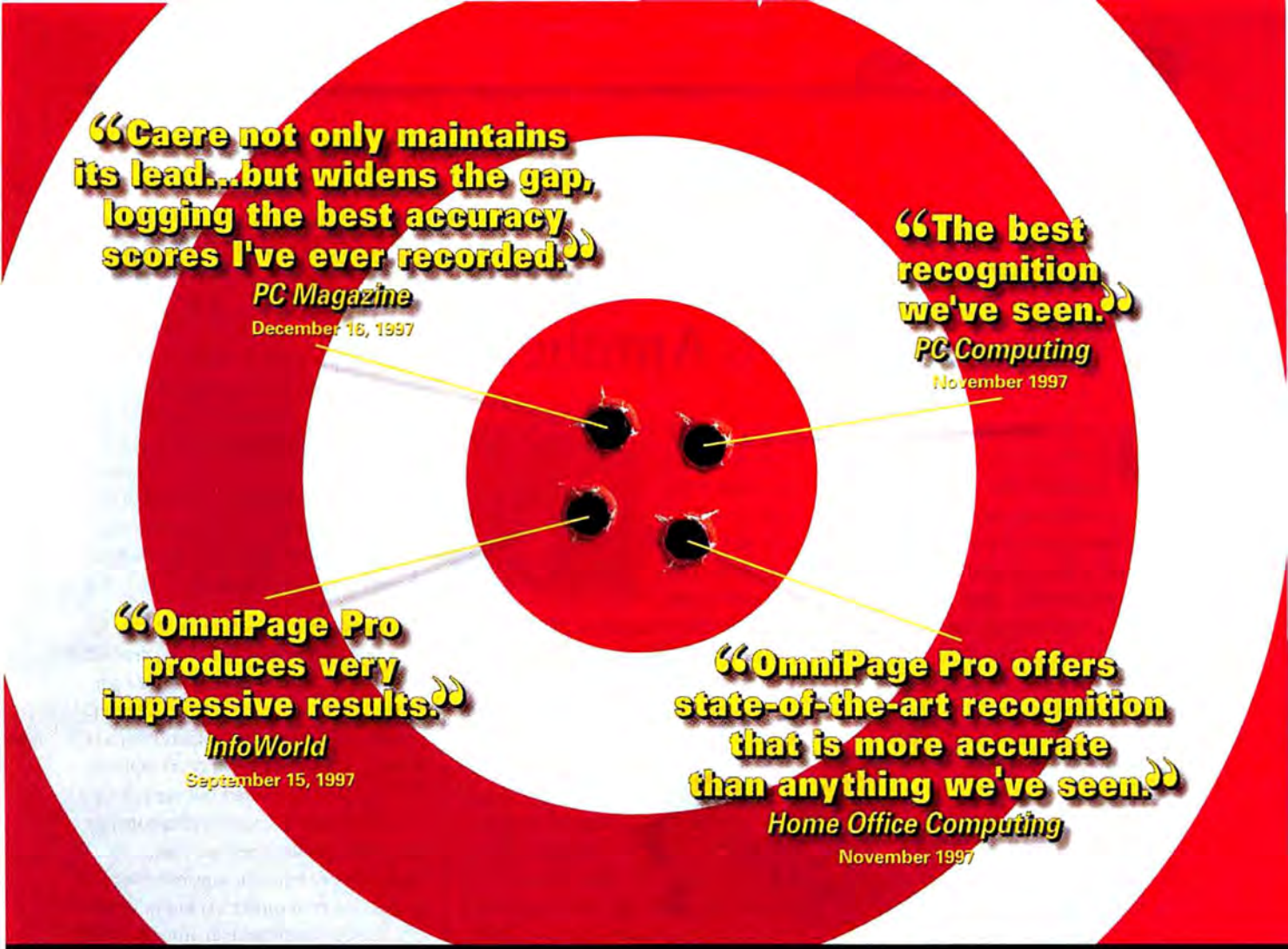
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Moving Files and Programs From One PC to Another

I'M UPGRADING TO a new Pentium II. What is the best way to move programs and files from my old computer to the new one? Should I just back up everything onto my external Iomega 2GB Ditto tape drive, or is there more to it?

Dolores McKenna, Exton, Pennsylvania

THIS IS A HARDER job than it should be. The problem is that the Windows Registry needs to know about both your hardware (which is changing) and your software (which isn t). The good news is that an external tape drive makes the job easier. You may be tempted to back up the files on your old computer to the tape drive, move the tape drive to your new PC, and then restore everything. Resist! Hardware conflicts could render Windows unusable on the new computer. What s more, you d probably be replacing a newer version of Windows with an older, buggier one.

Besides, the Windows folder is constantly filling up with garbage that wastes disk space and increases the likelihood of software conflicts. Consequently, it s a good idea to clean out your system every so often. This job will never be easier or safer than when you re changing computers. (For details on doing this when you re not upgrading your hardware, see the September 1997 issue, page 292.)

Now that we ve covered what not to do, here s what you *should* do:

1. Gather the installation CD-ROMs and floppies for all programs. Unfortunately, you ll have to reinstall them.
2. Back up everything on your old computer to your tape drive.
3. Move the tape drive to the new computer and install the drive s backup software.
4. Using your backup software, restore from the tape the following folders from your old PC s Windows folder: Start Menu, SendTo, Favorites, Media, Desktop, and Application Data (if you don t have one of these, don t worry about it). You might also want to restore .bmp, .pst (personal folder), .pab (personal address book), and .wab (Windows address book) files.
5. Your Start menu now contains files from your new *and* your old computer. But not everything is working. Open the Start menu in Explorer by right-clicking the *Start* button and selecting *Explore.* Go through the Start Menu folder and its subfolders, deleting duplicate shortcuts.
6. Most of the shortcuts from your old computer will be marked by blank icons. You have two choices for handling these: Delete the shortcut if you no longer need its application, or reinstall the application. Reinstalling is painfully time-consuming, but it s a necessary evil. You ll also need to restore select files, such as macros, templates, and custom dictionaries.
7. Restore your data from the tape. If you use Microsoft Office, restoring the My Documents folder is a necessity.
8. Some important configuration files for your applications may be floating around; if you can figure out what these are, restore them. If you re an Office user, restore your Templates folder, which is probably C:\Microsoft Office\Templates.
9. If you haven t saved the various updates and fixes for your applications, go online and get the latest versions.
10. Don t overwrite the tape cartridge for at least three months. At some point, you ll realize that it holds an important file you haven t recovered yet.

You can do pretty much the same job with a Zip drive or other removable disk drive, or a CD-Recordable drive. The main difference occurs in step 2. Since you probably can t back up your entire hard drive, you ll have to be selective about what you back up. Use steps 4, 7, and 8 as guides in determining what to back up.

If you have no such drive, your best bet is to link the computers together via cable (see April, page 292). Alternatively, you can remove the hard drive from the old PC and temporarily put it in the new one.

Make Another Emergency Floppy

MARK BOUCHER OF High Level, Alberta, notes that in talking about emergency boot disks, I've neglected Win 95's own Emergency Recovery Utility. To use ERU, first format a disk with the 'Copy system files' option checked. Then pop in your Win 95 CD-ROM, go to the folder other\misc\eru, and launch eru.exe, which will copy config.sys, autoexec.bat, win.ini, system.ini, protocol.ini, user.dat, io.sys, command.com, and msdos.sys onto your floppy, along with a program for restoring them.

IS IT A CYRIX OR A 486?

I RECENTLY BOUGHT a Cyrix 6x86 200+, thinking I had bought a Pentium-grade CPU. But Norton Utilities' System Information program tells me that I have a 486. What gives here?

Rex A. Jones, Internet

DON'T WORRY ABOUT IT. The Cyrix 6x86 behaves like a Pentium except when you ask it to identify itself. ▶

ILLUSTRATION: JEFFREY PELO (TOP); PHILIP ANDERSON (BOTTOM)

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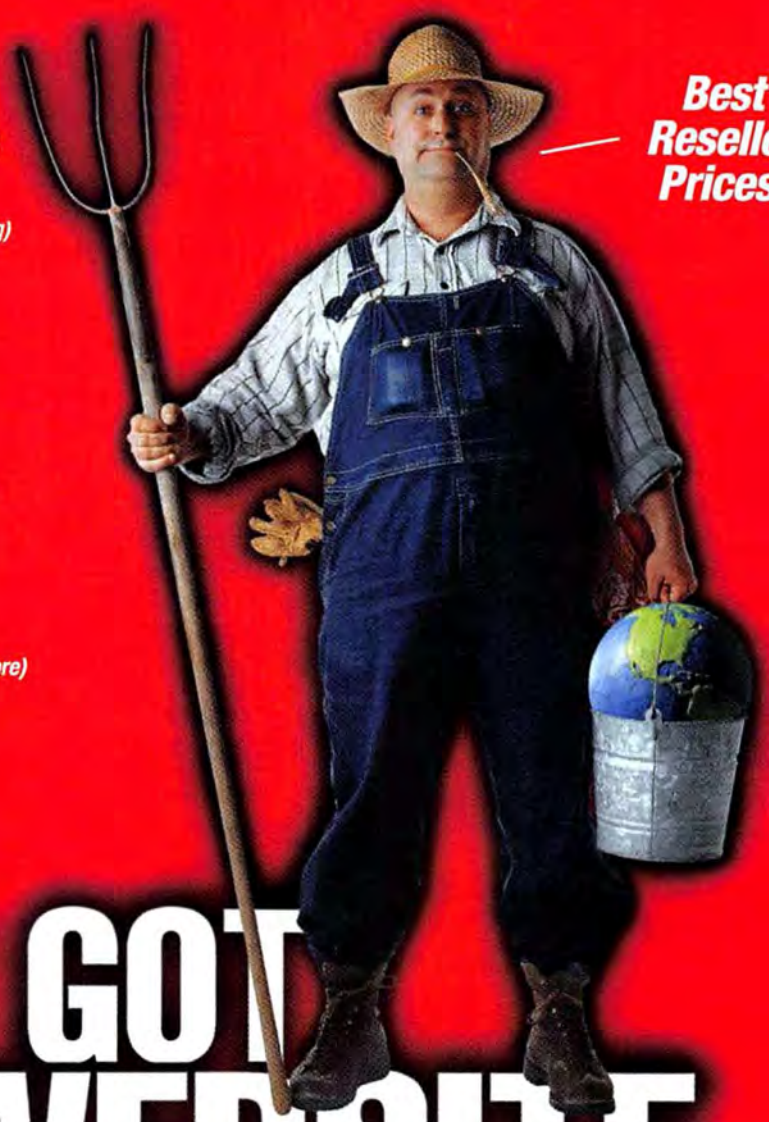

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FIGURE 1: DIMENSION 4 UPDATES your computer's clock by checking it against any of several time servers on the Internet.

That's because the 6x86 doesn't support the Pentium's CPUID instruction, which Norton's System Information typically uses to identify the chip. If System Information doesn't get a response, and its bag of other tricks doesn't work, the program reports the chip as a 486. My Symantec sources assure me that in Norton Utilities 3.0 for Windows 95, System Information correctly identifies the 6x86.

Could the 6x86's lack of support for System Information's CPUID instruction cause more serious problems? It's possible, but unlikely except with games—and there are work-arounds for those.

For additional reading on this subject, visit the AlternativeCPU Web site (www.alternativecpu.com), a source of information on non-Intel CPUs.

TRULY ERASING FILES

WHEN I BUY A new PC, I donate my old one to a charitable organization. Before I give it away, I'd like to remove certain files so that they cannot be recovered. What's the best way to do that?

Paul Belz, Ellicott City, Maryland

AN ENTIRE cottage industry has sprung up around this particular problem, created by Microsoft's less-than-thorough Delete command, which dates back to the old days of DOS. A number of programs can overwrite a deleted file so that it can't be restored, including Norton Utilities, Nuts & Bolts, and PowerDesk.

Norton Utilities 3.0 for Windows 95: When you do a full defrag with Norton's Speed Disk, you also wipe clean everything on your drive that isn't currently assigned to a file. Not all defraggers do this: Windows' Disk Defragmenter, for example, leaves some data where it can be found.

Nuts & Bolts: Click the *Secure Manage* button and select *Shredder*. A wizard will walk you through your options, which range from wiping out one file to clearing all the unassigned space on your drive.

PowerDesk: This file manager won't help you wipe out all stray data, but it can clean a file off your disk safely. Simply select the file, and then select *File•Destroy*.

If you don't have any of these programs, several shareware options are available. My favorite is Craig Christensen's $20 Mutilate, available as a download from PC World Online's FileWorld.

EXPENSIVE PCs AND CHEAP WATCHES

MY SYSTEM CLOCK is running a bit fast, gaining about 10 or 15 seconds a day. Can you recommend any ways I can regulate its speed?

Wade Saunders

St. Simons Island, Georgia

THIS HAS been bugging me for a long time. Why can't a $2000 PC keep time as accurately as a $20 watch? Part of the problem is that timekeeping is more complicated in a PC than in a watch because a PC's clock chip is doing other tasks in addition to timekeeping, and because the battery-operated clock in your hardware has to work with an AC power–driven software clock in your operating system. So how do you fix it? You can't, but you can set up your PC to correct its clock at regular intervals. Naval observatories and other scientific and military organizations go to great lengths to know the correct time, and various free or cheap programs let you use the Net to synchronize your PC's clock with those of these institutions.

Rob Chambers' free program Dimension 4 (www.thinkman.com/~thinkman, see **FIGURE 1**) is a great program for resetting your clock at boot time. You put it in your Startup folder, and every time you boot, it goes online (dialing up if necessary), corrects your time, and exits.

If you don't want your system to go online every time you load Windows, consider paying $10 for Locutus Codeware's SocketWatch (www.locutuscodeware.com). This program goes in the Startup folder, too, but it doesn't check the Internet when you load it. Instead, it hangs around in the background, and updates your clock only when you go online for some other reason.

YAKETY YAK, <CAPS LOCK> TALKS BACK

I'M A TWO-FINGER typist, and I often hit the <Caps Lock> key by mistake. Since my Toshiba 405 CS laptop doesn't have a visual Caps Lock indicator, I'd like to get some kind of audible warning when I hit that key. How do I give my computer a noisy <Caps Lock> key?

William R. Brand, Hailey, Idaho

YOU'RE NOT ALONE in your wish, so Windows offers an option that makes your system beep whenever you hit one of the standard toggle keys—<Caps Lock>, <Num Lock>, or <Scroll Lock>.

Here's how to activate the beeping. Select *Start•Settings•Control Panel* and look for the *Accessibility Options* icon. If it's there, skip the next paragraph.

If the icon isn't there, pop in the Windows CD-ROM. In the resulting blue ▶

FIGURE 2: MAKE <CAPS LOCK> BEEP by using one of Windows' accessibility options.

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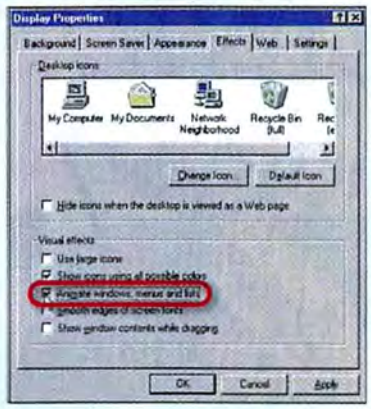
Open Menus Faster in Windows 98

WHEN YOU pull down or pop up a menu in Windows 98, it slides gracefully onto the screen—nice at first, but annoying after a few hundred viewings. If you want old-fashioned, faster menus that just appear, right-click the desktop, select *Properties*, and click the *Effects* tab. Uncheck the *Animate windows, menus and lists* option, and then click *OK*.



window, click the *Add/Remove Software* icon. On the Windows Setup tab, click the *Accessibility Options* icon, and then *OK*. Click *Yes* when asked if you want to restart your computer. After you've rebooted, select *Start•Settings•Control Panel*.

Double-click the *Accessibility Options* icon. Click the *Keyboard* tab on the Accessibility Properties dialog box, check the *Use ToggleKeys* box, and then click *OK* (see **FIGURE 2**). That's all there is to it. You don't even have to reboot. Go ahead, hit <Caps Lock> and hear for yourself.

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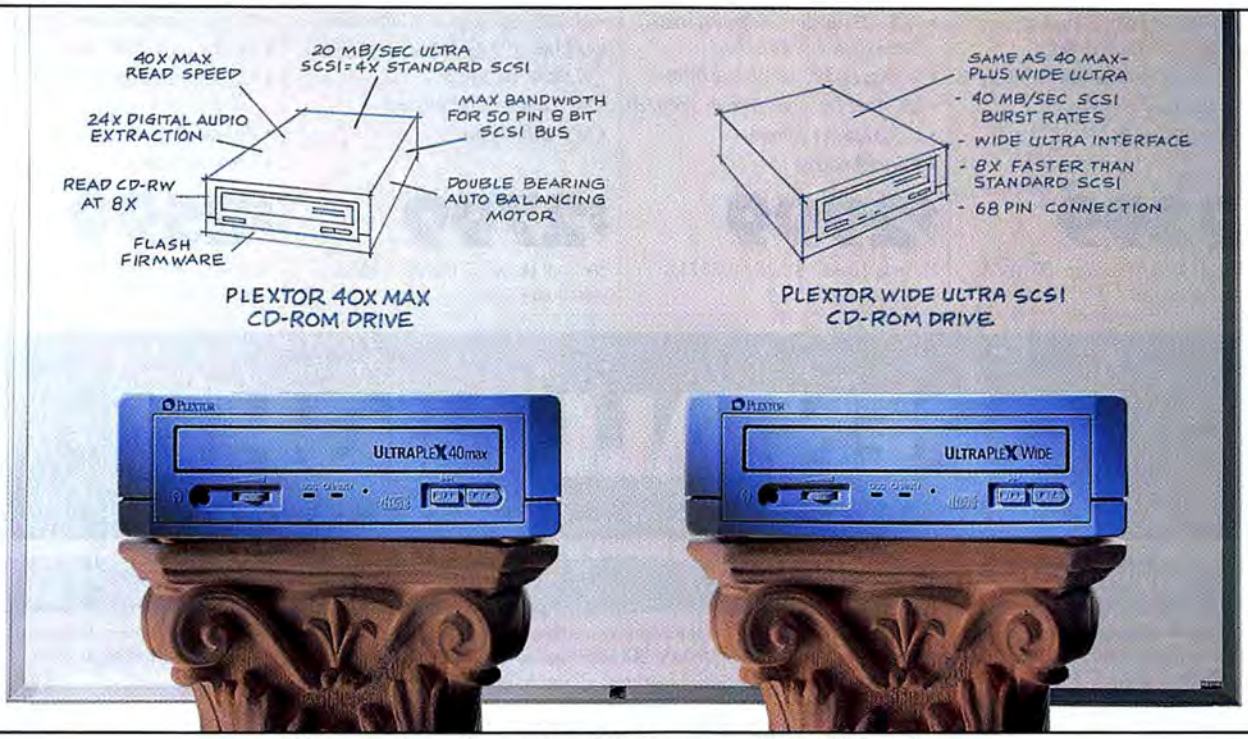

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Browse faster ◆ Send anonymous e-mail ◆ Get Web pages by mail

Playing Favorites With Your Browser

WHEN INTERNET Explorer runs into connection problems, it loads an empty HTML document called blank.htm from the C:\Windows\System folder. Robert E. Butts, a reader who got in touch with us via the Internet, saw no reason to leave this page bare, so he turned it into a quasi-favorites page. Here s how it s done:

Before you start to edit blank.htm, you must open it in FrontPage Express. (If you don t have this free Web editor, you can download it from www.microsoft.com/ie/ie40/download.) Select *Favorites•Organize Favorites*, and drag all of the links you want into FrontPage Express. After you re done, resave blank.htm in its original location.

Or make life really easy on yourself by specifying c:\Windows\Favorites or wherever your Favorites folder resides as your home page.

To achieve the same goal in Navigator 4, you should select **Edit•Preferences**, click *Navigator* in the left pane, and then click the *Browse* button and look for and select *bookmark.htm*, which is usually located in \program files\netscape.

REGAIN CONTROL OVER WILD BROWSER WINDOWS

WE ASKED, YOU answered. In fact, *lots* of readers answered my challenge in Too Many Browser Windows (*Internet Tips*, July, page 296) to find a way to stop Web sites from opening several browser windows. One of the best tips comes from Ryan Pfeifle of Thousand Oaks, California, who points out a $10 shareware program called PopAway from Triceris Systems (www.triceris.com). This tool prevents Web sites from opening multiple copies of your browser. It works with IE 3.*x* and higher and with Navigator 4.*x*.

GET AUTOMATIC WEB SITE UPDATES

SOME SITES CAN e-mail you news alerts or updates. Like this idea? You can get a similar service from any Web site if you use Internet Explorer 4.*x* (which is also integrated into Windows 98). You can instruct the browser to regularly log on to Web sites that you frequent, and either download updates for reading offline or notify you when there s something new on the site. To perform automatic updates, Internet Explorer must be running and connected. Here s how to set up this arrangement.

Go to the Web site and select *Favorites•Add to Favorites* from the menu. In the Add Favorite dialog box, either select *Yes, but only tell me when this page is updated* (in which case Internet Explorer will notify you by adding a red gleam to the site s icon or by e-mailing you) or choose *Yes, notify me of updates and download the page for offline viewing.*

Click the *Customize* button to designate whether you want to download just the current page or the current page and all other pages linked to it and to schedule how frequently Internet Explorer should search the site; then click *OK* (see **FIGURE 1**). Click the *Create in* button to tell IE where to download pages. IE will send you a note via e-mail when your favorite pages are updated. To read them offline, select *Favorites•Manage Subscriptions* and then click a site s icon to read it.

Alternatively, you can update your subscribed-to sites manually by selecting *Favorites•Update All Subscriptions.* ▶

FIGURE 1: TELL INTERNET EXPLORER 4.*x* to notify you when a favorite Web site has been updated.

To Java or Not to Java

IN THE JULY issue, I recommended disabling JavaScript in Navigator and Active Scripting in Internet Explorer to prevent ads from popping up ("Quash Pop-Up Ads," page 296). As several observant readers found out, however, doing this also disables help in those browsers. On top of that, disabling scripting in Internet Explorer creates a new annoyance: frequent pop-up messages informing you that scripts the browser has encountered on the Web are unable to run. Pick your own poison.

ILLUSTRATIONS: JEFFREY PELO (TOP); PHILIP ANDERSON (BOTTOM)

How to scan and e-mail a photo from their scanner.

How to do it from ours.

One small step for scanners. 13 fewer steps for you.

Let's face it, most scanners are not as simple as they are supposed to be.

Drag and drop, plug and play, billions of colors, and all the other terms and specs don't make a bit of difference when all you want to do is e-mail a photo. Scan a page of text into your word-processor. Or any of the other tasks you do countless times a day, every day.

PaperPort OneTouch offers a simpler, more elegant solution. It does most of the work for you, thanks to its tight integration with our PaperPort software. Drop in your original. Push a button. It's that easy. Hold down a button, change a few settings, and your scanner is practically a whole new machine.

Sure, we also have 600 by 1200 dpi scanning resolution, 36-bit color, printer-port pass-through connector, and all the other features you expect in a quality scanner. But we think you will be much more impressed by those five friendly buttons up front.

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DOES MORE MEMORY MEAN FASTER WEB CRUISING?

SEVERAL READERS disagreed with my response to Paul Farley in "Will Adding Memory Speed Up My Browsing?" (June, page 300), noting that a system low on either CPU or video card memory may start to choke if the Web throws lots of multimedia files your way. Good point.

Here are some solutions if a hardware upgrade is not in your future:

Use an older version of Navigator or IE, or even the super-lean Opera browser (available from FileWorld on PC World Online at www.fileworld.com).

Close other applications before you go out on the Web.

If you notice that your browser is slowing to a crawl, sometimes your best response is to turn the computer off, turn it back on, and run your browser afresh.

STAY ANONYMOUS WITH JOHN DOE

ANONYMITY ONLINE is hard to come by. Of course, you can always detour your messages through a remailer. (Variously known as a nymserver or an alias server, a remailer is a computer that shuttles your e-mail from its source to its destination with no trace of where it originated.) But remailers tend to be a hassle to use. Here's another alternative: John Doe, a $25 mail utility from Net Services, lets you send e-mail or post messages in newsgroups anonymously. Note: Just because you're using a false identity doesn't mean readers can't respond to your messages. Their mail is similarly shuttled through a remailer to your mailbox.

John Doe works with any POP3 client. Be warned that it's no spy's picnic to set up. You need to install PGP, as well as VBRUN300.DLL. Configuring it the first time requires patience and tolerance for obscure technical details.

Before sending any mail that you create with John Doe, review it in your mail program's outbox. John Doe is available (as is PGP) from FileWorld.

LOCKED YOURSELF OUT OF INTERNET EXPLORER?

HELP! I activated the Content Advisor in IE 4.0, and now I can't disable it because I forgot my password.

Pamela Bell, Manassas, Virginia

THERE'S NO WAY AROUND IT: You'll need to edit the Registry, or certain sites will remain out of bounds for you and your family for as long as the Content Advisor stands guard.

Before you start, back up the Registry files: system.dat, system.dao, user.dat, and user.dao.

Select *Start•Run*, type **regedit**, and click *OK*. Go to HKEY_LOCAL_MACHINE/SOFTWARE/Microsoft/Windows/CurrentVersion/Policies/Ratings. Next, click the *Key* entry situated in the right window, and press **<Delete>**. When you have completed these steps, you can exit the Registry and restart your PC.

Once on your desktop, right-click the Internet Explorer icon; then select *Properties*, click the *Content* tab, and click *Disable Ratings*. Don't enter anything when prompted for a password; simply click *OK*.

Get Windows Updates Without Fuss

TIRED OF THRASHING around in Microsoft's Web site searching for updates? Head to WinFiles.com to download product updates and learn the latest on Windows 9*x* and Internet Explorer bugs.

```
      To: agora@dna.affrc.go.jp
    From: Judy Heim <judyheim@execpc.com>
 Subject:
      Cc:
     Bcc:
Attached:

send news:alt.business
```

```
      To: agora@dna.affrc.go.jp
    From: Judy Heim <judyheim@execpc.com>
 Subject: Re: Newsgroup: alt.business (URL: news:alt.business)
      Cc:
     Bcc:
Attached:

15
17
22
```

FIGURE 2: RETRIEVE NEWSGROUP POSTINGS through your e-mail account.

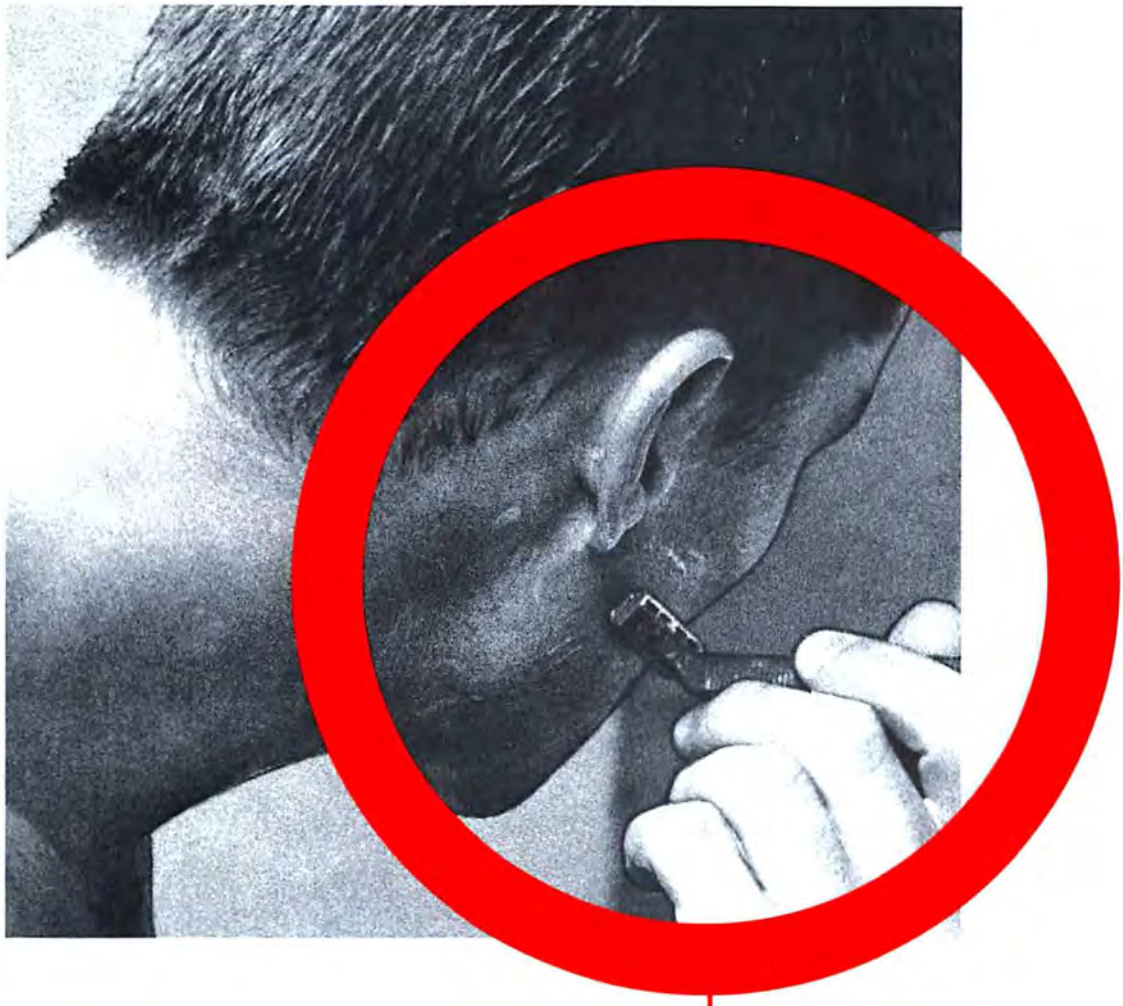
READ WEB PAGES AND NEWSGROUPS VIA E-MAIL

BOB RANKIN OF Tillson, New York, observes that, if you obtain your Net access through an e-mail–only service such as Juno, you can still arrange to read Web pages and newsgroups by sending an e-mail message to agora@dna.affrc.go.jp or to agora@kamakura.mss.co.jp. To retrieve the text of a Web page, send e-mail that contains the line **send http://*theurl*** (where *theurl* stands for the specific Web address you want to reach) to one of those two addresses. For example, to get the text off *PC World*'s Web page, you would type: **send http://www.pcworld.com**.

To read Usenet messages, type **send news:*alt.rec.stuff***, where *alt.rec.stuff* is the name of the newsgroup. The message you receive in reply will contain a list of message postings. To retrieve them, send a reply including the number of each message on an individual line (see **FIGURE 2**).

For more directions on retrieving Web pages and Usenet postings, as well as on conducting Internet searches via e-mail, send a message to agora@dna.affrc.go.jp with WWW in the body of the message.

You'll find files from this article at www.fileworld.com. Internet Tips *welcomes your questions and tips and pays $50 for published items.* PC World *Contributing Editor Judy Heim is a coauthor of* The Quilter's Computer Companion: Hundreds of Easy Ways to Turn the Cyber-Revolution Into Your Artistic Revolution *(No Starch Press, 1997).* *See page 14 for contact information.* ■



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Don't be afraid to hug your notebook. Sometimes, nothing is more comforting to the weary road warrior than 300MHz of mobile desktop-replacing power.

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Cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache
RAM	32MB SDRAM	64MB SDRAM	64MB SDRAM	64MB SDRAM
Hard Drive	3.2GB hard drive	3.2GB hard drive (removable)	3.2GB hard drive (removable)	3.2GB hard drive (removable)
Monitor	12.1" SVGA TFT display	14.1" XGA TFT display	14.1" XGA TFT display	14.1" XGA TFT display
Extra Storage	3.5" floppy disk drive	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)
CD-ROM	24X CD-ROM drive	24X CD-ROM drive (dedicated bay)	24X CD-ROM drive (dedicated bay)	24X CD-ROM drive (dedicated bay)
Graphics	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator
Sound System	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone
Warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty
Software Included	Microsoft® Windows® 98 System Wizard Mobile Client™† Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™† Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™† Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™† Norton AntiVirus
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Price	$1,899 $66/mo. TechRefresh Bus. Lease, 36 mos.**	$2,399 $84/mo. TechRefresh Bus. Lease, 36 mos.**	$2,599 $91/mo. TechRefresh Bus. Lease, 36 mos.**	$2,799 $98/mo. TechRefresh Bus. Lease, 36 mos.**

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— PC Magazine
June 30, 1998

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Introducing the New Micron NetFRAME 6200

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TechRefresh lease prices are based on a 36-month lease and are available to business customers. Businesses can qualify for 60-day same-as-cash and individuals for 6-month same-as-cash programs. If not paid in full by end of period, finance charges will be assessed from purchase date. APR varies and is 17.65% as of 8/25/98 with a minimum finance charge of $1.00. Term financing is available to individuals for home or business use. PowerXchange accepts trade in of most major computer brands. Please call for details and the latest qualified brand list. Cash rebates are based on the average wholesale value of your PC per the Orion Blue Book or other source chosen by Micron, adjusted for condition at trade-in.

you're starting to scratch the surface. Let's face it, when you're crawling around under someone's desk in a jungle of twisted cables because they want to see the dancing baby and you're the only one in the office that understands that "hot-swappable hard-drives" aren't something dirty, the last thing you need is a server that's anything but flawless.

THEY SHOULD CALL ME HERO.

11
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WINDOWS NT FACT: Micron Was The First PC Company To Ship Windows NT In The Summer Of '94

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nVidia Riva 128, 4MB SGRAM 3D AGP graphics
64-voice PCI Wavetable sound
3Com 3C905 WOL 10/100 network card
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Microsoft® Windows NT® Workstation 4.0*
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SMART II hard drive monitoring
Chassis intrusion detection
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Virus detection reporting
Remote Wake Up capability
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3.5" floppy drive
104-key enhanced keyboard
Microsoft IntelliMouse®

$1,499 $53/mo. TechRefresh Bus. Lease, 36 mos.

New!

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128MB SDRAM
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32X max speed CD-ROM drive
Diamond Viper 330 nVida, 4MB AGP video
64-voice PCI Wavetable sound
3Com 3C905 WOL 10/100 network card
5-year/3-year Micron Power limited warranty
Intel LANDesk Client Manager available
Microsoft Windows NT Workstation 4.0*
Norton AntiVirus

SMART II hard drive monitoring
Chassis intrusion detection
Fan, temperature, and voltage problem reporting
Virus detection reporting
Remote Wake Up capability
MiniTower case
3.5" floppy drive
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32X max speed CD-ROM drive
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Emergency Management Port Console

Supports up to two Intel Pentium II processors
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Integrated Symbios PCI Ultra Wide SCSI-3 dual channel controller
Integrated RAID upgrade option
Intel PRO/100+ Server Adapter
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9GB U2W LVDS SCA 1" hard drive
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Intel LANDesk Server Manager 6.0
Emergency Management Port Console
Microsoft Windows NT Server 4.0 (10-user license)

Supports up to four Intel Pentium II Xeon processors
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Integrated Symbios narrow SCSI controller
Intel PRO/100+ Server Adapter with Adaptive Load Balancing and Adapter Fault Tolerance software
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6 internal, hot-swappable hard drives bays
1 hot-swappable 400-watt power supply (upgradable to three w/redundancy)
3 external 5.25" media bays
Free-standing pedestal chassis standard (rack mount option available)
ICMB and cluster support
104-key enhanced PS/2 keyboard
Microsoft mouse
1 parallel, 2 serial ports
• Add 3Com Gigabit EtherLink Network Interface Card for $800*

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Ask Word for a raise ◆ Indent quotations ◆ Write in the margins

Create Fancy Monograms for Logos in Word

ARE YOU READY TO GET fancy with your letterhead? In the October issue, we discussed how to create monograms for your initials, company logo, or other graphical elements in WordPerfect by printing one letter on top of another. You can perform similar tricks in Word, with even more flexibility. Here s how to create large monograms using two or more letters in Word 7 and 97:

1. Type the desired characters on a separate line, with no intervening spaces, and then select the characters. Make sure you don t select any surrounding spaces.
2. Choose a font and a point size for your monogram. This technique usually works best with font sizes that are 36 points or larger.
3. Select *Format•Font*, then click the *Character Spacing* tab in the Font dialog box.
4. Choose *Condensed* from the Spacing list, and enter your font size in the By box to the right. Select *Condensed* again in the Spacing list to display your selection in the Preview window (see **FIGURE 1**).
5. If you wish, click the *Font* tab in the dialog box and choose a color for the monogram text, or experiment with other formatting attributes, watching the Preview window to see the results.
6. Click *OK* to apply the new formatting.

CHOICE WORDS FROM WORD

WHO SAYS THAT WORD doesn t have any sense of humor? Try this in Word 7 or 8: Type the phrase **I'd like a big raise** in a Word document, then select the typed phrase and press **<Shift>-<F7>** to see the comment in Word s Thesaurus. **Hint**: This little trick will give you the same result for any phrase that starts with the letter *I* and an apostrophe.

INDENT A BLOCK OF TEXT

NOT ALL QUOTATIONS are sound bites often, they run for several paragraphs. When they do, it s common practice to indent both sides of the block. Here s a guide to handling the job in the three major word processing programs.

Word 6 and later:

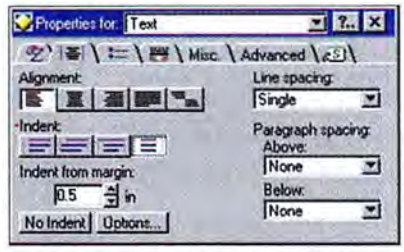
1. Select the paragraphs you want to set off.
2. Right-click the selection and select *Paragraph*. Click the *Indents and Spacing* tab if it s not already selected.
3. In the Indentation section of the Paragraph dialog box, type the number of inches you want the paragraphs indented in the Left and Right fields, or click the Up and Down arrows in each field.
4. Click *OK*.

WordPerfect 6.1 and later: WordPerfect offers a direct way to quickly indent both sides of text paragraphs.

1. In versions 7 and 8, select the paragraphs you want to set off. In version 6.1, do not select the paragraphs. Instead, place the cursor at the beginning of each paragraph in turn before giving the command below.
2. Select *Format•Paragraph•Double Indent*, or press **<Ctrl>-<Shift>-<F7>**. This indents both sides of the paragraphs to the first tab setting (see **FIGURE 2** on the next page).

Hint: Repeat step 2 to increase the amount of indentation.

Word Pro (all versions): The Text InfoBox gives you a fast way to indent both sides of a paragraph.



1. Select the text you want to set off.
2. If the Text InfoBox is not visible, press **<Alt>-<Enter>** to display it.
3. Click the *Alignment* tab in the InfoBox.
4. Click the double indentation button in the Indent section of the InfoBox.

FIGURE 1: WORD'S Character Spacing Tool helps you create fancy monograms.

ILLUSTRATION: JEFFREY PELO (TOP); PHILIP ANDERSON (BOTTOM)

Formatting on the Fly

AS YOU TYPE A DOCUMENT, you often need to add formatting to text. Most users select pretyped text, then click a toolbar button to add the formatting. Here's a more efficient way: Press a keyboard shortcut *before* typing the word or phrase to turn on a formatting option, then press the same keystroke when you're done typing the word to turn the option off.

Keystrokes that work in all current Windows processors are <Ctrl>-B for bold, <Ctrl>-I for italics, and <Ctrl>-U for underline.

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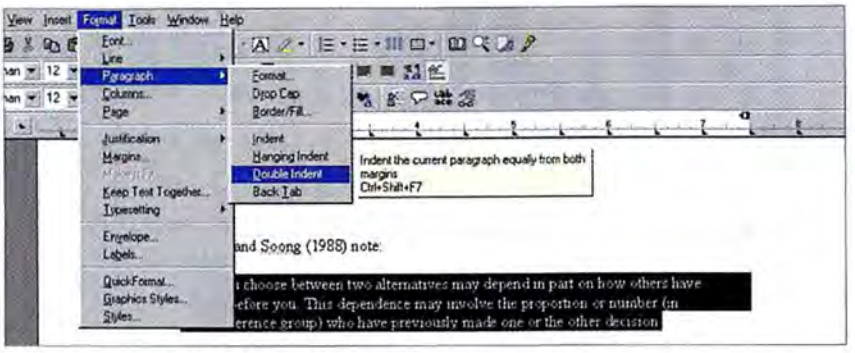

FIGURE 2: DISPLAY A LONG QUOTATION in WordPerfect by double-indenting it.

5. If necessary, adjust the level of the desired indentation in the InfoBox's 'Indent from margin' field.

WRITE IN THE MARGINS

NOW YOU KNOW HOW to indent epigraphs and long quotes within the body of a document, but what about the opposite problem: writing in a document's margins? Perhaps you need a marginal note to annotate a passage of text or draw attention to a point (see **FIGURE 3**). Here's how to create marginal notes in Word, WordPerfect, and Word Pro.

Word 6.0 and later: Before you can write anything in the margin, you must create a frame or text box.

1. Select *File•Page Setup* and increase the size of the left margin to fit in the marginal text. Keep in mind that most printers can't print any closer than a quarter inch from the edge of the paper.
2. Select *Insert•Frame* (Word 6 and 7) or *Insert•Text Box* (Word 8). Word automatically switches into Page Layout view. Click and drag in the margin to draw the frame or text box where you want it to appear.
3. Adjust the size and position of the box as needed by dragging the box's handles, being careful at the same time to keep the box at least .25 inch from the edge of the page. Adjust the margins for the frame or text box by dragging the margin icons on the ruler (if the ruler is not visible, select *View•Ruler*).
4. Type your note and format the text as needed. Word will automatically increase the height of the box to accommodate your marginal text.
5. To remove the line border in Word 6 and 7, right-click the border of the box, select *Borders and Shading* from the context menu, select *None* in the Presets area of the resulting dialog box, and then click *OK*. In Word 8, you also right-click the border of the text box, but select *Format Text Box* in the resulting context menu. In the Line area of the resulting dialog box, select *No Line* from the Color drop-down list, and then click *OK*.

WordPerfect 6.1 and later: As in Word, you enter marginal notations in a text box.

1. Select *Format•Margins*, then increase the size of the left margin to accommodate the marginal text.
2. In WordPerfect 8, select *Insert•Text Box;* in 6.1 and 7, select *Graphics•Text Box*. When the box appears, drag it to the margin.
3. Adjust the size and position of the box by dragging the sizing handles, making sure the box is at least .25 inch from the page's edge.
4. Type your note in the box, formatting it as you normally do. WordPerfect will automatically adjust the height of the box.
5. In WordPerfect 6.1, a feature bar should appear at the top of the document window. If it doesn't, right-click the text box and select *Feature Bar* from the menu. Click the *Border/Fill* button on the feature bar, select *None* from the dialog box's Border Style list, and click *OK* to turn off borders for your text box. In WordPerfect 7 and 8, right-click the text box, select *Border/Fill* from the menu, click the blank area in the 'Available border styles' list, and then click *OK*.

Word Pro (all versions): Unlike Word and WordPerfect, Word Pro does not automatically resize a frame so that the text within the frame will fit.

1. Right-click anywhere in the document screen and select *Page Properties* from the context menu. Increase the left margin to accommodate your marginal notes.
2. Select *Create•Frame* and then click the *Size & Place Frame Manually* button in the Create Frame dialog box.
3. Click and drag to draw the frame, remembering to keep it at least .25 inch from the edge of the page.
4. Type your note in the frame, formatting it as you normally do. Because Word Pro does not automatically adjust the height of the box, use the sizing handles to increase the height, if necessary.
5. To remove the line border, just right-click the frame and select *Frame Properties* from the menu. Click the *Line Style* tab, and then click the *none* button in the 'Lines around frame' region. Then close the InfoBox.

Word Processing welcomes your questions and tips and pays $50 for published items. Contributing Editor George Campbell is a contributor to The PC Bible *(Peachpit Press, 1995).* *See page 14 for contact information.* ■

FIGURE 3: CREATE MARGINAL NOTES to annotate documents or emphasize points by inserting a frame or text box within the margin.

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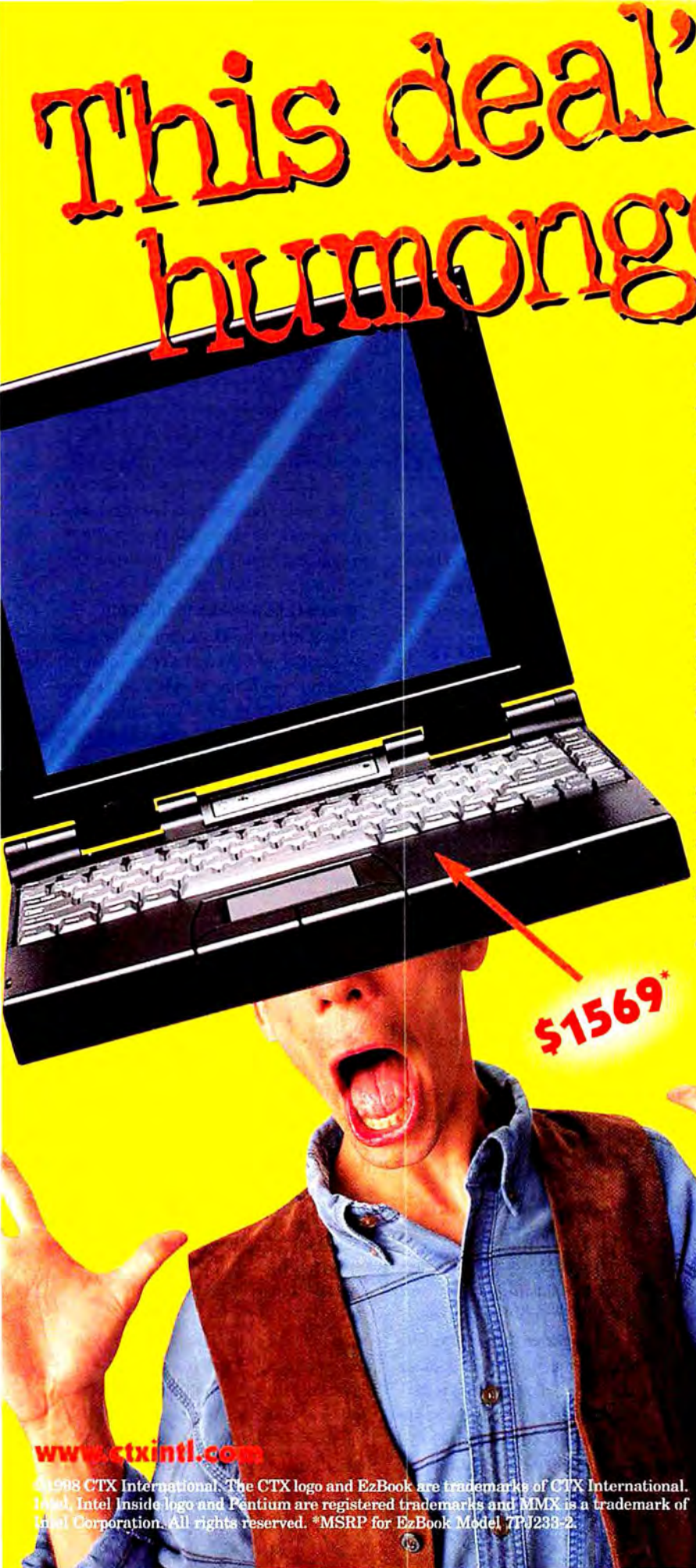

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Chris Winston, Parsippany, New Jersey

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Creating a book.xlt template is also useful for many other purposes. For example, the template can store your preferred default font and size, print settings, named styles, and other settings such as gridline display.

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Even better, if you copy an entire sheet (even a blank one) to your new workbook, *all* of the custom number formats from the first workbook transfer to the new one.

NAVIGATE EXCEL'S SHEETS

EVERY EXCEL USER knows that you can activate a different sheet in a workbook by clicking its sheet tab. Most users also know that you can press <Ctrl>-<Page Up> to activate the previous sheet, and <Ctrl>-<Page Down> to activate the next sheet.

But if your workbook contains many sheets, and not all of the sheets' tabs fit on the screen, you may find it tedious to scroll through the tabs or use the keyboard to activate a distant sheet. Here's a little-known trick that will allow you to bypass repeated scrolling or typing: Display a pop-up list of sheet names by right-clicking one of the arrows to the left of the sheet tabs that are located at the bottom of the worksheet window (see **FIGURE 1**). Select a sheet from the list, and you're there in a flash.

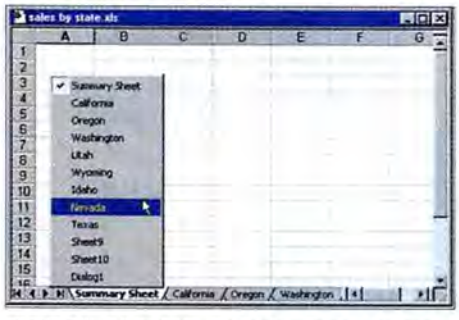

FIGURE 1: JUMP TO A DISTANT sheet in Excel by right-clicking an arrow to the left of the sheet tabs.

WHEN @VLOOKUP WON'T WORK

SUPPOSE YOU HAVE a 1-2-3 worksheet like the one in **FIGURE 2**. You want to enter an employee number into cell B9 and have the formula in cell B10 return the corresponding employee name. Your first instinct might be to try the @Vlookup function, but @Vlookup requires the first column of the range to contain the value to be looked up. In our example, the lookup value is in the fourth column.

You could rearrange the columns, but an easier way to get the job done is to use an @index formula instead. Just enter the following formula in cell B10:

@index(A1..D6,0,@match(B9,D1..D6,0))

The @match function returns the relative position of the employee number in column D (with row numbering beginning at 0). The result of this function is then used as the third argument for the @index function, which returns the cell at a specified column and row position within a range.

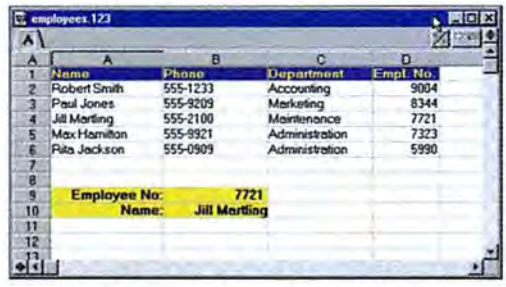

FIGURE 2: 1-2-3'S @VLOOKUP FUNCTION works only if the lookup value is in the first column of a range.

The formula will also work in Quattro Pro, but you'll have to make the following slight adjustments, since the arguments for Quattro Pro's index function appear in a different order, and cell and row numbering begins with 1, rather than 0:

=index(A1:D6,match(B9,D1:D6,0),1)

Spreadsheets welcomes questions and tips and pays $50 for published items. Contributing Editor John Walkenbach is the author of nearly two dozen books and The Spreadsheet Page (www.j-walk.com). See page 14 for contact information. ■

Compare Ranges Using an Array Formula

IN EXCEL, you can compare the cells in two ranges with an array formula. For instance, to see if the values in A1:A100 are identical to those in B1:B100, type **=sum(if(A1:A100=B1:B100,0,1))** in any cell. Then press **<Ctrl>-<Shift>-<Enter>** to make it an array formula.

To compare ranges located on different sheets, just precede the range references with the sheet name, followed by an exclamation point (for example, Sheet1!A1:A100).

ILLUSTRATION: JEFFREY PELO

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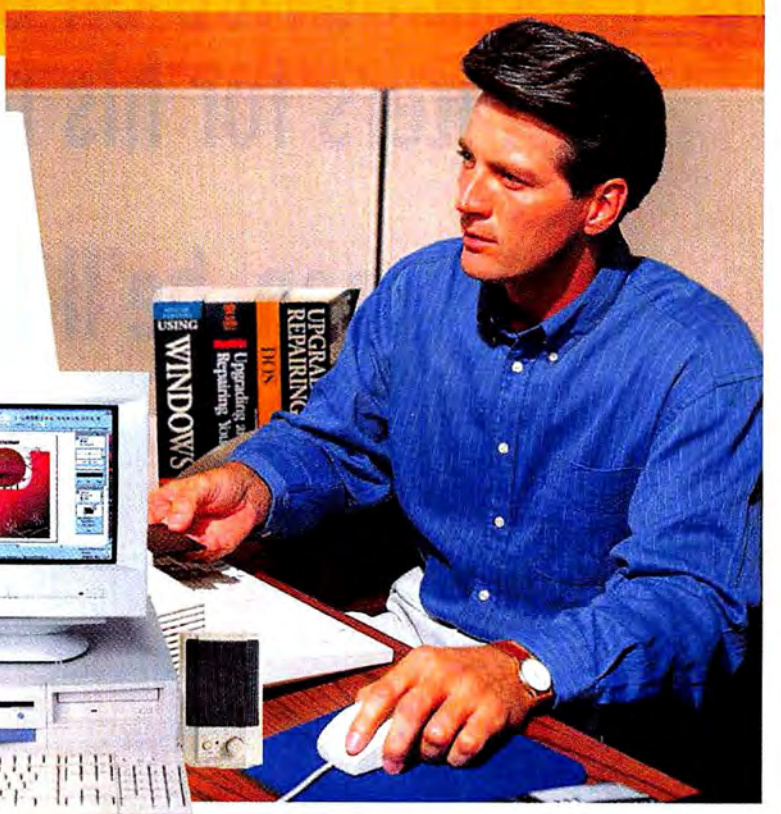

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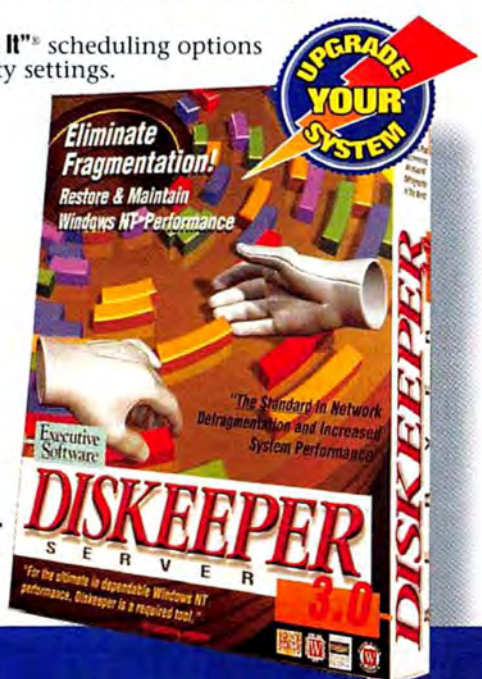

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STILL ON THE FENCE over whether to upgrade to Windows 98? If you constantly add new hardware and software, Win 98's maintenance and troubleshooting tools should simplify your decision. Lots of new and improved utilities to help keep your system running fast and problem-free are tucked away under Start•Programs•Accessories•System Tools.

NIGHT JANITOR

THE MOST difficult part of maintaining a hard disk is finding the time to do it. Defragging your disk (which reorders the location of data on the disk so files are stored in continuous, easy-to-read chunks) can tie up your computer for hours. And the same can be said for utilities that scan the disk surface for errors. Fortunately, Windows 98 links four disk tools—Compression Agent (if you have a DriveSpace 3 compressed drive), Disk Defragmenter, ScanDisk, and Disk Cleanup—in a handy scheduling utility called the Maintenance Wizard. Each of these utilities can be launched from the System Tools menu, but the Maintenance Wizard (also found there) lets you schedule them to run while your system is idle (see **FIGURE 1**). To set them up, start the Maintenance Wizard, click the *Change* button and *OK*, and then follow the prompts.

Compression Agent. The Maintenance Wizard lets you specify which compressed drives to optimize. You can also choose to customize the compression methods, but the default settings are usually more than adequate.

Defragmenter. Click the *Settings* button and put a check mark in the box next to *Rearrange program files so my programs start faster.* This tool, new in Windows 98, takes traditional defragging one step further by taking advantage of FAT32 drives. It works by rearranging pieces of each frequently used application file into the order in which those pieces are read from the hard disk. This process results in speedier launching.

ScanDisk. This utility is basically unchanged from the one in Windows 95. ScanDisk examines both hard disks and floppies for corrupted files and damaged surfaces. If you regularly run ScanDisk, don't forget to uncheck the box next to *Check drive for errors.*

Disk Cleanup. New in Windows 98, this utility deletes unnecessary files in order to save space. Click *Settings* to identify the types of files to be deleted. Temporary Internet files and downloaded program files are in Internet Explorer 4.0 folders of the same names. Note: If you're using IE 4.0, it may not be worth deleting downloaded programs you use frequently—you'll just download them again.

Better Ink Jet Output

ARE ANNOYING WHITE streaks ruining your ink jet printer's output? Take a lint-free wipe or a sponge-tipped swab and moisten it with distilled water or isopropyl alcohol. Gently clean the tiny nozzles on the print head, and dry with a clean wipe. Examine the cartridge, print head, and surrounding areas for stray lint or other debris. To avoid future clogging, never turn off your printer before it comes to a rest. Ink dries very fast, and nozzles clog easily if the print cartridge has not returned to its proper not-in-use position.

WINFORMATION AT YOUR FINGERTIPS

BEFORE WINDOWS 98, finding information about your PC's resources and configuration was quite a chore. In Win 95, that means digging into the Device Manager (open *System* in the Control Panel), which is awkward at best. In Win 98, there's Microsoft System Information (MSInfo). This handy tool should be your first stop in any troubleshooting investigation. It contains a wealth of configuration and troubleshooting data in three categories: hardware, components, and software (see **FIGURE 2**).

Hardware Resources. Here you'll find standard lists of IRQ, DMA, and I/O assignments. There's also a section listing Forced Hardware—non–Plug and Play components with user-assigned resources—and a Conflicts/Sharing section, which lists devices that share resources and identifies those that have resource conflicts. The latter two sections ▶

FIGURE 1: LET WINDOWS 98 handle your hard disk housekeeping chores after hours.

ILLUSTRATIONS: JEFFREY PELO (TOP); PHILIP ANDERSON (BOTTOM)

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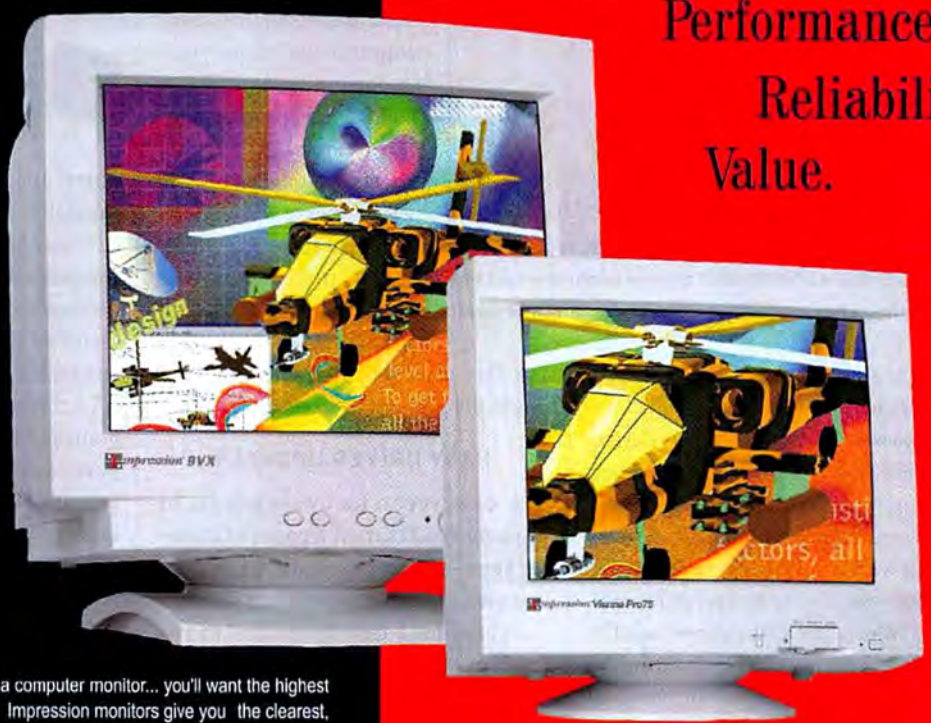

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VIEWABLE AREA	18.0"	16.1"	16.0"
H-SCAN (KHZ)	24-96	24-96	30-96
MAX. RESOLUTION	1600x1200	1600X1200	1600X1200
OPTIMUM RESOLUTION	1280X1024 @85 Hz	1024X768 @ 85 Hz	1024X768 @ 85 Hz

MODEL	7VXL	7V	5V
CRT	17" MICROFILTER	17" S-MASK	15" S-MASK
DOT PITCH (MM)	0.26	0.27	0.28
VIEWABLE AREA	16.0"	16.0"	13.8"
H-SCAN (KHZ)	30-70	30-70	30-70
MAX. RESOLUTION	1280X1024	1280X1024	1280X1024
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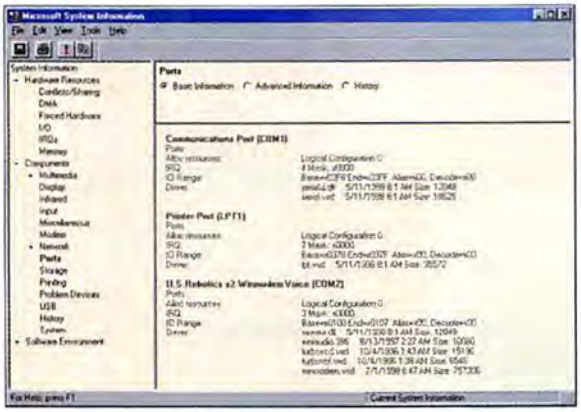

FIGURE 2: ARE YOU MSINFORMED? System Information puts all your PC's configuration information in one place—what a concept!

should be your first stops if you suspect that there may be a hardware conflict.

Components. This category lists device-driver and other component information by group. The Problem Devices group shows troubled components—devices flagged with a yellow circle in Device Manager—together with their status info. History, which lists all the drivers used by the system since installation or during the last seven days, is useful for tracking down recent configuration changes that may have led to conflicts.

Software Environment. This category compiles data aimed primarily at support technicians. But check out Running Tasks to see what files are currently running. And Startup Programs is great for identifying *all* programs that load at startup—particularly those that start from the Registry without any visible indication that they're running.

MSInfo is also a handy starting point for launching most of Windows 98's troubleshooting and maintenance utilities. The Tools menu lists lots of new utility programs that make troubleshooting *much* easier (see **FIGURE 3** for a summary). Make a copy of all the MSInfo data each time you install new hardware or software. Simply click *File•Save* on the MSInfo menu to save to either a standard text file or an NFO (MSInfo) file. You can also print a copy if you wish, but expect the printout to exceed 80 pages.

EASY DRIVER UPDATES

YOU CAN AVOID hardware hassles by using the most current versions of drivers for your PC's components. Until now, that meant going to the vendor's Web site, searching for a new driver, and (if you found one) downloading and installing it.

Windows Update, a utility that connects to a database of the latest device drivers on Microsoft's site, eases this process. Select *Start•Settings•Windows Update*; this will take you straight to www.microsoft.com/windowsupdate. To use the site, you must use the IE version that ships with Win 98.

Once you're on that site, the program will compare your system's configuration files with the driver database and list any drivers for which updated versions exist.

Note: If a new driver is causing problems and you want to reinstall the original one, run the Update Wizard Uninstall utility, which is located on the System Information Tools menu.

OFF TO A ZIPPY START

I HAVE A NEW Pentium II PC with a built-in Zip drive, and I'd like to boot from it. Is this possible?

Clint Duyke, Denver

SOME BIOS MAKERS have included this capability in the latest versions of their BIOSes. But there's no guarantee your computer will support nonfloppy booting, because motherboard and system manufacturers often tweak the BIOS code to suit their needs.

To check, go into the CMOS Setup program and look for a boot option that lists devices such as Zip or LS-120 drives. If your BIOS offers it, you'll also need Windows 98 or an OSR2 version of Windows 95. (To see which version of Win 95 you have, right-click *My Computer*, click *Properties*, and look under the *General* tab for 'B' or a later letter at the end of '4.00.950'.) You'll need to set your floppy drive letter to B: during the session before booting from the alternative drive.

If your BIOS doesn't provide the necessary support, you may need to get a flash BIOS upgrade from your PC's manufacturer. You may also be able to buy an add-on card that provides the necessary BIOS extensions. Both Promise Technology (800/888-0245, www.promise.com) and Micro Firmware (800/767-5465, www.firmware.com) will probably have cards available for under $50 by the time you read this. But be warned: Windows has a long history of BIOS-related problems, especially with first-generation add-ons.

For more hardware tips, visit PC World Online (www.pcworld.com/heres_how). Kirk Steers is a PC World *contributing editor.* Hardware Tips *welcomes tips and questions and pays $50 for published items. See page 14 for contact information.* ■

WINDOWS 98 SYSTEM INFORMATION TOOLS

UTILITY	What it does
Automatic Skip Driver Agent	Automatically reports improperly working hardware components and disables their drivers for trouble-free startup. You can enable or disable problem devices to aid in troubleshooting.
Dr. Watson (updated version)	Takes snapshots of your system before and after software fault messages and writes the information to a log file—a big help in tracking down the cause of system errors.
Registry Checker	Scans the Registry for errors and repairs some problems; provides vastly improved automated backup for Registry files.
System Configuration Utility	Very handy diagnostic tool enables you to easily edit system files and bypass any combination of these files upon start-up.
System File Checker	Scans key Windows 98 program files for corrupt files or nonstandard versions of files installed by applications; lets you easily replace these with original files from Windows CD.
Version Conflict Manager	Monitors software installations and flags any file being overwritten by an older version; stores existing version and lets you easily switch between the two versions in case of compatibility problems.
Windows Report Tool	Provides a template that lets you describe a problem, and packages it with key configuration information into a Windows .cab file that can be easily sent via e-mail to tech support personnel.

FIGURE 3: LAUNCH THIS ARSENAL of utilities from the Windows 98 System Information Tools menu.

"When will I **finally** get the affordable, **high-speed** internet access I was promised?

DirecPC

"Right

How long have YOU been waiting?

If you've been holding out for the cable or telephone company to bring high-speed Internet access to your neighborhood, chances are it's been a while. Which is a shame, because if you'd chosen DirecPC, you could be surfing at up to 400 Kbps **right now**. That's up to 14 times faster than a standard 28.8 modem and almost three times faster than an ISDN line.

It's easy.

How do you get started? Just visit us at www.direcpc.com to find a retailer near you. If you can't find a store in the neighborhood, call us at 1-800-DIRECPC. We'll send you your dish, satelite modem, software and everything else you need. We can arrange professional installation for you, too. Either way, getting started is just a phone call or a mouse click away.

HARDWARE AS LOW AS

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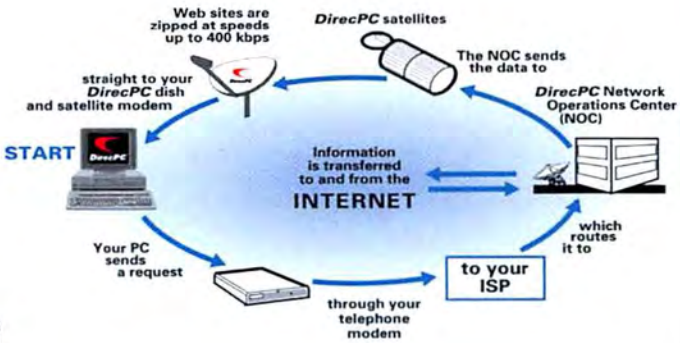
How does it work?

The engineers at Hughes figured out that the real bottleneck in the speed of the Internet wasn't the request **out** to the Web — telephone modems handle that just fine. Everything slows down when the Web tries to use the telephone system to send you **back** the media-rich information you requested. So, we use a much faster satellite connection for sending you the Web content you want. Check out the diagram — this is the system that makes DirecPC the fastest Internet access available nationwide.



now."

DirecPC gets pushy.

Sure, you love the idea of surfing the Web at up to 400 Kbps. But what if you could get your favorite Web sites and Usenet Newsgroups delivered straight into your PC by satellite — **automatically**, without even having to tie up your phone line to ask for them? That's just what DirecPC's Turbo WebCast™ and Turbo NewsCast™ services do — so you're never behind on the news and information that's important to you. The best thing about these two services? They're **free** with your paid subscription to any Turbo Internet™ service package.

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The good news.

No other high-speed Internet access provider offers so much for so little. Take a close look at our service pricing — we're sure you'll find a package you like.

Service Plan Details	Residential		Business
Name of Service Plan	Executive Surfer	Family Surfer	Office Surfer
Price of Service Plan (Including ISP)	$29.99/Month	$49.99/Month	$129.99/Month
Price of Service Plan (Without ISP)	$19.99/Month	$34.99/Month	$109.99/Month
Hours of Service (Availability)	24 Hours a Day	24 Hours a Day	24 Hours a Day
On-Line Time (Hours of usage for Turbo Internet)	25 Hours /Month	100 Hours/Month	200 Hours/Month
Additional Hourly Rate (Including ISP) Additional Hourly Rate (Without ISP)	$1.99/Hour $.99/Hour	$1.99/Hour $.99/Hour	$1.99/Hour $.99/Hour
DirecPC Services			
Turbo Webcast: Broadcast delivery of popular Websites to your PC's hard drive	Included	Included	Included
Turbo Newscast: Broadcast delivery of up to 30,000 Usenet Newsgroups to your PC's hard drive	Included	Included	Included
Turbo Internet: Fully interactive access to the Internet at speeds up to 400Kbps	Included in Online Time	Included in Online Time	Included in Online Time
Free E-mail Accounts	1	1	4
Networking (Number of Seats)	N/A	N/A	4

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You already know how great the Internet is — you're just looking for a way to go faster. DirecPC is the fastest Internet access available nationwide. It's affordable, and it's available everywhere. So, if you're still plugging away with an old-fashioned telephone modem, you need to ask yourself:

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HUGHES NETWORK SYSTEMS

Computer, Camera, Action!

NOT LONG AGO, editing videos on a PC meant splurging more than $1000 on video capture cards, not to mention buying high-end SCSI hard drives and the fastest PC you could afford. But now, for $150 to $400 you can buy video capture hardware that works with nearly any Pentium PC. Even better, most capture systems these days plug right into your PC's parallel port. You then plug your camcorder's video output cable into the capture device, connect a few other cables, install the video editing software that comes with the device, and you're ready to create your own video spectacular.

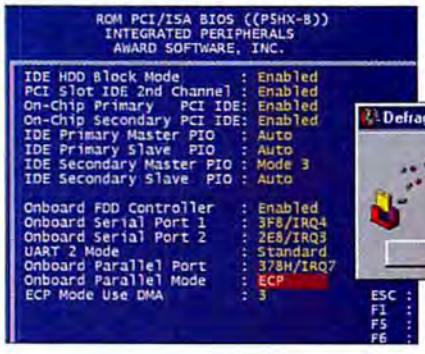
Video capture devices come in various flavors. The right one for you depends on what you want to do with the video after you capture it. Low-end products such as the $100 Play Snappy (www.play.com) are designed primarily for capturing still photos from video; they're perfect for e-mailing photos over the Net or incorporating video into presentations. Snappy uses sophisticated technology to sharpen and improve the quality of the images. Higher-end products, such as FutureTel's $299 Video Sphinx Pro (www.futuretel.com), capture high-quality video for use on Web pages or in more elaborate presentations.

But most people use video capture devices to edit video, add titles and fancy transitions, and record the finished product onto videotape. Reasonably priced products like the $229 Pinnacle Studio 400 (shown below in step 2) offer features that until recently appeared only in very expensive, PC-based video editors—which despite their cost still lacked professional quality. A popular alternative is Iomega's $199 Buz (www.iomega.com/buz), although this product doesn't plug into the parallel port and requires a special SCSI card with chips for processing video.

On the PC side, you'll need at least a Pentium-133 machine and 16MB of memory (32MB is preferable). You'll also need lots of free hard disk space, since compressed, captured video consumes about 2MB of storage space per minute.

Keep in mind that you'll need to hook up many cables to capture and edit video on a PC, but the results are worth it. Here's how to get your personal video editing system up and running. For best results, read all equipment instructions carefully and spend plenty of time experimenting and honing your editing skills.

Stan Miastkowski is a PC World *contributing editor.* ■



1 Set up your parallel port. Video capture devices that hook up to your printer port require maximum port performance. Restart your PC, launch the BIOS setup utility (details vary by PC maker), and find the setting for the printer port; it's usually listed in the BIOS setup menu under "Integrated Peripherals" or some similar heading. Make sure that it's set for Extended Capabilities Port or ECP. Save the setting and reboot your PC. Once Windows is up, select *Start•Programs•System Tools•Disk Defragmenter* and defrag the drive you'll be saving your video on. Next, set up the video capture software. Most video capture boxes require you to install the software before you hook up the hardware. Read your manual and follow the directions.

2 Identify the connections. You need to connect four devices: PC, camcorder, video capture device (an example is shown below), and VCR. All camcorders carry a standard video-out connector—a single RCA jack, usually yellow, that works with a standard composite video cable. In most instances, they include a pair of RCA jacks (one red, one white), too, for audio out. Hi-8 camcorders come with an S-Video-out connector and cable, as well (see inset).

Camcorders also require a remote control mechanism. It may be an infrared connection, a tiny jack labeled LANC, or—in the case of Panasonic camcorders—a five-pin connector.

Video-out cables usually come with your camcorder; audio cables accompany your PC's sound card; and remote control cables are included with video capture hardware.

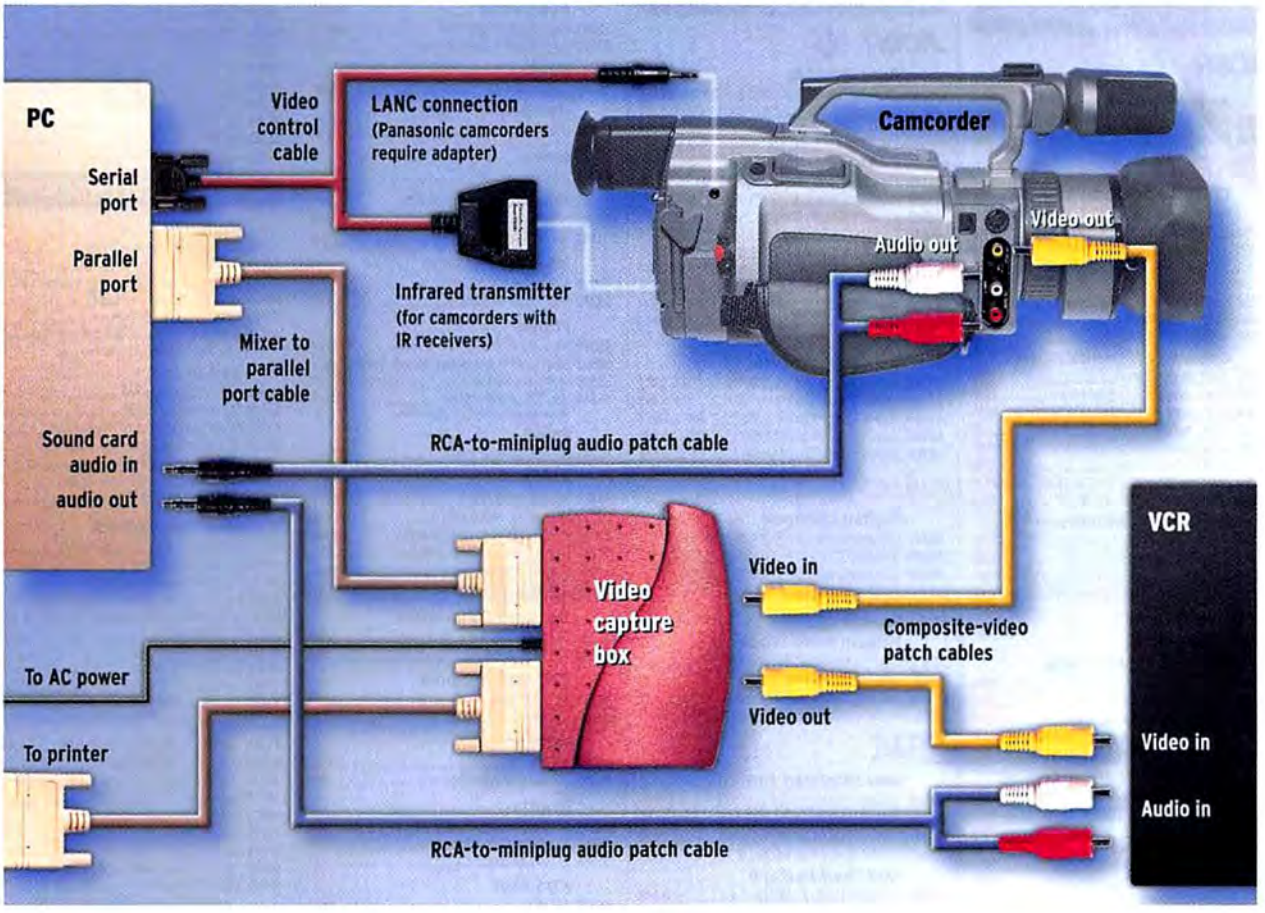
PHOTOGRAPHS: KEVIN CANDLAND

3 Hook up the hardware. Read your video capture box manual carefully, or run the video tutorial on the software installation CD-ROM (if one is included there). You'll need a fair amount of room to set everything up. Here's a typical approach:

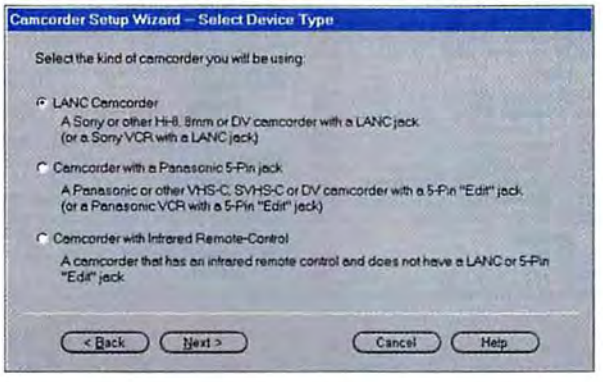
Turn off your PC, and connect the video capture device to your PC's printer port and the AC adapter to the box. Connect one end of the main cable bundle that came with the box to your PC's serial port, and plug the other end into your camcorder's remote control jack. If you're using your camcorder's IR control, position the camera and the VCR next to each other, and make sure that the IR transceiver on the cable points toward both of them.

Next, connect a video cable (standard composite video or S-Video if your camcorder is so equipped) between your camcorder's video-out jack and the video-in jack of the video capture box. Attach a cable from the video-out jack of the capture box to the video input of your VCR.

Connect an audio cable from your camcorder's audio-out jack to the line input of the sound card on the back of your PC. Finally, attach an audio cable from the sound card's output to the VCR's audio input.



4 Calibrate your setup. Make sure that everything is hooked up correctly (as in the diagram above). Most video capture packages use a setup wizard to lead you through the necessary steps.



5 Start producing video. Procedures for capturing, editing, and writing the finished product to tape vary by maker but are usually easy.

For example, the Pinnacle Studio 400's software automatically creates a series of thumbnail sketches, shown here, as you load the video from your camcorder. Editing can be a simple matter of dragging and dropping the thumbnails into the order you want. When you're done, the software sends the finished video to a tape in the VCR.

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101594 300PII/64MB/6.4GB/56K/12.1" Act. 3599
101595 300PII/64MB/6.4GB/56K/12.1" Act. 3649

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48675 120MMX/16MB/1.58GB/6.1" Act. $999

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101101 266PII/32MB/4.3GB/56K/12.1" TFT $2898
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102883 300PII/64MB/6.4GB/24X/56K/13.3" TFT ..3699
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54104 Palm III 2MB, Backlit, Infared Port 359.95

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56361 Cassiopeia E-10 ..... $395

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101561 REX Pro S for Laptops $199.95
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59973 660LX Color Palmtop PC 999

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49695 19" VisionMaster 450 689
55681 21" VisionMaster 501 999

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46332 17" VS-7 259

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36126 17" DJ702e 279
32695 17" DX700T Technitron 359

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100822 17" Diamond Scan 70 ..... $399
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36276 21" Diamond Pro 91DXM 1049

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49696 17" P750 Mist White 669
55433 20.1" MultiSync LCD2010 (LCD Monitor) 5899
46575 21" Multisync E1100 ..... $999
101425 21" MultiSync P1250 (Trinitron) 1199

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100838 17" 107S 319
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48756 17" 200GS Multiscan 569
48748 17" 200PS Multiscan 779
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53515 LaserJet 5000N 11" x 17" Network-ready 1999

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45773 Optra E+ Laser 399
56072 Optra S 1625N Laser w/NIC 1299
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*Windows 98 †Windows NT

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ViewSonic G790 19" (18" view) 0.26mm	619.98
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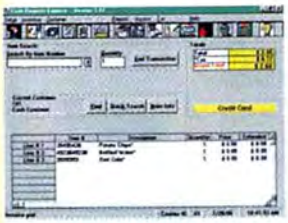

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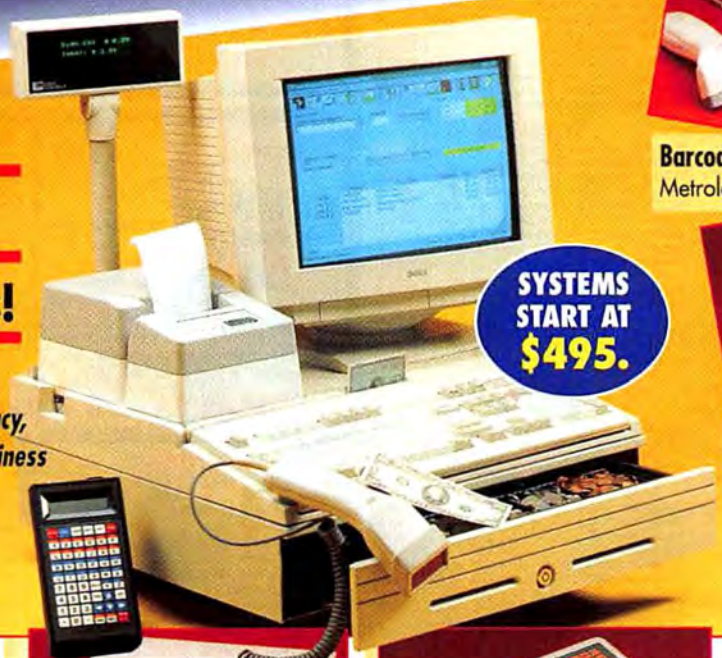

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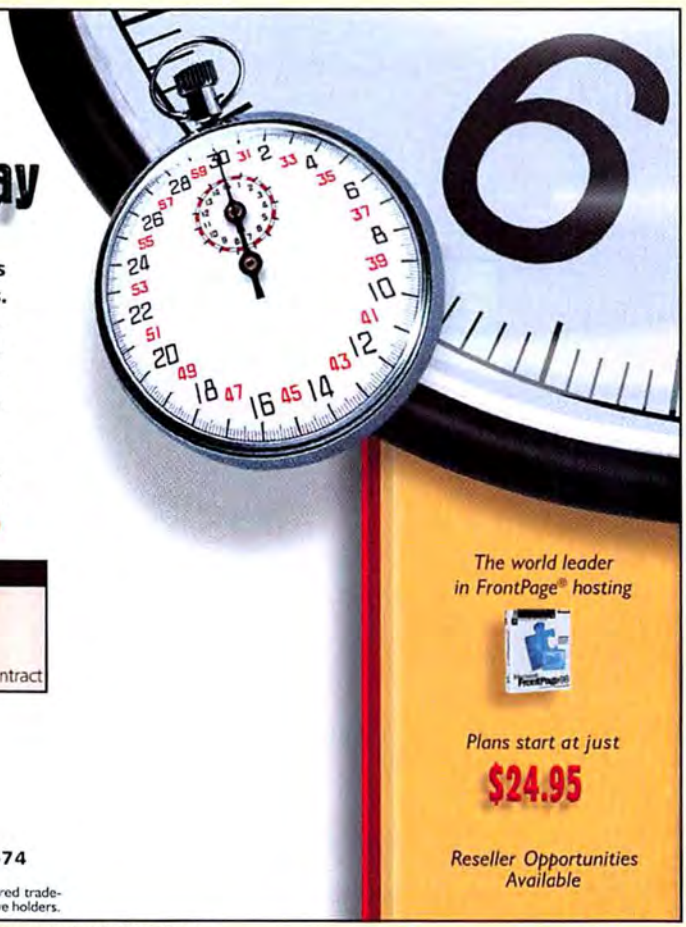

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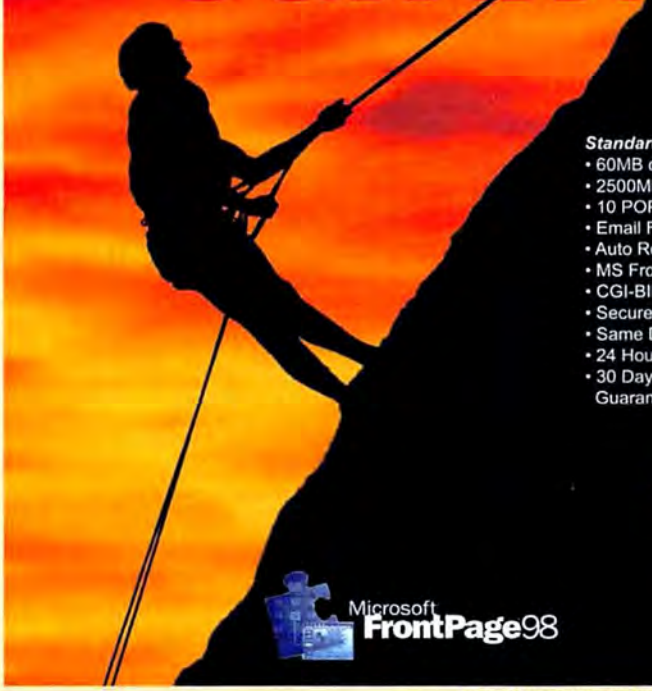

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J19323	320CDS	P233MMX	32	4.1GB	20X	-	12.1DSTN	$1,461
J19324	320CDT	P233MMX	32	4.1GB	20X	-	12.1TFT	$1,635
J19327	330CDS	P266MMX	32	4.1GB	20X	-	12.1DSTN	$1,635
J19326	330CDT	P266MMX	32	4.1GB	20X	-	12.1TFT	$1,923
J19358	4000CDS	PII-233	32	4.1GB	24X	-	12.1DSTN	$1,923
J19359	4000CDT	PII-233	32	4.1GB	24X	-	12.1TFT	$2,403

Sattelite Pro

Order#	Model#	Processor	Ram	HD	CD	Modem	Display	Price
J19305	490CDT	PII-233	32	4GB	20X	56K	12.1TFT	$2,500
J19306	490XCDT	PII-266	32	4GB	20X	56K	3.3TFT	$2,884
F90158	320CDT	P266MMX	32	4GB	-	56K	0.4TFT	$2,692
J19362	7000CT	PII-266	32	4.3GB	-	56K	2.1TFT	$2,884

Libretto

Order#	Model#	Processor	Ram	HD	CD	Modem	Display	Price
F90128	70CT	P200MMX	16	1.6GB	-	-	6.1TFT	$995
F90187	100CT	P166MMX	32	2.1GB	-	-	7.1TFT	$1,730

Tecra

Order#	Model#	Processor	Ram	HD	CD	Modem	Display	Price
G0285	520CDT	P166MMX	32	2.1GB	0X	33.6K	2.1TFT	$1,923
F90155	550CDT	P266MMX	32	4GB	20X	56K	12.1TFT	$3,147
G02889	780CDM	PII-266	64	5.1GB	20X	56K	13.3TFT	$3,847
J19301	780DVD	PII-266	64	5.1GB	DVD	56K	13.3TFT	$4,232
J19363	8000	PII-233	32	4GB	24X	56K	12.1TFT	$2,692
J19364	8000	PII-266	64	6.4GB	24X	56K	13.3TFT	$3,365

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G99828	656142U	PII-266	32	4.2GB	32X	DT	$1,189
I74077	659134U	PII-266	32	4.2GB	-	MT	$1,069
G99829	656153U	PII-300	32	4.2GB	-	DT	$1,169
J81202	627555U	PII-350	32	3.2GB	-	DT	$1,399
J87457	627566U	PII-400	64	6.4GB	32X	DT	$1,709

IBM PC300PL Series

Order#	Model#	Processor	Ram	HD	CD	Modem	Price
J60131	686218U	PII-266	32	4.2GB		DT	$1,309
J60138	689212U	PII-266	32	4.2GB		MT	$1,418
G99844	686211U	PII-333	64	4.2GB	32X	DT	$1,739
J60135	686224U	PII-350	64	4.3GB		DT	$1,869
J99061	D5882A	PII-400	64	6.4GB	32X	DT	$2,408

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G99856	380XD	PII-233	32	4GB	24X	2.1HPA	$2,243
G99857	380XD	PII-266	32	5.1GB	24X	2.1TFT	$2,769
G99811	560X	P233MMX	32	4GB	24X	12.1TFT	$2,482
G99861	600	PII-233	32	3.2GB	24X	13.3TFT	$3,819
G99862	600	PII-266	32	4GB	24X	13.3TFT	$4,392
G99863	770E	PII-266	32	5.1GB	-	4.1TFT	$3,849
G99865	770ED	PII-266	64	8.1GB	DVD	14.1TFT	$5,239

COMPAQ

Presario Series

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G64141	2256	AMD K6-266	48	4GB	32X	56K	$943
G64145	4860	P2-233	64	8GB	DVD	56K	$1,920
G64156	4880	P2-400	64	12GB	DVD	56K	$2,208
G64195	5020	Celeron 300	64	8GB	32X	56K	$1,079
G64185	5030	P2-300	64	8GB	32X	56K	$1,262
J86604	5050	Celeron 333	96	8GB	32X	56K	$1,262
G64187	5140	P2-400	96	8GB	DVD	56K	$1,957
G64186	5610	P2-350	64	8GB	DVD	56K	$1,792
G64188	5630	P2-400	128	12GB	DVD	56K	$2,185
J86605	5660	P2-450	128	12GB	DVD	56K	$2,319
J86620	5170	P2-350	128	10GB	CD	56K	$1,589

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J25805	PII-266	32	3.2GB		DT	WIN 95	$914
J25806	PII-300	32	3.2GB	24X	DT	WIN 95	$1,120
J25807	PII-333	32	3.2GB	24X	DT	WIN 95	$1,238
J25808	PII-350	64	6.4GB	24X	DT	WIN 95	$1,630
J25809	PII-400	64	6.4GB	24X	DT	WIN 95	$1,760

Deskpro EP Series Tower

Order#	Processor	Ram	HD	CD	Modem	Factor	System	Price
J25820	Celeron 266	32	2.1GB	24X	56k	MT	WIN 95	$1,053
J25811	PII-266	32	4.3GB	24X	56K	MT	WIN 95	$1,279

Deskpro EN Series

Order#	Processor	Ram	HD	CD	Factor	System	Price
J25878	Celeron 300	32	3.2GBGB	24X	DT	WIN 95	$1,027
I86882	PII-266	16	3.2GBGB	24X	DT	WIN 95	$1,155
I86887	PII-333	32	6.4	24X	MT	WIN 95	$1,536
I86883	PII-300	32	3.2GBGB	24X	DT	WIN 95	$1,192
I86884	PII-333	32	3.2GBGB	24X	DT	WIN 95	$1,310
I86885	PII-350	32	6.4GBGB	24X	DT	WIN 95	$1,443
J25882	PII-400	64	6.4GBGB	24X	DT	WIN 95	$1,839
J25802	PII-400	64	9.1UWSC	24X	MT	NT4.0	$2,426

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COMPAQ Prof Workstation Series

Prof Workstation AP200 Tower

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H76429	PII-350	64	6.4GB	32X	2D/3D	MT	$2,049
H76430	PII-400	64	6.4GB	32X	2D/3D	MT	$2,179

Prof Workstation AP400

Order#	Processor	Ram	HD	CD	Card	Factor	Price
H76418	PII-350	64	6.4GB	32X	2D+	MT	$2,489
H76421	PII-400	128	4.3UWSC	32X	2D+	MT	$2,949

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Aramada Notebooks

Order#	Model	Processor	Ram	HD	CD	Modem	Display	Price
H385561505	DMP-200MMX	32	2.1GB	20X	56K	12.1CSTN		$1,644
H385361592	DMTP-233MMX	32	3.2GB	20X	56K	12.1TFT		$1,999
H38560	1700	P2-233	32	4GB	24X	56K	12.1TFT	$2,499
J10515	7800	P2-266	64	5G	20X	33.6	13.3TFT	$4,289

Presario Notebooks

Order#	Model	Processor	Ram	HD	CD	Modem	Display	Price
G64189	1230	MGX-233	32	3.2GB	24X	56K	12.1DSCN	$1,386
G64190	1625	AMD K6-266	32	3.2GB	24X	56K	12.1DSCN	$1,749
G64191	1640	AMD K6-266	32	4GB	24X	56K	12.1TFT	$1,999
G64192	1650	P2-266	64	4GB	24X	56K	12.1TFT	$2,599
H38585	1655	P2-266	64	4GB	24X	56K	13.3TFT	$2,789
J86608	1810	P2-300	64	4GB	24X	56K	13.3TFT	$3,339

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D6766A	D6766A	PII-333	32	4.3GB	32X	-	DT	WIN 98	$1,379
D6637T	D6637T	PII-350	32	4.3GB	-	-	MT	WIN 98	$1,589
D6632B	D6632B	PII-400	64	8GB	32X	-	MT	NT 4.0	$1,959

HP VE PC Series

Order#	Mfg Part#	Processor	Ram	HD	CD	NIC	Factor	System	Price
H58244	D6530T	Celeron 266	32	2.5GB	-	-	DT	WIN 95	$834
H58264	D6535T	Celeron 300	32	3.2GB	-	10/100	MT	WIN 95	$969
H58250	D6550T	PII-266	32	3.2GB	-	-	DT	WIN 95	$1,096
G99066	D6552N	PII-266	32	3.2GB	-	10/100	DT	NT/95	$1,233
G99065	D6551A	PII-266	32	3.2GB	-	-	MT	WIN 95	$1,147
H58252	D6560T	PII-333	32	3.2GB	-	-	DT	WIN95	$1,389
H58254	D6570T	PII-350	32	3.2GB	-	-	DT	WIN95	$1,562
H28255	D6584T	PII-400	64	4.4GB	32X	-	MT	WIN 95	$2,020

HP VL PC Series

Order#	Mfg Part#	Processor	Ram	HD	CD	NIC	Factor	System	Price
J30400	D5720T	PII-266	32	3.2GB	-	-	DT	NT/95	$1,226
E89172	D5724N	PII-266	32	3.2GB	-	10/100	DT	NT/95	$1,398
G99053	D5735A	PII-266	32	4.3GB	24X	-	MT	NT/95	$1,468
H58256	D5731T	PII-300	32	4.3GB	-	-	DT	NT/95	$1,239
H58257	D5797T	PII-333	32	4.3GB	-	-	DT	NT/95	$1,429
H58258	D5880T	PII-350	32	4.3GB	-	-	DT	NT/95	$1,539
G99061	D5882A	PII-400	64	6.4GB	32X	-	DT	NT/95	$2,199

HP XA PC Series

Order#	Mfg Part#	Processor	Ram	HD	CD	NIC	Factor	System	Price
H72413	D4796S	PII-266	32	4.3GB	24X	10/100	DT	NT 4.0	$1,795
G51278	D4692N	PII-333	64	6.4GB	24X	0/100	DT	NT 4.0	$2,857

HP XU Workstation

Order#	Mfg Part#	Processor	Ram	HD	CD	NIC	Factor	System	Price
H51281	D4695N	PII-300	64	4.5GB	SC24X	10/100	MT	NT 4.0	$2,965
J30401	D6331T	Xeon400	128	4.5GB	SC32x	10/100	MT	NT 4.0	$4,799

HP XW Workstation

Order#	Mfg Part#	Processor	Ram	HD	CD	NIC	Factor	System	Price
H72406	D6475N	PII-333	64	4.5GB	SC24X	10/100	MT	NT 4.0	$3,176
H72417	D6480N	PII-400	128	4.5GB	SC32X	10/100	MT	NT 4.0	$4,797

HP Omnibook Notebook

Order#	Model#	Processor	Ram	HD	CD	Display	Price
F1580WT	J305142	100 P233MMX	32	3.2GB	24X	2.1DSTN	$1,770
F1599WT	J30522	2100 PII-266	32	4GB	24X	12.1TFT	$2,879
F1462WT	J30507	4100 PII-233	32	4GB	24X	13.3TFT	$3,190
F1479WT	H58241	4100 PII-266	32	4GB	24X	14.1TFT	$3,880
F1442WT	J30503	7100 PII-266	32	8GB	24X	14.1TFT	$4,679

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G67678	E330	P-233	32	3.2GB	24X	56K	12.1TFT	$1,959
J13317	985TX	P233MMX	32	5GB	20X	56K	13.3TFT	$2,639
G67660	990TX	P2-266	32	5GB	24X	56K	13.3TFT	$2,939

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J26008	PRO 5290	PII-233	32	3.2GB	24X	56K	2.1TFT	$2,219
J26007	PRO 7755	PII-266	64	4GB	24X	56K	3.3TFT	$2,949

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J77037	CPD-100GS	15/14	1280X1024	0.25mm	$292
J77063	CPD-L150	15"	1024X76	TFT	$1,719
J77032	CPD-200ES	17/16	1280X1024	0.25mm	$427
J77033	CPD-200GS	17/16	1280X1024	0.25mm	$539
J77035	GDM-400PS	19/18	1600X1280	0.25mm	$804
J77036	GDM-500PS	21/20	1600X1200	0.25mm	$1,292
J77066	CPD-520GS	21/19	1600X1200	0.25mm	$1,211
J77065	GDM-F500	21/19	1600X1200	0.25mm	$1,329

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I67503	Stylus Color 740 1440dpi,Par/Ser/USB	$269
H27072	Stylus Color 800 1440dpi, Mac/PC	$227
G21290	Stylus Color 850 1440cpi,Mac/PC,8pm	$318
G21293	Stylus Photo EX 1440dpi,11x17" Print	$459
G21250	Stylus Color 1520 1440dpi, up to 6ppm	$448
G21228	Stylus Color 3000 1440dpi, Large Form	$1,632

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C4562B	HP Deskjet 659C 600dpi,up to 5ppm	Call
C5895B	HP Deskjet 710C 600dpi,up to 6ppm	Call
C5870A	HP Deskjet 720C 600dpi,up to 8ppm	$286
C5876A	HP Deskjet 890CXi PhotoREt ii,9ppm	$382
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C3982A	HP Laserjet 6MP 600dpi PC/Mac,8pp	$869
C4177A	HP Laserjet 3100XI Fax,Copy,Scan*	$628
C4118A	HP Laserjet 4000 1200dpi 17ppm	$1,069
C1120A	HP Laserjet 4000N 1200dpi NIC	$1,389
C4119A	HP Laserjet 4000T 1200dpi 2nd Tray	$1,225
C4121a	HP Laserjet 4000TN NIC 2nd Tray*	$1,536
C4110A	HP Laserjet 5000 1200dpi,16p 11x17"	$1,422
C4111A	HP Laserjet 5000N 1200dpi NIC**	$2,010
C4112A	HP Laserjet 5000TN NIC 2nd Tray*	$2,489
C4085A	HP Laserjet 8000 1200dpi, 24ppm	$2,299
C4086A	HP Laserjet 8000N 1200dpi,24ppm,NIC	$2,599
C4087A	HP Laserjet 8000DN NIC,2nd Tray,24M	$3,069
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I72701	Optra S1255 12ppm, 1200dpi	$928
I72703	Optra S1625 16ppm, 1200dpi	$997
I72705	Optra S1855 18ppm, 1200dip	$1,090
I72707	Optra S2455 24ppm 1200dpi	$1,965
G33012	Optra SC1275 Color Laser	$2,949

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H728457	Okipage 4W 600dpi,4ppm,LED	$159
G72603	Okipage 6E 600dpi,6ppm, LED	$259
G72638	Okipage 10I 600dpi,10ppm, LED	$489
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J76723	A700	17/15	1280X1024	0.28	$399
J76725	E700	17/15	1600X1200	0.25	$517
J76737	E900	19/18	1600X1200	0.28	$750
J76716	E1100	21/19	1600X1200	0.28	$984
J76741	E1100+	21/19	1600X1280	0.24	$1,061
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Epson Expression 636 Artist	$635
Epson Expression 836XL	$2488

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Microtek V600 Flatbed	$124
Microtek ScanMaker X6	$143
Microtek ScanMaker 9600I	$1,439

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Visioneer PaperPort 3100 flatbed	$119
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3Com USRobotics V.34 33.6K externak w/ fax	$104
3Com USRobotics Voice V.34 33.6K internal w/ fax	$137
3Com USRobotics Voice V.34 33.6K external w/ fax	$137
3Com USRobotics 56K V.90 internal	$157
3Com USRobotics 56K V.90 external	$177
3Com USRobotics 56K V.90Voice internal	$177
3Com USRobotics 56K Winmodem V.9	$97
3Com USRobotics ISDN 128K terminal adapter	$176
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Hayes ACCURA 56K V.90 external	$178
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BC PRO 550 4 outlets LAN port	$166

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C31906	Q71-2	17/16	1280X1024	0.28	$243
G09468	V75	17/16	1600X1200	0.26	$358
G09444	GS771	17/16	1280X1024	0.27	$369
J06417	V95	19/18	1600X1280	0.26	$499
G09442	G790	19/18	1600X1200	0.26	$528
G09410	Q100	20/18	1600X1280	0.28	$862
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3Com 33.6K 10BT LAN+modem combo	$297
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Kodak DC120 Zoom digital camera	$559
Kodak DC210PLUS Zoom digital camera	$524
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Minolta Dimage PIC digital camera	$267
Minolta Dimage V digital camera	$389
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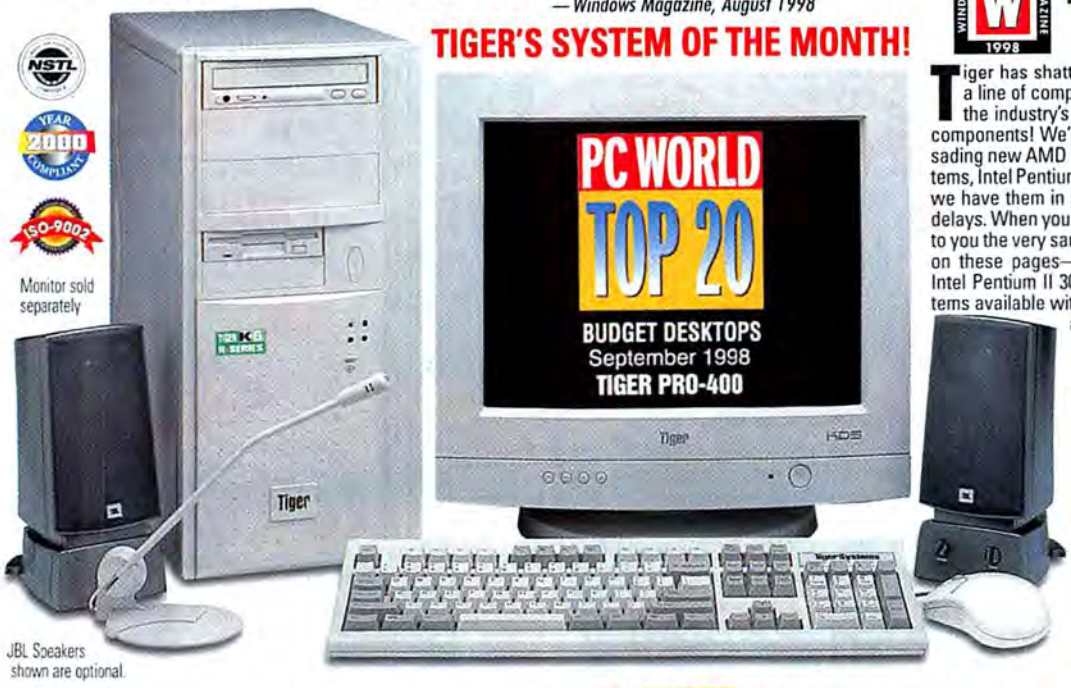

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A Few Good Reasons to Give Thanks

IN THESE FRANTIC TIMES, when the whole world can seem almost as frustrating as a corrupted .dll file, those of us whose lives revolve around computers sometimes seem to spend our time focusing on their problems rather than their benefits. But just this once, in the month when most of us gather together to give thanks, it seems appropriate to count our digital blessings. Here's my list:

Multitasking: Probably the most underrated feature of modern computers. Consider the way you work today, with several programs open at once. You cut from one, paste to another, drag, drop, flip among them with the Taskbar or the <Alt> and <Tab> keys. With Windows 95 and 98, it works well enough most of the time.

Imagine having to save what you're working on, close the application, load your Web browser every time you want to use it, then close the browser and reopen the app in order to get back to work. Imagine an e-mail client that can't receive mail in the background. Now imagine how much less valuable your Internet connection would be if you had to use it this way.

Less than $1000 gets you a fast PC with plenty of memory and a big hard drive. Thank you, Gordon Moore.

IT'S IN THERE

The Web: Despite problems with security, reliability, usability, and bandwidth, the Web remains an amazing source of information, misinformation, entertainment, idiocy, and everything in between. Somehow, the stuff you want just tends to be there; clear evidence of the Web's importance is the surprise you feel when you actually can't find something on it. Though electronic commerce still has a long way to go, the Web makes things happen.

Search engines: No, they're not perfect, but they make the difference between a rigid, totalitarian Web and a free one. More than anything else, search engines transformed the Web from an interesting means of publishing linked documents into an indispensable global tool. Next wave: using local versions to manage personal information on your hard disk.

Internet mail: Those of us who remember the days when e-mail systems were islands unto themselves can't help giving thanks for the ability to send mail to people all over the world. Bulletproof standards for attachments are needed, and major questions remain about the proper roles of server and client, but few things have become quite as essential quite as fast. Want to make me even more thankful? Develop smarter mail clients.

Moore's law: Less than $1000 gets you a fast computer with plenty of memory, decent video, a big hard drive, a fast modem, and all the standard ports. Peripherals are cheaper too; even flat-panel displays are approaching the realm of affordability. I suspect price/performance ratios may be slower to improve in the next year or so, but the overall trend shows no signs of stopping. Thank you, Gordon Moore.

SEEING THE LIGHT

Light computers: I've been harping on the need for truly portable PCs for years, so it's gratifying to see them become reality. From shirt-pocket devices like the Psion Series 5 to the three-pound magnesium-cased beauties pioneered by the Sony VAIO 505, little machines are finally coming of age. I'm thankful, and so are my back, shoulders, and arms.

Digital innovation: The ferment in electronics and communications continues. Both industries are awash in new ideas, some of which will cleverly take advantage of increasing bandwidth, storage, and processing power. Devices like the PalmPilot, the Rex, and two-way pagers with tiny keyboards may be niche items now, but as they meld with our phones, they'll become far more useful. Set-top boxes, home networking, and data broadcasting all have potential, though it's too early to tell digital boons from digital doorstops. And while the inevitable gaps between idea, product, and marketing realities will turn many dreams to dust, some of those dreams will lead to things you and I come to depend on.

And in the year that gave its name to Windows 98, I have plenty of other things to be thankful for. One is that Thanksgiving will be a day to contemplate literal turkeys instead of silicon ones.

PC World *Contributing Editor Stephen Manes has been writing about computers and their blessings for more than 15 years. He is coauthor of* Gates, *a biography of Microsoft's chairman.* ■

PHOTOGRAPH: ERIK BUTLER

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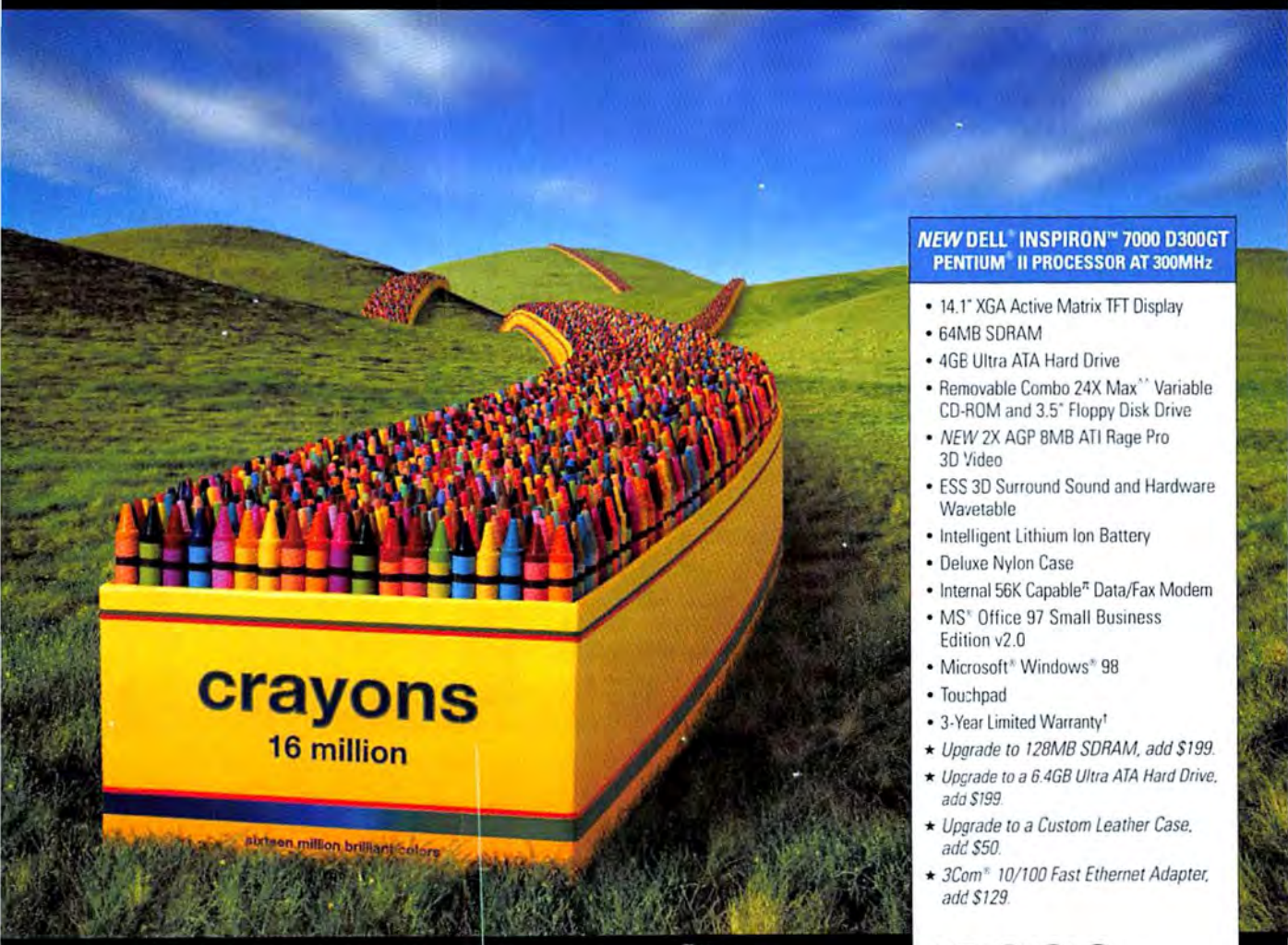

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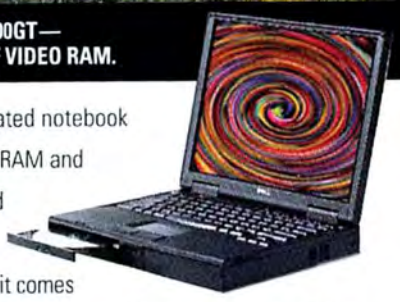

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pentium® II

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