

BEST BETS FOR THE NET: 12 TOP INTERNET SERVICE PROVIDERS RATED

BURNED! HOW TO AVOID ONLINE SCAMS

PC WORLD

FEBRUARY 1997 \$5.95



Microsoft Office 97

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Fast, Easy Backups

20 Leading Drives Tested—Zip, Jaz, Tape, and More



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Test-Driving the First Cable Modems

YOUR NEXT PC

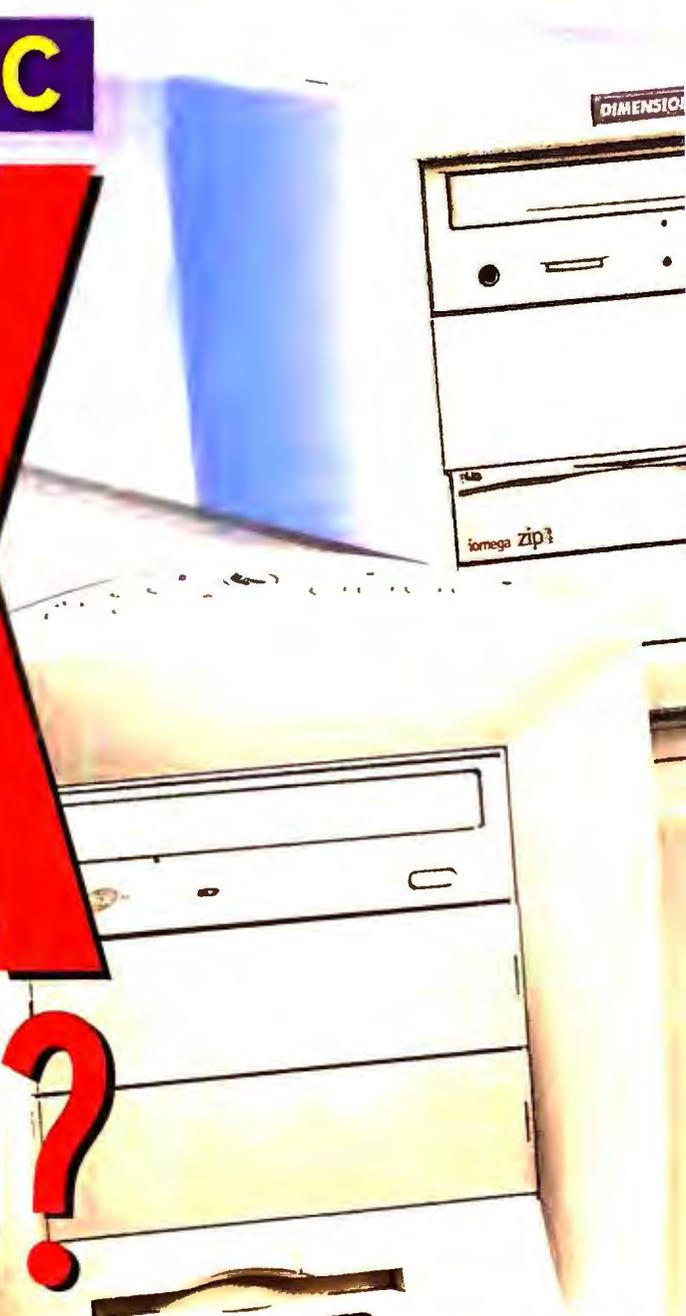
MMMX

OR PENTIUM?

WE TEST THE FIRST

AND FASTEST

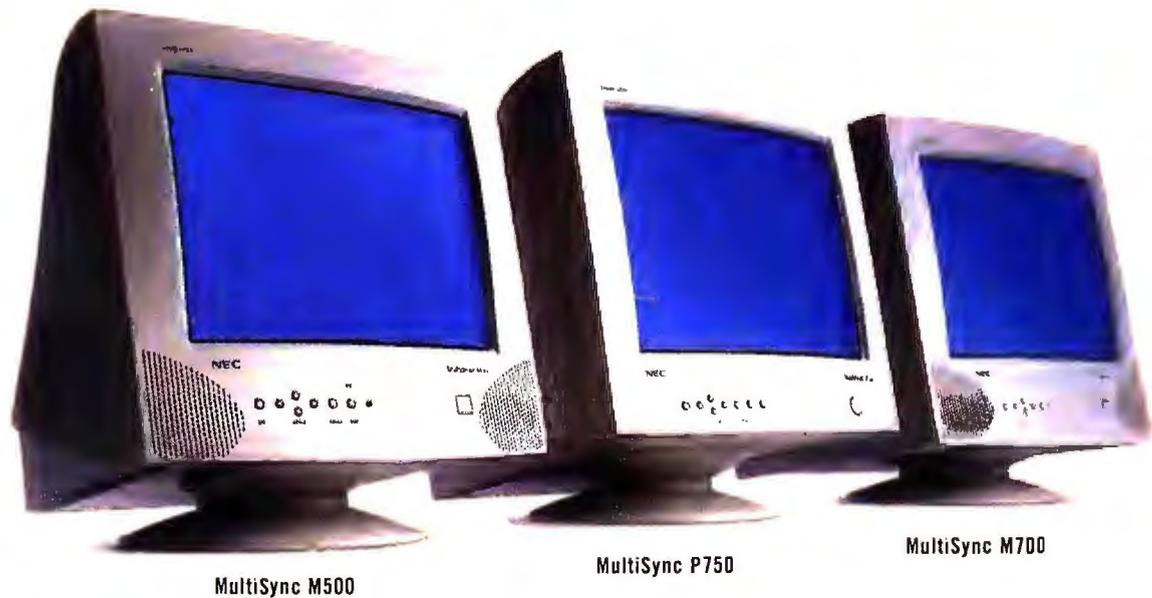
PCs FOR THE FUTURE



PRINTED IN USA

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MONITOR WITH CROMACLEAR?**





These days, it seems as if a monitor, is a monitor, is a monitor. So to set the record straight, we proudly unveil a different kind of monitor. Introducing CROMACLEAR™ from NEC. A patented, new CRT technology that is specifically designed to maximize sharpness, contrast and dimension. The result of this revolutionary technology? Graphics will be more detailed, smaller type will be easier to read, even video will have unparalleled definition. As the leader in monitor technology, we can simply say CROMACLEAR CRT offers unprecedented sharpness and image clarity. Something you can easily see if not feel.

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MODEL	P750™	M700™	M500™
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MAX. RES.	1600X1200@75HZ	1280X1024@65HZ	1280X1024@65HZ
REC. RES.	1024X768@55-117HZ	1024X768@55-86HZ	800X600@55-110HZ
MASK PITCH	0.25MM	0.25MM	0.25MM
WARRANTY	3 YEAR LTD.	3 YEAR LTD.	3 YEAR LTD.

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NEC

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line of Color Bubble Jet printers has everything it takes to make your ideas click: User-friendly technology.



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*Manufacturer's suggested retail price. Dealer prices may vary. **Canon Creative 2 is designed for use with Windows 3.1 and Windows 95 only. Software available on CD-ROM only. © 1996 Canon Computer Systems, Inc. Canon is a registered trademark and Bubble Jet is a trademark of Canon Inc. CCSI, 2995 Redhill Ave., Costa Mesa, CA 92626. In Canada, call 800-263-1121.

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Corel dominates U.S. office suite retail sales and legal market

It's official. Corel® WordPerfect® business applications have consistently outsold the competition in U.S. office suite retail sales. Corel has a 10% lead over Microsoft and more than eight times the unit sales of Lotus.†

In the legal environment, Corel controls the word-processing market with 82.5% of users choosing WordPerfect for their document creation needs.‡ Corel WordPerfect offers more versatility, more intuitive tools and more pertinent features for the legal professional than any other software on the market.

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Retail Market Share



†Data received from SofTrends, the premier PC software tracking service. Based on unit office suite sales for MS-DOS, Windows and Windows 95 at retail for the month of September.

Legal Market Share



‡Data received from Law Office Computing, October/November issue.

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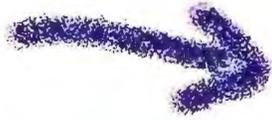
Share Corel's Vision of Tomorrow's Office

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Ahead

of Microsoft

Only Corel office suites take advantage of Java™



Advanced Corel Barista™ technology, an integral part of Corel® WordPerfect® Suite 7 and Corel® Office Professional 7, takes full advantage of Java™—an initiative that's left the competition behind. Even the upcoming Microsoft® Office 97 won't offer this vital technology.

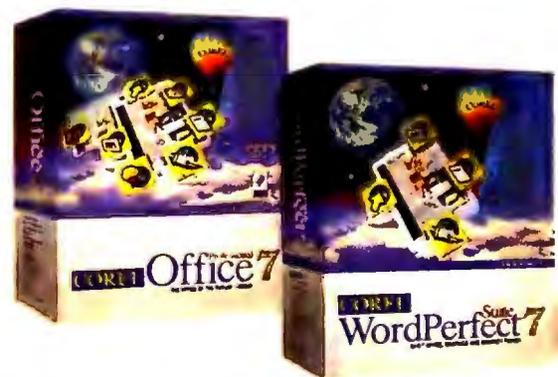
Java™ - Breaking the Boundaries of Traditional HTML Publishing

Java Language Output Using Corel Barista Technology - Corel WordPerfect Suite 7 and Corel Office Professional 7 are the *first* office suites that allow you to publish to the Java language from core applications—Corel® WordPerfect® 7, Corel® Quattro® Pro 7 and Corel® Presentations™ 7.

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COVER STORY

50 MMX PENTIUMS: BIG GAIN, NO PAIN
FIRST LOOK Pentiums just got faster—thanks to Intel's new MMX technology. *PC World* tested a dozen of the first PCs sporting MMX processors. The result: impressive performance boosts on multimedia, with modest speed gains on business apps. The question: Should you spend the extra money for MMX now, or wait?

FEATURES

106 MICROSOFT OFFICE 97: WHAT'S NEW
REVIEW Microsoft's latest version of its suite comes with a reworked, easy-to-use interface, integrated Web features, creative help, and an innovative information manager called Outlook. Does all this save time and boost productivity?

125 BEST ROUTES TO THE NET: TOP INTERNET SERVICE PROVIDERS
REVIEW From costs to customer service, Internet service providers are not all the same. We signed up with 12 popular ISPs to discover which are most likely to give you hassle-free connections.

148 BEAT INFORMATION OVERLOAD
HOW-TO It's 5 p.m. and you're still nowhere near caught up with e-mail, faxes, or voice mail—let alone your *real* work. It's all become just another part of our overloaded workday. Here are the best ways to turn technology back into a time-saver.

166 BETTER SAFE THAN SORRY
REVIEW "Backup" doesn't mean just "hard-to-use tape drives." We checked out 20 backup devices—tape, Jaz, Zip, and more—and found options that are easier, more reliable, and less expensive than ever.



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 Additional material available on PC World Online

SPECIAL REPORT

THE WEB AND YOU

223 NO PRIVACY ON THE NET
 Looking for anonymity? You've come to the wrong place. Almost anyone can track anything you do on the Internet, from what Web sites you visit to how you use e-mail or shop online. Here's how to safeguard your privacy.

COVER Photography by Marc Simon

50 MMX PENTIUMS: BIG GAIN, NO PAIN

As MMX PCs roll out, buyers benefit from a wide range of choices. We tested 166- and 200-MHz MMX desktops from CLR, Compaq, Dell, Gateway, Micron, Packard Bell, Quantex, and Vektron, and MMX notebooks from Micron, NEC, and Toshiba.

56 ONLINE VENDORS: HOW CAN YOU TELL THE GOOD FROM THE BAD?

Pyramid schemes, misleading ads, deals that sound too good to be true—scams are proliferating online. Here's how to avoid being taken.

62 CABLE MODEMS: FASTEST INTERNET ACCESS

Cable makes Web downloading up to 80 times faster than ISDN, though initial availability is limited. Plus the latest on upcoming 56-kbps modems.

NEW PRODUCTS

- 72 Teac CD-512E, Toshiba XM-5701B 12x CD-ROM drives
- 73 MicroWorks speakers
- 74 Juggler e-mail and voice mail utility
- 74 BocaPro Video Phone Elite
- 76 Fujitsu LifeBooks
- 76 HP Network Kit
- 80 Monorail home PC
- 84 Kiplinger TaxCut Deluxe Multimedia, Personal Tax Edge, TurboTax Deluxe
- 88 Corex CardScan Plus 300
- 88 Pagis Pro 97 OCR program
- 92 CompuServe WinCIM 3.0.1, Prodigy Internet
- 96 I bid electronic whiteboard
- 96 Intuit QuickBooks Pro 5.0
- 100 PEP Multimedia utilities
- 100 Corel Print & Photo House



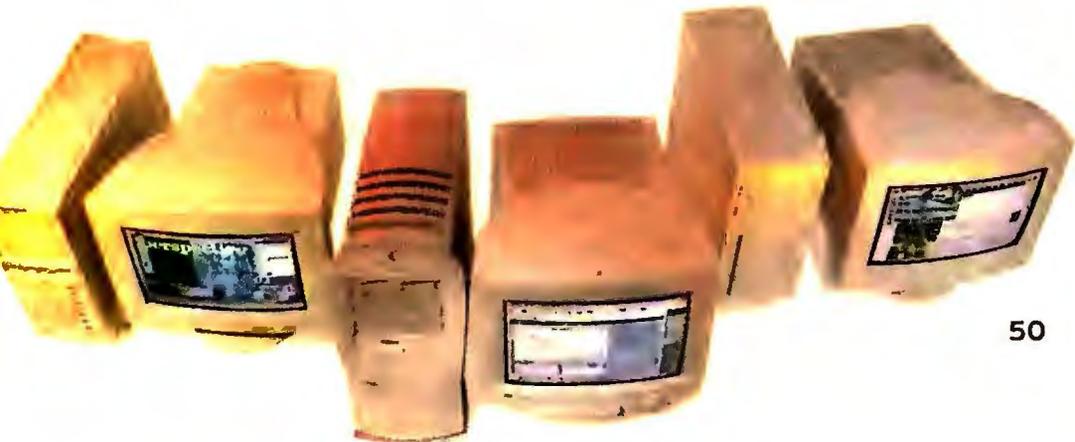
148



166



125



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179 TOP POWER AT BUDGET PRICES

TOP 100 Six Pentium-Pro 200 PCs on this month's Power chart are priced under \$3000, and the first Pentium Pro-200 desktop makes the Budget chart. Should you wait for Pentium MMX PCs, which are just around the corner, or cash in now on these bargain power systems?

182 POWER DESKTOPS

TOP 20 Dell and Micron systems continue to dominate the Best Buys, though Quantex's speedy new Pentium Pro-200 and Pentium-200 break into the Top 20 despite less-than-stellar reliability.

194 BUDGET DESKTOPS

TOP 20 The \$2499 Quantex QP6/200 Pro is the first Pentium Pro-200 to crack our Budget chart with great performance despite only 2MB of video RAM.

200 NOTEBOOKS

TOP 20 New notebooks entering the chart include the lightweight Sharp PC-W100T, the multimedia Compaq Presario 1010, and the inexpensive AST Ascentia J20.

210 WIN A PENTIUM-133 PC

CONSUMER FEEDBACK How satisfied are you with your PC? Fax in this survey for a chance to win a Gateway 2000 P5-133, a Best Buy from this month's Top 20 charts.

213 PERSONAL PRINTERS

TOP 10 You pay extra for great laser-quality text with the \$399 Canon BJC-620, the only new printer on this month's chart.

217 15-INCH MONITORS

TOP 10 New on the chart: the number one Dell UltraScan 800HS and the number five ViewSonic—both selling for just \$399.

219 GRAPHICS BOARDS

TOP 10 4MB of RAM is standard on new boards this month, including the number one \$199 STB Velocity 3D.

221 MODEMS

TOP 10 U.S. Robotics' 33.6-kbps Sportster and Motorola's ISG VoiceSURFR 28.8 finish first and second on our chart. ▶

HERE'S HOW

- 238 REAL PROBLEM, REAL SOLUTION**
Set up a telecommuting program that works for employer and employee.

240 ANSWER LINE

 Win 95 with or without the FAT32, multiple dial-up networking done right.

244 WINDOWS TIPS

 Deleting parts of Windows, how to stop StartUp, cheap Windows security.

250 SPREADSHEET TIPS

Link Quattro Pro formulas to Web data, combine line and bar charts in Excel.

252 WORD PROCESSING TIPS

Vertical letterhead in Word; different column settings on the same page in Word, Word Pro, and WordPerfect.

256 INTERNET TIPS

 Toss out junk mail, inoculate against e-mail viruses.

260 HARDWARE TIPS

 A crash course in speaking BIOS, designed to optimize your system.

262 MULTIMEDIA TIPS

 Videoconferencing on the cheap, converting CD audio into WAV.

264 UPGRADE GUIDE

 Installing a new sound board, step-by-step.



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@HOME

231 @HOME PRODUCTS

A wine CD that's sour, a solar system disc that's a star, a keyboard for that 7-year-old power user.

232 KEEPING UP

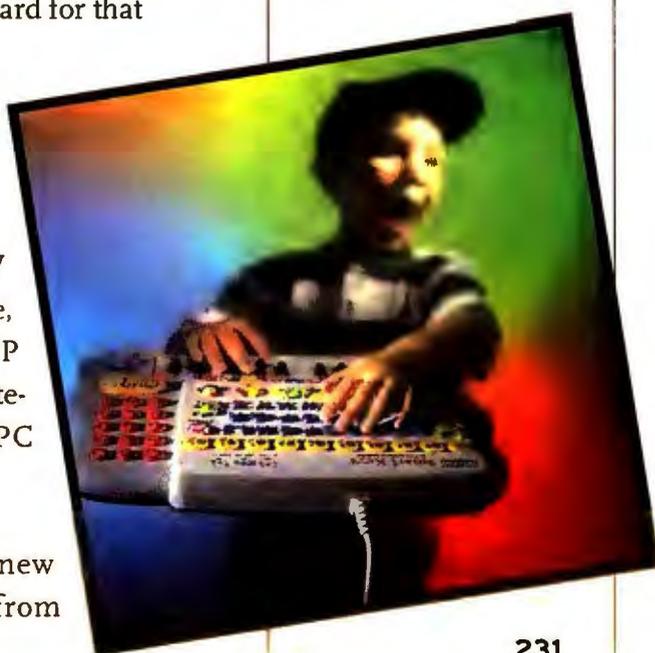
Web sites and services for consumers.

234 TOP 5 HOME PCS

Dell's Dimension P200V is still tops for the home, but price cuts from HP and a new version of Gateway 2000's Family PC deserve a look.

236 HOME OFFICE

Steve Bass loves his new mouse—even if it's from Microsoft.



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DEPARTMENTS

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- 23 LETTERS** Readers on PC service, support.
- 31 CONSUMER WATCH** Tech Support 101: Solve problems yourself quickly, cheaply.
- 39 PCW ADVOCATE** Delays on Iomega rebate, specials that end by the time you see the ad.
- 45 BUGS AND FIXES** NT slows down on some Cyrix-based PCs; fix false alarms in Norton.
- 302 FULL DISCLOSURE** Network computers? Not a chance, says Manes.

RESOURCES

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PCW ONLINE

READY FOR THE NEW MILLENNIUM?

ONLINE EXCLUSIVE Can your computer handle the year 2000? Worse yet: Is your bank ready? How about the government? We look at The Year 2000 Bug and some of its proposed solutions.
<http://www.pcworld.com/millennium>

THE WEB AND TV:

HARMONIC CONVERGENCE

TRENDS Whether you're channel surfing on a PC or Web browsing on TV, it's getting hard to tell where a TV ends and a computer begins. We check out existing and emerging technologies you may be using.
<http://www.pcworld.com/convergence>

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- Extremely reliable, Micron systems had fewer reported problems than other PC brands. In fact, Micron boasts one of the lowest problem rates in the industry.
- Not only did owners of Micron systems report few problems with their PCs, they also applauded Micron's competent support staff as the best at problem resolution.

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OVERALL	RELIABILITY	SERVICE
BEST	BEST	BEST
MICRON DELL	MICRON DELL APPLE COMPAQ HEWLETT-PACKARD	MICRON DELL
GOOD	GOOD	GOOD
APPLE AT&T COMPAQ DIGITAL HEWLETT-PACKARD	AT&T DIGITAL	DIGITAL HEWLETT-PACKARD
FAIR	FAIR	FAIR
GATEWAY 2000 IBM QUANTUM	GATEWAY 2000 IBM NEC	

PC World Reliability & Service Survey—PC World, December 1996



July 1994



January 1995



December 1995



December 1996

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- 1-, 2- or 3-year optional on-site service agreement for Micron desktop systems
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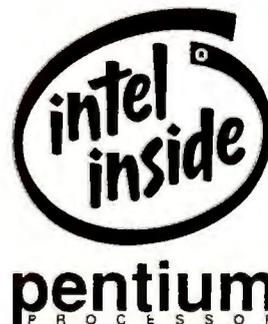
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- Intel 200MHz Pentium® Pro processor
- Dual Pentium Pro ZIF sockets
- 256KB L2 cache, flash BIOS
- Memory upgradable to 512MB
- Slots: 1 ISA, 3 PCI, 1 shared PCI/ISA
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- 3.5" floppy drive
- 64-bit 1MB ISA video
- 3Com® 3C905-TX Fast EtherLink® PCI 10/100-Bose-TX NIC
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- 15" Micron 15FGx, .2Bdp (13.7" display)
- Microsoft® Mouse, 104-key keyboard
- NOS support (3 incident resolutions)
- 5-year/3-year Micron Power™ warranty

STANDARD FEATURES

- **Dual Intel 200MHz Pentium Pro processors**
- 256KB L2 cache, flash BIOS
- Memory upgradable to 512MB
- Slots: 1 ISA, 3 PCI, 1 shared PCI/ISA
- Adaptec PCI 32-bit Ultra SCSI Fast-20 controller
- 12X SCSI-2 CD-ROM drive
- 3.5" floppy drive
- 64-bit 1MB ISA video
- 3Com 3C905-TX Fast EtherLink PCI 10/100-Bose-TX NIC
- Full-size tower with 10 drive bays
- 15" Micron 15FGx, .2Bdp (13.7" display)
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- Microsoft Windows NT Server 4.0 (10 user license)

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Business lease \$163/month

VETIX™ EL 2000 SERVER

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- 128MB ECC EDO RAM
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- 3-year limited parts-only system warranty
- 1-, 2- or 3-year optional on-site service agreement for Micron desktop systems
- 30 days of free Micron-supplied software support for Micron desktop systems
- 30-day money back policy
- 24-hour technical support

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*Actual battery performance will vary depending on applications and configurations. Based on two 4-hour batteries.

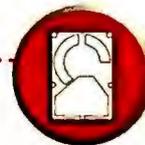


Modular Bay #1

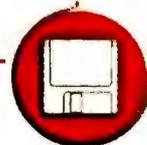
Modular Bay #2



8X CD-ROM



Second hard drive

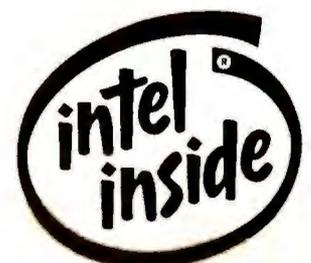


3.5" floppy drive



Lithium-ion battery

With up to eight hours' battery life* and full multimedia desktop performance, the **Millennia TransPort™** puts compact, no-compromise computing where you need it.



pentium
PROCESSOR

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 - † 6.9 lbs. includes 3.5" floppy and one battery
 - ‡ Lock secures both Millennio TransPort and MicronDock

Options

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- With 2nd modular lithium-ion battery add \$199
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- With 2nd hard drive (1.3GB) add \$599
- With 2nd hard drive (2.1GB) add \$699
- With 16MB DIMM upgrade. add \$349
- With cord adapter add \$89



MicronExec™ desktop package

Millennia TransPort™

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- 12.1" active matrix color display, 800 x 600
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\$3,999

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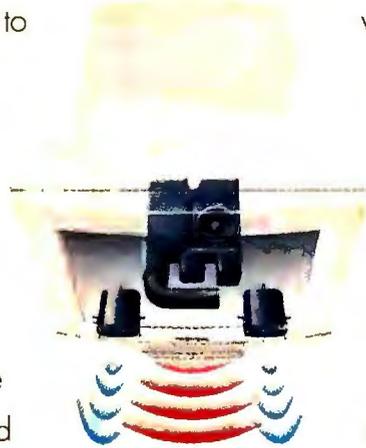
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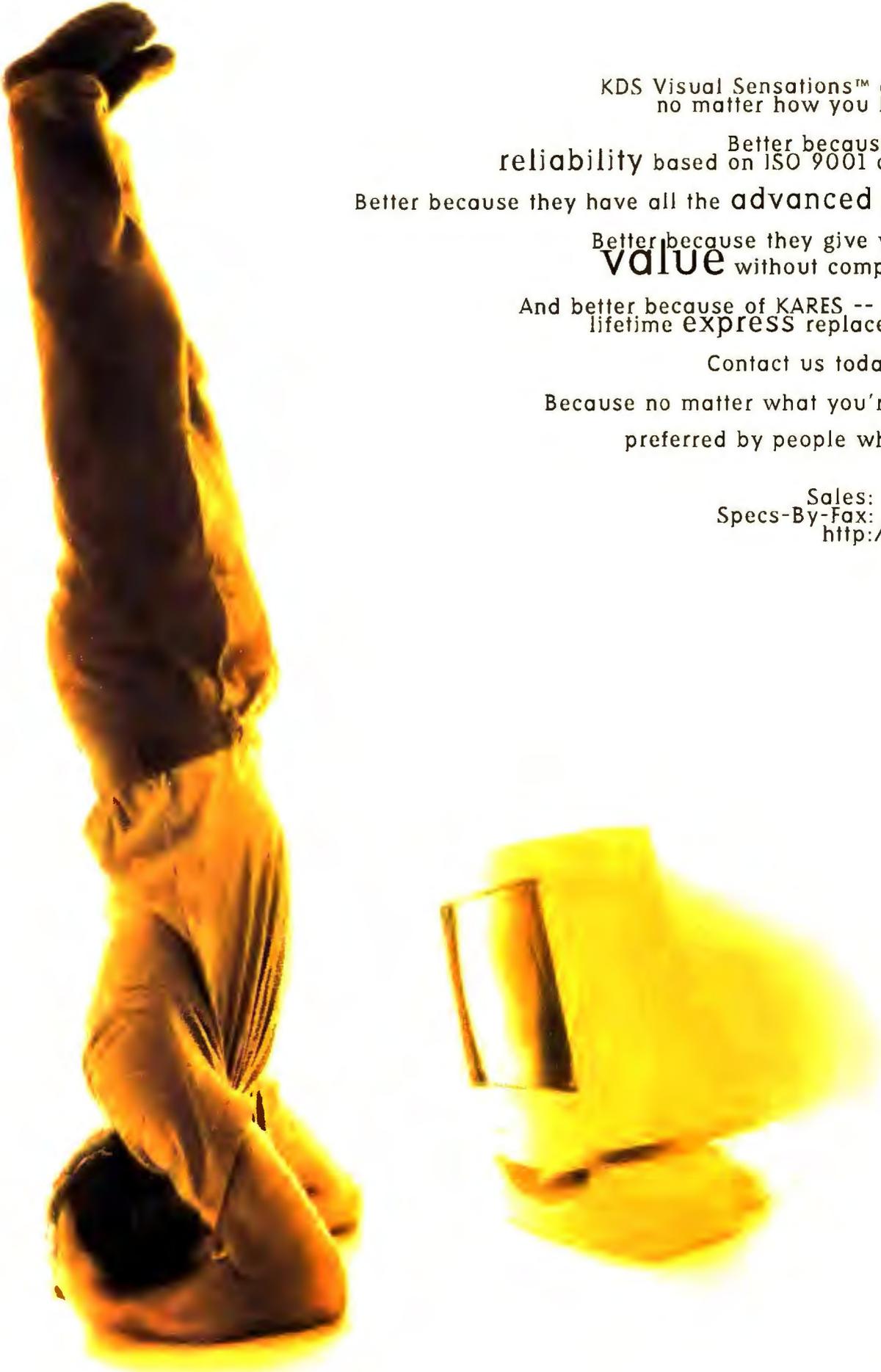


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A person in a dark suit is performing a handstand on the left side of the advertisement. To their right is a computer monitor, which is tilted and appears to be glowing with a yellow light. The background is plain white.

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When the Medium Watches You

HAVE YOU EVER WONDERED why other media aren't more like the Internet? Imagine how good television would be if it could tailor its own content to our individual needs. Then we'd be able to get a TV set with a V-chip to exclude violence, an S-chip to exclude sex, and in the office version an NB-chip to exclude anything not business related and an MC-chip to make sure that we get mission-

critical information first. Republicans could get a D-chip to exclude Democratic views, and Democrats could get an R-chip. If we bought a 52-inch set, we'd have room for enough chips to rival the filtering in a standard e-mail package. Then if we could also make our television transmit as well as receive, it would really start to rival the power and versatility of the Internet.

Of course, with two-way communications we'd have to worry about the privacy and security of our video messages. Anyone with a dish could tune in to our outgoing messages unless we invested in encryption hardware. And if we wanted to keep nosy marketers and prying competitors from monitoring our viewing habits, we'd be wise to forgo cable connections and satellite subscriptions. Got to stay off those mailing lists. Better to just receive TV broadcasts to avoid all these complications.



We need to make our voices heard on how the Internet's privacy and security standards should evolve.

THE SECURE TWO-WAY NEWSPAPER

IMAGINE HOW GOOD the newspaper would be if we could select the information we wanted about any topic anywhere—and have it come right to our homes and offices. Of course, if we made the newspaper a two-way medium we would have to complicate the delivery and selection process for the sake of privacy and security. We'd have to arrange for the newspaper to be sent to a post office box we keep under a false name. We'd have to contract with a third-party courier to pick the paper up, with instructions to remove and burn certain content before dropping off the remaining pages at a secret place of our choosing. We would make a pickup only after carefully observing that the courier had departed and hadn't been tailed. If we decided to reply to something in the newspaper, whether an ad or an article, we would send messages only through a third party who would agree to conceal our

return address by placing a fictitious one on the envelope before sending the message to its destination. We would encrypt each message and count on the advertiser or editor to have the key needed to decrypt it. Looks as though the secure, private two-way newspaper might be even tougher to implement than the secure, private two-way television.

Although other mass media aren't up to the task of providing security and privacy in two-way communication, the Internet is tackling it. The challenge can be met, but it won't be easy. With today's technology, any serious effort to protect your privacy and security on the Internet requires using anonymous remailers and public-key/private-key encryption, sacrificing the use of applets, and before making or collecting payments online, awaiting the introduction of new financial standards such as Secure Electronic Transactions.

WHY WORRY?

WHY SO MUCH CONCERN about privacy and security in the online world? Because it's a new, barely regulated frontier, and the same virtues that make the Internet so appealing—interactivity, customizability, addressing conventions, versatile messaging, and so on—also make it an ideal medium for others to keep tabs on us without tipping us off to the intrusion. If other mass media had these virtues, they would be vulnerable as well. Yet the Internet is too valuable to do without. That means we need to do two things: Make our voices heard on how the Internet's privacy and security standards should evolve, and find out how to preserve our privacy and security in the meantime. After reading Jeffrey Rothfeder's "No Privacy on the Net," you'll be better prepared for both of these tasks.

Armed with Rothfeder's advice, you're ready for the pleasures of the Internet as well as the perils. Getting a good Internet service provider is the first step. Unfortunately it's more complicated than signing up for local or long-distance telephone service. Should you go with the impersonal giants that jumped into the field after they saw start-up companies enjoy spectacular growth? Can the once-small start-ups maintain good service in the face of rapid growth, major new competitors, and rate wars? Which service provider can minimize your phone charges with a local connection? Which will be most helpful when something goes wrong? Brad Grimes rates 12 companies and helps you sort through these and other issues in "Best Routes to the Net: Top Internet Service Providers."

Phil Lemmons is editorial director of PC World. ■

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YOUR TAKE ON: PC Reliability and Service ♦ Juno's delays ♦ OS/2 coverage

PRICE IS EVERYTHING

I READ THE ARTICLE critiquing Packard Bell computers ["Top 20 PCs," June] and the follow-up letter by Edward Spuler II [Letters, November]. There are three reasons people buy Packard Bell computers: price, price, and price. I know because I have purchased about 12 PCs over the last five or six years. The price is often low, but it is usually the result of a slower processor or some other feature. And yes, the service stunk. I like the fact that you call it the way you see it, even if some of your readers and advertisers don't always agree! Keep up the good work.

J. Riggs, Internet

MONSTER TRUCK BOTTOMS OUT

I JUST FINISHED READING the December issue and loved it—but I didn't really care for "Best CD-ROMs of 1996." In particular, the article's "Bottom Ten List" bothered me. There you list the worst CD-ROMs of 1996. And at number 8, you list Microsoft Monster Truck Madness because it uses too much hard drive space. Get serious. Is that the only flaw in the game? How about how the game plays and what its graphics and sound options are? I know that everyone has a different opinion about computer games, but it seems kind of harsh to include this one in the Bottom Ten list.

Roman Kasper, Internet

TECH SUPPORT HEAVEN

AFTER READING THE October *Bugs and Fixes* regarding the U.S. Robotics modem, I sent an e-mail message to the company. The updated chip was immediately sent to me at no cost. Awesome support like this needs to be recognized at times when we all complain of poor or no support from hardware manufacturers. Well done, U.S. Robotics and *PC World*!

Mark Palmer, Staten Island, New York

LOST, NOW FOUND

"SEARCHING IS MY BUSINESS" [December] was the most informative article I have seen in a long time. It cleared up many faulty conceptions I had about ►

HOT BUTTON

Compaq Tech Support: Who Loses?

MANY READERS WROTE to complain about Compaq's tech support policy in response to December's "PC Reliability and Service: Goodbye to Good Support?"

I WISH I HAD READ "PC Reliability and Service: Goodbye to Good Support?" [December] before buying a new computer.

I bought a Compaq Presario 4112 and immediately had trouble with feedback in the monitor speakerphone. Since there was nothing on this problem in the Help system, I called tech support and was told they wanted \$35.

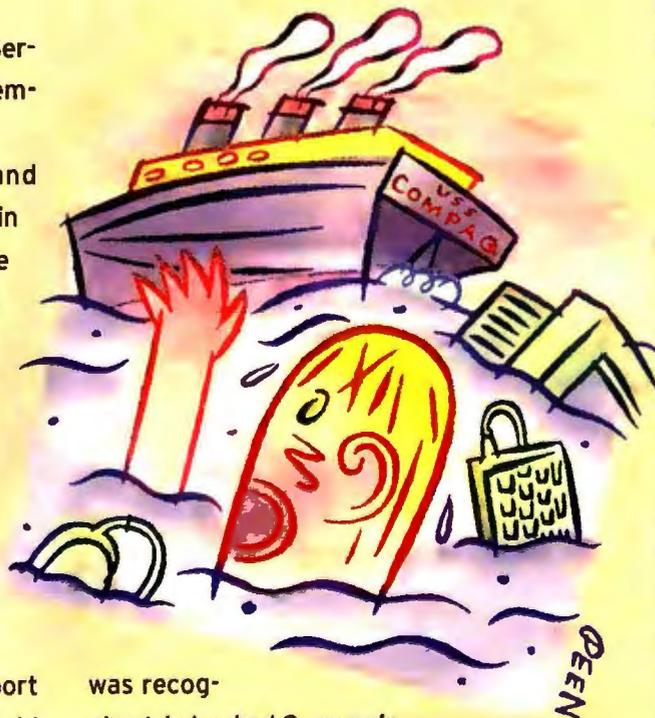
After three calls to Compaq, I was able to fix the problem. But then the modem would not stay connected during transmission. Of course, Compaq wanted another \$35 to talk about this problem too.

Compaq should post its technical support policy on the box so consumers can avoid such frustrations. Finally, I decided to return the computer to the store. And who loses? I hope Compaq does.

Les Meredith, Internet

YOUR DECEMBER REPORT "PC Reliability and Service: Goodbye to Good Support?" was right on target. After purchasing my Presario, I ordered the cache memory upgrade

directly from Compaq. After installing the upgrade, I rebooted the computer. There was no indication that my PC recognized the memory. To find out whether the memory



was recognized, I checked Compaq's skimpy owner's manual, searched the company's Web site, and then sent Compaq's technical support department two e-mail messages, neither of which was answered. It was only after exhausting these resources that I finally called Compaq's tech support line. Compaq wanted \$35 up front just to talk to me. Compaq's arrogance is incredible.

Charles Hester, Internet

WHOM CAN ONE DEPEND on for Compaq technical support? Certainly not Compaq. My daughter, a university student, was finishing her English paper late one night when she noticed that the keyboard keys were scrambling letters. Her computer was under warranty, so she called the 800 number. Despite the warranty, Compaq refused to provide technical assistance without a credit card number. My daughter does not have a credit card. She was told she could not stay on the line and that she would have to call the 900 number and pay \$2 per minute, for a maximum of \$30.

After dialing the 900 number, my daughter reached an incompetent support person who had no clue as to the cause of the keyboard malfunction, but managed to keep her on the line for 15 minutes, enough to reach Compaq's \$30 maximum charge. Finally, she was told a new keyboard would be mailed to her within 10 to 12 days. She would have been better off buying a keyboard with the \$30 that same day as opposed to waiting two weeks! Compaq could have at least sent the keyboard in a more timely manner.

Compaq's policy of refusing to provide technical assistance without a credit card stinks like a barrel of rotten fish!

Philip H. Ivey, Jackson, Tennessee

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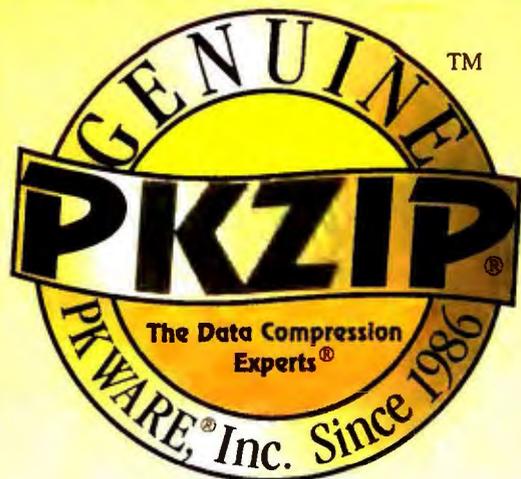
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LETTERS

how the World Wide Web operates. One bit of information alone was worth the cost of the magazine. I was not aware of the difference between directories and search engines—no wonder I kept getting lost trying to find specific information. Thanks again for a job well done.

Jim Boyd, Internet

READING MINDS

I AM PLEASED TO SEE that you are staying ahead of me. You must have read my mind. "You Win 95, I'm Switching" by Steve Bass in the October issue and "Upgrades: The Best for the Buck" by Jeff Bertolucci in the November issue both met my needs on a very timely basis. I'm a happy customer.

Richard Bazinet, Internet

JUNO'S SHORTCOMINGS?

I JUST FINISHED READING Steve Bass's glowing minireview of the Juno e-mail program in "Hot Picks for the Home Office," *Small Office/Home Office Special Report* [December].

Bass apparently confined his review of the product to the Juno interface, its ease of use, and the fact that it's free. What about determining whether (and how well) the e-mail program, and the Juno service itself, does the job for which it was designed?

The fact is that Juno routinely delays the release of outgoing e-mail, often by many hours. For example, a former associate sent me an e-mail message from her Juno account. It was "time stamped" at 4:03 p.m., but was not released to the Internet until 10:15 p.m.

I think you owe it to your readers to point out Juno's shortcomings.

David Texter, Internet

Author's response: That's a valuable observation, but I didn't experience the problem you described. In the two months I used Juno I noticed some delivery delays—but no more so than I regularly have when sending e-mail from, say, America Online to CompuServe. My suspicion is that because Juno is free it's often beleaguered with new subscribers and its ability to provide timely deliveries decreases. —Steve Bass

OS/2 WARPED COVERAGE

WHEN I FIRST BEGAN to read *PC World* a couple years ago, it was a great magazine filled with interesting articles and information. I first heard about OS/2 from *PC World*, and the magazine was a big influence in my decision to switch to OS/2 from Win/DOS.

But as soon as Windows 95 started to come onto the scene, the information in *PC World* went downhill. For months prior to the release of Win 95, most of the articles were "Chicago this, Chicago that." Windows 95 was on the cover of numerous issues both before and after its rollout. But hardly anything has been written about OS/2 Warp 4, the latest release.

Readers aren't asking that *PC World* endorse OS/2—or any other operating system for that matter. All we want is informative and unbiased information that we can use to make our own decisions. If this need isn't being met, then we readers will have to go elsewhere.

Avery Yackel, Internet

Editor's response: The summary of our review on OS/2 Warp 4 versus Windows 95 and NT 4.0 can be found in January's "War of the Windows: NT 4.0 Versus 95." A full review can be found on *PC World Online* (<http://www.pcworld.com>). —Julie Campagna

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

CORRECTIONS AND CLARIFICATIONS

THE OCTOBER REVIEW of multifunction devices, "Office in a Box," stated that the Canon MultiPass C2500 has no bundled software. The Canon does come with a CD-ROM of printing utilities and a proprietary fax application; however, it does not come with optical character recognition, document management, or other stand-alone software that some vendors bundle with their multifunction machines.

The photo in the "The Fastest CD-ROM Drive in the World" (*Top of the News*, December) showed the wrong drive. The drive pictured should have been a Plextor 12Plex PX-12Csi. *PC World* regrets the error.

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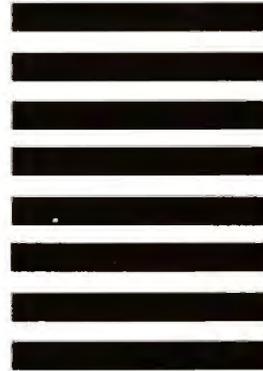
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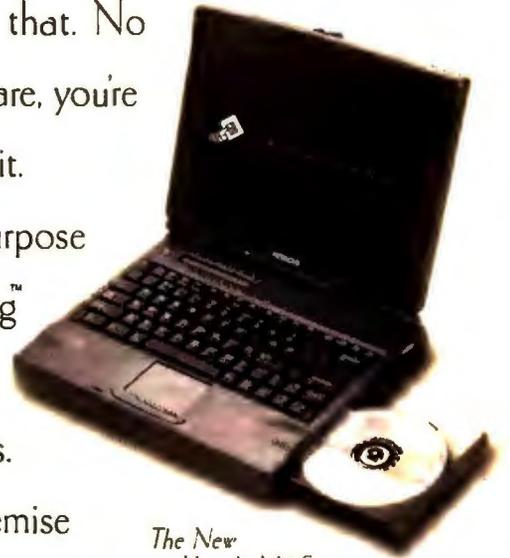
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Horizontal Frequency	30-115 kHz	30-107 kHz	30-95 kHz	30-96 kHz	30-86 kHz
Video Input Bandwidth	250 MHz	230 MHz	200 MHz	200 MHz	135 MHz
Maximum Resolution	1800 x 1440	1600 x 1280	1600 x 1280	1600 x 1280	1600 x 1280
Optimal Resolution	1800 x 1440 @ 76Hz	1600 x 1200 @ 85Hz	1600 x 1200 @ 76Hz	1600 x 1200 @ 77Hz	1280 x 1024 @ 80Hz
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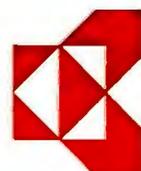
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Tech Support Survival Guide

Get your hardware and software problems solved quickly, easily, and with little expense.



I CUT THE CORPORATE UMBILICAL CORD and moved into my own home office last July. No more 2-hour commutes; no more meetings; and no more Norman, Rodney, Stan, and Pearl, *PC World's* trusty technical gurus—the folks I could call when the printer stopped printing or my e-mail went haywire. I don't miss the commute, and I get lots more work done now that I'm free of the constant office interruptions.

But man, do I miss having my own in-house technical support staff. In the last several months, I've called Netscape four times,

Toshiba three times, Hewlett-Packard four times, Netcom twice—well, you get the idea. Not surprisingly, the service has been as varied as the companies and their products. I've spoken with technicians who clearly thought they were doing me a big favor just by answering the phone, let alone deigning to answer my questions. And I've had the pleasure of talking to technical support representatives who really cared about their products and their customers: The HP representative who shipped me a new printer overnight, even though it was already past the FedEx cutoff time; and the Toshiba tech support rep who called back just to be sure the suggested fix worked.

Through it all, I've become something of an expert at solving problems—and with a minimum of time on hold. I've found that while some technical hassles require phone tech support, others don't. So here are my tips: practical, proven ways to get your problems solved as quickly, easily, and inexpensively as possible. Read them. Follow them. And send yours to me at the address at the end of the column.

Read the manual. I know what you're thinking: Computer manuals are poorly organized, never include information on the problems you're having, and are written either for idiots or for Ph.D. candidates in computer science. But you know what? While I wouldn't go so far as to say I've enjoyed reading any of the manuals I've looked at lately, they're getting better—a lot better.

And with hold times practically guaranteed whenever you call a hardware or software company these days, it's worthwhile to consult the book before you call. Even if you don't find what you want, you won't have wasted your time. When asked, you'll be able to say honestly that yes, you did look in the manual before calling.

Give automated support a chance. I'm always certain that my problem is unique—that no other customer has suffered similar torture. And sometimes, I'm right. (I'm lucky that way.) But every now and then, my hardware or software snafu turns out to be a well-known quirk that's documented in the company's automated support system.

It's easy to find out: Just accept the option to listen to the prepared list of frequently asked questions when you call the technical support line. It typically takes 2 to 5 minutes, depending on how many menu layers you have to wade through before you get to the most appropriate list of questions. And even if you don't get ►

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your answer, it's not a complete loss. Most companies bump you to the head of the technical support queue if you've already gone the extra mile of trying to solve the problem through the automated system.

Don't forget cybersupport. Online support isn't an option, of course, if your PC is dead in the water. But if your computer's working—and your problem is annoying but not catastrophic—check the company's Web site or its forum on one of the commercial online services for FAQs, drivers and fixes for downloading, and access to the same database of solutions that the tech support reps use.

In most cases you can also send private e-mail to the technical support staff. By all means send the e-mail, but don't stop there. Post your question on one of the company's forums or on an Internet newsgroup, where other people are likely to read and respond to your message.

Document your problem. Keep a log of all error messages you receive (particularly the obscure ones), and note the circumstances under which they occur. Did you load new software immediately beforehand? Install a new piece of hardware? What programs were open when the error occurred? Make sure you share all this information with the technical support representative. It's invaluable, particularly for resolving intermittent problems.

Know your hardware. And I don't just mean the brand of PC you're using. Before you call tech support, ascertain the following about your PC: processor speed; amount of RAM; and manufacturer and model of your sound card, CD-ROM drive, and fax-modem. (You can get these in Windows 95 by right-clicking *My Computer* and selecting *Properties*.) For software, keep a list of version numbers of the applications you use most frequently.

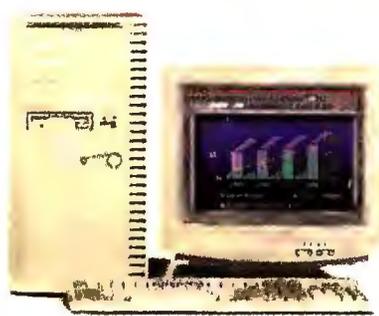
Master the phone system. Just about every company I've dealt with requires that customers calling the technical support department go through a phone loop. You know how it works; "Press 1 for Windows 95 support. Press 2 if you're calling about a desktop system," and so on. The first time you call, jot down the sequence of keys you need to hit to get into the queue for tech support. I know, it may save ►

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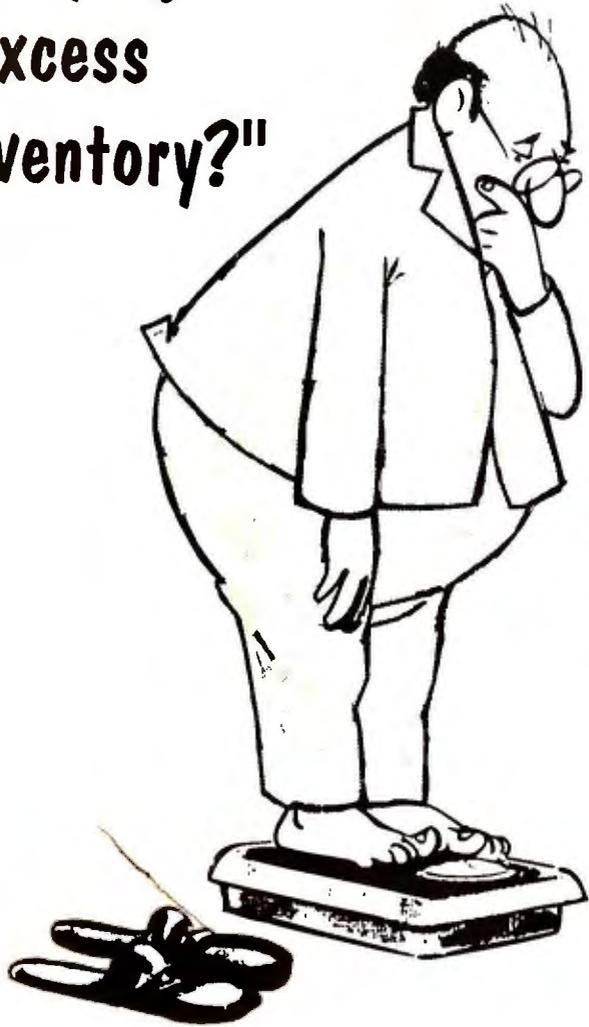
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CONSUMER WATCH

you only a minute or two, but when it's Friday afternoon and your printer won't print, every shortcut counts.

Know who's helping you. Keep a record of who you speak to (including the person's name and telephone number), what action they recommend, and what happens when you follow their instructions. For example, do you get new error messages? Does the recommended action solve the problem? Many companies maintain records of every call to tech support, but those logs are only as complete as the technician who entered the information makes them. If you happen to get someone who's getting ready to punch out for the evening, all the details of your call may not make it into your customer file.

Give the technician your phone number. Last month I waited 30 minutes for a technician, only to have him inadvertently disconnect the call. I had to start all over—and spend 45 more minutes on hold. From then on, I have given the technician my phone number as soon as I get through—just in case.

Don't be afraid to escalate. It's luck of the draw who answers your call to tech support. It might be an experienced technician or a trainee, a Pollyanna or an ogre. If your luck is bad and you wind up with someone who can't or won't help you, ask to speak with someone else—be it a supervisor or another technician.

Invest in a speakerphone. Inevitably, you find yourself locked in an endless technical support queue. With a hands-free speakerphone, you don't have to be tethered to the receiver while on hold. And when a real person finally does answer, you can follow their instructions without simultaneously performing neck contortions to keep a grip on your receiver.

Yeah, it's a jungle out there in technical support land, but you can make it an easier trek if you go in prepared. These tips will help you do just that.

*Do you have tech support survival tips? Send them or any other comments to consumerwatch@pcworld.com. Roberta Furger is a PC World contributing editor and author of the forthcoming *CyberGirls* (Warner Books, 1997, 212/522-7200). ■*

COMING UP

IN MARCH

ALL WINDOWS, ALL TIPS, ALL THE TIME

Whether it's Windows 3.1, Win 95, or NT 4.0, isn't there always something you wish worked better? From customizing your desktop to avoiding crashes, from freeing hard drive space to dialing your phone—have we got Windows tips for you.

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A steady stream of new computer viruses means that antivirus utilities are more necessary than ever. Using thousands of different viruses, we tested seven Win 95 packages to find which worked best at detecting and removing viruses.

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Iomega delays on rebate promises ♦ Micron PC arrives unordered ♦ Speedy APC

WHERE'S MY REBATE?

IN JULY 1996 I purchased a Zip drive and disk pack from Iomega through PC Connection, intending to take the company up on its offer of a \$70 rebate and a free wallet and caddy. I spent \$350 on both products. I mailed my rebate coupon immediately, but it's been three months and I still haven't heard anything. When I called Iomega, they said that the check was in the mail. Is Iomega going to pay up?

*Eric Hompe,
Washington, D.C.*

Editor's response: Hompe was one of six readers who wrote to us about the rebate delay.

We forwarded the letters to Iomega and spoke to Cory Maloy, senior manager of public relations. Maloy says the rebates are being processed by a fulfillment company, which has been deluged with responses since the program was launched last July. "There were overload problems originally, and now we have caught up with the backlog," claims Maloy. He estimates that customers should now receive the rebate check and giveaway items between four and six weeks after they send in their paperwork. At press time, Hompe reported that he received his rebate.

The rebate delays were not the only cause of dissatisfaction among Iomega customers. Four additional readers complained of intolerably long hold times when trying to reach the company's tech support department.

Maloy agreed that Iomega customers had to endure lengthy hold times during much of last year. According to Maloy, the delays were the result of increased growth at that time, and last August Iomega revamped its entire technical support operation to manage the increased load.

In December 1996 we made several calls to Iomega's technical support, and our average wait on hold was approximately 10 minutes.

HEY, I DIDN'T ORDER THAT SYSTEM

I WAS LOOKING for a P-200 computer, and as part of my research I requested a quote from Micron. Strangely enough, I was asked for my credit card number to use as a reference in holding the quote for me. I thought this was odd, and I questioned the representative about it, but I was reassured that it was a quotation only. Imagine my surprise when I had to sign for a FedEx delivery of a Micron Millennia P200 Plus a few weeks later. I found a

packing slip in the box with my name and my American Express card number. I was furious. What recourse do I have?

Eddie Albert, Waldorf, Maryland

Editor's response: We spoke to Nikki Colton, customer relations director at Micron. She assured us that Micron does not require a credit card number to provide a price quote. "If someone is phoning Micron about a quotation, we issue the caller a quotation number," says Colton. "If a caller gives a clear indication that they want to book the order, then—and only then—will the sales rep ask for payment details, like credit card numbers."

Colton apologized for the incident and concluded that the PC shipment occurred as a result of gross miscommunication between the sales rep and Albert. Micron authorized the return and agreed to pay the freight. At press time, Albert confirmed that he had received the materials necessary for shipping. As soon as Micron receives the P200, Albert's account will be credited. He is still unhappy about the incident, however.

Our advice? When you call for a quotation from any vendor, you may be asked to provide your name and address for tracking purposes, but don't give out your credit card number until you're ready to buy.

APC'S PROMPT SERVICE

I WAS IN the middle of a move when I ran into trouble trying to set up American Power Conversion's PowerChute Pro version 1.0 (an uninterruptible power supply) on my PC. I called APC tech support, and my call was picked up immediately. The techie told me I needed the updated version of the software. However, I was going to be at that address only for another four days. He said the package would reach me the next day. It did. I installed the new PowerChute Pro version 1.1 and it worked perfectly. APC is a first-class company.

Michael Kramer, Henderson, Nevada

Think you've gotten a raw deal—or a great one? PCW Advocate wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Aoife McEvoy is an assistant editor for PC World. ■



THE FINE PRINT

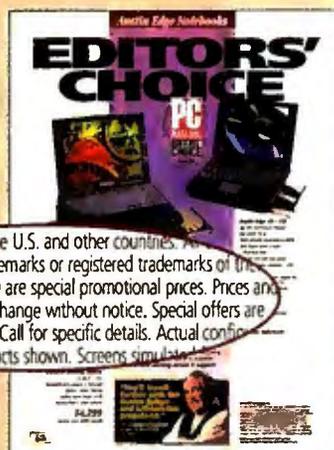
SPECIAL OFFERS: HERE TODAY, GONE TOMORROW



SEEING A MACHINE advertised at a great price doesn't mean you can buy it for that price—or even get that specific model at all. Cost, availability, and configurations can change rapidly—a fact noted only in the fine print in this Austin advertisement.

In *PC World's* September 1996 issue, the Austin Edge Duet-133 was advertised at \$4079; in October it was \$4774 (after the machine's EDO RAM was bumped up from 16MB to 24MB), and in November it was back down to \$4229. Shortly after the November 1996 *PC World* hit the newsstands, this Austin notebook was completely sold out.

Check on the current price before ordering a product: Your cost may differ dramatically from what's printed in the ad. Also inquire about configuration changes. The Austin Edge CD-133, for example, currently ships with a 1.44GB hard drive, rather than the 1.35GB drive as advertised here. Austin is honoring the advertised price, despite the enhanced feature.



Microsoft in the U.S. and other countries. All names and products are trademarks or registered trademarks of their respective owners. The above are special promotional prices. Prices and specifications are subject to change without notice. Special offers are valid for a limited time only. Call for specific details. Actual configurations may differ from products shown. Screens simulated.

WICKEDLY FAST 3D, WINDOWS & VIDEO

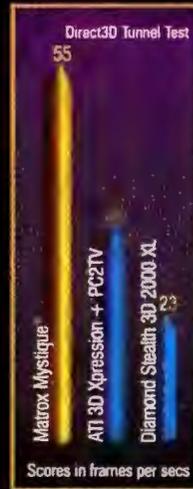
MATROX MYSTIQUE

From the company that consistently delivers high performance graphics accelerators, comes the next wave of graphics innovation for your business and home PC.

Matrox Mystique's state-of-the-art technology combines the new MGA-1064SG 64-bit graphics chip, an integrated high speed 170 MHz RAMDAC and powerful SGRAM memory for mind altering performance.

An ideal solution for both office and home, Mystique's all-in-one solution delivers outstanding acceleration for general Windows applications, multimedia CD ROM titles, 3D texture mapped games and DOS games.

From now on your Windows 95 applications will explode onto your screen at over 44 million Winmarks and at resolutions as high as 1600 x 1200. You'll also play back TV quality MPEG and AVI video clips at a smooth 30 frames per second.



And unlike many of the competition's 3D decelerators, Mystique delivers true 3D game power with the highest frame rates possible and a unique set of 3D features not available with other products. You'll also get blazing fast DOS game acceleration with Mystique's superior 32-bit VGA engine.

By adding on the Matrox Rainbow Runner series of upgrades, you'll discover an exciting new universe of digital video and make obsolescence nightmares a thing of the past (Q1 '97). You'll be able to send video over the internet, play RC games on a big screen TV, decode MPEG video in hardware and watch TV on the PC! Explore all the possibilities at incredibly low prices.

Satisfy your desire for the fastest, most complete 3D Windows and video accelerator available. Discover the plug and play world of Matrox Mystique. Starting at only \$179 (ESP 2 MB, PCI bus)

	Direct 3D Tunnel Test	Direct 3D Game Speed	Full PCI Bus Mastering	H/W True Perspective Correct Texture Mapping	8-bit Palettized Textures	3D Z-Buffering	Memory Upgradeable	1600 x 1200 Non-Interlaced
Matrox Mystique	55	30	✓	✓	✓	✓	✓	✓
ATI 3D Xpression + PC2TV	35	16				✓	✓	✓
Diamond Stealth 3D 2000XL	23	14		✓		✓	✓	

matrox

1-800-362-9352 <http://www.matrox.com/mga>

Matrox Graphics Inc. 1025 St. Regis Blvd. Dorval, Quebec, Canada, H9P 2T4 Tel: 514-969-6320 Fax: 514-969-6363 In Quebec call: 514-969-633

All Winbench 96 and Direct 3D tests conducted by Matrox Graphics Inc. on a Gateway P5 166 configured with Intel P5-166MHz 16MB of EDO RAM with 256K cache. Matrox Mystique Direct 3D Tunnel Test score is 55 FPS. Direct 3D Game Speed score is 30 FPS. ATI 3D Xpression + PC2TV Direct 3D Tunnel Test score is 35 FPS. Direct 3D Game Speed score is 16 FPS. Diamond Stealth 3D 2000XL Direct 3D Tunnel Test score is 23 FPS. Direct 3D Game Speed score is 14 FPS. All tests were conducted at 512 x 384 @ 16 bit while Matrox Mystique tests were conducted at 640 x 400 @ 16 bit based on Gouraud shaded, perspective correct texture mapping. All Direct 3D tests were conducted at 640 x 400 @ 16 bit based on Gouraud shaded, perspective correct texture mapping. All Direct 3D tests were conducted at 640 x 400 @ 16 bit based on Gouraud shaded, perspective correct texture mapping. All Direct 3D tests were conducted at 640 x 400 @ 16 bit based on Gouraud shaded, perspective correct texture mapping.

PC WORLD
BEST BUY

Winner of

1996 Winner
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(ESP)**

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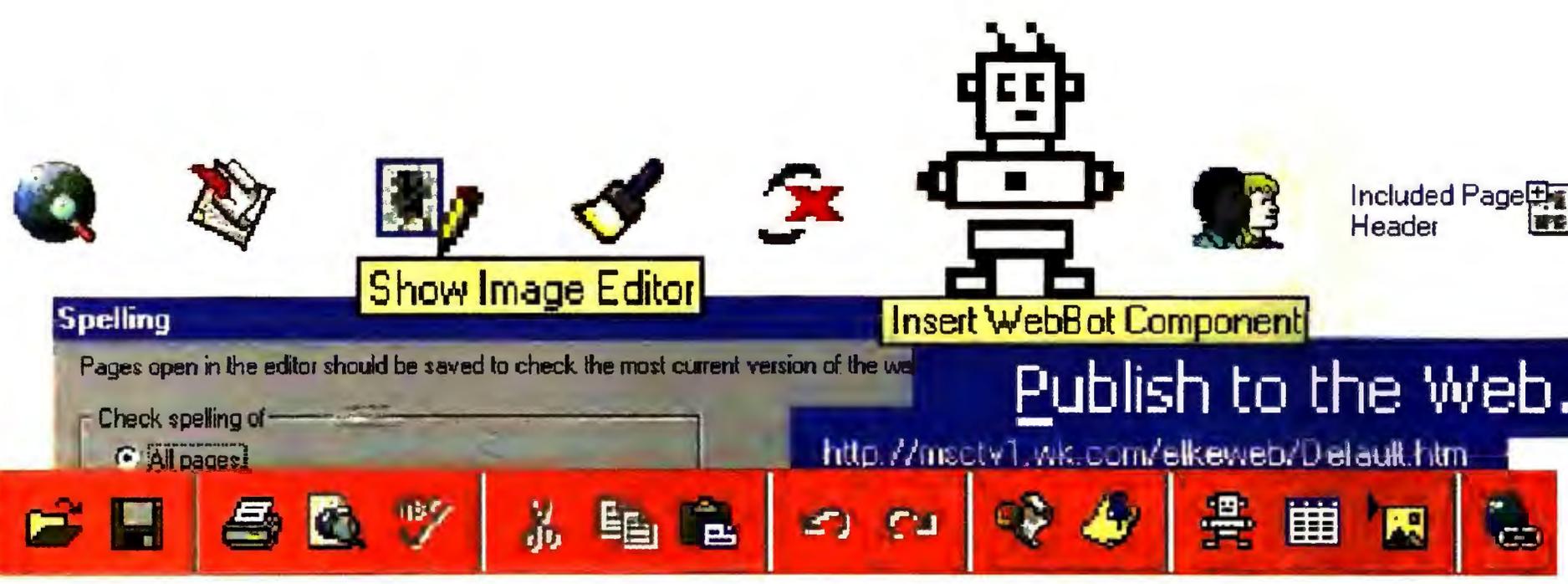
**BEST
BUY**

MICRO CENTER
THE MP3 & DEPARTMENT'S ONLY

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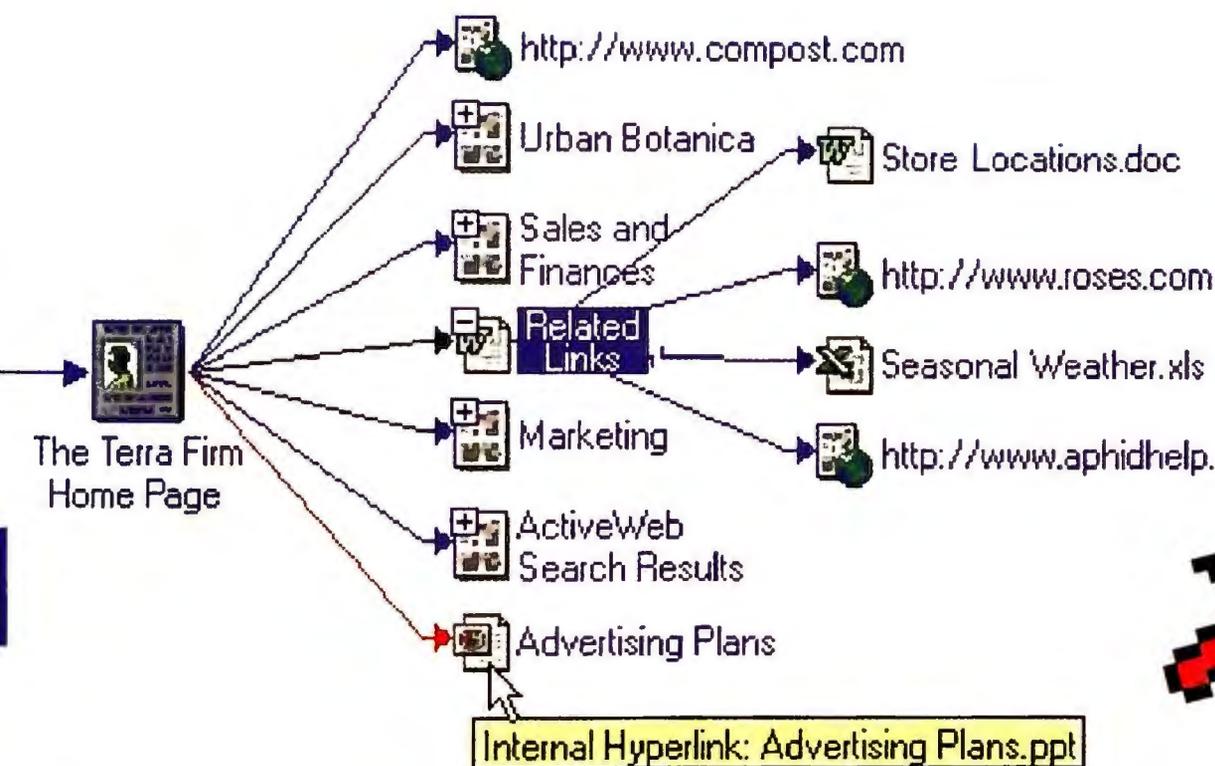
New Microsoft FrontPage 97

lets you
a really professional
even if you



create and manage -looking Web site

don't know what the hell you're doing.



Maybe you're not ready to wrangle computer gibberish to the ground and make it cry uncle. (Or **Uncle!**, as it more likely would say.) That's okay—the new Microsoft® FrontPage™ 97 Web authoring and management tool has everything any Webmaster needs, and it lets you skip right to the fun stuff. For starters, you can use Web wizards to begin building your site. Create instant hyperlinks. Without a whit of programming know-how, call on WebBot™ components to add interactive features. Spell check across your entire site, instead of page by laborious page.

And check out that Bonus Pack: Microsoft Internet Explorer 3.0, Microsoft Personal Web Server and Microsoft Image Composer (a program packed with tools and free art). Want an even more dynamic site? Insert Java™ applets, Netscape plug-ins or ActiveX™ controls. You can even get in there and fiddle with the HTML code. And if there's an intranet in your future, the fact that Microsoft Office documents can be used as Web pages will help it right along. It's all doable, and you get to make co-workers call you "O Webmaster." Interest piqued? Visit us online to find out more.

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QV-100

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Take a picture and view it instantly on the brilliant 1.8" color viewfinder. The QV-100 stores up to 192 images at standard resolution or 64 fine resolution VGA images.

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Enjoy viewing your images with the whole family, or leave a lasting impression at business presentations.

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Connect to the QG-100 Color Printer and produce color prints of images as soon as you shoot them.

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New PC Partners from CASIO

More capability, more versatility, more mobility.

CASSIOPEIA is
a handheld PC
developed together
with Microsoft®
and designed
for Windows®95.



HANDHELD PC
CASSIOPEIA

A-10 2MB RAM A-11 4MB RAM



Automatic data links with a Windows® 95 desktop PC

Simply attach the CASSIOPEIA to the optional large/mini dock connected to a Windows® 95 desktop PC for easy linking and data synchronization.

Built-in Microsoft® Pocket Word/Microsoft® Pocket Excel

Powerful New Microsoft® Windows® CE Operating System

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Use Microsoft® Pocket Mail to send and receive e-mail anywhere you are. Use Microsoft® Pocket Internet Explorer to surf the Net.

*Internet access requires a modem and the subscription to an Internet provider.

Backlit display makes for easy viewing, even in total darkness.

*All displays shown in this advertisement are photographic facsimiles.

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NT too slow on Cyrix? ♦ Windows 95 virus false alarm ♦ Sound Blaster turns off the mike

NT 4.0 Bogs Down on Some Cyrix CPUs

ALTHOUGH MICROSOFT certified Cyrix's 6x86 processors as compatible with Windows NT 4.0, early versions of the chips caused beta versions of the operating system to crash. The shipping version of Windows NT prevents crashes by switching the chips' internal cache mode from write-back to write-through. But the result is a 20 to 30 percent performance slowdown. Windows NT runs normally on revisions 2.7 and later of the chips, suggesting that Cyrix discovered the flaw and corrected it.



Though Microsoft and Cyrix point the finger of blame at each other, Cyrix has instituted an exchange program for owners of the faulty chips. Call 800/462-9749, choose option 1, and ask for information on the Windows NT processor exchange program. A technician will verify that you use Win NT 4.0 and a Cyrix 6x86 processor and have the problem, then will arrange to ship you a new chip. Cross-shipment requires a credit card and the return of the original chip within 30 days. At press time, Cyrix was working with Microsoft on a downloadable software patch that would solve the problem and make the swap unnecessary.

IBM versions of the 6x86 processor behave identically to corresponding Cyrix versions, but as we went to press IBM had no exchange program in place. Instead it is referring owners of affected chips to the computer manufacturer. IBM has a Web page devoted to the problem (<http://www.chips.ibm.com/products-nojs/x86-nojs/x86dev/14devcc.html>) where you can download a utility, `ibmm1.exe`, that reports the version of your 6x86 chip. You can also download `ibmm1.exe` from PC World Online. This utility works for both Cyrix and IBM chips. If the program reports step 1, revision 6 or less, then your chip will run slowly under NT (step 1, revision 7 is the first fixed version). Be sure to run the program under MS-DOS or Windows 95's MS-DOS mode—it won't work under Windows NT.

Though the performance problem occurs only under Windows NT, 6x86 users who run Windows 95 and DOS aren't completely safe either. The OEM Service Release 2 of Windows 95 properly recognizes the Cyrix and IBM chips as Pentium-class CPUs. But earlier versions of Windows 95 read a 6x86 chip as a 486, which

could prevent games that require a Pentium from running. Though no Windows 95 patch is currently available, Cyrix maintains a software compatibility list on its Web site (<http://www.cyrix.com/process/support/games.htm>), with links to 6x86-compatibility patches released by game developers.

For the latest information on Cyrix 6x86 issues, take a look at Bryan Davis's excellent Cyrix 6x86 Upgrade Advice Guide (<http://www.ionet.net/~rbdavis/>).

FALSE ALARMS WITH NORTON ANTIVIRUS

BUG According to Symantec, versions of Norton AntiVirus 1.0 dated before June 1, 1996, may cause false alarms when you install the latest virus signature update files.

FIX You'll need the huge (nearly 4MB) version 95.0b patch to read the newer virus signature updates properly. And the patch is required to install the December 1996 or later virus definitions. The patch also adds support for the FAT 32 file system in Win 95 OEM Service Release 2. Download the patch from Symantec at <http://www.symantec.com/avcenter/download.html> as 'NAV for Windows 95 v. 1.0, Large Volume Update'.

NEW SOUND BLASTER DRIVERS

BUG If you've recently installed the full-duplex Win 95 drivers for a Creative Labs Sound Blaster 16 board, you may have discovered that the microphone input is turned off by default. And when you turn it on, it's turned off again when you reboot.

FIX Creative Labs has released new drivers that fix the problem and improve support for AWE32 wavetable synthesis, OEM Service Release 2, and DirectX 3.0. You can find the new drivers in the 250K self-extracting archive file `sbw95up.exe` at the company's Web site (<http://www.creaf.com/wwwnew/tech/ftp/ftp-sb16awe.html#95>).

I N B R I E F

Get the Right PC-Cillin 95 Update

TREND MICRO HAS posted a version 1.04 patch for PC-Cillin 95 to its FTP server (<ftp://ftp.trendmicro.com/pub/pcc95/pcc104.exe>). The 1.7MB patch supersedes the "improved scanner" update (`pcc95upd.zip`) still available from the company's Web site (<http://www.antivirus.com>).

Corel Click & Create 1.01

COREL HAS POSTED patches for both the Windows 3.1 and Win 95 versions of its Click & Create multimedia authoring program that fix problems with list/combo box objects, path movement, cutting and pasting frames, and more. You'll find both patches at Corel's page (<http://206.116.221.5/click&create/patches/>).

B U G G E D ?

IF YOU FIND a hardware or software bug, post your report on PC World Online, or send us e-mail at bugs@pcworld.com.

THE HUMAN EYE

— *Also known as:* —

“THE PIERCING GAZE OF SCRUTINY”

NARROWED AS IT SEARCHES FOR THE DEFECTS AND DESIGN FLAWS SO COMMONLY FOUND IN THE TECHNOLOGICAL ERA, THE EYE HAS ALSO BEEN KNOWN TO POP WIDE OPEN WHEN IT SEES A BETTER WAY.

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The LifeBook™ 500 and 600 Series. Notebooks perfectly designed for a manic, mobile world. A process that involved a close look at the way a notebook should feel, the way it travels, adapts, and, of course, performs.

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*Preliminary measurement

OUR NOTEBOOKS AS SEEN
FROM A HOLY COW PERSPECTIVE.



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① Is this a 12.1 inch active-matrix color SVGA 800x600 resolution screen? Or am I blind with joy? Yes.

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We saw a big need for flexibility. So our notebooks are expandable by design — second batteries, second hard drives, available 28.8 fax/modems, CD-ROM capabilities, docking options and a full range of the latest Intel Pentium® processors.

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Able to inflict massive amounts of damage when confronted with a poorly designed notebook. In extreme cases, it is quite capable of putting a hole in the wall.

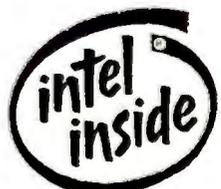
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*Every LifeBook product
must pass the 18,000
open and close test.
Or it's not a LifeBook.*



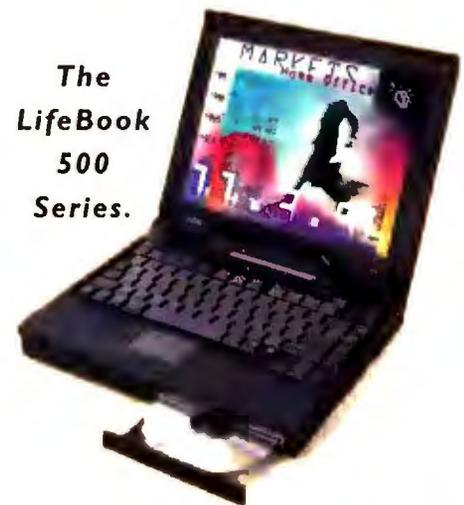
pentium
PROCESSOR

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Introducing the Lifebook™ 500 Series. A hands-on kind of machine to make your daily experience with a notebook personal and productive, not difficult and really annoying.

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- ① With the **MULTI-FUNCTION BAY**, you always have a choice. Second battery? Second hard drive? Or maybe a snack for later?
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6x CD-ROM, 16-bit sound and full-motion video support are standard. 120MHz, 133MHz or 150MHz Intel Pentium® processors are powerful options.



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Circle 103 on reader service card

The first MMX Pentium PCs set multimedia records and show solid gains for standard software—making MMX models the fastest ever tested. They're also a great buy.



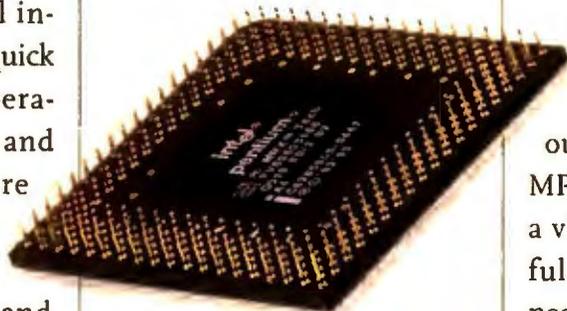
INTEL'S FLAGSHIP Pentium CPU just got better, with the introduction of an enhanced version of the processor. The new Pentium, dubbed MMX, sports additional instructions that can make quick work of multimedia operations such as graphics and communications that are written for MMX. Intel has also doubled the chip's internal cache and streamlined the internal architecture for greater efficiency.

The changes breathe new life into the Pentium line. We tested ten MMX Pentium desktops using the PC World-Bench test suite and found the Gateway 2000 P55C-200M to be the fastest machine we have ever tested. And in tests with MMX-compliant applications like Adobe Photoshop and Macromedia Director, MMX-enhanced operations such as graphics handling and video playback showed a significant performance increase. Image-manipulation tasks ran more than 50 percent faster on MMX systems than on standard Pentium CPUs.

EVERYONE BENEFITS

FORTUNATELY, USERS will enjoy some MMX advantages even in applications that don't specifically support the technology. Many Windows-based programs access multimedia functions through standard Windows modules, such as

the DirectX drivers or Active-Movie player. Microsoft has added MMX capability to these modules, which means existing software that uses them can run significantly



MMX changes breathe new life into the Pentium line. The Gateway P55C-200M is the fastest machine we have ever tested.

faster on MMX systems. For example, video and animation playback in PowerPoint presentations can use MMX technology immediately, even though PowerPoint has not been optimized for MMX.

Upgrade-weary buyers may view MMX with suspicion, but the technology promises to enhance PC content and applications. MMX Pentiums will let users play back high-quality MPEG-2 video without expensive hardware accelerators—increasingly important as DVD drives begin to reach the market. In our informal tests, a P-200 MMX PC displayed full-screen MPEG-2 video at up to 20 frames per second. On the Web, MMX

CPUs will let computers handle VRML sites' 3-D graphics and animation much more smoothly. This capability will become critical as high-bandwidth net connections proliferate. For handling two or more multimedia applications simultaneously—such as playing an MPEG-2 game while receiving a video call—or for playing full-motion video, you will need a coprocessor card.

Should you buy a system with an MMX Pentium CPU? Before long, you may not have a choice. Intel plans to change all its desktop and notebook CPUs to MMX technology this year, starting with 166-MHz and 200-MHz Pentiums for desktops, and 150-MHz and 166-MHz low-voltage Pentiums for notebooks. A forthcoming P6 CPU, a successor to the Pentium Pro, will incorporate MMX technology when it is introduced in the first half of 1997, while Intel's competitors also plan MMX-compatible versions of their CPUs. Cyrix's M2 processor and AMD's K6, both expected in the second quarter of 1997, will introduce binary-compatible MMX instructions to speed MMX-enhanced apps.

Over the next year, buyers will face a mixed bag of Pentium CPUs as Intel phases out non-MMX processors. Many system vendors, for example, will sell Pentium-166 and Pentium-200 PCs in



Keyboard Users Win \$5.9 Million in Lawsuit

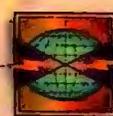
DIGITAL EQUIPMENT became the first computer keyboard maker ordered to pay damages to users who developed carpal tunnel syndrome. In December 1996, a U.S. District Court jury in New York awarded \$5.93 million to three plaintiffs and their families. Digital was faulted for not placing labels on its products warning that excessive and improper use of keyboards could lead to carpal tunnel and other repetitive strain injuries. At press time, the company asked the court to set aside the jury's decision; Digital will appeal the case if the request is denied.

Compaq Armada AC Adapters Recalled

COMPAQ COMPUTER issued a recall on AC adapters for its Armada 4100 notebook PCs after discovering the adapters could pose an electrical shock hazard to users. The recall potentially affects 75,000 AC adapters sold with Armada 4100 systems from September 23 through November 20, 1996. Only AC adapters with part number 217984-001 on the bar code label and with three hollow connector pins in the recessed male connector on the power adapter are affected.

The Armada 4100, one of ▶

I N T E R N E T



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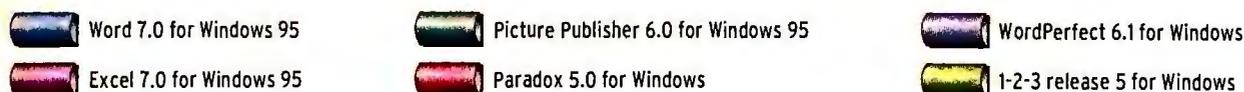
EDITED BY
Charles Piller and Randy Ross

TEST REPORT

MMX Chips Give All PCs a Performance Kick

Larger internal cache helps new Pentiums speed up business applications.

DESKTOPS	CPU	RAM (MB)	MMX or non-MMX	PC WorldBench score	Improvement with MMX (percent)	Application test times
						← Faster Slower →
CLR Infinity PT5-A166C	P-166	16	MMX	208	6.67	
			non-MMX	195	-	
CLR Infinity PT5-A200C	P-200	32	MMX	229	7.33	
			non-MMX	214	-	
Compaq Presario 8772	P-200	32	MMX	223	7.21	
			non-MMX	208	-	
Dell Dimension XPS M200s	P-200	32	MMX	234	1	
			non-MMX	-	-	System BIOS does not allow installation of a non-MMX CPU.
Gateway 2000 P55C-200M	P-200	32	MMX	237	7.88	
			non-MMX	220	-	
Micron Millennia Mxe P166	P-166	32	MMX	224	6.67	
			non-MMX	210	-	
Micron Millennia Mxe P200	P-200	32	MMX	235	6.67	
			non-MMX	220	-	
Packard Bell Platinum 2240	P-200	32	MMX	220	6.81	
			non-MMX	206	-	
Quantex QP5/200 SM-3	P-200	32	MMX	227	6.57	
			non-MMX	213	-	
Vektron Vision PW2-166M	P-166	32	MMX	214	7.89	
			non-MMX	199	-	
Average for 18 Pentium-200 PCs	P-200	32	non-MMX	214	-	
Average for 8 Pentium-166 PCs	P-166	32	non-MMX	207	-	
NOTEBOOKS						
Micron TransPort Xpe 166	P-166	32	MMX	221	1	
NEC Versa 6050MX	P-150	16	MMX	196	1	
Toshiba Tecra 740	P-166	16	MMX	198	1	
Average for 4 Pentium-150 notebooks	P-150	16, 32	non-MMX	167	-	



¹No basis for comparison.

HOW WE TEST We tested each system under PC WorldBench, first using the native MMX Pentium processor and then using a standard Pentium CPU of the same speed. Notebooks were tested only with their native MMX Pentium processor. Desktops had a 512K secondary cache; notebooks, a 256K cache. Higher PC WorldBench scores are better. For a description of PC WorldBench 1.0 tests, see PC World Online (<http://www.pcworld.com>). Data based on PC WorldBench testing conducted by the PC World Test Center. All rights reserved.

both MMX and non-MMX flavors; expect similar overlap for P-150 notebooks. Meanwhile, MMX Pentiums will appeal to power users and to game and multimedia fans. Business users should weigh the 7 to 8 percent performance gain that MMX systems provide with non-MMX software against the modest \$100 to \$200 extra MMX computers command.

BUILT FOR SPEED

WHAT DOES THE new technology do for the PC platform? Quite a bit, according to our tests. We tested ten desktops and three notebooks outfitted with MMX Pentium CPUs, using our PC WorldBench suite to evaluate their performance with standard business applications. We also conducted a series of tests to exercise the MMX architecture, using MMX-enabled versions of Photoshop, Macromedia Director, and Fractal Design's Ray Dream 3D Studio. To measure the improvement the MMX Pentium provides, we then swapped out the MMX CPU for a standard Pentium CPU of the same clock speed and ran the tests again.

Most software won't take full advantage of the enhanced Pentium design, so performance with non-MMX applications is critical. These PCs did not disappoint. The seven MMX-enhanced Pentium-200s averaged an impressive score of 229 on PC WorldBench tests—nearly 7 percent better than the 214 average for similarly configured Pentium-

200 PCs tested over the past six months. Gateway 2000's P55C-200M received a PC WorldBench score of 237, the top score ever recorded; Micron's Millennia Mxe P200 and Dell's Dimension XPS M200s finished close behind.

The 200-MHz MMX desktops even exceeded the average for 200-MHz Pentium Pro systems.

In general, the gains over standard Pentium-200 performance mean that MMX upgrades offer improvements comparable to those provided by recent clock speed upgrades within the Pentium

improvements of just over 20 percent for Fractal Design's Ray Dream 3D Studio.

If gains for MMX desktops are impressive, the impact on notebooks is spectacular. We tested three before our deadline: the 166-MHz Micron TransPort Xpe 166 and Toshiba Tecra 740, and the 150-MHz NEC Versa 6050MX. All post superb PC WorldBench scores that make them the fastest notebooks ever tested. The Micron blazed past all others with a 221 PC WorldBench score, over 30 percent higher than the average for 150-MHz Pentium notebooks and better even than three

MMX desktops we tested. The NEC and Toshiba, meanwhile, both ran more than 15 percent ahead of the Pentium-150 notebook competition, with PC WorldBench scores of 196 and 198, respectively.



MMX LAPTOP SUPERSTARS:
the NEC Versa 6050MX (left)
and the Micron TransPort Xpe.

line. Among specific applications, WordPerfect showed the greatest improvement with the MMX processors, followed by Excel and Word.

Multimedia applications optimized for MMX show far greater speed benefits, though our tests fail to confirm Intel's lofty claims of up to 400 percent improvement in some image editing operations. Our tests show a 50 percent boost for Photoshop rewritten for MMX. Macromedia Director results improved by about 35 percent, and we saw im-

BEHIND THE NUMBERS

MMX PENTIUMS may look familiar, but the x86 architecture has undergone major changes. The 57 new instructions reduce complex operations to a single step. They target specific media and signal processing tasks such as audio and video playback and graphics handling.

To shoehorn the added capabilities into the existing Pentium die size, Intel had to make a few compromises. MMX CPUs cannot execute MMX and floating point instructions at the same time. This isn't a huge problem, since few PC apps use the ►

Compaq's more popular notebooks, has been in short supply. Compaq advises people to stop using the affected AC adapters and to contact Compaq at 800/322-9515 for a replacement.



Speed Up Your Browser

AT LEAST TWO companies claim their software makes your Web browser faster. Peak Technologies' Net.Jet uses the idle time when your browser isn't shuttling data to pull down and cache pages you might want, such as hyperlinks from the present document; it works with both Netscape Navigator and Internet Explorer. You can download a free 30-day trial version from Peak's Web site (<http://www.peak-media.com/>). Datalytics is shipping Blaze Web Performance Pack, which features similar technology plus compression and other acceleration tricks. A free evaluation copy is available at Datalytics' site (<http://www.datalytics.com/>).

No More Decency Act?

ABOUT A YEAR after it was signed into law, the Communications Decency Act could get nixed. In December, the U.S. Supreme Court agreed to review the Act to determine whether Congress violated free-speech rights when it passed it. A decision should be reached by July. The Act makes "indecent" or "patently offensive" communications via the Internet, including via e-mail, punishable by fine or up to two years in jail; it has been in litigation since President Clinton signed it last February.

FPU much. But a handful of applications that switch frequently between floating-point and MMX operations could

run slower on MMX Pentiums than on non-MMX Pentiums of the same clock speed.

Intel also increased the Pentium's cache to 32K—twice the

size of the cache on standard Pentiums. This lets more operations execute without going outside to slower secondary cache or main system memory and improves overall processing efficiency.

Along with the larger cache and beefed-up instructions, the new Pentiums pack 4.5 million transistors—up from 3.3 million in the standard Pentium. (Compatibility with existing peripherals isn't affected.) MMX Pentiums' lower power requirements should reduce overheating—common in crowded CPUs. But the low voltage means MMX Pentiums won't work on old motherboards. Systems also need an updated BIOS. Intel plans to introduce MMX Pentium OverDrive chips for existing upgradable motherboards, probably before midyear.

Even with all the improvements, don't expect MMX to replace dedicated coprocessors. MMX can't match the acceleration of new 3-D graphics cards, and doesn't help set up 3-D scenes. Products such as software-only modems will also tax the CPU, slowing performance.

GOOD PRICING, BUT SOFTWARE LAGS

INTEL AND PC makers are pricing MMX to move, with virtually every major vendor introducing MMX products by spring. Some MMX systems cost scarcely \$100 more than identically configured non-MMX PCs, making them a better relative value than higher-speed non-MMX

Some MMX systems cost the same as identically configured PCs that use a standard Pentium.

systems. The Gateway P55C-200M for example, comes with 32MB of SDRAM, a 17-inch monitor, and a 12X CD-ROM drive—all for \$2918. At press time, an identically configured non-MMX system cost almost the same. The MMX Vektron Vision PW2-166M, at \$2145, costs just \$50 more than its non-MMX equivalent.

MMX PCs are an obvious buy for power users, but it will be some time before many mainstream applications can take full advantage of the technology. Developers face complex coding and huge time investments in optimizing their software for MMX.

For a while, at least, consumers will need to figure out which titles are best for their type of Pentium PC. Some software will run only on MMX systems, while other apps may ship in separate MMX and non-MMX editions. Some software will detect the CPU type at setup and install the appropriate code.

Despite such drawbacks, the move to MMX already looks like an inevitable decision for business-oriented users and multimedia buffs alike.

—Michael Desmond

 To find out where to purchase MMX Pentium systems, just point your browser to <http://www.pcworld.com/news/buymmx>.

TEST REPORT

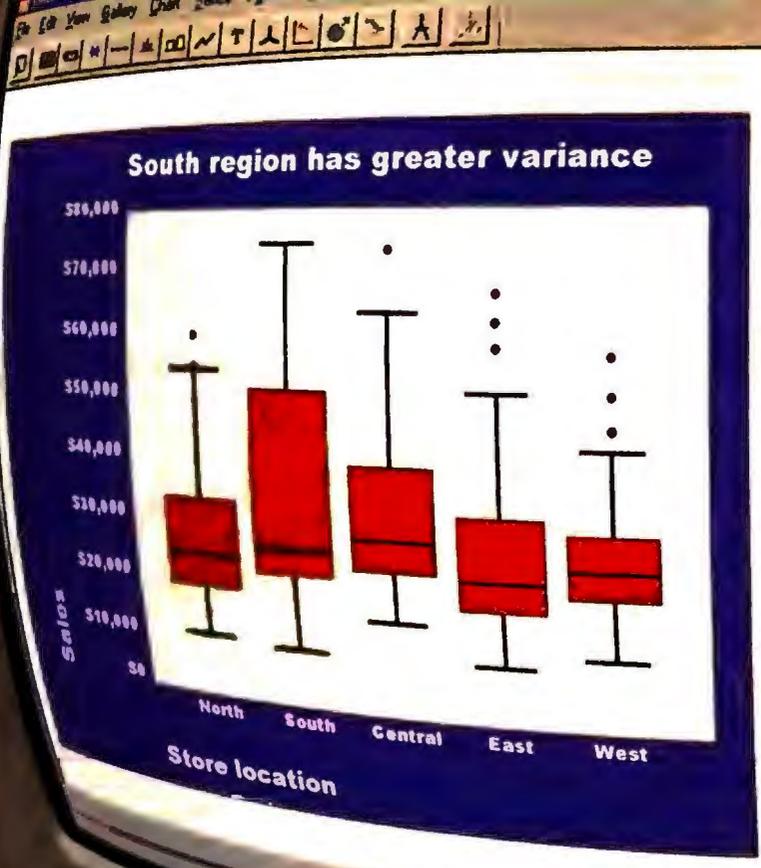
Multimedia Boost

MMX apps yield gains in graphics, 3-D, and video.

DESKTOPS	MMX or non-MMX	Application test times		Macromedia Director movie viewing Frames per second
		Faster	Slower	
CLR Infinity PT5-A166C	MMX			77.2
	non-MMX			57.1
CLR Infinity PT5-A200C	MMX			80.5
	non-MMX			60.4
Compaq Presario 8772	MMX			77.4
	non-MMX			59.2
Dell Dimension XPS M200s	MMX			64.0
	-	System BIOS does not allow installation of a non-MMX CPU.		-
Gateway 2000 P55C-200M	MMX			85.8
	non-MMX			63.2
Micron Millennia Mxe P166	MMX			82.2
	non-MMX			59.1
Micron Millennia Mxe P200	MMX			83.8
	non-MMX			63.3
Packard Bell Platinum 2240	MMX			76.4
	non-MMX			59.3
Quantex QP5/200 SM-3	MMX			78.9
	non-MMX			60.1
Vektron Vision PW2-166M	MMX			60.7
	non-MMX			46.8
NOTEBOOKS				
Micron TransPort Xpe 166	MMX			77.2
NEC Versa 6050MX	MMX			57.1
Toshiba Tecra 740	MMX			80.5

 Adobe Photoshop image editing  Ray Dream 3D Studio redraw

HOW WE TEST We tested each system using a series of MMX-enabled applications, first using an MMX Pentium processor and then a non-MMX Pentium CPU of the same speed. In Macromedia Director 5.0, we play a graphics-intensive executable file, recording the number of frames that display each second. In Photoshop 4.0, we time several image editing operations. In Fractal Design Ray Dream 3D Studio, we time how long it takes to redraw rendered 3-D scenes at two levels of complexity. Testing conducted by the PC World Test Center. All rights reserved.



Staff courtesy is inconsistent

Satisfaction with store

Stores In South		How helpful was the staff?					Total
		Extremely helpful	Very helpful	Somewhat helpful	Not very helpful	Not at all helpful	
Store #216	Mean	8.26	8.00	7.05	5.79	3.42	7.27
	Count	9	17	14	7	2	49
	Std. Deviation	.95	.99	1.54	2.38	4.69	1.90
Store #235	Mean	8.30	7.90	7.44	5.53	4.19	7.32
	Count	12	13	15	3	5	48
	Std. Deviation	.64	.87	.87	2.98	1.67	1.88
Store #241	Mean	8.43	8.54	4.64	5.93		53
	Count	34	14	4	1		53
	Std. Deviation	1.29	1.47	1.84			1.71
Store #244	Mean	8.92	8.78	6.04	4.30		80
	Count	34	8	7	1		50
	Std. Deviation	.80	1.81	1.95			1.68
Store #273	Mean	7.84	7.61	7.26	6.03	5.42	7.24
	Count	13	14	8	8	2	45
	Std. Deviation	.95	.96	1.49	1.91	1.14	1.43
Total	Mean	8.49	8.11	6.86	5.78	4.29	7.68
	Count	102	68	48	20	9	247
	Std. Deviation	1.05	1.23	1.61	2.06	2.20	1.74

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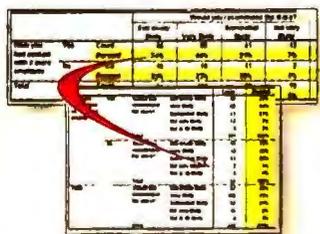
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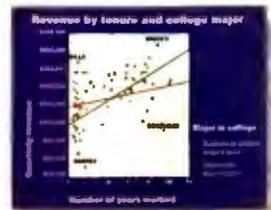
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Circle 253 on reader service card

Online Vendors: How Can You Tell the Good From the Bad?

CONSUMER ALERT

THE DIFFERENCE between good companies and bad ones isn't easy to see when you're online. Just ask Airlee Owens, a retired social worker from Bandon, Oregon. Owens thought he'd discovered great audio equipment deals on the Web site of a vendor called Audio Underground. The ad asked \$12 for a product catalog, which Owens bought online in November 1996, using his credit card. "I figured the deal was good enough that the \$12 was worth it," Owens says. "As soon as

Underground site. iMall serves as developer and host for more than 700 retail sites, many run by reputable firms.

iMall promises to refund your money if an iMall vendor doesn't respond to complaints,

Web site wasn't touting a guide—or a membership club.

Clearly, many good companies offer smart deals in online storefronts. But how can you tell if an online vendor is reputable and responsive? Help is on the way.

The Federal Trade Commission and individual state attor-



As soon as I got the catalog, I knew I'd been taken. I didn't want it to happen to other people.

—Airlee Owens, Bandon, Oregon

I got the catalog, I knew I'd been taken." The Web site didn't mention membership fees, but the catalog said discount prices applied only if you paid a membership fee of \$39 to \$599. What's more, the product he saw advertised on the site wasn't in the catalog. While the Web site promised free shipping, the catalog indicated shipping was free only with the \$599 membership.

IN HOT PURSUIT

OWENS PURSUED the matter. "I didn't want it to happen to anyone else," he says. But he couldn't reach Audio Underground—nobody answered the phone number shown in the catalog, and directory assistance had no listing. So Owens contacted iMall, whose logo appeared on the Audio

says vice president David Nadell. After *PC World* spoke with iMall, Owens got his \$12 back from Audio Underground. iMall agreed that the Audio Underground Web page was "not as clear as it could be" and told us it would ask that the site be changed.

Audio Underground owner Blaine Hartlib told us that at iMall's request, the Web site would be changed as of December to mention membership fees. He offered no apologies for Owens' experience, saying the \$12 catalog is a valuable guide. But the

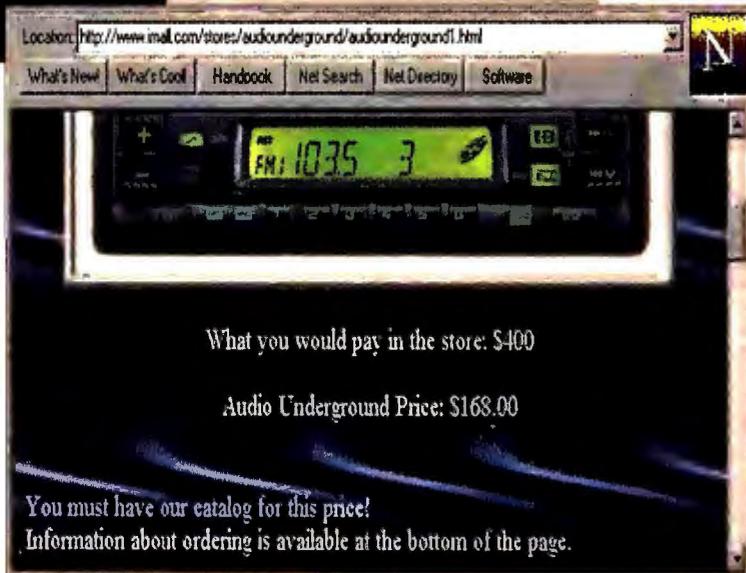
ney generals' offices are trying to root out problem vendors, but this is no small job. "We are paying attention to what's being sold on the Net," says Jodie Bernstein, director of the FTC's Bureau of Consumer Protection. The FTC's most recent effort, Operation

Missed Fortune, targeted 75 companies in 25 states for allegedly operating fraudulent self-employment and get-rich-quick schemes.

Be very critical of home-business opportunities advertised online, Bernstein warns. Self-employment scams are hot right now, she says. Many frauds involve *multilevel marketing companies*: You pay an initial investment to sell the company's product and are told you'll earn big money as you recruit people. You're promised a bonus for each recruit and/or a portion of their commissions. But the money commonly runs out, according to the FTC.

"Many are nothing but glorified pyramid schemes," says Christine Lanning, an associate attorney general in North Carolina. As part of Operation Missed Fortune, North Carolina investigat-

ed Destiny Telecomm, a firm in Oakland, California, that recruits people to sell prepaid telephone calling cards. We didn't have to look far to find Destiny Telecomm online: It had a Web site in iMall's home-business section, under the tagline "How to turn a \$100 investment into a lucrative career for you or your family members." Some 15,000 people signed up in North Carolina alone—but the promised earnings didn't materialize, Lanning says. In late November, Destiny agreed to cease doing business in North Carolina until it could present



AUDIO UNDERGROUND'S WEB SITE promises low prices if you order its \$12 catalog. The site doesn't say you have to pay a membership fee of \$39 to \$599 to get those prices.

reer for you or your family members." Some 15,000 people signed up in North Carolina alone—but the promised earnings didn't materialize, Lanning says. In late November, Destiny agreed to cease doing business in North Carolina until it could present

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Circle 246 on reader service card



bought RealAudio Player Plus, a Web audio utility, from Progressive Networks. The enticement: an ad on Progressive Networks' Web site promising a month of free Internet access time from Netcom, Stiel's provider. After Stiel bought, Netcom told him it gave the free time only to new subscribers. Two e-

Buying with a credit card offers customers a way to dispute charges. But be sure to contact the credit card company as soon as you know you have a problem: Some of those companies won't help you if you don't dispute a charge within a certain amount of time. Carol Wallace, a teacher in Chinchilla, Pennsylvania, found out the hard way last year after she bought a bad motherboard from a company that has since gone out of business. "The company took so long between calls, sending things out, that the 90-day period for reporting bad charges had expired," she says.

Cherico. Vendors began applying to the program in December 1996. A BBB seal on a company's site tells you some significant facts about its online business: The company has no unanswered complaints at the BBB; has been in business for at least six months; has provided information regarding company ownership, management, and previous business records; and has provided a street address and phone number. Also, the company has agreed to submit unresolved customer service problems to binding arbitration by the BBB.

a marketing plan that complied with the state's Deceptive Trade Practices Act.

iMall told us it was not aware Destiny Telecomm was under FTC investigation. After we made iMall aware of that fact, the company promised to study ways to prescreen multi-level marketing companies.

A final tip from the FTC: Con artists often try to extract only small amounts of money, because people won't pursue small losses. But if you have a bad experience, report it.

ON GUARD ONLINE

BEFORE BUYING, look for an address, a phone number, and refund policy details on a Web site. If the information isn't posted, request it, and if the company declines, think twice before ordering.

Ideally, companies can solve customer service problems via e-mail, but even if you're buying from a well-known firm, you may have to press the matter by phone. Jim Stiel, manager of a commercial mortgage banking office in Detroit, recently made that discovery firsthand. Stiel

If they won't give you contact and refund policy information, it's caveat emptor.

—Jodie Bernstein, director, FTC Bureau of Consumer Protection

mail messages from Stiel to Progressive Networks yielded no response, but a month later, after Stiel phoned, Progressive Networks promised to refund his money and told him to keep the product.

When we pointed out that the ad was misleading, Progressive Networks apologized. Days later, it changed the ad.

MORE HELP
UNTIL NOW, there has been no central place to check online companies. But a new program from the Council of Better Business Bureaus should help you shop and research wisely. The BBB's new online "seal of approval" ranking system separates legitimate vendors from scam artists. As part of the program, the BBB will also help with disputes regarding returns, refunds, or misrepresentations. You'll see the first sites with BBB seals in March 1997, says spokesperson Holly

When you click on a seal, you're linked to the company's report on the BBB site. The BBB site will also let you file a complaint or consult a searchable database of companies that have qualified for the seal or been the subjects of complaints. A portion of that database is online now at <http://www.bbbonline.org>; the BBB will add to it throughout 1997.

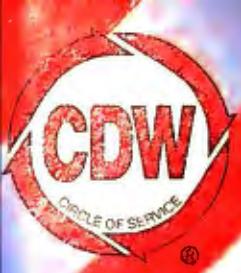
This type of resource is good news for consumers like Airlee Owens, who says he won't stop buying online, because it's convenient and prices are good. "I'll just be a little more careful next time," he says.

—Laurianne McLaughlin ▶

T I P S H E E T

How to Avoid Bad Online Vendors

1. **Don't Judge companies by their Web sites.** Anyone can look reputable online.
2. **Get contact information other than e-mail addresses.** If a Web site doesn't list a street address and phone number, ask for them. If the company declines, pass.
3. **Check out the company yourself.** Phone first and ask questions to see how you're treated.
4. **If it sounds too good to be true, it usually is.** Don't be fooled by the hype about miracle drugs or ridiculously low-priced products.
5. **Be critical of home-business ads.** Multilevel marketing clubs and other self-employment schemes are a rapidly growing type of online fraud.
6. **Use your credit card.** If you don't feel comfortable giving out your credit card information online, charge by phone. The credit card company may be the only way for you to get your money back.
7. **Speak up.** Unless you complain to your state's attorney general about rip-offs, bad vendors won't be prosecuted.



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- ✓ Warranty: 3 years parts; first year labor and on-site repair



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5100/1200	100MHz Pentium	16MB	1.2GB	\$1229.00	72754
5120/1200	120MHz Pentium	8MB	1.2GB	\$1139.00	72607
5120/1200	120MHz Pentium	16MB	1.2GB	\$1239.00	72612
5133/1200	133MHz Pentium	16MB	1.2GB	\$1389.00	72608
5133/2500	133MHz Pentium	16MB	2.5GB	\$1549.00	72613
5166/1200	166MHz Pentium	16MB	1.2GB	\$1639.00	72610
5166/2500	166MHz Pentium	16MB	2.5GB	\$1799.00	72614
5200/2500	200MHz Pentium	32MB	2.5GB	\$2209.00	72755
6180/1200/CD	180MHz Pentium Pro	16MB	1.2GB	\$2099.00	72756
6200/2500/CD	200MHz Pentium Pro	16MB	2.5GB	\$2599.00	72762

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525CD	133MHz Pentium	16MB	1.2GB	8X	\$1729.34	76404
525MCx	133MHz Pentium	16MB	1.2GB	8X	\$1905.72	76405
525CD	166MHz Pentium	16MB	1.6GB	8X	\$2069.12	76406
525MCx	166MHz Pentium	16MB	1.6GB	8X	\$2229.46	77135
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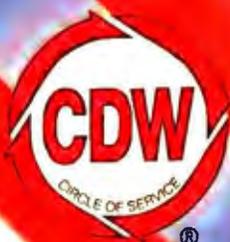
Monitor sold separately

AST Advantage! mini-tower PCs

Model	CPU	RAM	Hard drive	CD-ROM	Modem	Price	CDW
9304	133MHz Pentium	24MB	1.6GB	8X	33.6K bps	\$1599.00	71899
9208	166MHz Pentium	16MB	1.6GB	8X	33.6K bps	\$1799.00	7507
9308	200MHz Pentium	24MB	2.5GB	8X	33.6K bps	\$1999.00	71899
9314	200MHz Pentium	24MB	4GB	8X	33.6K bps	\$2499.00	71900

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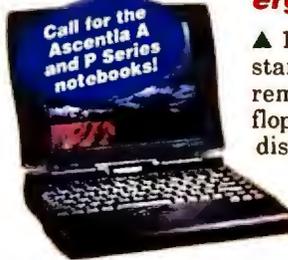
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430CDS **\$2449.03** CDW 77242

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 ✓ 28.8K bps data/fax modem

510CDS **\$3636.87** CDW 77238

510CDT **\$4899.62** CDW 77241



Tecra 510

Tecra 500CS and 500CDT

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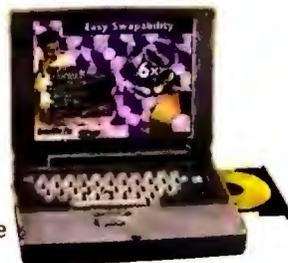
500CDT **\$4166.53** CDW 70243

Satellite Pro 420CDS and 420CDT

✓ 100MHz Intel Pentium® processor ✓ 8MB EDO RAM standard, 40MB maximum ✓ 810MB (420CDS) or 1.26GB (420CDT) hard drives ✓ Internal 6X CD-ROM drive, swaps with standard 1.44MB floppy drive
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Cable Modems: Fastest Internet Access in the East and West



HIGH-SPEED HARDWARE: LANCity's cable modem is leased to cable Net users.

TEST DRIVE THESE DAYS it seems like everyone wants to sell you Internet access. First there were the runny-nosed kids from next door who set up an Internet server in their basement and offered the lowest-price service in town. Then the phone companies and online service providers got into the act. Now the cable television companies are slowly rolling out Internet service. What's a PC user to do?

For the fastest Internet access, cable service wins hands

down. The services we examined—among the first commercially available—use a cable TV network and special modems to connect your PC to the Net. The services promise to let you download files at up to 10 megabits per second, about 80 times faster than the 128 kilobits-per-second ISDN service the phone companies offer and about 350 times faster than a 28.8-kbps modem. Uploading is much slower,

topping out at about 500 kbps. This prospect may sound too good to be true, and for most PC users it is. Though cable companies have aggressive deployment plans, their Internet services are not yet widely available. We examined Continental Cablevision's Highway1 service, offered in some parts of suburban Boston and Jacksonville, Florida, and TCI's @Home service, available in certain areas in Northern California. At press time, Time Warner had rolled out its Road Runner service to

some residents of northeast Ohio and upstate New York.

Availability issues aside, you'll need more than just a fast modem to truly improve Internet performance. While high-speed options such as cable and ISDN provide a fast on-ramp to the Net, once you hit the infohighway, your speed is subject to the same traffic problems that affect data from standard modems: Dial in to a busy Web server, and your high-speed connection could poke along like a 14.4-kbps modem.

The cable companies hope to limit traffic congestion by posting proprietary Web content and stored versions of popular Internet sites on servers that reside on the ►

First Look at New 56-kbps Modems

CABLE IS NOT the only new high-speed Internet option. Early this year, expect to see phone-line modems that can retrieve information from compatible Internet services at up to 56 kbps. This level of performance is limited to downloading; the devices cannot send information at that rate. *Com-*

patible is the key word. At press time, modem vendors had not agreed on a 56-kbps standard, and the industry had split into two major camps. U.S. Robotics is pushing a technology called x2, while Rockwell Semiconductor Systems and Lucent Technologies are advocating their own variation, called K56flex.

Questions remain about how often users will actually be able to connect at 56 kbps or at any speed beyond what they get now. U.S. Robotics has completed lab tests and claims customers will see more reliable, faster connections than with a 28.8-kbps modem. Still, going from the lab to the public phone network is a giant step. In areas with poor-quality phone lines, the new devices may perform like 28.8-kbps modems.

X2 modems and online connections are expected to hit the market first. For example, at press time CompuServe and Prodigy Internet announced plans to offer x2-compatible 56-kbps connections early in 1997. However, these service providers were also evaluating the competing 56-kbps technologies. Lucent expects that modem vendors and service providers will offer K56flex technology at about the same time.

REALITY CHECK

ONCE AN ISP or online service offers 56 kbps, the few, the proud, and the well-heeled may consider a 56-kbps modem. The less adventurous will want to wait for prices to drop and technology to mature. "Based on what I've seen, I would have reservations about buying the first product to market," says Virginia Brooks, Aberdeen Group analyst. —R. R.

Developing an international standard for 56-kbps communications could take a year, notes Dataquest's Lisa Pelgrim.

High-Speed Modem Rollout

The modems: Who's offering what

VENDOR	Estimated ship	56-kbps technology
Boca Research	Q1 1997	K56flex
Cardinal Technologies	Q1 1997	x2
Hayes	Q1 1997	K56flex
Logicode Technology	Q1 1997	x2
Multi-Tech Systems	Q1 1997	K56flex
U.S. Robotics	Q1 1997	x2

The services: Big guns line up

America Online	trials Q4 1996	x2
CompuServe	Q1 1997	x2, K56flex
Prodigy Internet	1997	x2
PSINet ¹	Q1 1997	x2, K56flex

¹Provides network for ISPs, such as Delphi, Earthlink, IDT, and Mindspring.

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If you were to take stock of all the information stored on your PC, you'd soon realize how vital it is to your business. What if one day all that information vanished? Accidents happen. Theft, fire, floods, computer failure or human error can result in a devastating loss of data. The cost of rebuilding that data can be massive and often impossible. Few businesses survive it. Regular backups using a reliable HP Colorado tape backup system are your best insurance that,



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* Maximum capacity using 2:1 data compression

cable networks. These servers would be available only to cable customers, resulting in less traffic and enhanced performance. Based on our preview of these cable sites, the performance claims are true.

HIGHWAY1

WE EXAMINED Continental's Highway1 Boston-area offering, which costs \$59.95 per month, or \$49.95 for current customers of Continental's standard cable TV service. Installation of a LANCity cable modem, plus purchase and installation of software and an ethernet network interface card total about \$150. You don't buy the modem; the monthly fee includes leasing the device.

We took Highway1 out for a spin at one of Continental's offices, and the results were often astounding. We downloaded a 7MB file from a Continental server in about 50 seconds. Venturing onto the Internet brought mixed results. In one case, we down-

loaded a 614K file in approximately 3 seconds from a popular FTP site. Normally, downloading this same file with a 28.8-kbps modem takes about 4 minutes. At other times, however, tapping the Internet via cable modem proved no faster than with a standard 28.8-kbps modem.

The Highway1 package includes a customized version of Navigator 3.0. On its own servers, Continental plans to offer proprietary content, such as news and weather tailored to the customers' location. The company plans to make Highway1 available to about 30 percent of the people within its service areas around the country by year-end 1997.

@HOME NETWORK

TCI'S @HOME Network service costs \$35 per month, including cable modem lease and service. In addition, you pay a \$150 fee for installation and an ethernet card. The @Home package includes Netscape Navigator 3.0.

Again, browsing was noticeably quicker than with a standard modem. Downloading files stored on the @Home Network was incredibly fast: We downloaded a 7MB video clip in seconds. But when we attempted to retrieve our 614K test file from a server located on the Internet, we were stuck operating at 28.8 kbps.

@Home plans to offer plenty of compelling information on its own cable network servers so that customers will rarely feel the need to venture onto the Internet. As of now, @Home provides a range of family offerings, plus 12 on-screen Web Guides that offer fast access to selected Web sites stored on its servers. In general, the sites will appeal to families, but techies and more adventurous Web surfers may be disappointed.

At press time, @Home Network was available only in Fremont and Sunnyvale, California, through TCI, which plans to offer the service in other cities. Other cable companies,

including Cox and Comcast, will soon offer the service to their respective customers. @Home plans to offer an @Work component for businesses. Stay tuned.

—Dean Andrews and Randy Ross

@Home Network's @Home Network, Continental Cablevision's Highway1

PRO: Incredibly fast.
CON: Not available in most areas; can't speed up busy Internet sites.
VALUE: Home users and families will want to consider cable Internet service once it's available in their area.
@Home
 888/780-4663
<http://www.home.net/>
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 800/665-5501
<http://www.continental.com/>
 Pricing: \$59.95 per month (\$49.95 for current customers); installation \$150
 READER SERVICE NO. 797

WEB BROWSER

Where to Find Ergonomic Advice



AS PC USE INCREASES, so do complaints about repetitive strain injuries such as carpal tunnel syndrome, tendinitis, and neck strain. But in many cases the culprit—a computer—also turns out to be your ally.

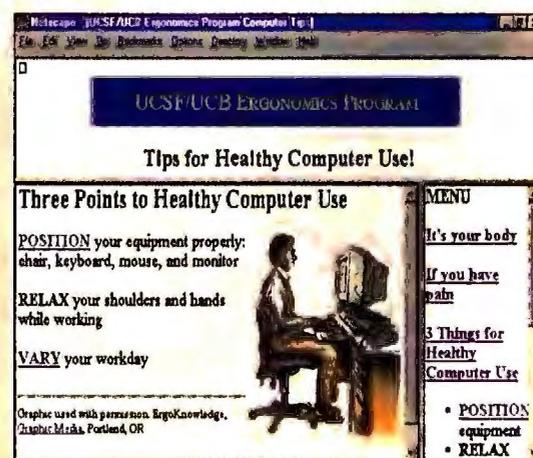
A number of Web sites offer advice for the ergonomically challenged. Of course you can't expect to cure an injury by visiting a Web site, so be sure to check with a physician if any problem persists.

Two sites with detailed ergonomic advice are run by universities: the UCSF/UCB Ergonomics Program (<http://www.me.berkeley.edu/ergo>) and the Typing Injury FAQ (<http://ftp.cs.princeton.edu/~dwallach/tifaq>). Web sites of universities that have strong engineering programs are excellent starting points for your search—most of the advice

they publish is backed by expert research. The university sites mentioned here list exercises to help prevent injuries, and they publish ergonomic news and links to research sites and other related Web sites.

How to Create a Comfortable Working Environment (<http://www.ocean.odu.edu/ug/ergonomics.html>) offers straightforward advice, sans graphics, on how to set up your computer workstation to avoid strain. Created by the Center for Coastal Physical Oceanography at Old Dominion University, this site is probably one of the more unexpected sources of ergonomic advice.

Academia can't claim all the worthwhile sites. The Human Factors and Ergonomics Society (<http://www.hfes.org>), a Web support group that focuses on repetitive strain injury, offers information on the society, member-



THE UCSF/UCB ERGONOMICS PROGRAM offers extensive information about preventing PC-related injuries.

ship services, and professional activities. Also check out the Cumulative Trauma Disorder News site (<http://ctdnews.com/>). While not extensive, the site outlines CTD research. Caution: Requests for full CTD reports will cost you. —Courtney Schlisserman

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- 2MB Video RAM
- Zoomed Video Port
- 2GB Hard Drive
- Modular 8X CD-ROM Drive
- Modular 3.5" Diskette Drive
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*Maximum data transfer rate dependent on certain variables including particular modems with which you are communicating, telephone lines, communications software and communications protocols.

*The Destination 31" monitor is covered by a one-year limited warranty. Call or write for a free copy.

*For a limited time, Destination system purchases include a coupon for one DISH Network Satellite system (satellite receiver, 18-inch antenna with single LNBF, infrared remote control) at no charge with the purchase of a one-year subscription to a qualifying programming package from DISH Network for \$300. Taxes, delivery and installation not included. Satellite system service covers 48 contiguous states and is supported by DISH Network. Residential use only.



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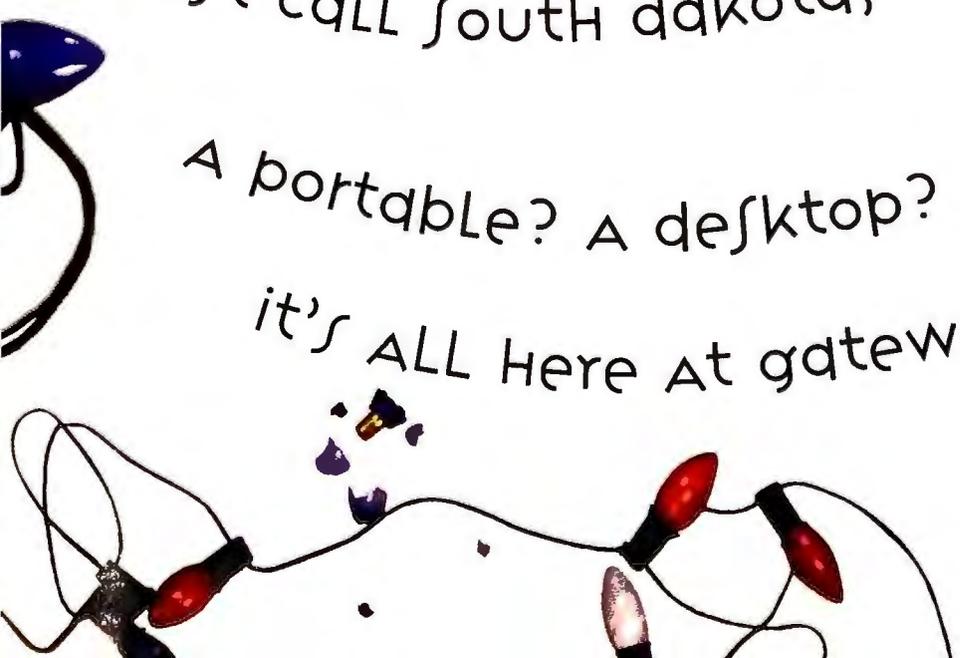
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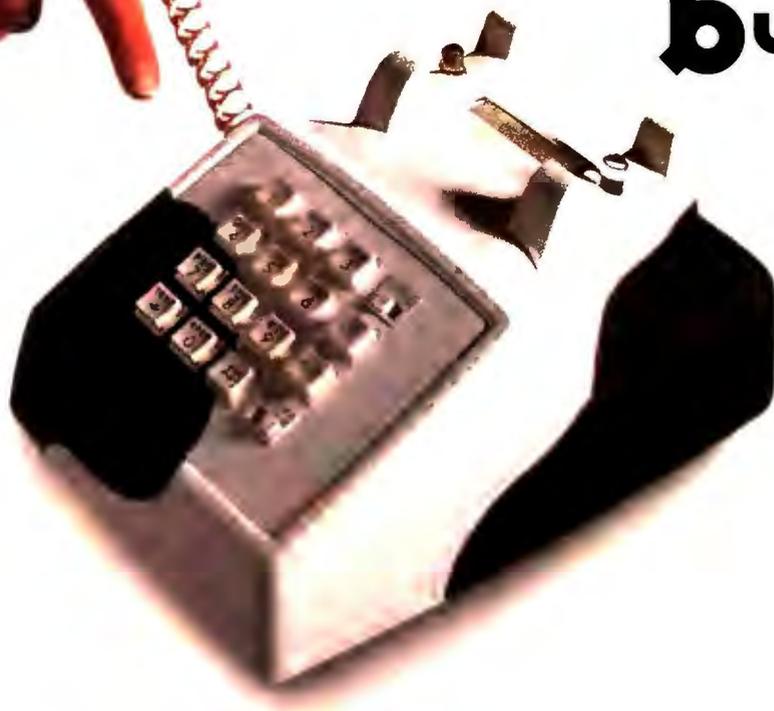




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Performance Graph



Ziff-Davis' Winstone 97 Version 1.0 produced scores of 16.9 and 36.4; 18.2 and 38.0; 18.5 and 37.4; and 20.2 and 42.7 Winstone Version 1.0 units on its Business Winstone 97 suite and High-end Winstone 97 suite on Gateway 2000, Inc. PCs configured with 166MHz Intel Pentium Processor with MMX technology, 200MHz Intel Pentium Processor with MMX technology, 180MHz Intel Pentium Pro processor and 200MHz Intel Pentium Pro processor, respectively. All Gateway 2000 PCs tested featured 32MB RAM, 256K RAM cache, 3.8GB hard disk, IDE controller, FAT file system, and no hardware disk cache. Systems include S3 ViRGE/VX graphics adapter, with 4MB VRAM with v1.23m3 driver, 1024x768 with 256 colors, and a refresh rate of 75Hz. Test systems used MS DOS 7.1 and MS Windows 95. All products used in the test were shipping versions available to the general public, and the test and its results were not verified by Ziff Davis.



Professional Systems

P5-133

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- CrystalScan500 .28dp Monitor (13.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 1.2GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
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- 256K Pipelined Burst Cache
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- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon*

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- 512K Pipelined Burst Cache
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- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon*

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G6-200

- Intel 200MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron700 .26dp Monitor (15.9" viewable area)
- STB ViRGE/VX 4MB, 3-D 64-Bit PCI Graphics
- 3.8GB 11ms EIDE Hard Drive
- 12X CD-ROM/3.5" Diskette Drives
- Tower Case
- 104+ Keyboard & MS Mouse 2.0
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- MS Office 97, Professional Edition Upgrade Coupon*

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- Epson® Stylus™ Color 500 Ink Jet Printer **\$279**
- Canon BJC-70 Portable Bubble Jet Printer **\$299**
- Hewlett-Packard LaserJet 5L Xtra Laser Printer **\$479**
(less \$50 manufacturer rebate)
- Hewlett-Packard LaserJet 6P Laser Printer **\$769**
- MS® SideWinder™ 3D Pro Joystick **\$59**

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- **Altec Lansing ACS-410 Speaker System w/ ACS-251 Subwoofer** \$120 (upgrade from PCs that include Altec ACS-41 speakers)
- **CD-Recordable** \$429
4X read/2X write recordable CD drive with SCSI controller, CD Creator 2 for MS Windows® and three media disks.
- **Iomega® Ditto™ 3200 Internal Tape Backup Unit** \$199
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- **Iomega External Zip 100MB Drive** \$149
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(includes SCSI controller and 1GB cartridge)
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- **Intel Pentium Processors with MMX Technology available.**
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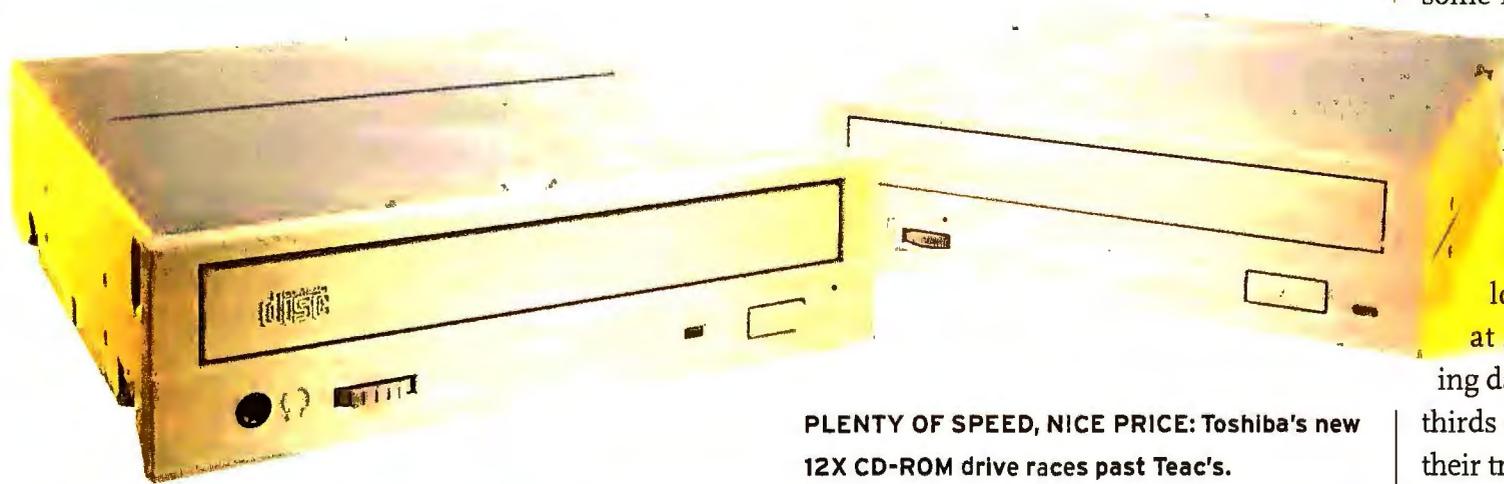
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G6-200XL featuring new mini-tower case.



NEW PRODUCTS

CD-ROM Drive Revolution: 12X Drives Are Just the Beginning



PLENTY OF SPEED, NICE PRICE: Toshiba's new 12X CD-ROM drive races past Teac's.

C D - R O M
WE'RE WITNESSING a quiet CD-ROM drive revolution. New mechanics and electronics are fundamentally changing the way these drives operate. On the one hand, these changes will soon lead to dramatic performance improvements—but on the other hand, the expected marketing hype could confuse consumers.

Two recent advances in CD-ROM drive technology are faster, more robust motors and better digital signal processors. We tested shipping versions of new 12X drives from Teac and Toshiba. Both are internal, tray-loading drives with the usual complement of controls. The \$195 **Toshiba XM-5701B Internal** (a SCSI drive) is by far the better unit, performing image down-

loads, data searches, and installs at a significantly faster clip than the **Teac CD-512E**. The \$149 Teac (an IDE/ATAPI drive) has a disappointing access time and generally poor real-world performance.

In December 1996 *Top of the News* we reviewed two other 12X drives, the \$329 Plextor 12Plex PX-12CSi (an internal SCSI drive) and the \$249 Mitsumi FX-120 (an internal ATAPI IDE drive). The Plextor is the Toshiba's equal on all counts, but the Toshiba costs far less. Plextor offers the most choices, with tray- or caddy-loading drives (Plextor's caddy-loading 12X drives cost \$50 more, but caddy-loading drives are less taxing on the discs.) The Mitsumi drive performs dead last among all the 12X drives that we've tested.

These drives spin discs at up to 6360 rpm, nearly equal to the speed of a hard drive and probably as fast as possible for CD-ROM drives. Any faster and the small irregularities on CDs would create vibration, heat, and other problems. You may have heard about 16X drives and wonder if they'd be worth waiting to buy instead of a 12X model.

THE TRUTH ABOUT 16X DRIVES

IN REALITY, 16X CD-ROM drives are not as fast as they sound. Because of the way data is stored on CDs, rotation speed varies constantly as data is read, and drives must spin much more slowly when retrieving data from outside tracks of the disc. Ideally CD-ROM drives would run at a constant speed, but at 6360

rpm, data on the outside tracks would zip by at the equivalent of 30X speed, and no digital signal processor can read data that fast. But the latest digital signal processors can read at 16X speed, so some manufacturers, notably Hitachi, NEC, and Sony, have essentially retrofitted their old 8X drives with the new DSPs to create Partial Constant Angular Velocity drives. These run at 4240 rpm when reading data from the inside two-thirds of the disc. That means their transfer rate climbs from 8X on the inside tracks to 16X toward the outside.

In many ways these drives are stopgap, interim products

Teac CD-512E (IDE/ATAPI)

PRO: Inexpensive.

CON: Performance is worse than some 6X and 8X drives.

VALUE: An unremarkable drive.

Teac

213/726-0303

<http://www.teac.com>

Street price: \$149

READER SERVICE NO. 724

Toshiba XM-5701B

Internal (SCSI)

PRO: Excellent drive for an excellent price.

CON: No caddy-loading model.

VALUE: More bang for your buck.

Toshiba America Information Systems, Disk Products Division

714/457-0777

<http://www.tais.com/taispd/>

Street price: \$195

READER SERVICE NO. 725

that will be around only until vendors come up with better DSPs. But for now, major computer makers want less expensive, more reliable, yet reasonably high performance CD-ROM drives, and P-CAV fits that bill. Though you'll be seeing plenty of ads for 16X P-CAV drives, you won't see many of the drives in stores—almost all will ship only in new computers.

Don't pay a premium for a new PC with a 16X P-CAV drive, as there are performance drawbacks. Because data is stored on CD-ROMs from the inside track out and few discs are filled to the brim, most data transfers take place on inner tracks—which is where P-CAV drives perform like 8X machines. They do have slightly faster access times, which means you'll soon see computers for sale equipped with "16 Max" CD-ROM drives, much to the chagrin of 12X drive manufacturers.

"This is a marketing guy's dream to make something sound better than it is," says Toshiba CD-ROM senior product manager Sean Stead. Plecter engineering director Felix Nemirovsky says, "They are making a drive that is a step back from 12X. Basically, they are jumping the gun."

At press time Toshiba announced that it would ship the xM-3801B, a 15X P-CAV drive, in December 1996. This internal SCSI drive is tray-loading and has a \$290 list price. A Toshiba 15X unit was not available for evaluation in time to be included in this article. Look for performance testing in a future issue.

OUR BUYING ADVICE
SO WHAT SHOULD you do if you're in the market for a new CD-ROM drive? If you have a quad-speed or slower drive running on a 486-66 MHz or better PC, you'll find that an upgrade to a 12X CD-ROM drive will boost your performance substantially. The

Toshiba 12X drive clearly earns our recommendation, at only \$195 for the SCSI version we tested, \$165 for the ATAPI IDE version.

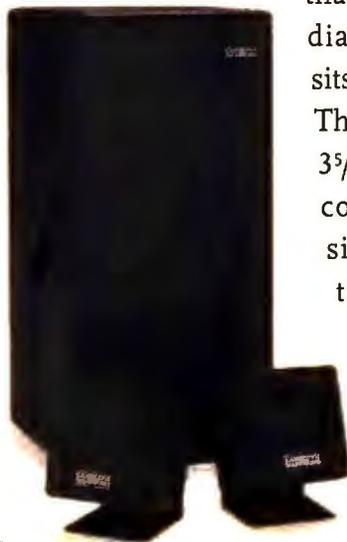
If you're really watching your pennies, look for specials on 8X CD-ROM drives, which should now cost even less.

—Jeff Sengstack

MicroWorks Speakers: The Best for Less

S P E A K E R S
THE FIRST TIME I heard the heavy-duty sounds pumped out by the **MicroWorks** speakers, I assumed that they were

powered by testosterone rather than electricity. Even when setting up the weighty subwoofer and its two satellite stereo speakers, I was aware from the start that this system was high quality. And because Cambridge SoundWorks distributes its product directly through its mail order catalog and nationwide showrooms, the company achieves



MICRO PRICE, MAX SOUND:
MicroWorks speakers roar.

economy of scale and sells these speakers for \$349, which is a real bargain.

The subwoofer supplying the deeper low-bass sounds

that most multimedia speakers miss sits under your desk. The twin 4-by-4-by-3⁵/₈-inch satellites, compact and boxy, sit on metal desktop stands, tilted upward at a slight angle for better sound dispersal. The three channels (left, right, and subwoofer) have a

combined power of 67 watts. That's major muscle for multimedia sounds. Play a game like Quake or Doom and you will literally *feel* like you are in a war zone: The subwoofer cranks out those thumping, vibrating bass sounds. And even at high volume, they won't produce the distortion that you would normally hear from many multimedia speakers. In fact, the MicroWorks speakers might be overkill if

MicroWorks

PRO: High quality, compact design.

CON: May be too powerful for a small work space.

VALUE: Clearly a great buy.

Cambridge SoundWorks Inc.

800/367-4434

<http://www.hifi.com>

Street price: \$349

READER SERVICE NO. 726

- 72 Teac CD-512E, Toshiba XM-5701B 12X CD-ROM drives
- 73 MicroWorks speakers
- 74 Juggler voice-based message system
- 74 BocaPro Video Phone Elite
- 76 Fujitsu LifeBooks notebooks
- 76 HP Network Kit
- 80 Monorail home PC
- 80 Aiwa America SC-C37 portable speakers
- 80 Panasonic KXL-783A portable 8X CD-ROM drive
- 84 Kiplinger TaxCut Deluxe Multimedia, Personal Tax Edge, TurboTax Deluxe software
- 88 CardScan Plus 300 business card scanner
- 88 Xerox Pagis Pro 97 scanning software
- 92 CompuServe WinCIM 3.0.1, Prodigy Internet online services
- 92 After Dark 4.0 screen savers
- 96 MicroTouch Ibd electronic whiteboard
- 96 QuickBooks Pro 5.0 for Windows accounting software
- 96 Zdo Intelligent Task Manager
- 100 PEP Multimedia online publishing applications
- 100 Corel Print & Photo House
- 100 Lexmark 2030 color ink jet printer

I N T E R N E T



FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at <http://www.pcworld.com/news.html>.

you're in a small work space.

I particularly liked the convenient dual volume controls on the subwoofer and on the cable that connects to one of the desktop speakers. The system also has inputs for two separate sound sources, such as a stereo or a TV as well as your PC. I haven't heard better speakers at this price.

—Michael S. Lasky ▶

Use Your Phone to Retrieve E-Mail

E-MAIL UTILITY

PURE SPEECH'S **Juggler** program lets your PC read e-mail and play voice messages to you over the phone. When you call in, Juggler responds to simple verbal commands such as "Read my e-mail" and "Play my messages." This lets you use Juggler without using your hands. List priced at \$149, Juggler should be helpful for people who work at

Juggler

PRO: One call plays your e-mail and voice mail.

CON: Computerized voice can be hard to understand.

VALUE: Good tool for home-based workers who travel frequently.

PureSpeech

617/441-0000

<http://www.speech.com/>

List price: \$149

READER SERVICE NO. 727



JUGGLER FEATURES A SINGLE IN-BOX for voice mail, e-mail, and faxes—and provides access to these messages via telephone.

home but travel frequently. Currently, it's the only product of its kind that we've seen at this price.

In a test of a preproduction version, we found Juggler effective, with some limitations. When we dialed in to a PC with Juggler, the system

understood our commands and recited e-mail messages that were generally understandable. The computerized voice slurred some words, particularly numbers, dates, Web addresses, and names. A few words were impossible to make out. Also, the product

doesn't recognize or read file attachments. If faxes come into your e-mail in-box, Juggler reads the headers, but not the contents. Though the product works with e-mail accounts from CompuServe and Internet providers, it doesn't work with America Online.

Juggler also requires a powerful PC: a Windows 95 system with 16MB of RAM and at minimum a Pentium-100 processor, as well as a compatible voice modem—such as Creative Labs PhoneBlaster—and a 16-bit sound card. The product offers top performance on Pentium MMX PCs. Juggler is designed for use with a standard analog phone line, not with the PBX phone systems found in most corporate offices.

The software also includes an address book that can read names and addresses to you over the phone.

—Randy Ross

Boca's Try at Low-Cost PC Videoconferencing

VIDEOPHONE

BOCA RESEARCH has announced its \$349 **BocaPro Video Phone Elite**, the latest home PC videoconferencing product. The price is right—but we had mixed results installing it on two different clone PCs, both from mom-and-pop stores. With almost any videophone product, installation experiences will vary, depending on your PC and its chip sets, cards, and drivers.

The BocaPro Video Phone Elite uses conventional telephone lines and provides real-time video as fast as 15 frames

per second, the company says. You can size the video window to full screen, 4 by 4 inches, or (for best quality) 2 by 2 inches. The BocaPro package includes a full-length PCI card and software that works with a Pentium PC with Windows 95, 12MB of RAM, and a VGA graphics adapter that supports Windows 95's DirectDraw.

You'll also need a camcorder or a desktop video camera, a microphone, speakers, and a 28.8-kbps modem—preferably one with H.324 support.

With our newer clone PC, a Pentium-120 full-tower system bought in 1996, installa-

tion was doable. Be aware it's a long PCI card. We ended up with the board hanging over the Pentium chip. We then had to run wires from the card to the modem, video camera, and external microphone. (With a speakerphone modem, fewer wires are required.) The software installation went smoothly. Video quality was acceptable for family but not business use.

With the other clone PC, a Pentium-90 bought in 1995, we were able to install the card and software, but we couldn't make the video driver load properly, even with polite help

from tech support. We reseated the board, reinstalled hardware drivers, checked IRQ conflicts, and checked the PC's chip set—but no luck.

This product is priced reasonably, but be aware that installation might not be simple.

—Richard Jantz
and Shane Mooney ▶

BocaPro Video Phone Elite

PRO: Cheap videoconferencing using telephone lines.

CON: Installation may be tricky; no microphone, camera, or speakers.

VALUE: Affordable for home use.

Boca Research Inc.

407/997-6227

<http://www.bocaresearch.com/>

Street price: \$349

READER SERVICE NO. 728



Hear
what you
see.

RDC-2 multimedia digital camera

The RDC-2 lets you select between five independent recording modes to capture digital information in any combination or order you choose: Still Mode with macro capability, Sound Mode, Stills with Sound Mode, Continuous Mode, Document Mode.

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- Removable Media: PCMCIA cards.
- Photo-editing and Cataloging Software Included.

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Fujitsu LifeBooks Don't Stand Out

NOTEBOOK

FUJITSU HAS announced its second foray into the notebook market with its humbly titled **LifeBook** series. Fujitsu has reduced the cost of its entry-level notebook, decreased the weight of its lightest notebook, and increased CPU speeds. At press time none of these units were available for testing, but compared to the competition's

Fujitsu LifeBooks

PRO: More multimedia offerings, some light weights.

CON: With the exception of the 635T's small size, the LifeBooks don't top the competition.

VALUE: If cost is your number one concern, shop around.

Fujitsu PC Corp.

888/466-8434

<http://www.fujitsu.com>

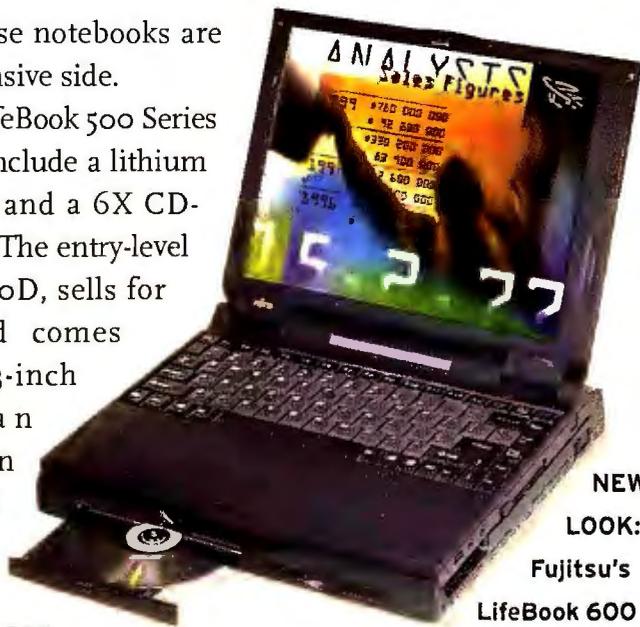
Street prices: LifeBook 520D \$2299, 520T \$2799, 530T \$3499, 555T \$4399, 635T \$3999.

READER SERVICE NO. 729

pricing, these notebooks are on the expensive side.

All four LifeBook 500 Series notebooks include a lithium ion battery and a 6X CD-ROM drive. The entry-level unit, the 520D, sells for \$2299 and comes with an 11.3-inch dual-screen, an 810MB hard drive, and a Pentium-120 processor.

Its active-matrix screen cousin, the 520T, sells for \$2799. For \$700 more you can get the 530T, a Pentium-133 unit that offers 16MB of EDO RAM, a 1.3GB hard drive, and an 11.3-inch active-matrix screen. Unfortunately, these units don't measure up to their peers. Toshiba's Satellite Pro line, for example, includes a P-120, 16MB of RAM, a 1.3GB hard drive, and



NEW
LOOK:

Fujitsu's
LifeBook 600

series notebooks travel light.

a 10X CD-ROM for only \$200 more than the LifeBook 520D.

Fujitsu's high-end model, the 555T, houses a Pentium-150 processor, 16MB of EDO RAM, a 1.3GB hard drive, and a 12.1-inch active-matrix screen, for \$4399. This is a great price for a notebook with top-of-the-line components. All units in the LifeBook 500 series weigh in at 6.6 pounds

or less. (The 555T is 6.6 pounds, while all the others are 6.2 pounds.)

The \$3999 635T is one of the lightest and thinnest notebooks we've seen—4.2 pounds, with a side profile of 1.2 inches. The 635T provides a 12.1-inch active-matrix screen, P-133 processor, 4-megabits-per-second infrared port, and two thin lithium ion batteries that together provide 4 hours of battery life, the company says.

Fujitsu has come up with a unique offering in its 635T. Compared to other lightweight notebooks, though, it still has a little way to go. Sharp's Widenote offers very similar features for \$1000 less, and TI's Extensa 900 series has the same features and an 11.3-inch active-matrix screen for \$200 less than the Fujitsu 635T. Fujitsu's three-year warranty and 24-hour, 7-day toll-free technical support help to round out the package.

—Eric Hellweg

HP's Network in a Box for Small Offices

NETWORKING

HEWLETT-PACKARD'S Network Kit is designed for small businesses that want simple networking without the cost of hiring a systems integrator or a full-time network administrator. Based on my test of a shipping kit, it works—provided you're happy with Windows 95's peer-to-peer networking. Peer-to-peer is fine for two or three machines, but the more PCs you add, the slower and more complicated it is to manage.

Priced at \$499, the **HP Net-**

work Kit provides three PCI 10Base-T network adapters, a tiny eight-port hub, and three 50-foot cables. A step-by-step manual walks you through everything from installing the network adapters to setting up Windows 95 file sharing and printer sharing. The kit was made for HP's Vectra 500 PCs, which are designed for small and home offices, but it will connect any Windows 95 PC that has a PCI slot. Installation is just a little harder.

I tried to network an HP Vectra 500 to a slightly older

HP Multimedia 6140S PC (which was upgraded to Windows 95) and got mixed results. With the Vectra 500, Windows 95 detected the newly installed network card and within a couple of minutes asked me for my network name and password. Then I just had to set up Windows 95's peer-to-peer file sharing. But on my older HP system, Windows 95 had trouble linking to the network card. Eventually, I got it running, after working through some cryptic error messages. The docu-

mentation needs more information on connecting non-Vectra 500 PCs. The kit makes networking relatively easy, but it's still not a piece of cake.

—Tracey Capen ►

HP Network Kit

PRO: All-in-one Windows 95 networking kit, excellent for Vectra 500s.

CON: Installation gets harder with other PCs.

VALUE: Good choice for small offices, but not perfect.

Hewlett-Packard Company

800/752-0900

<http://www.hp.com>

List price: \$499

READER SERVICE NO. 730

Look into our world.



Ricoh did. They loved what they saw.

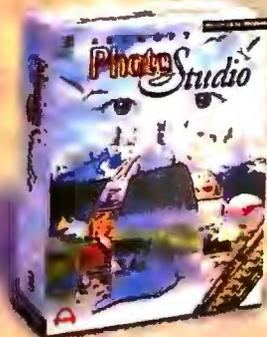
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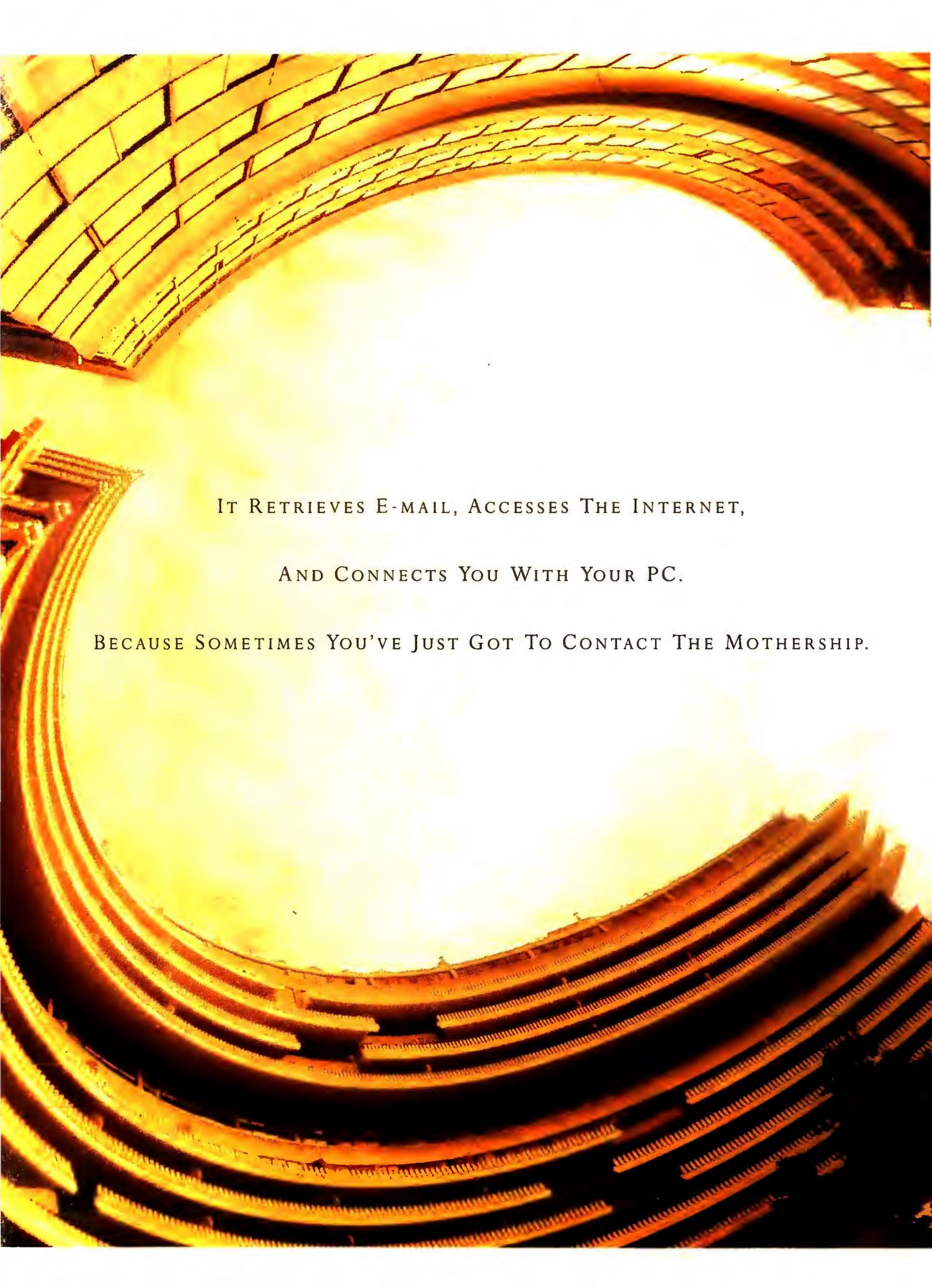
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d i s t r i b u t e d



a c c e s s

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With bundled features like e-mail, Microsoft Internet Explorer and remote access software, you'll be able to stay in constant touch with your data.

FORM WITH SUBSTANCE

Check out its sleek, lightweight design with a touch-sensitive, backlit display. It can have 6MB of RAM, and can give you up to 20 hours of power. On just two AA alkaline batteries.

COMPAQ INNOVATION

And who better than the number one PC company to provide you with the best extension to your PC?

Monorail: \$999 Home PC of a New Kind

DESKTOP

SPENDING \$2000 or \$3000 on PC for your home is a big decision for anyone—and it's an impossibility for many people. A few PC vendors have come up with sub-\$1000 systems, but they've been spartan configurations with slow 486 processors, minimal amounts of RAM and hard disk space, and other obvious compromises. Monorail Inc.'s **Monorail** computer, by contrast, is a \$999 PC that's well equipped to run Windows 95.

I used a preproduction unit of the Monorail, which was not ready for formal speed tests. This briefcase-size desktop system has an AMD K5 processor (comparable to a Pentium-75), 16MB of RAM, a 1.08GB hard disk, a 33.6-kbps modem, a 4X CD-ROM drive, and 16-bit sound. The compact tabletop case holds a 10.4-inch dual-scan color LCD screen. Setup was unusually easy; I just plugged in the well-marked keyboard, mouse, phone, and power cables, and I was up, running, and able to use Windows 95 at a respectable clip.

The Monorail's superlow

Monorail

PRO: Extremely low price, compact size, easy setup.

CON: Disappointing display, limited upgradability, subpar warranty.

VALUE: Cons aside, still a lot of PC for the price.

Monorail, Inc.

770/980-0387, 888/880-7245

<http://www.monorail.com>

List price: \$999

READER SERVICE NO. 731



A LOOK ALL ITS OWN: The trim Monorail home computer saves money and desktop space, though its display isn't perfect.

price does involve some concessions. Incorporating a dual-scan LCD display on a desktop PC is an unusual move, and after spending a few days with the system, I understood why. The display's viewing range isn't wide—it looks fine as long as you sit squarely in front of the PC, but anyone crowding around the system at odd angles may not be able to see well. It's also limited to 640 by 480 resolution and 256 colors; that's enough for most programs, but be prepared for the occasional multimedia title that it can't handle—such as Starwave's *Muppets Inside* CD-ROM. The only bundled apps are Internet Explorer and a multimedia help system.

The system's space-efficient case also poses one major drawback: It offers minimal room for upgrades. In fact, you can't open up the Monorail's case at all; if you want

extra RAM or a larger hard disk, you'll have to ship it back to the manufacturer for upgrading. You can't add a peripheral that requires an internal expansion card, such as most flatbed scanners. (There is one half-size ISA expansion slot, which the manufacturer may use to provide factory-installed options at a later date.)

Monorail also cut corners on the warranty—parts are covered for the first year only, and labor is free for just the first 90 days. A three-year extended warranty costs \$99.

For all these reasons, the Monorail is not the equal of costlier home-PC competitors. Still, it's a strong contender if the alternative is no PC at all. Just take a careful look at its display before buying, and consider other low-cost options such as refurbished big-name systems.

—Harry McCracken ►

Flat Speakers, Fat Sound

The problem with most portable speakers is that they tend to be bulky, even if they aren't heavy. Aiwa America now offers a 9-ounce pair of speakers that are flat in looks but not in sound. The magnetically shielded **SC-C37** speakers offer 1-watt amplification each, and power up with four AA batteries or an AC power connection. The pair attach to each other for efficient storage and include a built-in cord winder, so the cables can be hidden conveniently in the rear of the speaker housing. The set, list priced at \$39.95, also works with Walkmans and other portable devices. The price and quality make the speakers noteworthy. Aiwa America, Inc., 800/289-2492, <http://www.aiwa.com>.

READER SERVICE NO. 732

Portable 8X CD-ROM

If your laptop PC is sans CD-ROM drive or you want to have your own in-flight music, Panasonic's new **KXL-783A** portable 8X CD-ROM drive is a perfect traveling companion. It's a diminutive dual-purpose drive that claims the fastest transfer rate (1800 K/sec.) of all portable drives and a reasonably fast access time of 180 milliseconds. It comes with both PC Card Type II and SCSI-2 connectors, so it's easy to connect to your laptop or desktop PC. With its built-in headphone jack and Spatializer 3-D speaker system, it can also serve as a portable audio CD player. The drive burns through six AA batteries in only 3 hours, so its AC adapter is a must when an outlet is available. The drive's street price is \$399. Panasonic, 800/662-3537, <http://www.panasonic.com>.

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– PC WORLD, December, 1996 –

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New Tax Software: Intuit's TurboTax Deluxe Takes Top Honors

TAX SOFTWARE

FINALLY, some good news about taxes: Tax software has become easier to use. This year's three leading products are Personal Tax Edge from Parsons Technology, Kiplinger Tax Cut from Block Financial, and Intuit's TurboTax Deluxe. Based on our tests, TurboTax is the best of the bunch.

All three programs include the necessary federal tax forms and step you through the filing process. Once you complete the forms, the programs do a final audit of everything, looking for mistakes or missed deduction opportunities. Then you can print out all the necessary paperwork, or you can pay extra to file electronically; Parsons, Block

Kiplinger TaxCut Deluxe Multimedia

PRO: Fine interface, good multimedia elements.

CON: The self-employed should look elsewhere for tax help.

VALUE: Nice, but not quite as easy to use as TurboTax.

Block Financial

800/235-4060

<http://www.conductor.com/>

Street price: \$30 to \$40

READER SERVICE NO. 734

Personal Tax Edge

PRO: Cheap, cheap, cheap.

CON: Unfriendly interface, poor help system.

VALUE: Only for tight-budgeted consumers with simple tax returns.

Parsons Technology

888/883-0791

<http://www.parsonstech.com>

Street price: \$19

READER SERVICE NO. 735



PARSONS TECHNOLOGY'S Personal Tax Edge program will get the job done, but slowly—the interface is tedious.

Financial, and Intuit all charge about \$10 to do this.

The main advantage of the \$19 Personal Tax Edge is that it's the least expensive program of the bunch. I used a beta version of the program, which offers a slick multimedia guide, and lets you play "what if" with next year's taxes. The downside: Personal Tax Edge is the least friendly. Filling out the return is incredibly tedious, since the software forces you to click the Next button with every line and check box. Also, the program assumes you are familiar with IRS-speak.

Expected to sell for \$30 to

TurboTax Deluxe

PRO: The most intuitive and easy to follow of the three.

CON: Importing process not perfect.

VALUE: For now, the best on the market.

Intuit

800/446-8848

<http://www.intuit.com/turbotax>

Street price: \$50



TURBOTAX IS MAX: Intuit's TurboTax Deluxe costs more but is easiest to use. Video clips answer common questions.

\$40, Kiplinger's Deluxe Multimedia version of TaxCut, which I looked at in shipping form, is much easier to use. (Kiplinger also offers a basic version for \$20.) The program provides more than 2 hours of video with Kiplinger experts offering tax-saving tips. Unlike last year's version, TaxCut now lets you fill out a 1040PC, an IRS-approved form that cuts back on paperwork. (Parsons and Intuit also offer this capability in their programs.) TaxCut is a breeze if your tax situation is typical—that

is, if you're not self-employed.

If you are, TaxCut quickly becomes confusing. The program made me plow through several pointless questions. In a number of instances I was unsure whether questions applied to me.

If you have an unusual tax situation or want to make sure you've got the best, then choose Intuit's TurboTax. It comes in a \$35 basic version and a \$50 deluxe version; we reviewed a shipping copy of TurboTax Deluxe. It's the easiest to use. The top-notch interface is improved from last year's. The program is easy to follow, thanks to intuitive controls and quality multimedia. TurboTax Deluxe guided me

through the forms more clearly than the other two programs, asking questions at the right times and explaining the issues clearly.

Inexplicably, though, while the program was able to automatically import most of my data from last year's version of TurboTax, it missed some fields such as spouse's name and social security number. (It did prompt me for that information.) Still, this is only a minor glitch in an otherwise strong program.

—Shane Mooney ►

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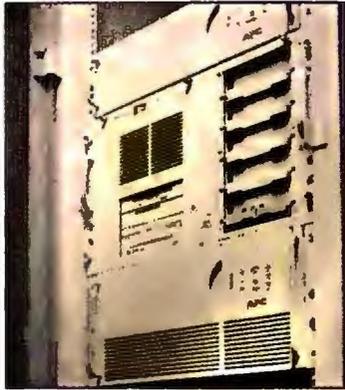
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November 19, 1996
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*source: InfoWorld 1996



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Circle 45 on reader service card



Corex's Smart but Not Perfect Card Scanner

SCANNING

I HATE BUSINESS CARDS. I receive about a dozen each week, and they pile up on my desk. I could type the information into a contacts database, but who has the time? When I tested Corex Technologies' CardScan Plus 300 card scanner, I was pleasantly surprised by its speed and accuracy.

Corex CardScan Plus 300

PRO: Fairly accurate, fast, and easy to use.

CON: Requires some corrections, somewhat expensive.

VALUE: Not bad, but not cheap.

Corex Technologies Corp.

800/942-6739

<http://www.cardscan.com/>

List price: \$299

READER SERVICE NO. 736



BUSINESS CARD BONANZA: Corex's CardScan Plus 300 scans cards and saves contact information in a flexible database program.

The product includes a small 6-by-6-inch scanner that plugs into a PC's parallel port, and slick Rolodex-like software for Windows 3.x or 95. While

you run a pile of cards through the scanner, the software waits to process the scans. Processing takes about 10 to 15 seconds per card. You

then have to review each card on screen and make any corrections. Accuracy was surprisingly good, based on the 20 or so cards I scanned. Most of the time, CardScan located the person's name, title, company, and even e-mail address on the card and put the information into the right fields. Most scans needed minor corrections: Phone numbers were usually accurate, but e-mail addresses often needed repairs. Fortunately, most fixes took only a few seconds.

CardScan also has fast free-form searches, data exporting tools, and lots of print options. At \$299, it's expensive for a one-trick scanner, but worth the price for the time you'll save. (For \$99, you can buy the software and use it with TWAIN-compliant scanners.)

—Tracey Capen

Pagis Pro 97: A Scanning Secret Weapon

SCANNING

XEROX CORP.'S solid Pagis Pro 97 package can make life easier for people who do lots of scanning. Street-priced at \$169, this program combines

document scanning, storage, and retrieval features with built-in optical character recognition software (TextBridge Pro 96, a \$100 value). Pagis Pro is a Windows 95/NT

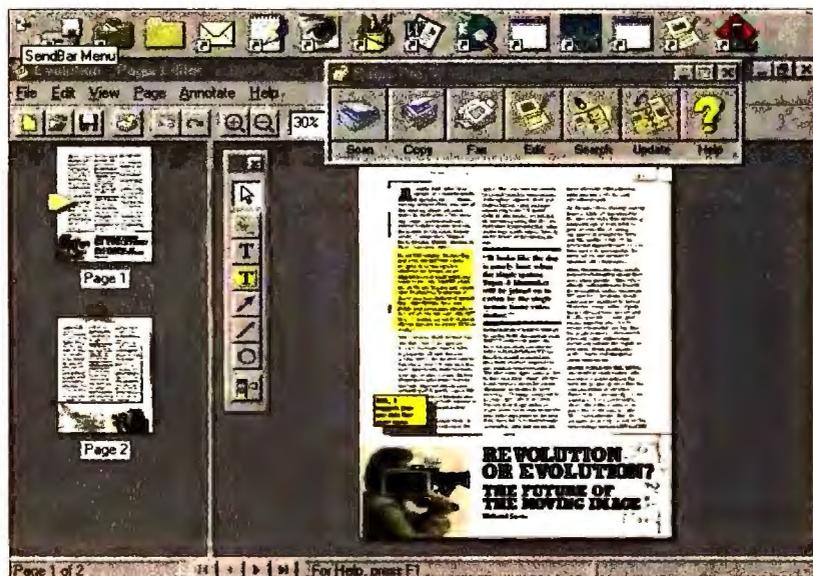
product that works with popular color scanners.

I examined a beta version of Pagis Pro and found several unique features. Pagis Pro adds floating toolbars directly to the Windows 95/NT desktop, so you're never more than one click away from the program's main features, including scan, copy, fax, edit, search, and update. You can also view thumbnails of scanned documents through Windows Explorer or desktop folders.

Pagis Pro's biggest crowd pleaser will be its automatic scanning features. It distinguishes pictures from text on a color document and scans each element individually,

then stores the entire page as a single document. With other scanning programs you have to select text and pictures manually, then perform separate scans for sharp text and high-quality color graphics. The automatic scanning features make Pagis Pro invaluable if you often scan color documents such as brochures or magazine pages.

—Richard Jantz



FOR FASTER COLOR SCANS, Xerox's Pagis Pro 97 automatically separates text from color pictures in one operation.

Pagis Pro 97

PRO: Easy to use, great for color document scanning, low price.

CON: OCR program lacks wizards.

VALUE: Clear winner if you do lots of color scanning.

Xerox Corp.

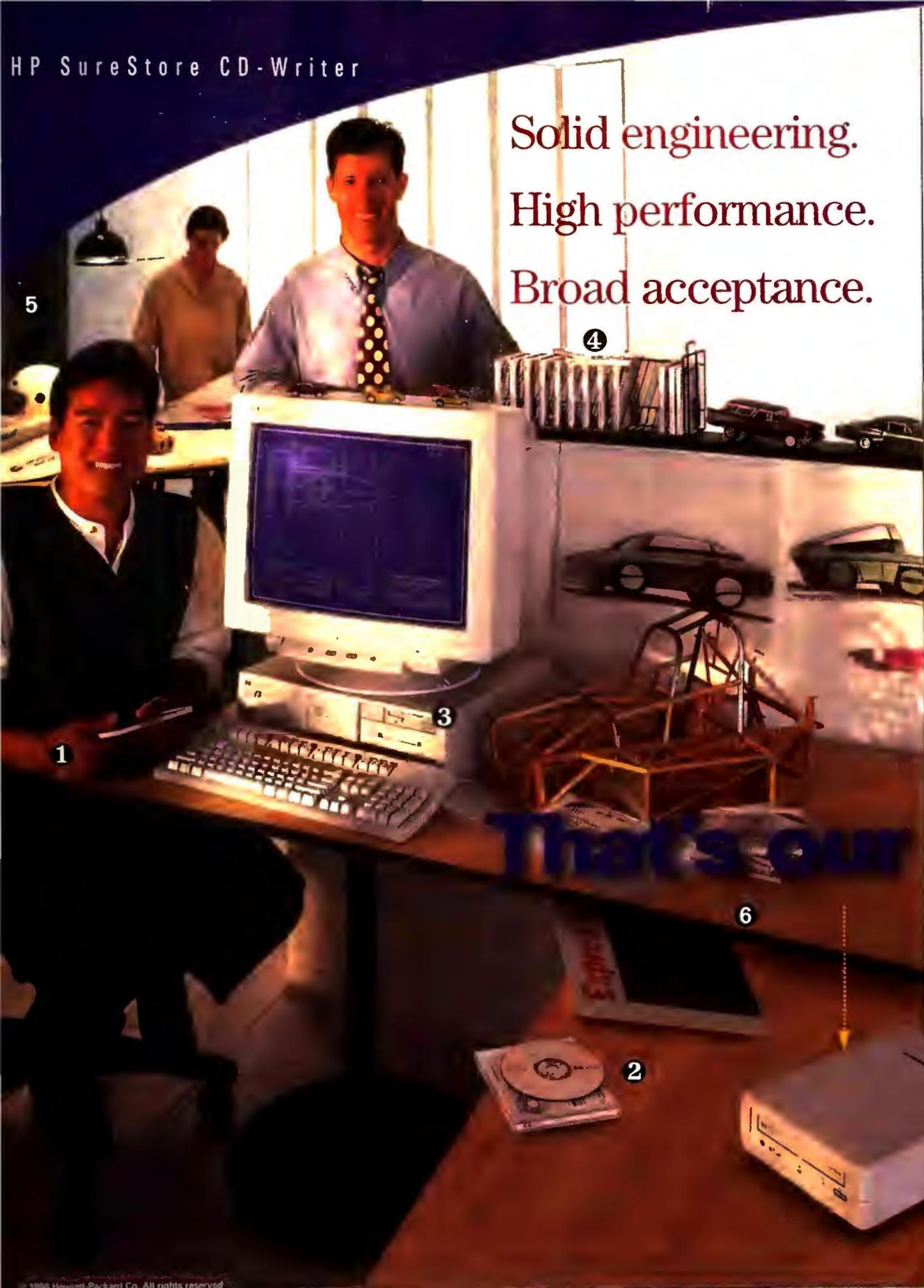
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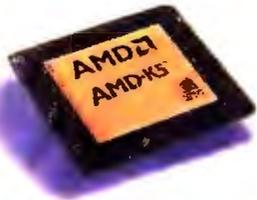
The robust software suite included with the CD-Writer lets you ③ copy all your drafts to CD

quickly and easily. And files stored on CD can be retrieved in seconds. It's ideal for ④ creating permanent archives of your files. What's more, CD-Writer can ⑤ make custom audio CDs that can be played on stereo CD players at home or in the car. CD-Writer is also a 6X* CD reader so it can ⑥ play all your CD-ROMs smoothly. Now we're cruisin'.

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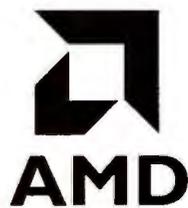
*Actual speed may vary according to application used



With the AMD-K5™-PR133 processor,

CyberMax provides its customers a

viable alternative: the freedom to choose a Microsoft® Windows® & Pentium-compatible processor solution that offers superior value. The AMD-K5-PR133 processor delivers equivalent performance of a 133-MHz Pentium (chart below), making it the *best performance value* for today's desktop PC users.

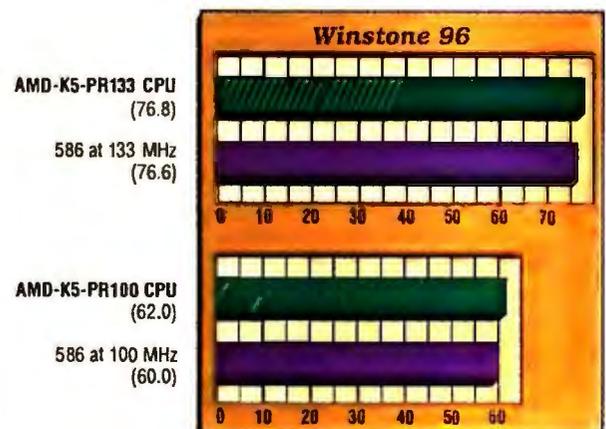


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The P-Rating of an AMD-K5 processor is determined in an "apples to apples" system-level comparison. PC system manufacturers utilize this methodology, for consistent/objective rates on Pentium-relative performance for Windows applications. And the P-Rating helps end users understand true processor performance equivalences while making their PC buying decisions. For example, if an AMD-K5 processor offers the equivalent performance of a 100-MHz Pentium, it receives a P-Rating of "PR100".



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New Looks for CompuServe and Prodigy

ONLINE

EVER SINCE THE World Wide Web became a household name, CompuServe and Prodigy have steadily been losing customers. The reasons? Poor e-mail handling, sluggish Web access, and inscrutable interfaces. New revisions to both of the online services target these three issues.

YOU WINCIM, YOU LOSE SOME

CompuServe WinCIM 3.0.1 is the first WinCIM with a worthwhile set of e-mail features. It's easy to set up folders and move messages into them—though you still can't drag and drop. You can sort messages by clicking on category headings. And you can defer send-

CompuServe WinCIM 3.0.1

PRO: Excellent offline data and e-mail management.

CON: No flat-rate pricing.

VALUE: Now more accessible.

CompuServe

800/487-9197

<http://www.compuserve.com/>

Pricing: Basic membership \$9.95 for 5 hours per month, \$2.95 per hour thereafter; value membership \$24.95 for 20 hours per month, \$1.95 per hour thereafter

READER SERVICE NO. 739

Prodigy Internet

PRO: Personalized Internet access.

CON: Can be slow.

VALUE: You'll like the bonuses.

Prodigy

800/776-3449

<http://www.prodigy.com/>

Pricing: Basic membership \$9.95 for 10 hours per month, \$2.50 per hour thereafter; unlimited access \$19.95 per month.

READER SERVICE NO. 740



COMPUSERVE OVER EASY: WinCIM 3.0.1 manages data offline better than the previous version and has an improved interface.

ing e-mail or forum messages by adding them to a to-do list.

You can now search your CompuServe offline filing cabinets quickly, thanks to a tabbed hierarchical interface. CompuServe's content in technical forums, business databases, and pay-per-view information still outclasses other online services. Web browsing is integrated with Microsoft Internet Explorer.

The beta version I tested was slow, and I had problems setting up the Winsock and dial-up networking. Hopefully, this will be fixed in the final version. Overall, this WinCIM is worth the money.

THE WEB PRODIGY

Prodigy Internet, an all-Web service, severs ties with the structure of Prodigy as we knew it. (That's now called Prodigy Classic.) Prodigy Internet uses Netscape Navigator or Microsoft Explorer to navigate an entirely Web-based service. Prodigy Internet's flat monthly fee is a good deal because of bonuses such

as Prodigy-only Web sites and a personalized home page with news headlines, stock tickers, and local weather. A Prodigy toolbar lets you check out newsgroups, Internet Relay Chat, or Prodigy's Related Content feature. Just don't try connecting at less than 28.8 kbps.

Unlike Prodigy Classic, Prodigy Internet limits you to one member and e-mail box per account. By the time you read this, Prodigy will be providing space for personal Web sites.

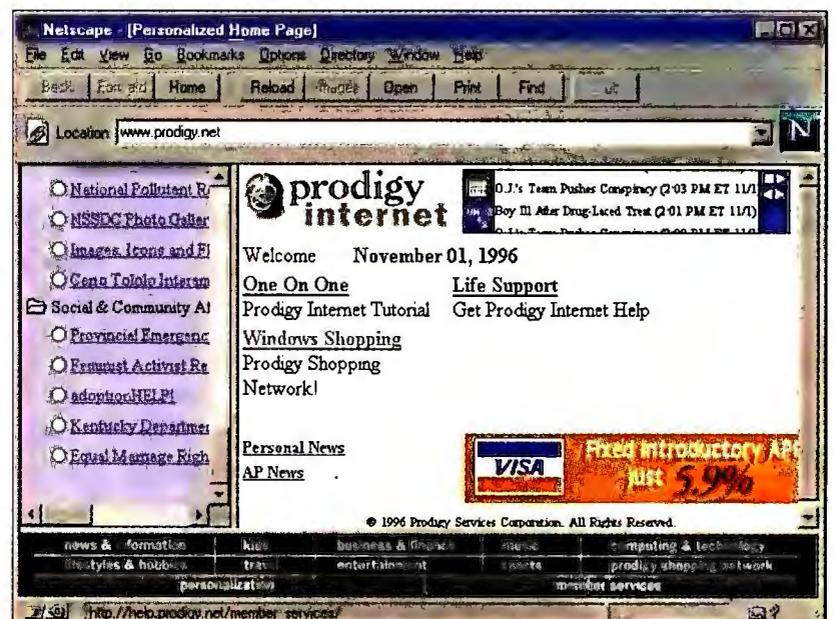
After Dark Goes Online

Berkeley Systems' **After Dark 4.0**, a Generation X medley of funky screen savers, features more than 20 new designs, including dancing hula twins with attitude. List priced at \$30, After Dark also lets you use Web sites such as Sports Illustrated Online and The Wall Street Journal as screen savers. The program can download content from these sites regularly. But since the product is always linked to the Web, you may inadvertently click part of the screen that fires up your browser when you just want to wake up your PC. News delivery is new to After Dark, but AOL, Yahoo News Ticker, and PointCast Network (which is free) offer comparable features. Berkeley Systems, 510/540-5535, <http://www.berksys.com>.

READER SERVICE NO. 738

Like CompuServe, Prodigy clearly beats America Online in e-mail management. If you want affordable access to the Web, Net e-mail, Internet Relay Chat, and Usenet news groups, Prodigy's service rivals that of national Internet access providers.

—Matt Lake



PRODIGY INTERNET: The new Prodigy is easy on the eyes, competitively priced, and full of daily personalized information.

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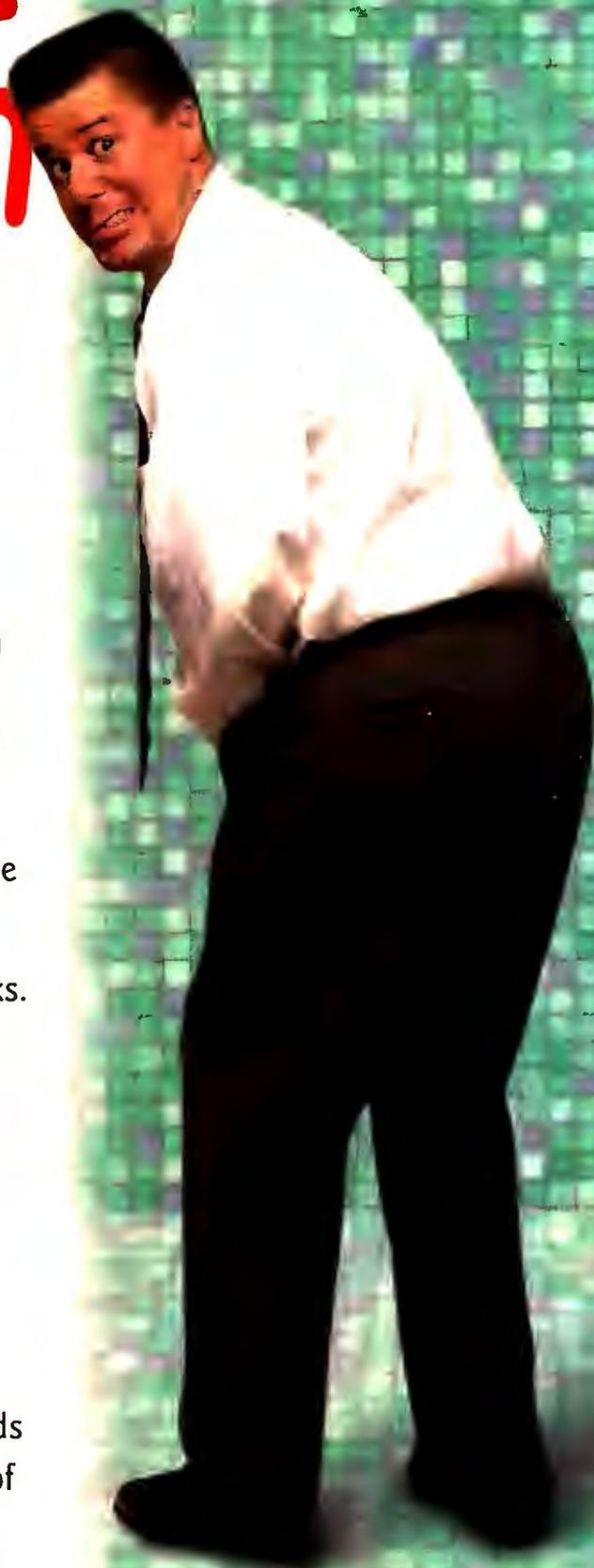
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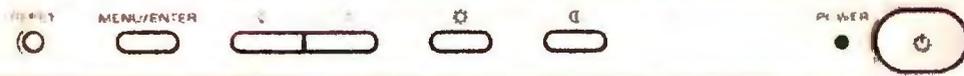
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Trinitron

Multiscan 200sx



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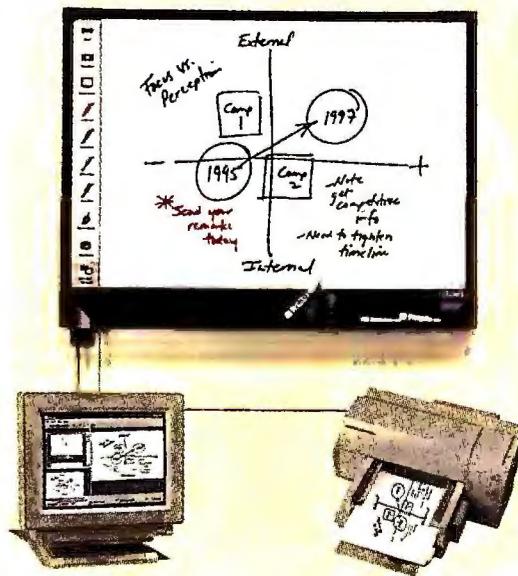
SONY

Take Meeting Notes the Easy Way

WHITEBOARD

ELECTRONIC whiteboards are the Etch-A-Sketches of the business world. Write on them with a marker and your text or drawings appear on your computer screen, where they can be saved or printed out. While useful for catching workgroup meeting notes, these devices have traditionally cost \$2000 or more.

So when MicroTouch Systems said it had one for \$500, I was skeptical. But after trying



THE AFFORDABLE IBID whiteboard does well at saving group work in meetings.

it out I have to say that MicroTouch's **Ibid** board—with a 2-by-3-foot writing surface—does a good job at a fraction of the cost. **Ibid** can capture multicolor drawings and text, save information in system memory, and incorporate those meeting notes into most Windows-based applications,

such as presentations and e-mail.

Setup was a snap. I connected the serial cord from the whiteboard to my notebook system, and the install routine found an available port. However, there are potential problems, because some notebook PCs have serial ports pre-assigned for communications purposes. Before you buy **Ibid**, ask your

notebook PC vendor if the serial port can be used for jobs other than communications.

Ibid's Windows 95 software lets you save the captured images in bit-mapped or Windows Metafile format for exporting. You can print out the results on your monochrome or color printer. To

Tsk, Tsk, Task, Task

A personal information manager is like a fresh cup of coffee—there's always room for another one. Especially if it can organize the tasks that make up your so-called working life. The **2do Intelligent Task Manager** concentrates on your job list more than your contacts, although it can handle both. You'll appreciate the way the software assigns dependent tasks, which helps you outline bigger projects. But Starfish Software's **Sidekick** program is more intuitive, and Microsoft's **Schedule+** is better integrated with other applications. List price is \$39. Arial Software, 503/646-4515, <http://www.arialsoftware.com>.

READER SERVICE NO. 742

indicate colors (red, green, black, or blue), just press icon buttons that sit along the board's left side. You also can take "snapshots" of work, then drag and drop the shots into Windows apps.

—Michael S. Lasky

Ibid

PRO: Captures workgroup meeting notes in digital format.

CON: Doesn't work with some notebook computers.

VALUE: Low cost and ease of use make this a bargain.

MicroTouch Systems, Inc.

800/642-7686

<http://www.microtouch.com>

Street price: \$500

READER SERVICE NO. 741

Intuit QuickBooks Pro 5.0: Easy Accounting

ACCOUNTING

INTUIT'S NEW **QuickBooks Pro 5.0 for Windows** accounting software is elegant and easy to use, based on the beta version I reviewed. Most features are just a mouse-click away, thanks to the new **QuickBooks Navigator** and menu buttons that appear on every list. An easy-to-use layout designer lets you customize your invoices, purchase orders, and other forms. **QuickBooks** now offers the **EasySteps** feature, which leads you step by step through major setup functions. The

program then provides you with a pictorial flowchart that illustrates daily tasks.

Past versions of **QuickBooks** required you to choose one style of invoice for all your customers, but 5.0 lets you assign a different style to every type of customer and even use color logos. In addition, **QuickBooks Pro** lets you use long file names. The program also supplies lots of help during setup: Industry-specific documentation is available for many types of businesses, from construction to writing.

If you work with an outside CPA who uses **QuickBooks**, you will value the Accountant's Review feature: The CPA can copy your data files, work with them, then merge any changes back into your files. **QuickBooks Pro 5.0** also includes online banking and bill-paying, which saves time once it's set up.

QuickBooks Pro 5.0 is especially good for service-based businesses because it allows progress billing and job costing. Current **QuickBooks** users should be pleased with

the program's face-lift. If you're still using spreadsheets or personal finance packages to keep your company books, you've now got good reason to make the switch to a business-oriented program.

—Theresa W. Carey

QuickBooks Pro 5.0 for Windows

PRO: Easy to use and customize.

CON: Occupies more than 40MB of hard disk space.

VALUE: Excellent revamp of best-selling accounting package.

Intuit

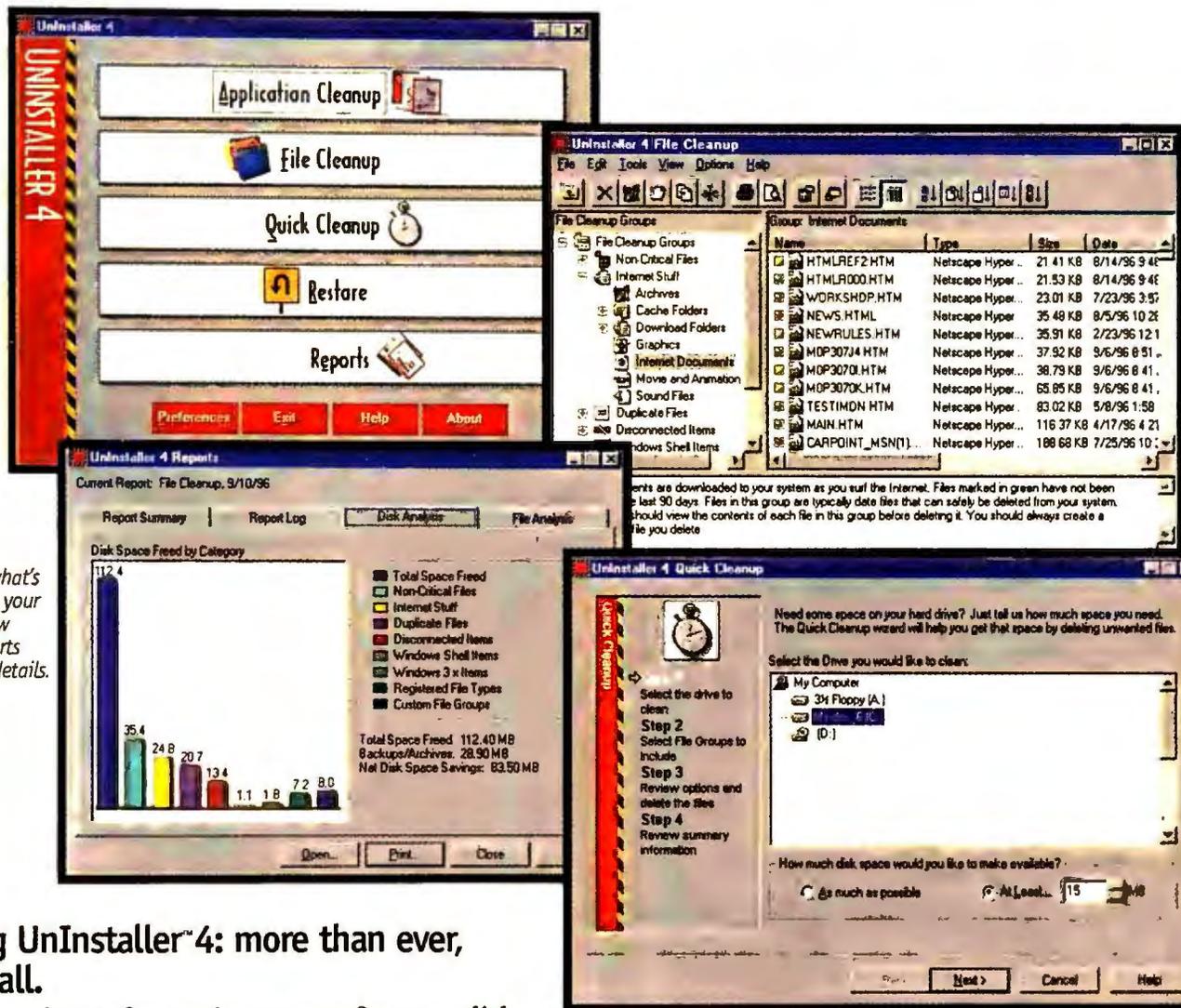
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MicroHelp

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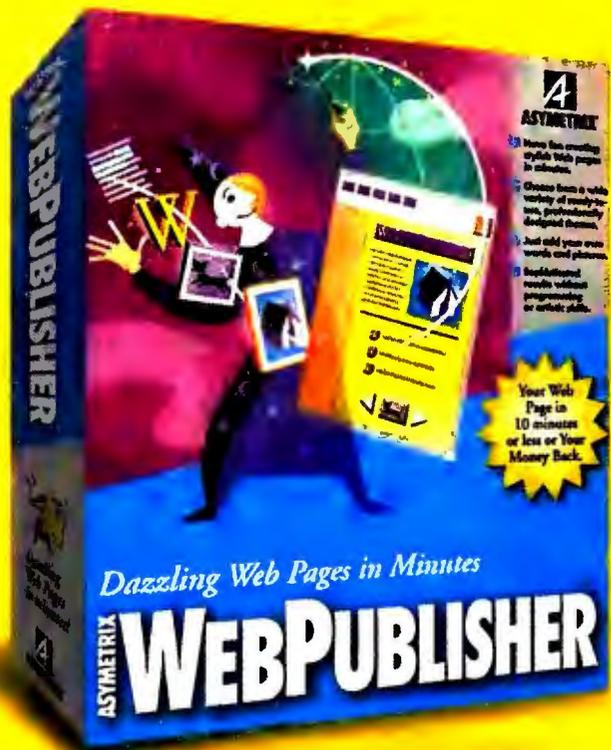
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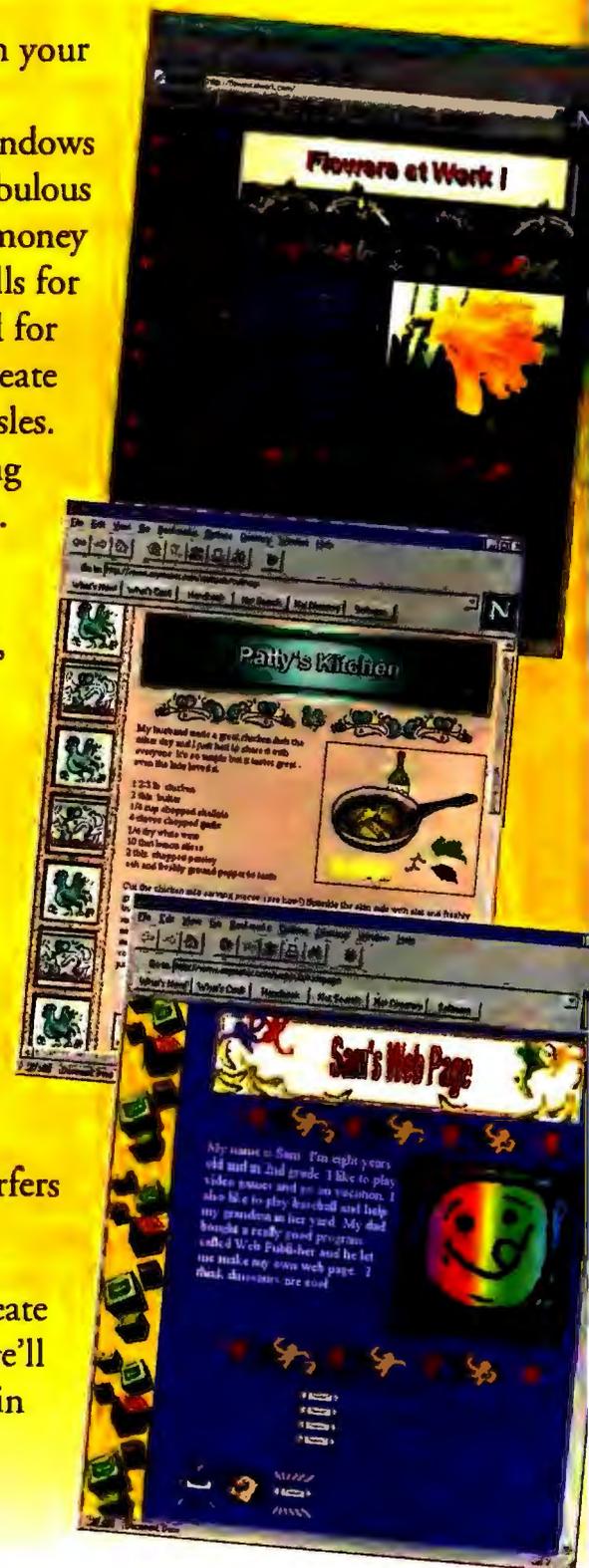
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PEP Rallies: Add Multimedia to Your Work

PUBLISHING

WRITING USED TO BE such a simple affair. Then the Internet came along. These days, some people think an online document is hardly worth reading if it isn't shot through with video clips and hyperlinks to other content. That's why you may need PEP Multimedia's applications alongside your favorite word processor. I was pleased with what I found in a shipping copy.

Resembling a desktop publisher more than a multimedia authoring tool, PEP Composer helps you stitch together different elements with hyperlinks, pop-up windows, and page jumps. PEP can import graphic elements or produce text with its built-in word processor. Each page, or screen, of the document is organized as an outline.

PEP supports several graphics formats, including .gif, .jpg, .pcx, and .wmf. However, video files are limited to .avi format, and audio is limited to .wav files and MIDI—no QuickTime.

Creating links is simple: Select text or an object on screen, then create a hyperlink that propels the reader to another

topic. PEP's text tools outshine its page layout tools. You can create paragraph styles, for example, but you can't drag a picture to a specific location, then wrap text around it.

PEP projects can be saved as HTML files for the Internet or packaged as self-running executable files, which you can send separately with the free PEP Viewer. The HTML option is the most compelling,

but the result isn't as elegant as what you can get with a true-blue HTML editor. Internet gurus will need a more powerful tool.

But for simpler uses, from business training to home creativity projects, PEP can move you beyond print to interactive documents. And with a list price of \$99.95, it's quite affordable.

—Peter Scisco

Artful Documents on a Budget

PUBLISHING

IF YOU HAVE Madison Avenue dreams but a Kinko's budget, give some serious thought to **Corel Print & Photo House**. This two-program bundle provides quick assistance and the right tools for creating all kinds of personal and business publications.

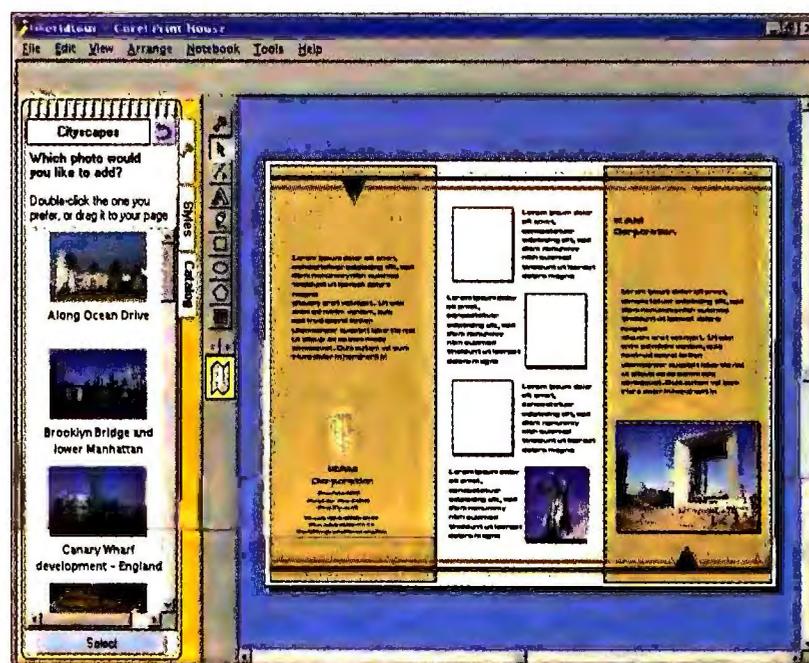
Although published on a single CD-ROM, the programs aren't linked extensively. You can launch Photo House from

within Print House when you need to edit photos. Both programs use an intuitive, effective notebook-style tool palette. You can select from the many image libraries, fonts, and canned text by simply selecting a tab from the notebook, then dragging the needed object to the work space.

Serious graphic artists who need to do precise image editing will need a more powerful product, such as Corel Draw.

—Peter Scisco

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



CAVIAR WISHES AND ARTFUL DREAMS: Give your documents an expensive look when you create them with Corel Print & Photo House.

Lexmark's Photo Pro

The new **Lexmark 2030** is the latest color ink jet to offer optional photorealistic waterproof inks designed for printing pictures. This 600-by-300 dpi home printer isn't speedy—3 pages per minute for text, less than 1 ppm for color—but it *is* convenient. The black and color cartridges sit in the printer at the same time, so you don't have to swap cartridges in and out, as with some competitors in this price range. Expected to sell for \$199, the Lexmark 2030 comes with particularly helpful driver software that warns you when you're low on ink; a 24-hour replacement warranty; and the Lexmark Workshop CD-ROM for home-oriented projects. Some retail stores are bundling this printer with a free parallel cable, which usually costs an extra \$20. Lexmark, 800/358-5835, <http://www.lexmark.com>.

READER SERVICE NO. 747

But if you're doing typical work, Print & Photo House fits the bill. This graphics toolbox is particularly good for beginners, with lots of automation and wizards.

Corel Print & Photo House

PRO: Inexpensive and powerful features you can really use.

CON: No morphing tools.

VALUE: A large collection of graphics and photos at a small price.

Corel Corp.

800/455-3169, 613/728-0826

<http://www.corel.com>

Street price: \$69

READER SERVICE NO. 748

PEP Multimedia

PRO: Quickly creates hyperlinked electronic documents.

CON: Layout tools don't permit sophisticated designs.

VALUE: Good for simple presentations.

Group 32 Corp.

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[*DICTIONARY OF THE FUTURE, PAGE 531*]

lost (lôst) *adj.* [archaic]
1. unable to locate one's position, as in, "Help. I am lost."
2. having no sense of direction at all
n.b. became obsolete in 1996 with the introduction of Street Atlas USA 4.0 and Tripmate.



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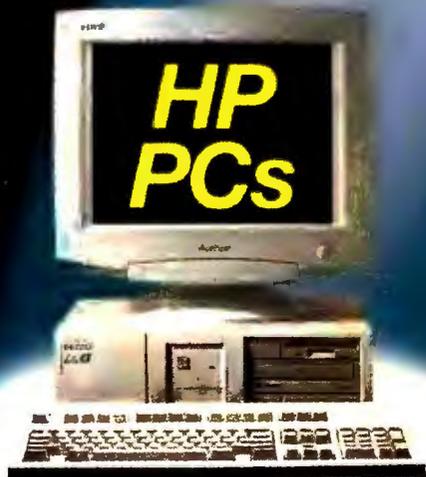


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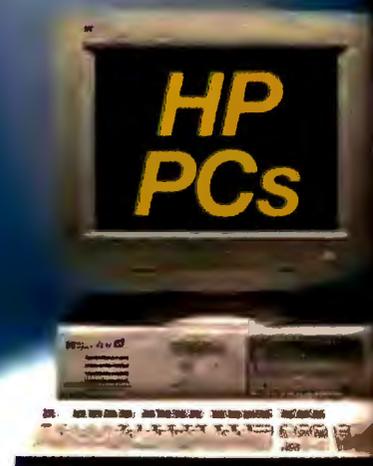
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- Free three-year limited warranty for parts and labor¹

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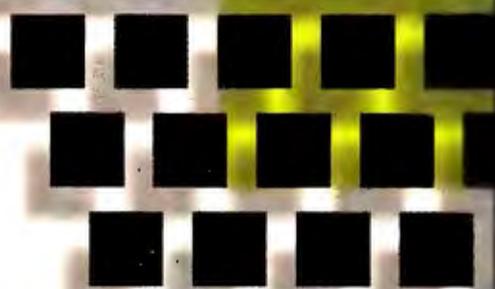


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M I C R O S O F T O F F I C E

WHAT'S NEW

FOR

More applications, improved interfaces, Web integration, smarter help—Microsoft

97

Office 97 is bursting with new features.

Here's what to expect.

WHAT IF Microsoft Office were a *real* office? If you worked there you would see perpetual expansion and renovation, with new equipment, fancier fixtures, and fresh coats of paint. But would all these snazzy additions really help you get your work done any faster?

That's not so different from the issues Office users must ponder every time Microsoft revises its business-application software suite. Fifteen months after the release of Office 95, the company is rolling out Office 97, a Windows 95 product it hopes will be an irresistible upgrade for current Office users, as well as a lure for users of

Lotus's SmartSuite and Corel's WordPerfect Suite.

Is Office 97 worth the time and money—prices start at

\$209 for a competitive upgrade to the Standard Edition, almost \$500 for new users—or are its many new features just fluff? We asked a group of longtime software-suite mavens to spend a few weeks working with a nearly final prerelease version. For the most part, they liked what they saw—Office 97 really is full of useful new stuff, more so than Office 95, which was itself a *PC World* Best Buy.

In fact, Office 97 introduces so many features that it's tough to say which are the most important.

EDITED BY HARRY MCCRACKEN Your perspective will vary ►

depending on whether you're, say, a neophyte who bangs out memos in Word or a database devotee who pushes Access to its limits. But four major areas of change stand out:

Basic improvements to Word and Excel. Office's word processor and spreadsheet, already tops in their respective categories, have undergone their most substantial revisions since Windows 3.1 days. Office 97's versions boast better formatting tools and extra automation of common tasks.

Great built-in Web tools, finally. Office 95 supported Internet and intranet features only through a series of clumsy add-ons. Office 97, by contrast, is more conversant with the Web than even Corel's impressively Net-savvy WordPerfect Suite. It's got wizards for creating HTML documents, options for shuttling files to a Web server, and many other features. Not surprisingly, Office 97 comes with Microsoft's Internet Explorer Web browser; it ships with version 3.0, with a free upgrade to the new version when it's available.

Introducing Outlook. Office 95's Schedule+ personal information manager has undergone a complete metamorphosis. Under the new name of Outlook, it's become a more important member of the

suite, adding built-in e-mail and collaborative features, as well as more integration with Office's other applications.

Help gets animated. The Office Assistant is a radically different help system, with cartoon characters who monitor what you're doing, offer tips and instructions, and mug shamelessly. Microsoft says that the Assistant got overwhelmingly positive response from the people who served as testers during Office 97's development. Our authors had mixed reactions, ranging from guarded approval to sheer revulsion.

Those are the suite's biggest changes, but there's more. Camcorder, for instance, is a handy new animated screen capture utility that's similar to SmartSuite's ScreenCam. And the Office 97 Professional upgrade even comes with IntelliMouse, a unique new pointing device (see *Home Office* in this issue).

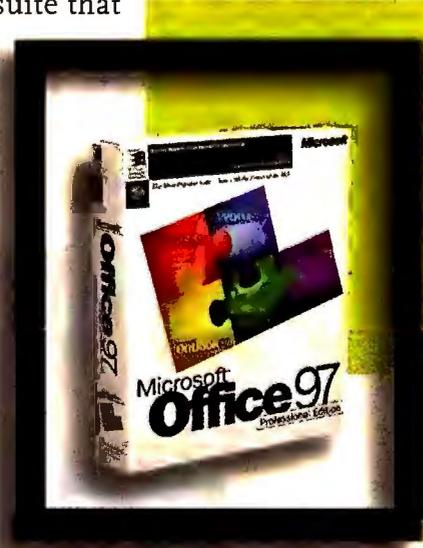
Office Versus the Competition

GIVEN THAT OFFICE 97 looks to be the best version yet of the suite that already has the lion's share of the market, does it spell curtains for Microsoft's competitors? Not necessar-

ily. Corel's WordPerfect Suite 7 remains an attractive suite for cost-conscious buyers. Although overall it's not as strong as Office, it's still a large, mostly pleasing collection of software at a terrific price: \$99 for a competitive upgrade from a wide variety of applications, or \$269 for the full package. Corel Office Pro, a \$499 high-end version, adds even more applications, including the Paradox database, a project manager, and more. Our main beefs about Corel's suite are its so-so speed and integration; the company says it will address both issues in an upgrade that's due in March.

Lotus's SmartSuite 95 has suffered in our recent reviews—its 1-2-3 spreadsheet is an aging, 16-bit program, and its Word Pro word processor is sluggish. But at roughly the same time that Office 97 hits store shelves, Lotus plans to release SmartSuite 97, with a true Win 95 version of 1-2-3 and, Lotus says, a speedier Word Pro. Look for our review next month.

We named both Microsoft Office 95 and WordPerfect Suite 7 as Best Buys in our September 1996 software suite review, "Corel Takes on Microsoft and Lotus." Although we certainly give Office 97 a tentative thumbs-up, we will not revise our Best Buys until we have verified that everything we liked in



the prerelease version makes it into the finished product.

We also need to test the suite's performance using a variety of PC configurations. Using the prerelease software, our authors found that Office 97's speed seemed similar to that of Office 95 for the most part, with the possible exception of Excel, which felt a bit slower. Bear in mind that prerelease software often performs differently than the final product. By the time you read this, the PC World Test Center will have performed extensive speed tests on the major Office 97 applications; visit PC World Online to learn what we found. Microsoft 800/426-9400, <http://www.microsoft.com>

READER SERVICE NO. 802

A CHOICE OF OFFICES

STARTING WITH OFFICE 97, the Standard and Pro editions are joined by two new versions, one for small businesses and one for developers who build custom Office apps. You can buy your software à la carte, too: Full versions of Word, Excel, Outlook, PowerPoint, and Access are \$339 each; upgrades are \$85 for Word and \$109 for the others.

Office 97 version	Includes	Pricing ¹
Standard Edition	Word, Excel, Outlook, PowerPoint, Camcorder, Internet Explorer	competitive upgrade \$209, full version \$499
Small Business Edition	Word, Excel, Outlook, Publisher, AutoMap Streets Plus, Small Business Financial Manager for Excel, Internet Explorer	competitive upgrade \$209, full version \$499
Professional Edition	Same as Standard Edition, plus Access and Bookshelf CD-ROM. Upgrade version also includes IntelliMouse pointing device	competitive upgrade \$309, full version \$599
Developer Edition	Same as Professional Edition, plus additional developers' tools, ActiveX controls, code samples, and programming documentation	competitive upgrade \$499, full version \$799

¹ Does not reflect \$40 rebate for upgrade versions.

WORD 97

More Help, Better Layouts, and the Web, Too

W

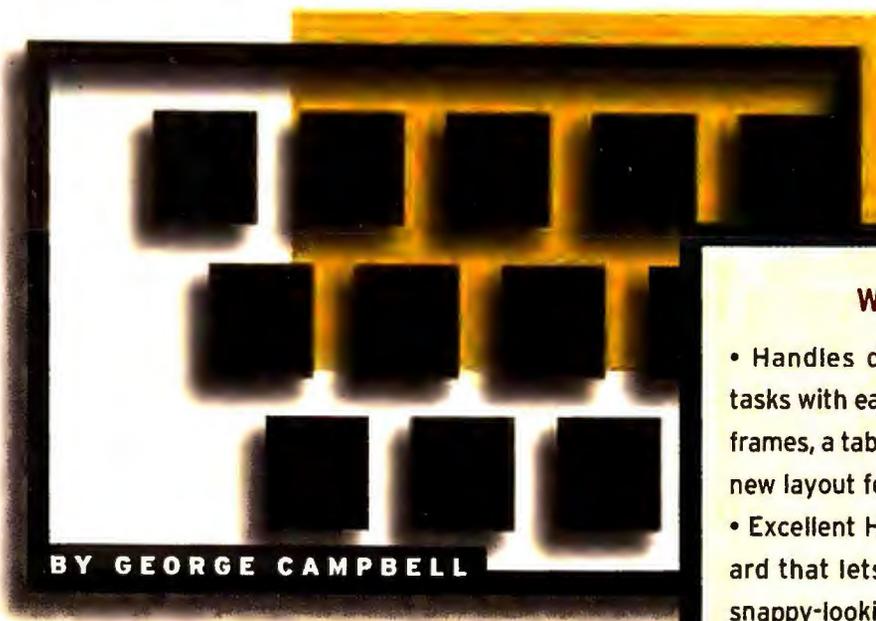
ORD 95 (aka Word 7.0) was the best of the first-generation Windows 95 word processors, but it really didn't do much more than give a Win 95 look to the tried-and-true features of Word 6.0. Word 97 does a lot more than that, introducing additional as-you-work automation and much-improved formatting and Web tools. Overall, the changes are more than enough reason to upgrade, but a

few may send you to the Tools•Options menu to shut them down if you find them more distracting than helpful. It depends in great part on the degree of hand-holding and automation you expect from your word processor.

Word Wants to Help

ONE OF THE MOST STRIKING changes in Word 97 is the way it attempts to be a full-fledged writing coach. Word 95 monitored your input as you typed, flagging misspelled words and automatically correcting some common errors. Word 97 adds some subtle but helpful refinements: For instance, besides instantly correcting single-word typos, such as "thier" for "their," it can fix common multiple-word errors, changing "int he" to "in the."

Other common tasks get similar treatment. Most notably, if Word thinks you've committed a grammatical gaffe, it marks



the offending sentence immediately with a wavy green underline. You right-click the mouse button to see Word's proposed corrections. It's a great idea, but it misses as many errors as it catches, and its advice isn't always on the mark. For example, when I typed, "There are to many decisions too make two decide today," Word flagged the sentence as incorrect, but suggested that I had left out the word "that."

Word also tries to guess which wizards you might need, based on what you type. If you enter, say, "Dear John," Word asks if you want to use its Letter Wizard, which inserts dates and addresses, and automates design. Beginners may like this, but it's a bit redundant if you already know that this wizard is available from the File•New command. Still, Word's already outstanding wizards have been improved further. The Fax Wizard, for example, now takes you through the entire process, from choosing a cover page to sending the fax.

Word 97's new layout and graphics features let you easily create documents that would have required a desktop-publishing package in the past. The unique new table-drawing tool is dynamite: Instead of using menu commands, you simply use the mouse to sketch out a table with any column-and-row layout, right where you want it on the page. Vertical centering of text, easy text rotation, and

vertical merging of cells are also long-needed enhancements. WordPerfect, however, offers more formula functions for adding spreadsheet-style calculations to your tables.

Word has always done a respectable job with frames, but Word 97 really aces its competitors

WHAT'S HOT

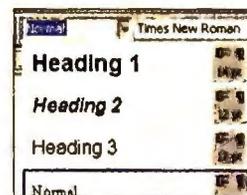
- Handles desktop publishing-like tasks with ease, thanks to flexible text frames, a table-drawing tool, and other new layout features.
- Excellent HTML tools include a wizard that lets even beginners create snappy-looking Web pages.

WHAT'S NOT

- Interactive grammar checker is no substitute for real writing skills.
- Creating a watermark on a page is still much easier in WordPerfect.

with its new Text Boxes, which can hold anything from graphics to tables. Like a desktop publishing program, Word can automatically link and flow text across multiple text boxes, making tough projects like newsletters simple.

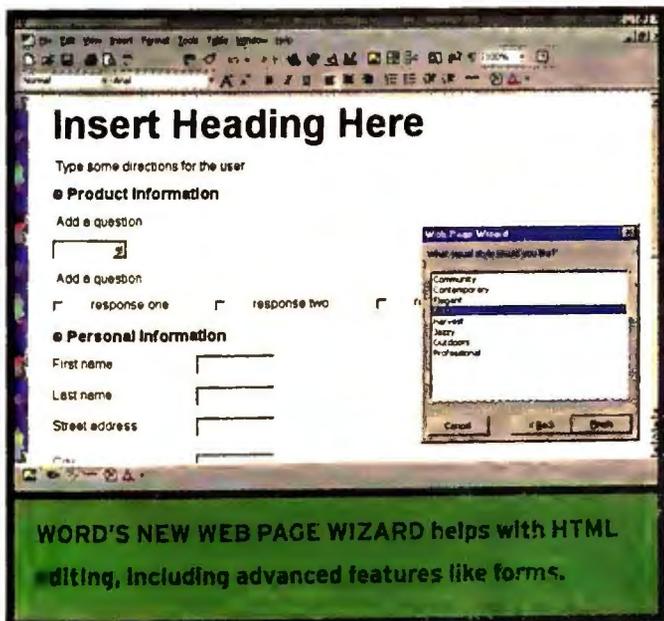
The Style list in Word 97's Command Bar shows you what to expect by previewing the font, style, and size that will be used when you apply a style to a block of text. Too bad that the font list does not work this way.



Other new formatting goodies, including embossed and shaded text—and even on-screen text animation tricks such as shimmering and sparkling—can punch up your documents if used sparingly.

Word's Web Magic

UNTIL NOW, Corel's WordPerfect 7 has set the standard for World Wide Web features in a word processor, but Word 97's HTML tools easily surpass those in WordPerfect. Starting from scratch or using the Web Page Wizard, which makes Web design approachable even for a beginner, you can use Word to create home



pages or entire sites, complete with ActiveX controls and interactive forms. The new Online Layout view gives you a sense of how pages will look without having to launch a browser. Word 97's File•Open and File•Save dialog boxes let you open and save documents on a Web server as easily as on your own hard disk (other Office applications do the same).

Advanced Features

A COUPLE OF new tools in Word 97 greatly simplify working with long documents. The Document Map view creates a list of your document's major divisions and topics on the left side of the window; click an item and Word jumps to that section. The AutoSummarize option creates a quick executive summary at the beginning of the document or in a separate file. If you use heading styles, Word's summaries work surprisingly well, although they'll almost always need some editing before distribution.

Word still doesn't match Word Pro's extensive workgroup options, but new features help you manage collaborative work. Multiple versions of a document can now be stored in a single file, making it easier to revert to an earlier version. When you hover the mouse pointer over revised text, the editor, date, and time of the change is displayed via a pop-up box similar to a ToolTip. However, unless everybody in your organization upgrades to Office 97 at once, be prepared for file-format hassles: Word 97 uses a new file format that's not compatible with prior versions, as do the other Office 97 apps. You can save files in the old formats, but you'll lose some of the new features.

Anyone who uses Office's programmability to customize the suite will be happy that Word 97 finally joins Excel and Access in using Visual Basic for Applications as its macro language. There's also an excellent converter for old macros.

The Bottom Line

JUDGING FROM the prerelease version, Word 97 is a terrific upgrade for most current users. Even if you end up shutting off some features—I turned off the interactive grammar checking—you'll wind up with a substantially better version of Word than any that's preceded it.

EXCEL 97

The Best Spreadsheet Gets Better

MICROSOFT EXCEL just keeps rolling along. It's already the best Windows spreadsheet, and has undergone an impressive upgrade with glitzy new gadgets as well as refinements to fundamental

WHAT'S HOT

- Much-improved formatting tools let you tackle complex page layouts.
- Workgroup enhancements allow groups to collaborate on spreadsheets and keep everything organized.
- Web connectivity gives Netheads a host of new toys to be creative with.

WHAT'S NOT

- Excel needs a scenario manager as good as 1-2-3's for what-if modeling.
- You still can't use all statistical functions freely in a pivot table.

tools. While it offers no blockbuster new features—nothing, for example, to rival release 5.0's pivot tables—Excel 97 makes stylish progress in usability and power.

As always, Excel's designers have paid careful attention to the fit-and-finish details that make a spreadsheet program easy to use. Some changes are long overdue: You now get a more intuitive wizard

for turning data ranges into charts, multiple undo levels, and a button that shrinks a dialog box out of the way while you select a range, just like the one in 1-2-3.

Other interface improvements are more substantial, including the ability to build formulas using your own data headings instead of cell addresses. For instance, if you have a table of data with the column heading "January," the formula =SUM(January) will calculate the column's

total, with no need to create a range name. Excel can also check your formulas as you enter them and attempt to remedy common errors on the fly. It can fix basic syntax problems but won't detect the flaws in logic that are usually at the heart of serious spreadsheet troubles.

Fancy Formatting Does the Trick

IN OUR CYNICAL HEARTS, we all know that style often triumphs over substance. Excel 97 packs a slew of new features for improving your spreadsheets' looks so they can have both substance *and* style. For example, you can merge several cells together to create a jumbo-size "super-cell," perfect for laying out complex forms.

The screenshot shows a spreadsheet titled "The Shoe Shack Sale-abration!". It features a large "Pairs Sold Today: 127" and "Goal for Week: 1525" display. Below this is a table of daily sales:

Day of Sale	Goal	Pairs Sold
Monday	200	201
Tuesday	178	148
Wednesday	228	227
Thursday	278	282
Friday	300	282
Saturday	350	310

At the bottom of the screenshot, a banner reads: "GIVE YOUR SPREADSHEETS GOOD LOOKS with Excel 97's new formatting tools."

BY RICHARD SCOVILLE

You can rotate text in a cell any way you want, at any degree. And you can make the formatting of a cell conditional on its value—so that, for instance, numbers that are below a certain value appear in a red-shaded cell.

Collaboration and the Web

BUDGETEERS, planning teams, and other groups that use spreadsheets to model complex scenarios will especially like some new features for tracking spreadsheet changes. Excel 97 allows multiple users to view and edit the same worksheet (even at the same time), and remembers who made what changes to which cells, and when. You can track all the changes with color coding on the worksheet, or by generating a report; you can even go back and selectively accept or reject changes after the fact.

Like WordPerfect Suite's Quattro Pro spreadsheet, Excel can save and open spreadsheets in HTML format. But Excel's Web features go beyond Quattro Pro's in several ways. For instance, you can use a Web browser for basic spreadsheet editing, with the ability to open Excel spreadsheets directly from a Web server, recalculate formulas, rearrange pivot tables, and filter data. You'll need Microsoft's free add-in browser applet to do so. Excel formulas can also include URLs that point to cells and ranges stored in spreadsheets on a Web server; expert users can even create Web queries that can, say, request a specific stock quote from a Web page, then pop the result into a cell.

Power Grid

POWER USERS will find substantial improvements in Excel, too, even if they never touch its World Wide Web tools. Pivot tables, the workhorses of serious data analysis, are even more serious now. You can combine values to create calculated fields, and better memory management and new links to SQL databases let you work more quickly with larger repositories of data. On the downside, you're still limited in how you can use statistical functions in pivot tables.

Other improvements round out Excel's growing status as a platform for creating customized corporate applications: Restrictions on array size have been lifted,

OFFICE 97 INTEGRATION

BY THEIR VERY DEFINITION, software suites should be made up of well-integrated applications with consistent interfaces and easy tools for swapping data back and forth. Office 95 already had the basics down pat; Office 97 doesn't make any huge changes, but it's got several pleasing refinements.

New Look for 1997

WORD, EXCEL, PowerPoint, Access, and Outlook all sport a revamped interface; icon toolbars and menus have merged into a feature called Command Bars. Everything in a Command Bar is customizable: You can quickly create new toolbars and menus, rip off any toolbar (and some menus) to use as a floating palette, and even add menus to toolbars and vice versa.

Behind the scenes, the Office apps share far more code than before; Microsoft says this will result in both better speed and more efficient use of hard disk space. (Even so, this is a portly suite: A typical installation of Office 97 Professional eats up 121MB of disk space, versus 82MB for Office 95 Pro.)

Among Office 97's new shared tools, the most useful is OfficeArt, a set of drawing features available in Word, Excel, and Power-

Point. OfficeArt is both easier to use and more powerful than Office 95's art tools. You can choose from dozens of predefined shapes or draw your own, and can even apply fancy effects such as perspective and surface textures.

A Better Binder

OFFICE 95'S most innovative data-sharing feature was its Binder, a sort of electronic paper clip that let you collate Office documents into one file that could be viewed, edited, and printed as a single entity. But the Binder didn't really turn disparate documents into a seamless whole—you had to create a separate set of headers and footers for each document, and you had to switch to each of the originating apps to see how documents would appear when printed. Both of these problems have been solved in Office 97's Binder, which provides global document settings and a single Print Preview command for an entire Binder file.

Where Office Falls Short

MICROSOFT SEEMS to have lost interest in its Office Shortcut Bar, the icon bar that sits on the Win 95 desktop and serves as a launching pad and data-exchange center for the Office apps; it isn't even part of a default installation of Office anymore. By contrast, Lotus continues to add clever features to its more highly evolved SmartCenter.

Also, not all members of Microsoft's growing collection of Office applications have caught up with the suite's new features. For instance, Publisher, part of Office's Small Business Edition, lacks the Command Bar interface, the Office Assistant, and OfficeArt. That's also true of several stand-alone products that are marketed as Office Family Members, such as the FrontPage World Wide Web editor.



and improvements to queries using the ODBC engine offer quicker, more user-friendly access to server data.

The Bottom Line

MICROSOFT MAY HAVE captured the lion's share of the software suite market,

but it's nice to know that this hasn't slowed its efforts to improve the Office applications. With impressive advances in both usability and features, Excel 97 looks to be a worthwhile upgrade for casual spreadsheet users and truly power-hungry number crunchers alike. ▶

OUTLOOK 97

Schedule+ Grows Up

AT BEST, OFFICE 95's Schedule+ was an adequate group scheduler and personal information manager. But Outlook, which replaces Schedule+ in the Office 97 lineup, is a suite of powerful productivity and workgroup tools. In fact, it's a suite within a suite, and calling it a mere PIM is like describing Seattle as a fishing village.

Anybody who's familiar with the Office look and feel will be very comfortable with Outlook's interface. The program has a customizable vertical icon bar that lets you jump between its different features; this bar can also hold Shortcuts to other programs. Several applets make up Outlook.

Inbox/Messaging client: This universal e-mail client, a beefed-up version of Windows 95's Exchange Inbox, supports any MAPI-compliant e-mail system as well as messages from the Internet and CompuServe. A new and quite revolutionary feature is the ability to poll colleagues with multiple-choice questions. Can't decide what kind of food to serve at the next company meeting—Thai, pizza, or Chinese? Send out a survey on Outlook, and then it tabulates the votes. The survey's interface isn't particularly intuitive—the buttons it uses tend to get lost among the other

entries as "the first Sunday in January," and the calendar now "pencils in" tentative meetings whenever you receive invitations via the Inbox. A Holiday tool lets you import holiday sets into your calendar, including U.S., Jewish, and other groups. Unfortunately, holidays don't actually block out days, so you may schedule activities on a nonworkday if you don't pay attention.

Contacts: Outlook's Contacts applet lets you enter lots of information about your colleagues and clients, including phone numbers, e-mail addresses, and free-form notes. This is standard PIM fare, but the applet is organized not by alphabetized pages but in a continuous A-to-Z list. Clunky interface aside, you'll enjoy the ability to add names and e-mail addresses to your contact list by simply dragging messages out of the Inbox and onto the Contact icon.

Journal: Schedule+ had little integration with the other Office 95 apps, but the innovative Journal ties Outlook together with the rest of the suite. The Journal automatically logs all your work in Word, Excel, and the other Office modules. It shows this information in a time line view; you can backtrack to any date, see a list of the files you worked with that day, and double-click to

launch them. If you tend to forget file names and locations but do remember *when* you used a document ("Where's that memo I edited last Tuesday?"), the Journal could be valuable. But if you keep your files neatly organized into their own folders anyhow, it may be superfluous.

WHAT'S HOT

- Outlook's contact manager, calendar, and other features go far beyond those of its predecessor.
- Polling feature makes it easy to open decisions to a democratic vote.

WHAT'S NOT

- No discussion forms for brainstorming, bulletins, or just plain chatter.
- Some features, such as the e-mail polling, have clumsy interfaces.

Collaborating With Outlook

UNLIKE SCHEDULE+, Outlook has real workgroup tools that go beyond simple scheduling. The Tasks applet, for instance, lets you delegate tasks from your To Do list to other workers; when they check off them off as having been completed, you're notified automatically by e-mail. If your company uses Microsoft's Exchange Server as its e-mail backbone, everybody can also share contact lists and task lists.

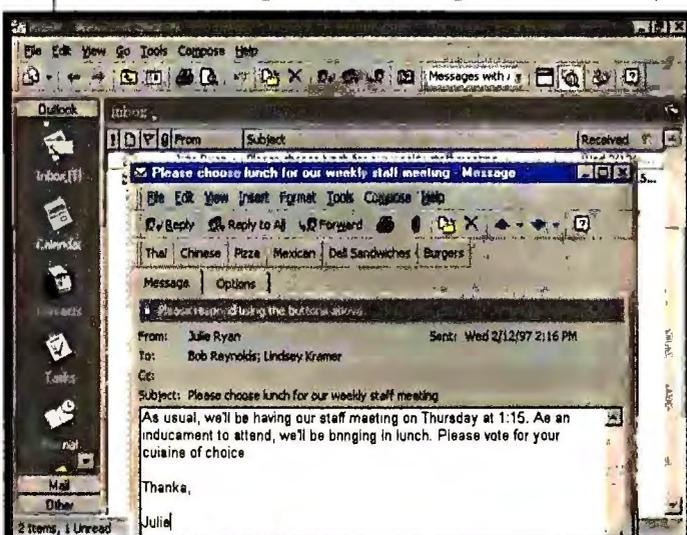
Outlook also has several ready-made workgroup applications, including expense reporting and job postings. With a little ambition, you can use its form designer to customize these forms or create new ones for other corporate needs.

The Bottom Line

OVERALL, OUTLOOK 97 is an almost complete workgroup package. What's missing? Discussion groups à la Lotus Notes wouldn't hurt. And for true group management tools, consider Microsoft's Team Manager, which works with Outlook to help supervisors divvy up tasks among workers, monitor their progress, and prepare employee reviews. ▶



BY Yael Li-Ron



OUTLOOK'S POLLING FEATURE helps groups reach a consensus, although the interface could be better.

tools—but once you figure it out, it'll save you much time and effort.

Calendar: The old Schedule+ calendar, and then some. The new AutoDate feature understands such plain-English

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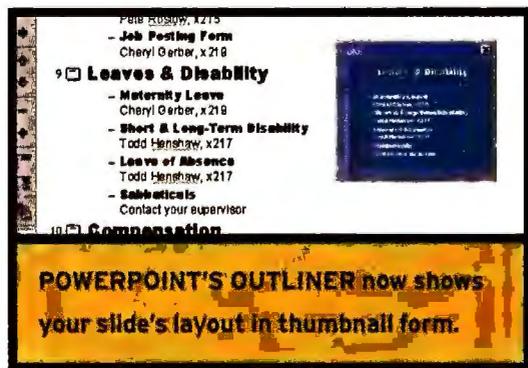
POWERPOINT 97

Presentations Without Pain

LIKE WISCONSIN CHEDDAR cheese, PowerPoint grows better with age. Though not radically different from its already solid predecessor, this new version of Microsoft's presentation graphics package rates my recommendation, both for PowerPoint veterans and presentation novices.

Neophyte's Delight

MANY NEW FEATURES make PowerPoint easier and more fun for beginners and occasional users. PowerPoint Central, a slick multimedia slide show, provides easy access to resources such as tips and tricks, animated demos, and tutorials on the Office CD-ROM and Microsoft's Web site.



The AutoContent Wizard now provides 23 content-specific templates, ranging from financial reports to persuasive presentations (such as Motivating a Team). I'd like this wizard even more if it would let me pick and choose which slides from a given topic to include in my show, as I can with Freelance Graphics 96's similar tool.

The new Clip Gallery is a convenient one-stop manager for sounds, movies, and pictures. Creating interactive shows has become easier, too, thanks to the new Action Buttons—preprogrammed on-screen buttons that you can use to play multimedia clips or jump from slide to slide, among other functions.

PowerPoint's slide and outline editors haven't changed much, but there are a few refinements. The Outline view, for instance, now shows you helpful previews of your slides. Another new feature that

BY RICHARD JANTZ

reduces the need to switch displays is the ability to edit speaker notes from within outline or slide view. It would be nice, though,

WHAT'S HOT

- Better AutoContent Wizard helps you jump-start a presentation.
- New Web tools are all you need to put shows on the Internet.

WHAT'S NOT

- Freelance Graphics has a more flexible canned presentation tool.

if you could shrink the speaker's notes to show more of an outline or slide.

PowerPoint on the Web

FINALLY, I was impressed with PowerPoint 97's tools for distributing presentations across the World Wide Web. A wizard helps you create HTML-format shows; you can also create simple Web animations, which can be viewed with Microsoft's free player applet for Netscape Navigator and Internet Explorer. ▶

OFFICE ASSISTANT: DOG OR GENIUS?

OFFICE 97'S help system has been invaded by a motley crew of cartoon characters, including a dog, a paper clip, and a caricature of Albert Einstein among others. You can choose any of these personalities to serve as your Office Assistant; by default, the Assistant stays on screen, watching you work and offering advice in word-balloon form. You can also call on the Assistant by typing plain-English questions. We asked some of our authors whether the Assistant helped them work or just drove them crazy.

It looks like you're writing a letter.
Would you like help?
 Get help with writing the letter
 Just type the letter without help



Richard Scoville: Is it obnoxious? Yup. Is it effective? I'm almost sad to say that it is, at least sort of. To test the Assistant's IQ in Excel, I selected a cell in a list of medical-cost data and asked it to help me "Sum the charges by physician." The Assistant then walked me right through the steps for setting up a pivot table to do the analysis—cool! Ultimately, though, the Assistant's intelligence is still pretty artificial: When I asked how to "Calculate the average charges by physician," it didn't bother to mention pivot tables at all.

Celeste Robinson: The first time I saw the "hip paper clip" appear, I grimaced, grabbed my mouse, and got rid of it. However, my heart softened when I discovered Mother Nature, another Office Assistant personality. Although I soon retired it back to the toolbar instead of leaving it open to offer its advice as I worked, I find myself calling up the Assistant frequently for quick help.

Cathy Kenny: I mistakenly assumed that the different Assistant characters would provide different kinds of advice—for example, that the Einstein-like character would offer especially advanced assistance.



In addition, the Assistant was often

a little late with its advice—it would display a tip after I already found the appropriate button on my own.

Yael Li-Ron: It's been a couple of years since Microsoft's last public humiliation, and it's time for round two. Yes, ladies and gentlemen, Bob's back. Microsoft's reliance on academic research that claims intelligent adults need cartoons to cope with complicated software could be funny if it were not utterly annoying.

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ACCESS 97

Office's Database Gets Web-Friendly

IF YOU WANT to bring database information and the World Wide Web together, Access 97 is a must-have. Even if you're not into Web publishing, this new version of Microsoft's database has enough new features and improvements to existing tools to make it a rewarding upgrade.

Accessible Hyperlinks

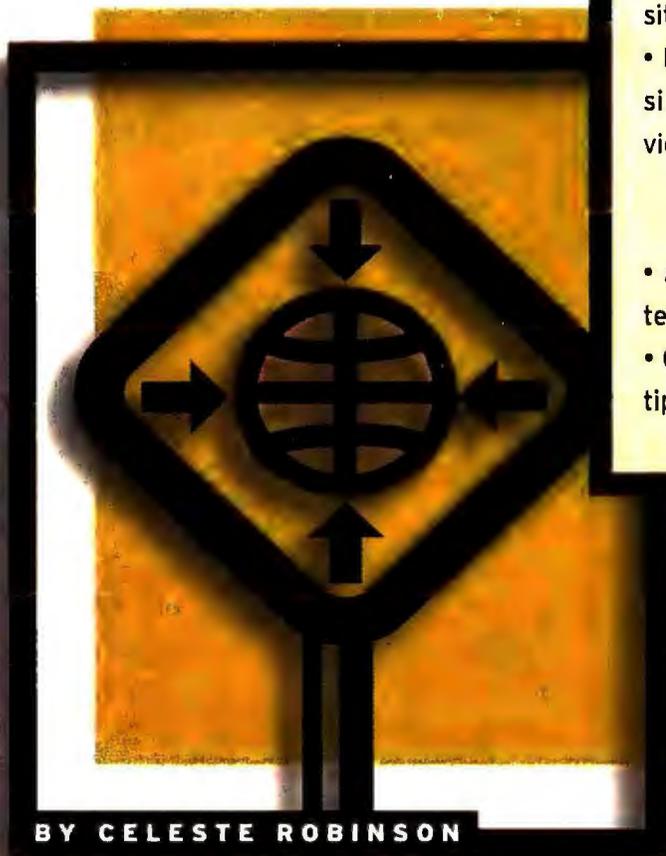
I FOUND MYSELF PLAYING with hyperlinks more than any other new feature, and I'm no webmaster. A click on a hyperlink in an Access 97 database can take you to any Web page, assuming you're properly hooked up with an Internet connection. Just as useful, you can use hyperlinks to jump to Access objects such as forms or reports, or to documents created in other Windows applications. These hyperlinks can be text labels, pictures, or buttons, and you can place them on a form or report, or include a different hyperlink for each record.

The straightforward Publish to the Web Wizard lets you take an Access object like a report or a query and turn it into a page on the Web. You can either publish a static snapshot of data, or you can set up a dynamic link that updates the Web page as the database changes, so Web surfers can browse the latest version of data that's available. Preformatted templates make it easy to dress up your page with items such as logos and navigation buttons.

Keeping Tabs on Design

SEVERAL OTHER ADDITIONS to Access 97 help you design databases that are easy to use. The new Tab control lets you create forms with tabbed pages, similar to the tabbed dialog boxes in most Win 95 apps. It's an elegant alternative to using push buttons for navigation. More design flexibility is provided by new options for customizing toolbars and menus.

Other small but useful improvements are everywhere in this release. For instance, you can now right-click a field and enter a value to quickly narrow your view



BY CELESTE ROBINSON

of a database. And Access now assumes that dates entered with "00" through "29" for the year are in the 21st century—which makes a big difference for data entry.

Technical Terminology

ONE PLACE where Access could still stand improvement is in its use of database

WHAT'S HOT

- Hyperlinks let databases jump to Web sites and other sources of information.
- Publish to the Web Wizard makes it simple to put static or dynamic data views on the Web.

WHAT'S NOT

- Access still uses more intimidating terminology than does Approach.
- Creating forms and layouts with multiple text styles can be tricky.

lingo such as *object* and *module*. SmartSuite's Approach does a better job of avoiding buzzwords. Still, Access is fairly friendly—especially if you're comfortable with Office's look and feel, and even more so if you can use its templates in your projects.

 Find test results on PC World Online (<http://www.pcworld.com/feb97/office97>). George Campbell, Richard Jantz, Celeste Robinson, and Richard Scoville are contributing editors, Cathy Kenny a freelance writer, Yael Li-Ron a senior online editor, and Harry McCracken a senior associate editor for PC World. ■

CAMCORDER COPIES SCREENCAM

ONE OF LOTUS SmartSuite's niftiest tools is ScreenCam, a utility that lets you capture your on-screen activities in Windows and turn them into movie files that can be played back on any Windows PC. ScreenCam movies are useful for a multitude of business tasks, ranging from presentations to annotating corporate documents.

Microsoft must think that ScreenCam is neat, too—Office 97 introduces Camcorder, a suspiciously similar utility with a nearly identical VCR-like interface. Like ScreenCam, it's a valuable addition to the suite. But judging from my tests of pre-release versions of both Camcorder and

ScreenCam 97, the original retains some advantages over the imitator. Both programs let you use a microphone attached to your sound card to record a voice-over narration for your movie, but ScreenCam also



CAMCORDER's interface sports VCR-style controls.

lets you create on-screen captions, which take up far less disk space than an audio track. With either program you can save your movies in Microsoft Video for Windows (AVI) format, which lets you slice and dice them in video-editing applications

such as Adobe Premiere. AVI file playback can be choppy, though; ScreenCam offers an alternative, proprietary format that plays back smoothly even on modestly equipped PCs.



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- Key Master Maps
- Windows 95 with MS Plus
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- Microsoft Phone 1.0 Telephony Software
- Mecklermedia's Official Internet World Yellow Pages
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- 200MHz Pentium Pro Processor
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- Diamond Stealth 3D 2000 w/ 4MB EDO DRAM
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- Intel DSVD 28.8 Fax/Modem
- Toshiba 12X 125ms EIDE CD-ROM Drive
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- Altec Lansing ACS-45 Speakers w/subwoofer
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Canada 1-800-793-4167 Puerto Rico 1-800-793-4185

WHY DO YOU use the phone company you use? Chances are you don't have a good answer. It's just the company you ended up with. The same can be said about Internet service providers. You may be using a particular ISP simply because you got a free start-up disk. Or you may have signed up for an online service like America Online or CompuServe and just never got around to looking for another service. Whatever the reason, there are differences in ISPs—and switching to one that better suits your needs is really easy. What's not easy is keeping up with the changing ISP landscape. The ISP business started out with a few specialized providers like Net-



Best Routes to the Net

com and PSINet. But then telecommunication heavyweights like AT&T and MCI entered the fray, and now many local phone companies want a piece of the action. Even television cable companies are looking for ways to deliver the World ►

IN THIS REVIEW

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It's not just where you go on the Internet, but how you get there. We pick the best of 12 leading service providers.

Wide Web. A California company called WebTV pipes the Web right to its customers' television sets for the same monthly rate that most traditional ISPs charge. For now, though, your best route to the Internet is still through your PC. All you need is a good modem (for this review, we assumed you don't have a high-speed line) and some idea of what you want to do once connected. Are you looking for lots of well-organized information? Want to set up your own Web page? Need to read e-mail on the road? From our sampling of Internet service providers, we found that no single ISP does it all, but you do have many good choices.

DIALING FOR DATA

WE SIGNED UP WITH 12 national ISPs that serve individuals, homes, and small businesses using standard modem connections. These are the biggest, most popular national ISPs according to their reach as well as a survey of PC World Online users. We hired reviewers in California, Colorado, Massachusetts, and Texas in order to get an idea of how ISPs serve dif-

ferent parts of the country. And we asked ISP customers what they thought of their current providers. It turns out that picking the right ISP is a process of learning your Internet ABCs.

A is for access: Can you connect to an ISP with a local phone call? All of the national ISPs we reviewed had local servers (aka points of presence) in at least 200 locations. But there are parts of the country where connecting to a national ISP requires a toll call. Our reviewer in Mendocino County, California, for example, has trouble finding local numbers for

Best Buys



TWO ISPs stood out as the best of the group due to their reliable connections and great features. For straight access to the Net, IBM Internet Connection is an excellent choice. It's fast, affordable, and fun to use, and there were few complaints from



Internet Connection users in our online ISP survey. The only drawback is that you don't get any server space to publish

your own Web pages. IBM tells us that will soon change.

MindSpring also works well and is easy to use. It comes with a nice Internet tool kit and 5MB of storage for publishing your own Web creation. The support people we talked to were among the friendliest, most helpful we found. MindSpring charges a \$35 start-up fee, but we don't think that's too much to pay.

national ISPs. For his day-to-day Net needs, he uses a small regional provider that serves his area (see "The Friendly Neighborhood ISP"). How many local numbers an ISP provides is especially important if you want Internet service while you're on the road. Almost every service we tested offers toll-free 800-number access, but the service always costs extra on your ISP bill—anywhere from \$4.50 to \$7.50 per hour on top of your standard access fee.

B is for bandwidth: What's the traffic like over an ISP's lines?

Does it get so heavy that e-mail delivery and file downloading run slowly? If you buy a high-speed ISDN modem, could you use it to connect to your ISP? To test for traffic tie-ups, our reviewers sent e-mail and downloaded files at different times of day over a period of weeks. In most cases, but not all, e-mail delivery was prompt. But the time it took to download our 450K test file varied from 2 to 12 minutes. All our connections were made with 28.8-kilobits-per-second modems. As for ISDN access, several ISPs don't yet offer the service. Some that do offer it only in

FEATURES COMPARISON

STANDARD FEATURES

ISPs	Monthly rate	Hours of Internet time included	Cost per additional hour	Start-up fee	Hourly charge for toll-free access	ISDN support	Bundled Web browser	Space for Web pages included
America Online	\$19.95	unlimited	○	○	\$6	○	AOL browser	2MB ¹
AT&T WorldNet	\$24.95 ²	unlimited	○	○	\$4.50	○	Netscape Navigator	○
CompuServe	\$24.95	20	\$1.95	○	not available	●	Internet Explorer	5MB
Concentric Network	\$19.95	unlimited	○	○	\$5	○	Netscape Navigator	5MB
EarthLink Network	\$19.95	unlimited	○	\$25	not available	●	Netscape Navigator	2MB
GTE Internet Solutions	\$19.95	unlimited	○	○	\$4.50	●	Netscape Navigator	5MB
IBM Internet Connection*	\$19.95	unlimited	○	○	\$6	○	Netscape Navigator	○
MCI Internet	\$19.95	unlimited	○	○	\$5.95	○	Internet Explorer	○
Microsoft Network	\$19.95	unlimited	○	○	not available	●	MSN Program Viewer	○
MindSpring*	\$19.95	unlimited	○	\$35	\$7.50	●	Internet Explorer	5MB
Netcom	\$19.95	unlimited	○	○	\$4.80	● ³	Netscape Navigator	1MB
SpryNet	\$19.95	unlimited	○	○	\$6	●	Internet Explorer	5MB

*Best Buy ● Yes ○ No ¹ 2MB per screen name; 10MB per account. ² \$19.95 for AT&T long distance customers. ³ In California only.

certain areas. To find out more about peak traffic times, see "It's 9:37. Are You Connected to the Net?" at PC World Online (<http://www.pcworld.com/isps>).

C is for customer service: How easy is it to get connected the first time? How helpful, knowledgeable, and available is the technical support staff? Customer service is tough to measure accurately, but it's important when choosing an ISP. We had our reviewers sign up with ISPs under their own names and grill the sales representatives about the service they provided.

We surveyed customers and came up with satisfaction grades for each ISP.

After they were connected, they made repeated calls to tech support. Some ISPs, like EarthLink, were impossible to get hold of. Others, such as IBM Internet Connection, were extremely responsive.

To see if our testers' support experiences matched those of our readers, we asked users of PC World Online to rate their ISPs. We asked about their overall satisfaction, about troubles they had connecting and downloading files, and whether they were happy with the technical support they got. Their responses (we received over 3800) became customer sat-

isfaction grades for each ISP we reviewed. The top of the class, according to our readers, was IBM Internet Connection, which earned a sterling A+. The class clown turned out to be Netcom, which earned a D- from its users.

Besides the ABCs, you should consider some other features of ISPs when making a selection. Most ISPs give you one of the two popular Web browsers—Microsoft Internet Explorer or Netscape Navigator—along with the software that you'll need for sending e-mail, downloading files, and

reading newsgroups. Although we expect providers like America Online and CompuServe to offer a wealth of extra content, we were surprised to find that several Internet-only services also have rich home pages.

The commercial online services and many of the national ISPs also let you post your own personal Web pages on their servers. A few even provide Web authoring tools, but in most cases the software is just enough to help get you started. Unfortunately, most of the ISPs give you very little space on their servers—often only 1MB or 2MB, which is not really enough for a sophisticated page.

LOTS OF CHOICES

AFTER ALL IS SAID and done, we picked IBM Internet Connection and MindSpring as the best of the group. Both gave us reliable access, good performance, and friendly customer service. One other ISP, however, deserves honorable mention. Except for the brutally long waits for tech support, EarthLink was fun and easy to use. And the landscape continues to change. As we polished off this review, Prodigy launched an Internet-only service, and America Online adopted a \$19.95-per-month flat fee. AOL's Global Network Navigator went out of business, and CompuServe started using Microsoft's Internet Explorer. How these and perhaps other changes will affect your choice of ISPs remains to be seen.

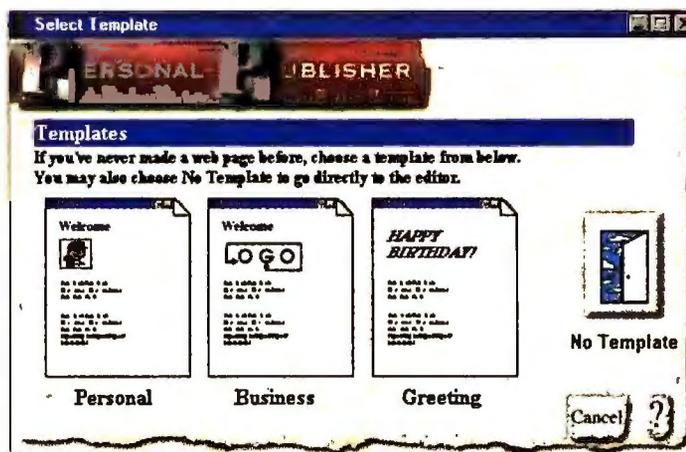
AMERICA ONLINE

SHORT PRO: Easy to use, great customer features like chat rooms. CON: Expensive, not ideal for aspiring Web publishers. SUMMARY: Great for novices, or those who like their information more organized than the the Web. But cyberveterans should score a faster, direct Internet account.

CUSTOMER SATISFACTION GRADE: D

Our reviewers agree: America Online makes it easy to connect to the Net. Just pop in one of AOL's ubiquitous set-up disks—one is probably in your mailbox now—and you're on your way. AOL gives you access to hundreds of forums, software libraries, and chat rooms.

Although AOL's Web browser is easy to use, it lacks the bells and whistles of Netscape Navigator and Internet Explorer. Fortunately, AOL subscribers can use the 16-bit versions of Navigator or Internet



AMERICA ONLINE'S Web publishing utility is a pleasure to use, but the results are unspectacular.

Explorer in place of AOL's browser. Posting Web pages is free, but you're limited to 2MB of server space per screen name. AOL's Personal Publisher service, which lets you create Web pages with text, graphics, audio, and video clips, is a no-brainer, but the pages it creates are simplistic.

It was easy to log on to AOL regardless of the time of day, and we never encountered busy signals. But connecting at 28.8 kbps was next to impossible. This slows Web browsing and file downloading.

Like everything else about AOL, getting technical support was easy. Our reviewers hardly ever spent time on hold, but when they did, a voice message prompted them to explore AOL's online help section, where answers abound.

Unfortunately, AOL subscribers who responded to our survey aren't nearly as happy. They reported long waits for

SUPPORT		
Toll-free technical support	Weekday phone support (hours)	Weekend support
●	24	●
●	24	●
●	17	●
●	24	●
●	24	●
●	24	●
●	24	●
●	24	●
●	19	●
●	15	●
○	24	●
○	12	●



Successfully Migrating to

Corporate America is fast embracing Windows NT workstation for its desktop computing as it seeks a true multitasking, robust, 32-bit OS with reliability, security, and high performance. The Pentium Pro, offering superior speed and performance, is far and away the preferred platform for NT. These were among the key findings of IDC's recent global survey of 1,500 corporate enthusiastic NT adopters and active evaluators.

International Data Corporation (IDC), the world's leading information technology (IT) research firm, recently surveyed 1,500 medium-sized and large corporations around the world about their advanced desktop PC usage and plans via in-depth telephone interviews. Primarily, the research analyzed how corporations are currently using and adopting advanced Windows NT/Pentium Pro systems and what users found as key drivers and constraints. The study focused on advanced adoption so that organizations adopting less than 10% NT systems among their total systems, within the next two years, were excluded from the survey.

The market momentum for NT/Pentium Pro systems will intensify over the next 3-18 months, especially among U.S. corporations. Key drivers for this upward migration include the accelerated price/performance improvements of the Pentium Pro; the increasing availability of 32-bit applications; and recent release and success of Windows NT Workstation 4.0. IDC predicts 1998 to be the pivotal cross-over year when U.S. Pentium Pro Processor PC U.S. sales will exceed Pentium Processor PCs overall, and when NT will surpass Windows 95 on desktops in large corporations.

Why Upgrade to Advanced PCs?

Corporate PC users are constantly seeking better CPU performance, more memory, faster data access times, and more powerful OS and

application suites. In the late 1990s, technology continues to accelerate with more intensive requirements due to the increase in the size of applications and graphics-intensive files; expanded multimedia data types (color images, audio, and full-motion video); the inclusion of more software (Web browsers, utilities); and the constant IT mandates to cut costs and improve productivity. In addition, the tremendous growth in the Internet, Web, and corporate intranets is bringing ever-greater amounts of data to the desktop.

Recent and unprecedented price/performance improvements in advanced PC systems have whetted organizations' appetites. IDC PC pricing research indicates the cost of Pentium Pro systems will decline a full one-third to nearly half (or 33-47%) from the beginning to the end of 1996, depending on chip speed. As an industry example, consider the advanced desktop offerings in late 1994 vs. late 1996 from AST Computer. AST's high-end brand series has dropped in price by more than one-third, from about \$4,300 to about \$2,850 in estimated street price, while the overall performance offering has more than doubled. In short, there has never been a time in which corporations have needed advanced desktop PCs more, nor a time in which cost justification for upgrading has been stronger for the business enterprise.

Pentium Pro—Platform for and to the Future

The Pentium Pro, Intel's sixth generation microprocessor family, released in late 1995, was specifically designed to optimize the performance of 32-bit code while maintaining backward compatibility with previous x86 code. In essence, the chip is a bridge between today's world, which predominantly uses 16-bit OS (Windows 3.X) and applications, and the emerging world of 32-bit OS (NT, Windows 95) and applications, which is fast becoming the industry desktop standard. The Pentium Pro also offers unparalleled speed and performance through its superscalar and superpipeline design; Intel's "Dynamic Execution," and its L2 "cache on-board" dual-chip module.

As prices further decline, IDC predicts that demand for Pentium Pro PCs will increase significantly, especially in the corporate environment. Current street prices for NT/Pentium Pro systems have now fallen to less than \$3,000—within the range of most corporate IT budgets. Accelerating price competition and expanded product selection will continue through 1997, which will further fuel the market. IDC anticipates Pentium shipments will peak in 1996, and the Pro, with 15 million units, will surpass Pentium sales (13.9 million units) as the dominant PC platform in the total U.S. market by 1998 (see Figure 1).

The Corporate Move to Windows NT

Migration to the 32-bit desktop enables true multitasking, improved stability, virtual memory, multiprocessing, and robustness. More than half (53%) of those IDC surveyed currently do 32-bit application development. Key drivers of 32-bit adoption cited by the IDC user base included new application availability, price declines, performance gains, and the success of NT 4.0. Within two years, three-quarters of all internal PC application development will be 32-bit.

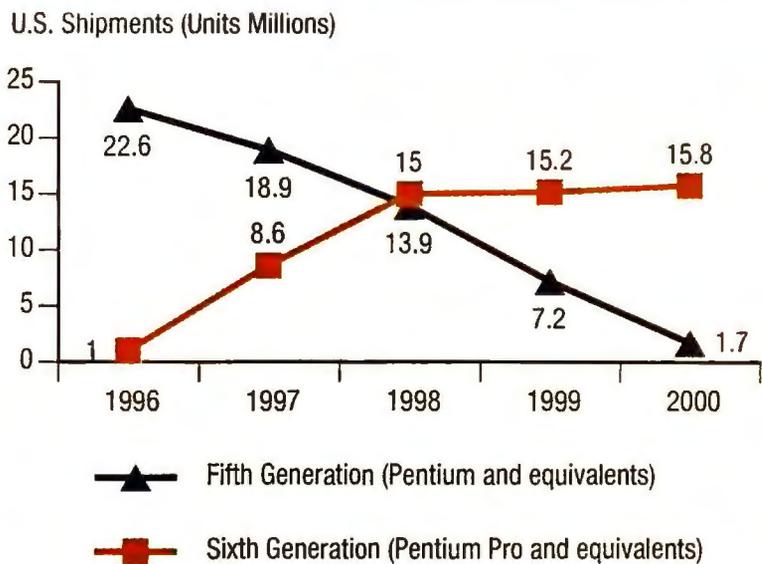
Key Advanced PC Study Findings

- By YE 1997, half said at least 50% of new PC purchases will be Pentium Pros.
- Corporate user plans by late 1997 include the following:
 - 150% increase in Windows NT
 - 50% decrease in Windows 3.X
 - 50% increase in Windows 95
- Within two years, the majority of internal application development will be 32-bit.
- Reliability, security, and performance are top reasons for choosing NT over Windows 95.
- Twenty-five percent of respondents will gradually roll out NT company-wide; 50% will roll out NT selectively.
- Key NT applications are general office, software development, technical/engineering, customized business, and multimedia.
- Performance and speed are top benefits of running NT on Pentium Pro PCs.
- Cost, hardware requirements, and incompatibility with existing software/peripherals key barriers to adoption.

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Next Generation PCs

Figure 1 – Pentium vs. Pentium Pro Processor Shipments



Again, IDC user research bears out corporate America's preference of Windows NT over Windows 95 or any other OS. Corporate users surveyed included in their 12-month plans a 150% increase in the use of Windows NT. They saw a decrease of Windows 3.X or Windows for Workgroups use by about 50% and an increase of Windows 95 by only 50%. Users cited reliability, security, performance, and robustness, in that order, as the most important reasons for choosing Windows NT over Windows 95. The primary departments driving advanced desktop computer system purchases among IDC respondents are MIS/DP, engineering, and R&D—traditional leading technologists, as might be expected. Somewhat surprising, are the current applications users identified running under NT such as general office automation packages (word processing, e-mail, spreadsheets) or today's general mainstream desktop applications (see Figure 2).

Among corporations polled, the Pentium Pro was also the preferred platform to run NT. Fifty percent of respondents stated that at least half of all their new PC purchases will be Pentium Pro systems by the end of 1997.

The Call to Action

The decision of when and how to upgrade an IT infrastructure is difficult and complex. Hesitating can be even more hazardous, possibly leading to forfeited opportunity costs and lost productivity. As we approach 1997, it is clear that the U.S. corporate migration process to NT/Pentium Pro PCs is far beyond initial assessments.

Perhaps the only thing as important as choosing the right advanced PC is choosing the right vendor partner behind it. The top criterion among the survey respondents were price/value and technical support. IDC recommends users to look for PC vendors that push the

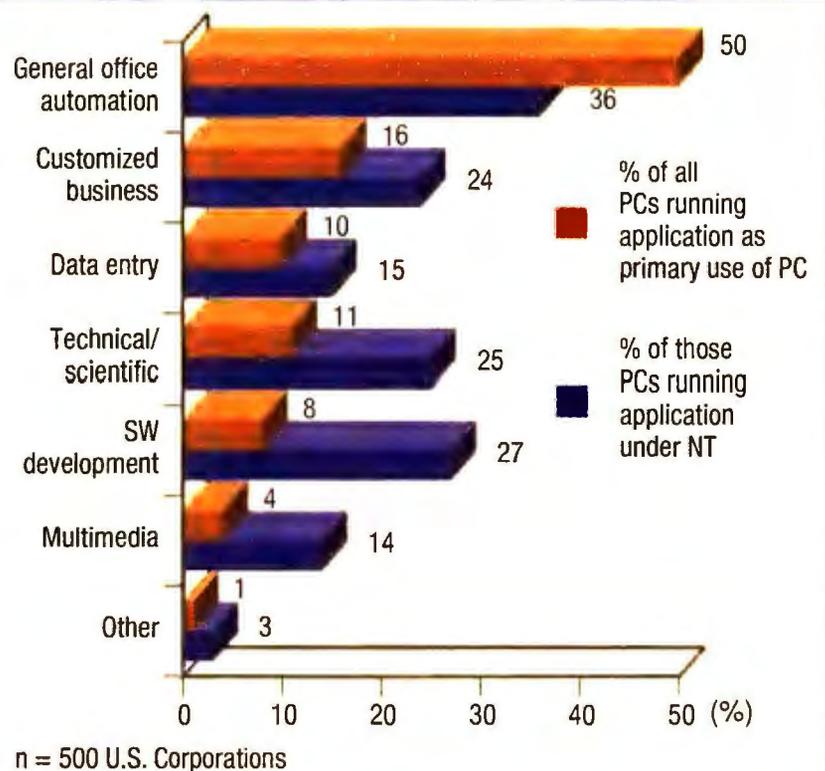
price performance ratios and offer the most complete total value package. Closely examine what prospective vendors include in:

- Hardware (components, configurations, investment protection);
- Cost of ownership (virus protection, data and system management, real time diagnostics);
- Productivity enhancement (Internet/intranet, utilities);
- Vendor viability;
- Product quality and price/performance.

IDC predicts that 1998 will be the pivotal cross-over year when Pentium Pro outstrips Pentium U.S. sales overall, and NT surpasses Windows 95 on desktops within large corporations.

Given its total value, performance benefits, and headroom, the time for serious consideration of NT is here. The collective experience and insights of 1,500 corporate users—senior IT managers already in upward PC migration, can greatly benefit an organization's information technology design and planning.

Figure 2 – Current PC Applications, Share for NT PCs



This Insight was written independently by IDC and sponsored by AST Computer. For a complimentary copy of IDC's full White Paper on migrating to Next Generation PCs (Asian, European or U.S. versions available) please call AST at 1-800-447-0023 x 100 or check the AST Web site at <http://www.ast.com>

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files to download and general dissatisfaction with AOL. America Online, 800/827-6364, <http://www.aol.com>

READER SERVICE NO. 761

AT&T WORLDNET

SHORT **PRO:** Fast downloads, flat rates, convenient billing for AT&T customers. **CON:** No space for Web pages, no support for ISDN connections. **SUMMARY:** A fine ISP if you're an AT&T long distance customer, but support is erratic, high-speed connections don't yet exist, and forget about a personal Web page. **CUSTOMER SATISFACTION GRADE: C+**

We got more responses to our online survey from AT&T WorldNet customers than any other ISP except Netcom. Both our survey respondents and our reviewers were pleased with WorldNet. But a few improvements can make it better.

The start-up disc is supposed to arrive in a few days, but one of our reviewers waited closer to 2 weeks. The WorldNet setup program automatically installs Netscape Navigator, finds your local access number, and tells you your e-mail address. If you're an AT&T long distance customer, you will find your Internet expenses tacked onto your phone bill.

WorldNet performed well, except for a couple of slow e-mail messages. Connections were prompt, and downloads were faster than average for the group.

One drawback of WorldNet is that it doesn't offer space for personal Web pages. We also found it odd that AT&T's service does not support ISDN.

Tech support drew mixed results. One reviewer waited days for the call-back service to actually call back; another reached technicians in minutes and got prompt, accurate help. AT&T WorldNet, 800/967-5363, <http://www.att.com/worldnet>

READER SERVICE NO. 762

COMPUSERVE

SHORT **PRO:** Fast e-mail delivery, great discussion forums. **CON:** Expensive; sluggish downloads. **SUMMARY:** If you like CompuServe's content and you want Net access mostly for sending e-mail, this is a good choice. Otherwise, a national ISP is cheaper. **CUSTOMER SATISFACTION GRADE: D**

Most of CompuServe's proprietary content is not available elsewhere. As a source for technical support forums, free utility

Questions to Ask Before Signing Up



Do you offer a flat rate for unlimited Internet access?

Do you charge a start-up fee?

Do you offer a free trial period?

Is there a local access number for where I live?

Do you have a toll-free access number in case I'm away from home?

Do you support ISDN connections?

Do I get space for my own Web page? How much?

Do you provide toll-free tech support?

When will I receive my start-up disks?

files, and discussion groups, CompuServe beats anything the Web has to offer.

But as a means of accessing the Internet, we found that CompuServe leaves a lot to be desired. Exploring the Web with the Spry Mosaic browser was slow, and the browser was prone to frequent crashes. (At press time, CompuServe started bundling Internet Explorer.) Downloading files took longer overall than any of the other ISPs. On the plus side, e-mail messages arrived quickly every time.

CompuServe's Homepage Wizard helps aspiring Web publishers. The end product is more sophisticated than Web pages created with AOL's software, and unlike AOL, you have 5MB of space to work with.

Tech support was so-so. Our survey respondents also had mixed feelings. What really irks customers, according to the survey, is the long time it takes to download files. CompuServe, 800/848-8199, <http://www.compuserve.com>

READER SERVICE NO. 763

CONCENTRIC NETWORK

SHORT **PRO:** Friendly support, ample server space. **CON:** So-so performance, no publishing utilities. **SUMMARY:** Concentric is an average ISP with a friendly staff and above-average capacity for hosting Web pages. **CUSTOMER SATISFACTION GRADE: C-**

Concentric is a middle-of-the-road ISP. It doesn't do anything particularly poorly, but it doesn't stand out either. Concentric customers are also wishy-washy about the service, according to our survey results. While many of their customers said that they were happy with the technical support they received, a larger number said they were not. Their experiences with connecting to Concentric followed the same pattern.

Our performance tests mirrored the survey results: Downloading files took longer than average. At least one download stalled completely (tech support said this was "normal"). In most cases, e-mail delivery was prompt—the longest time for delivery was about 11 minutes.

Concentric bundles Netscape Navigator, but you're free to use another product such as Microsoft Internet Explorer. Concentric gives you 5MB of server space for publishing a Web site, but no tools to create your own Web pages.

Overall, Concentric's technical support staff was knowledgeable and polite. But you may get stuck in a labyrinth of recorded messages when you want to talk to a human. Concentric Network, 800/939-4262, <http://www.concentric.net>

READER SERVICE NO. 764

EARTHLINK NETWORK

SHORT **PRO:** Fast performance, easy to use, nice Web site. **CON:** \$25 start-up fee, hard to get tech support. **SUMMARY:** A good ISP, especially for newsgroup devotees; tech support hard to reach. **CUSTOMER SATISFACTION GRADE: C+**

With EarthLink, connecting to the Net is fast, downloading files is fast, and sending e-mail is fast. Getting tech support, however, can be slo-o-o-o-w.

Starting up isn't free (it costs \$25), but the company has taken pains to make the process easy. The service uses a wizard-style setup program to step you through connecting your PC to EarthLink. Similarly, when you sign up for space for ►

Talk around the world... for the price of a local call.



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Increase Productivity

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Internet phone calls
from your PC keyboard.*

*Make and receive
regular phone calls
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*Conference between
Internet phone calls and
regular phone calls.*



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Integrated Technology USA, Inc.

For more information
visit our Web Site at:
<http://www.gemini-usa.com>

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your own Web page, EarthLink thoughtfully e-mails you a message with embedded links to resources you'll need.

EarthLink maintains a meatier-than-average home page with lots of resources for Internet rookies, including FAQs (frequently asked questions files) and pointers to interesting sites. EarthLink also maintains a large Usenet server, giving subscribers access to tons of newsgroups.

You get only 2MB of server space from EarthLink, which is enough for a nice personal Web page but not much else. EarthLink does not provide any Web authoring tools, so you have to get your own HTML editor or other publishing program.

Toll-free tech support is available around the clock. A menu-driven system tried to steer us away from humans, and we waited for up to an hour on some calls. We got better results when we dug for answers at the company's support pages or sent questions to tech support by

e-mail. EarthLink Network, 800/395-8425, <http://www.earthlink.net>

READER SERVICE NO. 765

GTE INTERNET SOLUTIONS

SHORT

PRO: Good performance, ISDN support. **CON:** Spotty

tech support. **SUMMARY:** An adequate, no-nonsense ISP, but uploading Web pages was hard.

CUSTOMER SATISFACTION GRADE: C

If you can get through to GTE, your connection should be pretty fast. But our reviewers had problems connecting. Many of their calls ended with busy signals. Once hooked up, however, our reviewer in rural California had surprisingly good browsing and file downloading speed, even though his local phone lines are terrible. While we had no problem downloading files, GTE customers who responded to our survey did. So to borrow a phrase from those gasoline stickers, your mileage may vary.

GTE's online Web authoring tool is fine for simple pages, but considering that GTE gives you 5MB of server space, you'll probably want a more robust site.

Tech support was good, but not always timely. We called their toll-free number a couple of times and after a brief period on hold, we were told that no one was available and to leave a message. We usually received a call back in about 4 hours. GTE customers in our survey are pleased with tech support. GTE Internet Solutions, 800/363-8483, <http://www.gte.net>

READER SERVICE NO. 766

IBM INTERNET CONNECTION

SHORT

PRO: Good service, prompt e-mail, easy to use, fun Web

site. **CON:** No space for Web pages. **SUMMARY:**

Almost perfect for anyone needing a reliable, inexpensive, and interesting Internet connection. **CUS-**

TOMER SATISFACTION GRADE: A+



IBM's Internet Connection was a shoo-in for one of our two Best Buys. Using the service was a

pleasure. It wasn't the fastest at downloading Web pages and other files, but it was still quick and consistent from hour to hour and day to day. E-mail was delivered promptly, and tech support was helpful. Our only complaints are that we had rocky moments getting started with the service, and during our tests, IBM didn't offer server space. IBM says that server space should be available in a few months.

Our survey shows that IBM Internet Connection customers are delighted with the service. Not one person reported

chronically slow downloads, no one said they were unhappy with tech support, and only one person said they often had trouble connecting.

As befits an Internet service run by Big Blue, Internet Connection is, well, big. IBM provides more than 830 dial-in numbers in some 50 countries around the world, and you can use any of them without an additional charge. IBM is generally not ►

The Friendly Neighborhood ISP

SOMETIMES CHOOSING AN ISP is like choosing a grocery store. Do you go to the Megamart for its gigantic selection, or do you pop over to the corner store where everybody knows your name? Service is the name of the game for regional providers.

"What a local provider can offer is a level of service that most of the nationals can't," says Scott Lent, senior vice president of marketing for Dallas-based Internet America. "Even though we serve 40,000 customers, we do a lot of handholding. We classify ourselves as largest, fastest, and friendliest."

Mellonie Dalton, an IA customer for about seven months, says the company lives up to its billing. "When I have had any questions or software problems they have always been very friendly and helpful," Dalton says.

Rural providers often give their customers much more than even the best national ISPs. Stephan May, regional director of Online Systems Services in Williamson, West Virginia, opened shop in August and is signing up 25 to 30 subscribers a month.

"We cover the whole nine yards out here," May says. "We design Web pages for small businesses, we do consulting—everything. I

MELLONIE DALTON is pleased with her regional ISP, Dallas-based Internet America.

even sell hardware to these folks because they've got nowhere else to get it."

Whether it's the service or the easy access, regional ISPs are popular. Over half of the people who responded to our online survey said they used a regional ISP. Some of the most popular providers are regional phone companies such as Pacific Bell in California and Southern New England Telephone in Connecticut. For a local ISP in your neck of the woods, check out PC World Online's ISP Finder (<http://www.pcworld.com/interactive/isps/isps.html>). —Glenn McDonald



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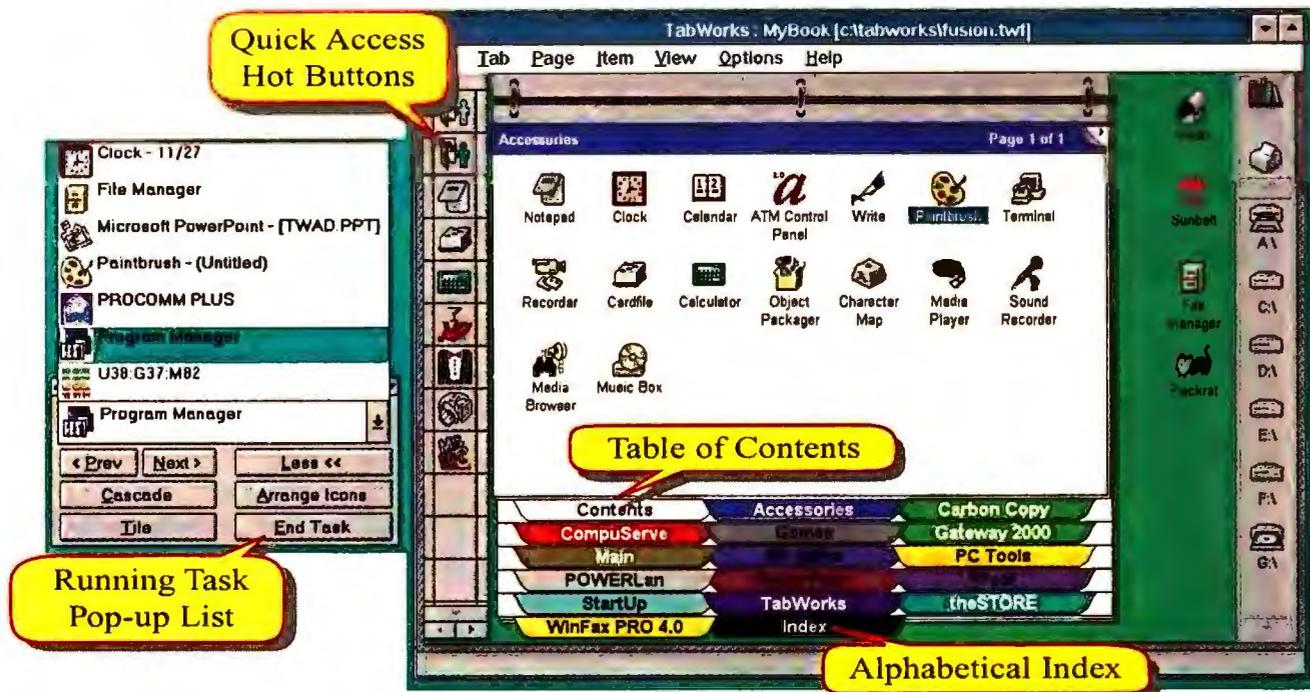
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P702

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Businesses Need More From an ISP

WHEN YOUR BUSINESS GROWS to more than a dozen people, a direct connection to the Internet over a leased T1 or T3 line makes sense. You may also want a large, complex Web site; a security system to protect your data; and merchant services for processing product orders over the Net. Several national ISPs in our review, including AT&T, IBM, and MCI, sell business services. Other ISPs serve only businesses.

"They're not exactly cheap but we're willing to pay it," says Jeff Weener, director of technology for Lanier Professional Services in Canton, Massachusetts. A customer of BBN Planet for the past four years, Weener says a comprehensive service plan is worth it. "With the size of our company, if we handled it ourselves, I'd have to put someone on it full-time," he says. "So I just job it out to the experts."

Important as business services are, a reliable connection is even more so. Consider BBN's guarantee. If your Net connec-

tion is out for 15 minutes or more in a 24-hour period, BBN will credit you one full day of service.

Here are four business-oriented ISPs:

BBN Planet (<http://www.bbn.com>), 800/472-4565 READER SERVICE NO. 798

CERFnet (<http://www.cerf.net>), 800/876-2373 READER SERVICE NO. 799

PSINet (<http://www.psi.net>), 800/827-7482 READER SERVICE NO. 800

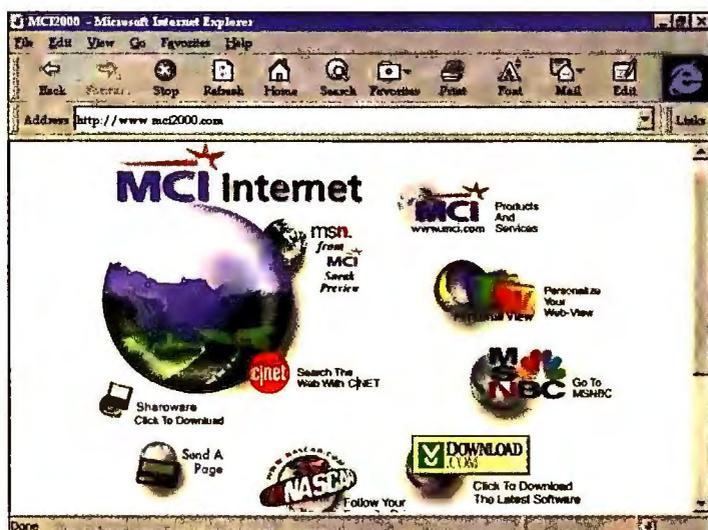
UUNET Technologies (<http://www.uu.net>), 800/488-6383 READER SERVICE NO. 801



When his company needed comprehensive Internet service, Jeff Weener called on BBN Planet.

known for bargain pricing, but for Internet access it offers the popular, all-you-can-eat flat-rate fee of \$19.95.

The Internet Connection Web site provides a fun collection of reviews and links devoted to seemingly random topics of the day—anything from Star Trek to Sigmund Freud. It also includes support information that, although plentiful, seems designed for advanced users rather than beginners. When we couldn't find answers there, we sent the company an e-mail or called the toll-free phone support line; in both instances we got quick, helpful replies. IBM Internet Connection, 800/455-5056, <http://www.ibm.net>



MCI INTERNET has a clean, uncluttered home page, but it isn't very interesting or useful.

MCI INTERNET

SHORT

PRO: Easy installation, good software bundle. CON: Poor

e-mail delivery, spotty tech support, no server space for Web pages. SUMMARY: For an ISP that seems to be popular with its customers, we sure had a lot of trouble—especially when sending

e-mail. CUSTOMER SATISFACTION GRADE: B+

We have to take issue with the glowing reports we've received about MCI Internet. Although our survey respondents tell us they are satisfied, we're not. Our problems ran the gamut from start-up to service. One of our reviewers waited over two weeks to get his start-up software. At one point, a customer service representative said it might take as much as five weeks.

Once our reviewers got their software, installation was a snap. The set-up CD-ROM automatically determines whether you're using Windows 3.1 or 95 and installs the appropriate software. The package includes Microsoft Internet Explorer, E-mail MCI, and the PointCast Network, a useful application that automatically downloads the latest headlines from various Web sites. MCI Internet doesn't offer server space, so there's no Web publishing software included.

Using MCI Internet was not a lot of fun. Our Colorado reviewer was often unable to connect to the network, and on some days it took longer to download files than we expected. Both reviewers were very disappointed with E-mail MCI. Transferring e-mail from the PC to MCI Internet's server was usually so slow that one reviewer thought the program had frozen. Once in cyberspace, e-mail took a long time to arrive at our central mailbox.

Our encounters with MCI's technical support team were also erratic. We waited anywhere from 5 to 15 minutes on hold. When we asked one staffer if we could use our account on our office's high-speed T1 line, she

said yes, but that we would have to call back and request a fax on this topic from MCI's fax-back service. At other times, we were able to receive helpful answers on the spot. MCI Internet, 800/550-0927, <http://www.mci2000.com>

READER SERVICE NO. 767

MICROSOFT NETWORK

SHORT

PRO: Cool proprietary content. CON: Terrible e-mail

delivery, poor service. SUMMARY: Just because it comes with your OS doesn't mean you have to use it. As one reviewer described Microsoft's attitude, "This is MSN. Take it or leave it!" CUSTOMER SATISFACTION GRADE: C-

So, how do you go from a dead-before-it-started commercial online service to one of the largest ISPs? Give away the software with your dominating operating system and wait for people to come. The strategy worked. Microsoft Network has grown big, more out of convenience ►



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than through any effort of its own.

When one reviewer signed up for MSN over the phone and asked for the start-up software, the presumptuous response was "Boot up your PC and press Start." Fortunately, our reviewer had upgraded to Windows 95 and wasn't one of the many PC users still using Windows 3.1.

MSN is focused more on content than on supporting an Internet connection. Connect times were the slowest of all, and its e-mail delivery was the worst we saw. When we asked MSN if we could post a Web page on its server, we got a series of oblique answers before someone finally fessed up: The answer is no. When we asked some Internet-specific questions, one support person told us to seek out the MSN help section and added, "That's what the 30-day trial is for."

MSN is glitzy, we'll give it that. Although it takes a while to load, the MSN On Stage page, which you can set up as your default page, offers an *Entertainment Weekly*-style look at popular culture. But beauty is only skin deep, and our survey respondents agree with our reviewers—they give the service relatively low marks

for satisfaction. Microsoft Network, 800/373-3676, <http://www.msn.com>

READER SERVICE NO. 768

MINDSPRING

SHORT

PRO: Lots of software, good performance, ISDN access,

SMB for Web pages. **CON:** \$35 start-up fee. **SUM-**

MARY: This popular regional service provider goes national and delivers top-notch Net access.

CUSTOMER SATISFACTION GRADE: B+



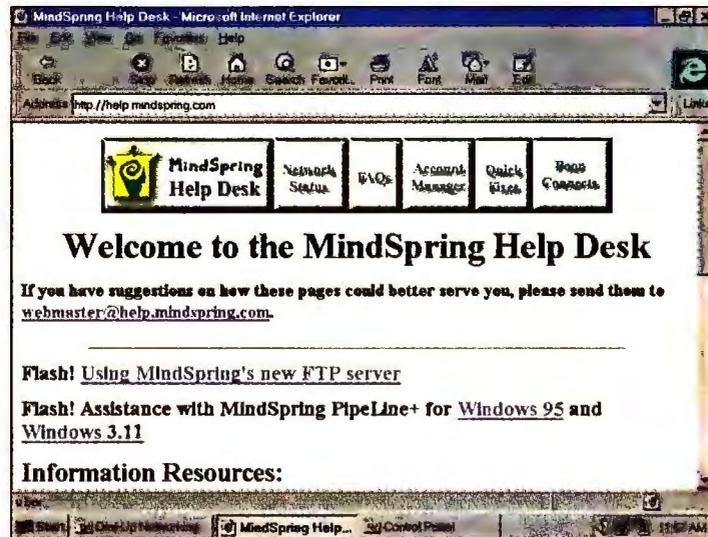
When the dust settles, MindSpring could be a top national

ISP. We caught the company as it was acquiring PSINet's consumer business, and it made for some confusing moments over the technical support phone lines. Overall, though, this was one of the best ISPs that we tested—well worth the \$35 start-up fee. In addition, MindSpring users who answered our survey raved about the service.

MindSpring delivers one of the most complete Internet

tool sets around. Programs like Internet Explorer, Eudora Lite Mail, Free Agent news reader, FTP, IRC Chat, Telnet, and other TCP/IP utilities are easily accessible from MindSpring's own launch pad. The launch pad uses Windows 95's Dial Up networking utility, so it's easy to swap in your favorite programs, such as Netscape Navigator.

If you're seeking higher bandwidth, you can take advantage of 64-kbps ISDN service in some areas of the country at no extra charge. An even faster 128-kbps ▶



MINDSPRING, perhaps the most pleasant ISP to use, offers a lot of help on its Web site, including service updates.

INTERNET SERVICE PROVIDERS

TEST REPORT

ISPs	Percentage of e-mail delivered in under 5 min.	Percentage of e-mail delivered in over 10 min.	Percentage of e-mail delivered in over 1 hour	Longest time to deliver e-mail	Average time to download file	Longest time to download file	Average time to connect to service
America Online	89	11	0	54:00	3:26	7:54	1:08
AT&T WorldNet	89	11	11	140:00	2:42	3:38	0:44
CompuServe	100	0	0	1:06	4:33	11:37	0:55
Concentric Network	88	6	0	10:46	3:55	4:17	0:53
EarthLink Network	100	0	0	3:29	2:25	4:00	0:36
GTE Internet Solutions	100	0	0	2:49	2:18	2:58	0:45
IBM Internet Connection*	100	0	0	2:36	3:42	4:05	0:49
MCI Internet	56	44	6	159:00	3:00	5:32	0:45
Microsoft Network	54	23	15	401:00	2:33	3:06	1:26
MindSpring*	100	0	0	4:54	2:42	4:20	0:47
Netcom	100	0	0	2:32	3:04	5:34	1:08
SpryNet	100	0	0	2:47	3:59	12:47	0:45

*Best Buy

Time in minutes:seconds

HOW WE TEST Reviewers spent several days connecting to the ISPs with a 28.8-kbps modem, sending 80-character e-mail messages, and downloading a 450K file. E-mail delivery times are calculated from the time the reviewer sent the message to the time it arrived at the server for our central mailbox. Connect times are calculated from the time the application was launched to the time the reviewer regained control of the Web browser. Download times are calculated from the time the file began to download to when it was completely saved to the reviewer's PC.



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ISDN connection costs an extra dollar per hour of use. And if setting up your own Web site is in your future, the 5MB of server space MindSpring provides you will do nicely.

MindSpring's home page is pretty complete and has a good technical support section. In addition, e-mail was delivered promptly and files downloaded quickly in our tests. MindSpring, 800/719-4332, <http://www.mindspring.com>

READER SERVICE NO. 769

NETCOM

SHORT PRO: Prompt e-mail delivery, friendly service, good

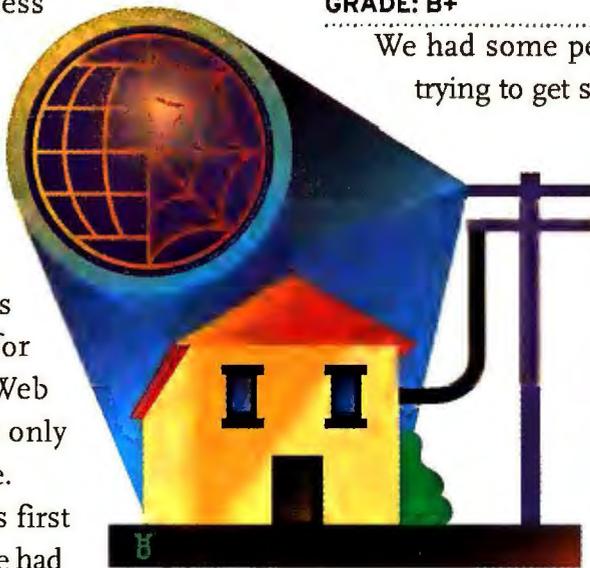
software, ISDN access. CON: Only 1MB for Web pages, no way to upload your own Web site, toll call for tech support. SUMMARY: Netcom is a big service provider that has some unhappy customers. However, we like it—for the most part. CUSTOMER SATISFACTION GRADE: D-

Netcom is one of the biggest Internet-only service providers, and our survey shows that it's having difficulty supporting its many customers. We didn't have any major problems with Netcom, but many users who responded to our satisfaction survey did. More people said they often or always had problems connecting and downloading than said they never had problems. And more people were unhappy with tech support than were happy.

Connecting to the service took longer than we'd have liked. E-mail delivery, on the other hand, was great. Every message was received in less than 5 minutes.

Netcom comes with Netscape Navigator, but you can also use Internet Explorer. Netcom also offers an online facility for creating simple Web pages, but you get only 1MB of server space.

Tech support was first rate, even though we had to foot the phone bill—it's not toll free. The people we talked to understood the Internet thoroughly and were quick to answer our questions. When we tried the automated answer system, we easily found answers to even obscure questions.



AS WE WENT TO PRESS, Prodigy went from being a commercial online service to a rich Internet service provider, complete with a \$19.95 unlimited pricing plan and, for a Web browser, a choice between Netscape Navigator and Microsoft Internet Explorer.

We tested the old Prodigy along with the other ISPs in this review and found it to be less than spectacular. PC World Online readers felt similarly, giving Prodigy Classic a D- for customer satisfaction. In our tests, e-

One of the questions we had: Could we use an ISDN modem? Netcom's answer: Yes, if you happen to live in the San Francisco Bay area; other parts of the country should have access by the time you read this, however. Netcom, 800/353-6600, <http://www.netcom.com>

READER SERVICE NO. 770

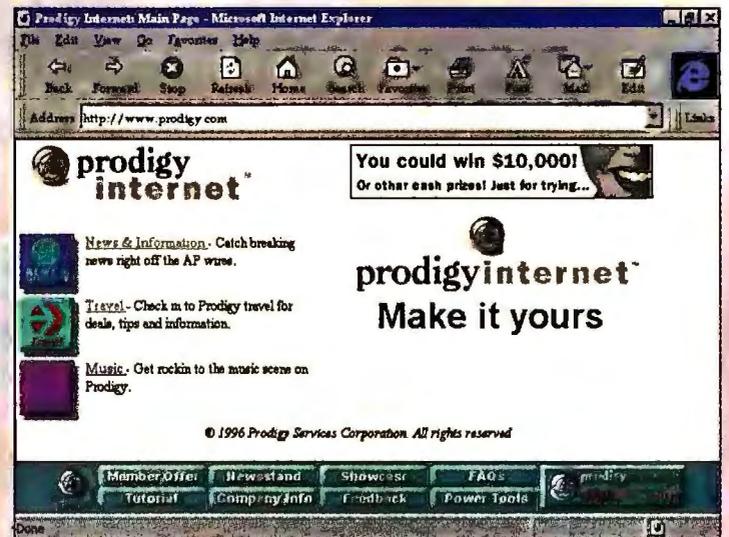
SPRYNET

SHORT PRO: Prompt e-mail delivery, useful Web site, 5MB of Web page storage. CON: Setup problems, slow downloads at rural test location. SUMMARY: If you're willing to wait for your software and fine-tune your connection, SpryNet will yield adequate results. CUSTOMER SATISFACTION GRADE: B+

We had some perplexing moments trying to get started with SpryNet, which is CompuServe's Internet-only ISP, but after that it was a pleasure to use. Both reviewers had to wait over a month to receive the software in the mail, and getting the service to run acceptably took a call to tech support.

SpryNet uses the same dial-in network as CompuServe, which explains why our reviewer in rural California experienced slow downloads with both services (other ISPs performed well in the country).

mail disappeared into cyberspace for hours, and files took their sweet time to download. To its credit, Prodigy Classic has some great proprietary content that is being rushed to Prodigy Internet. For a look at Prodigy Internet, see this month's *New Products*.



CHANGING OF THE GUARD: Prodigy Internet will benefit from its predecessor's file libraries, chat rooms, and more.

E-mail delivery was prompt in all cases.

The ISP uses its own Mosaic browser, e-mail package, network dialer, and news-group software. Mosaic is not as up-to-date as more popular browsers, so the company is planning to bundle Internet Explorer. Publishing Web pages involves downloading SpryNet's proprietary Home Page and Publishing wizards (great for novices), and you get 5MB of server space.

When we got through to tech support, the staff was helpful. But waiting on hold was no fun, especially since it was a toll call. SpryNet users who responded to our satisfaction survey are generally pleased with their choice of ISP. SpryNet, 800/777-9638, <http://www.sprynet.com>

READER SERVICE NO. 772

 For more information on ISPs, check out <http://www.pcworld.com.isps>. Brad Grimes is a senior associate editor for PC World. Senior Editor Michael Desmond, Network Test Center Director William L. Rinko-Gay, Senior Associate Editors Bryan Hastings and Harry McCracken, Staff Editor Glenn McDonald, and freelance writers Dean Andrews, Jeff Bertolucci, Jon L. Jacobi, and Owen Linderholm contributed to this article.

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REVIEWS
A New Millennium

Micron's Millennium Pro
Flies High With 200MHz
Of Pentium Pro Power

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It's Microsoft's most important product of the year. Will it be your next operating system?

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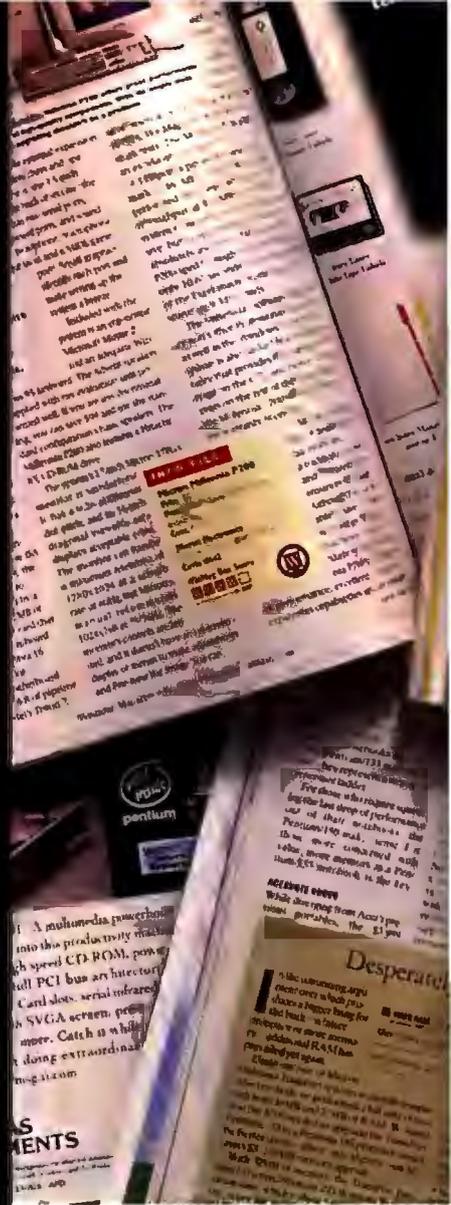
Windows NT Server: Enabling Intranet Development

TOP OF THE



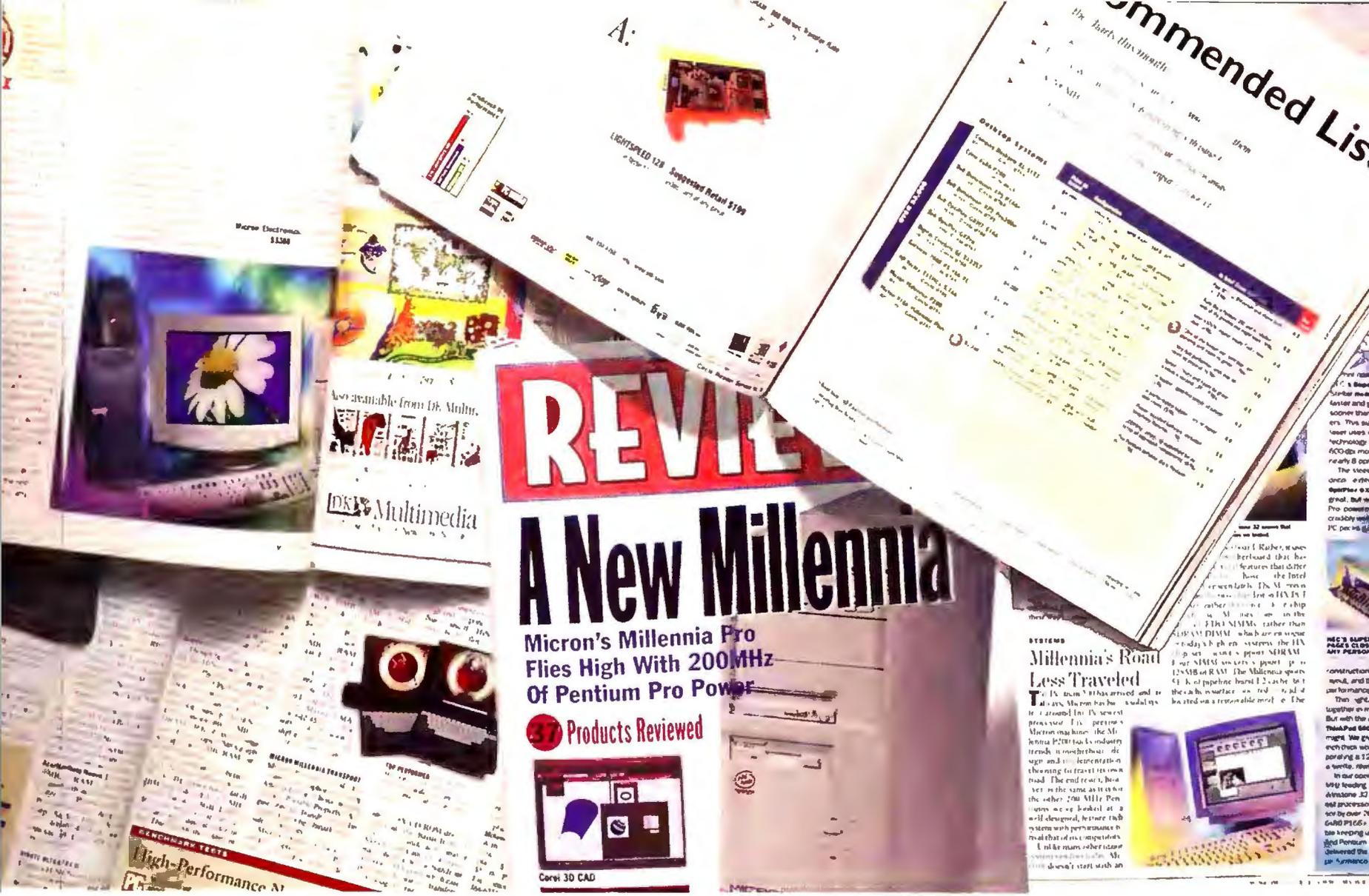
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In the past year, Micron Electronics™ has won nearly a hundred awards for product performance, customer service and support.





REVIEW

A New Millennium

Micron's Millennium Pro Flies High With 200MHz Of Pentium Pro Power

37 Products Reviewed



SUPERIOR DESKTOP SOLUTIONS

Millennium™ P200

With Intel 133MHz Pentium processor subtract \$100
 With Intel 166MHz Pentium processor subtract \$100

- Intel 200MHz Pentium® processor
- 512KB pipeline burst cache, flash BIOS
- 12X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- PCI 64-bit 3D video, MPEG, 4MB EDO RAM
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 & MS® Plus! CD
- 5-year/3-year Micron Power® warranty

- 16MB EDO RAM
- 1.6GB EIDE hard drive
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Works 95 CD
- 32MB EDO RAM
- 2.5GB EIDE hard drive
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Office Pro 95 & Bookshelf® 95 CDs
- 64MB EDO RAM
- 3.1GB EIDE hard drive
- 17" Micron 17FGx, .26dp (15.8" display)
- Microsoft Office Pro 95 & Bookshelf® 95 CDs

\$1,999
Bus. lease \$68/ma.

\$2,299
Bus. lease \$78/ma.

\$2,899
Bus. lease \$99/ma.

Millennium™ P200 Plus

With Intel 166MHz Pentium processor subtract \$100

- Intel 200MHz Pentium processor
- 512KB pipeline burst cache, flash BIOS
- PCI 32-bit Ultra SCSI Fast-20 controller
- 12X SCSI CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- PCI 64-bit 3D video, MPEG, 4MB EDO RAM
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 & MS Plus! CD
- 5-year/3-year Micron Power warranty

- 16MB EDO RAM
- 2GB Ultra SCSI hard drive
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Works 95 CD
- 32MB EDO RAM
- 4GB Ultra SCSI hard drive
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Office Pro 95 & Bookshelf® 95 CDs
- 64MB EDO RAM
- 9GB Fast SCSI-2 hard drive
- 17" Micron 17FGx, .26dp (15.8" display)
- Microsoft Office Pro 95 & Bookshelf® 95 CDs

\$2,699
Bus. lease \$92/ma.

\$3,199
Bus. lease \$109/ma.

\$4,799
Bus. lease \$163/ma.

EXCITING HOME SOLUTIONS

Home MPC™ P133

With Intel 166MHz Pentium processor add \$100

- Intel 133MHz Pentium® processor
- 512KB pipeline burst cache, flash BIOS
- 16MB EDO RAM
- 1.6GB EIDE hard drive
- 12X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- 33.6 fax/modem, speakerphone, voice mail
- Microsoft® Phone telephony software
- Internet ready: Free 1 month Spry™ Internet access, Microsoft Internet Explorer™ 3.0
- America Online® & CompuServe® trial memberships
- PCI 64-bit 3D video, MPEG, 2MB EDO RAM

- 15" Micron 15FGx, .28dp (13.7" display)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows® 95 & MS® Plus! CD
- Quicken® Financial Pak includes: Quicken Deluxe 5.0, Quicken Financial Planner™, Quicken Parents' Guide to Money™ and Quicken Family Lawyer™
- Family Pak includes: ABC by Dr. Seuss, Thinkin' Things™ Collection 1, Earthworm Jim™ and Mechwarrior™ 2
- Microsoft Home Pak includes: Works 4.0, Publisher Deluxe, Encarta® Encyclopedio, Monster Truck Madness™ and CD sompler
- 5-year/3-year Micron Power™ warranty

\$1,899

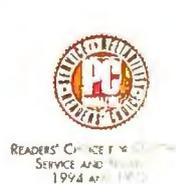
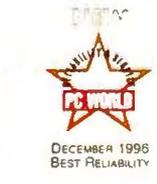
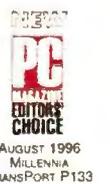
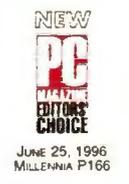
Home MPC™ P200

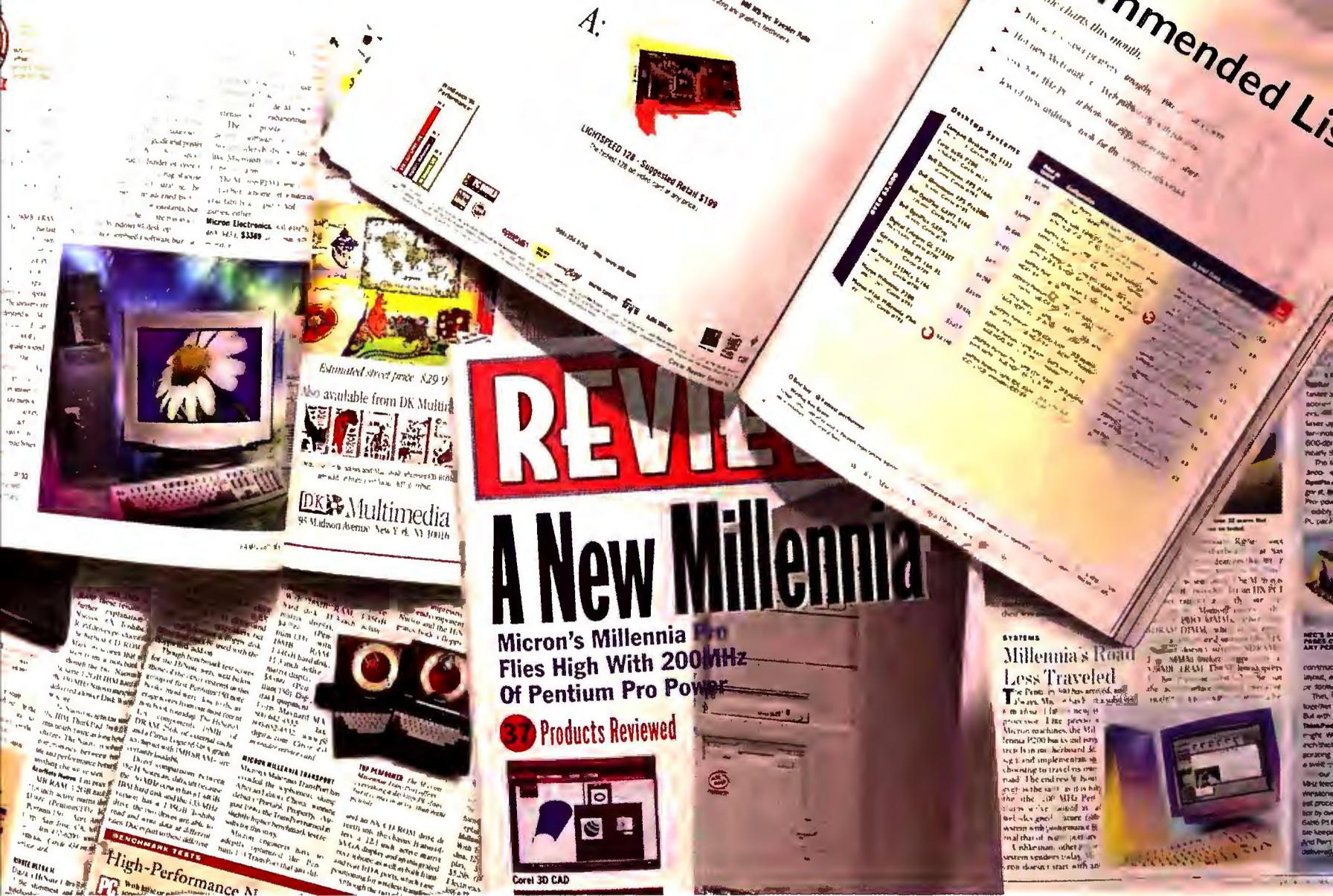
With Intel 166MHz Pentium processor subtract \$100

- Intel 200MHz Pentium processor
- 512KB pipeline burst cache, flash BIOS
- 32MB EDO RAM
- 2.5GB EIDE hard drive
- 12X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit 3D Wovetable stereo sound cord
- Advent® AV27D 2x25 watt stereo speakers
- 33.6 fax/modem, speakerphone, voice mail
- Microsoft Phone telephony software
- Internet ready: Free 1 month Spry Internet access, Microsoft Internet Explorer 3.0
- America Online & CompuServe trial memberships
- PCI 64-bit 3D video, MPEG, 2MB EDO RAM

- 17" Micron 17FGx, .26dp (15.8" display)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 & MS Plus! CD
- Microsoft Office Pro 95 & Bookshelf™ 95 CDs
- Quicken Financial Pak includes: Quicken Deluxe 5.0, Quicken Financial Planner, Quicken Parents' Guide to Money and Quicken Family Lawyer
- Family Pak includes: ABC by Dr. Seuss, Thinkin' Things Collection 1, Earthworm Jim and Mechwarrior 2
- Microsoft Home Pak includes: Works 4.0, Publisher Deluxe, Encarta Encyclopedio, Monster Truck Madness and CD sompler
- 5-year/3-year Micron Power warranty

\$2,899





DISCOVER FOR YOURSELF WHY MICRON KEEPS RECEIVING ACCLAIM.



Any PC maker can claim to offer a solution that covers your needs. But at Micron Electronics™, we prefer to let our history and our products speak for themselves. We think you'll agree it's an impressive story.

Superior Manufacturing—A Micron Tradition

Micron builds PCs with a legacy of excellence. Our manufacturing processes grew out of nearly two decades in the semiconductor business, where precision is measured in millionths of an inch, and quality in parts per million. We've built strategic relationships with companies like Intel, Microsoft and Novell. From this solid background, we're forging unbeatable systems you can count on today and tomorrow.

Award-Winning Products

In the past two years, leading industry publications have applauded Micron PCs with more than 170 awards for product performance, customer service and support. This includes *PC Magazine's* Best Products of 1995 and Editors' Choice awards in several categories. Add more than 40 *PC World* Best Buy awards and you've got an impressive technology hall of fame.

Recognized Service and Reliability

After your purchase, the story continues. Just ask *PC Magazine* readers. They bestowed on us the coveted Readers' Choice for Customer Service and Reliability in 1994 and 1995. And *PC World* readers recently rated Micron the best overall PC company for reliability and service in 1996.

Micron Power™ Warranty—An Industry First

We support our reliability promise with the industry-leading Micron Power warranty. It backs the microprocessor and main memory for five years, an industry first. Add a three-year, parts-only system warranty and a 30-day money-back guarantee, and you can rest assured that you're in good hands.

A New Millennium

Micron's Millennium Pro
Flies High With 200MHz
Of Pentium Pro Power

37 Products Reviewed



Corel 3D CAD



Hewlett-Packard LaserJet



Outstanding Performance—Don't Take Our Word for It.

Talk is cheap when you're speaking for yourself. But when it's from the mouth of an industry expert, it carries weight. Here are a few of many examples of what they're saying about Micron PCs:

Micron Home MPC™ *"... the fastest we've ever tested... as well as a marvelous family package... it wins our Top Rated award..."* —Family PC, May 1996

Micron Millennium™ *"In short, Micron covers all the bases with this Best Buy"* —PC World, March 1996

Micron Millennium TransPort™ *"... nearly a dead ringer for IBM's ThinkPad... but performs better and saves you about \$2,500."* —PC Magazine, April 1996

The Right System for You

Micron makes a suite of outstanding solutions designed for the way you work or play. From exciting home systems to custom servers, superior desktop PCs to exceptional portable multimedia solutions, Micron always comes through with a system built to satisfy. For details and prices, turn the page.

Micron Power **Warranty & Support**

- 5-year limited warranty on microprocessor and main memory
- 3-year limited parts-only system warranty
- 1-, 2- or 3-year optional on-site service agreement for Micron desktop and server systems
- 30 days of free Micron-supplied software support for Micron desktop systems; 3 optional network operating system incident resolution, included for Micron server systems
- 30-day money-back policy
- 24-hour technical support

The foregoing is subject to and qualified by Micron's standard limited warranties and terms and conditions of sale. Terms and conditions of sale may vary for specific configurations. Copies of the limited warranties may be obtained on our Web site or by calling Micron.

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ELECTRONICS, INC.

800-249-1176

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CUSTOM SERVER SOLUTIONS

Standard Features

- Intel 200MHz Pentium® Pro processor
- Dual Pentium Pro ZIF sockets
- 256KB L2 cache, flash BIOS
- Memory upgradable to 512MB
- Slots: 1 ISA, 3 PCI, 1 shared PCI/ISA
- Adapter® PCI 32-bit Ultra SCSI Fast-20 controller
- 12X SCSI-2 CD-ROM drive
- 3.5" floppy drive
- 64-bit 1MB ISA video
- 3Com® 3C905-TX Fast EtherLink® PCI 10/100-base-TX
- Full-size tower with 10 drive bays
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft® Mouse, 104-key keyboard
- NOS support (3 incident resolutions)
- 5-year/3-year Micron Power™ warranty

Vetix™ EL 1000N Server

- | | |
|---|---|
| • 32MB ECC EDO RAM | • 64MB ECC EDO RAM |
| • 2GB Ultra SCSI hard drive | • 4GB Ultra SCSI hard drive |
| • Novell® IntranetWare® 4.11 (5 user license) | • Novell IntranetWare 4.11 (5 user license) |
- \$4,099** Business lease \$139/month
- \$4,599** Business lease \$156/month

VETIX™ EL 1000 SERVER

- | | |
|--|---|
| • 32MB ECC EDO RAM | • 64MB ECC EDO RAM |
| • 2GB Ultra SCSI hard drive | • 4GB Ultra SCSI hard drive |
| • Microsoft Windows NT® Server 4.0 (10 user license) | • Microsoft Windows NT Server 4.0 (10 user license) |
- \$4,299** Business lease \$146/month
- \$4,799** Business lease \$163/month

• With Sanyo® 4/8GB SCSI DDS-2 DAT tape backup drive.....add \$999

POWER DESKTOP SOLUTIONS

Millennia™ Pro2 180

With 2nd Intel 180MHz Pentium Pro processoradd \$599
 With Microsoft Windows NT® Workstation 4.0 CDadd \$99
 *Second processor requires Microsoft Windows NT Workstation 4.0

- | | | |
|---|---|---------------------|
| • Intel 180MHz Pentium® Pro processor | • 16MB EDO RAM | \$2,199 |
| • Supports dual Intel 180MHz Pentium Pro processors | • 2.5GB EIDE hard drive | Bus. lease \$75/ma. |
| • 256KB internal cache, flash BIOS | • 15" Micron 15FGx, .28dp (13.7" display) | |
| • 12X EIDE CD-ROM drive, 3.5" floppy drive | • Microsoft Works 95 CD | |
| • 16-bit stereo sound & speakers | | |
| • PCI 64-bit 3D video, MPEG, 4MB EDO RAM | • 32MB EDO RAM | \$2,699 |
| • Tool-free minitower or desktop | • 3.1GB EIDE hard drive | Bus. lease \$92/ma. |
| • Microsoft® Mouse, 104-key keyboard | • 17" Micron 17FGx, .26dp (15.8" display) | |
| • Microsoft Windows® 95 & MS® Plus! CD | • Microsoft Office Pro 95 & Bookshelf® 95 CDs | |
| • 5-year/3-year Micron Power™ warranty | | |

Standard Features

- Dual Intel 200MHz Pentium Pro processors
- 256KB L2 cache, flash BIOS
- Memory upgradable to 512MB
- Slots: 1 ISA, 3 PCI, 1 shared PCI/ISA
- Adapter PCI 32-bit Ultra SCSI Fast-20 controller
- 12X SCSI-2 CD-ROM drive
- 3.5" floppy drive
- 64-bit 1MB ISA video
- 3Com 3C905-TX Fast EtherLink PCI 10/100-base-TX
- Full-size tower with 10 drive bays
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Mouse, 104-key keyboard
- NOS support (3 incident resolutions)
- 5-year/3-year Micron Power warranty

Vetix™ EL 2000N Server

- | | |
|---|---|
| • 64MB ECC EDO RAM | • 128MB ECC EDO RAM |
| • 4GB Ultra SCSI hard drive | • Two 4GB Ultra SCSI hard drives |
| • Novell IntranetWare 4.11 (5 user license) | • Novell IntranetWare 4.11 (5 user license) |
- \$5,399** Business lease \$170/month
- \$6,499** Business lease \$204/month

Vetix™ EL 2000 Server

- | | |
|---|---|
| • 64MB ECC EDO RAM | • 128MB ECC EDO RAM |
| • 4GB Ultra SCSI hard drive | • Two 4GB Ultra SCSI hard drives |
| • Microsoft Windows NT Server 4.0 (10 user license) | • Microsoft Windows NT Server 4.0 (10 user license) |
- \$5,599** Business lease \$176/month
- \$6,699** Business lease \$210/month

EXCEPTIONAL PORTABLE SOLUTIONS

Millennia TransPort™

- | | |
|--|--|
| • Mobile Intel Pentium® processor | • 2 type II or one type III PCMCIA slots |
| • Intel 430MX PCI chipset | • S-video and NTSC-video outputs |
| • 256KB L2 pipeline burst cache | • Headphone, microphone and line-in jacks |
| • 8X modular CD-ROM drive | • 2 infrared ports, one front, one back |
| • PCI graphics accelerator, 1MB EDO RAM | • Parallel, serial, VGA and 2 PS/2® ports |
| • Pick-a-Point™ dual pointing devices integrate both pointing stick and touchpad | • Dimensions: 11.7" x 9.4" x 2.0", weight: 6.9 lbs.† |
| • Removable EIDE hard drive | • Nylon carrying case |
| • 3.5" modular floppy drive | • Microsoft® Windows® 95 and MS® Plus! CDs |
| • Intelligent modular lithium-ion battery | • Microsoft Office Pro 95 and Bookshelf® 95 CDs |
| • 16-bit stereo sound | • Kensington™ security lock ready†† |
| • Built-in stereo speakers and microphone | • 5-year/3-year Micron Power™ warranty |
| • Motorola® Montana 33.6 fax/modem | |
- † 6.9 lbs. includes 3.5" floppy and one battery.
 †† Lock secures both Millennia TransPort and MicronDock

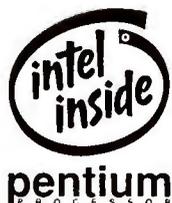
Millennia™ Pro2 360 Plus

- | | | |
|--|---|--------------------|
| • Dual Intel 180MHz Pentium Pro processor | • 32MB EDO RAM | \$3,699 |
| • 256KB internal cache, flash BIOS | • 2GB Ultra SCSI hard drive | Bus. lease \$126/m |
| • PCI 32-bit Ultra SCSI Fast-20 controller | • 15" Micron 15FGx, .28dp (13.7" display) | |
| • 12X SCSI CD-ROM drive, 3.5" floppy drive | | |
| • 16-bit stereo sound & speakers | • 64MB EDO RAM | \$4,549 |
| • PCI 64-bit 3D video, MPEG, 4MB EDO RAM | • 4GB Ultra SCSI hard drive | Bus. lease \$155/m |
| • Tool-free minitower or desktop | • 17" Micron 17FGx, .26dp (15.8" display) | |
| • Microsoft Mouse, 104-key keyboard | | |
| • Microsoft Windows NT Workstation 4.0 CD | • 128MB EDO RAM | \$6,799 |
| • Microsoft Office Pro 95 & Bookshelf 95 CDs | • 9GB Fast SCSI-2 hard drive | Bus. lease \$214/m |
| • 5-year/3-year Micron Power warranty | • 21" Micron 21FGx, .26dp (20.0" display) | |

- | | |
|--|----------------------|
| • 133MHz mobile Intel Pentium processor | \$3,999 |
| • 32MB EDO RAM (4MB max.) | Bus. lease \$136/ma. |
| • 12.1" active matrix color display, 800x600 | |
| • 1.3GB removable hard drive | |
| • 133MHz mobile Intel Pentium processor | \$4,399 |
| • 4MB EDO RAM | Bus. lease \$150/ma. |
| • 12.1" active matrix color display, 800x600 | |
| • 2.1GB removable hard drive | |

OPTIONS

- With 16MB DIMM upgradeadd \$349
- With 2nd lithium-ion batteryadd \$199
- With 2.1GB primary hard drive upgradeadd \$100
- With MicronDock™ multimedia port replicatoradd \$299
- With MicronExec™ desktop packageadd \$799
- With car adapteradd \$89
- With 3Com® ethernet 10BT PCMCIAadd \$149
- With Samsanite leather bagadd \$99



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Make a Great PC Even Better!

Custom configure your new Micron Electronics system with these popular options.

Multimedia Options

- 16-bit 3D Wavetable stereo sound.....\$59*
- 16-bit 3D Wavetable stereo soundcard w/2MB RAM.....\$99*
- Advent® AV270 Powered Partners® stereo speakers.....\$99
- Advent AV370 Powered Partners stereo speakers w/subwoofer.....\$199
- Microsoft® SideWinder™ 3D Pro joystick.....\$59

Storage/Media Options

- Adaptec® 2940U Ultra SCSI Fast-20 controller.....\$100
(upgrade from system with standard Ultra SCSI Fast-20 controller)
- Plextor™ 12PleX 12X 1.6MB/sec SCSI internal CD-ROM drive.....\$200**
(upgrade from systems with standard 12X EIDE CD-ROM drive)
- Iomega® Jaz™ SCSI drive with 1GB removable cartridge.....\$399**
- Iomega Zip™ IDE drive with 100MB removable cartridge.....\$99
- Iomega 6-pak of 100MB Zip cartridges.....\$99
- Iomega Dito™ 800 (400/800MB) Travan™ tape backup w/tape.....\$149
- Iomega Dito 3200 (1.6/3.2GB) Travan tape backup w/tape.....\$199
- Sanyo® 4/BGB SCSI DDS-2 DAT tape backup w/tape.....\$999**

Communications Options

- 33.6bd V.34 internal data/fox modem.....\$139***
- 33.6bd V.34 internal telephony data/fox modem w/full duplex speakerphone and voice mail.....\$159***†

Networking Options

- 3Com® 3C509 ethernet ISA NIC (BNC, AUI & RJ-45).....\$99
- 3Com 3C595 Fast EtherLink® PCI 10/100 NIC (RJ-45 only).....\$159
- SMC® ISA TokenCard network card.....\$199

Quicken® Financial Pak

- Quicken Deluxe 6.0, Quicken Financial Planner™, Quicken Parents' Guide to Money™, Quicken Family Lawyer™ (includes FREE TurboTax® 1996 coupon).....\$79
(available only on desktop systems with Windows® 95)

HP Printer Options

- HP DeskJet 690c printer—low-cost color printing for the home, complete with cable.....\$369
- HP DeskJet 870Cxi printer—fast color printing for the office, complete with cable.....\$519
- HP LaserJet 5L-FS printer—affordable B&W printing, complete with cable.....\$499

Options and accessories available with system purchase only.



EdVenture Pak

- Sheila Ray the Brave, Puti-Puti® Saves the Zoo™, Reader Rabbit's Reading Development Library™ 1, Freddy Fish™ and the Case of the Missing Kelp Seeds™, and the Thinkin' Things™ Collection 2.....\$69
(available only on desktop systems with Windows 95)

Display/Video Options

- 17" Hitachi® SuperScan® 1711 (15.9" display) .26dp color monitor.....\$150 ††
- 21" Hitachi SuperScan 2111 (20" display) .26dp color monitor.....\$650 ††
- Number Nine® Imagine™ 128 series II video card w/4MB VRAM.....\$500 †††
- Number Nine Imagine 128 series I video card w/8MB VRAM.....\$750 †††

Millennia TransPort™ Options

- MicronDack™ multimedia part replicator: ethernet 10BT LAN adapter, SCSI-2 port, S-video and NTSC-video output, built-in stereo speakers, infrared port, headphone, microphone, line-in jacks, parallel, serial, VGA and 2 PS/2® parts.....\$299
- MicronExec™ desktop package: matching black 17" monitor (15.8" display) with matching black mouse, mousepad and keyboard (can be used with or without MicronDack).....\$799
- Matarala® Mantana 36.6 fax/modem supports regular telephone connections, cellular phones and two-way paging devices.....\$259
- 3Com ethernet 10BT PCMCIA.....\$149
- Samsonite® leather bag.....\$99
- 2nd modular lithium-ion battery.....\$199
- 2nd hard drive (1.3GB).....\$599
- 2nd hard drive (2.1GB).....\$699
- 16MB DIMM upgrade.....\$349
- Car adapter.....\$89

Service Options

- Extended 2-year on-site service coverage for desktop systems.....\$99
(upgrade from optional 1-year on-site service coverage)
- Extended 3-year on-site service coverage for desktop systems.....\$139
(upgrade from optional 1-year on-site service coverage)
- Complete on-site PC installation (call Micron Electronics™ for details).....\$159

Other Options

- APC® Per7T surge suppressor.....\$39
- APC Pra7T surge suppressor.....\$59
- Microsoft Natural Keyboard®.....\$49
(upgrade from standard keyboard)

* Upgrade from systems with standard 16-bit stereo sound card

** Requires SCSI host adapter

*** V.34 modem includes trial memberships to CampusServe®, Pradigy® and America Online®

† Requires sound card

†† Upgrade from systems with standard Micron 17" 17FGx color monitor

††† Upgrade from systems with standard 64-bit 2MB video card

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Information

inform

Welcome to
Finally, find out what's

in overdraft

spend

develop

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Beat Information Overload

E-mail, faxes, voice mail, pages, meetings...where will it all end?

Follow these strategies to keep your head above water and get some real work done.

BOB ROSS had the kind of office setup most of us would kill for, with all the bleeding-edge conveniences a knowledgeable technology executive could gather. There was just one problem, according to Ross: "I couldn't get my work done.

"I would start the morning with 40 e-mail messages, the phone ringing off the hook, the fax going, and that's on the few days I was in my office and not on the road," says Ross, the New York-based VP of engineering for CBS television stations across the United States. He had a bright and capable personal assistant to handle

the standard sorting and gatekeeping chores, but Ross was also laden with the personal technologies that busy executives carry in their suitcases—cell phone, notebook computer, two way pager, and portable printer. The very tools that made him immediately accessible to station managers everywhere were stealing precious minutes of productivity. Something had to be done.

Ross admits that "I still haven't found that Holy Grail," but he *has* found some solutions. By prioritizing his e-mail and investing in technology to help him get a handle on it, Ross discovered that he ►

BY DENNIS ESKOW

didn't have to fall victim to the age of information. And neither do you. By posting information where people can get it themselves, by keeping organized, and by being selective about which messages you return, you can stay informed but still get some work done.

"Technology that's supposed to make you more efficient can wind up wasting your time," says Jay Conrad Levinson, a marketing guru who advises owners of small companies to seize every technological opportunity to defeat big corporations. "We can fritter away days distracted by our e-mail, faxes, and meetings. We have to stay on top of these things."

But how? Those messages keep on coming and we have to respond somehow. In emergency rooms, doctors practice what is called *triage*: They must decide which patient needs immediate attention. For example, you don't set a broken finger before attending to a heart attack victim just because the patient with the broken finger came in first. Handling problems as they come in is inefficient and ineffective in any field. Triage applies to your work even when lives aren't at stake.

Information triage involves prioritizing, delegating, and just letting some things

slide. As e-mail messages, faxes, phone calls, and other communications flood in, you must learn how to make quick decisions about what to do with them. Remember, you don't have to answer, or even read, every single message. The fewer messages you must deal with right away, and the more you can pass on to other people—or even throw away without reading—the better.

And getting too many messages isn't the only cause of overload. To keep the flow of information under control, you must learn how to handle, or perhaps

Fact

Sales representatives spend an average of 25 minutes per day playing telephone tag. SOURCE: RUECKGAUER SYSTEMS ASSOCIATES, WASHINGTON, D.C.

avoid, those ubiquitous business meetings, and learn to be selective when searching the World Wide Web and downloading information from the Internet.

Today's technology floods you with information. Either you take what you need and discard the rest, or you'll drown in it. Here are some ideas to help you keep your head above water.

E-Mail Avalanche

ACCORDING TO CBS TV'S Ross, those electronic messages flitting about on private networks and the Internet can be dangerous. If you don't control the process, Ross warns, "your productivity will get crushed by the endless messages."

If you want a textbook example of e-mail triage, note one of the first steps Ross took to deal with his e-mailstrom. A self-described pragmatist, Ross began to teach himself how to filter e-mail. "I started to use filters [in the e-mail packages them-

selves] to help me prioritize messages from key people—separate them from the other incoming stuff," he recalls. "And I developed an internal filter of my own: You have to learn how to read message headers to train yourself in what's urgent and what's trivial."

The main rule of e-mail triage is to watch the headers. Who is the message from? Give messages from your boss and your clients priority. What is the subject? You would open a note that says "change of schedule" immediately. But you might take longer to get to one that says "Read attached article."

Prune Before Reading

AND DON'T BE AFRAID TO delete messages without even reading them. "You have to create your own set of rules and adhere to them," advises Lynn Lively, author of *Managing Information Overload* (Acom Books, 1996, 800/262-9699). "You ought to be able to say to yourself: I will only read the messages that pertain to my issues or that come from my boss. Everything else I will read on an as-can basis. I will hold the as-can mail for two days and then automatically dump those notes I haven't gotten to yet."

Of course, you'd get fewer e-mail messages in the first place if you

Emergency!

YOU'RE FLOODED WITH E-MAIL, voice mail, and paper. How do you decide which messages to handle immediately, put off until later, pass along to someone else, or throw away? That's where *triage*, a medical term for prioritizing emergency situations, comes in.

Initially, give each message as little time as possible. With e-mail, what can you tell by the header? With paper, the envelope? Get the general gist of the message, and ask yourself the following questions:

- **Who is it from?** A message from your boss or from an important client takes precedence over a note from someone you've never heard of.
- **Are you the best person in the office to handle it?** Perhaps one of your staff can take care of this request for you. Or maybe it falls into someone else's area of expertise? Remember, you can always forward a message.
- **How soon is the deadline?** Something that's due tomorrow takes priority over something that isn't due until next week. And if you don't have to act on the message, hold it for later.



- **Is it important in the long term?** If the message is important but there's no deadline, put it aside. Leave yourself half an hour at the end of the day to go through long-term important messages. And make sure to take that time every day.
- **Would anything bad happen if you ignored the message entirely?** If the answer is no, deep-six it.
- **Does it look nonessential but interesting?** Some messages are worthwhile simply for their entertainment value—for instance, funny stories that people e-mail to everyone they know. If you're swamped, set these messages aside for later.

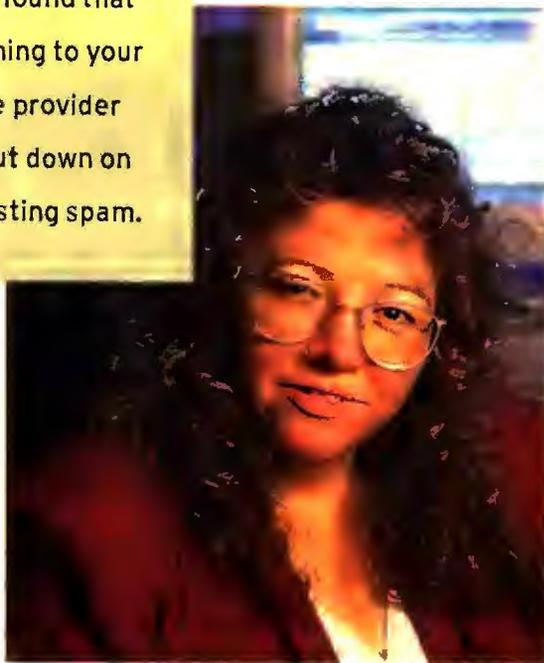
were stingier with your e-mail address. Give it only to people who need it. "Don't put it on your business card," suggests Lively. "Not unless you love e-mail. I put just one phone number on my business card, and I give my e-mail address only to those I want to hear from every day."

Lively acknowledges that less e-mail may mean more phone calls and faxes. If that describes your situation, she advises you to give out a single phone number and e-mail address, and keep control of your messages through a second important rule of e-mail triage, closely related to the first: Open e-mail only at set times during the day—for instance, when you arrive in the morning, after breaks, and at the end of the day. "The whole point of e-mail is that the other person doesn't know when—or even if—you looked at it," she says. "If you constantly reply to e-mail messages, the little buggers multiply."

Unwanted, Unloved, and Sometimes Unwholesome

THEN THERE ARE MESSAGES that have nothing to do with getting your job done: pep talks; announcements of promotions in other departments; reminders to fill out a form by Tuesday that you personally don't have to fill out at all; and of course, those allegedly (and sometimes genu-

Business owner Fran Barclay found that complaining to your service provider helps cut down on time-wasting spam.



inely) funny stories that get sent to everyone on a mailing list.

Finally, there's *spam*—advertising sent via e-mail to massive Internet mailing lists. These unwanted messages try to lure you into everything from electronic chain letters to pornographic Web sites. Fran Barclay, owner of Fran's Office Services in Bothell, Washington, learned about spamming the hard way. Soon after giving her company a presence on the Web, she began to receive truckloads of unwanted e-mail from pranksters, hucksters, and Web surfers with too much time on their hands. Eventually, however, Fran got mad as hell and refused to take it any more.

"You don't have to take other peoples' junk," she says. "I learned to put a note in large letters with my phone numbers,

'Only Interested Parties Need Call.'" That simple step reduced junk mail by almost half. Most of the rest of it went away when she sent notes of complaint to her service providers, America Online and CompuServe. "Online services are very responsive to customers who refuse to be pushed around," she says. All the major Internet service providers and commercial online services have some kind of antispamming policy, but you have to complain to get action. If you are spammed, save all the data from the header, including the return address and any other e-mail addresses, then contact the service provider. Spamming is often grounds for getting kicked off the service.

Lowering Your Voice Mail

"I'M STANDING IN the lobby with a client at General Electric," remembers Tony Castle, president of the Castle Group in New York. "I'm concentrating on what the client is saying and suddenly my cell phone starts to ring. It keeps ringing and ringing, and I'm trying not to notice that my client is trying not to notice. Finally, we shake hands and part company. And the phone stops. Right then."

Murphy's Law reigns supreme: Phone calls come at the worst possible time. And if you don't pick up the phone when it rings, the calls turn into voice mail— ▶

E-MAIL: Tips for Lightening Your Load

1. Check e-mail headers. Read the subject header first, and then decide if you should open the message. If your e-mail program displays the length of the message, check that as well. Don't waste your time reading long and unnecessary e-mail messages.

2. Dispose of e-mail immediately. If your e-mail program allows it, create folders for your various projects and drag your messages into the appropriate folders as soon as you've read them. If your e-mail program doesn't allow folders, cut and

paste your messages into a word processing file.

3. Treasure your e-mail address. To limit unwanted e-mail, give your address only to special clients, colleagues, coworkers, and others who really need it.

4. Use just one mailbox. If you have multiple e-mail addresses with different services, give out only one of them to coworkers and business correspondents. And find one e-mail front end that

will handle them all. Possibilities include Microsoft Office 97's Outlook, Eudora Pro, and Windows 95's bundled e-mail program, called either Microsoft Exchange or Windows Messaging, depending on the version.

5. Write brief responses. Correspondents who write to you frequently will adopt your style.

6. Stop repeated spam. When you receive spam, check the bottom of the sales pitch for an

"autoresponder" address. Send an e-mail message to the address with the word *remove* in the subject area, and you'll probably be removed from the mailing list. If you're not, find out whether your service provider has a customer service department that will deal with spammers. A squeaky wheel gets less garbage.

7. Prevent needless responses. Let your correspondents know when they don't need to respond. Make sure you haven't invited a response when you don't want one.



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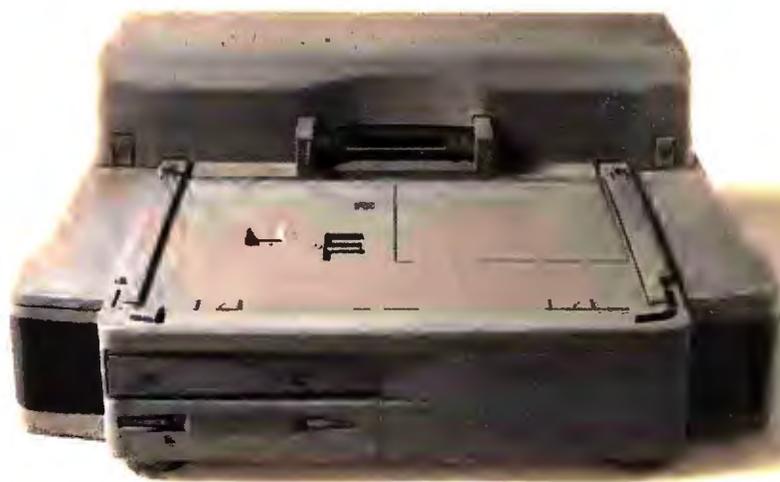
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more messages awaiting your attention. And if you respond and get the original caller's voice mail, you have the worst situation of all: telephone tag.

You generally can't scan for headers in a voice-mail system, so triage in this case involves listening to as little of the message as is necessary to figure out who it's from and what it's about. Then you must decide whether to act immediately, forward the message along to someone else, save it for later, or delete it.

After the cell-phone-and-client incident, Castle decided to subscribe to Wildfire Electronic Assistant, a digital answering service with some unique features. For one thing, you give it your schedule and it knows where to reach you.

With Wildfire, anyone who calls you gets a voice-activated "assistant" that asks the usual questions (Who are you and

why are you calling?), records the answers, and then asks the caller to hold while it locates you. If you're on the other line, Wildfire can cut in and whisper in your ear so that only you can hear it. ("You have a call waiting on line one from Mister Clinton. He wants your political views.") If you don't respond, Wildfire will return to the caller, say you're in a meeting, and ask for a telephone number.

Fact

Nearly 7 minutes of productivity is lost per day per employee because of e-mail errors such as hitting the Send button too quickly.

You can program Wildfire Electronic Assistant to respond differently based on who is calling—"If it's my wife, tell her I'll call her before noon. If it's the office tell them I will return the call within the hour. All other callers can leave a message." Prices for the digital answering service vary, but the average cost per user is around \$150 a month.

What Goes Out

IF YOU CAN REDUCE the number of calls you receive, you might not need an expensive answering service or voice-mail system. One way to limit the number of messages coming in is to think wisely about the messages going out. If you leave the right kind of messages on other people's voice mail, and if you provide people with the correct information in your outgoing

message, you'll find you have fewer return calls to make later on.

Dial Claudia James's phone number and you'll get one of two messages: One says she's out of the office or away from her desk, and the other tells you she's on the phone with a client. Her voice-mail system, supplied by her local phone company, changes the message if it gets a busy signal, allowing James to reassure clients that she'll call them back promptly, which keeps them from panicking and trying to get through to her in some other way. A good outgoing message "directs the traffic," according to James, who adds that her outgoing messages provide information to callers that helps them choose the best way to contact her.

VOICE MAIL: Tips for Lightening Your Load

1. Check voice mail often. Going hours without checking voice mail causes *message bump*, where the same person calls you over and over with the same message. Check your voice mail at least three times a day to avoid the problem.

2. Skip the outgoing message. The next time you get someone's voice mail, try pressing your phone's star (*) or pound (#) key. One of them is likely to skip the rest of the outgoing message and put you straight through to the beep, so you can leave your message. And pressing the zero key usually takes you out of voice mail altogether and puts you through to a human being. Usually, but not always—some voice-mail systems regard the pound, star, or zero key as an order to disconnect the call.



3. Discourage return calls. When you leave a voice-mail message for someone else, try to frame it as a communication that doesn't require an answer, and say explicitly that you don't need a response.

4. Return calls late at night. If you have to return a phone call but you don't want to engage in a real conversation, try returning the call late at night when you are sure to get the recipient's voice mail rather than a human being. Leave a succinct message that does not require a response. Just make sure the number you're calling isn't a home phone number.

5. Have a short but comprehensive outgoing message. Create an outgoing message that is quick and reasonably friendly. The perfect message

greet the caller, identifies you and your company, asks the caller to leave a detailed message, gives the caller the option of contacting someone else right away, and closes courteously.

6. Change your outgoing messages. Your callers shouldn't get the same outgoing message when you're on the phone as when you're on vacation. Change your voice-mail message if you're going to be out of the office for an extended period of time.

7. Let callers skip your outgoing message. Find out which Touch-Tone key skips the outgoing message on your office voice-mail system, and tell your callers about it in your outgoing message. If you want first-time callers to hear your entire message, give them this information at the end of your message, so they'll know what to do next time.

Outgoing Approach

THE SAME RULES APPLY to the messages you leave on other people's systems. Pastor Carl C. Alexander of Tabernacle of Praise Church in the Bronx hosts a weekly show on WWDJ radio and frequently speaks at seminars on executive decision making. "When you leave a message for someone," he says, "it should give them the opportunity to take action. If you simply say, 'This is Pastor Alexander calling'...you have guaranteed that they will call you back rather than do what you intended them to do."

Alexander says effective voice mail starts with personal efficiency: Identify yourself and get directly to the point, stating your business and anticipating what the person you are calling might want to know. If you



Binary Arts may make toys, but for Blaine Christian, information technology manager, the problem is paper.

was created by someone else. And Binary Arts has been able to use Outlook as a universal e-mailbox as well, receiving e-mail from America Online, CompuServe, and Office Mail.

Christian hopes eventually to have Outlook handle the company's faxes, as well.

Pulp Friction

PAPER, ONE OF THE oldest communications media, has long been a symbol of message glut. Early in their first term, Bill Clinton and Al Gore posed for a sensational photo on the White House lawn, standing amid tons of reports, booklets, and letters symbolizing what they had done to cut paperwork. Gore declared that the paperwork reduction would speed the patent process by six months.

"Paper takes a very long time to travel," declares Alan Rueckgauer, president of Rueckgauer Systems Associates, a computer consultancy in Washington, D.C. "There are buildings in Washington where a paper document takes days to go from the first to the fifth floor. That kind of delay—in an atmosphere where some messages are taking less than a second to get around—creates confusion."

Fax machines, which just move paper faster, have only made things worse. A fax is as easy to send as e-mail. But for the recipient, it's still that clumsy old paper.

The worst result of that inequity is junk faxes, which are like e-mail spam ▶

get a return call that asks, "What kind of data do you need?" you left the wrong kind of message.

Office of Dead Trees

AT BINARY ARTS, paper is the enemy. "Picture a salesperson holding a phone with one hand and thumbing through a datebook with the other," says Blaine Christian, information technology manager for the Alexandria, Virginia-based toy company. "The customer on the other end asks a question, and now the salesperson is fumbling all over the desk for a report, completely unaware that the needed figures are in a fax that just came down from accounting. And the salesperson also doesn't know that the appointment being set up during this phone call coincides with an important department meeting. Our sales force, our marketing department, all of our employees are in a constant message mode," says Christian. "There's a lot of wasted energy when you have to look all over the place."

Christian decided to get rid of paper and do everything electronically. Binary Arts' primary tool was Outlook, an information

manager and universal in-box in Microsoft Office 97, which the company beta-tested. (For a preview, see "Microsoft Office: What's New for '97?" in this issue.)

With everyone keeping their notes and appointments in Outlook, there aren't nearly as many scraps of paper floating around. Binary Arts employees can find what they're looking for easily, even if it

PAPER: Tips for Lightening Your Load

- 1. Throw it away.** When you pick up a piece of paper, insist that it give you a good reason to keep it.
- 2. Make sure the fax machine is attended.** An unattended fax machine rapidly creates a log jam. Someone should check it regularly.
- 3. Avoid publishing fax numbers.** To cut down on junk faxes, don't list your fax number in a phone directory or a newspaper ad unless you include phrases that specify
- 4. Complain loudly.** Let the Better Business Bureau and your utility commission know about any business that sends junk faxes. The offender will stop.
- 5. Use a fax-modem.** Faxes in your computer are easier to sort, store, and delete than are pieces of paper. Set up your computer to receive those faxes.
- 6. Use faxback.** For such jobs as letting your customers know that their orders are being processed, set up an automatically responding faxback service. With the right software, most contemporary fax-modems can handle this function.



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except that you pay for the ink and paper. The solution is pretty much the same as with unwelcome e-mail: Let junk fax pushers know you won't take it, and contact your local telephone company and Better Business Bureau authorities.

Let It Go

WHEN PAPER ARRIVES by the bagful, what's the triage? Says Alexander: "Throw things away. Paper is something that should have a last stop." If a piece of paper doesn't direct you to action, or state that it must be saved, it should be tossed. Paper is often kept in files just because it's paper, Alexander observes.

Go through your mail, including faxes, once a day—twice at the most. Challenge each piece of paper to show you, as quickly as possible, why you shouldn't throw it out. If the paper meets the challenge (and most pieces won't), act on it, place it in a to-do stack, send it to someone, or file it.

Meanwhile, keep your own paper con-

sumption down as much as possible. "As you sow, so shall you reap," quips marketing guru Levinson. "You can cut down on paper by producing less paper."

The Medium Is the Meeting

THE MEETING HAD STARTED 25 minutes late and now it had become hopelessly bogged down. The marketing manager who called it hadn't expected any

serious opposition to her plans. But now she was embroiled in a heated debate about the value of the marketing plan itself. The meeting dragged on for hours and ended without a clear resolution. Everyone walked away in frustration.

"I worked for someone else when I ▶

MEETINGS: Tips for Lightening Your Load

1. Be sure you need a meeting. If you need to get facts straight or solicit opinions, use e-mail. Don't call a meeting unless you have brainstorming to do or need to iron out a group problem.
2. Have an agenda for all meetings. Ask to see the agenda beforehand, or bring your own if none is provided.
3. Ask for RSVPs. When you first set up a meeting, ask people if they plan to attend. If you fail to do so, those you invite won't feel obliged to check their schedules until the last minute.
4. Write everything down. If no one is taking notes, there may as well be no meeting. By the end of the meeting, there



should be a written resolution or plan of action for every item on the agenda. Post these notes where everyone can read them.

5. Answer every question. If you don't understand a participant's question, rephrase it and then answer what you think was being asked. This keeps your meeting moving along smoothly.



Just How Overloaded Are You?

NOT ENOUGH time for all the information in your life? Not enough time for a life? Take a few minutes anyway to see how you score in *PC World's* Information Overload Quiz.

How many ways to reach you does your business card list?

- One [0 points]
- Two [1]
- Three [5]
- We're using a smaller font [10]

When do you check messages?

- Every hour [0 points]
- Twice a day [3]
- At the end of the day [4]
- I've forgotten how [10]

How many e-mail messages do you get on an average day?

- Fewer than 10 [0 points]
- 11 to 40 [5]
- Over 40 [7]
- There's no end to the list [10]

How much of your e-mail is from people you don't know?

- None [0 points]
- A modest amount [5]
- More than half my e-mail [7]
- More than Brad Pitt [10]

How old is the oldest unread message in your mailbox?

- Less than 6 hours [0 points]
- 6 to 24 hours [3]
- 25 to 48 hours [5]
- The time stamp has faded [10]

How much time do you spend on the Web each week?

- 10 hours or less [0 points]
- 11 to 15 hours [5]
- 16 to 21 hours [10]
- I'm supposed to leave? [20]

Your useful-to-fun Web site ratio:

- 3 to 1 [0 points]
- 2 to 1 [5]
- 1 to 1 [10]
- There are useful Web sites? [15]

How many phone calls do you get a day?

- 5 or fewer [0 points]
- 6 to 8 [5]
- 9 to 12 [8]
- Can I get back to you on that? [10]

The pile of papers in your in-box is:

- about a half inch thick [0 points]
- Used to prop up the table with the broken leg [5]
- Referred to around the office as the Big Kahuna [7]
- What in-box? [15]

How many meetings do you usually attend in a week?

- 3 or less [0 points]
- 4 to 6 [3]
- 7 to 10 [6]
- I'll call a meeting about it [10]

How many of these meetings run over their scheduled times?

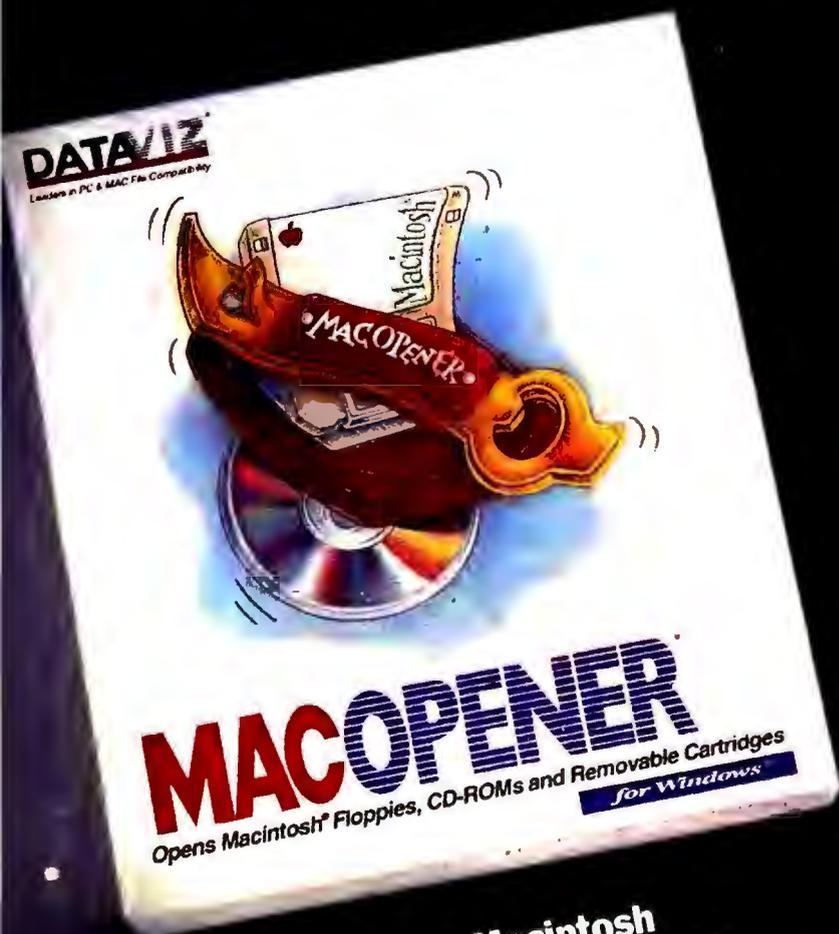
- None of them [0 points]
- Less than half of them [3]
- Most of them [6]
- Hard to say—the meetings have all run together [10]

Have you ever fallen asleep in an important meeting?

- No [0 points]
- Once [2]
- It's a long story [5]
- I'm sorry, what did you say? [10]

SCORES: [0-10] Get a job! [11-50] You're cool—don't change a thing. [51-80] You're warm. Get better organized. [80-120] Slow down, take a vacation. [121 or above] Get a life!

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experienced something like that," says Lynn Lively. "I wouldn't stand for it today. A meeting is a medium for communication. If it doesn't seem to have a point, it's just noise."

At the center of most data smog is something few people think of as a medium—the meeting. But let's face it, meetings are basically another way to share information; nowadays they're held in offices, on the road, via the Internet, and in video conferencing or telephone conferencing facilities. And all these meetings eat up valuable time and generate loads of paper. If you're getting called to

mind—a limit you lay on the table right at the beginning of the meeting.

"Time and communications have one thing in common," says Lively. "Give up your responsibility for yourself, and you will wind up in some kind of smog."

Oh, What a Web

INFORMATION DOESN'T have to be uninvited to swamp you. Thanks to the World Wide Web, every research project is now an opportunity to drown in data.

Brad Edwards hoped that he could search for potential market-

ing partners on the Web, but he got more than he bargained for. "I didn't know anything about how the search engine worked," he remembers.

Edwards' company, My Fortune, is a San Francisco manufacturer of plastic fortune cookies that are given away as keepsakes at weddings and business functions.

Entrepreneur Brad Edwards searched the Web for partners and got thousands more than he bargained for.



Edwards used Yahoo to search for wedding consultants, and within minutes he had access to thousands of sites on the World Wide Web, many of them run by wedding gown designers and business consultants.

"The trick to making a Web search efficient is to use the right search terms," advises syndicated small-business ►

Fact

One out of 5 minutes spent on voice mail is lost to fumbling through menus.

too many meetings, and you're wrestling with a schedule that can't handle any more of them, triage calls for bold action.

Sometimes you've just got to say, "Sorry, but if I'm going to get that report to you on time, I really can't attend that meeting." If you know that a flat refusal won't work, you can try, "I can only stay for 30 minutes," or at least, "Can I see the agenda ahead of time?"

There's no escaping some meetings, and others are simply too important to miss. But if you're finally settling down to check your morning mail at 5 p.m., it's time to cut back. Remember: Meetings are for brainstorming, or for making sure everyone's on the same wavelength. For anything else, use e-mail.

"Meetings are a good test of how much control you have over your message environment," says Lively, who speaks at meetings constantly. "You have to decide what's important before you walk in. You must set your own agenda or you can lose control of your own life."

Carl Alexander has a similar warning. "Write everything down," he says. "And even more importantly, make sure what you write down has an action item attached to it. Don't have a meeting that doesn't have an agenda—not even a telephone conference."

If the person who is calling a meeting will not provide you with an agenda, both of these experts suggest that you set one yourself and then stick to it. And make sure that you have a firm time limit in

Handling Information on the Road

A TIDAL WAVE of messages is bad enough at the office; but when it hits you as you're hopping from planes to meetings to hotels, it's a nightmare. Here are five tips for handling message overload on the road.



1. Set up an autoresponse. It's good to let people know you're not on your regular schedule. If your e-mail system has the feature, set up an autoresponse—often called a vacation response—to reply automatically to every message you receive.

2. Direct voice-mail traffic. Leave an outgoing message that tells callers you're gone, promises you'll be checking voice mail regularly, and identifies who to call in your absence.

3. Emergency connection. Plan for emergencies back home. Make sure someone at the office—and someone in your family—has your pager number or another way to contact you quickly.

4. Don't pack paper. In the course of a business trip, you're likely to be given enough reports, memos, and faxes to bury a bureaucrat. Excess paper weighs too much to lug around an airport, so when

you're packing for home, look your pile over and decide what you can throw away. If you still have a lot to take home, get a box and ship it back on its own.

5. Be realistic. Make sure you accurately schedule travel time between appointments, and keep a close eye on your wristwatch. Late arrivals and long stays can create follow-up communications nightmares that will tie you in knots.

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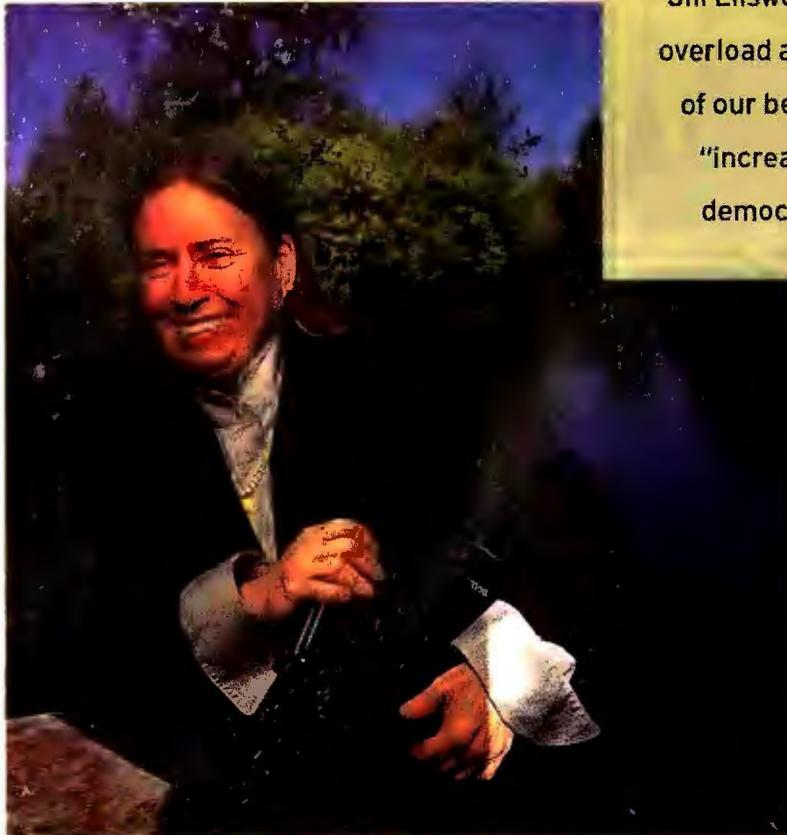
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columnist Paul Tulenko. Syntax that will tell one search engine to look for the term *wedding consultant* tells another to list any page where either word appears by itself. "You have to learn how to use the tool right." (For more information on search engines, as well as on metasearch tools, search assistants, and offline browsers that can help you do more complete and controlled searches, see "Searching Is My Business: A Gumshoe's Guide to the Web," December 1996.)



Professor and author

Jill Ellsworth sees overload as a result of our becoming "increasingly democratic."

Using a search engine wisely is a skill you must learn. "The best search engine is sitting on your shoulders," explains Alan Rueckgauer, who recommends using the scoring systems on search engines to rank search results in order of relevance. "If you word your query well—using simple textbook logic—the answers that come back with scores of 90 to 100 percent will be what you want, and you can eliminate hours of time wasted looking through the lower-scoring words."

George Suter, president of Access Management Corp. in Charlotte, North Carolina, knows the value of patience while searching the World Wide Web. "Sometimes when you point to a specific page, you get a message back that it is busy or out of service," notes Suter. "Busy on the Internet could be one second of time. I

have learned to go right back to the site after you get the message, and you will connect the second time."

All Together Now

WE ARE, THE POPULAR wisdom says, an information society. But technologies that are supposed to help us can sometimes frighten and choke us, turning our lives

Fact

Five minutes of every hour on the Web is spent waiting for pages to load.

and work into one big meeting.

To make your life easier, you should begin by deciding on one preferred way of receiving messages: e-mail, telephone, or paper (including faxes). Each medium has its benefits and drawbacks.

the recipient pretends not to have noticed it. Voice mail offers the promise of a real-time conversation, if you get through to someone; but it's inherently vague (you rarely remember exactly what someone said), interrupts you, and can turn into telephone tag. Faxes and the good old U.S. mail create a paper trail, but all that paper clutter is bothersome to deal with and communication usually moves slowly.

Whichever communications medium you settle on, encourage your clients and associates to use that form when they contact you. You'll still get messages all three ways, but you'll at least shift the balance in your favor.

Perhaps around the corner lies a new technology that will integrate everything—a perfect Wildfire or Outlook that works with anything. But until that comes, your first line of defense is triage.

"We're becoming increasingly democratic," says university professor and Inter-

net consultant Jill Ellsworth, coauthor (with Matthew V. Ells-

worth) of *Marketing on the Internet* (Wiley & Sons, 1995, 800/225-5945). "That means anyone with an idea can speak up. And that's why your phones are ringing, e-mail's piling up, and faxes are pouring out of your machine. If you want to make it all work together, you have to be flexible and you have to be willing to lead."

Microsoft Office 97, \$499 street, Microsoft Corp., 800/426-9400, 206/882-8080, <http://www.microsoft.com>

READER SERVICE NO. 788

Wildfire Electronic Assistant, \$150 to \$200 per month, on average, prices vary; Wildfire Communications, Inc., 800/945-3347, 617/674-1500, <http://www.wildfire.com>

READER SERVICE NO. 789

Dennis Eskow, former Editor in Chief of Home Office Computing and InformationWEEK, is a consultant and writer based in New York.

THE WEB: Tips for Lightening Your Load

1. Hit it again. If your browser gives you an error message when you type in a URL, try it again immediately. You might have hit some traffic.

2. Choose one search tool and learn it well. At one search site, the syntax may be **restaurant AND tax**, while at another it's **restaurant + tax**. If you stick to one search tool, you won't get confused.

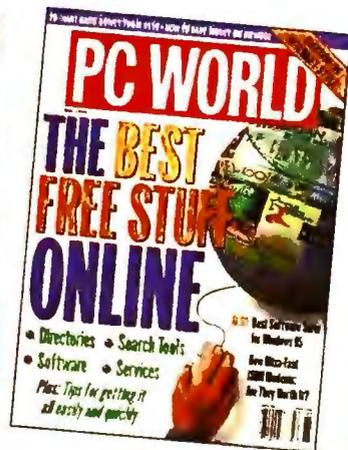
3. Use near searches. Settle for a search tool that does near searches. For instance, while **restaurant AND tax** will find any page with those words on it, **restaurant NEAR tax** will only show pages where the words are no more than 10 words apart (the maximum will vary among browsers).



4. Bookmark distractions. Don't blindly follow any links that are irrelevant to the subject that you're researching at the moment, no matter how interesting they might seem to you. If you just can't control yourself, bookmark tempting links for your future enjoyment.

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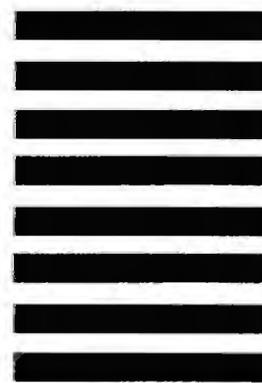
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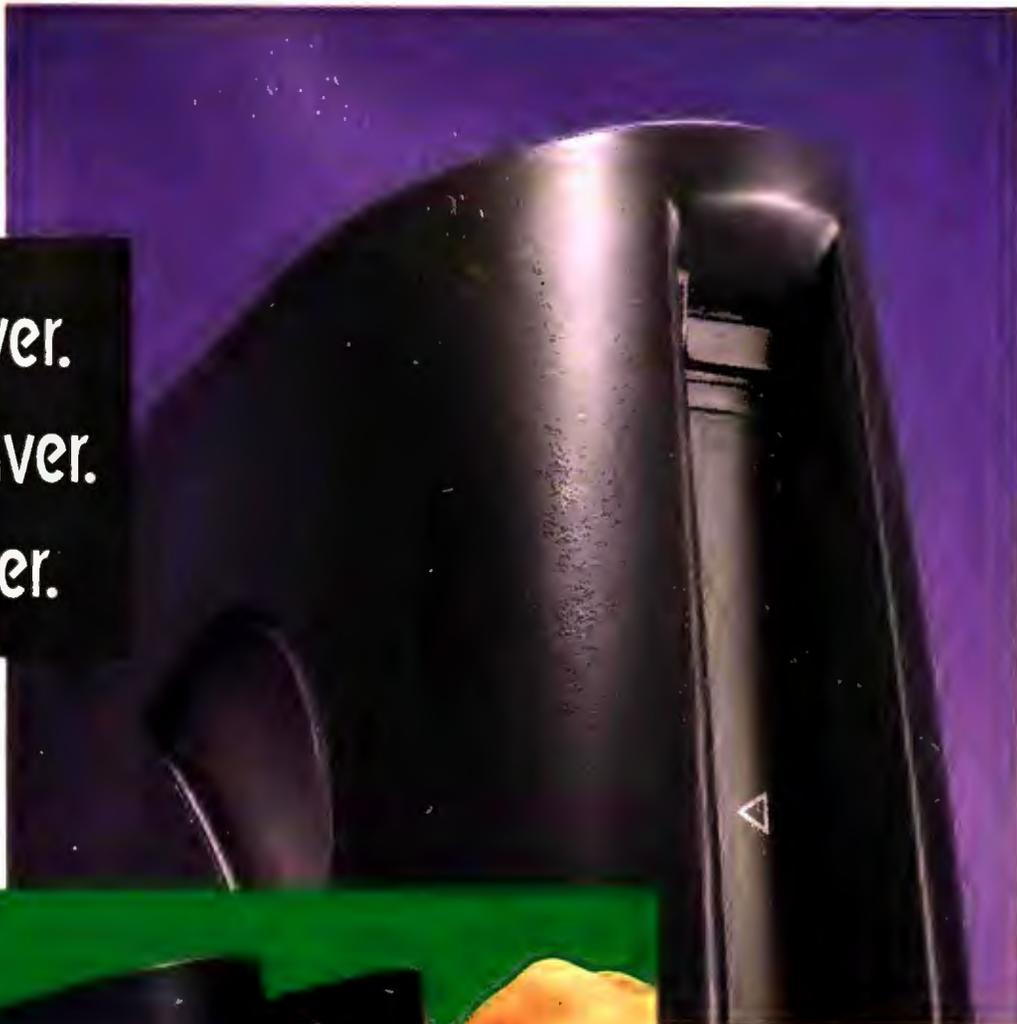
Our stylish vertical design features an integrated power supply and cable. Whether you choose the 800 MB or 3.2 GB model, you'll have plenty of reliable capacity for backing up, archiving, or transferring your files.

TapeStor drives install in seconds, connecting to the floppy disk controller or parallel port of your IBM compatible PC or workstation. The kit includes everything needed for installation, including a 4-step installation poster. Each TapeStor drive also comes with Tape-It™ for Seagate, a unique drag and drop backup and file management software program. This Win95 compatible program makes your tape drive look just like another disc drive, for easy copying and transfer of files between disc and tape.

Seagate TapeStor drives use industry standard Travan media (the latest in tape storage technology), and are fully compatible with other Travan and QIC-compliant tapes. For more information, contact your local computer retailer, visit our website at www.seagate.com, or call 800-626-6637.

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WE REVIEW 20 DEVICES—TAPE, JAZ, ZIP, AND OPTICAL DRIVES—
THAT COULD SAVE YOUR DATA...AND MAYBE YOUR JOB.

better safe than sorry

TODAY'S FAMILY FEUD category is "Things I wish I'd done." Survey says: "Backed up my hard drive."

Only two of ten PC users report backing up even once a month. Assuming you're in that club, you're a rare bird indeed if you also keep your backups in a safe off-site location.

What if you lost the data you've been working on all day? A whole week of data? A month? What if you lost everything? It could hap-

pen. If natural disasters like fire or lightning strikes don't get your hard drive, old age, viruses, and software glitches will. Maybe you'll suffer the fate of a *PC World* editor who was betrayed by a software suite. Something went awry during installation, and before he knew it he had lost his address book, applications, and every bit

of work stored on his hard drive. Not that it takes a disaster to kill your data. There's good old operator error. The editor of this very article accidentally erased most of it. We're here with you now, ►

PHOTOGRAPHS BY PIERRE-YVES GOAVEC



sanity intact, only because he dutifully does nightly backups.

When it comes to backing up data, people tend to fall into one of three categories: Goody two-shoes who have always kept multiple copies of their data; "it can't happen to me" types who never back up, even when the IS department hands them a backup utility on a platter; and the bet hedgers, who back up only the files it would cost a job, a life, or a love to lose.

Look at it this way: If you don't back up, you can either wait until you get scared straight or you can turn over a new leaf now. With so many personal backup options available for so little money, why not pick door number two?

LET THE BACKUP FIT THE NEED

LOTS OF VENDORS CLAIM that their hardware is perfect for backing up data. While you *can* back up with anything from floppies to optical discs, all products aren't equally good for safekeeping your precious data. Only a few are suitable for backing up your entire hard drive. Others are good for partial backups of your most important files. Still others are great for long-term storage—but not practical for doing frequent backups.

To cover the waterfront, we formally tested 16 devices that you can use for backing up your data, ranging in price from \$99 to \$1424 and in capacity from as low as 100MB uncompressed to as high as 8GB compressed. We also did informal evaluations of several optical drives and two off-site storage services. The devices we tested for speed included 12 tape drives from Exabyte, HP Colorado, Iomega, Seagate, and Tandberg. Most of the products we benchmarked are less-expensive internal models that fit into an empty storage bay in your PC, but most are also available as external models. We also looked at four other devices that are bundled with backup utilities, but are less commonly used for backups: Iomega's 100MB Zip drive and 1GB Jaz drive, and SyQuest's EZFlyer 230MB drive, all of which use removable magnetic cartridges; and Panasonic's LF-1000AB PD Drive, a 650MB rewritable optical disc drive. We tested SCSI-2 versions (one internal, three external), though the Zip and EZFlyer are also available in parallel port externals that plug into any PC.

TAPE: STILL BEST FOR MOST

DESPITE THE RECENT PROLIFERATION of products like Iomega's Jaz cartridge drive, which can be used for backup among other duties, tape drives are still the best solution for full backups. No matter how big your hard drive, you can find a tape

drive to store all its data on one cartridge, so you won't have to wait around to swap media. All but two of the tape drives we tested, Seagate's Tape-Stor 800 and HP Colorado's T1000, were capable of backing up and restoring the entire contents of our 1.6GB test hard drive. Tape drives are relatively easy to install and even easier to use. And tape is cheap: a penny or less per compressed megabyte with most tapes. Of the removable disk cartridges, only CD-R discs go for under a penny per compressed megabyte—for media that can't be erased and rewritten.

Our Best Buys are Iomega tape drives: the Ditto 2GB internal and external and the Ditto Easy 3200 external. The inexpensive Ditto 2GB internal and external drives both store up to 2GB of compressed data per tape and are perfect for backing up today's typical hard drives. For hard drives bigger than 2GB, the Ditto Easy 3200—our Best Buy external model—handles about 3.2GB of compressed data per tape. Both Dittos are terrific combinations of low cost and ease of use, thanks in no small part to Iomega's painless Ditto Tools 1-Step software. Each drive performed well for its price and capacity, but neither was the fastest backup device we tested. But speed isn't the first consideration with devices you can schedule to run in off hours. Even if you de-

cide to use your tape drive for short backups during the day, background backups shouldn't slow applications running in the foreground too much.

What if you've decided to back up only your most important files? You should consider one of the four alternative devices we benchmarked. These mag-

netic and optical disc drives are

generally too expensive and inconvenient for full backups because their media doesn't hold enough stored data to be practical. But these cartridge drives are much faster to use than most tape drives for backing up smaller numbers of files. For instance, the 230MB SyQuest EZFlyer 230 backed up 90MB of data and folders in about 1 minute, while the Best Buy Dittos took over 5 minutes to complete the same task.

TAPE DRIVES: UNDER A GIGABYTE

TRAVAN, QIC-WIDE, DAT: What's it all mean? Each is a type of tape. But to know what to buy, you mainly need to know how much data each tape holds and what the media and drive cost.

Eight of the tape drives we looked at are based on some variation of Travan, the latest evolution of quarter-inch cartridge (QIC) tape. Seagate's Tape-Stor 800 and HP Colorado's T1000 are Travan-1 drives—and they're limited to 800MB of compressed data per tape. Their big advantage is low drive cost: The Tape-Stor 800 internal is only \$99 and the T1000 internal costs \$119. And Travan-1 drives can read any old QIC-80 tapes you might have.

The Travan-1 drives' disadvantages are more numerous.

Best Buys Iomega Ditto 2GB external ■ Iomega Ditto 2GB internal ■ Iomega Ditto Easy 3200



SEARCHING FOR THE perfect backup can leave you feeling like you're trapped in "Goldilocks and the Three Bears": Most are too small, too big, or too pricey. But Iomega's easy-to-install Ditto 2GB is just right. With the \$129 internal or \$179 external, the compressed 2GB-per-tape capacity is perfect for today's hard drives. Need more capacity? The \$229 Best Buy Iomega Ditto Easy 3200 external's tapes can handle a hefty 3.2GB of compressed data. Best of all, Iomega's backup software manages backups for you—and it practically installs itself.

■ **Use more than one tape.** Some experts recommend backing up to a different tape each day, but the average person doesn't need to be *that* compulsive. We recommend changing tapes once a week. Start with a full backup, and store that tape off site—even at a neighbor's house. Then store daily backups of changed files on a fresh tape. At the end of the week, add a full backup and store that tape off site, too. Repeat step two with the third and fourth tapes. When you've filled the fourth, bring back the first and oldest tape, erase it, and continue your backup pattern. This way, you'll always keep multiple recent backups stored off site.

■ **If you can't afford four tapes, buy two.** Then when you have to erase and reuse a tape, you'll always have at least one full backup.

■ **Do a full backup every time you install software.** Make sure that you have a recent full back-

up before installing any new programs. Then if the new software makes unwanted changes to your system, you'll be able to restore it to its original state.

■ **Keep your heads clean.** To keep your tape in good shape,

HP recommends you clean tape heads after every 20 or so uses and regularly retension your tape using a software command.

■ **Choose your backup software's verify option.** Unless you have a tape drive that automatically verifies while storing data, make sure you've set your software to verify backups. It will double your backup time, but it's the safest way to go. To make certain a backup was successful, restore a few random files from the start, middle, and end of the tape.

■ **Tapes last longer if you rotate them.** Tapes need regular replacement. According to 3M offshoot Imation, you can rely on Travan tapes for about 150 to 200 uses. If you



rotate four tapes, refilling one a week, each should last over 10 years. But if you're putting tapes through hard use, using only two and refilling one a day, you'll need to replace both once a year. After buying new tapes, use the old ones to

archive data and free up disk space.

■ **If you're on a local area network and have no other backup option,** see if you can get rights to some space on a network drive for backing up critical files. Administrators typically back up LAN drives regularly.

■ **If you refuse to buy a backup drive,** at least copy your most critical files to floppies. You can make the copies by dragging them out of Windows 95's Explorer or by using the Backup utility. The latter approach allows you to use multiple floppies to back up files too large to fit on one disk.

■ **If you refuse to back up at all,** make sure to keep a copy of the want ads handy. Then when you lose critical files and get fired, you'll be able to save time looking for another job.

They're relatively slow compared to newer drives, because the fastest controller they'll work with is a 1-megabit-per-second floppy controller. With tapes running about \$30 apiece, Travan-1 cartridges cost about 4 cents per compressed megabyte—exorbitant compared with other tapes. Most important, they've fallen behind the 1GB-plus capacities of current hard drives, so you probably can't put a full backup on one tape. If you have a small hard drive or just want to back up a few directories, you might consider buying one of these drives. But for most people, a Travan-1 drive won't make a smart purchase.

Like their higher-capacity siblings, neither the T1000 nor the Tape-Stor 800 was particularly hard to install—for an internal drive. We popped the top on our test PC, took the cover plate off an external 5¼-inch drive bay, secured the drive with the included screws, and then hooked it up to a spare connector on our floppy drive's data cable and plugged it into a power connection.

Installing software was even easier. Like all the other reviewed tape drives, the T1000 and Tape-Stor come with DOS, Windows 3.x, and Win 95 backup utilities. We used the latter, and found that they automatically detected and configured our tape drive. Like the utilities included with the other drives, they have many backup options, including after-hours scheduling.

Novices should find both Colorado Backup, the T1000's utility, or Seagate Backup, the Tape-Stor 800's program, easy to use. But we think raw beginners will find Seagate Backup, with its handy wizard, the more accessible of the two. Instead of having to go to a settings menu to pick backup options, as in Colorado Backup, you simply follow the wizard's prompts. When you're done selecting, Seagate Backup offers the choice of backing up on the spot or scheduling the job to run later; it then gives you access to its on-screen scheduler. And instead of making you scroll down a Windows 95 tree display to choose

your backup device, Seagate offers your tape

drive as the default option. Most of the tape drives here come with software based on some variation of Seagate Backup.

BACKING UP MORE THAN A GIGABYTE

FOR BACKING UP 1GB TO 2GB, choose a QIC-Wide tape drive. Our one example is the Iomega Ditto 2GB, an easy Best Buy. The Ditto 2GB is inexpensive at \$129 for an internal and \$179 for an external, has a fast 2-mbps maximum transfer rate, and tapes are only about \$15 each. Clear instructions make even the internal version a snap to install. You hook it up to a new PC's 1-mbps floppy controller or the faster optional 2-mbps Ditto Dash (\$39). You'll need the latter if your PC is older and has a 512-kbps floppy controller. Or you can just buy the Ditto 2GB external—also a Best Buy.



The great Ditto Tools 1-Step software comes preset with common backup options—all you have to do is click a button on-screen. We like the two-year warranty and the Web, BBS, and fax-back or automated voice support. But we don't like paying \$15 an incident for live tech support (charged unless a product is defective). ▶



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TRAVAN-3 DRIVES HANDLE OVER 2GB

IF YOU'RE PLANNING FOR FUTURE expansion or if you own a 2GB to 3.2GB hard drive, a Travan-3 tape drive is your best bet. Starting around \$179, prices are still reasonable. The tapes hold about 3.2GB compressed and cost about \$35 apiece (about a penny per megabyte). Like the Ditto 2GB, these drives transfer backups to media twice as fast as Travan-1 drives. We reviewed four popular Travan-3 drives, including the Exabyte Eagle Nest TR-3—a unique solution for workgroups.

The Iomega Ditto Easy 3200 is the best 3.2GB value. For only \$50 more than the comparable Ditto 2GB internal or external, you get over a gigabyte more capacity, the same good backup performance, and the same great software. We tested both the internal and external Ditto Easy 3200 but singled out the \$229 parallel port external as a Best Buy. Why? The internal is a fine value at \$179 with a 2-mbps card, but the external is nearly effortless to install and about 10 percent faster at full backups.

Our main gripe with HP Colorado's \$189 T3000 tape drive (internal only) is that the box does not warn consumers the device needs a 1-mbps to 2-mbps controller. HP Colorado's 2-mbps FC-20 card costs \$59 extra, making the T3000 a bit pricey.

Seagate's Tape-Stor 3200, which is \$199 for an internal and



\$249 for an external, is a fresh design—the attractive dark-blue exterior is so sleek and modern it makes other devices look dated. We got this external model too late to test, but the internal was slightly faster than the Best Buy Iomega Ditto 2GB. The internal comes with the same good Seagate Backup as the Tape-Stor 800.

At press time, Seagate told us it would be bundling the new Tape-It for Seagate with the external Tape-Stor 3200. The program lets you use the tape drive almost as a disk drive, allowing you to modify files directly on tape. A caching scheme uses a bit of your hard drive to speed the direct tape access. An early demo of Tape-It looked even easier to use than Seagate Backup. But without reviewing a shipping version, we can't add the external Tape-Stor 3200 to our list of Best Buys.

The Exabyte Eagle Nest TR-3 3.2GB drive is a unique solution

BACKUP DRIVES

SCORECARD

TAPE DRIVES	Estimated internal/ external drive street price	Estimated best media street price	Approximate capacity with/without compression (GB)	Comments	Price rating
Exabyte Eagle Nest TR-3 800/392-2983	\$249/n/a	\$35	3.2/1.6	Best choice for passing drive around small workgroup. Extra docking ports cost \$69 each.	average
HP Colorado T1000 800/810-0133	\$119/\$159	\$30	0.8/0.4	Well made, but per-megabyte cost is high for low-capacity tape.	inexpensive
HP Colorado T3000 800/810-0133	\$189/n/a	\$35	3.2/1.6	Good per-megabyte cost for media and drive, good software, good speed.	inexpensive
HP Colorado T4000s 800/810-0133	\$389/\$489	\$40	8/4	With speed, capacity for workstations or small server, drive's priced well.	average
HP Colorado SureStore 6000 800/810-0133	\$1276/\$1424	\$20	8/4	Fastest tape drive here. Great fit for LAN use. Drive pricey, tapes cheap.	very expensive
Iomega Ditto 2GB* 800/697-8833	\$129/\$179	\$15	2/1	Inexpensive media and drive, good capacity, easy-to-use software, good speed.	very inexpensive
Iomega Ditto Easy 3200* ² 800/697-8833	\$179/\$229	\$35	3.2/1.6	Good per-megabyte cost for media and drive, easy-to-use software, good speed.	inexpensive
Seagate Tape-Stor 800 800/626-6637	\$99/\$149	\$30	0.8/0.4	Good drive, but per-megabyte cost is high for tape with low capacity.	very inexpensive
Seagate Tape-Stor 3200 800/626-6637	\$199/\$249	\$35	3.2/1.6	New software with external drive allows you direct access to files on tape.	inexpensive
Seagate Tape-Stor 8000 800/626-6637	\$399/\$479	\$40	8/4	Good price for fast, capacious backup solution for workstations or small servers.	average
Tandberg Panther Mini 4600 800/826-3237	\$499/\$629	\$40	4.6/2.3	Fairly pricey, but much faster than Travan-3 drives.	expensive
DISC AND CARTRIDGE DRIVES					
Iomega Jaz 800/697-8833	\$399/\$499	\$99	2/1	Superb for graphic artists, users who need hard drive performance and removability.	average
Iomega Zip 800/697-8833	n/a/\$149	\$15	0.2/0.1	Great for transporting data. Cost per megabyte is too high for full backups.	inexpensive
Panasonic LF-1000AB PD Drive 800/742-8086	\$499/\$599	\$40	1.3/0.65	High-capacity rewritable drive doubles as a 4X CD-ROM drive.	expensive
SyQuest EZFlyer 230 800/245-2278	\$299/\$299	\$20	0.46/0.23	Handy for transporting data, inexpensive media. For users needing hard-drive performance.	inexpensive

*Best Buy ● Yes ○ No

¹ Internal version only.

² Only parallel port (external) model earns a Best Buy.

³ Parallel port model; internal version's installation is satisfactory.

⁴ Also comes with software tools disk.

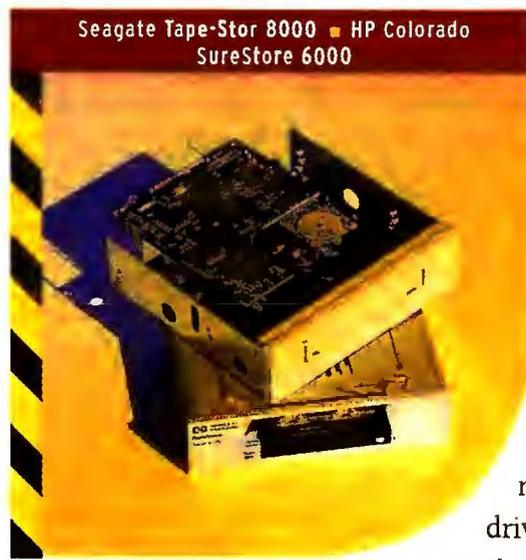
to the problem of sharing a backup device. If you pass around a parallel port drive, it's a hassle to reconnect the power and data cords. Exabyte lets you install a docking port or "nest" in each PC. Passing the drive between members of a workgroup is as easy as gripping the sturdy handle, pulling it out of one PC's nest, and inserting it in the next.

Each \$249 Eagle Nest kit includes a tape drive and a docking port. Additional nests cost \$69, and optional 2-mbps cards cost \$58. The kit was straightforward to install, and although performance was slower than our Best Buy Iomega Ditto 2GB tape drives in our tests, that won't be a problem if you schedule unattended, after-hours backups.

A REALLY BIG BACKUP...

IF YOU WORK WITH GIANT FILES on a multigigabyte hard drive or you have to back up a workgroup, you need super capacity and speed. Four of the drives we tested store more than 4GB of compressed data per tape, but they cost more than our Best Buys and need a SCSI-2 card costing an extra \$60 at minimum.

A word about SCSI: These days, most SCSI products are Plug and Play and easy to install on new PCs. On older PCs, such as this writer's 486, you may have DMA and interrupt conflicts and



wind up doing a lot of debugging (and cursing). That said, SCSI is the way to go for really big, fast backups.

Tandberg's \$499 Panther tape drive is a bit pricey for its capacity (4.6GB of compressed data on each QIC-Wide tape). But the Panther was much faster than Travan-3 drives, backing up about 26MB

per minute. Tandberg bundles a version of Seagate Backup that is similar to Seagate's. And the well-

designed Panther verifies data integrity while writing. To get this security with Travan drives or the Ditto 2GB, you have to do a second verify pass that takes about as long as the backup. The \$40 media costs less than a penny per compressed megabyte.

Travan-4 and DDS-2 DAT drives have more capacity, backing up about 8GB compressed per tape. The HP Colorado and Seagate products reviewed here use Colorado Backup and Sea-

FEATURES

Overall speed backing up	Ease of installation	Ease of use	Type of media	Interface	Interface card included	Media included	Bundled software	Warranty (years)	Weekday tech support hours	Reader service number
satisfactory	satisfactory	very good	Travan-3 tape	floppy controller	○	1	Seagate Backup	2	12	773
satisfactory	good ¹	good	Travan-1 tape	floppy controller or parallel port	○	1	Colorado Backup	2	10	774
satisfactory	satisfactory	good	Travan-3 tape	floppy controller	○	1	Colorado Backup	2	10	775
very good	satisfactory	good	Travan-4 tape	SCSI-2	○	1	Colorado Backup	2	10	776
outstanding	satisfactory	good	DDS-2 DAT	SCSI-2	○	1	Colorado Backup	2	10	777
good	outstanding ³	outstanding	QIC-Wide tape	floppy controller or parallel port	○	1	Ditto Tools	2	12	778
good	outstanding ³	outstanding	Travan-3 tape	floppy controller or parallel port	●	1	Ditto Tools	2	12	779
satisfactory	good ¹	very good	Travan-1 tape	floppy controller or parallel port	○	1	Seagate Backup	2	10	780
good	very good ¹	very good	Travan-3 tape	floppy controller or parallel port	●	1	Seagate Backup	2	10	781
very good	satisfactory	very good	Travan-4 tape	SCSI-2	○	1	Seagate Backup	2	10	782
very good	satisfactory	very good	QIC-Wide tape	SCSI-2	○	1	Seagate Backup	3	9	783
outstanding	satisfactory	outstanding	removable cartridge hard drive	SCSI-2	○	1	Jaz Tools	1	12	784
very good	outstanding	outstanding	flexible magnetic cartridge	parallel or SCSI-2	○	1 ⁴	Zip Tools	1	12	785
very good	satisfactory	very good	phase-change optical	SCSI-2	○	1	Corel/Seagate	1	24	786
outstanding	satisfactory	very good	removable cartridge hard drive	parallel or SCSI-2	○	1	SyQuest Utilities	1	14	787

All products: 914

gate Backup. HP Colorado's \$389 T4000s and Seagate's \$399 Tape-Stor 8000 internal Travan-4 drives are inexpensive for SCSI-2 products. Their \$40 media's cost per compressed megabyte is only about half a cent. While the T4000s backed up faster than the Tape-Stor 8000, the latter did a faster verify pass. As a result, both drives took about an hour and ten minutes to back up and verify our 1.4GB of data—a bit slower than the HP Colorado SureStore 6000 but twice as fast as our Best Buys.

The HP Colorado SureStore 6000 DDS-2 DAT drive was the fastest drive we tested, taking just over a minute to do a full backup with verify pass. At around \$1276 for the internal, it is also the most expensive tape drive here. It's overkill for most one-person operations, but it's a good deal if you need its unparalleled

speed and capacity. It ran flawlessly and with blinding speed, thanks to its hardware data compression and ability to verify while writing. If you use lots of media, you'll appreciate the \$20 tapes: The DDS-2 DAT media has the best price/capacity ratio of any media we tested: just a quarter of a cent per megabyte.

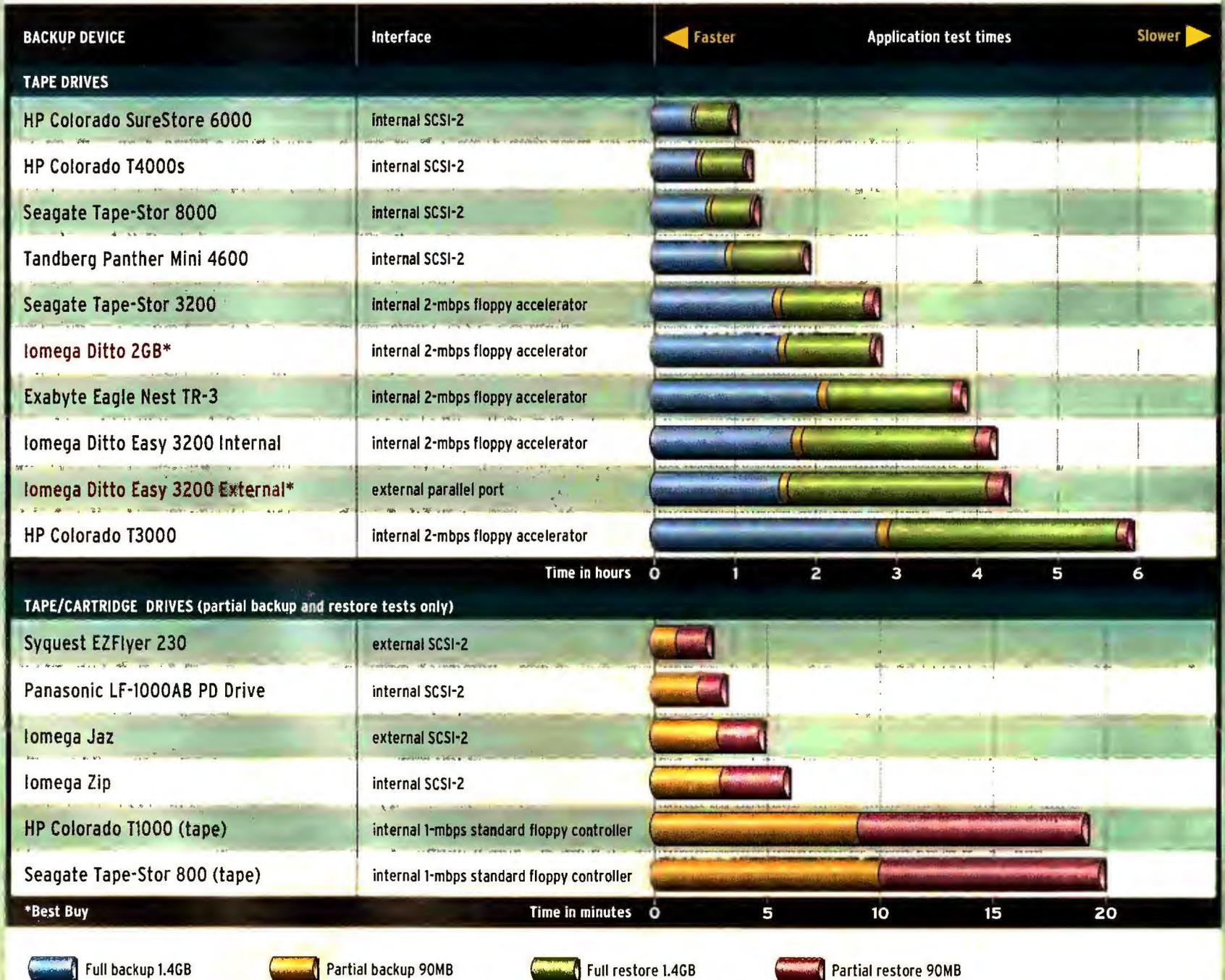
BACKUPS FOR FOOT-DRAGGERS

NOT EVERYONE IS A TRUE BELIEVER when it comes to backing up data. Maybe the most you do is make a second copy of really essential files now and then. If so, you need something that makes it easier to keep your backups up to date—with the convenience of a floppy but a lot more capacity. Of the four disk cartridge drives we tested, the Iomega Jaz 1GB removable-cartridge SCSI-2 drive impressed us as the nearest to ideal because its 1GB

TEST REPORT

Fast as a Speeding Backup...

Able to store full hard drives on a single tape, Best Buy tape drives back up nearly 1GB an hour.



HOW WE TEST We tested using two HP Vectra VL P-133 systems running under Windows 95 with 16MB of RAM, 256K of secondary cache, a 1.6GB EIDE hard drive, and an Adaptec AHA-2940 PCI adapter for testing SCSI products. We filled each hard drive to 90 percent capacity with 1.4GB of folders, representative business applications and documents, and multimedia files. We installed each product following the vendor's directions and using the default settings. Results include only times for backup and restore operations, omitting verification times if any. For the partial backup and restore, we used a folder containing 90MB of mixed files and programs. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Use Remote Backups for Ultimate Security

IF LOSING CERTAIN FILES could wreck a big project, your business, or even your life, you might want to consider a remote backup service. Companies providing this service not only back up your data on their own hard drives and optical discs, they store it where catastrophes can't touch it, usually in a fire-proof vault. All you need is a modem, a link to the Web or a local access number, and the service's backup software. The catch: Remote backup is much too costly—and slow—for full backups. It's only for protecting your most precious files. Back up the rest—letters to mom and applications you can reinstall—yourself.

GOING REMOTE

WE SIGNED UP WITH McAfee Personal Vault and Surefind. They offer similar software, and the costs end up being about the same. Both provide a convenient way to back up and protect 20MB to 30MB of data for only about \$10 a month. And your data is accessible via modem. We found McAfee Personal Vault a bit more economical for our purposes and easier to use.

Each service makes its backup software available on its Web site, but we requested

disks. Surefind initially looks like the better deal: Its software is free. To use Personal Vault, we had to buy the \$29 McAfee WebStor backup program for Windows 95. Surefind also throws in an initial backup of 100MB of data for free, and offers impressive-sounding insurance: If your data is damaged once Surefind has it, the company will pay up to \$100,000 to recover or reconstruct it.

But in the long term, you might find McAfee Personal Vault cheaper and more flexible. After the initial free 100MB, Surefind charges for every backup on a sliding scale based on frequency. Personal Vault, however, functions almost as an interactive hard disk. You get unlimited access to 30MB of storage space for \$10. You can continue to make fresh backups for no extra charge as long as you retrieve enough files to keep the data stored to under 30 MB.

We also preferred WebStor over Surefind's software. Both packages have capabilities similar to the tape backup software in this review and are easy to use. But WebStor comes with a wizard to help with configuring backups. And unlike Surefind, WebStor can be used to back up to other



devices—to space your ISP provides you, for instance, or to a LAN server or even a local hard drive.

SAFE DATA

TO INCREASE SPEED and ensure security, Surefind and Personal Vault compress and

encrypt data before it leaves your PC. As in a Swiss bank vault, the data is stored by number. But backing up files over phone lines is tedious: It took our modem about three minutes per megabyte, fairly typical for a 28.8-kilobits-per-second unit. Fortunately, both packages automatically schedule unattended backups for the wee hours—when the services get the fewest calls.

Until they get cheaper and *much* faster, backup services can't replace your own backup hardware. But they're a nice security blanket to toss over those files you absolutely can't afford to lose.

■ McAfee Personal Vault \$10 per month, McAfee WebStor backup utility \$29; McAfee Associates; 408/988-3832; <http://www.mcafeestore.com>
Reader service no. 790

■ Surefind \$10 per month, backup utility free; Surefind; 800/787-0009; <http://www.surefind.com>
Reader service no. 791

For more information about both these products, circle reader service no. 915.

you'll find them reasonably easy to use. We liked the

Iomega software best. Jaz Tools and Zip Tools both include the 1-Step approach found in Ditto Tools and add their own features such as the Copy Machine Jaz disk duplicator. Iomega's Jaz and Zip drives come with one-year warranties and free fax-back, automated phone, Web, and BBS support. But be warned: Live tech support will cost you \$20 per incident with the Jaz and \$15 with the Zip—unless you have a defective product.

The \$299 SyQuest EZFlyer 230 is sort of like a Jaz Lite. As the name implies, the EZFlyer's cartridges store 230MB uncompressed (about 460MB compressed). At \$20 each, the SyQuest cartridges are inexpensive, and their cost per compressed megabyte is about 4 cents. If you're a graphics pro, the SyQuest could be the perfect solution both for organizing work for your clients and for doing small backups and transporting data. Besides, it hurts less to lose a \$20 EZFlyer cartridge to a careless client than a \$99 Jaz cartridge. We tested the SCSI-2 external EZFlyer—the right choice if you need the fastest performance. Consider the parallel port model if easy installation and portability are your prime focus. The SCSI-2 EZFlyer was the fastest by far at backing up 90MB of data, taking only about a minute. ▶

cartridges can accept up to 2GB of compressed data: enough to back up most hard drives. The Jaz costs just \$399 for the internal and \$499 for the external. Each comes with a free disk—extras are \$99 each in packs of three. The media cost is 5 cents per compressed megabyte: great for an alternate hard disk but too high for high-volume, off-site backups. Like SyQuest's EZFlyer 230, the Jaz operates at close to hard drive speeds—making it a fine choice for storing projects you can't spare hard disk space for. We tested the external, but there's no speed difference between external and internal SCSI-2 devices.

Like the other disk-based drives here, the Jaz comes with its own backup software.

But foot-draggers will find it fast and easy to add DriveSpace compression to disk cartridges and drag files and folders to the drive icon. Data will be compressed as it's stored, and you'll have direct access at hard drive speeds. If you do use the backup utilities that come bundled with all these devices,



Optical Drives Are Good for Archiving

TAPE MAY NOT BE RIGHT FOR YOU. To keep data, such as tax, accounting, or medical records safe for a *long* time, you may want an optical solution, like the Panasonic PD Drive we review or a magneto-optical drive. These drives have durable removable media that lasts much longer than tape and can take millions of writes over an expected 30-year life. Optical media is also resistant to accidental erasure by magnetic fields and damage from dust, heat, and shock.

We looked at the Fujitsu DynaMO 230 Portable PC Card Drive, the Olympus SYS.230 Personal Storage System, and the Pinnacle Micro Tahoe 640MB MO drives. All three come in attractive external designs, and the latter two are also available as 5¼-inch internal drives.

MO' BETTER STORAGE

THE \$499 FUJITSU DynaMO and \$359 Olympus SYS.230 use magneto-optical discs that store 230MB (460MB compressed). The tiny Fujitsu comes with an IDE PC Card interface for use with notebooks. Olympus sells three versions of the SYS.230 and has the least expensive MO discs: \$10 each in a 5-pack (a cost of about 2 cents per compressed megabyte). Graphic artists and professionals should like

these discs because they're the right size for organizing and storing files by job. For even more space, check out the \$699 Pinnacle Micro Tahoe 640MB MO. Its \$55 discs hold 640MB (about 1.3GB compressed), but their cost per megabyte is about twice that of the Olympus discs.

ONE-TIME BACKUPS

SUPPOSE YOU DON'T need rewritability? A CD-Recordable drive can be handy for archiving—though CD-R drives' main usefulness is still in specialized applications like mastering CD-ROMs and audio CDs. Because they're write-once devices, they're not for repeated backups. But they're great for archiving big files, and their 650MB media can be read on any CD-ROM drive. CD-R discs now cost about \$10 apiece—less than a penny per compressed megabyte.

We tried the HP 4020I CD-R drive, a 4X-read/2X-write unit that has its own SCSI-2 adapter. At press time, HP replaced the 4020I with a 6X-read/2X-write unit, which is available in internal and external SCSI models and a parallel port version. The HP 6020 CD-R drive starts at \$777 for the internal model with a SCSI adapter. As with the 4020I, you can fill a whole disc at once—or a little at a time. The new 6020 includes a drag-and-drop utility for copying files and Alchemy Personal, a file organizer. Alchemy creates a file database and puts

If you already have a SCSI-2 adapter, make sure that you get the right cable—SyQuest has configurations for newer Pentiums, older PCs, and Macs. SyQuest provides a one-year warranty.

If you only need to back up a handful of critical files, consider Iomega's external 100MB Zip drive. This "super-floppy" drive is inexpensive at \$149 and media is \$15 each. But keep an eye peeled for an internal Zip drive that will be offered in new PCs from more than a dozen PC vendors. The stand-alone Zip comes in parallel port and SCSI-2 versions. The parallel-port Zip is a snap to install, but if you want the added speed of the SCSI version, you'll have to install an adapter such as Iomega's \$60 Zip Zoom card. The Zip SCSI-2 model we tested was the slowest of the disk cartridge drives, taking over three minutes to back up 90MB. (That's still a lot faster than most tape drives). The media costs 7.5 cents per compressed megabyte—exorbitant for big backups. But the portable Zip drive is great for transporting data.

With compression, the 650MB Panasonic LF-1000AB PD Drive stores about 1.3GB per disk—or the full contents of many hard drives. The \$599 SCSI-2 external (internals are \$499) was almost as fast as the SyQuest EZFlyer at backing up our 90MB folder—and no other device was as fast at 90MB restores. The PD Drive isn't the best for frequent large backups because of the 3 cents-per-megabyte cost of the \$40 phase-change rewritable

optical media. But if you want long-term storage, optical discs have projected lives of at least 30 years—and they're safe from accidental magnetic erasure. The PD Drive adds another talent: It can also accept and read CD-ROMs at 4X throughput. The drive is warranted for one year.

THE DAY THE DATA DIES

YOU MIGHT HAVE A LIST AS LONG as your arm of things you wished you'd done. But backing up *before* your data was destroyed doesn't have to be one of them. Back up your whole drive now—or just the files you're working on. Every megabyte you sock away is like money in the bank for that inevitable rainy day when your files disappear. Best thing you've done for yourself lately? Survey says: backing up your data.

Mike Hogan is a former PC World senior editor and a frequent contributor. Senior Editor Carla Thornton and Senior Associate Editor Rex Farrance also contributed to this article. Testing by Ulrike Diehlmann and Dave Casini. ■

Olympus Sys.230 Personal Storage System
■ Fujitsu 230 MO ■ Pinnacle Micro Tahoe 640MB



the search engine on the disc, so you can search it on any PC with a CD-ROM drive.

■ Fujitsu DynaMO 230 Portable PC Card Drive \$499; Fujitsu Computer Products of America; 800/626-4686; <http://www.fcpa.com>

Reader service no. 792

■ HP 6020 CD-R drive \$777; Hewlett-Packard; 800/810-0134; http://www.hp.com/go/storage_support
Reader service no. 793

■ Olympus SYS.230 Personal Storage System \$359 external SCSI, \$389 external universal (parallel and SCSI), \$299 internal; Olympus America; 800/347-4027; <http://www.olympusamerica.com>
Reader service no. 794

■ Pinnacle Micro Tahoe 640MB MO \$699; Pinnacle Micro; 800/553-7070; <http://www.pinnacle-micro.com>
Reader service no. 795

For more information about all these products, circle reader service no. 915.



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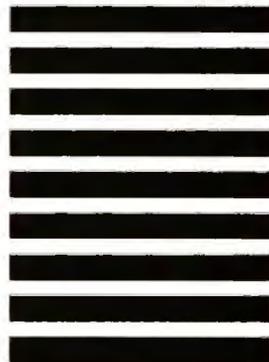
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TOP POWER at Budget Prices

BY BRYAN HASTINGS

POWER BEST BUY
FOR \$2888: Micron's
Millennia Pro2 200 B.



WILL WE SOON SEE faster processors? We often do when PCs based on the current top-speed chips are selling for near-budget prices. Pentium 200 PCs have steadily dropped in price, and Pentium Pro-200 PCs—which average 10 percent faster than their sibs—have become just as inexpensive. Of the eight Pentium Pro-200s on the Power chart, six sell for under \$3000. Quantex's \$2499 QP6/200 Pro makes Top 20 history as the first desktop ►

to make the Budget chart while sporting the leading-edge CPU. Bear in mind that these PCs are not bare-bones boxes. All have outstanding features, and most are backed by good support policies and have good or better support. Even our top Best Buy for Power Desktops, Dell's Dimension XPS Pro200n, sells for an affordable \$3349.

Some new processors are on the horizon. By the time you read this, the first Pentium MMX computers should be available. The MMX-enabled Pentium CPU is supposed to dramatically improve the performance of multimedia applications, and our first tests bear that out (see the MMX story in this month's *Top of the News*). We'll review the first Pentium MMX desktops in next month's Top 20 roundup. Meanwhile, in the first half of this year Intel plans to release the first MMX Pentium Pro chip, code-named Klamath. Cyrix's M2 chip, intended to compete directly with Klamath, is due out about the same time.

Of the eight Pentium-Pro 200 PCs on the Power Desktop chart, six of them sell for under \$3000.



BUDGET PENTIUM PRO 200:
Quantex's QP6/200 Pro.

What it boils down to is this: If you are looking to buy now, go for it. Prices are terrific, so there's no sense holding off unless you need the best possible multimedia performance. For power users, the next choice may be between an MMX

Pentium and a Pentium Pro PC. According to a company spokesperson, Dell expects to phase out all non-MMX Pentium systems from its Dimension product line by the first quarter of this year, basing the entry level Dimension model on the MMX Pentium-166 processor.

Of the affordable Power systems, Micron's new Millennia Pro2 200 B (Power Desktop number four) stands out. This Pentium Pro-200 mini-tower—the only new PC this month to score a Best Buy—is the second-fastest of the Best Buys and sells for a very reasonable \$2888. Its PC WorldBench score of 231 puts it above average even for its processor class, and this PC comes replete with features. The main reason this Millennia isn't higher up the list is that Micron's PC reliability slipped from best to good.

From a pure price/performance standpoint, Quantex's new QP6/200 PD-4 (Power Desktop number ten) is hard to beat. For sheer speed, this \$2769 mini-tower with a PC WorldBench score of 235

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them. If not, ask us; see page 12 for contact information.

 **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. Every month we test the latest products in each category and compare them to the pool of items we've already reviewed. As new products earn places on the charts, those at the bottom drop off. Price cuts also cause chart 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?** It's the sum of all our tests—both hands-on evaluations and automated speed tests. The scale is 1 to 100, so a product that scores in the 90s is generally considered exceptional, one in the 80s is among the best, one in the 70s is above average, and one that scores lower usually doesn't place.

 **What does the PC WorldBench score mean?** It's a measure of how fast a PC is in relation to our baseline machine, a Dell P75t configured with 8MB of RAM, a 540MB hard drive, and no secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline unit.

 **Where do the reliability and service and support scores for PCs come from?** The reliability score and the "service" portion of the service and support score come from readers who respond to the Reliability and Service fax-back survey in each issue of *PC World*. The "sup-

port" portion of the service and support score is based on the vendor's support policies (such as length of warranty and support hours).

 **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 example, a budget PC that is rated "expensive" is high-priced only in relation to other budget PCs. Likewise, a power notebook rated "good" for performance is good only in relation to other power notebooks. Word scores for other categories, such as features, are relative to all desktops or all notebooks.

 **Where can I find the online version of the Top 100?** Go to PC World Online (<http://www.pcworld.com>). There you'll find not only the current issue of *PC World* and reviews for the last 18 months, but some extra features you'll want to check out. For one thing, PC World Online includes reviews you won't find in print. If a product misses a chart and we don't cover it here, you can go directly to an online review by using the URL provided in each Top 100 section.

 **Have you ever wished you could build your own chart based on your buying criteria?** Now you can, with Personal Shopper at our Web site. Personal Shopper combines your criteria with *PC World's* current data and test results to generate customized Top 20s and Top 10s. For instance, if you want your chart to rank notebooks that have 120-MHz processors and 28.8-kbps modems, Personal Shopper will find and rank all the machines that fit your specifications.

is passed only by Sys Technology's Performance Pro 200 (Power Desktop number 17). The QP6/200 PD-4 is also exceptionally well appointed: The Ensoniq Vivo wavetable-equipped sound card offers rich, realistic sound, the 17-inch monitor is particularly crisp, and the 12X CD-ROM drive and 33.6-kilobits-per-second modem are state of the art.

OTHER CHART ACTION

QUANTEX'S PC reliability record improved from poor to fair, which helped move the \$2799 QP5/200-SM3 to number 15 on the Power Desktop chart, the third new system on the list. This Pentium-200 has a cavernous 3.2MB hard drive, excellent multimedia components, and a speedy 33.6-kbps modem.

This month, no new Budget Desktop PCs made the chart. The most dramatic change is Gateway 2000's G6-

180, which became a Best Buy after a \$145 price drop. This is the only system on the Budget chart based on the Pentium Pro-180 processor, and it performs like a high-end Pentium-200 desktop. In fact, the G6-180 outruns over half the of the Top 20 Power Desktop PCs. This is excellent performance for a system selling for only \$2179, especially considering the excellent features. Most Power Desktops have smaller hard drives than the G6-180's capacious 3.2GB model, and the 15-inch monitor displays razor-sharp images.

Only three new notebooks made it to the charts. Most interesting among them is Compaq's Presario 1010, sixth on the Power chart. It's bulky, weighing 8.6 pounds and measuring an inch wider and deeper than most notebooks, which helped keep it from the Best Buy ranks. But its numerous highlights include a pair of great-sounding speakers mounted on the wrist rest, both floppy and CD-ROM drives, and the ability to create separate desktops for different users. Sharp's

PC W100T comes in fifth. It's a sleek, light (6.6 pounds) notebook and the only one on the chart that has a screen with true-color 1024 by 768 resolution. AST's Ascentia J20 is the only new budget notebook (number 5). This \$1599 system doesn't come with any extras, but it's a very good performer and one of the cheapest notebooks on the Budget chart.

Meanwhile, steep price cuts brings a pair of Gateway 2000 notebook PCs to the top on both Power and Budget charts. Number one for Power Notebooks is the

For Top 10 Personal Printers, the sole new entry is Canon's BJC-620, an ink jet that debuts at second place on the color chart. It's pricey (\$399), but it's the first ink jet we've seen with print quality that can rival a laser's. We also tested Hewlett-Packard's \$800 LaserJet 6P, a real budget stresser. It is networkable, which makes this HP laser printer worth considering for a small office. However, it does not offer many other advantages over most personal monochrome laser printers that sell for about half the price.

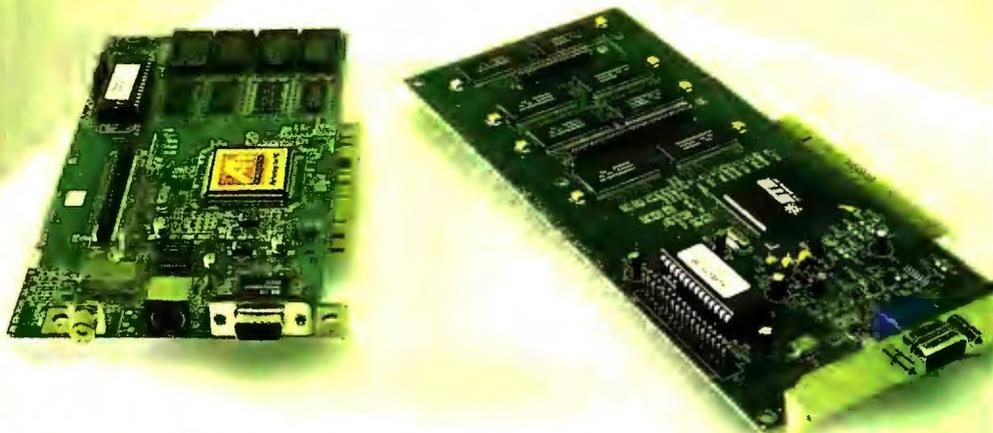
Among 15-inch monitors, the focus is on Dell's Trinitron-based UltraScan 800HS. This monitor costs \$399, the same as its predecessor, the UltraScan 15TX. The 800HS has better image and text quality than the earlier model, making it our top Best Buy. The other Best Buy is Samsung's SyncMaster 15GLi, which delivers sharp text and graphics, and is backed by

very good support. See Top 10 Monitors for more details.

Turning to the Top 10 Graphics Boards, the new STB Velocity 3D and the ATI 3D Xpression+ PC2TV—both Best Buys—sell for \$199 and come with 4MB of RAM. The Velocity and Xpression cards offer basic 3-D rendering—not up to snuff for most Computer-Aided Design work, but good for some gaming. You also get true color (16.8 million colors) images at 1024 by 768 resolution.

Bryan Hastings is a senior associate editor for PC World. Assistant Editor Allyson Bates, Staff Editors John Goddard and Eric Hellweg, Senior Associate Editors Brad Grimes and Harry McCracken, Associate Editor Melissa Riofrio, and freelance writers Jon Jacobi, Jim Martin, and Dan Littman contributed to the Top 100. Testing for the Top 100 by Dave Casini, Ulrike Diehlmann, Jeffrey Kuta, Kevin Mitchell, Mike Salayko, and Susan Silvius. See page 14 for contact information.

Zoom's V.34i Plus card is the first 33.6-kbps modem on the Top 10 Modem chart to drop below \$100.



3-D DEALS: Both Best Buy graphics cards are \$199.

Solo 2100 P-133, which sells for \$450 less (now \$4149) than last month. With a PC WorldBench score of 186, the P-133 is the fastest notebook we've tested, and it comes with a terrific set of features, including a huge (for a notebook) 1.4GB hard drive, multimedia, and a 28.8-kbps modem. A very steep \$900 cut turns the P-120 version of the Solo, now \$2499, into the leading Budget notebook. Its 171 WorldBench score puts it well ahead of any other Budget notebook and it even outruns a couple of Budget Desktops. It's also especially well configured for a Budget notebook with an 11.3-inch active-matrix screen and a 6X CD-ROM drive.

PERIPHERAL ISSUES

THE MODEM PRICE WARS keep raging. Zoom's \$99 V.34i Plus Fax Modem card is the first 33.6-kbps unit on the chart to drop below \$100. Our Best Buy U.S. Robotics' \$179 33.6 Sportster Voice 33.6 Fax Modem is fastest on the chart and full-featured. See Top 10 Modems for details.

PC WORLD TOP 20 POWER DESKTOPS

	SYSTEMS*	Last month	Month tested	Street price (11/15/96)	CPU	Comments
1	 Dell Dimension XPS Pro200n 800/388-8542 www.dell.com	2	Jan 97	\$3349	Pentium Pro-200	\$389 price drop makes fast, feature-packed minitower our top power choice.
2	 Dell OptiPlex GXpro 200 800/388-8542 www.dell.com	3	Aug 96	\$3702	Pentium Pro-200	Fast corporate PC, modular design, built-in networking.
3	 Dell Dimension XPS P200s 800/388-8542 www.dell.com	5	Sept 96	\$2949	Pentium-200	Hot graphics card is a plus; also comes with 12X CD-ROM drive.
4	 Micron Millennia Pro2 200 B 888/634-8799 www.mei.micron.com	-	NEW	\$2888	Pentium Pro-200	Very fast minitower, but Micron's PC reliability drops from best to good.
5	 Dell OptiPlex GXMT 5200 800/388-8542 www.dell.com	6	Sept 96	\$3771	Pentium-200	Fast, network-ready PC backed by excellent service. Good multimedia, too.
6	Micron Millennia P166 888/634-8799 www.mei.micron.com	1	Jan 97	\$2807	Pentium-166	A reliability rating drop to good pushes this system out of the Best Buy ranks.
7	Gateway 2000 P5-200XL 800/846-2000 www.gw2k.com	-	Sept 96	\$2704	Pentium-200	 \$700 price drop puts loaded multimedia PC on chart.
8	Gateway 2000 G6-200 800/846-2000 www.gw2k.com	7	Dec 96	\$2879	Pentium Pro-200	Very fast; SCSI storage; ample expandability; good as a workgroup server.
9	HP Pavilion 7285 800/724-6631 www.hp.com	9	Jan 97	\$3148	Pentium-200	 Quick; large hard disk; voice modem; warranty is for only one year.
10	Quantex QP6/200 PD-4 800/896-4898 www.quantex.com	-	NEW	\$2769	Pentium Pro-200	 Almost as fast as Sys's PC; Quantex PCs need better quality control.
11	Cyrix 6x86 P200+ 800/340-7501 www.cyrix.com	10	Nov 96	\$3489	Cx6x86-P200+	Cyrix cuts price by \$350 for minitower that competes with slower PPro-200s.
12	Compaq Deskpro 2000 Model 5200/1080 800/345-1518 www.compaq.com	8	Nov 96	\$2733	Pentium-200	Hefty \$485 price cut, but Compaq PC reliability drops from best to good.
13	HP Vectra 500 Model 515MCx 5/166 800/752-0900 www.hp.com	12	July 96	\$2754	Pentium-166	 Small-business PC comes with voice mail.
14	Quantex QP5/200 SM-3 800/896-4898 www.quantex.com	-	NEW	\$2799	Pentium-200	This minitower is reasonably fast.
15	HP Vectra VL4 5/200MT 800/752-0900 www.hp.com	13	Sept 96	\$3183	Pentium-200	Well-built PC; P-166 version is also good.
16	Sys Technology Performance Pro 200 800/613-9963 www.systechology.com	14	Dec 96	\$2949	Pentium Pro-200	Fastest PC to date; good graphics card, but otherwise generic components.
17	IBM PC 350 P166 800/426-2968 www.pc.ibm.com	-	Dec 96	\$2769	Pentium-166	\$276 price increase moves this PC from Budget to Power chart.
18	Netis N6200PCI 800/577-7526 www.netistech.com	15	Dec 96	\$2920	Pentium Pro-200	Enormous tower PC can take two CPUs; it's fast and cheap for a PPro-200.
19	ZDS Z-Station GT 500 800/533-0331 www.zds.com	17	Sept 96	\$3570	Pentium-200	Fast and well put together, except for the add-in cards—they're upside down.
20	Tangent TC6200 800/800-5550 www.tangent.com	18	Dec 96	\$2895	Pentium Pro-200	Up \$100 this month, but still fast, and inexpensive for a PPro-200 PC.



Best Buy

See features chart, page 184; performance chart, page 188.



Recommended as home system

* To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews (\$9.95, available January 29).



IN THEIR LONG-RUNNING BATTLE for the top spots, Dell gains the upper hand this month against Micron. Four of this month's Best Buys are from Dell, while Micron's PC reliability rating has slipped from best to good. Of the ten power PCs we evaluated that missed the chart, two Pentium-200s—Compaq's Presario 4716 and Robotech's Cobra XLT P-200—came closest to making it. The main factors holding back the Compaq were its comparatively high pricing and a merely fair rating for the company's support policies. The Robotech system had a cheap keyboard and a monitor that looked slightly fuzzy to our reviewers. For more details, visit PC World Online (<http://www.pcworld.com/t2opcsnaps>).

SCORECARD

★ Overall rating	PC WorldBench score/performance	Vendor's system reliability	Features and design	Price	Vendor's support quality/policies	Fax reprint number ¹	Reader service number
93	230/very good	best	outstanding	average	best/best	3474	601
91	232/outstanding	best	outstanding	average	best/best	3401	602
90	208/very good	best	outstanding	average	best/best	3415	603
90	231/outstanding	good	outstanding	average	best/best	3487	604
89	216/very good	best	outstanding	average	best/best	3417	605
88	208/very good	good	outstanding	average	best/best	3473	606
88	208/very good	fair	outstanding	inexpensive	best/best	3418	607
88	234/outstanding	fair	outstanding	average	best/best	3458	608
87	207/good	best	outstanding	average	good/fair	3475	609
87	235/outstanding	fair	outstanding	inexpensive	good/best	3488	610
87	223/very good	?	outstanding	average	?/best	3444	611
85	218/very good	good	very good	inexpensive	fair/best	3442	616
85	192/good	best	outstanding	inexpensive	good/poor	3383	612
84	216/very good	fair	outstanding	average	good/best	3489	613
84	201/good	best	very good	average	good/poor	3421	614
83	236/outstanding	?	outstanding	average	?/poor	3459	615
85	197/good	fair	outstanding	inexpensive	good/good	3468	-
82	230/very good	?	outstanding	average	?/fair	3460	617
82	215/very good	good ²	outstanding	average	?/good	3420	618
81	230/very good	?	outstanding	average	?/good	3461	619
Scorecard weightings	Performance 25 percent	Reliability 25 percent	Features 20 percent	Price 15 percent	Support 15 percent	All products:	901

² Insufficient data.

³ Limited data; score is based on responses for this company and average of all companies.

comes the side panel to reveal an impeccable interior with plenty of free slots and bays. All the cable connectors sit right below the drive cage, which means you're not faced with the usual maze of ribbon cables obstructing the slots. The interior needs better ventilation, however; the heat sink in this minitower burned our hand when we touched it, despite the presence of a big cooling fan. More air could circulate if the system's hard drive were mounted farther away from the front grille.



Dell Pro200n

Dell's system documentation is thorough and easy to understand, its support policies are among the best, and you can usually get through to technicians without waiting, especially in the mornings. System reliability ranks among the best, too, according to *PC World* readers. We get dozens of fax-back responses from Dell owners each month, and few of them complain about system problems.

2 DELL OPTIPLEX GXPRO 200

PRO: Speedy, great design, built-in networking

CON: None significant



The \$3702 GXpro is a very fast, easily upgradable powerhouse designed to work well in a corporate environment. The system comes with some multimedia components, including integrated sound and speakers, but don't count on the ultimate multimedia experience. Dell put most of the muscle behind this Pentium Pro machine into a LAN connection and a terrific interior design that network administrators will love.

With a PC WorldBench score of 232, the GXpro is one of the fastest PCs we've tested. The graphics hardware is top-notch—a Number Nine Imagine 128 Series 2 graphics card with 4MB of VRAM, and a bright, crisp 17-inch Dell D1728D monitor. The multimedia setup is pretty much par for the course for power desktops today, with an integrated Vibra 16 sound chip, Altec Lansing ACS 31 speakers, and an 8X CD-ROM drive. The PC comes ready to plug into your network with an integrated 3Com ethernet adapter. ▶

This Month's Best Buys

1 DELL DIMENSION XPS PRO200N

PRO: Very fast, great multimedia and 33.6-kbps modem, top reliability, excellent support

CON: None significant



The Pro200n's price dropped \$389 from last month, making it one of the best power PCs you

can buy. This \$3349 system has the same case style as the "s" series of Dell Dimensions. The CD-ROM drive is located at the top of the front panel, making it easily accessible, and the power and reset buttons are located in the center of the front panel, well away from the floppy disk eject button. While the engineers were at it, they made the case much easier to open. Give a thumbscrew a few turns, and off

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	3.2	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
2	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
3	Dell Dimension XPS P200s*	Pentium-200	16	512	2.6	Number Nine Imagine 128 Series 2	4/VRAM	17/15.3	.28	12X
4	Micron Millennia Pro2 200 B*	Pentium Pro-200	32	256	2.1	Diamond Stealth 3D 2000	4/ORAM	17/16	.26	12X
5	Dell OptiPlex GXMT 5200*	Pentium-200	32	512	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
6	Micron Millennia P166	Pentium-166	32	512	2.1	Diamond Stealth 3D 2000	4/E00 ORAM	17/15.8	.26	12X
7	Gateway 2000 P5-200XL	Pentium-200	32	512	3	Matrox Millennium	2/WRAM	17/15.9	.26	8X
8	Gateway 2000 G6-200	Pentium Pro-200	32	256	2.1	Matrox Millennium	4/WRAM	17/15.9	.25	8X
9	HP Pavilion 7285	Pentium-200	32	256	3.2	S3 Virge PCI	2/E00 ORAM	17/15.5	.28	8X
10	Quantex QP6/200 PD-4	Pentium Pro-200	32	256	3.2	Matrox Millennium	2/ORAM	17/16	.26	12X
11	Cyrix 6x86 P200+	Cx6x86-P200+	32	256	4.1	Matrox Millennium	2/WRAM	15/14	.28	8X
12	Compaq Deskpro 2000 Model 5200	Pentium-200	32	256	1.1	integrated Cirrus Logic 5436	2/E00 ORAM	15/14	.28	8X
13	HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	1.6	integrated Trio64	1/ORAM	15/13.7	.28	8X
14	Quantex QP5/200 SM-3	Pentium-200	32	512	3.2	Matrox Millennium	2/WRAM	17/15.8	.28	12X
15	HP Vectra VL4 5/200MT	Pentium-200	16	256	2.5	Matrox Millennium	2/WRAM	15/13.5	.28	8X
16	Sys Performance Pro 200	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15	.28	8X
17	IBM PC 350 P166	Pentium-166	16	256	1.3	integrated Trio64V+	2/E00 ORAM	15/13.7	.28	6X
18	Netis N6200PCI	Pentium Pro-200	32	256	2.1	Matrox Millennium	2/WRAM	17/15.1	.28	6X
19	ZDS Z-Station GT 500	Pentium-200	32	256	2.6	integrated ATI-264VT	2/SGRAM	17/15.5	.26	8X
20	Tangent TC6200	Pentium Pro-200	32	256	2.1	STB Lightspeed 128	2/MORAM	17/15.7	.27	8X

* Best Buy

1 Toll call.



Dell GXpro 200

The OptiPlex GXpro's desktop design is a vast improvement over previous systems. It's one of the easiest-to-upgrade PCs we've seen. The case is simple to remove, and the internal construction is modular. Cards are housed on a vertical riser plane that slides out at the touch of a lever. Even the power supply swings aside for effortless access to the motherboard and drive bays. An easy-to-upgrade tower version is also available. The GXpro uses DIMM memory modules rather than SIMMs. People who service PCs love these newer modules because they make it easier to add

memory without having to remove lower-capacity modules to make room. Unlike other systems with DIMM sockets, the OptiPlex GXpro has four sockets instead of two. This leaves three sockets open, so graphics professionals and other people who need lots of RAM can fill 'er up.

3 DELL DIMENSION XPS P200S

PRO: Big hard drive, 12X CD-ROM drive, fast graphics card, 33.6-kbps fax-modem

CON: A bit slower than we expected, considering use of fast SDRAM; no speakers



The \$2949 Dimension XPS P200s is the top-end PC in Dell's "s" series, the follow-on to the well-regarded "c" line of Dells that dominated our charts for months. The updated Intel chip set in Dell's "s" series sup-

ports SDRAM—a type of main memory that's faster than today's popular EDO DRAM. It's difficult to draw hard conclusions, considering the different configurations of the Pentium-200s we've tested, but SDRAM doesn't seem to have done the P200s much good. Although it's among the fastest Dell Dimension systems we've ever tested, the P200s's PC WorldBench score of 208 lags behind that of several Pentium-200 desktops that use EDO DRAM. It may be that Dell hasn't finished fine-tuning the P200s. We'll re-test soon to see if speed has improved.

One thing Dell doesn't have to tweak is the graphics card. The Number Nine Imagine 128 Series 2 with 4MB of VRAM that came with our machine adds more than \$300 to the system's price, but it can

EXPANDABILITY

CUSTOMER SUPPORT

Modem speed (kbps)	Sound board	EXPANDABILITY						CUSTOMER SUPPORT			
		Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
33.6	Sound Blaster AWE32	minitower	128	512	2	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
-	integrated Vibra 16	desktop	512	256	3	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated Vibra 16	minitower	64	512	1	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	integrated Sound Blaster 32	minitower	512	512	3	3/0	4	3/1	24	Sat., Sun.	CIS, WWW
-	integrated Vibra 16	minitower	128	512	2	3/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	integrated Vibra 16S	minitower	128	512	2	3/1	5	3/1	24	Sat., Sun.	CIS, WWW
33.6	Ensoniq Soundscape Vivo	tower	128	512	1	2/6	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
-	Sound Blaster 16 PnP	tower	256	256	2	3/6	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	integrated Yamaha YMF 701	minitower	128	256	2	2/3	6	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
33.6	Ensoniq Vivo 90	minitower	256	256	2	3/3	4	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
-	Sound Blaster AWE32	minitower	256	512	0	1/3	4	3/3	24	Sat., Sun.	BBS, WWW
-	-	compact	128	256	2	2/0	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	Sound Blaster 16	minitower	128	256	4	2/1	4	1/1	16	Sat.	AOL, BBS, CIS, WWW
33.6	Ensoniq Soundscape Vivo PnP	minitower	128	512	2	3/2	4	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
-	Sound Blaster 16	minitower	128	512	4	2/1	4	3/3	11	-	AOL, BBS, CIS, WWW
28.8	Sound Blaster 32 PnP	minitower	128	512	2	3/1	4	1/1	24	Sat., Sun.	-
-	-	desktop	192	512	4	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
33.6	Sound Blaster 16 PnP	tower	256	512	6	3/0	5	1/3	10	Sat.	BBS, WWW
-	Creative Labs Vibra 16	minitower	192	512	4	4/1	5	3/3	24	-	BBS, CIS, MSN, WWW
28.8	Sound Blaster 32 PnP	desktop	1024	512	6	2/2	4	3/3	11	Sat.	BBS, WWW

handle all your graphics chores, including high-end image editing and desktop publishing. The card even has 3-D hardware and support for CAD acceleration.

The system's on/off button is circular, slightly recessed, and smack in the middle of the front panel, well away from the floppy eject button. A wide foot at the minitower's base helps prevent tipping. Inside the P200s you'll find several other nice design touches: An extremely quiet secondary fan augments the power supply fan, the memory comes in high-capacity DIMMs, and a vertically mounted hard drive is placed just behind the internal speaker so as to save space. Dell doesn't include any speakers to go

with the integrated sound chip, however. Adding a pair of basic speakers to the system will set you back another \$36.

Dell's system reliability and service are highly rated by our readers, and the three-year parts and labor warranty, year of free on-site service, 30-day money-back guarantee, and around-the-clock tech support hours all are fine offerings.

If you don't want to spend quite as much and don't need Pentium-200 speed, we recommend the \$2729 Dimension XPS P166s, which we tested with 16MB of RAM, a 17-inch monitor, and a 28.8-kbps fax-modem. Like the P200s, it's not the fastest in its processor class, but it's still a good performer.



Dell P200s

4 MICRON MILLENNIA PRO2 200 B

PRO: Very fast; highly rated 33.6-kbps modem; second processor socket; comes with Microsoft Office; backed by good reliability record

CON: Long waits for technical support



The first Millennium Pentium Pro-200 we received a scant two months ago was the number four power desktop Best Buy in January, but now Micron has sent us a new version with added features and a much lower \$2888 price. Even though Micron's PC reliability rating has dropped from best to good, this system is an outstanding value.

The Millennium Pentium Pro-200 now comes with a U.S. Robotics 33.6-kbps Sportster internal modem, one of the best according to recent *PC World* tests. If you're going to be surfing the Net you



Car shopping bytes.



Plymouth Neon

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One clever idea after another.



That's Plymouth.

should have at least a 28.8-kbps or 33.6-kbps modem. Micron also added a pair of Advent AV007 speakers and integrated the sound chip to complete the multimedia setup; however, this chip, unlike the one in the previous PC, lacks a wavetable, so sound is less crisp and true.

The different Intel motherboard on this new Micron includes a CPU socket for adding another Pentium Pro-200 processor, a rare but useful option for true mul-

titasking. The new model's DIMM sockets are capable of holding twice as many megabytes of memory as SIMM sockets; the Micron's RAM ceiling is 512MB, way more than most users will ever need.

The Millennium Pro2 200 B's WorldBench score of 231 places it a point ahead of its predecessor and makes it one of the fastest machines we've tested. Micron has



Micron Millennium Pro2

a very good record for reliability and support—although in recent calls, we've been lucky to reach a support person in under 45 minutes. The service is great once you get it, though. Policies are typical of a top-tier PC vendor—three-year parts and one-year labor warranty, free on-site service, and 24-hour-a-day, seven-day-a-week toll-free technical support. ▶

TOP 20 POWER DESKTOPS

PERFORMANCE

SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score	Average of tested PPro-200s	
					Faster ←	→ Slower
1 Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	230	[Bar chart showing application times]	
2 Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	232	[Bar chart showing application times]	
3 Dell Dimension XPS P200s*	Pentium-200	16	512	208	[Bar chart showing application times]	
4 Micron Millennium Pro2 200 B*	Pentium Pro-200	32	256	231	[Bar chart showing application times]	
5 Dell OptiPlex GXMT 5200*	Pentium-200	32	512	216	[Bar chart showing application times]	
6 Micron Millennium P166	Pentium-166	32	512	208	[Bar chart showing application times]	
7 Gateway 2000 P5-200XL	Pentium-200	32	512	208	[Bar chart showing application times]	
8 Gateway 2000 G6-200	Pentium Pro-200	32	256	234	[Bar chart showing application times]	
9 HP Pavilion 7285	Pentium-200	32	256	207	[Bar chart showing application times]	
10 Quantex QP6/200 PD-4	Pentium Pro-200	32	256	235	[Bar chart showing application times]	
11 Cyrix 6x86 P200+	Cx6x86-P200+	32	256	223	[Bar chart showing application times]	
12 Compaq Deskpro 2000 Model 5200/1080	Pentium-200	32	256	218	[Bar chart showing application times]	
13 HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	192	[Bar chart showing application times]	
14 Quantex QP5/200 SM-3	Pentium-200	32	512	216	[Bar chart showing application times]	
15 HP Vectra VL4 5/200MT	Pentium-200	16	256	201	[Bar chart showing application times]	
16 Sys Technology Performance Pro 200	Pentium Pro-200	32	256	236	[Bar chart showing application times]	
17 IBM PC 350 P166	Pentium-166	16	256	197	[Bar chart showing application times]	
18 Netis N6200PCI	Pentium Pro-200	32	256	230	[Bar chart showing application times]	
19 ZDS Z-Station GT 500	Pentium-200	32	256	215	[Bar chart showing application times]	
20 Tangent TC6200	Pentium Pro-200	32	256	230	[Bar chart showing application times]	

*Best Buy

Application test times in minutes 0 10 20 30

- Word 7.0 for Windows 95
- Picture Publisher 6.0 for Windows 95
- WordPerfect 6.1 for Windows
- Excel 7.0 for Windows 95
- Paradox 5.0 for Windows
- 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 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 score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (<http://www.pcworld.com>).

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Model/ Viewable Area	Dot Pitch Horiz. Scan	Max. Horiz. Scan Rate	Refresh Rate	ESP
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21" MF-8221E (19.5" vis)	.27mm Flat Square	94 kHz	76 Hz (1600 x 1200)	\$1,585
17" MT-9017E (16" vis)	.25mm Aperture Grille	92 kHz	72 Hz (1600 x 1200)	\$799
17" MF-8617E (15.75" vis)	.26mm Flat Square	86 kHz	69 Hz (1600 x 1200)	\$690
15" MF-8515F (13.9" vis)	.28mm Flat Square	66 kHz	80 Hz (1024 x 768)	\$374

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January 1997

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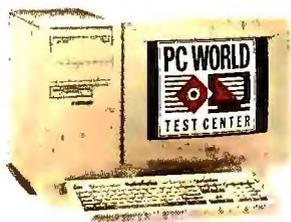
BAL

Circle 108 on reader service card

5 DELL OPTIPLEX GXMT 5200**PRO:** Fast, built-in networking, hot graphics card**CON:** None significant

The Pentium-200 model in Dell's network-ready OptiPlex GXMT line is a real greyhound. With a PC World-Bench score of 216, it's one of the fastest P-200 systems we've tested. The high performance of our test machine was helped along by the unit's copious amount of RAM, big secondary cache, and Number Nine Imagine 128 Series 2 graphics board with 4MB of VRAM. The multimedia setup on the OptiPlex GXMT 5200 is good: an 8X CD-ROM drive, 16-bit integrated Vibra sound, and a pair of Altec Lansing speakers.

The minitower case is sturdy and easy to open, and the 3Com ethernet adapter is integrated, saving you an expansion slot. The expansion slots hover above the motherboard on a daughtercard, so you don't have to worry about system chips getting in the way of longer boards. As with all its OptiPlexes, Dell backs the GXMT 5200 with a three-year warranty.

**Dell GXMT 5200**

if your kid goes wild with movie files and a digital camera, you probably won't run out of room for a while. As a multimedia machine, the QP6/200 PD-4 is mostly high-end. Its 17-inch MAG Innovision monitor provides an ample 16 inches of actual viewing area and shows particularly crisp images, but the video card comes with only 2MB of RAM, cutting out super-high-resolution, superrich color

images. However, Quantex included a 12X CD-ROM drive with this system.

The interior is uncluttered, with four free expansion slots and six open drive bays, and offers easy access to all memory and adapter slots. The ports in back are clearly labeled and accessible.

The software bundle will keep you busy for a while. You get WordPerfect 7, Quicken, Compton's Interactive Encyclopedia 1996, Corel's Printhouse and Internet Mania, a résumé designer, a map and atlas CD-ROM, a Windows primer, and the Internet Yellow Pages.

Quantex offers a three-year warranty for parts and one year for labor. The company's support policies look good on paper—you get free on-site service for the first year and seven-day-a-week technical support, plus online help through Prodigy and the World Wide Web. But the proof is in the results of our ongoing fax-back reader survey, and they show that Quantex customers could be happier campers. Quantex now gets a good endorsement for the quality of its service, but readers could still be happier with the reliability of its systems.

14 QUANTEX QP5/200 SM-3**PRO:** Fast for a Pentium-200, great sound, large hard drive, decent software bundle**CON:** Only fair reliability rating, lousy keyboard

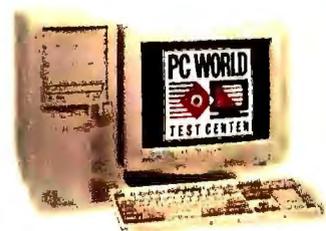
This minitower is a nice fit for musicians or anyone who needs good audio on a PC. The Ensoniq Soundscape Vivo sound card is one of the best low-price recording cards around that's capable of 16-bit, 48-kHz simultaneous playback and recording, and it has nice wavetable sound. The 3.2GB hard drive offers plenty of room even for full-length songs. Rich sound is

provided by a set of Altec Lansing speakers, including a subwoofer that makes you feel you're immersed in the sound rather than just listening to it.

The QP5/200 SM-3 is good for business use as well. Its MAG 17-inch monitor has somewhat limited brightness, but this is noticeable only when there's a lot of glare. Otherwise, picture quality is excellent. The Matrox video card features 2MB of memory, enough for 16-bit color at up to 1024 by 768 resolution. This system's software bundle includes Corel's Standard Perfect Office, an alternative suite to Microsoft Office. You also get Quicken, a popular home finance program, as well as a bunch of reference and game titles.

One of the few disappointments with this system was the clattery keyboard. Also, the documentation is scattered among a bunch of component manuals.

Quantex's QP5/200 SM-3 is well configured for a \$2799 minitower, and this machine is speedy to boot: Its PC WorldBench

**Quantex QP5/200 SM-3**

score of 216 makes it one of the faster Pentium-200 systems that we've tested.

Quantex's support package includes a three-year parts and one-year labor warranty. Technical support is available on the weekend, too. What Quantex needs to keep working on is its follow-up act. While *PC World* readers now rate service quality as good, the company's system reliability rating is still only fair. ▶

New This Month

The following PCs made our Power Desktops chart for the first time this month. For previously tested PCs on the chart, visit our Web page at <http://www.pcworld.com/t20pcs>.

10 QUANTEX QP6/200 PD-4**PRO:** Very fast, great software bundle**CON:** Only fair PC reliability rating

If performance and price were our only criteria, the Quantex QP6/200 PD-4 would be a Best Buy. This Pentium Pro-200 is the second-fastest system we've tested. At \$2769, it's less expensive than most Pentium Pro-200s with similar configurations. But the unit's tepid reliability rating keeps it out of the Best Buy ranks.

The Quantex is a good computer for both home and office. You get a generous 3.2GB hard disk; even

**Quantex QP6/200 PD-4****Beyond the Top 20**

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online (<http://www.pcworld.com/t20pcsnaps>).

- ◆ Austin Elan Pentium-Pro 200
- ◆ Compaq Presario 4716
- ◆ DTK P-Pro 200
- ◆ Kingdom Computers P200
- ◆ Packard Bell Platinum 1570
- ◆ Pionex Elite
- ◆ Polywell 686-200cx
- ◆ ProGen Discover MPEG II P200
- ◆ Robotech Cobra XLT P-200
- ◆ Toshiba Infinia 7200



When it comes to scanners, not all 800 pound gorillas are what they're cracked up to be.



If you need a scanner that combines high performance and maximum value, may we suggest a little head-to-head competition. UMAX vs HP? Unfair comparison? Maybe for them. UMAX has a reputation for offering advanced, award-winning scanners at prices that make good business sense. Plus, our software bundles are unmatched, even by the big boys. So why monkey around? Compare the UMAX Vista S-12 with the HP ScanJet 4c and decide for yourself.

Compare	UMAX Vista S-12	HP ScanJet 4c
Image editor software	✓ Adobe Photoshop Full	Photopaint
Presentation software	✓ ASAP Word Power	None
Maximum DPI	✓ 9600	2400
Bit depth	✓ 33-bit ¹	30-bit
Scanning speed (5" x 7" color photo)	✓ 18 sec.	42 sec.
Lamp	✓ Cold cathode - lasts longer	Fluorescent
Tech support	✓ Toll free	No 800 number
Price	✓ \$699 ²	\$ 938 ³



UMAX Vista S-12



toll free **800-859-2728**
<http://www.umax.com>



HP ScanJet 4c

¹ 33-bit equivalent with the analog gamma correction. ² Estimated street price after \$50 mail-in rebate. ³ Average street price from sampled advertisements in Computer Shopper Sept. 1996.
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 ASAP Word Power is a registered trademark of Software Publishing Corp. All other trademarks are the property of their respective owners.

Circle 250 on reader service card

"When I logged on that Tuesday night

"It was supposed to be just another evening chat session on our genealogy forum, discussing family histories. We had about 15 people online from all over, including one gentleman logged on from Arbroath, Scotland. It was 4 o'clock in the morning there. Turns out he was alone in his apartment and not feeling very well.

"I didn't even notice when he first typed in 'I think I have a problem.' But by the time he wrote 'I think I have had a stroke' and I saw this stuff scrolling up my screen, I realized he was really in trouble. I kept writing 'what is your phone number?' He was barely able to see clear enough to

key in his number - and then he stopped typing. I dialed the operator and within 2 minutes I'm talking to a police dispatcher in Arbroath. Ten minutes later, police made it to his home and found him lying on the floor, conscious but unable to talk.

"The next morning I was told that I'd saved this man's life. Fortunately, it wasn't a stroke, and he was home from the hospital later that day.

"At times like this, you don't stop to think - you just do it. Like, I didn't worry about my modem. I just knew it would keep me connected. I've been using personal computers for, oh, about 17 years now so I know what works. I put my

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Because Communication Matters™

RULES AND REGULATIONS

NO PURCHASE NECESSARY. The "WebStories Contest" is open to legal U.S. residents, 18 years or older. Employees (and their immediate families) of Rockwell, its affiliates, subsidiaries, agencies, distributors and retailers are not eligible. Void where prohibited or restricted by law. Contest begins on November 1, 1996 at 8 a.m. CST and all entries must be received no later than January 31, 1997 at 5 p.m. CST.

HOW TO ENTER: Link to the Rockwell website at <http://www.nb.rockwell.com> and follow the instructions. In addition to entering the requested information, you will be asked to write a story, 75 to 100 words in length, about your use of a modem. Or, obtain an entry form by mailing a self-addressed, stamped envelope to: "WebStories Contest" - Entry Request, 4311 Oak Lawn Ave., Ste 600/LB 18, Dallas TX, 75219-2315; requests must be received by January 15, 1997. Complete the entry form and mail with your story, regarding your use of a modem, to the above address, to be postmarked by January 31, 1997 and received by February 10, 1997. Be sure to mark the outside envelope "Contest Entry." Limit of one entry per e-mail address or

by mail. Original entry form must be used. If an e-mail entry is selected as a winner, the prize will be awarded to the registered e-mail addressee. Stories submitted via regular mail must be legibly handprinted in ink or typewritten on an 8.5" x 11" piece of paper. Entries, via e-mail or regular mail, not satisfying the official rules will be automatically disqualified. All entries become the sole property of Rockwell and will not be returned.

WINNERS: Winners will be determined on or around February 20, 1997 from all eligible entries received. Stories will be judged based on which is the most compelling human-interest story that best reflects how your modem has allowed you to connect and make a difference; that is, how you have utilized a modem. All stories must be true. One winner will be selected in each of four regions/quadrants of the U.S. For make-up of regions, send a self-addressed stamped envelope to: 4311 Oak Lawn Ave., Ste 600/LB 18, Dallas TX, 75219-2315. Be sure to indicate "Regions" on the outside envelope. Entrant's state of residency will determine the appropriate region for purposes of this Contest. Entries will be evaluated by The Marketing Continuum, an independent judging organization. All judging decisions are final and binding in all

respects. Entrants agree to these rules and to the judges' decisions. Winners will be notified by mail and will be required to execute an Affidavit of Eligibility, Liability and Publicity Release Form (where legal), Warranty of Originality and an Assignment of All Rights. If a winner fails to execute and return these materials within the prescribed time, prize may be deemed forfeited at the discretion of Rockwell and awarded to an alternate winner. Winners are responsible for all taxes. No transfer, substitution, or cash in lieu of prizes is permitted, except at option of sponsor for prize of equal or greater value. Acceptance of prize constitutes permission to the sponsor to use the winner's name, likeness, and story for purposes of advertising and trade without further compensation, unless prohibited by law. Rockwell is not responsible for illegible, incomplete, lost, late, misdirected or postage due entries/mail or for phone, electronic, network, computer, hardware, or software program malfunctions, delays, or difficulties. All ideas, concepts, suggestions, materials and trademarks contained in the entrant's story are assigned to Rockwell for any and all uses, and may thereafter be used by Rockwell without further compensation to entrant. All stories must be original work

of the entrant regarding the indicated theme. In the event the Internet portion of the Contest is not capable of being conducted as planned due to computer virus, tampering, or other cause, Rockwell, in its sole discretion, reserves the right to cancel the Internet portion of the Contest and award prizes based on the mail-in entries only. By participating and winning a prize, winner releases Rockwell, its affiliates, subsidiaries, agencies, distributors and retailers, and their respective officers, directors, employees and agents from any and all liability with respect to participation in the Contest or acceptance or use/misuse of the prize.

PRIZES (4): A personal computer system including monitor and a Rockwell-based modem, with an approximate retail value of \$2500, will be awarded to each of the four regional winners.

WINNERS LIST: To receive a list of the winners, available after March 31, 1997, send a self-addressed envelope to: "WebStories," 4311 Oak Lawn Ave., Ste 600/LB 18, Dallas TX, 75219-2315. Be sure to indicate "Winners" on the outside envelope. Winner's name will only be posted to the Rockwell web site on January 31, 1997 and on 1/31/97.

had no idea I would save a life."

system together myself. I pick components with the best performance and value. Like my modem. It has Rockwell chips at its heart. I wouldn't depend on anything less. I mean, you never know when a discussion about the family tree just might end up keeping one branch alive."

*Richard Eastman
CompuServe® Genealogy Forum founder
Billerica, Massachusetts*

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PC WORLD TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (11/15/96)	CPU	Comments
1	 Dell Dimension P133v 800/388-8542 www.dell.com	2	Dec 96	\$1879	Pentium-133	 Fast, affordable; sound and modem are included; good first PC.
2	 Micron Millennia P133 888/634-8799 www.mei.micron.com	1	Jan 97	\$1899	Pentium-133	As fast as some P-166s, but lowered reliability score drops it down a notch.
3	 Dell OptiPlex GXM 5133 800/388-8542 www.dell.com	3	Jan 97	\$2245	Pentium-133	Quick corporate PC with built-in networking; we also like the P-166 version.
4	 Gateway 2000 P5-133 800/846-2000 www.gw2k.com	4	Nov 96	\$1709	Pentium-133	Very fast for a P-133; fast graphics card; sound costs extra.
5	 Gateway 2000 G6-180 800/846-2000 www.gw2k.com	8	Dec 96	\$2179	Pentium Pro-180	Faster than a P-200; \$145 price drop makes this powerful PC a budget Best Buy.
6	HP Vectra VE 5/133 800/752-0900 www.hp.com	7	Dec 96	\$2170	Pentium-133	Corporate PC with nice touches; Unified Memory Architecture slows it down.
7	Quantex QP5/166 SM-2 800/896-4898 www.quantex.com	-	Aug 96	\$2299	Pentium-166	Very fast; lands on chart because reliability rating rises from poor to fair.
8	ProGen Discover MPEG II P150 888/776-9595 www.progen.com	11	Nov 96	\$1549	Pentium-150	 An option for gamers on a budget.
9	Quantex QP6/200 Pro 800/896-4898 www.quantex.com	-	Aug 96	\$2499	Pentium Pro-200	Upgrade to 12X CD-ROM drive makes this the first PPro-200 on Budget chart.
10	HP Vectra XM5/120 Series 4 800/752-0900 www.hp.com	10	Oct 96	\$2013	Pentium-120	Well-built corporate PC backed by great reliability.
11	AST Advantage 9304 800/876-4278 www.ast.com	-	Dec 96	\$1599	Pentium-133	Price dropped \$100; wavetable sound; fast modem.
12	DirectWave Blue Thunder P133 MVP Pro 800/882-8108 www.directwave.com	13	Oct 96	\$1699	Pentium-133	Very fast; lots of components; unknown reliability and service.
13	Micro Express MicroFlex-686/P166+ 800/989-9900 www.microexpress.net	-	June 96	\$1799	Cx6x86-P166+	\$100 price drop on fast PC with big monitor, wavetable sound.
14	Diamond Technologies P133 800/989-7253 www.diamondtech.com	15	Jan 97	\$1650	Pentium-133	Fast; great features such as a 33.6-kbps modem.
15	First Computer FCC P-120 800/900-1008 www.firstcomputer.com	16	Aug 96	\$1399	Pentium-120	Nondescript but well-built PC; service and reliability are unknown.
16	Robotech Cobra XLT P-133 800/255-2215 www.robotechusa.com	17	July 96	\$1799	Pentium-133	 Fast home PC, decent price, but spotty documentation and support.
17	Acma zPower 166V 800/786-6888 www.acma.com	20	Sept 96	\$1945	Pentium-166	 Quick multimedia PC is one of few that come with PC Card slots.
18	National Microcomputers Expert 166 800/800-4662 www.natmicro.com	-	July 96	\$1795	Pentium-166	\$100 price drop puts fast but generic minitower on chart.
19	Netis N5120 Media 800/577-7526 www.netistech.com	-	Apr 96	\$1715	Pentium-120	Has a 28.8-kbps modem, but CD-ROM drive is only 4X.
20	Xi Computer Xi P133MTower SP 800/432-0486 www.win.net/xi_comp	-	Mar 96	\$1699	Pentium-133	Very fast; lots of room for expansion.



Best Buy

See features chart, page 196; performance chart, page 198.



Recommended as home system

To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews (\$9.95, available January 29).



QUANTEX IS SLOWLY PULLING its quality-control act together, with readers now reporting fair reliability (up from poor) for this company's PCs. As a result, Quantex's QP5/166 SM-2 cracked the chart this month, and the \$2499 QP6/200 Pro became the first Pentium Pro-200 to make the Budget list. We tested six new budget desktops this month—but none made our chart. The terrifically fast Micro Express MicroFlex-PCI/5200 and MidWest Micro P5-200 came close. But the Micro Express's monitor lacked clear, sharp images. And MidWest Micro's low reliability record is keeping its PCs from making our charts. For more details, visit PC World Online (<http://www.pcworld.com/t2opcsnaps>).

SCORECARD

★ Overall rating	Price	Vendor's system reliability	Features and design	PC WorldBench score/performance	Vendor's support quality/policies	Fax reprint number ¹	Reader service number
91	average	best	very good	188/very good	best/best	3462	620
88	average	good	outstanding	191/very good	best/best	3479	621
88	expensive	best	very good	191/very good	best/best	3480	622
84	inexpensive	fair	very good	192/very good	best/best	3449	623
83	average	fair	outstanding	218/outstanding	best/best	3466	624
82	average	best	very good	166/good	good/poor	3465	625
82	expensive	fair	outstanding	209/very good	good/best	3404	626
81	inexpensive	²	very good	183/very good	² /poor	3451	627
81	expensive	fair	outstanding	224/outstanding	good/best	3405	628
80	average	best	good	177/good	good/poor	3455	629
80	inexpensive	poor	very good	189/very good	fair/good	3490	630
80	inexpensive	²	outstanding	194/very good	² /good	3469	631
79	average	²	very good	211/very good	² /fair	3491	632
79	inexpensive	²	outstanding	185/very good	² /poor	3484	633
79	very inexpensive	²	very good	178/very good	² /poor	3470	634
79	average	²	outstanding	189/very good	² /poor	3393	635
79	average	²	outstanding	199/very good	² /poor	3429	636
79	average	²	very good	197/very good	² /worst	3472	637
78	inexpensive	²	very good	170/good	² /fair	3492	638
78	inexpensive	²	very good	193/very good	² /good	3493	639
Scorecard weightings	Price 25 percent	Reliability 25 percent	Features 20 percent	Performance 15 percent	Support 15 percent	All products:	902

² Insufficient data.

This Month's Best Buys

1 DELL DIMENSION P133V

PRO: Fast, well designed, top reliability score

CON: Limited RAM expandability, dark monitor

 \$1879 is a good price for a powerful multimedia minitower from a company with a solid record for reliability and service. Dell's P-133 offers good performance and features. With its

16MB of SDRAM and 256K pipeline-burst cache, the P133v scored 188 in our PC WorldBench test suite—on a par for its CPU class. Our test model even came with a 16-bit sound card, something you don't usually get with a bare-bones Dell PC. (Speakers cost extra.) Dell also includes a 28.8-kbps fax-modem.

With its fine stripe pitch, the Dell Trinitron monitor displays crisp images and

text; however, the unit that shipped with our system was a little dark, and we couldn't improve the brightness. For ex-

panding memory, the P133v uses DIMMs, which hold more memory on a module than SIMMs. The system's two DIMM sockets can hold a total of 64MB of synchronous RAM (two 32MB DIMMs). When 64MB DIMMs become available, the system will be able to hold 128MB.

If you want a little extra power, there's the Dimension P200v, which we reviewed in the November issue. This minitower is similar to the P133v, but it costs \$120 more and is about 10 percent faster.

2 MICRON MILLENNIA P133

PRO: Fast, well built, fine support

CON: No modem, no software

 The \$1899 Millennium P133 performs as well as many P-166s—you'll need to add only a modem and applications to make it a complete package. The internal design is spare, clean, and open, and the motherboard is easily accessible, making it a snap to add cards or upgrade memory. There are plenty of available expansion slots, drive bays, and SIMM sockets. The Millennium's good multimedia setup has gotten better with the addition of a 12X CD-ROM drive. The Diamond Stealth 3D 2000 video card comes brimming with a hefty 4MB of RAM, enough to give you high-resolution images in true color. The audio is good if not

inspiring, with an integrated Vibra 16S chip and fair-quality Advent 270 speakers. The system's 2.1GB hard disk should provide enough room for most users. And although the 15-inch monitor is none too big, it should be adequate for most business and home use.

Strong support is one of Micron's fortes. Aside from 24-hour-a-day tech support, you get a three-year parts and one-year labor warranty and a year of free on-site service. Our readers have been satis- ▶



Dell Dimension



Micron Millennium

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension P133v*	Pentium-133	16	256	1.6	integrated Trio64V+	2/EDD DRAM	15/14	.25	8X
2	Micron Millennia P133*	Pentium-133	16	512	2.1	Diamond Stealth 3D 2000	4/EDO DRAM	15/13.5	.28	12X
3	Dell OptiPlex GXM 5133*	Pentium-133	32	256	2.1	integrated S3 Trio64	2/DRAM	15/13.7	.28	8X
4	Gateway 2000 P5-133*	Pentium-133	16	256	2	STB Lightspeed 128	2/MDRAM	15/13.9	.28	8X
5	Gateway 2000 G6-180*	Pentium Pro-180	16	256	3.2	STB Lightspeed 128	2/MDRAM	15/13.9	.25	8X
6	HP Vectra VE 5/133	Pentium-133	16	256	1.1	integrated SiS 62D5	2/EDD DRAM	15/14	.28	8X
7	Quantex QP5/166 SM-2	Pentium-166	32	512	2.5	STB Lightspeed 128	2/MDRAM	17/15.9	.26	12X
8	ProGen Discover MPEG II P150	Pentium-150	16	512	1.3	ProGen Gold 64V+ PCI	2/EDD DRAM	15/13.7	.28	8X
9	Quantex QP6/200 Pro	Pentium Pro-200	32	256	2.5	STB Lightspeed 128	2/MDRAM	17/16	.26	12X
10	HP Vectra XM5/120 Series 4	Pentium-120	16	512	1.3	integrated Trio64	2/DRAM	15/13.5	.28	-
11	AST Advantage 9304	Pentium-133	24	256	1.6	integrated Trio64V+	1/EDD DRAM	15/13.8	.28	8X
12	DirectWave Blue Thunder P133 MVP	Pentium-133	16	512	1.3	Diamond Stealth 3D 2DDD	2/EDO DRAM	15/13.5	.26	8X
13	Micro Express MicroFlex-686/P166+	Cx6x86-P166+	32	512	1.3	STB Powergraph 64 Video	2/DRAM	17/13.9	.28	8X
14	Diamond Technologies P133	Pentium-133	16	512	2.1	Diamond Stealth 3D 2DDD	2/EDD DRAM	15/13.9	.28	8X
15	First Computer FCC P-120	Pentium-120	16	512	1.2	Matrox Millennium	2/VRAM	15/13.8	.28	6X
16	Robotech Cobra XLT P-133	Pentium-133	16	256	1.3	Number Nine 9FX Motion 331	2/EDD DRAM	17/15.4	.28	6X
17	Acma zPower 166V	Pentium-166	16	256	1.3	Diamond Stealth64 Video-2DD1	2/EDD DRAM	15/13.7	.28	8X
18	National Microcomputers Expert 166	Pentium-166	16	256	2.1	ASUS PCI-AV868	2/DRAM	17/16.1	.26	6X
19	Netis N5120 Media	Pentium-120	16	256	1.6	Diamond Stealth64 Video VRAM	2/VRAM	15/14	.28	4X
20	Xi Computer Xi P133MTower SP	Pentium-133	16	512	1.3	Diamond Stealth64 Video VRAM	2/VRAM	17/15.6	.26	6X

* Best Buy † Toll call.

fied with the reliability of Micron's PCs, and the Millennia's documentation is clear and concise. Micron hasn't yet joined the growing group of vendors that provide snazzy interactive on-screen help, but the hard copy manuals are easy to read and contain plenty of diagrams. Micron offers the same configuration in a Pentium-166 model that costs \$200 more; that unit is also a very good value.

3 DELL OPTIPLEX GXM 5133

PRO: Good performer, excellent reliability and support record, built-in ethernet adapter

CON: Monitor display quality is subpar



The \$2245 OptiPlex GXM 5133 is an entry-level model in Dell's network-ready corporate line. With a PC WorldBench score of 191, the GXM

5133 doesn't fall far behind the average P-166 desktop. Many network administrators shopping for new workstations will find the built-in ethernet adapter convenient.

A 2.1GB hard drive and an 8X CD-ROM drive are good features, and an integrated S3 Trio64 card with 2MB of memory handles video chores nicely. One complaint is the lackluster display quality of the 15-inch monitor. The images are not as crisp as we're used to seeing on monitors these days.

The GXM 5133 we tested had few extras. No modem, software, or speakers came with it. Lack of a modem is hardly a negative in a unit that's meant to be networked, but bundled software is always



Dell OptiPlex

good to get. Sound comes from an integrated Vibra 16 sound chip. Inside the box, the case was reinforced by internal cages, giving it more strength than other PCs. No matter how heavy a monitor you set on this midsize desk-

top, there's no danger of stressing vital components. Cables were tied off, and the interior was easy to move around in.

Dell has continually received excellent scores from readers in our ongoing reliability and service fax-back survey. These factors, coupled with a three-year parts and labor warranty, help make a corporate buyer's decision quite a bit easier. Excellent documentation and around-the-clock phone support for the life of the unit are

EXPANDABILITY

CUSTOMER SUPPORT

Modem speed (kops)	Sound board	Case style	Max RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll free support (hours)	Weekend support	Online support
28.8	Creative Labs Vibra 16	minitower	64	512	1	3/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
-	integrated Vibra 16S	minitower	128	512	2	3/1	6	3/1	24	Sat., Sun.	CIS, WWW
-	integrated Vibra 16	desktop	128	512	2	1/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
-	-	minitower	128	256	1	2/2	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
-	Ensoniq Soundscape Vivo PnP	tower	128	256	2	3/6	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
-	Sound Blaster 32 PnP	desktop	192	256	4	1/1	3	3/3	11 ¹	-	AOL, BBS, CIS, WWW
33.6	Ensoniq Vivo 90	minitower	128	512	2	3/2	4	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
33.6	Audio Drive 32 PnP	minitower	128	512	2	3/2	4	3/1	9	-	BBS
33.6	Ensoniq Vivo 90	minitower	128	256	0	2/1	3	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
-	-	desktop	128	512	4	2/0	4	3/3	11 ¹	-	AOL, BBS, CIS, WWW
33.6	integrated Crystal 4232	minitower	192	256	0	2/2	6	1/1	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
28.8	Sound Blaster AWE32	minitower	256	512	2	3/0	3	3/3	11	Sat.	BBS, WWW
-	Sound Blaster AWE32	minitower	128	512	2	3/1	1	2/2	9.5	Sat., Sun.	WWW
33.6	Wavestar 32	desktop	128	512	3	3/0	4	1/1	9	-	BBS
-	Audio Drive 32 PnP	tower	128	512	2	3/0	6	1/1	11	Sat.	-
33.6	Sound Blaster 16	minitower	128	512	2	3/3	4	3/1	9	-	BBS, WWW
28.8	Sound Blaster 16	minitower	128	512	2	2/1	3	3/1	9.5	-	BBS, WWW
28.8	ASUS PCI-AV86B	minitower	128	512	2	2/1	4	3/3	10	-	BBS, WWW
28.8	integrated Vibra 16S	minitower	128	512	2	3/1	5	1/3	10	Sat.	BBS, WWW
-	Creative Labs Vibra 16	tower	128	512	2	5/2	6	3/3	11.5	Sat.	WWW

pluses. If you want a no-frills corporate desktop, the GXM 5133 nicely fits the bill.

4 GATEWAY 2000 P5-133

PRO: Fast, great documentation, good design

CON: No modem or sound card at this price, company's PC reliability could be better

 The Gateway 2000 P5-133 is a Best Buy and a dynamite business system, but it needs sound and speakers to make it a good home PC. It's fast, well designed, and at just \$1709 eminently affordable. The low price also includes Microsoft Office Professional. This system is good looking too, with a clean, angular case style that lends an up-to-date feel to an office. The P5-133 lived up to Gateway's reputation for fast machines. It turned in an impressive PC

WorldBench score of 192, making it one of the fastest Pentium-133s on the chart.

The unit we tested had a nice-size 2GB hard drive and an 8X Toshiba CD-ROM drive. The 15-inch CrystalScan is a fine basic monitor, but it's not equal to Gateway's best (the more expensive Vivitron). We can't fault the 2MB STB Lightspeed 128 video card, which has ranked near the top of our Top 10 Graphics Boards chart. Gateway earns a best support score because of its strong policies, but our readers still rate the company's PC reliability only as fair.



Gateway P5-133

The \$1549 P-120 version of this machine is also a good budget system.

5 GATEWAY 2000 G6-180

PRO: Very fast budget PC, fast graphics card

CON: Unimpressive monitor, tepid reliability score

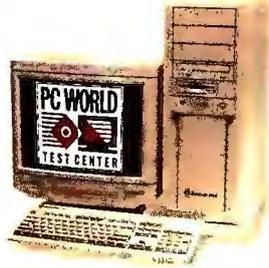
 Gateway 2000's Pentium Pro-180 budget system has ranked well since we reviewed it here two months ago; now a \$145 price drop makes the G6-180 a Best Buy.

For \$2179, this is one huge tower PC—not the type of computer you can easily tuck out of the way at your desk. It's powerful too, with a PC WorldBench score of 218—slightly faster than the average P-200 and slightly slower than the typical Pentium Pro-200. But it costs the same as a similarly configured Pentium-200, so it's a good value, especially if you might upgrade to Windows NT in the future.

It's superexpandable, with room for 

nine extra drives and five extra cards. All the drive bays and add-in cards are easily accessible, and a large fan blows across the motherboard to keep the components cool.

You get a generous 3.2GB hard drive and a quick STB Lightspeed 128 graphics card. Gateway even throws in Microsoft Office Professional—an inclusion that can save you around \$200



Gateway G6-180

if you don't already have a good office suite of business applications. The Gateway Vivitron 15 monitor is okay, although not as crisp as some other flat-screen, Trinitron-style displays we've seen.

And you won't need an MIS person to set up this Pentium Pro: The manual is attractive and easy to follow, with glossy, vivid color pictures and screen shots. ▶

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (<http://www.pcworld.com/t20pcsnaps>).

- ◆ ALR Optima MT5133
- ◆ AST Advantage 9310
- ◆ Cyber Max Cyrix Max C3 P166+
- ◆ Micro Express MicroFlex-PCI/5200
- ◆ MidWest Micro P5-200
- ◆ Packard Bell Platinum 40

TOP 20 BUDGET DESKTOPS

PERFORMANCE

SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score	← Faster	Average of tested P-166s	Slower →
1 Dell Dimension P133v*	Pentium-133	16	256	188			
2 Micron Millennia P133*	Pentium-133	16	512	191			
3 Dell OptiPlex GXM 5133*	Pentium-133	32	256	191			
4 Gateway 2000 P5-133*	Pentium-133	16	256	192			
5 Gateway 2000 G6-180*	Pentium Pro-180	16	256	218			
6 HP Vectra VE 5/133	Pentium-133	16	256	166			
7 Quantex QP5/166 SM-2	Pentium-166	32	512	209			
8 ProGen Discover MPEG II P150	Pentium-150	16	512	183			
9 Quantex QP6/200 Pro	Pentium Pro-200	32	256	224			
10 HP Vectra XM5/120 Series 4	Pentium-120	16	512	177			
11 AST Advantage 9304	Pentium-133	24	256	189			
12 DirectWave Blue Thunder P133 MVP Pro	Pentium-133	16	512	194			
13 Micro Express MicroFlex-686/P166+	Cx6x86-P166+	32	512	211			
14 Diamond Technologies P133	Pentium-133	16	512	185			
15 First Computer FCC P-120	Pentium-120	16	512	178			
16 Robotech Cobra XLT P-133	Pentium-133	16	256	189			
17 Acma zPower 166V	Pentium-166	16	256	199			
18 National Microcomputers Expert 166	Pentium-166	16	256	197			
19 Netis N5120 Media	Pentium-120	16	256	170			
20 Xi Computer Xi P133MTower SP	Pentium-133	16	512	193			

*Best Buy

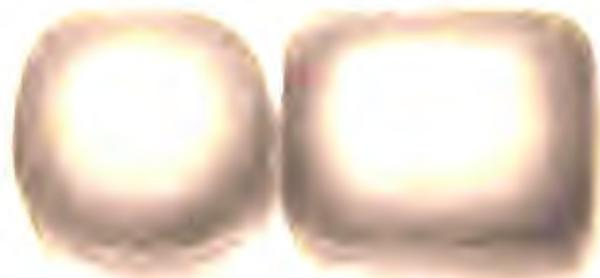
Application test times in minutes 0 10 20 30

- Word 7.0 for Windows 95
- Picture Publisher 6.0 for Windows 95
- WordPerfect 6.1 for Windows
- Excel 7.0 for Windows 95
- Paradox 5.0 for Windows
- 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 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 score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (<http://www.pcworld.com>).



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TOP 20 NOTEBOOK PCs

POWER NOTEBOOKS		Last month	Month tested	Street price (11/15/96)	CPU	Comments
1	 Gateway 2000 Solo 2100 P-133 800/846-2000 www.gw2K.com	3	Jan 97	\$4149	Pentium-133	\$450 price drop moves this ultrafast, reliable notebook to the top.
2	 Dell Latitude LM P133ST 800/388-8542 www.dell.com	1	Oct 96	\$2999	Pentium-133	Very fast, good price for large active-matrix screen, multimedia.
3	Dell Latitude XPi P133ST 800/388-8542 www.dell.com	2	Aug 96	\$3699	Pentium-133	Expensive for a unit without a CD-ROM drive, but still an excellent value.
4	Compaq LTE 5250 800/345-1518 www.compaq.com	4	Dec 96	\$4298	Pentium-120	Exceptionally well built and fast, but 10.4-inch screen is small.
5	Sharp PC-W100T 800/237-4277 www.sharp-usa.com	-	NEW	\$3499	Pentium-133	Quite fast and light, but battery life is a little short.
6	Compaq Presario 1010 800/345-1518 www.compaq.com	-	NEW	\$2998	Pentium-120	Good-looking notebook has full-sound speakers, CD player buttons.
7	IBM ThinkPad 760E 800/772-2227 www.pc.ibm.com	5	Sept 96	\$5014	Pentium-133	The Rolls Royce of notebooks—great features, but expensive.
8	Compaq Armada 4120T 800/345-1518 www.compaq.com	9	Nov 96	\$4298	Pentium-120	Modular multimedia notebook; reliability record improved this month.
9	HP Omnibook 5500CT 800/322-4772 www.hp.com	-	Oct 96	\$4450	Pentium-133	Massive \$1240 price drop propels this classy multimedia notebook onto chart.
10	IBM ThinkPad 560 P100 800/772-2227 www.pc.ibm.com	6	Nov 96	\$2814	Pentium-100	Slim, lightweight notebook has comfortable keyboard and good display.
BUDGET NOTEBOOKS						
1	 Gateway 2000 Solo 2100 P-120 800/846-2000 www.gw2K.com	-	Jan 97	\$2499	Pentium-120	This power performer is now the best budget buy after \$200 price drop.
2	 Toshiba Satellite Pro 420CDS 800/334-3445 www.toshiba.com	3	Sept 96	\$2199	Pentium-100	\$300 price drop makes excellent performer a Best Buy.
3	Sharp PC-3030 800/237-4277 www.sharp-usa.com	4	Dec 96	\$1599	Pentium-100	A little slow, but light and has one of lowest prices on chart.
4	Digital HiNote VP 800/642-4532 www.windows.digital.com	2	Sept 96	\$1999	Pentium-100	Light, well designed, great speed, bright screen.
5	AST Ascentia J20 800/876-4278 www.ast.com	-	NEW	\$1599	Pentium-100	A little feature-shy, but one of the fastest notes available for under \$2000.
6	HP Omnibook 5500CS 800/322-4772 www.hp.com	-	Jan 97	\$2565	Pentium-100	\$800 price slice puts sharp-looking note on chart; has 4-mbps infrared port.
7	Toshiba Satellite 110CT 800/334-3445 www.toshiba.com	7	Nov 96	\$2099	Pentium-100	Great low-end notebook with active-matrix screen; now \$400 cheaper.
8	Dell Latitude LM P100SD 800/388-8542 www.dell.com	-	Oct 96	\$2199	Pentium-100	\$200 price drop; has good battery life but needs more RAM.
9	Canon Innova Book 360CD 800/848-4123 www.ccsi.canon.com	-	Sept 96	\$2199	Am5x86-P75	Performance is uncompetitive, but has good price for multimedia note.
10	DTK DTN-5A120C 800/289-2385 www.dtkcomputer.com	-	Aug 96	\$2650	Pentium-120	Generic multimedia notebook but one of fastest on Budget chart.



Best Buy

See features chart, page 202; performance chart, page 204.

To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews (\$9.95, available January 29).



TWO OF THE SEVEN POWER NOTEBOOKS we tested this month made the chart. ARM's P133 wasn't far off—it achieved an outstanding PC WorldBench score of 183, making it one of the fastest P-133 notebooks we've ever seen. But the unit's poor support policies kept it from landing on the chart. A near miss on the Budget list was Mega Image's Megabook 880, noteworthy for having an active-matrix screen and a large 1.4GB hard disk at a cost of only \$1849. Two-hour battery life lessens its appeal, however. For more details, visit PC World Online (<http://www.pcworld.com/t2opcsnaps>).

SCORECARD

★ Overall rating	PC WorldBench score/rating	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/rating	Traveling weight	Fax reprint number	Reader service number
89	186/outstanding	average	above average	outstanding	average/fair	3:03/good	average	3797	640
86	180/outstanding	inexpensive	average	very good	average/good	4:32/good	heavy	3779	641
86	166/very good	average	average	very good	average/good	5:20/very good	average	3771	642
85	149/very good	average	above average	good	above average/good	5:42/very good	average	3793	643
84	165/very good	average	average ²	very good	³ /fair	2:26/satisfactory	light	3802	644
83	143/good	inexpensive	above average	good	above average/fair	4:00/good	heavy	3803	645
83	177/outstanding	expensive	average	very good	average/good	2:02/satisfactory	average	3773	-
83	143/good	average	above average	very good	above average/good	4:27/good	heavy	3786	646
83	162/very good	average	average ²	outstanding	³ /fair	3:50/good	heavy	3804	647
82	135/good	inexpensive	average	good	average/fair	3:35/good	very light	3789	-
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		
82	171/outstanding	expensive	above average	good	average/fair	2:15/satisfactory	average	3805	649
82	142/outstanding	average	above average	good	below average/good	4:02/good	heavy	3771	650
81	89/good	very inexpensive	average ²	satisfactory	³ /fair	4:56/very good	light	3797	652
81	139/very good	average	³	good	³ /fair	3:36/good	light	3776	653
79	137/very good	very inexpensive	below average	satisfactory	below average/good	4:30/good	light	3806	654
79	152/outstanding	expensive	average ²	good	³ /fair	4:00/good	average	3807	655
79	98/good	average	above average	good	below average/fair	3:35/good	average	3792	656
78	101/good	average	average	good	average/good	4:42/good	average	3808	657
75	83/satisfactory	average	average ²	good	³ /fair	3:21/good	average	3809	651
73	144/outstanding	expensive	³	very good	³ /fair	2:16/satisfactory	heavy	3766	658
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: 903	

² Limited data; score is based on responses for this company and average of all companies.
³ Insufficient data.

POWER NOTEBOOKS

This Month's Best Buys

1 GATEWAY 2000 SOLO 2100 P-133

PRO: Performance that rivals that of many P-166 desktops, top-notch display, lots of memory, large hard drive, full suite of business applications
CON: Warranty is for only one year



This P-133 notebook is breathtakingly fast, and it has the big, beautiful screen, capacious storage, and multimedia features to make it a mobile power user's dream.

It even comes with the Microsoft Office Professional business applications suite. We only wish that Gateway



Gateway P-133

supported this notebook with a warranty longer than one year. Service quality is okay. The \$4149 price is competitive, especially for a system that comes with a heady 40MB of RAM. The surfer of memory helps make this the fastest mobile system we've ever tested: Its

	POWER NOTEBOOKS	CPU	Traveling weight (pounds) ¹	RAM (MB)	Hard drive (MB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Gateway 2000 Solo 2100 P-133*	Pentium-133	8.2	40	1440	active	12.1	800 x 600	65,536	lithium ion	touchpad
2	Dell Latitude LM P133ST*	Pentium-133	8.8	16	810	active	12.1	800 x 600	256	lithium ion	touchpad
3	Dell Latitude XPI P133ST	Pentium-133	7.2	24	1215	active	11.3	800 x 600	256	lithium ion	trackball
4	Compaq LTE 5250	Pentium-120	8.4	16	810	active	10.4	800 x 600	65,536	NiMH	eraserhead
5	Sharp PC-W100T	Pentium-133	6.6	16	1080	active	11.2	1024 x 768	16.8 million	lithium ion	touchpad
6	Compaq Presario 1010	Pentium-120	8.6	16	814	dual-scan	11.3	800 x 600	65,536	NiMH	touchpad
7	IBM ThinkPad 760E	Pentium-133	7.8	24	1080	active	12.1	800 x 600	65,536	lithium ion	eraserhead
8	Compaq Armada 4120T	Pentium-120	10	16	1080	active	11.8	800 x 600	65,536	lithium ion	touchpad
9	HP Omnibook 5500CT	Pentium-133	9.6	16	1358	active	12.1	800 x 600	65,536	lithium ion	eraserhead
10	IBM ThinkPad 560 P100	Pentium-100	5.8	16	810	dual-scan	11.3	800 x 600	256	lithium ion	eraserhead
BUDGET NOTEBOOKS											
1	Gateway 2000 Solo 2100 P-120*	Pentium-120	8.2	16	810	dual-scan	11.3	800 x 600	65,536	lithium ion	touchpad
2	Toshiba Satellite Pro 420CDS*	Pentium-100	8.8	16	772	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
3	Sharp PC-3030	Pentium-100	6.8	8	543	dual-scan	11.3	800 x 600	65,536	lithium ion	touchpad
4	Digital HiNote VP	Pentium-100	6.8	16	810	dual-scan	10.4	800 x 600	256	NiMH	touchpad
5	AST Ascentia J20	Pentium-100	7	16	540	dual-scan	11.3	800 x 600	65,536	NiMH	eraserhead
6	HP Omnibook 5500CS	Pentium-100	8	16	1358	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
7	Toshiba Satellite 110CT	Pentium-100	7.4	8	814	active	11.3	800 x 600	65,536	NiMH	eraserhead
8	Dell Latitude LM P100SD	Pentium-100	8.2	8	810	active	11.3	800 x 600	256	lithium ion	touchpad
9	Canon Innova Book 360CD	Am5x86-P75	8.2	8	814	dual-scan	10.4	640 x 480	256	NiMH	touchpad
10	DTK DTN-5A120C	Pentium-120	9.4	16	810	active	10.4	800 x 600	256	NiMH	touchpad

*Best Buy ● Yes ○ No ¹Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one.

PC WorldBench score of 186 rivals that of many P-166 desktops. The Solo's 1.4GB hard drive is also generous. And the 12.1-inch super-VGA screen is stunning, with sharp, bright, and clear display of text and graphics. The removable 6X CD-ROM drive alternates in the options bay with the floppy drive or an optional second battery. The single battery pack lasted for 3 hours per charge in our test.

The two speakers located in the keyboard wrist rest aren't bad, but the included set of Koss headphones sounds better.

Good documentation is critical with portables. The Solo's well-illustrated manual is in striking contrast to the bland offerings that come with many notebooks.

2 DELL LATITUDE LM P133ST

PRO: Large, crisp screen; terrifically fast

CON: None significant



You don't always have to spend a bundle to get a high-end notebook. Dell's Latitude LM P133ST costs \$2999, a price even budget-minded shoppers may find worth considering. And this Pentium-133 notebook is *fast*: It scored a terrific 180 on our PC WorldBench test suite—placing it high on the curve of test results for P-133 desktops. The Latitude LM's 12.1-inch active-matrix color screen is vivid and spacious, with very true colors and a

viewable area that's close to what you get with a standard 14-inch desktop monitor.

In our test, the Dell managed to wring 4.5 hours per charge out of its lithium ion battery. The traveling weight of 8.8 pounds, while heavy, isn't bad for a multimedia notebook. As with most power notes these days, the unit comes with both a floppy drive and a CD-ROM drive you can swap in and out. The Latitude LM P133ST comes with 16-bit on-board sound and good integrated stereo speakers, but a 28.8-kbps PC Card fax-modem costs extra.

The Latitude's design is classy and uncluttered, and



Dell Latitude LM

EXPANDABILITY

CUSTOMER SUPPORT

CD-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
6X	28.8	40	1	●	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	-	40	1	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
-	-	40	0	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	-	72	1	●	●	●	3/3	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
-	28.8	32	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
4X	-	40	0	○	○	○	1/1	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
-	28.8	80	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
4X	-	48	1	●	●	●	3/3	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
4X	-	64	1	●	●	●	3/3	12	-	WWW
-	-	24	0	○	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	-	40	1	●	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	-	40	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
-	-	40	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
-	-	40	1	●	●	○	1/1	14	-	AOL, BBS, CIS, WWW
-	-	40	0	○	○	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
-	-	64	1	●	●	●	3/3	12	-	WWW
-	-	40	0	○	●	○	1/1	24	Sat., Sun.	BBS, CIS, MSN, WWW
6X	-	40	1	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
4X	-	32	0	○	○	●	1/1	18	Sat., Sun.	BBS, CIS, WWW
4X	28.8	40	0	○	○	●	1/1	9	-	WWW

the unit is sturdy. The keyboard is well laid out, with large, full-travel keys. The only compromise is the <F1> through <F12> function keys, which are whittled down to about half the size of the other keys. The touchpad is smooth and responsive, allowing you to click either with the buttons or on the touchpad itself. Dell's service for notebooks is okay, according to our ongoing reader fax-back survey. And the Latitude's support policies are strong: You get a three-year warranty on parts and one year on labor, a two-day factory repair turnaround policy, and 24-hour toll-free technical support. We found the documentation, both on-screen and printed, to be thorough and well written.

New This Month

The following PCs made our Power Notebooks chart for the first time this month. For previously tested PCs on the chart, visit our Web page at <http://www.pcworld.com/t20pcs>.

5 SHARP PC-W100T

PRO: Very fast, light, beautiful screen, sturdy

CON: No CD-ROM drive, battery life a little short
If you're looking for the fastest possible ultralight notebook, put the Sharp PC-W100T on your list. This \$3499 Pentium-133 is Sharp's latest notebook, and it scored an impressive 165 on our PC WorldBench test suite—which puts the unit in the middle of the pack for power

notes. This good-looking black-gray unit is one of the smallest and lightest on the chart. The whole ensemble (notebook, external floppy drive, AC adapter, and power cord) weighs only 6.6 pounds, and the notebook by itself is a full pound less. It's only an inch and a half thick, a half-inch slimmer than most notebooks, making it especially easy to slip into a briefcase. Notebooks this thin tend to be a little flexy, but this one felt rock-solid.

The PC-W100T is a pleasure to use. The keyboard has a slightly mushy feel ▶



Sharp PC-W100T

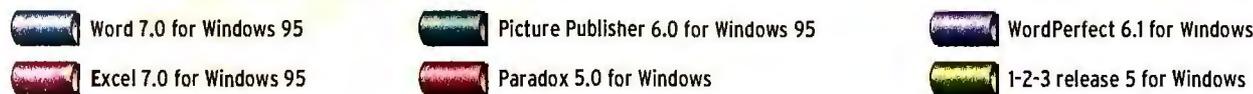
but it's still better than those on most notebooks this weight, which tend to have smaller keys. We've heard better sound from some notebooks with wrist rest-mounted speakers, but the PC-W100T's speakers, mounted by the hinges, are still a big improvement over the tiny side-mounted speakers found on many small notebooks. We found the touchpad pointing device to be fairly easy to control.

A unique feature of the PC-W100T is its brilliant 11.2-inch active-matrix screen. It's wider than the typical display for its height, and was designed that way with the idea of making certain tasks easier, such as viewing more of a spreadsheet at once (which means less scrolling) or being able to view two Web pages side by side. What also helps you see more at once is the screen's exceptionally high

1024 by 768 resolution. People who do a lot of graphics work will appreciate the exceptionally deep, rich colors the display is capable of—16.8 million of them. That 1024 by 768 resolution is high for an 11.2-inch screen, though, making icons and text look small. You should check it out for yourself before you buy. Other features worth mentioning are the ample 1.1GB hard disk and the 28.8-kbps modem. ▶

TOP 20 NOTEBOOK PCs

PERFORMANCE



HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 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 score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (<http://www.pcworld.com>).

San Press

Life On Mars!

CALIFORNIA — Astronomers at SOCAL Space Labs have proved life has and still does exist on Mars. For decades, scientists have held the possibility that Mars can sustain life. Now, Robert Packard and his team have come up with key evidence of its existence. Using space telescopes at four different sites in the desert, Packard and his team have come up with

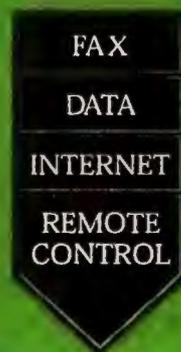
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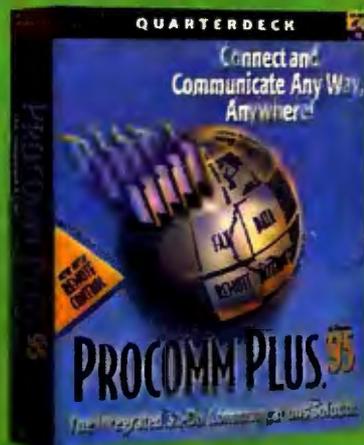
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Now with Remote Control

Based on limited fax-back responses to our ongoing reader survey, Sharp rates average for notebook reliability. We don't have enough information to comment on the quality of the company's support. In a few of our calls to tech support, however, we had to leave a name and number for a callback. Fortunately, the PC-W100T's documentation is well written and has a good troubleshooting guide. While the warranty is short (one year for parts and labor), tech support is available around the clock, including on weekends.

6 COMPAQ PRESARIO 1010

PRO: Affordable, good-sounding speakers, built-in floppy and CD-ROM drives, easy to set up for multiple users, durable construction

CON: Heavy traveling weight, large dimensions

If you're looking for a portable you can easily slip into your briefcase, the Presario 1010 won't fit the bill. But this nicely styled Pentium-120 notebook has good sound, a very good screen, and a surprisingly affordable price. Granted, the Presario 1010 isn't cheap enough to qualify for our Budget chart, but this \$2998 unit packs a lot of value for the money.



Compaq Presario

Among its long list of useful features are integrated floppy and CD-ROM drives. This approach doesn't do anything to reduce size or weight, of course: The Presario 1010 is larger than most, and it weighs 8.6 pounds, which is a little on the heavy side. But building both drives into the system also means that you'll never wind up on a trip thousands of miles from home only to discover that you've left either the floppy drive or the CD-ROM drive behind.

You can't help but notice the speakers; they're visible on the wrist rest even when the 1010 is closed, and they deliver some of the biggest and best sound we've heard emanating from a notebook. Compaq included a screen-based CD player—you can also use the player controls located below the touchpad pointing device. Our main complaint with the speakers is that when we tried to listen to music while typ-

ing, the sound faded in and out as our wrists passed over them. If you're a dedicated audiophile, you may want to plug in a set of external speakers when you're doing a lot of typing. We suggest you try the keyboard before you buy. Some of our testers found it very comfortable; others found that the unusually wide wrist rest got in the way. Also, the touchpad's right mouse key is small and located to the right of the keyboard's center, which made it awkward for those used to clicking with their left hand, because they had to move it especially far to right-click.

If you plan to share the notebook with others, Compaq's SmartQ interface will come in handy. Up to eight users can set up an individual desktop and password-protect it. On-screen help, including a

We hope other companies won't follow its example, but Compaq now charges for its round-the-clock technical support after just one year of ownership.

jargon-free topic search utility, is useful.

Joystick jockeys and musicians will appreciate the MIDI port. The rest of the Presario 1010's features are standard fare. Performance is merely okay, as indicated by the PC WorldBench score of 143. The screen looks especially sharp for a dual-scan panel, but it doesn't match the quality of active-matrix screens, the most common display on power notebooks. Multimedia files eat up disk space, but with MPEG video, 16-bit sound, and great speakers, who can resist? If you can't, you may feel constrained by the 814MB hard disk. The software bundle is modest—it includes Compton's Reference Library and several game titles—so you'll have to pay extra for business apps. We hope other companies won't follow its example, but Compaq now charges for its round-the-clock tech support after one year of ownership. Still, readers rate service as above average, and the company has maintained a high reliability record.

This Month's Best Buys

1 GATEWAY 2000 SOLO 2100 P-120

PRO: Fastest notebook on Budget chart, attractive display, above-average reliability, modular

CON: So-so battery life, short warranty



If you've been cruising for a speedy multimedia notebook with a top-notch display at a budget price, slow down and take a good look at the Solo 2100 P-120. It's rare to get the speed of a power notebook and a good-quality dual-scan color screen on a budget notebook selling for \$2499.

With a PC WorldBench score of 171, this sleek, black, sturdily constructed model is far and away the fastest unit on the Budget Notebooks chart. It even outpaces most of the power notebooks. The dual-scan color display is to computer screens what Waterford is to crystal: clear, clean, classy. There are larger active-matrix notebook displays on the market, such as the 12.1-inch models from Dell and IBM, but for most people, this 11.3-inch screen is more than adequate—sharp and bright enough for use over extended periods of time. You get a top resolution of 800 by 600 with 256 colors, common for dual-scan screens these days. The system comes with 1MB of EDO video memory.

The Solo 2100 P-120's modular drive bay lets you easily swap in a 6X CD-ROM drive, a floppy drive, or an extra battery—a common configuration these days. With the Solo, however, you can also change devices while the notebook is running. The keyboard and broad wrist rest make typing comfortable, but if you use the rest, your wrists will tend to vibrate at high sound volumes (the speakers are on the wrist rest). The touchpad is roomy, with two large buttons.

With 16MB of RAM, 256K of secondary cache, and a removable 810MB hard disk, the Solo is adequately equipped. RAM ►



Gateway P-120

You Bought 1 GB

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Partition-It does all this:

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can be expanded to 40MB. The 2.3-hour battery life we got in our run-down test was a little disappointing. But Gateway moved to lithium ion batteries for this unit, and they allow more charging cycles before needing replacement than nickel-metal-hydrate batteries do. Also, you can plug a second pack into the modular drive bay, doubling the time you can run the notebook away from wall power.

The latest fax-back reader survey results show that Gateway has upgraded the reliability of its notebooks from good to above average. Support is weaker, though. Readers give it an average rating. The one-year parts and labor warranty is short; many vendors these days are offering three years for parts and one year for labor. On-site service isn't an option, and the service policy is 14 days of turnaround time—a veritable lifetime when you're stuck on the road with a dead notebook. You do get 24-hour-a-day tech support, though. Gateway has great documentation. The manual, with lots of graphics and clear explanations, is among the best we've seen.

2 TOSHIBA SATELLITE PRO 420CDS

PRO: Low price, solid construction, good battery
CON: Fairly heavy traveling weight



When we reviewed this hefty unit last September, it hit number one on the Power Notebooks chart. Its price has dropped \$300 this month, making the 420CDS a budget Best Buy.

The \$2199 420CDS ably handles multimedia presentations with a 6X CD-ROM drive, 16-bit audio, and VESA local bus video. The notebook's 11.3-inch screen is about as bright and crisp as we've seen for a dual-scan, though the limited viewing angles mean you'll need to hook it up to a monitor to give group presentations effectively. With a PC WorldBench score of 142, the 420CDS is very fast for a Pentium-100, and its performance is all the more surprising because Toshiba didn't include any secondary cache. The unit weighs 8.8 pounds, which could mean an aching back by the time you hoofed it across O'Hare. But chances



Toshiba Satellite

are good the battery will last the duration of your flight. The 420CDS ran for a little over 4 hours on a charge in our test.

The system's keyboard is large and comfortable, and its eraserhead pointing

The latest fax-back reader survey results show that Gateway 2000 has upgraded the reliability of its notebooks from good to above average.

device is responsive. Beneath the wrist rest is a single speaker that emits respectable audio, though it's not as good as the stereo sound we're hearing on other notebooks these days. A welcome convenience is the built-in AC adapter; that's one less piece of equipment to worry about packing. In our ongoing reader survey, Toshiba's service quality has slipped to below average in recent months, but its above-average notebook reliability rating remains one of the highest around.

New This Month

The following PC made our Budget Notebooks chart for the first time this month. For previously tested PCs on the chart, visit our Web page at <http://www.pcworld.com/t20pcs>.

5 AST ASCENTIA J20

PRO: Nice price, fast performance, light weight
CON: Shadowy display, substandard reliability and service quality

AST's latest budget notebook won't appeal to everybody, but it would make a good purchase for people on tight budgets who feel that they can get by without all the latest features. But don't plan to load up on applications unless you buy this system with a larger hard drive. The Ascentia J20 as tested came with just 540MB of storage—about half the amount we would recommend as the minimum for the typical Windows 95 user. And like most budget notebooks, the

unit lacks a CD-ROM drive and modem. But at \$1599, the AST Ascentia J20 is one of the lowest-price notebooks available—you could add a 28.8-kbps modem and still come in well below \$2000.

You do get a surprising amount of value for the low price. The Ascentia J20 scored 137 on our PC WorldBench test suite, placing it in the middle of the pack among the machines on the Budget Notebooks chart, and well above average for a Pentium-100 notebook. Battery life, at 4.5 hours, is also quite good. The Ascentia J20 won't break your back, either: Its total traveling weight comes to a mere 7 pounds.

The Ascentia's 11.3-inch dual-scan color screen provides a rather mediocre display, and testers with large hands didn't like the small keyboard and eraserhead pointing device. Another nitpick: You have to take care not to type too hard when using the Ascentia's kickstand feet because they collapse too easily. The notebook does have an ample wrist rest, and the on/off button is located sensibly just below the display.

The biggest factor keeping the J20 from rising higher on the chart is some reader dissatisfaction with AST notebooks. The unit comes with a three-year parts and labor warranty, and tech support is available 24 hours a day, seven days a week. These are generous policies, and in the past AST notebooks have won many Best Buys. But the company now gets subpar ratings for service quality and reliability from readers in our ongoing survey. ■



AST Ascentia

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Notebook PCs chart. For write-ups, see PC World Online (<http://www.pcworld.com/t20pcsnaps>).

- ◆ 5D Technologies 5D-4080
- ◆ Acorn Patriot 8000
- ◆ ARM P133
- ◆ Chembook NB OHP
- ◆ IBM ThinkPad 365XD
- ◆ Mega Image Megabook 880
- ◆ Samsung Sens Pro 500

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3 The semi-botched installation.

Your new app installs perfectly. But when you try to run it, you see a "Missing DLL" message.

4 Plug & Play... Not!

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5 The non-disappearing application.

You uninstalled an application properly. But it's still listed in the program menu.

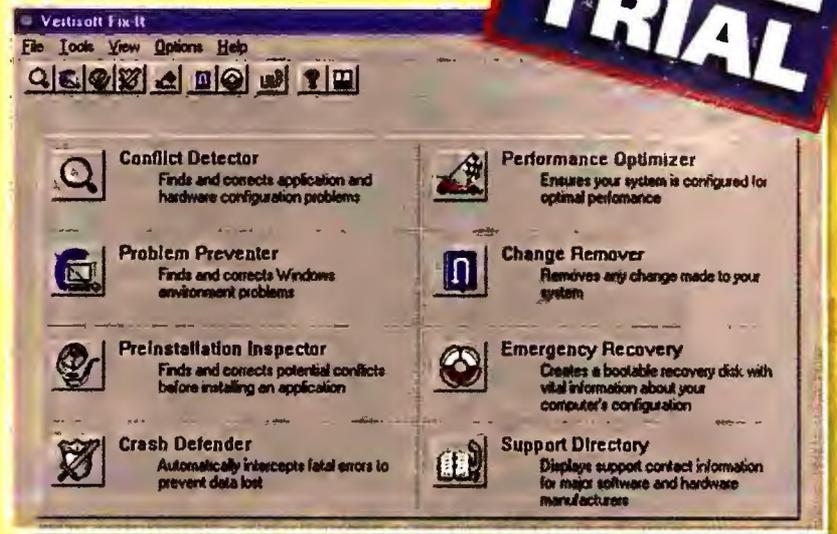
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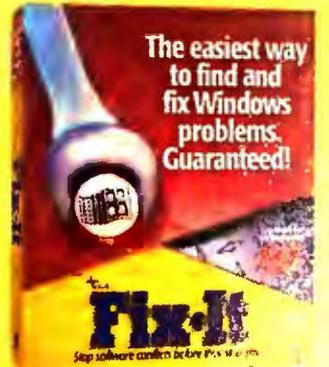
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PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.

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| <input type="radio"/> ALR | <input type="radio"/> CTX | <input type="radio"/> Hyundai | <input type="radio"/> Packard Bell | <input type="radio"/> Texas Instruments |
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| <input type="radio"/> Blackship | <input type="radio"/> Epson | <input type="radio"/> Micron | <input type="radio"/> Robotech | <input type="radio"/> Zenith (ZDS) |
| <input type="radio"/> Canon | <input type="radio"/> Everex | <input type="radio"/> Midwest Micro | <input type="radio"/> Samsung | <input type="radio"/> Zenon |
| <input type="radio"/> Compaq | <input type="radio"/> Future Tech | <input type="radio"/> MIS | <input type="radio"/> Sharp | <input type="radio"/> Zeos |
| <input type="radio"/> Compudyne | <input type="radio"/> Gateway 2000 | <input type="radio"/> Nat'l Micro | <input type="radio"/> Sony | <input type="radio"/> Other |

What size is this PC?

- Desktop
 Notebook/laptop
 Handheld

What is the CPU?

- PowerPC
 Pentium
 80486
 80386
 Other

Where did you buy this PC?

- Local dealer
 Mail/phone order
 Direct from field sales force
 Membership discount store
 Computer superstore
 Home electronics store
 Retail store
 Value-added reseller
 Other

After ordering, how long did it take to get your PC?

- Less than 1 week
 1-2 weeks
 3-4 weeks
 More than 4 weeks

Who set up your PC?

- Dealer/retailer/VAR
 Staff computer technician
 Self or coworker

Where do you use this PC? At home/home office At work Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

- Jan Mar May July Sept Nov 92 94 96
 Feb Apr June Aug Oct Dec 93 95 97

When you first set up your PC, were any components "dead on arrival" (DOA)?

- Yes No Don't know

If so, which component was it? (Mark all that apply.)

- | | | | |
|------------------------------------|--|---------------------------------------|------------------------------------|
| <input type="radio"/> Battery | <input type="radio"/> Graphics/video board | <input type="radio"/> Modem/fax board | <input type="radio"/> Power supply |
| <input type="radio"/> CD-ROM | <input type="radio"/> Hard drive | <input type="radio"/> Monitor/screen | <input type="radio"/> Sound board |
| <input type="radio"/> CPU | <input type="radio"/> Keyboard | <input type="radio"/> Motherboard | <input type="radio"/> Other |
| <input type="radio"/> Floppy drive | <input type="radio"/> Memory | <input type="radio"/> Mouse | |

Did your problem occur only after you added your own hardware or software?

- Yes No Don't know

Would you buy this brand of PC again?

- Yes No Not sure

How many times have you had a problem with this PC?

- No problem ever Three
 One Four
 Two More than four

NEW PROBLEM REPORT

Answer for the most recent problem—other than DOA—not reported in a prior survey.

When did this problem occur? (Specify month and year.)

- Jan Mar May July Sept Nov 92 94 96
 Feb Apr June Aug Oct Dec 93 95 97

How long after you purchased your PC did the problem occur?

- Less than 1 month 4-6 months More than 12 months
 1-3 months 7-12 months Not sure

Did the problem occur as a result of adding new hardware or software?

- Yes No Don't know

Did the problem occur under warranty?

- Yes No Don't know

What was the problem finally identified as? (Mark all that apply.)

- Faulty component Wrong configuration Device conflicts Other
 Incorrectly installed software Faulty peripheral OS problem Don't know

If a component failed, which one was it? (Mark all that apply.)

- | | | | |
|------------------------------------|--|---------------------------------------|------------------------------------|
| <input type="radio"/> Battery | <input type="radio"/> Graphics/video board | <input type="radio"/> Modem/fax board | <input type="radio"/> Power supply |
| <input type="radio"/> CD-ROM | <input type="radio"/> Hard drive | <input type="radio"/> Monitor/screen | <input type="radio"/> Sound board |
| <input type="radio"/> CPU | <input type="radio"/> Keyboard | <input type="radio"/> Motherboard | <input type="radio"/> Other |
| <input type="radio"/> Floppy drive | <input type="radio"/> Memory | <input type="radio"/> Mouse | |

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?

- Manufacturer
 Dealer/store where purchased
 Manufacturer's authorized repair technician
 Self Other

What types of service and support did you receive? (Mark all that apply.)

- Phone System swap
 On site Component swap
 In store Factory return

If you received phone service, how long were you on hold?

- Not at all 1-2 minutes 6-10 minutes More than 20 minutes
 Less than 1 minute 3-5 minutes 11-20 minutes

How long did it take before you talked to the person who finally helped you?

- Less than 15 minutes 2-5 hours 11-24 hours 3-5 days
 15 minutes-1 hour 6-10 hours 1 1/2-2 days 1 week or more

How long did it take to resolve the problem completely? Was it resolved to your satisfaction?

- 1-2 days More than 1 month Yes No
 3-7 days Never resolved
 8-14 days Awaiting resolution

How would you rate the person(s) who helped you?

- | | | | |
|----------------|-----------------------|-----------------------|-----------------------|
| | Poor | Good | Excellent |
| Courtesy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Knowledge | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Follow-through | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

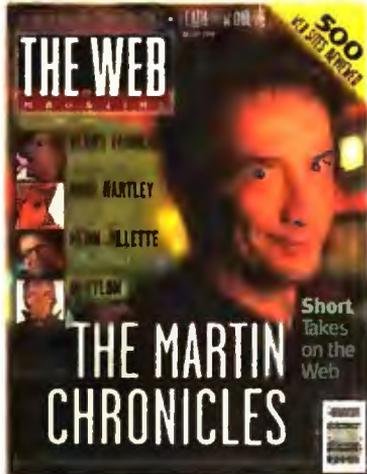
Based on the service and support you received, would you buy this brand of PC again?

- Yes No

On the whole, how satisfied are you with the service and support you received?

- Not at all Satisfied Extremely satisfied

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.



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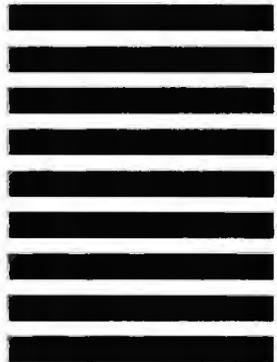
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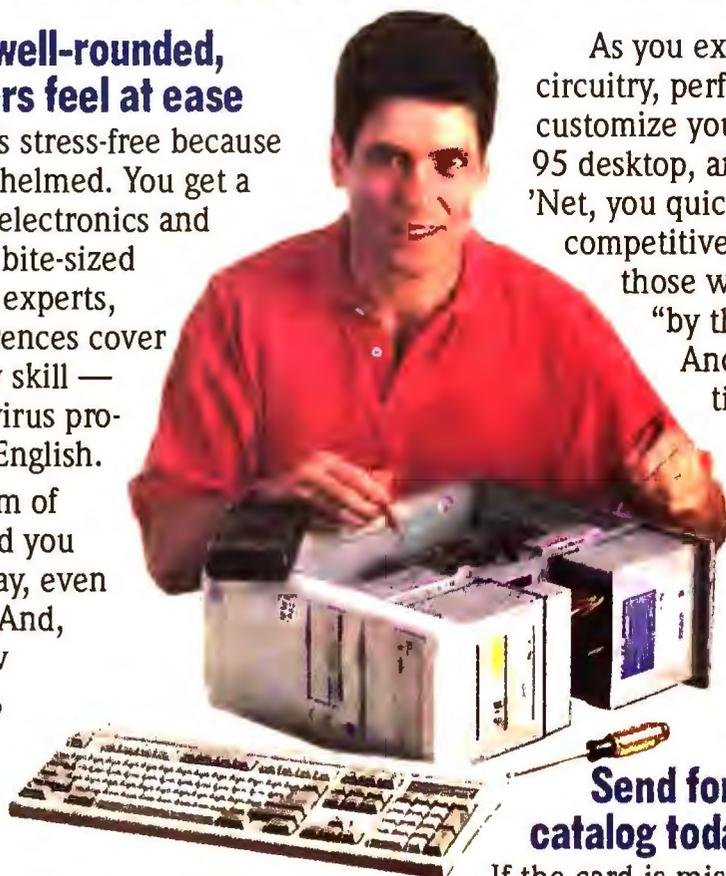
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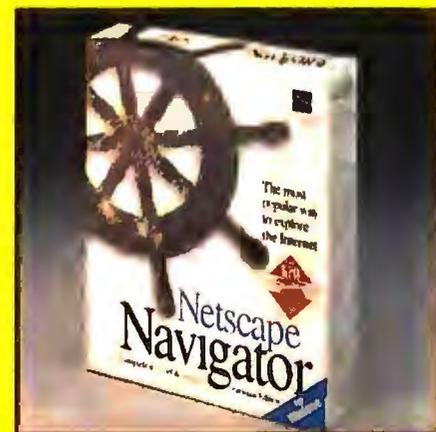
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TOP 10 PRINTERS

MONOCHROME PERSONAL PRINTERS		Month tested	Street price (10/8/96)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	 Panasonic KX-P6100 800/742-8086 http://www.panasonic.com	Apr 96	\$399	84	5.7	2.3	 FEATURES: 6-ppm laser. Standard 256K of RAM, 1200-by-300-dpi maximum resolution, 100 sheets input, 50 output. PRO/CON: Low price; quicker than most; space-saving tower design; excellent print quality for 300-dpi resolution. Tech support is automated during off-hours; no manual feed slot for envelopes.	664
2	Brother HL-720 800/827-6843 http://www.brother.com	Dec 96	\$350	84	5.4	1.1	 FEATURES: 6-ppm laser. Standard 512K of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 100 output. PRO/CON: Low price, good performance, straighter paper path helps prevent jams, includes Surf 'n Print utility for printing Web pages. Takes up a lot of space when you unfold the output tray.	665
3	NEC SuperScript 860 800/632-4636 http://www.nec.com	Aug 96	\$499	84	6.9	1.7	 FEATURES: 8-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 50 output. PRO/CON: Fastest laser on chart; comes with slick software that makes it easy to print booklets, posters, and more. Most expensive on chart; gray-scale output is so-so.	666
4	Panasonic KX-P6500 800/742-8086 http://www.panasonic.com	Dec 96	\$449	81	5.4	1	 FEATURES: 6-ppm laser. Standard 512K of RAM, 2400-by-600-dpi maximum resolution, 100 sheets input, 50 output. PRO/CON: Competitive performance; space-saving tower design; 600-dpi engine gives slightly crisper text than the 300-dpi KX-P6100. No manual feed slot for envelopes.	667
5	HP LaserJet 5L Xtra 800/752-0900 http://www.hp.com	Dec 96	\$479	81	3.9	0.7	 FEATURES: 4-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 100 sheets input, 100 output. PRO/CON: Great-looking text and graphics; easy to use; generous CO-ROM bundle; input tray lets you load envelopes without removing paper; compact footprint. Slow considering the price.	668
COLOR PERSONAL PRINTERS								
1	 Epson Stylus Color 500 800/463-7766 http://www.epson.com	Dec 96	\$279	79	1.7	0.4	 FEATURES: 4-ppm monochrome/1-ppm color ink jet. 720-by-720-dpi maximum resolution, 100 sheets input, 30 output. Accepts both black and color cartridges. PRO/CON: Impressive speed, print quality, and cost per page; two-year warranty. Lacks manual feed slot; CO-ROM bundle is good but not great.	-
2	Canon BJC-620 800/848-4123 http://www.ccsi.canon.com		\$399	78	0.9	0.4	 FEATURES: 6-ppm monochrome/2-ppm color ink jet. 720-by-720-dpi maximum resolution, 100 sheets input, 50 output. Separate cartridge for each color. PRO/CON: Laser-quality text on coated paper. Plain-paper quality is average; doesn't support photo or neon inks that other Canon ink jets use.	669
3	Canon BJC-4200 800/848-4123 http://www.ccsi.canon.com	Dec 96	\$279	78	1.1	0.2	 FEATURES: 5-ppm monochrome/1-ppm color ink jet. 720-by-360-dpi maximum resolution, 100 sheets input, 100 output. Accepts both black and color cartridges. PRO/CON: Software bundle lets you print everything from business brochures to storybooks. Overall print quality and speed lag behind the Epson's.	670
4	HP DeskJet 820Cse 800/752-0900 http://www.hp.com	Dec 96	\$399	77	3.8	0.3	 FEATURES: 5-ppm monochrome/1.5-ppm color ink jet. 600-by-600-dpi maximum resolution, 150 sheets input, 50 output. Accepts both black and color cartridges. PRO/CON: Very good print quality, excellent paper handling, best monochrome print speed. Does merely fair job with photographic images.	671
5	HP DeskJet 693C 800/752-0900 http://www.hp.com	Dec 96	\$349	77	1.7	0.3	 FEATURES: 3-ppm monochrome/0.8-ppm color ink jet. 600-by-600-dpi maximum resolution, 100 sheets input, 100 output. Accepts both black and color cartridges. 690C is same printer without software. PRO/CON: Optional kit provides best photo quality of any DeskJet; easy to use. No toll-free support.	672
 Best Buy		 http://www.pcworld.com/t10printers			 Windows 95-certified Plug and Play		All products: 905	

HOW WE TEST The overall rating for both monochrome and color personal 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 cost of 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.



PERFECT TEXT FROM AN INK JET? No way, we used to say. Laser-level crispness has been the Holy Grail of ink jet printers since they were first introduced; the most we'd grant an ink

jet was that it came close. Not anymore: Meet the new \$399 Canon BJC-620, the first color ink jet we've tested that can print text just as good-looking as a laser's—albeit slowly and expensively. On the strength of its print quality, however, the ►

Canon vaulted over several faster, less-expensive printers to take the number two spot on our color chart this month.

The debut of the BJC-620 caused the Canon BJC-240 to drop off our chart. And two new HP color ink jets we tested—the \$199 DeskJet 400 and the \$499 DeskJet 870Cse—didn't make the cut.

The monochrome rankings haven't changed since December, though the two Panasonic lasers lost a few points because of the company's exaggerated support policies. Panasonic claims to provide 24-hour, 7-day phone support. In reality, lines are staffed for 10 hours per weekday; the rest of the time, support is automated. Panasonic's KX-P6100 is still the Best Buy, but the Brother and NEC printers are a hair behind now. The KX-P6500 stays at fourth place, but the HP LaserJet 5L Xtra is nipping at its heels. Two new lasers we tested—the \$800 HP LaserJet 6P and the \$927 Xerox 4508—didn't rank high enough to make the chart.

A LETTER-PERFECT INK JET

THE CANON BJC-620's superior print capabilities don't come cheap. At \$399, it's one of the most expensive ink jets on the chart. To get laser-level quality, you have to print at its top resolution of 720 dpi, which is very slow—a 10-page plain text document took over half an hour to print!—and use Canon's High-Resolution paper, which costs \$25 for 200 sheets.

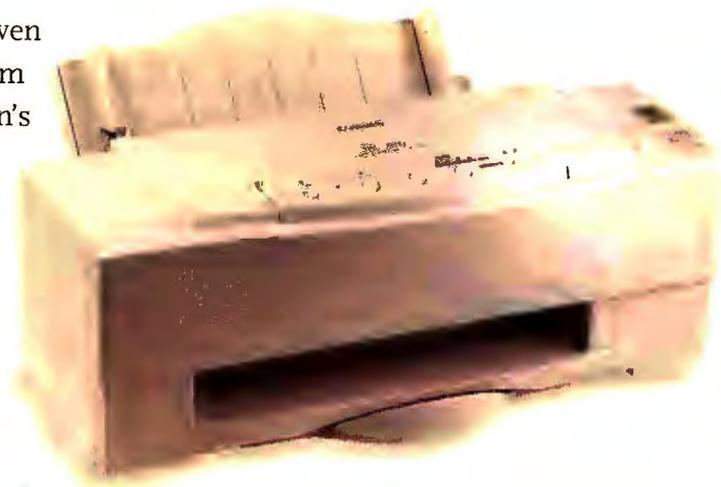
But the results are stunning: Even small 2-point type is legible, a claim not all lasers can make. The Canon's color palette seems overly bright at times, but its color images are very good. If most of what you print is monochrome text, you should buy a laser. But if you want an ink jet that can produce laser-quality text, the Canon BJC-620 is for you.

The BJC-620 has a few drawbacks. Its plain-paper output is passable, but nothing like what this printer produces on coated paper. The unit doesn't work with the special photo and neon inks Canon sells for its BJC-240 and BJC-4200 ink jets. And the printer needs extra room in front and on top to accommodate paper.

HIGH PRICE, GREAT FEATURES

THE \$499 HP DESKJET 870Cse costs too much to make the color printers chart, but users who want a higher-end ink jet may choose it anyway for its speed and features.

The fastest ink jet we've tested, the 870Cse, prints text at 4.7 ppm, outperforming some lasers. Although on coated paper it doesn't achieve the quantum leap in print quality that the Canon does, the HP, unlike the Canon, prints well even on plain paper. It also works with Macs, and with DOS as well as with Windows. But unless you need these features, you may prefer the number four HP DeskJet 820Cse—a similar printer that works



A LASERLIKE INK JET: Pair the Canon BJC-620 with Canon's premium paper, and you get text quality that rivals a laser's. But the printing process is much slower.

with Windows only but costs \$100 less.

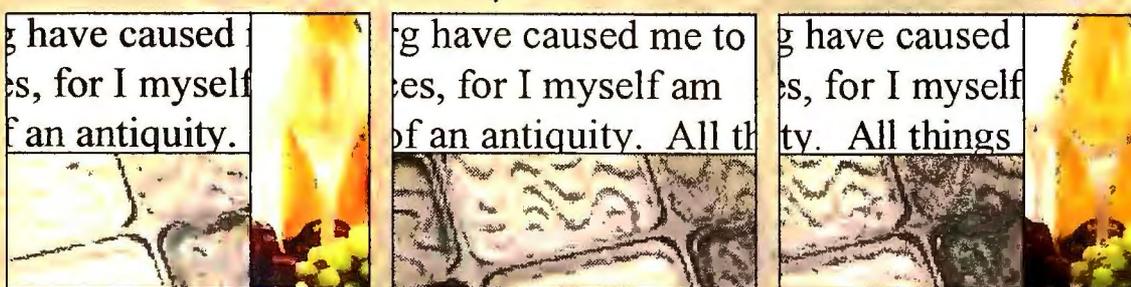
HP's new DeskJet 400 costs only \$199, but it's not a good value. Print quality is inferior, even on coated paper—especially in color images, where it blends a muddy green substitute for black. The printer's tiny, 50-sheet paper tray feels cramped with more than 30 sheets. Envelopes skewed easily despite the ridged guide.

The \$800 HP LaserJet 6P was too expensive to make the monochrome chart. It is among the fastest lasers we've tested, however, with 6.6-ppm text speed. It prints clean, crisp letters but slightly blocky gray-scale images. Changing paper size is irksome: It requires manually removing and replacing the plastic back wall of the tray and moving a lateral guide among various slots.

The new Xerox 4508 was also too expensive for the monochrome chart, and we're still trying to solve some testing problems. The first unit seemed to radiate excessive heat from its output slot, and the printer shut down periodically. It also printed an extra sheet with code on it before some jobs. A second unit Xerox sent us did the same. A third unit made it through our tests without hesitation, but it still required a RAM upgrade to 6MB to complete our tests—raising its estimated street price from \$695 to \$927. At press time, Xerox claimed the heat emanation was normal, and the company was working on a fix for the printer code problem; but Xerox did not know why our first two units shut down. —Dan Littman ■

PRINT QUALITY SAMPLES

The Best Ink Jet Text We've Seen



CANON BJC-620

Finally, an ink jet that prints text as good as a laser's. On coated paper, the BJC-620's text is flawless. Gray scale and color quality are also very good.

HP LASERJET 6P

HP's top-of-the-line personal laser has very good text quality. Gray-scale photos can look blocky or strangely shaded, however.

HP DESKJET 870CSE

This high-end, high-priced ink jet's output looks good on plain as well as on coated paper. HP's ColorSmart utility mixes great colors automatically, too.

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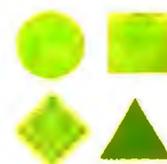
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TOP 10 MONITORS

	15-INCH MONITORS	Month tested	Street price (11/1/96)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	 Dell UltraScan 800HS 800/289-3355 http://www.dell.com	NEW	\$399	83	excellent/ excellent	FEATURES: 13.7-inch viewable screen, 0.25mm Trinitron tube, up to 110-Hz refresh rate ¹ , Level 2ab Plug and Play ready ² , 24-hour daily toll-free support. PRO/CON: Low price, terrific text and graphics detail, easy-to-use on-screen gauges; brief one-year warranty, very faint line across screen.	673
2	 Samsung SyncMaster 15GLi 800/933-4110 http://www.sosimple.com	Oct 95	\$408	80	very good/ good	FEATURES: 13.6-inch viewable screen, 0.28mm dot pitch tube, up to 100-Hz refresh rate ¹ , Level 2b PnP ready ² , color and image adjustment software, three-year warranty, 24-hour daily toll-free support. PRO/CON: Very sharp text and graphics, extensive on-screen menus, easy to adjust; small viewable screen.	674
3	Panasonic PanaMedia PM 15 800/742-8086 http://www.panasonic.com	June 96	\$399	79	very good/ good	FEATURES: 14-inch viewable screen, 0.27mm dot pitch tube, up to 107-Hz refresh rate ¹ , Level 2b PnP ready ² , speakers and mike, three-year warranty, 24-hour daily toll-free support. PRO/CON: \$30 price drop, big screen, very sharp text, ample on-screen controls, easy to adjust; screen is a little less bright in the corners.	675
4	MAG InnoVision DX15T 800/827-3998 http://www.maginnovision.com	Aug 96	\$379	79	very good/ very good	FEATURES: 13.9-inch viewable screen, 0.25mm Trinitron tube, up to 85-Hz refresh rate ¹ , Level 2b PnP ready ² , three-year warranty. PRO/CON: \$40 price drop, easy-to-read text and spreadsheet cells, realistic color graphics quality, navigating on-screen menus requires repetitive button pushing, faint line across screen.	676
5	ViewSonic 15GS 800/888-8583 http://www.viewsonic.com	NEW	\$399	78	good/ very good	FEATURES: 13.8-inch viewable screen, 0.28mm dot pitch tube, up to 108-Hz refresh rate ¹ , Level 2b PnP ready ² , three-year parts, one-year labor warranty, 11-hour weekday toll-free support. PRO/CON: Low price, very crisp graphics, TCO-92 compliant; controls require repetitive button pressing, no image tilt control.	677
6	Mitsubishi Diamond Scan 15VX 800/843-2515 http://www.mitsubishi-display.com	Oct 96	\$410	78	good/ good	FEATURES: 13.8-inch viewable screen, 0.28mm dot pitch tube, up to 90-Hz refresh rate ¹ , Level 2b PnP ready ² , color and image correction software, three-year warranty, 8.5-hour weekday toll-free support. PRO/CON: Detailed text and graphics, ample on-screen menus; no degauss button to demagnetize the tube manually.	678
7	NEC MultiSync XV15+ 800/632-4636 http://www.nec.com	June 96	\$449	78	good/ very good	FEATURES: 13.5-inch viewable screen, 0.28mm dot pitch tube, up to 103-Hz refresh rate ¹ , Level 2b PnP ready ² , color calibration software, three-year warranty. PRO/CON: \$30 price drop, very sharp graphics, uniform brightness; slightly blurred text along left side of screen, no on-screen menus or adjust gauges.	679
8	Sony CPD-100VS 800/476-6972 http://www.sony.com/pc	NEW	\$579	78	excellent/ excellent	FEATURES: 13.8-inch viewable screen, 0.25mm Trinitron tube, up to 85-Hz refresh rate ¹ , Level 2b PnP ready ² , built-in speakers, sub-woofer, and microphone, 11-hour weekday toll-free support. PRO/CON: Great text and graphics detail, boom-box sound quality, easy to adjust; brief one-year warranty, very expensive.	680
9	Eizo-Nanao FlexScan FX-B5 800/800-5202 http://202.247.39.1/welcome	Dec 96	\$575	78	very good/ very good	FEATURES: 13.6-inch viewable screen, 0.28mm dot pitch tube, up to 110-Hz refresh rate ¹ , Level 2b PnP ready ² , three-year warranty. PRO/CON: Tiny text and spreadsheet cells are razor sharp, realistic color graphics quality, comprehensive on-screen menus, easy to adjust, TCO-95 low-emissions approved; very expensive.	681
10	ViewSonic Optiquest V655 800/888-8583 http://www.viewsonic.com	Dec 96	\$329	77	very good/ good	FEATURES: 13.6-inch viewable screen, 0.28mm dot pitch tube, up to 104-Hz refresh rate ¹ , Level 2b PnP ready ² , three-year parts/one-year labor warranty, 11-hour weekday toll-free support. PRO/CON: Lowest price on chart, now \$16 less, very crisp text; adjusting screen requires tedious button pressing, no image tilt control.	682



Best Buy


<http://www.pcworld.com/t10monitors>

All products: 906

¹Highest refresh rate at 800 by 600 resolution. ²Level 2b Plug and Play monitors and graphics cards can communicate bidirectionally. Level 2ab uses Access.bus to enhance synchronization. However, Windows 95 does not fully utilize monitor Plug and Play.

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, 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.



TERRIFIC SCREEN DETAIL and a low \$399 price earn the new Dell UltraScan 800HS our top Best Buy. It replaces Dell's 15TX model. Two other monitors also debut this month. The fifth-ranked

ViewSonic 15GS costs only \$399 and deftly displays graphics. If you've seen Sony's Vaio PCs, you'll recognize the eighth-place CPD-100VS monitor. It's nearly as sharp as the top-ranked Dell, but built-in boom-box quality speakers up the price to \$579. ■



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TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARD	Month tested	Street price (11/8/96)	Overall rating	PC WorldBench graphics score	Comments	Reader service number
1	 STB Velocity 3D 888/234-8750 http://www.stb.com	NEW	\$199	101	187 very good	FEATURES: 4MB of VRAM, 120-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear interpolation, Mediamatics MPEG software, S3 Virge/VX chip. PRO/CON: Great performance, 4MB of fast memory good for very graphical programs, nice set of utilities; mediocre AVI and MPEG video playback.	709
2	 ATI 3D Xpression+ PC2TV 905/882-2600 http://www.atitech.ca	Jan 97	\$199	99	180 very good	FEATURES: 4MB of SDRAM, 150-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, ATI MPEG player, ATI Rage II chip. PRO/CON: 4MB of memory lets you see more colors at high resolutions, connects to a TV, excellent AVI and MPEG video, flawless installation; 3-D quality is merely okay.	710
3	Hercules Terminator 3D 800/532-0600 http://www.hercules.com	Dec 96	\$139	98	184 very good	FEATURES: 2MB of EDD DRAM, 90-Hz refresh rate at 1024 by 768, 3-D acceleration, optional MPEG card, Xing MPEG software, S3 Virge chip. PRO/CON: \$50 price drop, handles basic 3-D graphics well, excellent AVI and MPEG video playback, easy installation, toll-free support; poor documentation.	711
4	STB Lightspeed 128 888/234-8750 http://www.stb.com	Aug 96	\$150	98	186 very good	FEATURES: 2.25MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bilinear video interpolation, DirectVideo, Xing MPEG software, Tseng Labs ET6000 chip. PRO/CON: \$29 price drop, performs well in business and graphics programs, perfect AVI video playback, excellent MPEG, lifetime warranty; no 3-D acceleration.	712
5	Matrox Mystique 800/361-1408 http://www.matrox.com/mga	Dec 96	\$179	98	181 very good	 FEATURES: 2MB of SGRAM, 130-Hz refresh rate at 1024 by 768, 3-D acceleration, optional MPEG and TV tuner cards, Compcore MPEG software, DirectVideo, Direct3D, Matrox MGA-1064SG chip. PRO/CON: Best 3-D performance and quality, good AVI and MPEG video playback; refresh rates hard to set.	713
6	VideoLogic GrafixStar 600 800/578-5644 http://www.videologic.com	Oct 96	\$159	96	185 very good	FEATURES: 2MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bundled multimedia apps, Xing MPEG software, DirectVideo, Tseng Labs ET6000 chip. PRO/CON: Fast in business and graphics programs, inexpensive, excellent utilities, top-notch AVI and MPEG video; no 3-D acceleration.	714
7	Orchid Fahrenheit Video 3D 800/577-0977 http://www.orchid.com	Dec 96	\$149	95	187 very good	FEATURES: 2MB of EDD DRAM, 110-Hz refresh rate at 1024 by 768, 3-D acceleration, optional MPEG and TV tuner cards, Xing MPEG software, S3 Virge chip. PRO/CON: \$50 price drop, easy to use, good software and manual, one of fastest boards tested; not so good with AVI video playback, poor MPEG quality.	715
8	Diamond Stealth 3D 2400XL 800/468-5846 http://www.diamondmm.com	NEW	\$179	95	184 very good	FEATURES: 4MB of EDD DRAM, 100-Hz refresh rate at 1024 by 768, Mediamatics MPEG software, DirectVideo, Direct3D, S3 Virge chip. PRO/CON: All that RAM displays more colors and helps with 3-D effects; for \$20 less, the 2MB board is also a good buy; readers still tell us that tech support is hard to reach.	716
9	Matrox Millennium 800/361-1408 http://www.matrox.com/mga	June 96	\$199	95	184 very good	 FEATURES: 2MB of WRAM, 120-Hz refresh rate at 1024 by 768, optional MPEG and TV tuner cards, Compcore MPEG software, DirectVideo, Matrox MGA-2D64W chip. PRO/CON: Fast, some 3-D acceleration, superb AVI video; watch for slower refresh rates in version shipped with some PCs.	717
10	Hercules Dynamite 128/Video 800/532-0600 http://www.hercules.com	Nov 96	\$159	94	185 very good	FEATURES: 2MB of MDRAM, 90-Hz refresh rate at 1024 by 768, bilinear video interpolation, Xing MPEG software, DirectVideo, Tseng Labs ET6000 chip. PRO/CON: \$20 price drop, handles business and graphics programs well, nice utilities, excellent AVI playback, toll-free support; weak documentation, no 3-D acceleration.	718



Best Buy

<http://www.pcworld.com/t10graphics>

Windows 95-certified Plug and Play

All products: 910

HOW WE TEST We tested PCI boards under Windows 95 with PC WorldBench 1.0 at 800 by 600 resolution and 16.8 million colors (reported here) and at 1024 by 768 and 65,536 colors. Boards were tested in a Dell Dimension XPS P133c with 16MB of EDO DRAM and 256K of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



CARDS WITH 4MB of graphics RAM are suddenly affordable. The extra RAM lets you display more colors in high resolutions, and helps with 3-D graphics. Both new boards on this month's

chart have 4MB of RAM. The \$199 STB Velocity 3D is perfect for beginning 3-D artists due to its fast, dual-ported RAM. The \$179 Diamond Stealth 3D 2400XL is more suited for business users who use lots of colors and need occasional 3-D graphics.

ANOTHER MINDSPRING USER

MindSpring users look like everyone else... until they spring onto the Internet! MindSpring provides fast, reliable, easy-to-use performance for Mac or Windows that gets you directly to the Internet. No traffic tie-ups. No detours. You'll click right along with noggin'-springin' extras like e-mail, newsgroups, chat sessions and the best web browser available.

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TOP 10 MODEMS

	INTERNAL DESKTOP MODEMS	Month tested	Street price (11/15/96)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	 U.S. Robotics Sportster Voice 33.6 Fax-Modem 800/342-5877 http://www.usr.com	NEW	\$179	78	2:32	 FEATURES: 33.6-kbps, 8-bit card, supports IRO 5 and 7, stores multiple profiles, Distinctive Ring, full-duplex speakerphone, Caller ID, QuickLink Message Center voice/fax/data software. PRO/CON: Best performer on the chart; expensive, specific modem not listed in Win 95's Plug and Play options.	683
2	 Motorola ISG VoiceSURFR 28.8 800/426-6336 http://www.mot.com/modems	NEW	\$160	78	2:39	 FEATURES: 28.8-kbps, 16-bit card, supports IRO 5 and 7, voice mail, full-duplex speakerphone, Caller ID, QuickLink fax/data software. PRO/CON: Good performer, installation is a breeze, toll-free technical support, informative documentation; pricey, not upgradable, no security features.	684
3	Cardinal MVP288IS 800/775-0899 http://www.cardtech.com	Nov 96	\$189	77	2:48	 FEATURES: 28.8-kbps, 8-bit card, full-duplex speakerphone and mike, MNP-10EC cellular protocol, FlashROM, VoiceView, voice mail, Faxworks 3.0, lifetime warranty. PRO/CON: Includes a great software program, nice service and support policies, installation is a breeze; one of the most expensive modems on the chart.	685
4	Logicode Quicktel 28800 V.34 DSVD 800/735-6442 http://www.logicode.com	Dec 96	\$170	77	2:44	 FEATURES: 33.6-kbps, 8-bit card, FlashROM, Digital Simultaneous Voice and Data, QuickLink Message Center voice/fax/data software, Radish VoiceView, lifetime warranty. PRO/CON: \$19 price drop, great software package, easy to upgrade, solid performer; expensive.	686
5	Practical Peripherals PM288HC II 800/225-4774 http://www.practinet.com	NEW	\$130	77	2:49	FEATURES: 28.8-kbps, 16-bit card, Distinctive Ring, QuickLink II Windows/DOS fax/data software, lifetime warranty, weekend technical support. PRO/CON: Performed well over poor phone line conditions, great service and support policies; not upgradable, no security features.	687
6	Zoom V.34i Plus Fax Modem 800/631-3116 http://www.zoomtel.com	Dec 96	\$99	77	2:51	FEATURES: 33.6-kbps, 8-bit card, MNP-10EC cellular protocol, COMit and WinFax Lite software, seven-year warranty, 14.5 hours of tech support on weekdays. PRO/CON: \$20 price drop makes this the first internal modem on the chart under \$100; middle-of-the-pack performance, installation is not flawless.	688
7	Diamond Multimedia SupraExpress 33.6i Sp 800/774-4965 http://www.diamondmm.com	NEW	\$129	76	3:02	 FEATURES: 33.6-kbps, 16-bit card, supports IRO 5 and 7, FlashROM, Analog Simultaneous Voice and Data, voice mail, speakerphone, COMit fax/data software, Caller ID. PRO/CON: Great price for a modem that lets you talk on the phone and send data simultaneously; slowest performer on the chart.	689
8	Hayes Total Internet Solution 770/840-9200 http://www.hayes.com	Nov 96	\$163	76	2:54	 FEATURES: 28.8-kbps, 16-bit card, Distinctive Ring, Quarterdeck Internet Suite 3.0 and Web Talk, SmartCom Message Center LE fax/data software, toll-free tech support. PRO/CON: Includes Quarterdeck Internet Suite 3.0, good for beginners to get on the Internet; sluggish performer, documentation was meager.	690
9	Hayes Total Gaming Solution 770/840-9200 http://www.hayes.com	Nov 96	\$259	75	2:47	 FEATURES: 28.8-kbps, 16-bit card, voice mail, DSVD, Radish VoiceView, Quarterdeck Internet Suite 3.0 and Web Talk, speakerphone, Distinctive Ring, Caller ID, toll-free support. PRO/CON: Painless installation, good for gaming over the Internet, comes with Nascar Racing; most expensive on the chart.	691
10	Microcom DeskPorte Internal 800/822-8224 http://www.microcom.com	Nov 96	\$120	75	2:47	FEATURES: 28.8-kbps, 8-bit card, MNP-10EC cellular protocol, Distinctive Ring, Faxworks 3.0, five-year warranty, tech support available 12 hours on weekdays. PRO/CON: Attractive price, friendly documentation; aside from Distinctive Ring, doesn't have much in the way of features.	692



Best Buy

<http://www.pcworld.com/t10modems>

Windows 95-certified Plug and Play

All products: 907

HOW WE TEST We test a pair of identical modems on a simulated phone network. For the phone line test, we send a text file over 55 line conditions. For the file type test, we send five files—graphics, text, program, and compressed, and a mixture of those four file types—over one line condition. We average the results of the two tests. The overall rating is based on performance (43 percent), features (26 percent), price (12 percent), support (10 percent), and ease of use (9 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



FOUR NEW MODEMS debut on our chart this month, with the new U.S. Robotics Sportster Voice 33.6 Fax-Modem replacing the previous version of the Sportster Voice at number one. Motorola's ISG

VoiceSURFR 28.8 had flawless installation. The \$129 Diamond Multimedia SupraExpress 33.6i Sp is the first modem we've tested that features Analog Simultaneous Voice and Data, which costs much less to implement than its digital cousin, DSVD. 

You can attach just about anything to a Eudora e-mail.



That's right. Not only can you send messages anywhere in the world, but there's no limit on your attachments, too. You can add Shockwave™ animations, RealAudio™ clips, video clips, and Photoshop® masterpieces as well as spreadsheets, documents, or anything else you need. No matter what size or data format, simply drag and drop them on your message.

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NO PRIVACY

ON THE NET

An illustration featuring a large, detailed human eye in the upper left quadrant, looking towards the right. Several small, semi-transparent windows of web browser interfaces are floating in the air around the eye. In the lower left foreground, a man with dark hair is shown from the chest up, looking towards the eye. The background is a dark, smoky or ethereal space.

Use the Internet and your life's an open book. From the Web sites you visit to the e-mail you send, someone may be watching. Here's what you can do to protect yourself.

BY JEFFREY ROTHEFEDER

CHRISTOPHER KANTZES recently found out just how little privacy the Internet has to offer.

For about a year, the Fisher-Rosemount Systems engineer has occasionally prowled relatively noncontroversial discussion groups on the network—places such as rec.food.drink.beer—and added his opinions to dozens of others left at those sites. Kantzes figured this was an innocuous and reasonably anonymous activity. That is, until the *Minneapolis Star-Tribune* chose him at random to piece together a profile based on his online ruminations.

Using DejaNews, a Web site that lets you search Internet news- ▶

ILLUSTRATION: WILLIAM DUKE

HOW ENCRYPTION WORKS

groups by an individual's name, the newspaper produced a fairly complete dossier on Kantzes. He was born in Salisbury, Maryland; went to school at the University of Delaware and Syracuse University; worked at Magnavox in Fort Wayne, Indiana, before taking his current job; attends plays at Theatre de la Jeune Lune in Minneapolis; is partial to Garrison Keillor, microbrewed beer, good restaurants, and Macintosh computers; dislikes Bill Gates and Indiana (which he called a "socially repressive state"); and vacationed in Paris and Rome in 1995.

Soon after the *Star-Tribune* published its article, Kantzes moved. Within weeks, an Internet electronic white pages (<http://www.switchboard.com>) had a listing with his new address and phone number. "This is a lesson I never wanted to learn—that I can't hide even sitting alone at my computer," Kantzes says.

Although the *Star-Tribune* article was published with Kantzes's permission, it



'This is a lesson I never wanted to learn—that I can't hide even sitting alone at my computer.'

CHRISTOPHER KANTZES



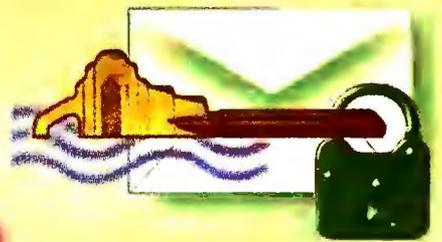
PUBLIC KEY

PRIVATE KEY

1 With your encryption software, you create a "key" with two parts—one public, one private. You distribute a file containing the public part of the key to those you want to communicate with. Only you can use your private key.



2 You write an e-mail message, then use the recipient's public key to encrypt it.



3 The encryption process puts a kind of digital lock on the message. Even if someone intercepts it en route, the message's contents are inaccessible.

provides a chilling example of just how much personal data can be collected on the Net. Not only can anyone easily catalog every word you write on newsgroups and find out which World Wide Web sites you frequent, but everything from electronic mail to online shopping and banking are vulnerable to would-be snoops.

"The danger of the Internet is the illusion of anonymity," says Janlori Goldman, an attorney at the Center for Democracy and Technology in Washington, D.C. Though people may feel they're incognito online, they're actually highly visible.

GETTING PERSONAL

ONE REASON for the lack of privacy, of course, is the open-ended nature of the Internet. With no rules—none with teeth, anyway—that define what information on the Net is personal, and with no limits on the use of this information by third parties, a lot of data about you is available for the taking. And there are plenty of takers. The Net has spawned a cottage industry of firms that monitor Web usage—culling through personal profiles created when you visit a site, and then selling this data to marketers.

Worse yet, the World Wide Web is notoriously insecure and fairly

easy for hackers to eavesdrop on. Suppose you're looking through U.S. Patent Office files on the Internet to see if your product has already been patented. The last thing you want is a hacker stealing the details of it as you type into search fields.

The Internet is also becoming an electronic stalker's paradise. At least half a dozen sites offer millions of phone numbers and addresses; others can supply Social Security numbers and driver's license data; and some even track political campaign contributions.

Nor are e-mail messages and financial transactions on public networks entirely safe from prying eyes. The reason? A combination of weak security schemes by companies managing sites and carelessness by people transmitting information.

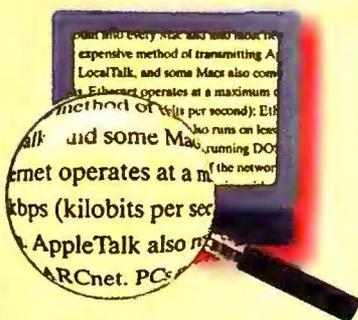
In short, whether you're online for business or pleasure, you're vulnerable to anyone bent on collecting data about you without your knowledge. Fortunately, by using tools like encryption and anonymous remailers—and by being selective about the sites you visit and the information you provide—you can minimize, if not completely eliminate, the risk of your privacy being violated.

WHO'S READING YOUR E-MAIL?

MOST ELECTRONIC MAIL on the Internet is about as private as a postcard. After it leaves the sender's computer, the message careens from one network server to the next as it streams toward the recipient.

PHOTOGRAPH: STEVE WOIT

4 When the message arrives, the recipient types a pass phrase. Then the software uses the private key to verify that the recipient's public key was used for encryption.



5 Using the private key, the software unlocks the unique encryption scheme, decoding the message.



The problem is, it's easy for a hacker to intercept the message en route—and impossible to tell if anyone else has read this supposedly private correspondence before it reaches its destination.

Hackers use various tricks to hijack e-mail as it passes between servers. Even a server protected by a firewall—software that denies unauthorized access to the system—offers no guarantee of security. Hackers could run a program that cycles through every permutation of simple passwords until it hits on one that unlocks the network. Or they could attach themselves to a company's World Wide Web server—which is often left outside the firewall, since it's considered an external site—and then slip into the company's network as if they were internal users.

E-mail is irresistible to eavesdroppers, because it's often full of juicy information, from secret corporate strategies to credit card numbers. Some e-mail contains headers with log-ins and passwords, allowing hackers to sign on and gain complete access, even to secure areas.

The only way to safeguard e-mail from eavesdroppers is by encrypting it—scrambling the message so it can be read only by the intended recipient. In essence, the e-mail is encased in a secure, digital envelope that hackers can't penetrate.

The unofficial encryption flagship on the Net is a program called Pretty Good Privacy, or PGP, developed by Phil Zimmermann, a computer security expert. A com-

mercial version of PGPmail costs \$129, but you can get an older freeware version at <http://www.pgp.com> or from PC World Online. RSA Data Security of Redwood City, California, makes more elaborate encryption programs, which can cost up to \$1500 per workstation.

Both PGP and RSA adopt an approach known as public key/private

key, which uses a complex algorithm to uniquely encode each e-mail with a so-called public key. The key includes data detailing who the recipient is. Only the corresponding private key can decode the message (see "How Encryption Works").

Many network operating systems and software adjuncts—Microsoft Windows NT, Novell NetWare, and Lotus Notes, among others—offer encryption programs as add-ons. These work well for closed networks and intranets because all users share the same software and, thus, the same security safeguards.

But encryption on an open network like the Internet is much more difficult. For it to work, the sender and the recipient must use compatible software. Although PGP and RSA software are compatible, other encryption schemes aren't.

Encryption can be complicated and expensive to use. If it's not feasible, keep in mind that your e-mail may not be private, and limit your correspondence accordingly. Don't send information in an e-mail message that you wouldn't send on a postcard. If you need to exchange confidential information, overnighting a disk or sending a fax may be safer.

LOOK BEFORE YOU BROWSE

ONE INSIDIOUS GAP in Internet security and privacy is located in the browser itself. Both Netscape Navigator and Microsoft's Internet Explorer contain tools that let Web sites reach into the hard disk

of your PC and run programs. These applets—the best-known are Java and ActiveX—can customize visits to a Web site based on your prior entries.

The applet gathers details about your activities and then resides on your hard disk until you return to the site; when you do, it runs programs that let you avoid ▶

ONLINE PRIVACY DO'S AND DON'TS

ENCRYPT YOUR E-MAIL

Don't send sensitive e-mail unless it's encrypted. To encode messages, use PGP or another program that has public-key/private-key encryption capabilities. Make sure recipients use the same encryption program or one that is compatible with it.

CONCEAL YOUR IDENTITY

To shield your identity when posting correspondence on a newsgroup, use an anonymous remailer. This hides the heading of an e-mail message, making the name and address of the sender indecipherable.

WATCH WHERE YOU SHOP

Before shopping or banking electronically, ask the company about its security hardware and software. Its encryption scheme should be a public-key/private-key program with a 128-bit secret key. Firewalls that guard against hackers should be installed to shield the network from intruders.

BUY THE OLD-FASHIONED WAY

If you're not satisfied that the online retailer or bank has adequate security measures in place, ask if you can forward your credit card information by telephone or mail—not electronically—when placing an order.

DON'T TALK TO STRANGERS

When using an online service or visiting a Web site, don't give your number or password to anyone who seeks you out—even if they claim to be affiliated with the provider.

STAY OFF THE LISTS

To avoid being spammed by direct marketers, ask your online service or the Web site manager not to sell your name to mailing list providers or include information about you on mailing lists. Don't reveal private information and personal interests on online-service profiles or home pages.



'The danger of the Internet is the illusion of anonymity...People think they're invisible when they go online. They're anything but.'

JANLORI GOLDMAN,
CENTER FOR DEMOCRACY AND TECHNOLOGY

having to reinput your name, interests, and other information. Sometimes, the applet even moves you directly to the spot where you left off on your last visit.

But this efficiency carries a big price. Because the applet is stored on your PC, in the wrong hands it could surreptitiously steal data or programs from your hard drive. In addition, hackers could piggyback on the applet to gain access to your computer, or even roam through a network to download corporate data or embed viruses in other PCs.

Microsoft and Netscape have built layers of security into their browser applets to prevent misuse. However, computer teams at Princeton University have uncovered nearly a dozen Java and ActiveX security flaws. Both Netscape and Microsoft have released updated versions of their browsers to plug the holes, but researchers are still concerned about security problems, as hackers continue to develop hostile applets.

Though the vast majority of Web sites use applets in perfectly legitimate ways, it's usually impossible to distinguish safe Web sites from dangerous ones. And you can't do much to avoid a malicious applet except to stay away from obvious low-rent Web sites or turn off Java and ActiveX, sacrificing the efficiency and speed they offer. Java and ActiveX can both be disabled through menu options in Netscape Navigator and Microsoft Explorer.

ATTACK OF THE WEB MARKETERS

APPLETS PRESENT potential security problems, but they usually can't be downloaded without your knowing it; and you can delete the files from your hard drive (if you can figure out where they are). Other data-collecting mechanisms are harder to deal with.

One such device—an offshoot of applets—is called a cookie. These personalized "cover pages" are automatically created when you register at some Web sites,

usually without your knowledge. They let site managers recognize you when you revisit and greet you with customized welcome screens and services. Like applets, cookies reside on your PC.

A cookie is primarily a marketing tool. It lets Web site owners gauge how often you visit a site and what you do there. A site manager can combine this data with information you shared when you registered, then create a demographic database of users to sell to marketers.

For instance, visits to World Wide Web sites are increasingly being monitored by auditing services like WebTrak and Doubleclick, which measure your interests according to what you do at the location, as well as by the ads that you read and respond to. These auditors create statistical user profiles based on your demographics and preferences, and

then sell them back to the Web site owner, who can use the data to alter what you see the next time you visit.

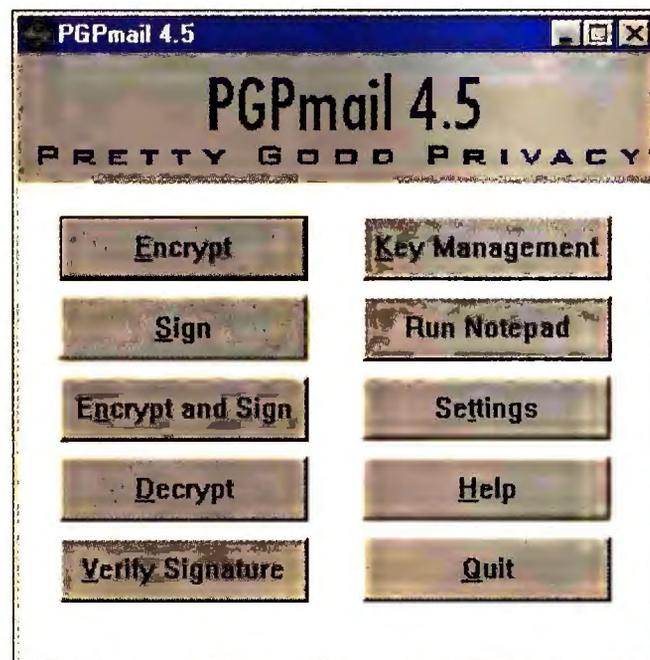
Other companies simply gather e-mail addresses and sell them in bulk to marketers. The Los Angeles-based Email America claims to have developed a list of 20 million electronic mail addresses, and in one promotion offers to sell 10 million for \$189. For a few dollars more, Email America can let clients create specialized lists based on users' specific interests. The company and others like it obtain much of this information from commercial online services—in particular, the personal profiles that users fill out when they sign on to the network.

AVOIDING COOKIES AND SPAM

MANY CONSUMERS flinch when they learn about the information collected through cookies and Web site tracking.

"We're a culture that has a high regard for privacy," notes Marc Rotenberg, director of the Washington, D.C., Electronic Privacy Information Center. "To most people, list gatherers like these, while they may not be doing anything illegal, are doing something unethical and intrusive."

Marketers and site managers argue that gathering demographic information in this way isn't much different from what many supermarkets do with discount cards. (PC World Online also creates cookie files based on user profiles, but doesn't sell any of the data collected.)



ENCRYPTING your e-mail with programs like PGPmail keeps your correspondence safe from prying eyes.

PRIVACY WARNINGS ON THE WEB

Two examples of warnings regarding web site visits and newsgroup postings.



DEJANEWS

"Be careful what you say about others. Please remember—you read net-news; so do as many as 3,000,000 people. This group quite possibly includes your boss, your friend's boss, your girlfriend's brother's best friend and one of your father's beer buddies. Information posted on the net can come back to haunt you or the person you are talking about."

ANONYMIZER.COM

"Many people surf the web under the illusion that their actions are private and anonymous. Unfortunately, it isn't so. Every time you visit a site, you leave a calling card that reveals where you're coming from, what kind of computer you have, and other details. Most sites keep logs of all your visits. In many cases, this logging may constitute an invasion of your privacy."

anonymizer.com

Though it's difficult to avoid cookies altogether, it's not impossible. Cookie files can be removed by deleting Netscape's cookies.txt file or Explorer's cookies directory. But you'll have to reregister at some sites and may lose customized features.

Another alternative is to use the Anonymizer Web site (<http://www.anonymizer.com>); this service prevents cookie files from being created while you're browsing. Later this year PGP Inc. plans to offer a product to keep you cookie-free.

Besides avoiding cookies, you can also limit the amount of junk e-mail you receive. One way is to complain to Web site managers, your Internet service provider, or your online service.

Last September America Online received enough complaints about electronic junk mail, or spam, that it decided to do something about it: The service started blocking messages coming from five of the most active junk e-mailers. Cyber Promotions Inc., which uses three of those sites for mailings, challenged AOL's decision in court. Last November, however, a federal district court judge ruled against the promoter. AOL subscribers can now block junk mail by using the Preferred Mail option.

The Interactive Services Association, a trade group of online companies, is creating a list of voluntary guidelines for electronic direct marketing. The proposed rules are intended to keep users informed of data collecting techniques, and give them the right to opt out of mailing lists.

"These guidelines are an important step to building an online community where consumers' privacy is protected while responsible marketing activities can take place," says Robert L. Smith, Jr., executive director of the ISA.

Since most information online is provided by users themselves, the best advice for avoiding unwanted marketing advances is the simplest: Don't tell marketers anything. If preserving anonymity is important to you, don't fill out personal profiles and online surveys; if a site asks for personal data when you register, use fictitious information. You won't be eligible for prizes or other inducements the sites offer, but that's a small price to pay for privacy.

PRIVATE CHATS AREN'T

IT'S A SIMPLE FACT, though perhaps a hard one for most people to accept: No one's anonymous and nothing's private in chat rooms and newsgroups. Every message you post is available not only for participants in the chat group to read at the time, but for anyone to retrieve from an archive months or years later. As Christopher Kantzes discovered, search sites like DejaNews and AltaVista let online sleuths and stalkers search by name for your entire online oeuvre. Give away enough data in your

postings, and you'll supply the content for a fairly complete dossier of your whereabouts, history, relations, and thoughts.

For many legitimate reasons, law-abiding people may seek anonymity on the Net. What if you were employed by a large industrial concern and want to talk about a flaw in a new product that the company refuses to disclose? You wouldn't want your employer knowing you were the online whistle-blower.

Your postings can also affect your chances of landing a job.

"If I'm a prospective employer, I can't ask about certain things because of the Americans with Disabilities Act," says Robert Gellman, a privacy and information policy consultant in Washington, D.C. "But if I check the Internet for your name and find out you're involved in a ▶



'To most people, while list gatherers may not be doing anything illegal, they are doing something unethical and intrusive.'

MARC ROTENBERG,
ELECTRONIC PRIVACY INFORMATION CENTER

spina bifida newsgroup, asking questions about young girls with the condition, and I know that you have a 12-year-old daughter, well, maybe I don't want to hire you because you'll drive up my health insurance costs."

Even if you just want to avoid junk e-mail from marketers who cull lists based on people's preferences, you'd be wise to hide your identity online.

Fortunately, you can shield who you are in online newsgroups fairly easily by using a so-called anonymous remailer—a program that cloaks the heading of an electronic message so that the sender's name and address are effectively indecipherable. Anyone who subsequently responds to the encoded address actually posts it to the anonymous remailer, which transmits all answers directly to you. More than a dozen anonymous remailers are available at no cost on the Internet.

Of course, anonymous remailers are only as secure and private as those who operate it, because they're responsible for keeping the identity of the people sending the messages secret. So it's important to use a remailer with a reputation for discretion (see "E-Mailers Anonymous").

ONLINE SHOPPER ALERT

NECX DIRECT, a seller of computer products on the Internet, learned firsthand about the perils of using the Net as a virtual store. Last year it began letting customers buy products electronically by submitting electronic order forms.

The company felt it could safely offer this service because it had installed the latest version of Netscape Navigator, which supposedly offered fully secure transactions, impenetrable to hackers. NECX's sales instantly doubled.

Then computer scientists at Princeton University discovered a security flaw in Navigator and revealed their findings on the Internet. Netscape said it fixed the flaw within a few days, but for NECX the damage was done. Though no one broke into the site, the ensuing publicity forced the company to withdraw its promise that its site was secure. Online sales tumbled.

In many ways NECX and the hundreds of other companies struggling to make

money from Internet shopping sites are fighting perception more than reality. A *USA Today*/IntelliQuest survey of computer users found that only 5 percent of respondents said they trust sending credit card and other financial data over the Net. In fact, shopping on the Net is some-

Still, some analysts say that Internet retailing could be a \$6 billion-plus market by the year 2000, once security solutions now in development are implemented. The most promising schemes are "wall-to-wall encryption" and electronic money.

In wall-to-wall encryption, data is encoded from the moment it leaves the consumer's PC and remains that way until it reaches the bank that is approving the sale. The most widely supported approach to encryption is a plan known as SET (for Secure Electronic Transactions). SET is backed by everyone from American Express, MasterCard, and Visa to IBM, Microsoft, and Netscape. The plan

is expected to be ready for widespread use by early this year.

Electronic money, or e-cash, is a competing approach that isn't based on credit cards at all. Instead, you place money in an e-cash account at a bank on the Internet, usually by transferring it from your existing checking or savings account. When you want to buy something, you send an encrypted message to the Internet bank, asking to withdraw enough money to cover the purchase. Still encoded, the e-cash stays in an account file on your personal computer until you send it to the merchant as payment.

About a dozen companies—Digicash and CyberCash are two of the larger ones—are developing or implementing e-cash programs.

When these encryption schemes and e-cash programs "are woven into applications, Internet users will have secure private links between business partners, or between retailers and consumers that no cracker can tap," says Paul Callahan, who researched this subject for Forrester. Until then, if you're uneasy sending information electronically, it may be wiser to limit your online expeditions to window shopping. When you're ready to buy, call the site's 800 number or fax in your order.

ANONYMOUS REMAILERS like Replay allow you to post in Usenet newsgroups without leaving behind a trail of personal information.

E-MAILERS ANONYMOUS

Anonymous remailers, which let you shield your identity online, can protect you from newsgroup snoops and demographic-hungry marketing firms. Here are some sites that help you post articles in private.

THE REPLAY REMAILER

<http://www.replay.com/remailer>

THE SHINOBI REMAILER

<http://www.ee.sine.edu/~avankla/mix.help.html>

MIXMASTER

<http://www.obscura.com/~loki>

RAFF LEVIENS'S REMAILER LIST

<http://www.cs.berkeley.edu/~raph/remailer-list.html>

what safer than using your credit card to buy goods over the phone. The loss to businesses from Internet hacking is only \$1 for every \$1000 in revenue, compared to \$1.41 for every \$1000 in sales from MasterCard fraud, according to a report by Forrester Research.

"The biggest problem is not one of technology, but consumer caution," says Magdalena Yesil, who until recently was a vice president at CyberCash, which offers a secured payment system for the Internet.

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**CENTER FOR
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and
TECHNOLOGY**

The Center for Democracy and Technology, a public-interest organization based in Washington, D.C., develops and advocates public policies to preserve civil rights and liberties in communications and computer technologies. Internet censorship, privacy, cryptography, and federal legislation regarding the Internet are all issues of CDT concern.

**CDT Privacy
Demonstration**

If you're interested in seeing just how much information is collected when you browse, check out CDT's privacy demonstration page (<http://www.13x.com/cgi-bin/cdt/snoop.pl>).

The page mirrors back your name and e-mail address, your geographic location, and the type of computer and browser you're using.

The demo also outlines various methods used to collect personal data, explains why you should be concerned, and provides links to sites that can help you protect your privacy.

BANKING ON THE NET

AT LEAST ON its face, banking via the Internet should be much more secure than online shopping. The reason is simple: Shopping involves thousands of merchants and dozens of banks; if any are lax about safeguards, a hole is opened that a hacker can drive an electronic truck through. Banking, however, typically involves a one-to-one relationship between customer and institution. If the bank's system is secure, it seems less likely that snoops could steal account information or even money.

Unfortunately, many banks have set up online programs to let customers perform routine transactions—such as account transfers and bill payments—only to find that hackers are eager to get in. In its first months, the first Internet-only bank, Security First Network, had to fend off a dozen attempts by hackers to break into account files electronically. However, the company says the firewall protecting the system was never breached.

According to both the FBI and the Secret Service, numerous online financial and shopping services have had similar experiences. As a result, many large banks—such as Chase Manhattan and Wells Fargo—are shying away from the Internet. Instead, these institutions are

teaming up with companies like Checkfree, Intuit, and Microsoft, which have all built private consumer banking networks that have powerful security schemes, including secure firewalls and automatic encryption for all of their transactions. Other financial institutions, including Bank of America and Citibank, are going it alone, hoping to lure customers to

their Internet sites with better services.

The firewalls and other security approaches banks have used to set up their online systems run the gamut from very secure to houses of straw. At this point, prospective customers have no way of knowing which banks can be trusted with their Internet accounts.

Just because a bank is well known, don't assume its security is watertight. For instance, Citibank was embarrassed two years ago by a Russian hacker's daring raid in which \$11 million was electroni-

cally transferred from the bank's mainframes in New York to accounts in Finland, Israel, and California (see "Hacked! Are Your Company Files Safe?" in the November 1996 issue of *PC World*).

Fortunately, things are looking up for online banking. Security First Network has used its unique firewall/security overlay, VirtualVault, for more than a year, and says it hasn't suffered any security breaches. Hewlett-Packard recently purchased VirtualVault and is now marketing it commercially. With these protections in place, even if hackers use a Web browser to break into the bank's data sites, the security gateway will keep them away from sensitive information.

Still, given the uncertainty of online banking security, be wary about where you set up online accounts. For now, systems that restrict themselves to offering modest services—like basic checking and bill paying—are the safest bets. They won't let you buy stock or open new accounts, but the banks that use financial software such as Quicken or Microsoft Money over private networks are generally safer.

YOUR OWN PRIVATE INTERNET

SO IS THERE SUCH a thing as complete privacy on the Internet? Unfortunately, not yet. Chances are slim that your local paper will publish the details of your life based on your e-mail trail, but your privacy may still be at risk. If you don't take the proper precautions, anytime you send an e-mail, access a Web site, post a message to a newsgroup, or use the Internet for banking and shopping, you're defenseless against would-be snoops. Says the Center for Democracy and Technology's Janlori Goldman, "People think they're invisible and secure when they go online. They're anything but."

As Internet usage grows, so does the amount of personal data it carries. And as Christopher Kantzes learned, private information can easily become public.

WHO DO YOU TRUST?

Educate yourself about online privacy. These sites will help you protect yourself, or at least discover how vulnerable you really are.

CENTER FOR DEMOCRACY AND TECHNOLOGY

<http://www.cdt.org>

Dedicated to informing and protecting consumers in the age of technology.

THE STALKER'S HOME PAGE

<http://pages.ripco.com:8080/~glr/stalk.html>

Lots of Internet privacy resources, plus searchable databases.

DISCREET DATA

<http://www.discreetdata.com>

Check out just how much of your vital data is available to online sleuths.

 Find files from this article at <http://www.pcworld.com>. Jeffrey Rothfeder is a freelance writer and the author of *Privacy for Sale* (Simon & Schuster, 1992, 800/983-5333).

New ATI 3D graphics upgrades put **A WHOLE NEW SPIN**
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playback today. All of which means startling improvements in realism and response from multimedia, games, business apps and Web graphics. And both come with the free ATI Software Superpak with today's hottest 3D games and 3D Web Browser software. See your dealer now or see more about them at www.atitech.com.

COMPARISON	3D XPRESSION+ PC2TV	3D PRO TURBO PC2TV
Use	Games, Home, Business	Games, Home, Business
Maximum 3D Resolution	1024x768	1024x768
Maximum Resolution	1600x1200 @ 60Hz	1600x1200 @ 60Hz
Memory	2MB or 4MB (2MB upgradable to 4MB)	2MB or 4MB (2MB upgradable to 4MB)



NOW YOU SEE IT.™



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Circle 5 on reader service card

Toys, Wine, and Wearable Printouts

TWO TOYS FOR KIDS

THOSE WACKY CREATIVE types at Headbone Interactive are at it again with two new kids' titles. The interactive geography game **World Tour** features the goofy Gigglebhone Gang (Alphabonk Farm, Pantsylvania), while **Escape From Dimension Q**, a slick adventure, serves up a new set of Headbone characters. During **World Tour's**

fast-paced, joke-laden style is geared more toward adolescents. The game features Iz and her robot pal Auggie, who are trying to save some secret agents for reasons too complicated to explain here. The new characters are appealing, the disc includes an abundance of humor and songs, and the brainteasers are challenging for kids and parents alike. —Peter Scisco



WORLD WISE: *World Tour's* colorful map interface makes it easy for kids to explore the cultures and geography of countries around the world.

playful romp through ten countries, the 4-to-8-year-old crowd can listen to the folk tales that shape different cultures, see photos of daily life and native animals, and play games. The content is fun and educational. Kids don't just hear that the sun shines all day during Norwegian summers, for instance; they see a picture of the earth's tilt and rotation. While **World Tour's** silliness should appeal to youngsters, **Escape from Dimension Q's**

World Tour

GRADE: **B**; PRICE: \$20 street

Escape From Dimension Q

GRADE: **A**; PRICE: \$20 street

Headbone Interactive; 800/267-4709;

<http://headbone.com>

READER SERVICE NO. 749

SOUR GRAPES

IT'S A GREAT IDEA: Robert Parker's **Wine Advisor & Cellar Manager 2.0** is a database of some 7000 wine reviews (by noted critic Robert Parker) and a graphical application for organizing your own cellar, complete with tasting notes. But the result is, in wine jargon, corked.

Though the reviews are comprehensive, they cover just a fraction of the wines released each year. As for the cellar organizer, another wine term comes to mind: *complex*. The program will try the most ardent oenophile's patience—and we're talking about people who wait years for their favorite cabernets to age. —Michael S. Lasky

Robert Parker's Wine Advisor & Cellar Manager 2.0

GRADE: **C-**; PRICE: \$99.95 list; Wine Technologies; 800/799-0096; <http://www.winetech.com>

READER SERVICE NO. 750

DOLL TALES

BARBIE'S GOT LEGS. The 37-year-old doll has reinvented herself again—this time as a movie star. And with **Barbie Storymaker**, you're her Spielberg. Create your Barbie epics from multiple locations, objects, and special effects; add sound clips; or record your own narrative. The game is creative, glitzy, and fun, though younger kids might need help with navigation. In ►

Typing for Tots

HERE'S ONE FOR the never-too-early files: VTech's **Smart Keys**, a keyboard for kids ages 3 to 7, lets your wee ones get a head start at becoming PC power users. This child-friendly device turns toddlers into typists, with chunky letters and piano keys that generate musical notes and punctuation marks. However, the keys are arranged in alphabetical order (Mavis Beacon would be appalled); children must relearn typing when they encounter a standard QWERTY keyboard. And the device is hardly ergonomically correct (what—no wrist rest?). Still, **Smart Keys** is a good tool for teaching kids the ABCs, and it includes a helpful bundle of educational software. —Allyson Bates

Smart Keys

GRADE: **B**; PRICE: \$80 street; VTech; 800/477-6278; <http://www.vtechinc.com>

READER SERVICE NO. 751



THE SMART KEYS KEYBOARD helps kids have fun with ABCs but won't teach them to type.

EDITED BY

James A. Martin

my movie, Barbie—attired in a lavish ball gown—flew over a deserted beach accompanied by bubbles and butterflies, to the strains of a piano sonata. —*Aoife McEvoy*

Barbie Storymaker

GRADE: **A**; PRICE: \$30 street; Mattel Media; <http://www.mattel.com>

READER SERVICE NO. 754



HOSTESS WITH THE MOSTEST: Barbie Storymaker lets you insert up to seven moving characters in each scene.

SHIRT STORIES

WHY LEAVE THE creation of your attire to overpaid fashion designers? With **Hanes T-ShirtMaker & More**, designing and printing your own clothes is easy. First, from the on-screen menu, select the garment you're going to print: long-sleeved or short-sleeved tees, with or without pockets; sweatpants; sweatshirts; even pennants, laundry bags, coasters, director's chairs, and visors. Choose from the included templates and clip art, or use your own graphics and scanned photos. Then print your design (using special transfer paper) on a color ink jet, iron it onto the garment, and voilà: instant tchotchke. There's no telling what you'll come up with. I designed matching laundry bags for my twin nieces.

—*Gabrielle C. Mitchell*

F Y I



A COMPUTER IN every room? Maybe not: 40 percent of home computers are still in offices and dens, 29 percent in family rooms, 18 percent in bedrooms. How wired are you?

SOURCE: CONSUMER ELECTRONICS MANUFACTURERS ASSOC.

Hanes T-ShirtMaker & More

GRADE: **B**; PRICE: \$39.95 list; Austin-James; 800/426-3728; <http://www.hanes2u.com>

READER SERVICE NO. 752

STAR SEARCH

NEXT TIME YOU FEEL the need to rise above the daily rat race, head for Mars.

Solar System Explorer, the latest interactive space title from Maris Multimedia (of RedShift renown), whisks you from your mundane desktop to a variety of interplanetary terrains: Walk on Venus, check out a tornado on Mars, or pilot a space capsule. The adventures re-create actual scientific missions, so you soak up some history along the way. Navigating the gamelike interface can be difficult, though, and a few activities—noodling with fuel gauges and flight mechanics, for example—may cause

users to space out. —*James Oliver Cury*

Solar System Explorer

GRADE: **B**; PRICE: \$45.95 list; Maris Multimedia; 800/336-2947; <http://www.maris.com>

READER SERVICE NO. 753

DISNEY WHIRL

IF YOU'RE PLANNING a trip to a certain Orlando theme park, use the **Walt Disney World Explorer** first to plot your attack. The CD-ROM combines Disney's trademarked dazzle with lots of entertaining (if sometimes shallow) facts about Disney World, Epcot Center, and the Disney Studios. Click on the Tinkerbell icon, complete with pixie-dust-sprinkling wand, and you're off on a multimedia tour of the park's attractions. You can put the program's ample trivia to good use in the Quiz Challenge, but don't expect useful info about resort accommodations. Still, there's some substance behind the sparkle: The Oceans of the World section offers an enlightening look at the environmental effects of oil and sewage spills.

—*Mimi Strandberg*

Walt Disney World Explorer

GRADE: **B**; PRICE: \$36 street; Disney Interactive; 800/228-0988; <http://www.disney.com>

READER SERVICE NO. 755

Going the Distance

IT SHOULDN'T COME as any surprise that the company that asks "Where do you want to go today?" has started a travel site. Microsoft's Expedia (<http://expedia.msn.com/>) taps the same networks that travel agents



use but translates the information into intelligible language. Use Microsoft Wizards to find the best fares, make reservations at some

25,000 hotels all around the world, see photos of the facilities, and check out local attractions at more than 300 destinations. A 24-hour toll-free hot line is available for help with reservations.

Finding the Distance

THE SHORTEST DISTANCE between two points may be a straight line, but knowing where to draw the line isn't always easy. Bali Online's distance calculator (<http://www.indo.com/distance/>) computes the distance between any two cities—both as the crow flies and as the car or plane travels. A link



to the Xerox PARC Map Server (<http://pubweb.parc.xerox.com/map>) enables you to view zoomable maps; a Mapquest link (<http://www.mapquest.com/>) provides precise driving instructions.

And if you're hankering for a South Seas vacation, the rest of Bali Online offers tourist information on the Indonesian island.

Keeping Your Distance

WANT TO GET junk mail (excuse me—*promotional sales literature*) out of your life? Go to <http://www.the-dma.org>, the Direct Marketing Association Web site. You can remove your name from phone and mailing lists by sending a letter to an address listed on the site. You'll also discover tips for shopping by mail as well as information on how parents can control what their kids see on the Internet. And you'll find hints on how to reduce waste, including ways to handle your mail, junk or otherwise.

—*Michael S. Lasky*

TOP 5 HOME PCs

	SYSTEM	Street price (11/12/96)	Overall rating ¹	PC WorldBench score	Reliability/service rating	Setup rating	Comments	Reader service number
1	 Dell Dimension P200v 800/388-8542 http://www.dell.com	\$2349	88	202 very good	best/ best	fair	FEATURES: P-200, 16M8 of RAM, 1.6GB hard disk, 8X CO-ROM drive, 28.8-kbps fax-modem, 15-inch monitor. PRO/CON: Your basic bare-bones muscle machine, with speedy performance at a very reasonable cost. Price here includes Microsoft Office but no other software. Mail-order only, so best suited for experienced users.	719
2	HP Pavilion 7285 800/724-6631 http://www.hp.com/info/pchome	\$2848	83	207 very good	best/ good	outstanding	FEATURES: P-200, 32M8 of RAM, 3.1GB hard disk, 8X CO-ROM drive, 28.8-kbps modem with voice mail, 3-D Surround Sound, 15-inch monitor. PRO/CON: Speedy, reliable. Includes Microsoft Works, Quicken, HP Financial Calculator, Investor Insight, and FreePhone. Excellent for home office; slower and more expensive than Micron's MPC.	720
3	Gateway 2000 P5-166 Family PC 800/846-2000 http://www.gw2K.com	\$2199	83	199 very good	fair/ best	good	FEATURES: P-166, 16M8 of RAM, 2.5GB hard disk, 8X CO-ROM drive, 33.6-kbps fax-modem with speakerphone, 17-inch monitor. PRO/CON: Very fast for a P-166, good price, big hard drive and monitor. Mail order only. Gateway 2000's so-so reputation for reliability makes this a system for confident users.	721
4	Micron Home MPC 800/223-6571 http://www.mei.micron.com	\$2749	82	215 outstanding	good/ best	good	FEATURES: P-200, 32M8 of RAM, 1.2GB hard disk, 12X CO-ROM drive, 33.6-kbps fax-modem with voice mail, 17-inch monitor. PRO/CON: True power machine for home or home office. Software package includes Microsoft Office Pro, Quicken, Microsoft Encarta, and MechWarrior 2. On the expensive side.	722
5	HP Pavilion 7280 800/724-6631 http://www.hp.com	\$2848	82	188 good	best/ good	outstanding	FEATURES: P-166, 16M8 of RAM, 3.1GB hard disk, 8X CO-ROM drive, built-in color scanner, 33.6-kbps fax-modem, 17-inch monitor. PRO/CON: Excellent setup, image editing software. Includes Encarta, Quicken, Great Word Adventure, Sim City 2000, VR Soccer, and Wow. Recent price drop makes this a great value. Slowest on chart.	723



Best Buy

<http://www.pcworld.com/top5soho>

All products: 911

HOW WE TEST The overall rating is based on reliability and service (30 percent), price (20 percent), PC WorldBench performance (20 percent), setup (10 percent), compatibility (10 percent), and extra features (10 percent). Reliability and service ratings are based on results of PC World's Reliability and Service Monitor survey. ¹ Higher overall ratings than last month due to updated scoring system.



THANKS TO A LOW PRICE and Dell's high reliability and service rating, the Dimension P-200v gets the number one slot among home PCs for the third straight month. But Hewlett-Packard's price reductions and a newly configured Gateway 2000 Family PC push the Compaq Presario 4402 and the Nexar 9000 off the list. Micron's Home MPC also drops, from third to fourth place.

Dell's bare-bones \$2349 PC is the bargain hunter's Pentium-200. But you couldn't go wrong with any from this month's lineup. A \$600 price drop pushes HP's Pavilion 7285 onto the chart from seventh place last month. It's slightly more expensive and a bit slower than the number four Micron, and it lacks Microsoft Office Professional, but super-easy setup is a strong plus.

Gateway 2000's Family PC costs \$150 less than last month and is surprisingly fast for a P-166. If you don't mind mail order (which means shipping parts for repair), this is a fun family machine.

Despite high performance scores, Micron's P-200 Home MPC comes in only fourth due to a less-than-perfect setup routine and a drop in Micron's reliability rating. But a 17-inch monitor, greyhound-like speed, and a truly functional application bundle make it a great choice as a powerful home office machine.

For fun though, it's hard to beat the snapshot scanner and photo-editing software of the number five Pavilion

7280. A built-in scanner digitizes 5-by-7-inch snapshots. And with Photo-Deluxe and EasyPhoto, you'll be inviting friends in for show-and-tell.

We also tested two interesting PCs that didn't make the Top 5. IBM's new Aptiva S66 boasts a wireless radio-frequency mouse, and floppy and CD-ROM drives in a compartment under the monitor. But a \$2898 price and IBM's so-so reliability rating keep this P-166 off the Top 5.

And Canon's new Pentium-200 Inova Media MT 9800 has an internal Iomega Zip drive, a 17-inch monitor, and a built-in 33.6 modem. While these extras may be worthwhile (a Zip drive costs about \$150), a \$3448 price tag keeps the system off the chart this month.

—Kirk Steers



THE BUILT-IN SCANNER makes HP's 7280 a good choice for photo buffs.

Kirk Steers is a PC World contributing editor. Testing by Ulrike Diehlmann of the PC World Test Center. ■

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Building a Better Mouse

WHEN I GET around to writing my autobiography, the title will be *Steve Bass: The Man Who Tried Every Mouse Invented and Lived to Tell About It*.

It's not far from the truth. Last year alone I tried over 15 different—and sometimes bizarre—pointing devices. It's not as much fun as it sounds. Many mice are poorly conceived, gimmicky creatures, best left in the box.

The good news is, after all that clicking and pointing, I emerged with a favorite. The bad news is, it comes from the company I hate to love—Microsoft.

I try to avoid using a mouse. Fact is, you can do most things far more easily and quickly with a keyboard. Most applications let me create dozens of keyboard shortcuts. And if they don't, there are utility programs to do the trick. For instance, check out Macro Mania, a Windows 3.x and 95 utility that lets you record keystrokes in just about any Windows program. It's available on PC World Online as macrom.zip.

So when I first heard about the IntelliMouse, Microsoft's new and improved rodent (*Mousticus pointidus*), I was somewhat underwhelmed. Then I tried it. Much as I hate saying it, Microsoft took a dumb device and made it almost brilliant.

RODENT WITH A HIGH IQ

FOR STARTERS, Microsoft put a small wheel between the right and left mouse buttons, sticking up a fraction of an inch. If you're using, say, Internet Explorer, and want to scroll down a few lines, just turn the wheel a couple of clicks. Same thing for navigating between cells in a spreadsheet. You can use the wheel to scroll a few lines at a time or an entire page.

But wait, there's more. With Office 97, if you hold down <Ctrl> and turn the wheel a notch, you can access WinWord's Zoom feature to get a better look at your document. Want to jump back to your previous page in Internet Explorer? Hold down <Shift> and roll the wheel. Presto, chango.



Much as I hate saying it, Microsoft took a dumb device and made it almost brilliant.

In fact, the IntelliMouse really comes in handy when reading Web pages. Click the wheel while inside Internet Explorer 3.0; a small circle superimposes itself on the page, the cursor changes shape, and Auto-Scroll mode takes over. Move the mouse cursor down a tad from the circle, and the document begins scrolling at a snail's pace. The farther you move from the circle, the faster the scroll. The neat part is, you don't have to keep your hand on the mouse—it's all automatic. After a few months, I found using the wheel much more natural than clicking the scroll bar.

Don't like the mouse's default settings? Customize it to your heart's content. You can adjust the mouse cursor's speed so it slows down when passing over desktop items such as scroll and title bars, icons, and borders. When you open a dialog box, you can make the pointer jump to the default button, a real time-saver. Or how

about this: When you start typing in a document, the pointer magically disappears. These and other features are available to both Win 3.x and Win 95 users; the IntelliMouse wheel works only in Win 95.

A FEW SOUR NOTES

THE DISCOURAGING part (you knew this was coming) is finding applications that use the wheel. For now, it works mostly with Microsoft programs—everything in the Office 97 suite, Publisher 97, Encarta 97, and probably every new product the company releases from here on. Some brighter vendors have already jumped on the IntelliMouse bandwagon—the wheel also works with Micrografx drawing programs and Visio Professional—but the list of non-Microsoft apps is short.

Fortunately, Microsoft released the mouse specifications last fall, so developers can build IntelliMouse support into their applications. The one I'm waiting for is Netscape's Navigator. Frankly, the IntelliMouse makes Internet Explorer the more compelling Web browser—I just hope the Netscape kids read my column.

What's more, the IntelliMouse isn't backward compatible—existing programs like Word for Windows 95 can't use the wheel. Yes, to use the IntelliMouse to its full effect, you'll have to upgrade your software. That's another reason I hate to love Microsoft. Feel the same way? Send me an e-mail (steve_bass@pcworld.com), and I'll forward it to our friends in Redmond.

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Find files from this article at <http://www.pcworld.com>. Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group.

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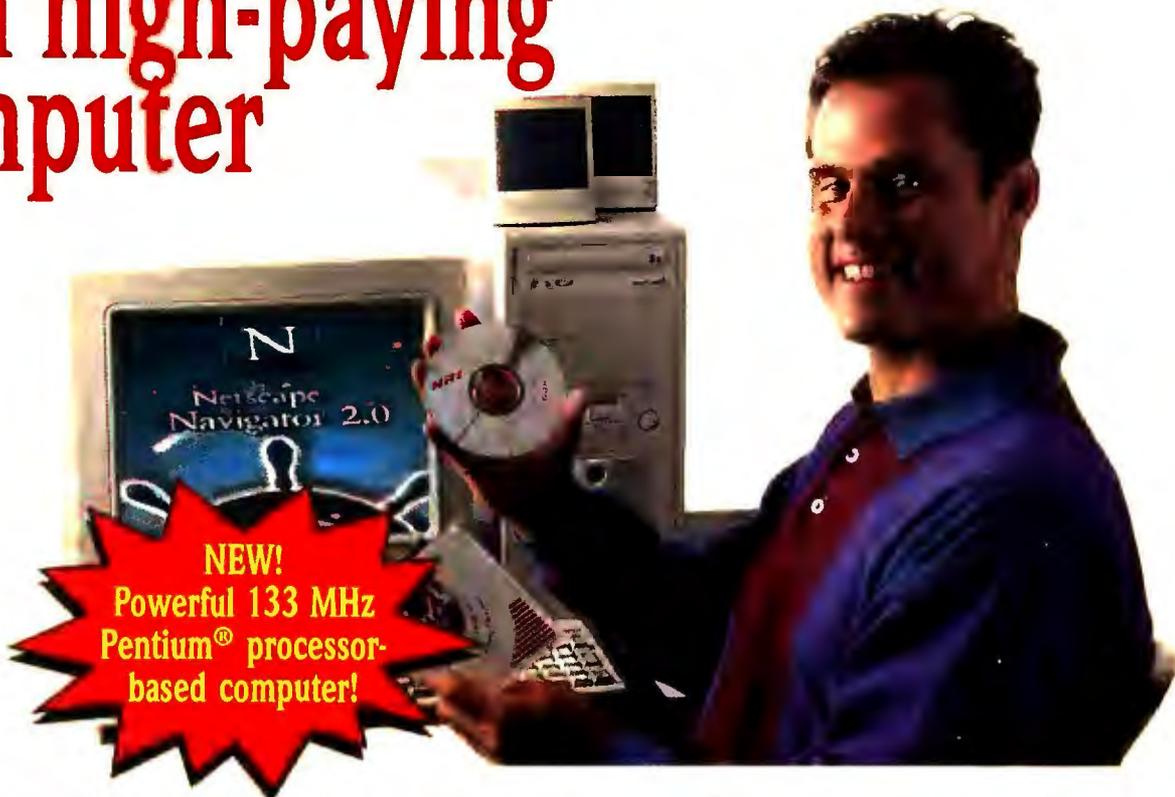
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HERE'S HOW

REAL PROBLEM. REAL SOLUTION

How do we set up a telecommuting program that really works? —Bernadette Fusaro



MERRILL LYNCH'S BERNADETTE FUSARO believes telecommuting requires training.

MORE THAN 11 MILLION PEOPLE work at home at least one day a week, and 68 percent of companies now allow employees to telecommute. But it's not easy to set up an arrangement that works. This month, Bernadette Fusaro, assistant vice president of work/life strategies for Merrill Lynch in New York tells how her company set up a successful telecommuting program. —Editor

PROBLEM: WHEN TELECOMMUTING FAILS

EVERYONE AGREES THAT telecommuting is a good thing for employees and employers. It saves workers time, increases flexibility, decreases stress, raises productivity, and reduces air pollution.

My company, Merrill Lynch, has joined

thousands of other firms on the telecommuting bandwagon. But we don't see telecommuting as just something nice to do for our 40,000 U.S. employees: For us, it's a strategic and competitive issue.

Much of our workforce is composed of women and dual-income couples who need flexibility to deal with their complex lives. To attract the best and brightest of these, we need to offer telecommuting among our other benefits.

Telecommuting should save us money, too. For example, the office spaces in our New York and New Jersey headquarters cost us about a quarter of a billion dollars per year. By encouraging some of our employees to telecommute, we should save substantial sums on office space. For

example, if 10 percent of our New York and New Jersey employees telecommute full-time, we will save about \$25 million dollars per year.

In 1992, when we began studying telecommuting, we found that many organizations treat it very casually. Even today, many companies don't have a formal policy about telecommuting. Instead they allow it only if the manager approves.

At least one out of five telecommuting arrangements fail, according to Illinois Institute of Technology sociologist Christena Nippert-Eng, who is researching a book on telecommuting (*Transition to Telecommuting*, to be published by the University of Chicago Press).

Of course, failure may have all kinds of causes. Sometimes candidates find that they're not suited for telecommuting. Sometimes the job doesn't lend itself to such an arrangement. Other times, the prospective telecommuter isn't prepared or trained to work independently at home.

In addition, managers are seldom taught how to accommodate telecommuters. Most managers have trouble adapting to a more independent relationship that's maintained via telephone or e-mail. This is particularly hard for those who are used to hands-on control or who like a lot of "face time" with employees.

If too many problems occur—and if management feels "burned" by failures—the company may stop offering telecommuting to all its employees. When that happens, it may be difficult to persuade management to try it again in the future.

Many companies seek to avoid these problems by creating guidelines for employees and their managers. At Merrill Lynch, we offer a 21-page set of guidelines for telecommuting. For example, we recommend that employees carefully analyze their jobs and personal characteristics when considering telecommuting.

But telecommuting demands a culture change and a radical shift in business strategy. To make it successful, we have to go far beyond publishing a set of rules.

SOLUTION: TRAINING FOR TELECOMMUTING

TO AVOID PITFALLS, we developed a four-step preparation program:

First, after reading the guidelines, a worker who wishes to telecommute writes a proposal that discusses work scheduling, communication with colleagues, and other relevant issues. In a closed meeting between employee and manager, the manager approves or disapproves the proposal based on the requirements of the job and the employee's capabilities.

Second, if the manager approves the proposal, a coordinator in human resources works with the employee on getting a PC, a printer, phone lines, and other equipment, as well as setting up the employee's home office. Sometimes the company pays for all installation and equipment expenses, though employees may choose to use their own computers.

Third, both the worker and the manager

SOLUTION: PLAN AHEAD

Keys to Making Telecommuting Successful for Employees

Do your homework. Read books such as *Creating the Flexible Workplace*, by Barney Olmstead and Suzanne Smith (Ama-com, 1994, UK: 44/181-810-7585) and *Making Telecommuting Happen*, by Jack M. Nilles (Van Nostrand Reinhold, 1994, 212/254-3232).

Put it in writing. Develop guidelines for telecommuters and managers, and require employees to present proposals. Provide training. Hire a human resources consultant with expertise in telecommuting to conduct in-depth training sessions. Practice makes perfect. Set up a lab. Have employees communicate with coworkers solely by phone and e-mail.

Don't cut the cord. Some organizations encourage full-time telecommuting, but successful programs require employees to be in the office at least once a week, says consultant Gil Gordon.

er participate in a day-long workshop, where the employee learns how to set up a home office. The employee also explores tough questions with the manager, other employees, and the workshop leader: "How do I structure my day? How do I set up my office? Will I miss the interaction with my coworkers? Will my absence hurt my career?" The manager addresses such concerns as loss of control, and learns how to measure the employee's productivity according to results, not face time. By the end of the day, both the manager and the worker have dealt with many of the most worrisome issues.

The final step consists of two weeks of hands-on practice. In our 1500-employee Private Client Technology Division, we set up a lab for would-be telecommuters. This practice lab is far removed from the worker's department. Employees work there for two weeks by themselves. Though their managers are in the same building, employees communicate with them exclusively via telephone and e-mail. In addition, the prospective telecommuters learn not only how to work with the PCs, software, and communications equipment that they'll take home, but also how to install and repair them so they can troubleshoot problems. Aside from the expense of installing phone lines and setting up cubicle space, the lab costs almost nothing, since the equipment in the lab is the hardware the employees bring home.

By last August, 60 people had undergone the training and the trial run in the lab. Only one person dropped out of the program, after discovering that she missed the interaction with coworkers.

According to surveys conducted after the trial period, the remaining employees boosted their productivity and reported lowered stress levels. Both employees and managers feel that their communication skills improved and that they are now doing a better job overall. Best of all, the employees say that they want to give more back to the company because it gave them greater flexibility.

We expect 150 people to complete the training by the end of 1996 and 400 people by the end of 1997. We hope to duplicate the effort in other company divisions.

ANSWER LINE

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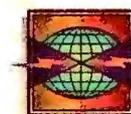
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I N T E R N E T



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We think we've found a way to make telecommuting work. By being thorough and proactive with our training, we're developing a more satisfied, more productive, and more committed workforce.

—Edited by Bronwyn Fryer

Bronwyn Fryer is a contributor to *PC World*. If you use PCs for management in your business, we want to hear from you: We pay \$300 for published columns. See page 14 for contact information.

Beat cluster waste ♦ Define separate TCP/IP accounts ♦ Monitor modem performance

WINDOWS 95 RELEASE 2—
AT YOUR SERVICE?

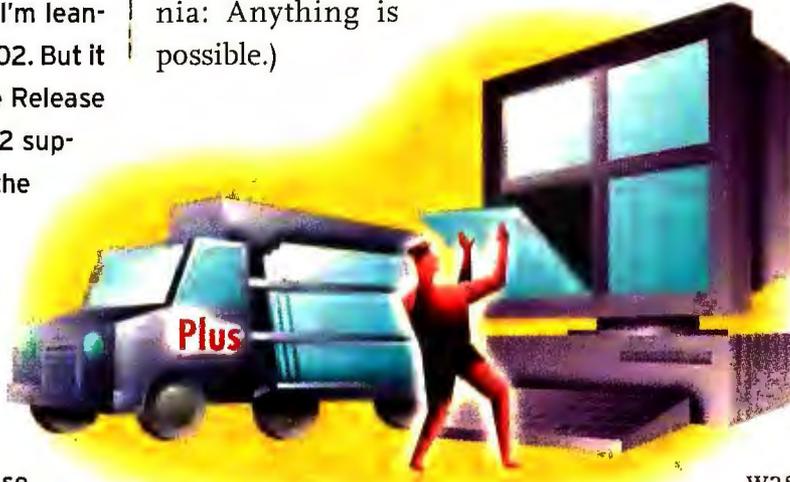
I'M RUNNING WINDOWS 3.1 and am ready to upgrade to a new PC preloaded with Windows 95. I'm leaning toward the Compaq Presario 8702. But it lacks the Windows 95 OEM Service Release 2, which I want because of its FAT32 support for handling large hard drives (the Presario has a 2.5GB drive).

I spoke several times each with Microsoft and Compaq customer service people, who had no idea what I was talking about. Finally, a Compaq representative admitted that the company had OSR2 in-house, but he didn't know when it would be bundled with Compaq's new PCs. Microsoft's bulletin board shows this discouraging statement: "At this time, there are no plans to make these [OSR2] features available in a step-up, service pack or upgrade kit for Windows 95." What good is OSR2 if it's not available?

Don Davison,
Puyallup, Washington

UNLESS MICROSOFT CHANGES its tune, that's the story—no OSR2 unless you get it on a new PC. Microsoft is adamant that

it won't release OSR2 as an end-user product, upgrade, or service pack. (Microsoft may tuck parts of it into Internet Explorer 4.0 or the next Cinema: Anything is possible.)



But by the time you read this, many vendors will be installing OSR2 on their PCs. The question is, do you really want it?

OSR2's most prominent feature is FAT32, the 32-bit file system that can partition a new, large drive as a single partition (the current DOS/Windows 95 FAT file system is limited to 2GB per partition), with smaller, less wasteful cluster sizes. FAT32 is an option with OSR2, not a requirement; you can stick with FAT, if your vendor gives you the choice.

FAT32 has some drawbacks. Although OSR2 includes DriveSpace 3, the disk compression utility formerly available only in the \$54 Plus add-on, FAT32 does not support disk compression. And since no other operating system can read a FAT32 partition, you can't dual-boot between Windows 95 installed on a FAT32 C: drive and any other operating system, including Windows NT, DOS, or OS/2.

If you already have a copy of Plus, or if you're about to purchase an OSR2-equipped system, you can stick with FAT and still beat cluster waste by compressing your drive with DriveSpace 3, which uses economical 512-byte clusters instead of the 32K clusters a 2GB FAT partition uses. Leave DriveSpace's compression turned off, and you'll find no performance degradation (see **STEP BY STEP**). MS-DOS can read the compressed volume; and though other operating systems can't, you can still dual-boot to OS/2 or NT installed on another partition because DriveSpace runs on top of a standard FAT C: partition.

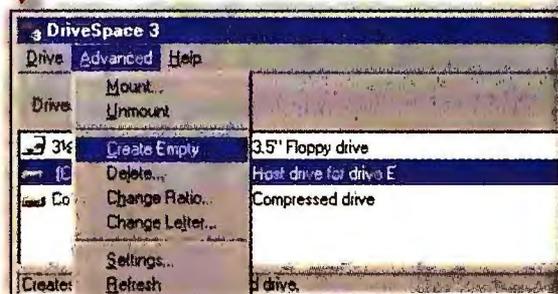
For complete details on what's in OSR2, and which of those elements are avail- ▶

STEP BY STEP

Reduce Wasted Space on Your Hard Disk by Compressing With DriveSpace 3

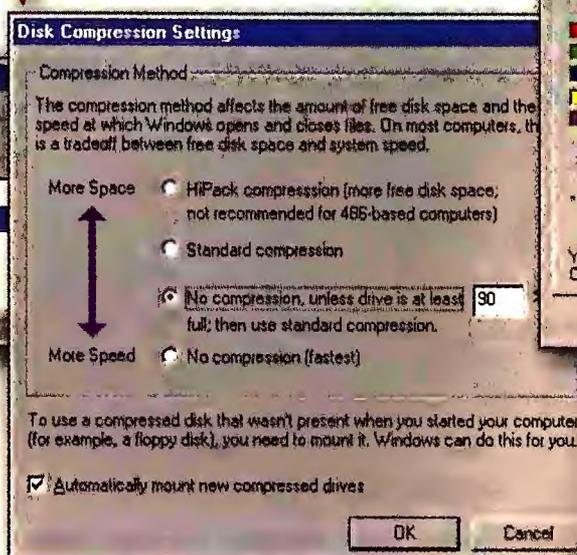
1 Start DriveSpace 3: Select *Start•Programs•Accessories•System Tools•DriveSpace*, and select a drive to use.

2 Choose *Drive•Compress* to compress the selected drive, or *Advanced•Create Empty* to create a new compressed drive using the selected drive's existing free space.



3 You may need to reboot your system more than once during compression. When the process is complete, launch DriveSpace 3 again, select the new compressed drive, and choose *Advanced•Settings*.

4 Choose one of the two *No compression* options and click *OK*. Files in the compressed drive that are already compressed will stay that way until you read and write to them. New files will be stored on the drive without compression.



5 To check compression settings on a particular drive, right-click the drive letter in Explorer, choose *Properties* from the resulting menu, and click *Compression*.

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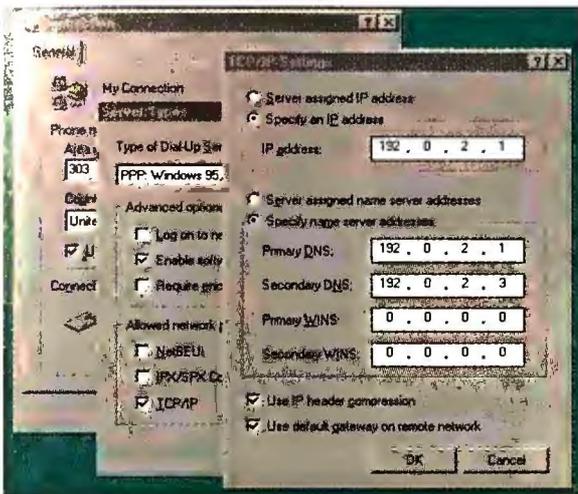


FIGURE 1: ENTER DUELING TCP/IP settings in your Dial-Up Networking properties sheets.

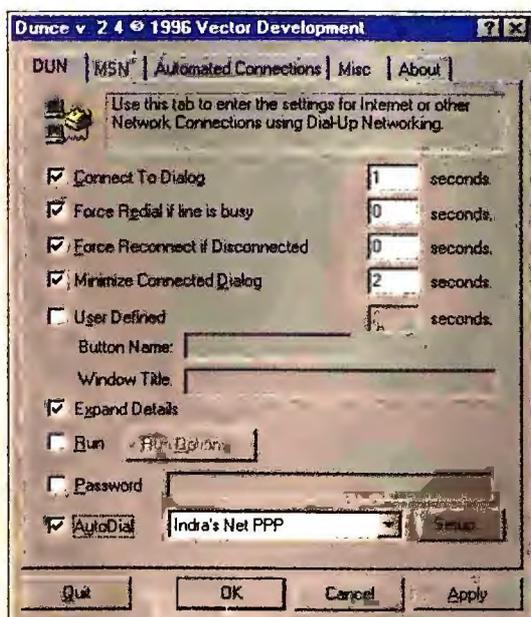
able to current users of Windows 95, check the company's brutally frank OEM Service Release 2 Web page at <http://www.microsoft.com/windows/pr/wing50sr.htm>.

Automate Internet Access

WINDOWS 95'S Dial-Up Networking is an excellent way to connect to the Internet, but it doesn't launch and dial out automatically when you fire up Netscape Navigator.

Installing Microsoft's Internet Explorer solves part of the problem, even if you don't use it. Explorer launches a DUN connection when you try to connect to a Net address using a Winsock application. But you must click the DUN dialog box to initiate dialing.

Instead, try Vector Development's free Dial-Up Networking Connection Enhancer. Duncer clicks the Connect button for you and launches DUN automatically, so you don't need Explorer. Find *duncer2_4.zip* at <http://www.vecdev.com> or http://www.pcworld.com/resources/current_issue/files.html.



MANAGE MULTIPLE DIAL-UP CONNECTIONS



I AM A HOME USER OF WINDOWS 95 and use Dial-Up Networking to access both a connection to the office and a personal Internet account. The problem is, these are two separate TCP/IP accounts, with different IP and domain name server addresses, and unfortunately, the TCP/IP Properties sheet in the Network configuration applet allows me to configure only one TCP/IP account at a time. Is there any way to define two separate TCP/IP Properties concurrently?

Stevan Makarevich, Phoenix
BROWSING THE WEB IS pretty intuitive, but the underlying technology that makes it work isn't, especially as implemented under Windows 95.

Instead of setting the TCP/IP configuration through the Network applet in the Control Panel, set it in each dial-up connection individually.

To do so, first open the Dial-Up Networking folder: Select *Start•Programs•Accessories•Dial-Up Networking*. Right-click the connection you want to modify, select *Properties* from the menu, and click the *Server Type* button in the resulting dialog box. Click the *TCP/IP Settings* button, and enter your IP address and DNS settings in the next dialog box (see FIGURE 1). Click OK three times to save the information. Now, repeat the process for your other Dial-Up TCP/IP connections. You can leave the configuration information already installed in the Network applet—the Dial-Up Networking configuration will take precedence.

TRACK MODEM PERFORMANCE WITH SYSTEM MONITOR

EVER WONDER WHETHER you're getting maximum performance out of that new 33.6-kbps modem? Windows 95's Dial-Up Networking Connected To dialog box tells you the speed at which you initially connected, but connection quality can degrade and fall back to a lower rate. And though double-clicking the Taskbar's modem icon brings up a dialog box that

shows the total number of bytes that have been sent and received in a particular session, it doesn't report your current transmission rate.

With a little coaxing, you can make Windows 95's System Monitor utility do the job (see FIGURE 2). First, make sure System Monitor is installed on your system; if you don't see it when you select *Start•Programs•Accessories•System Tools*, select *Start•Settings•Control Panel*, click the *Add/Remove Programs* icon, click the *Windows Setup* tab, double-click *Accessories* in the



FIGURE 2: MONITOR DIAL-UP CONNECTION RATES by adding a modem log file to System Monitor's list of tasks.

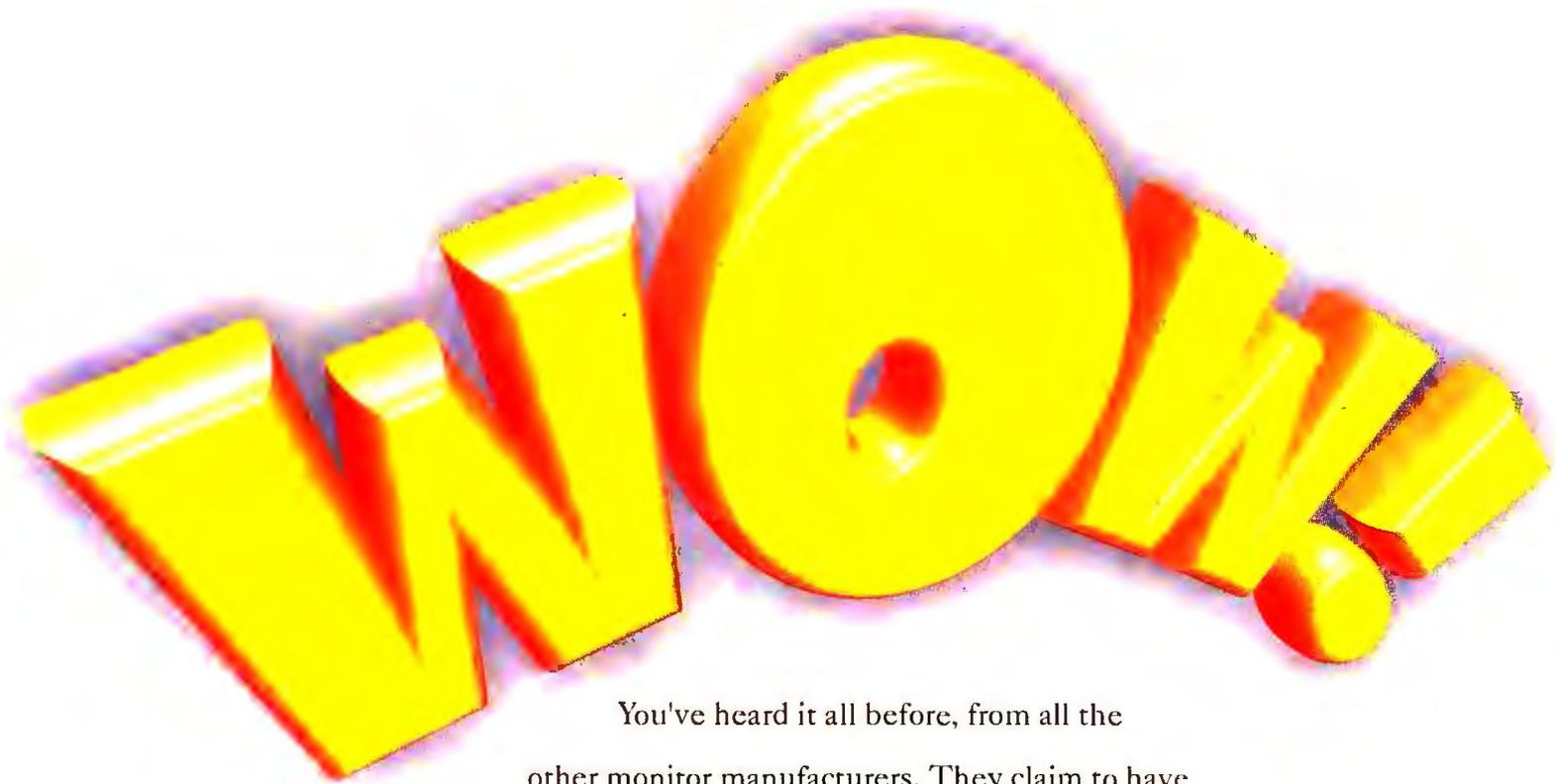
Components list, place a check mark next to *System Monitor*, and click OK twice to complete the installation. You'll need to have your Windows 95 CD-ROM or floppy disks handy.)

Choose *Start•Settings•Control Panel*, click the *Modems* icon, select the modem you want to monitor, click *Properties•Connection•Advanced*, check *Record a log file*, click OK twice, and click *Close* to save the change. Next, launch System Monitor, choose *Edit•Add Item*, select your modem in the *Category* list, pick one or both entries in the *Item* list (*Bytes received/sec* and *Bytes sent/sec*), and click OK.



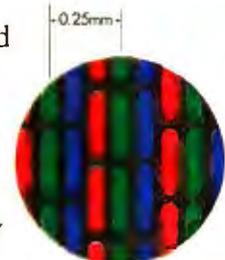
Find additional tips at <http://www.pcworld.com/hereshow.html>. Answer Line welcomes your questions and tips and pays \$50 for published items. PC World contributing editor Scott Spanbauer is the author of *The No B.S. Guide to Windows 95* (No Starch Press, 1996, 800/420-7240). See page 14 for contact information.

Once in awhile there's an advancement in technology that leaves you breathless...



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Rid Windows of unwanted extras ♦ Disable start-up apps ♦ Shut down hidden programs

Dump Unneeded Baggage

 LOOKING FOR A QUICK and easy way to cut down on Windows extras you don't really need? Windows can do the work for you, uninstalling any features that you don't want to carry around.

In Windows 3.x, double-click the *Windows Setup* icon in Program Manager's Main group, and choose *Options•Add/Remove Windows Components* from the Windows Setup menu. Then uncheck the boxes to remove entire categories of files, or click a *Selected Files...* button to designate specific components of a selected category for the trash heap (see **FIGURE 1**). A gray box means that some—but not all—of the items in that category have been installed. If you take the latter course, select one or more items from the right column and click *Remove*; then click *OK*. Click *OK* to close the dialog box. Confirm your decisions when prompted.

In Win 95, choose *Start•Settings•Control Panel*, and double-click *Add/Remove Programs*. Click the *Windows Setup* tab. Uncheck the boxes to remove entire cate-

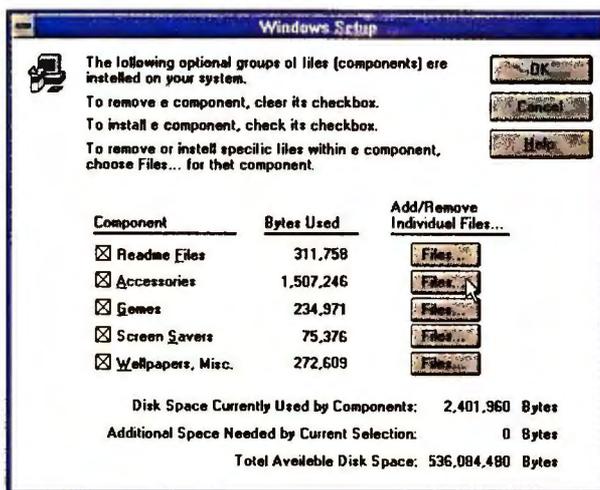


FIGURE 1: GET RID OF UNWANTED TOOLS in Windows 3.x (as shown here) or in Windows 95.

gories, or click *Details* to designate specific components of a selected category for deletion. If you take the latter course, uncheck one or more items there and then click *OK*. Click *OK* to close the Windows Setup dialog box.

STOPPING THE STARTUP STUFF

 AS ANY TRUE-BLUE Windows user knows, you can make Windows automatically start any application by creating an icon for it in the Program Manager Startup group in Windows 3.x or the StartUp folder in your Windows 95. But when you're short of time or are trying to fix problems, you may not want to run those programs.

To disable the start-up applications temporarily, press and hold **<Shift>** right after you enter the Windows command to start Windows 3.x or right after you see 'Starting Windows 95' on your screen. If your Windows 95 or Windows for Workgroups system requires that you log in with a password, press and hold the **<Shift>** key immediately after entering your password. If the computer gives you any further prompts, keep the **<Shift>** key depressed while you respond to the prompts. When Windows is fully loaded, you can release the **<Shift>** key. (This starts Windows 95 in Safe mode.)

To disable start-up applications for a longer period of time in Windows 3.x, choose *File•Run* in either Program Manager or File Manager, type **progman.ini** and click *OK*. To do this at a DOS prompt (for DOS 5 or later), type **edit c:\windows\progman.ini** (your path may differ) and press **<Enter>**. When **progman.ini** opens in a text editor, add the line **startup=** (with nothing to the right of the = sign) under the [Settings] heading. Then save the file and exit. This is a handy method for disabling the StartUp group without having to start Windows first.

A final note: These strategies don't prevent programs from starting if the programs are listed on the **run=** or **load=** line of the **win.ini** file located in your Windows directory. To disable those applications, open **win.ini** in a text editor such as Notepad and type a semicolon at the

beginning of each of these lines. You can remove the semicolon later to make the listed applications run the next time you start Windows. Because you can use this technique in DOS, it is particularly helpful in troubleshooting situations.

CLOSE A HIDDEN PROGRAM

 MANY PROGRAMS (especially utilities such as screen savers) run in a hidden mode that keeps their icons from appearing on the Win 95 Taskbar. This makes shutting down such programs a chore. What to do? Easy: Press **<Ctrl>-<Alt>-<Delete>** (only once!). Select the program's name from the list in the Close Program dialog box (see **FIGURE 2**), and click *End Task* or press **<Alt>-E**. Be sure not

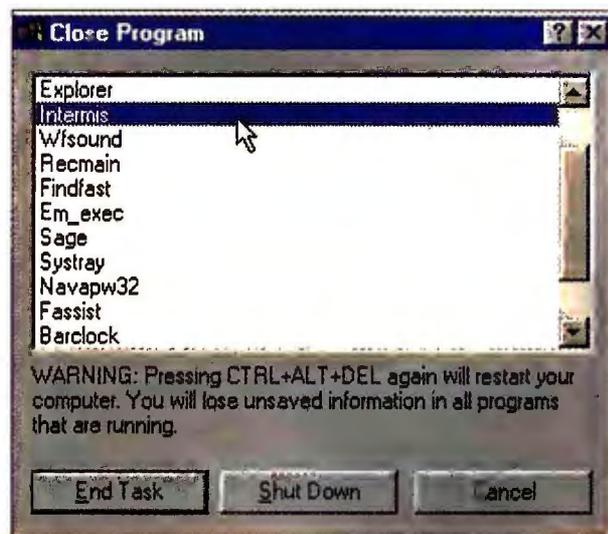


FIGURE 2: ESCAPE FROM screen savers or other hidden programs in the Close Program dialog box.

to blow away Explorer and Systray, which are system tools. If you want to exit Windows, click the *Shut Down* button in the Close Program dialog box.

QUICK ACCESS TO SPECIFIC PARTS OF LARGE DOCUMENTS

 DO YOU FREQUENTLY refer to a few large documents? If you're PC-savvy, you probably already use Shortcuts to open those documents in a hurry. But don't stop there. You can also create Shortcuts to specific sections of those documents. The only catch is that the application you use to read these documents must support Object Linking and Embedding.

Here's what to do: Open your docu- ▶

Upgrade to OmniPage Pro and get the recognition you deserve.

OmniPage Limited Edition or OmniPage Lite is the OCR that came with your scanner. They give you basic OCR.

How to Improve Your OCR Accuracy and Save Big \$\$\$

Caere Corporation (NASDAQ: CAER) recently announced an offer that makes the OmniPage Pro optional character recognition (OCR) major software resellers for an estimated street price of only \$129. This provides an inexpensive way for scanner users to step up to fully-featured OCR products (including those bundled with flatbed and edge-feed products) can upgrade to the full version of OmniPage Pro at a \$129.

OmniPage Pro has a separate upgrade package available through Computer City, Egghead, and Best Buy. Since the vast majority of Caere OCR, most scanner users are eligible to upgrade at this price.

The large number of scanner manufacturers that bundle Caere OCR (Microtek, Canon, Plustek, Umax, Nikon, Agfa, Logitech, Relay) are eligible for the upgrade.

The upgrade program includes OmniPage Pro 6.0 (Windows 3.1 and 7.0 (Windows 95), which offer all the capabilities of the bundled software for extended functionality. Most notable among them are high-resolution "zoning" and preprocessing of scanned images, verifiers for the Page technology for the retention of the original page formatting, and as OCR training and deferred processing capabilities.

The Changing OCR Market: In the not so distant past, OCR required expensive hardware and OCR software that was often difficult to use and provided little value. These issues were frustrating and limited the use of OCR to high-volume vertical markets. The use of desktop OCR was limited to the "early adopter" market.

"Today, several trends are contributing to the widespread use of OCR by the general public," said Chad Kinzelberg, Caere's vice president of marketing. "The program is another major factor that will promote the use of OCR. An occasional OCR user will find Caere software more attractive because of its ease of use and the time and money it saves."

Analysts following the OCR market agree that OCR use is on the rise and have identified several trends promoting its mainstream adoption:

- Higher Customer Awareness:** An increased number of computer users are recognizing the time and money saving benefits it provides.
- Higher Scanner Penetration:** Scanner prices have dropped drastically in the last few years with many flatbed grayscale scanners available for under \$500. Also, attractive, new scanner form factors (such as the small-footprint sheet-fed scanners) and multifunction devices have entered the market.
- Increased OCR Accuracy:** OCR developers have developed high accuracy OCR technology for increased output. The greatest improvement has been made on degraded and hard to read documents.
- Pricing and Availability:** OmniPage Pro 7.0 (Windows and Mac) and WordScan Plus 4.0 (Windows) upgrade packages are immediately available at major resellers for an estimated street price of \$129.

Improve Your OCR Accuracy and Save Big \$\$\$

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The Company: Caere Corporation, with U.S. headquarters in Los Gatos, Calif. and European headquarters, Caere GmbH., in Munich Germany, is a leader in OCR technology and desktop document management products. Caere has recently expanded its product line of OCR software to include a full range of products for the business and government markets.

OmniPage Pro gives you almost twice the OCR accuracy with the same ease-of-use as OmniPage Limited Edition.

OmniPage Pro keeps text in its original format and layout, including graphics.

OmniPage Pro even outputs to HTML.

continued on next page

OmniPage Limited Edition

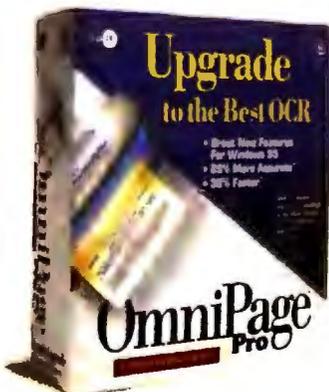
OmniPage Pro

Upgrade now to faster, more accurate OCR.

Sure, the OmniPage Limited Edition OCR that came with your scanner is good. In fact, that's why scanner makers like HP, Microtek and Agfa chose it above all others.

But if you want greater accuracy, full-throttle speed and a ton of new time-saving features, then it's time you moved up to OmniPage Pro®.

OmniPage Pro employs a new, more powerful OCR engine to recognize poor copies and degraded faxes.



www.caere.com

It integrates seamlessly with your favorite applications like Word, WordPerfect and more. It even guides you through the OCR process using its AutoOCR Toolbar. All with the simple push of a button.

What's more, you get the advantages of the world's most popular OCR software without learning an entirely new program. So make sure you're getting all the OCR power and accuracy you deserve. Call now to upgrade, or visit a local reseller.



Key Feature Comparison	OmniPage Pro	OmniPage Limited Edition
Caere's fastest and most accurate OCR engine	✓	
AutoOCR Toolbar™ for easy, one-button OCR processing	✓	
OCR Wizard to guide you through the process	✓	
Integrates with most image editors like Photoshop	✓	
OCR from within your favorite applications	✓	✓
Retains original layout	✓	

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ment in an OLE-compatible application such as Word or Excel, and select a block of text or range of cells to which you often refer. Choose *Edit•Copy*, then right-click on the desktop or in a folder and choose *Paste Shortcut*. Repeat these steps as often as needed. Before trying the Shortcut, make sure you save the file.

Leave these Shortcuts on the desktop or in a folder for easy access (see **FIGURE 3**), or move them to the Start menu by right-clicking the *Start* button and choosing *Open* or *Explore*. Open the folder where you want your Shortcuts to appear, or right-click in an empty area of a folder window and choose *New•Folder* to create a new submenu. Move your Shortcuts to this folder. Now any time you want to open your file to the designated portion, choose its Shortcut from the Start menu.

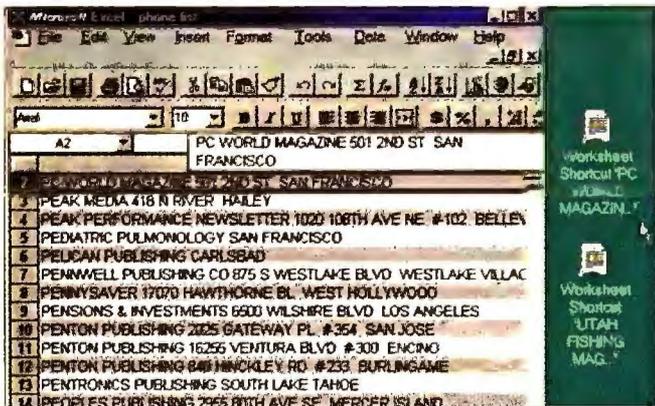


FIGURE 3: ADD SHORTCUTS to OLE-enabled files so you can jump to specific passages in your documents.

FIND THE MISSING BUTTONS IN NORTON NAVIGATOR



THE NORTON FILE Manager that comes with Symantec's Norton Navigator for Windows 95 features a customizable toolbar you can fill with every imaginable function. Trouble is, once you've added a number of buttons, the function you want may be hidden off the edge of the window.

Does that mean you have to put up with fewer or smaller toolbar buttons? Not at all. Simply press and hold the left mouse button on any toolbar button, then drag the cursor beyond the left or right side of the Norton File Manager window (or to the edge of the screen, if the window is maximized). The toolbar buttons will scroll as long as you leave your mouse outside the window or at the very edge (see **FIGURE 4**). When you see the button you

want, drag the cursor onto it, then release the mouse button to activate the function.

TAME PROGRAM MANAGER



PROGRAM MANAGER can balloon

into a crowded mess of icons with overlapping titles. Here are six tips for taming all those wayward icons:

- 1. Use Auto Arrange.** Isn't it nice how Control Panel icons never wander out of line? To get a similar effect with the icons in Program Manager groups, choose *Options•Auto Arrange* (if you see a check mark by Auto Arrange, it's already on; choosing it again will turn it off). For a one-time fix, choose *Window•Arrange Icons*.
- 2. Clean up groups.** Unfortunately, no Auto Arrange feature exists for the group icons in Program Manager. Instead, close or minimize your group windows, and choose *Window•Arrange Icons* from the menu.
- 3. Move a group of groups.** To move all your minimized group icons in unison up, down, left, or right, first close or minimize all your group windows, and then

cluster the icons so they all fit within the Program Manager window (that is, so Program Manager shows no scroll bars).

Next, open one group window and drag that window in the opposite direction from the way you want to move your icons. Keep dragging until the window is beyond the edge of the Program Manager window (see **STEP BY STEP**). For example, to move all group icons upward, move the open group window downward until its edge disappears. This forces at least one scroll bar to appear. Click in that scroll bar and scroll in the direction you want all the group icons to move.

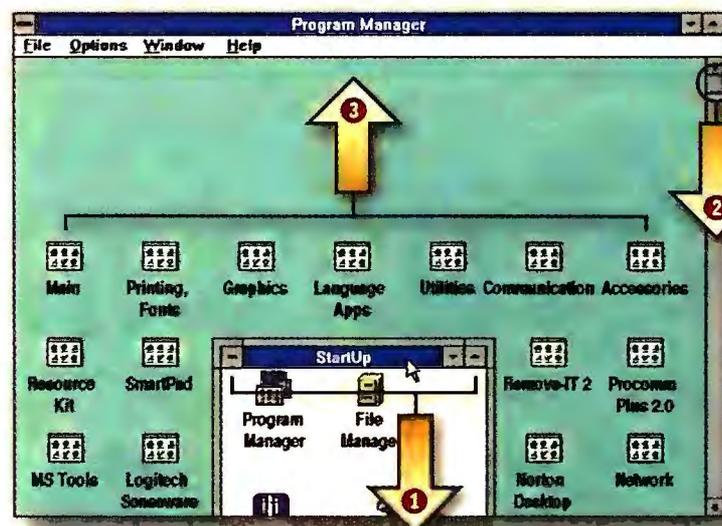
The open group window and all the group icons should reposition themselves within the Program Manager window. Repeat this process as needed. ▶



FIGURE 4: GET ALL THE BUTTONS YOU WANT in Norton File Manager by dragging the cursor outside the window.

STEP BY STEP

Move Group Icons as a Group in Program Manager



- 1** Drag a single open group window just beyond the main window in one direction.
- 2** Then drag the scroll box in the same direction.
- 3** Icons move in opposite direction as you scroll.

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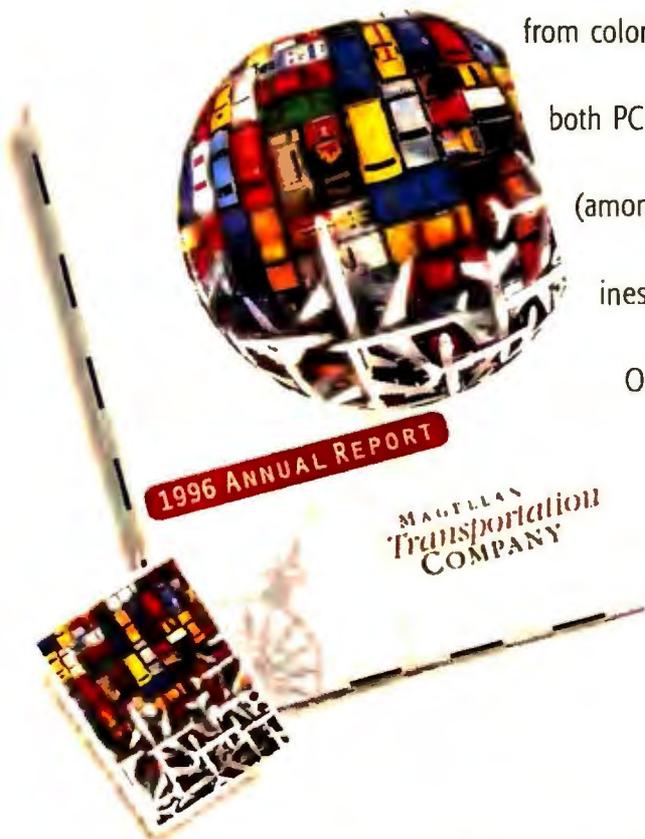
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from colored backgrounds. And you'll get greater versatility with easy, simultaneous hook-up to both PC and Mac platforms. Nobody else can do that. So now that you see what the numbers

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Bit Depth	36	30
Colors	68.7 billion	2.0 billion
Maximum Resolution	4800 x 4800	2400 x 2400
Optical DPI	600	600
Greyscale Levels	4,096	1,024
SCAN SPEED-Preview	6 seconds	11 seconds
Color (4x5)	21 seconds	27 seconds
Grayscale	23 seconds	33 seconds
Text OCR	14 seconds	28 seconds



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Restricting Access in Windows 95



I HAVE A log-on password on my home PC. I've also set up passwords to allow user profiles for each member of my family. Unfortunately, anyone can log in by typing a new user name. Is there any way to restrict the number of users allowed?

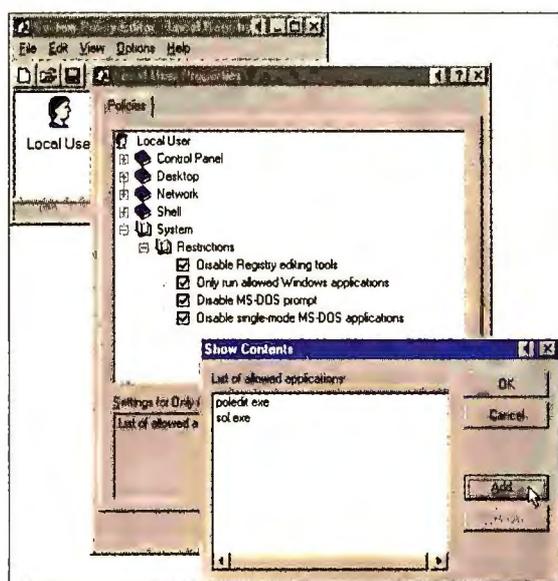
Majid Al Maskati, Internet

YOU CAN'T LIMIT the number of users who log on to your PC, but you can restrict what they do. The key is to use the System Policy Editor, available on the Windows 95 CD-ROM or from Microsoft's Web site (<http://www.microsoft.com/windows/software/admintools.htm>).

Put policy.exe in a folder outside the Windows folder, and double-click it to expand the System Policy Editor files. Then choose *Start•Settings•Control Panel* and double-click the *Add/Remove Programs* icon. Click the *Windows Setup* tab and click *Have Disk*. If you have the CD-ROM, type *d:\admin\apptools\poledit* in the *Install From Disk* dialog box, adjusting the drive letter to reflect the drive containing the disc. If you've downloaded the files, type the appropriate path to them. Check the *System Policy Editor* box and click *Install*. Then click *OK* to close the *Add/Remove Programs* dialog box.

Next, restart your PC as if you were an interloper: Instead of typing a password, press <Esc> or click *Cancel*. This puts you in the default mode—the one on which all new user profiles are based. Now start the System Policy Editor by choosing *Start•Programs•Accessories•System Tools•System Policy Editor*.

If the System Policy Editor prompts you for a template file, look for *Admin.adm* in the *Inf*



SYSTEM POLICY EDITOR lets you restrict what other users can do on your Win 95 PC.

4. **Space your icons horizontally.** Does the Auto Arrange or Arrange Icon command leave your icons too crowded—or maybe not crowded enough? Start Control Panel. Double-click the *Desktop* icon and change the Spacing setting. A larger number (up to 512 pixels) spreads things out; a smaller number cinches things tighter. If you want your icon labels to appear on a single line, uncheck *Wrap Title* while you're there. Then click *OK*.

5. **Space your icons vertically.** To increase or decrease the space above and below icons, you must edit the infamous *win.ini* file. In Program Manager or in File Manager, choose *File•Run*, type *win.ini*, and press <Enter>. Under the *[desktop]* heading (but before the next bracketed heading), add the line *IconVerticalSpacing=75* (the actual default value varies, depending on your system). To see the effect of your addition, you'll have to save the file and restart Windows. Experiment with bigger or smaller numbers to add or remove space between rows of icons. This setting also affects the vertical position of minimized icons on the desktop.

folder in your Windows folder and open it. With the Policy Editor open, choose *File•Open Registry*. Double-click *Local User*. Click the + next to *System* and the + next to *Restrictions*.

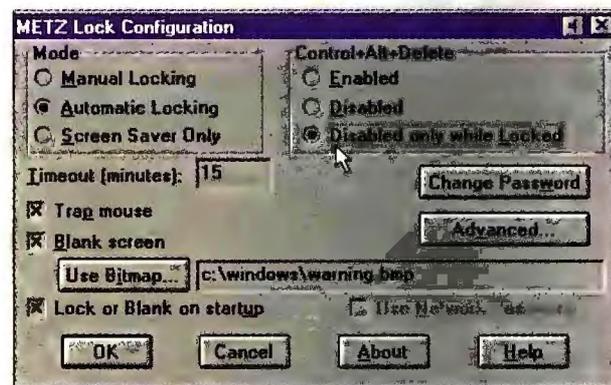
In *Restrictions*, check all the boxes to set maximum limitations on the default mode (and new users). To allow new users and users with default privileges to run some applications, select *Only run allowed Windows applications* and click *Show*. In the dialog box, click *Add*, type the executable file name of an application you want to make available, and click *OK*.

Make sure you include *poledit.exe* in the list of allowed applications if you ever want to change these settings in the future. When you're through with the list, click *OK*; then click *OK* again to close the *Local User Properties* dialog box. Exit the System Policy Editor and click *Yes* to save your changes. Finally, copy *poledit.exe* from your Windows folder to a diskette; then delete it from your hard drive.

These measures aren't foolproof, but they should do the trick for general family privacy. For a tougher approach to security, see this month's Windows Toolbox.

Security You Can Afford

IF YOU NEED TO KEEP prying eyes out of your system, check out Metz Lock, a \$39 shareware application that lets you password-protect your system on demand, at a scheduled time, or after the system has been idle for a designated period. It works with Windows 3.x and 95 and on Novell and Banyan networks. Available as *metzlk.zip* on PC World Online.



6. **Trim icon names.** If space is a problem, bring icons closer together by shortening their names—for example, change “Acme WordWrite for Windows” to the stylishly slim “WordWrite.” Just select an icon and choose *File•Properties* (or press <Alt>-<Enter>); then edit the description. Use this trick for group icons as well as for application and document icons.

SEEK THE RIGHT GEEKSPEAK

IF YOUR USER MANUAL'S propeller-headed prose ever gets the better of you, turn to your secret weapon: Windows' built-in glossary. Open Program Manager or File Manager, choose *Help•Contents*, then click the *Glossary* button for an alphabetized list of nerdy terms from *active* to *wrap*. In no time you can unlock the basic meanings of expanded memory, interrupt request lines, pels, and domains. So put aside your device contentions, take a little time slice, and maximize your input/output activity with this handy help file.



Find additional tips at <http://www.pcworld.com/hereshow.html>. Windows Tips welcomes your questions and tips and pays \$50 for published items. Contributing Editor Scott Dunn is a principal author of *The PC Bible, 2nd Edition* (Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.

You know the routine.
 You buy a PC. You use it for
 a year or two. And then you
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Removing the left-hand
 quick access panel
 provides easy access to
 expansion slots



Remove the right hand
 quick access panel
 to uncover the RAM,
 cache and CPU



The hard drive carriage
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Link Formulas to Web Data in Quattro Pro 7.0

SAY YOU HAVE a worksheet that does fancy calculations based on the AMEX computer stock index. Every day, you look up a value on the Web and enter it into your worksheet. Quattro Pro 7.0 can do this for you automatically, thanks to its ability to link cell formulas to Web URLs.

To try this out, fire up your Web browser and go to the Holt Stock Report's current data page (<http://metro.turnpike.net/holt/curr.htm>). Scroll the page, and count down the lines of text (ignore the graphics) until you find the line containing the statistic you want. On the day I created this example, the AMEX Computer Index was on the 38th row.

Now launch Quattro Pro 7.0 and enter the following formula:

+[\[http://metro.turnpike.net/holt/curr.htm\]](http://metro.turnpike.net/holt/curr.htm)A:B38.

A dialog box tells you that Quattro Pro is connecting to the Web site to get the data; then a value appears in the cell (see **FIGURE 1**). If it's not the one you want, compare the results with what you see in your Web browser, and adjust the column letter and row number until you locate the desired cell address. After a little experimentation, you'll be able to pluck items out of just about any Web page.

Whenever you reopen this file, Quattro

Pro refreshes the link with today's value from the Web page, provided you've got a live Internet connection. (You can also refresh it by selecting *Edit•Links•Refresh Links* and then double-clicking the <http://> link in the Refresh Links dialog box.)

This is pretty cool, except that Web pages are changeable beasts: The cell address that gives you the AMEX Computer Index today may yield pork bellies tomorrow. But Quattro Pro 7.0 is definitely a harbinger of things to come on the Web.

BACKING UP EXCEL SPREADSHEETS: MACRO FIX

MANY READERS informed us that the macro in our October column didn't work. The "not equals" operator was inadvertently dropped from three lines of code. To make the model work, change the macro statements in lines 12, 16, and 19 of Figure 4 on page 284 to read:

Line 12:

If dSaveTwice.Show <> "False" Then

Line 16:

If Right(strSPath, 1) <> "\" Then

Line 19:

If Right(strWPath, 1) <> "\" Then

Our apologies, and thanks again for keeping us honest.

COMBO LINE AND BAR CHARTS IN EXCEL

SUPPOSE YOU HAVE a worksheet like the one shown at the top of the next column, and that you want to display the team data (rows 2 through 7) as bars, and the state and national norms (rows 8 and 9) as lines. You use the Chart Wizard, which has four steps: Select *Combination* in step 2, select *Rows* as the data series in step 4, and then specify one row for the X-axis labels.

	A	B	C	D
1	TEAM	1986	1989	1992
2	BLUE	96	91	89
3	GREEN	82	87	80
4	RED	81	88	81
5	ORANGE	87	93	95
6	GRAY	83	81	96
7	YELLOW	85	89	95
8	STATE	98	99	93
9	NATIONAL	96	93	92

But evidently a bug in Excel prevents you from using the *Format•Line Group* command to change the chart type of a single series. Use this work-around: Begin by creating a columnar bar chart of all the data, instead of a combination chart. Then, if your chart is on a chart sheet, select it; if it's embedded, double-click to



edit it. If the Chart toolbar (left) is not visible, select *View•Toolbars*, then *Chart*, and click OK. Now, select the column for the state series, click the scroll button on the Chart Type tool, and click the *Line* tool, as in the figure.

Voilà! You've just transformed the bars

for state data into a line. Repeat the steps for the national data series. The result is shown in **FIGURE 2**.

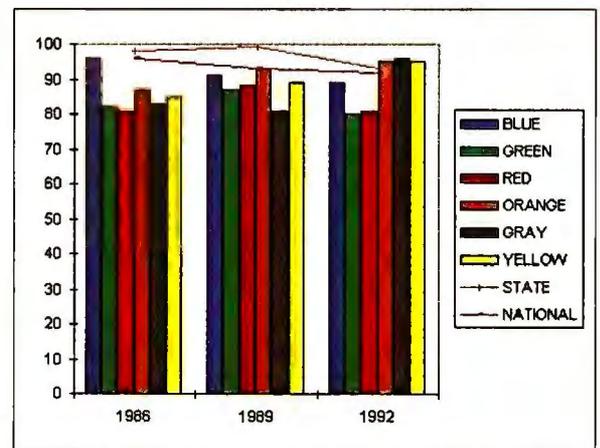


FIGURE 2: TO CREATE AN EXCEL CHART with bars and lines, make the bar chart, select the data for lines, and pick *Line* in the Chart toolbar.

Find more tips at <http://www.pcworld.com/hereshow/html>. Spreadsheets welcomes questions and pays \$50 for published items. Contributing Editor Richard Scoville is a software training consultant in Chapel Hill, North Carolina. See page 14 for information. ■

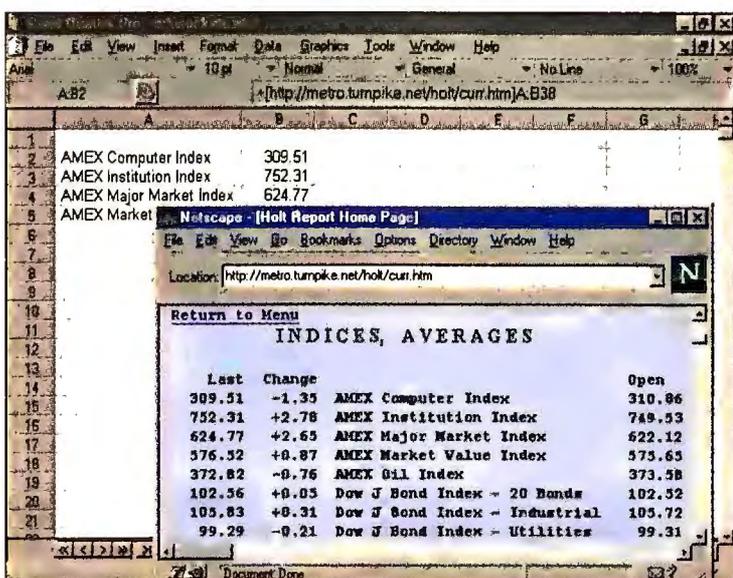


FIGURE 1: DOWNLOAD WEB DATA AUTOMATICALLY into your Quattro Pro 7.0 worksheet with linking formulas.



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Circle 89 on reader service card

Create Vertical Letterheads in Word

MANY ORGANIZATIONS and professional firms like their letterheads to run vertically down one side of the page, so as to include the names of executives, partners, the board of directors, or other staff. In Word 6 and 7, creating such letterheads is simple. Just follow the steps below (illustrated in **STEP BY STEP**).

1. Select *View•Zoom*, click *Whole Page*, then click *OK*. You need to see the whole page to create your letterhead area.

2. Select *Insert•Frame*, and click and drag the mouse on the page to create a vertical frame. Click on one of the sizing handles to adjust the frame's size and

position. You can position the frame outside the normal margins, but be sure to allow for your printer's minimum side margins, about one-quarter inch.

3. Select *View•Zoom*, choose your normal zoom level (typically 100 percent), and click *OK* in the Zoom dialog box.

4. Click inside the frame you just created, and type the information you want to include. Select font sizes that allow you to fit your text within the narrow column.

5. Click inside the frame, and select *Format•Borders and Shading*. Word's default frame settings are ideal for this. The text of your letterhead will automatically wrap itself around this information frame.

6. When your design is done, select *File•Save As*, choose *Document Template* in the Save as type list, enter a file name in the File name field, and click *Save*.

Whenever you need this letterhead, select *File•New* and choose your letterhead template from the New dialog box.

SET DIFFERENT COLUMN LAYOUTS ON THE SAME PAGE

WHETHER YOU'RE CREATING a newsletter or inserting a multiple-column section into a letter, today's word processors can change column settings without jumping to a new page. Here's how to do it.

Word 6 and 7: Place the cursor where you want the new column arrangement to begin and select *Format•Columns*. In the Columns dialog box (**FIGURE 1**), choose the number of columns, either in the Presets box or in the Number of Columns field. Click the *Apply To* list, select *This Point Forward*, and click *OK* to activate.

Word adds a new section with your ▶

STEP BY STEP

Put Your Letterhead in a Vertical Frame in Word 6 and 7

1 Set the Zoom level to Whole Page.

2 Select *Insert•Frame*, then click and drag the mouse on the page to create a vertical frame.

3 Set the Zoom level to 100%.

4 Click inside the frame and enter your letterhead text.

5 Select *Format•Borders and Shading* if you want to change the borders and shading.

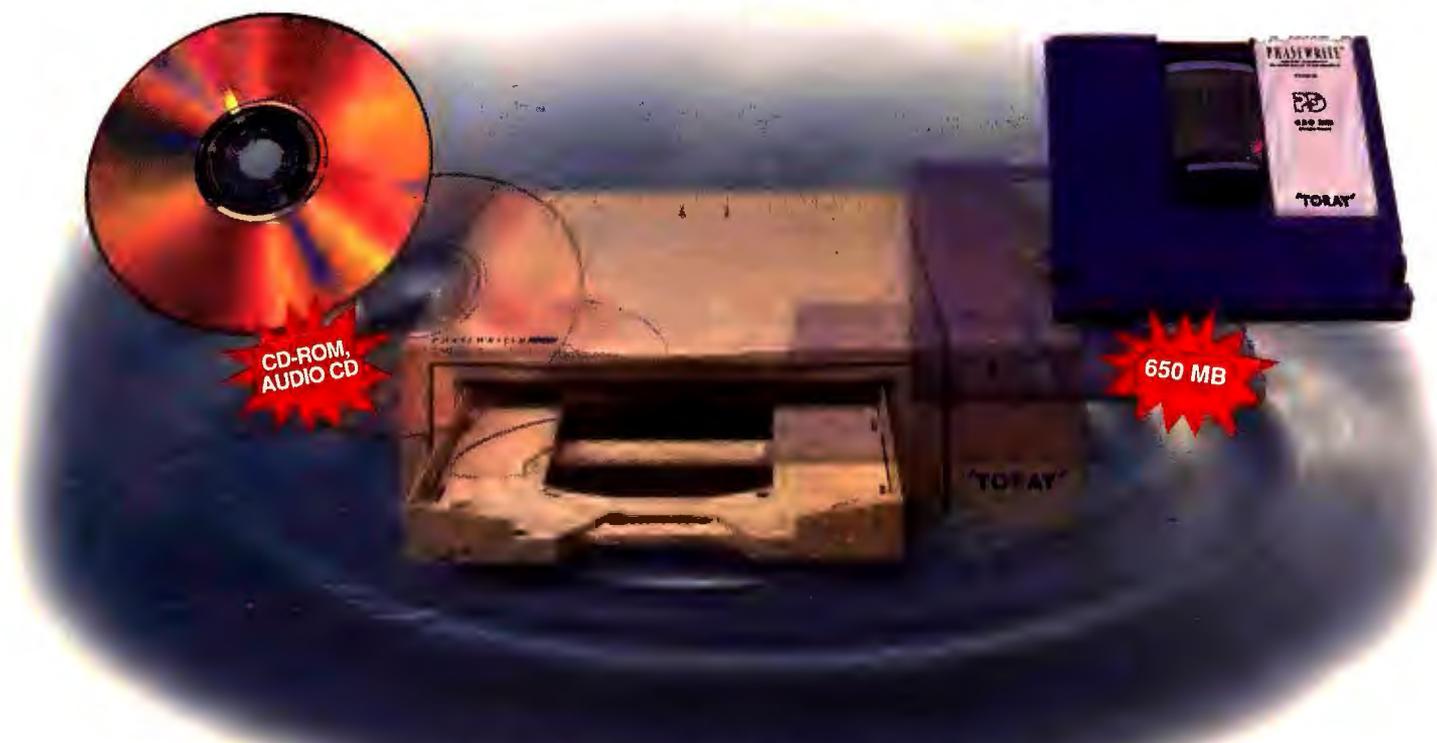
6 Save the letterhead as a template.



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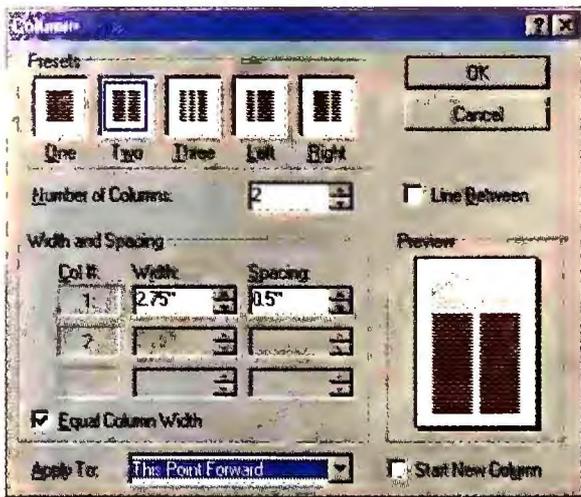


FIGURE 1: TO CHANGE THE NUMBER of columns in a Word document, select *Format•Columns*.

column settings in place. Repeat the process when you're returning to the normal column configuration. When you change settings, the text in the previous section adjusts to fill the multiple columns.

WordPerfect 6.1 and 7: Position the cursor where you want the new column arrangement to start; select *Format•Columns•Define*. In the Columns dialog box, enter the number of columns in the Number of Columns field, or use the arrows. Choose a column format in the Type frame (Balanced Newspaper often works best, since it keeps the column lengths equal), then click *OK* to apply.

When you're ready to go back to a single-column layout, select *Format•Columns•Off*. Even if you just want to change the number of columns to another multiple-column format, you must select *Format•Column•Off* before redefining your column settings. Otherwise, your change will affect the current settings as well.

Word Pro 96: Before entering text into the new column layout, position the cursor where you want the new layout; then

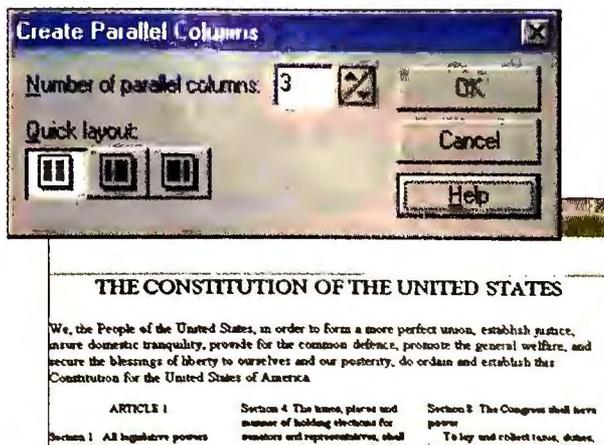


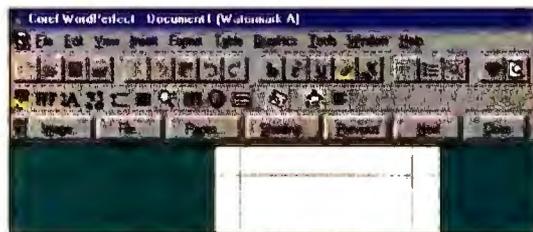
FIGURE 2: IN WORD PRO, you must specify the new column layout before you enter your text.

select *Create•Parallel Columns*. In the Create Parallel Columns dialog box (shown in **FIGURE 2**), specify the number of columns you want in the Number of parallel columns field, or click a *Quick Layout* button if you're using just two columns; then click *OK*.

You can now type your text inside of the column borders. To jump to the next column, press **<Ctrl>-<Enter>** or click in the next column. You'll have to balance the text yourself. When you are ready to resume normal layout or when you want to set up a new number of columns, click outside of the columns.

ADD A BACKGROUND BORDER IN WORDPERFECT 7

IT'S EASY IN WordPerfect 7 to create a graphical border on a page or another graphic to serve as a background for the text. You can use one of several designs included in the program, or you can import your own clip art images. Here are the steps for creating a background image or watermark.



1. With your cursor on the page where you want the border, select *Format•Watermark*, and click the *Create* button in the Watermark dialog box.

2. A new toolbar will appear, and you'll see a full-page view of your document, as partially shown in the figure above. On the toolbar, click *Image*.

3. In the Insert Image dialog box (see **FIGURE 3**, top of next column), click the *Preview* icon, choose a directory that contains the image you want to place on the page, and click an image's file name in the file list to view the image. When you find

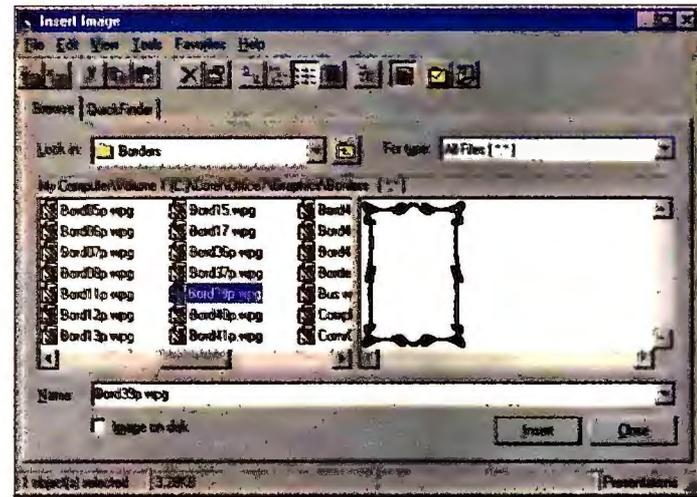
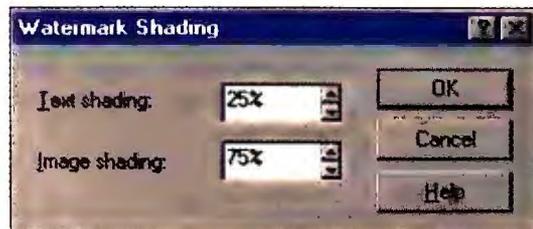


FIGURE 3: ENHANCE WORDPERFECT DOCUMENTS by adding one of the program's attractive borders.

the graphic you want to use, click *Insert*.

4. The normal setting is for WordPerfect to print the background image in a very light shade. To change this setting, click the *Shading* button on the Watermark toolbar. In the Watermark Shading dialog box—shown in the figure at the bottom of the middle column—adjust the Image shading percentage to suit your needs; then click *OK*.

5. Finally, click the *Close* button on the Watermark toolbar to return to normal editing mode. If you've inserted a border, you may need to adjust your margins to fit the text inside the border.

TURN OFF WORD PRO'S COLORED MARGINS



IS THERE ANY WAY to get rid of Word Pro's battleship gray margins? They distract me as I work.

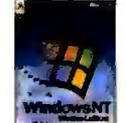
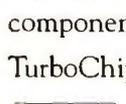
E. J. Slayton, Internet
SURE. SELECT *View•Set View Preferences*. In the View Preferences dialog box, click the *Show* tab, and then select *Show margins in color* to unmark that option. Click the *Make Default* button, and click *OK*. Those gray margins will be gone unless you change the settings again.



Find files from this article and more tips at <http://www.pcworld.com/hereshow/html>. Word Processing welcomes your tips and questions and pays \$50 for published items. Contributing Editor George Campbell is a contributor to *The PC Bible* (Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.



WHEN THE ARMED FORCES REALIZED THAT OUR TURBOCHIP COULD MORE THAN DOUBLE THE SPEED OF THEIR 486S, THEY DECIDED TO PICK SOME UP.



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The military has to be able to act quickly, and so do their computers. Maybe that's why they decided to upgrade their 486s with Kingston[®] TurboChips—an approved component on the GSA purchasing schedule. The TurboChip™ can extend the life of your fleet, too, whether you have 486-based DX2, DX, SX2, or SX systems. In the words of an Army computer scientist at the Army's Pentagon Automation Technology Branch, "The Kingston chip was completely compatible with all our systems and had an amazing



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CPU by AMD Am5x86-P75 *10/31/96 evaluation by Ron Jarmuth, Chief Automation Technology Branch, HQDA-IMCEN, Pentagon Automation Technology Branch. Kingston Technology Company, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699. © 1996 Kingston Technology Company. All rights reserved. Kingston is a registered trademark and Computing Without Limits and TurboChip are trademarks of Kingston Technology Company. Windows NT is a registered trademark of Microsoft Corporation.

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Protect yourself from spam ♦ Fight Internet attacks ♦ Keep your PC virus-free

Filter Out Junk Mail

ARE GET-RICH-QUICK schemes clogging your e-mail box? America Online offers several ways to filter out junk e-mail, or *spam*. Select *GoTo•Keyword*, type **mail controls**, click the *Go to Mail Controls* button, select the screen name for the person whose mail you wish to filter, click the *Edit* button, and fill in the E-mail Parental Controls dialog box (FIGURE 1). The dialog box lets you block all mail or specify the e-mail addresses you want to block or allow.

These filters aren't foolproof and won't block all annoying sales pitches, but they can provide some relief. To learn more about protecting yourself from spams, select *GoTo•Keyword* and type **spam update**.

FIGHT BACK IF YOUR BUSINESS IS ATTACKED

LAST FALL A SAN FRANCISCO businesswoman learned that her company was being bad-mouthed on an Internet mailing list. She signed up for the list and discovered that a bookkeeper was disparaging her wholesale policies. "He started by posting messages full of half-truths, then graduated to outright lies," says the business owner, who asked not to be named.

When she tried to defend herself, list members grew angry. Within days her e-mail box brimmed with nasty missives. The controversy also spread to other quarters of the Net, and she describes the

weeks that followed as "e-mail hell."

What do you do when your business is attacked on the Net? According to New York-based Internet business consultant Janet Attard, the best thing to do is to issue one public statement listing the facts, then ignore any more related e-mail. "Getting involved in these disputes seems to escalate them," says Attard.

If the messages appear on a commercial online service, such as America Online, contact the forum's manager and the online service. Posting libelous statements about a person or business is against the services' rules. At the least, a forum leader can break up the fight.

When the messages originate on the Net, recourse is limited. Mailing list owners are uninterested in mediating disputes. Usenet messages hang around for years. If an individual attacks your company repeatedly, consider contacting an attorney. Some businesses have been able to wring public apologies from slanderers on the Net after threatening legal action.

MAKE YOUR GIFS DANCE

WEB SURFERS DON'T MIND ADS, but their tempers bubble when their browsers are slowed by dancing soda cans, according to a study by Jupiter Communications.

If your heart is still set on adding the sparkle of animation to your Web page, try animated GIF files, which provide very compact animation. To build your own, download Alchemy Mindworks' GIF Construction Set (<http://www.mindworkshop.com/alchemy/alchemy.html>). Its animation wizard will turn your company logo into a whirling dervish in no time. You can also use this \$20 shareware program to make GIFs transparent. It's available on PC World Online. Look for gifcon.exe for

the Windows 3.x version, and gifcon32.exe for the Windows 95 and NT version.

Ready-made animated GIFs are available on America Online (see FIGURE 2) and CompuServe. On AOL, use the keyword **pgr**; click the *Graphic Resources* icon. In the next menu, scroll to *Creating Animated GIF Images*. On CompuServe, go to the 'comanim' service.

The HTML code for displaying an ani-

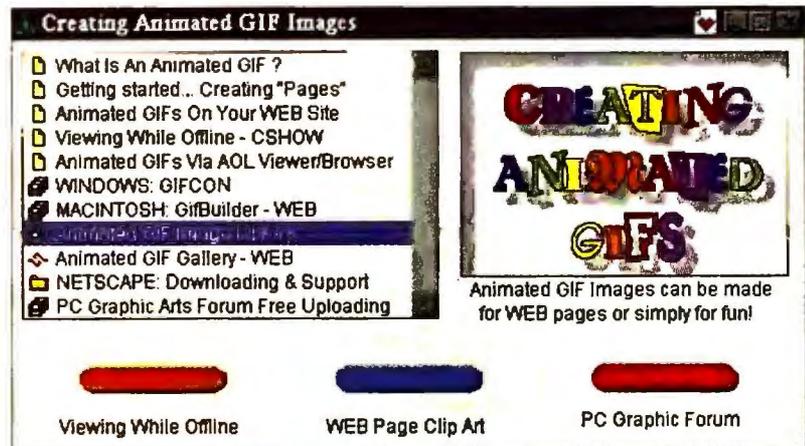


FIGURE 2: DOWNLOAD ANIMATED GIF FILES from America Online (shown here) or CompuServe, then add them to your Web page.

mated GIF file isn't too different from the code for displaying a static image. The code for an animated GIF named spin.gif with a 300 by 200 screen size is ``

INOCULATE YOUR PC AGAINST E-MAIL VIRUSES



I HEAR THAT my PC can be infected by a virus through e-mail. How can I prevent this from happening?

Edward Lychwala,
Ware, Massachusetts

FIRST, YOU CAN'T CATCH A VIRUS from an old-fashioned text message, the kind of no-frills e-mail that's passed around on the Internet and most online services. However, you can catch a virus from binary file attachments to e-mail messages, like the MIME or Uuencoded files that travel over the Net.

The most tenacious viruses are passed through Word and Excel macros, often on office networks. Symantec publishes a table of regional outbreaks on one of its Web pages (<http://www.symantec.com/avcenter/reg.html>). You can also read the latest virus alerts at the National Com-

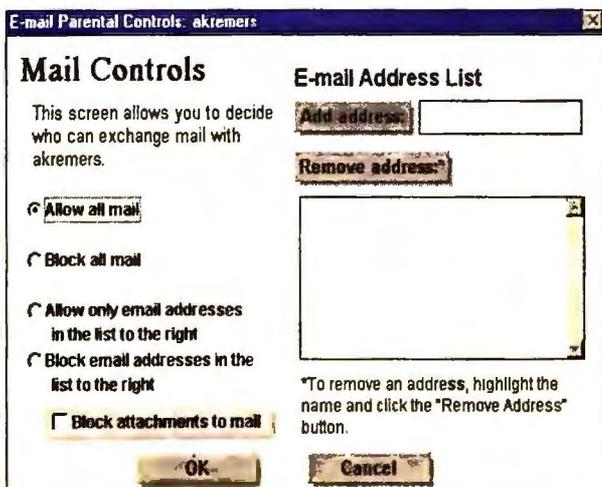


FIGURE 1: AMERICA ONLINE lets you use Mail Controls to block e-mail from spam artists and other annoying correspondents.

"With the new 32-bit Windows version, it's making a strong bid for honors as the best all-around remote control program on the market."
PC World March 1996

"Its modular design shines in Microsoft's Windows 95's 32-bit multitasking environment. It is easy to use, and it also has features that make it easy for network administrators to manage."
LAN Times Feb. 19, 1996

"LapLink is the easiest program to use, and it's one of the fastest and steadiest."
Federal Computer Week Feb. 6, 1996

"After hours of testing, a clear usability winner emerged-LapLink was far and away our testers top choice for fuss-free remote access to files, programs, or a network, and for remote training and technical support."
PC/Computing Sept. 1996

"LapLink consistently outperformed pcAnywhere on our network. With LapLink, we felt as though the remote system was performing tasks locally, but when we switched to pcAnywhere we still felt as though we were using a modem."
PC Magazine March 26, 1996

"LapLink is a powerhouse for, and the granddaddy of, remote computing."
Home Office Computing May 1996

"...if you haven't upgraded your LapLink in a while, it's time to do it again. LapLink for Windows 95 is good."
BYTE May 1996

"LapLink is a superior remote access client for telecommuters, remote offices and even local clients"
PC Week April 1996

"LapLink is still the tool of choice for laptop users. It may be the only remote access product you need."
LAN Magazine June 1996

"...LapLink's speed and intuitive design make it the best choice in the market."
Info World Jan. 29, 1996

"When we matched it up against Symantec's pcAnywhere32 in our labs, we found that LapLink is the product we'd want with us on the road."
PC/Computing May 1996

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Computer industry experts aren't in the habit of agreeing with each other. When they do, it's definitely worth noting.

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- ◆ Full Screen MPEG, CDI AVI, Cinepak, Indeo playback
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- ◆ 180W Stereo Speakers w/Sub Woofer
- ◆ 33.6kpbs Fax Modem w/Voice Mail and Speakerphone
- ◆ 2 16550 UART Serial & ECP/EPP Parallel Ports
- ◆ 7 Bay Digital Tower Case w/230W PS
- ◆ 104 Key Enhanced Keyboard, High Res. Mouse
- ◆ Microsoft® Family & Online Internet CD Bundles
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120MHz \$1849 133MHz \$1899
150MHz \$1989 166MHz \$2089

200MHz

\$2159

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- ◆ PCI Local Bus Enhanced IDE Controller
- ◆ 3.5" High Density Floppy Drive
- ◆ Matrox Millennia 2MB WRAM Graphics Accelerator
- ◆ Full Screen MPEG, CDI AVI, Cinepak, Indeo Playback
- ◆ 17" Digital .28dp, NI, Flat Screen SVGA Monitor
- ◆ 12X Speed Enhanced IDE CD-ROM
- ◆ Yamaha C.S. Wave Table Stereo Sound Card
- ◆ 180 Watt Amplified External Stereo Speakers
- ◆ 33.6 FAX Modem with Voice Mail & Speaker Phone
- ◆ 2 16550 UART Serial, 1 ECP/EPP Parallel Ports
- ◆ 7 Bay Digital Tower Case with 230W PS
- ◆ 104 Key Enhanced Keyboard, Hi Res. Mouse
- ◆ Microsoft Family & Online Internet CD Bundle
- ◆ Microsoft Windows® 95, or DOS 6.2 & WFW 3.11
- ◆ 5 Year/3 Year USCD Warranty

150MHz \$1759 166MHz \$1799 150MHz \$1299 200MHz \$1499

200MHz

\$1959

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- ◆ PCI Local Bus Enhanced IDE Controller
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- ◆ Full Screen MPEG, CDI AVI, Cinepak, Indeo Playback
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- ◆ 12X Speed Enhanced IDE CD-ROM
- ◆ 3D Surround Sound Stereo Sound Card
- ◆ 180 Watt Amplified External Stereo Speakers
- ◆ 33.6 FAX Modem with Voice Mail & Speaker Phone
- ◆ 2 16550 UART Serial, 1 ECP/EPP Parallel Ports
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- ◆ 104 Key Enhanced Keyboard, Hi Res. Mouse
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166MHz

\$1349

COMPUTER SHOPPER FEB-1996

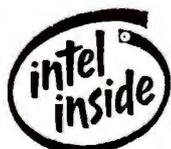
All results are taken from Benchmarks Scores in February Computer Shopper 1996.

U.S. Computer Patriot LX 133MHz	78
Dell Dimension XP5 P133c	68
Quantex QP5/SM-2 166MHz	70

REVIEWED IN COMPUTER SHOPPER FEB, 1996

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Circle 241 on reader service card

puter Security Association page (<http://www.ncsa.com/avpd1.html>).

Here's how to keep your PC virus-free:

Beware of an e-mail message with a binary file attachment. If you receive a binary file, scan it with a virus detector first.

Use a virus scanner that can destroy macro viruses. A good one is Symantec's \$79.95 Norton AntiVirus. You can download updates from <http://www.symantec.com/avcenter/download.html>.

Install a memory-resident virus checker to detect suspicious program activity. Norton AntiVirus is a good choice. Also, regularly scan your hard disk for viruses. You should also scan foreign disks. Home PCs are often infected by kids passing video games around, by disks from the office, or by computer repair shop diagnostic disks. If you buy a PC with software installed, even if it's DOS or Windows, always scan the hard disk for viruses before using it.

Scan anything you download off the Net or online services. Ideally you should download programs to a floppy, then scan them before copying them to your hard disk.

Use several types of virus scanners. A virus that slips past one product might be picked up by another.

Find out if your IS department scans its network file servers, e-mail, or files from outside the network. Integralis's MIMESweeper is a secure e-mail router that virus-checks e-mail and attachments. Trend Micro's InterScan Virus Wall provides protection for NT servers. ScanMail for Lotus cc:Mail searches stored e-mail for viruses. You can download a free copy of the cc:Mail program from the Trend Micro page (<http://www.antivirus.com/download/index.html>).

Don't use Word as an e-mail viewer. Word has been plagued with viruses.

Disable Java. Java works by downloading executable files to your PC. Security is built in, but Java may contain holes for virus makers to exploit.

Get the latest Microsoft antivirus tools at <http://www.microsoft.com/>. Search for **macro virus protection tool**.

- InterScan Virus Wall, \$695 for 50 users; Trend Micro Inc.; 800/228-5651; <http://www.antivirus.com>

READER SERVICE NO. 692

- MIMESweeper, \$995 for 25 users, \$1475 for 50 users; Integralis Ltd.; 206/889-4724; <http://www.mimesweeper.integralis.com/>

READER SERVICE NO. 693

- Norton AntiVirus \$79.95 list; Symantec; 800/441-7234; <http://www.symantec.com>

READER SERVICE NO. 694

SHAREWARE HTML EDITORS



I'M A COLLEGE STUDENT with a limited income who would like to set up a Web page. Can you recommend a good low-cost HTML editor?

Ken Banghart, Internet
I'VE NEVER BEEN FOND of HTML editors. It's often easier to type the HTML code yourself rather than to tussle with a program's buttons and wizards.

But there are a few shareware gems that automate Web page creation. My favorite is Web-It by Lincoln Beach Software. It displays the page in a window below its HTML code, showing changes to the page as you make them (FIGURE 3). Web-It is \$50 for the standard version, and \$99 for the Pro version, which supports forms, frames, and image maps. Download it from <http://www.lincolnbeach.com/> or from PC World Online (`wbit32.zip` for Windows 95; `wbit.zip` for Windows 3.x).

Another good one is WinHTML by Gulf Coast Software. It's \$25 for the Windows 3.x version, \$49 for the Windows 95/NT version. WinHTML lets you add forms and tables to pages but uses your browser to display the resulting page. Look for it on PC World Online (`whtml.zip` for Windows 3.x; `whtml32.zip` for Win95/NT).

Also consider Gulf Coast's TextPad editor, which is \$25 for the 16-bit program



FIGURE 3: WEB-IT displays your Web page below its HTML code so you can see how code changes affect your page.

Web-Webster's Dictionaries

ON THE WEB you can find definitions for every conceivable word, from the technically arcane to the slangishly bizarre. You can even learn their translations in almost any language. Here's a list of resources.

Free Online Dictionary of Computing (<http://wombat.doc.ic.ac.uk/>)

The Hacker's Dictionary ([gopher://gopher.sl.u.se/7waissrc%3a/wais-dbs/computers-and-software/gloss-and-dicts/jargon](http://gopher.sl.u.se/7waissrc%3a/wais-dbs/computers-and-software/gloss-and-dicts/jargon))

The Internet Language Dictionary (<http://www.netlingo.com/>)

The List of Dictionaries (http://math-www.uni-paderborn.de/HTML/Dictionaries_noframes.html): Pointers to many foreign language and technical dictionaries.

The Online Dictionaries (<http://www.bucknell.edu/~rbeard/diction.html>): Pointers to over 60 foreign language dictionaries, including Urdu, Chechen, Tibetan, and Russian sign language.

Roget's Thesaurus at The University of Chicago (http://humanities.uchicago.edu/forms_unrest/ROGET.html)

Webster's Dictionary at Carnegie Mellon (<http://c.gp.cs.cmu.edu:5103/prog/webster>)

The WWLIA Legal Dictionary (<http://www.islandnet.com/~wwlia/diction.htm>)

and \$49 for the 32-bit version. It's ideal for writing Web pages because it doesn't deposit strings of word-processing characters at the end of files. It also loads extra-large files. Look for it on PC World Online (`txp16131.zip` and `txp32131.zip`).

Also, if you have one of the latest Win 95 word processors, you can use it to generate HTML code as well.



Find files from this article and additional tips at <http://www.pcworld.com/hereshow.html>. Internet Tips welcomes your questions and tips and pays \$50 for published items. Contributing Editor Judy Heim is the author of *The Needlecrafter's Computer Companion* (No Starch Press, 1995, 800/420-7240). See page 14 for contact information.

Put BIOS in Its Place

IT'S HARD TO ACCESS, it's filled with arcane technical language, and if you mess with it the wrong way, it will shut down your computer.

But your PC's BIOS is also a powerful tool for customizing features, optimizing performance, and troubleshooting serious system crashes. Here are quick tips on when and how to do the work.

CONFRONTING YOUR OWN BIOS

YOUR COMPUTER'S Basic Input Output System is its fundamental set of software instructions for moving data around. The BIOS sits on a chip (either read-only memory or reprogrammable *flash memory*) and coexists with a system setup program (see figure below) that lives in CMOS memory. Every time your computer powers up, it reads these operating instructions and settings before loading Windows.

CMOS setup programs vary widely, and so do the ways in which you launch them.

Often a message about this pops up on your screen just after you power up. If not, consult your manual.

Once you're in, check how to get back out without making critical changes. You can ruin your day by unintentionally altering certain settings, so don't take chances.

Notice the menu choices for loading BIOS default and setup default values. 'Load BIOS Defaults' loads a very conservative set of BIOS values that are designed for maximum compatibility but give lower performance. 'Load Setup Defaults' loads the factory BIOS settings. These support faster performance than do the more basic settings but don't necessarily support all of your PC's special features such as Enhanced Parallel Ports and 32-bit file access for hard drives.

Now write down all of your BIOS settings for future reference. If the tiny battery on your motherboard that supports your CMOS memory fails—and someday

it will—you'll lose your BIOS settings. When that happens, you'll also lose access to your hard drive. You'll save hours or days of time if you know these settings.

TUNING YOUR SYSTEM

Enable cache. Machines have been known to leave the factory with the Level 2 cache disabled in the BIOS. Enabling it boosts performance tremendously. Also, if you have a choice, set your cache to write-back instead of write-through mode.

Speed up the hard drive. Check your manual to see if you can enable Block Mode, Logical Block Address, and 32-bit file access—enhancements that may or may not be supported by a given hard drive.

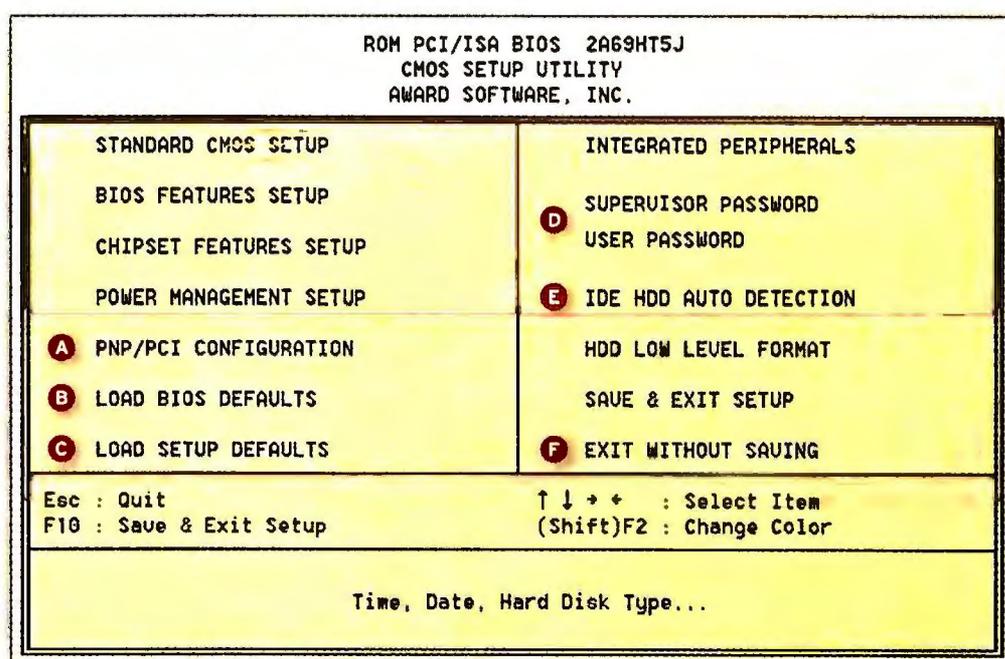
Open ports correctly. If you're using an Enhanced Parallel Port, ECP and EPP support must be enabled in BIOS. When installing a new serial port (for example, on an internal modem), you may need to change the COM address of a serial port on your motherboard—or disable it completely—to avoid hardware conflicts.

Avoid IRQsome problems. If you are installing a non-Plug and Play board that requires a specific interrupt in a PCI expansion slot, you can bypass conflicts by manually setting the IRQ for a given slot.

Minimize waits. A wait state is a forced pause that allows faster-working parts like the CPU to mesh with slower-working parts like memory. The pauses are usually measured in 0, 1, 2, or 3 clock cycles. The lower the setting, the better the performance—but only to a point, since cutting too deeply may hang your computer.

Set passwords. You can also set a password to protect access to your computer at boot-up; such passwords are tougher to thwart than Windows passwords. But beware: If you forget the password, you'll have no one to call. You'll just have to reset your BIOS by changing a jumper on your motherboard—if you're lucky.

Working Through Your System Setup



- A** Handles IRQ settings.
- B** Sets BIOS for maximum compatibility.
- C** Sets BIOS to factory settings.
- D** Protects your PC at boot-up.
- E** Tunes hard drive parameters.
- F** When in doubt, use this.

YOUR PC'S SYSTEM SETUP PROGRAM, WHEN HANDLED CAREFULLY, can fix problems, support special features, and boost performance.

 For advice on BIOS upgrades and other hardware tips, see <http://www.pcworld.com/hereshow/>. Kirk Steers is a PC World contributing editor. Hardware Tips welcomes your questions and pays \$50 for published items. See page 14 for contact information. ■

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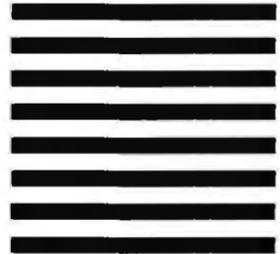
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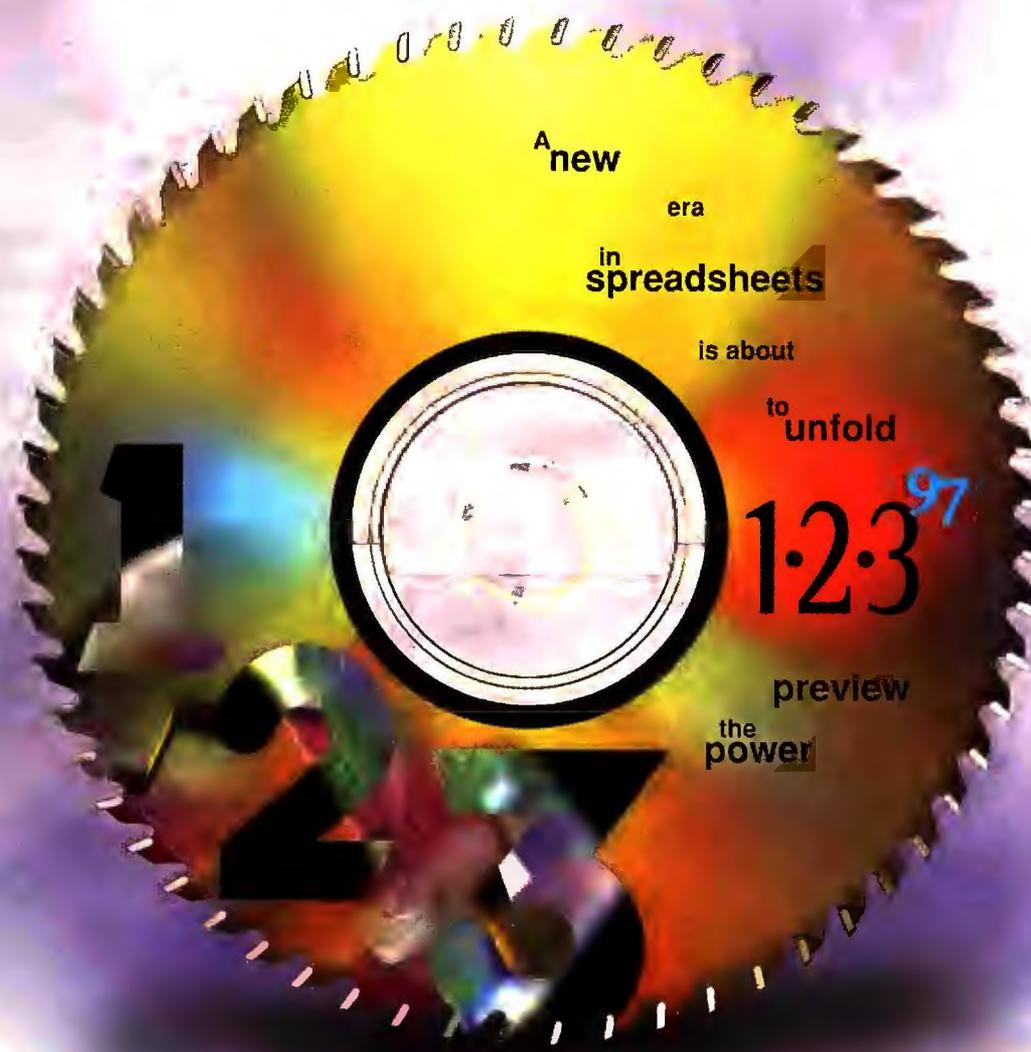
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Videoconferencing for the Rest of Us, on the Net

CAN CU-SEEME DO FOR conferencing what Mosaic did for the Web? The University of Illinois's free NCSA Mosaic browser was the spark that ignited the World Wide Web. Cornell University's free CU-SeeMe conferencing software has been slower to take off, but it could play a similarly dramatic role in jump-starting Internet videoconferencing.

CU-SeeMe lets you yak long-distance using your PC's sound board and microphone (see figure at right). To see how it works, download the latest version of the 16-bit Windows program from Cornell's Web site (<http://cu-seeme.cornell.edu/>). To get started receiving video only, all you need is a real Internet IP address (the program won't work with IP emulators, like Cyberspace Development's Internet Adapter, or through America Online).

You'll find a frequently-asked-questions file at <http://www.indstate.edu/msattler/sci-tech/comp/CU-SeeMe/>. Or sign up for tips by e-mail by subscribing to the CU-SeeMe mailing list. To subscribe, send the message **SUBSCRIBE CU-SEEME-L first last** (where *first* and *last* are your first and last names) to listproc@cornell.edu. Be sure to leave the subject line blank.

Add Connectix's QuickCam camera, and your video pals will be able to see you, too. But before you order a QuickCam, note: You don't need a video camera or a sound board to participate. To send and receive audio, you do need a sound card, a mike, and speakers or headphones.

The program's chat window gets more use than its audio feature, and you can see the people you're typing to (if they have video cameras), even if they can't see you. Most CU-SeeMe *reflector sites* (Net servers that receive video, audio, and text, then reflect all three out to logged-in users) allow a certain number of lurkers (users without cameras). Senders (users transmitting video) usually have an easier time

gaining access to reflector sites, though.

The black-and-white QuickCam costs about \$100; the color model, about \$200. White Pine Software's Enhanced CU-SeeMe 2.1 adds color support, a shared



SEE AND BE SEEN OVER THE NET using Cornell University's free CU-SeeMe software. Say, who's that handsome devil in the fez?

whiteboard, and other improvements to Cornell's freeware version. Download a demo from <http://www.cu-seeme.com>.

One warning: Anything goes on most CU-SeeMe reflectors. If you're not ready for provocative stuff, stay away.

- Enhanced CU-SeeMe 2.1 \$69 list; White Pine Software; 800/241-7463; <http://www.cu-seeme.com>

READER SERVICE NO. 707

- QuickCam \$100 street, Color QuickCam \$200 street; Connectix, Inc.; 800/950-5880

READER SERVICE NO. 708

CD AUDIO INTO .WAV FILE



YOU CAN CONVERT parts of an audio CD track into a .wav file with commercial sound editing utilities, but why not use Windows 95's own free tools? Just insert a CD in the drive, open the CD Player and Sound Recorder (select

Start•Programs•Accessories•Multimedia), and press *Record* in Sound Recorder and *Play* in CD Player. When you've captured all the audio you want, stop recording and save your cut as a .wav file. Most sound boards come with a CD player and .wav audio recorders that do the same thing.

Michel Morency, Montreal, Quebec
SURE YOU CAN DO THAT. However, even though you're reading one digital audio file and writing it to another digital audio file, you'll find the copy none too faithful. That's because your computer's sound board converts the CD-based audio from digital to analog format when you play it, and then from analog back to digital when you record. The higher frequencies and stereo separation suffer noticeably.

The other main problem is that Sound Recorder doesn't let you record for very long at CD-quality sampling rates. Here's a trick to overcome this: After you start recording, drag Sound Recorder's slider to the right. If you keep clicking, you can record until you run out of hard disk space. But each click or drag mars the .wav file with a small gap, or skip.

A few programs make direct digital copies from CDs to hard disks. Cyberdyne Software's CD Workshop for Windows 95 lets you save CD audio bits and bytes as a .wav file. A free beta version is available at <http://www.tfh-berlin.de/~s570959/cdworkshop.html>; Cyberdyne plans to charge \$30 for the shareware version.

If you use MS-DOS, you can try the free MS-DOS command-line utility CDDA 1.5. Like CD Workshop, this program lets you extract digitally perfect copies of audio CDs, and it also grabs MPEG video from CDI discs and video CDs. You can download a copy from the author's Web site (<http://www.tardis.ed.ac.uk/~psyche/pc/cdrom/CDDA.html>).

Find additional tips at <http://www.pcworld.com/hereshow.html>. Multimedia Tips welcomes your questions and tips and pays \$50 for published items. Contributing Editor Scott Spanbauer is author of *The No B.S. Guide to Windows 95* (No Starch Press, 1996, 800/420-7240). See page 14 for contact information. ■

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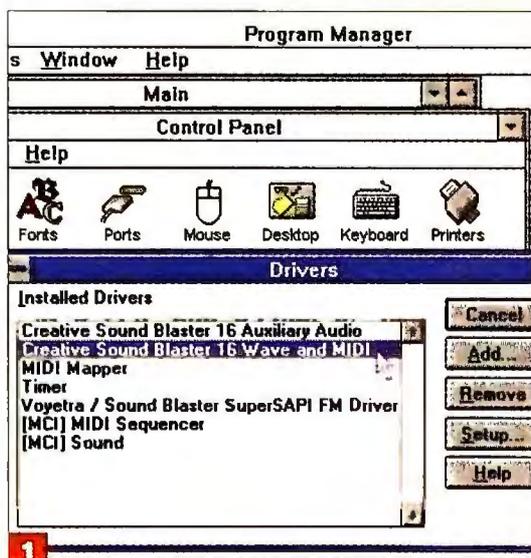
Meanwhile, prices have fallen dramatically. You can get a decent entry-level board for under \$100 and a top-of-the-line model for \$200 to \$250 (for the cream of the crop, see Top 5 Sound Boards

at http://www.pcworld.com/hardware/soundcards_speakers/).

The sound board has a well-deserved reputation as one of the trickiest add-ins to install, but jumperless cards with automatic installation software (for Windows 3.1 users) and Plug and Play (for Win 95) have made getting great sound less of a chore.

Here are the basic installation steps. For additional tips, check out <http://www.pcworld.com/hereshow/>.

Stan Miastkowski is a PC World contributing editor.



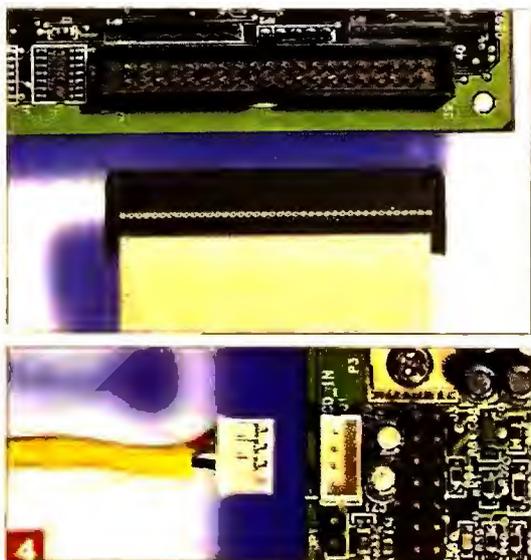
Out with the old. If your PC already has a sound board, remove the board's software. In Windows 3.x, open Control Panel's Drivers icon. In Windows 95, start up in Safe Mode, then use Device Manager. Shut down your PC. Remove the cover and the old board.



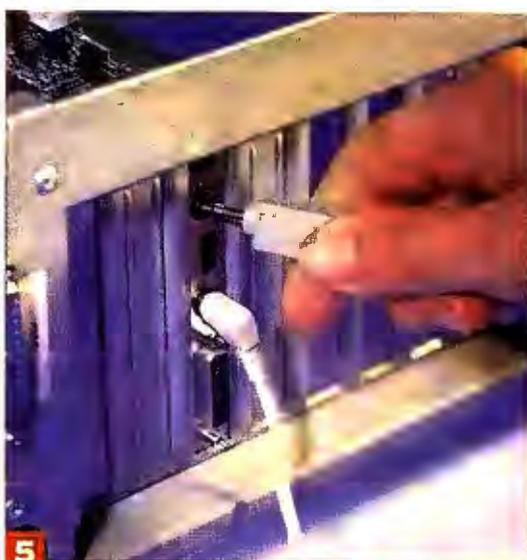
Check the jumpers. Some sound boards still make you set jumpers manually before connecting CD-ROM drives—check your manual for details. If your CD-ROM drive is connected elsewhere or you don't have one, set the IDE jumper to Off.



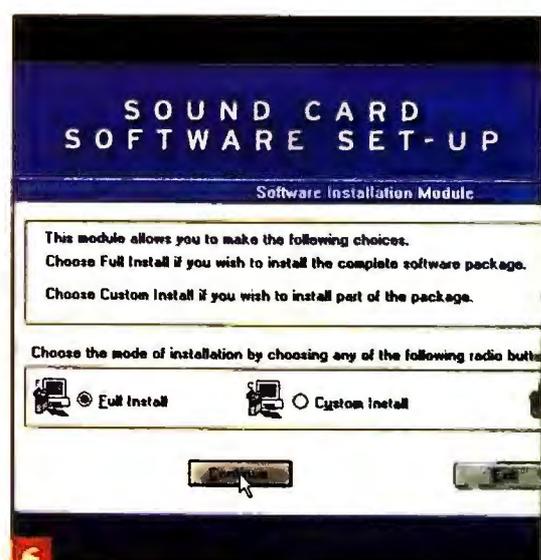
In with the new. Find a free slot (most sound boards use standard ISA slots). If you're connecting a CD-ROM drive to the sound board, use the slot closest to the drive. Carefully insert the board in the slot, and tighten the screw that holds the board in.



Connect the CD-ROM and audio cables. Attach a CD-ROM drive to the sound board by connecting the ribbon cable to the board's connector (top). Connect the audio cable to the CD-ROM drive and the sound board. (Some drives need special audio cables.)



Connect the peripherals. Connect the speaker cable to the rear of the sound board. Then connect your microphone (if any). Most sound boards also have jacks for connecting audio-in, MIDI, and other specialized devices—check your sound board's manual.



Install the software. Turn your PC on. With Windows 3.x, install the software manually. (You may need your original Windows disks.) Win 95 should sense the new board and ask you for the installation disks. If everything works, put the PC's cover back on. ■

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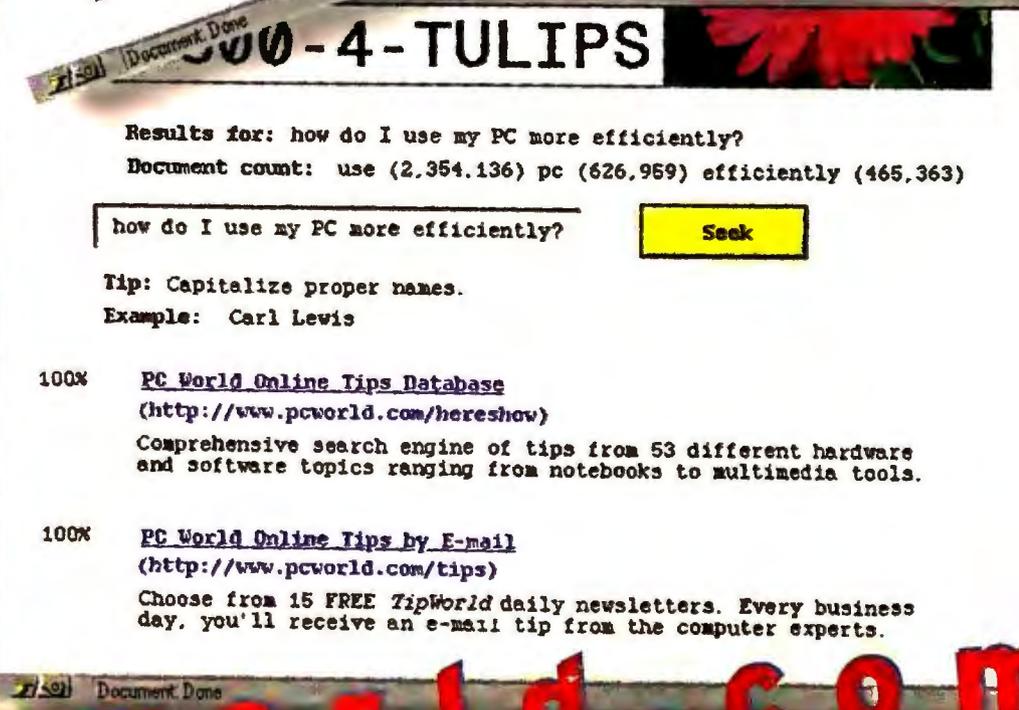
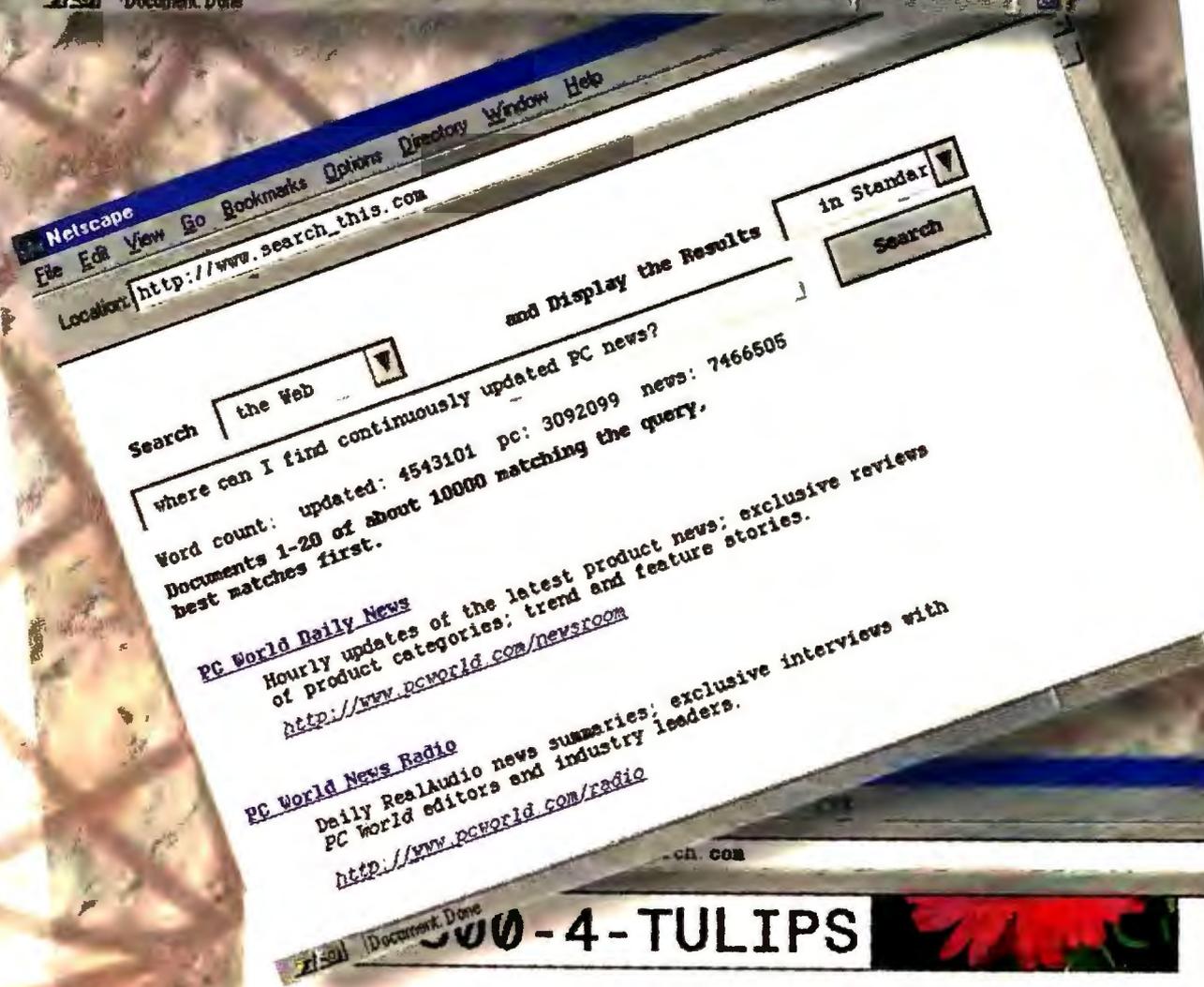
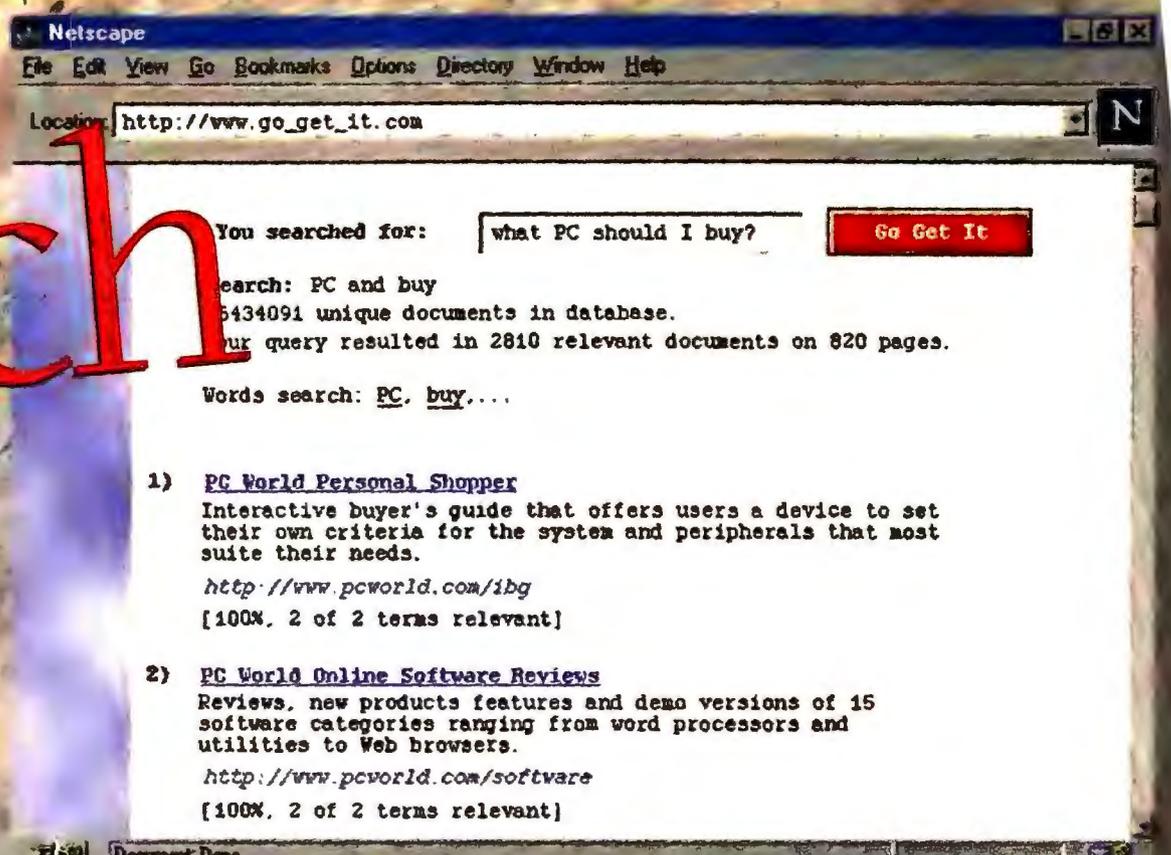
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Apiva 700 Series (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Apiva A Series (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Apiva C Series (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Apiva M Series	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 330 Models 6571-6576	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 330 Model 6577 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 340 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 350 Model 6587 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 730 Model 6877 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 750 Models 6885-6886 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 750 Model 6887 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC Server 310 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC Server 500 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PS 1, 30 Pin Simms	1Meg/4Meg	12/39
PS 1, 72 Pin Simms	4Meg/8Meg/16Meg/32Meg	49/79/139/249
PS 2, 55SX, 65SX	4Meg	49/79
PS 2, 53, 53LS, 56, 57	4Meg/8Meg	49/79
PS 2, 95XP (ECC, pairs)	4Meg/8Meg	49/79
PS 2 Server, 95, 195, 295 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249

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Compaq Contura Aero	— \$109.00
Compaq Contura 410, 420, 430	— \$109.00
Epson ActionNote 800, 866C, 880C	— \$134.00
NEC Versa E, V	— \$119.00
NEC Versa S	— \$119.00
Toshiba 610 and 400	— Cali
Toshiba 1900, 1910, 1950, 1960	— \$119.00
Toshiba 2400, 4700, 4800, 4900	— \$119.00
Toshiba 2100 Series	— \$121.00

CACHE MEMORY

8Kx8	12NS	15NS	20NS	25NS
32Kx8 (3.3V)	9.00	4.50	6.00	4.00
64Kx1	11.00	9.00	8.00	8.00
64Kx4	11.00	9.00	8.00	8.00
64Kx8	15.00 (5V)	19.00 (3.3V)	19.00	19.00
128Kx8	29.00	26.00	24.00	24.00
32x8 SDRAM	12.00	11.00	9.00	9.00

CACHE MODULES

256K (160 pin) Pipeline Burst Cache Module	\$22.00
512K (160 pin) Pipeline Burst Cache Module	\$39.00
256K (160 pin) Async Cache Module compatible with IBM Aptiva	\$59.00
256K (160pin) Async Coast Module	\$29.00

Individual D-RAM Chips

MEMORY FOR IBM & APPLE	60NS	70NS	80NS	100NS
1Meg x1	19.00	4.00	2.00	2.00
1Meg x1	19.00	16.00	17.00	—
1Meg x1 (2p Pin)	12.00	12.00	12.00	—
256K (Page Dip)	7.25	6.75	6.50	5.95
256K (Static Dip)	—	9.95	—	—
256K (Page Zip)	9.25	9.00	8.95	—
256K (Video Zip)	—	10.95	9.95	7.95
256K SDRAM	12.00	11.00	—	—
256x16 SDRAM	39.00	29.00	—	—
256x16 SDJ Edo	39.00	—	—	—
256x16 Video Zip	49.00	39.00	—	—

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80287-XL	49.00
80387-DX (Does All)	49.00
80487-SX (Does All)	183.00
Intel SX (Does All)	49.00
Intel SL Mobil	39.00

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256 x 9	40NS	50NS	60NS	70NS	80NS	100NS
1Meg x 9 (3 chip)	6.00	—	16.00	13.00	13.00	5.00
1Meg x 9 (9 chip)	—	—	22.00	19.00	14.00	14.00
4Meg x 9	—	—	41.00	39.00	39.00	—
16Meg x 9 (9 chip)	—	—	179.00	169.00	169.00	—

72 PIN SIMMS (FPM, EDO)

256 x 36 1 mg	60NS	70NS	80NS
512 x 36 2 mg	19.00	19.00	19.00
1 meg x 36 4 mg	36.00	34.00	34.00
2 x 36 8 mg	44.00	39.00	39.00
4 x 36 16 mg	74.00	69.00	69.00
8 x 36 32 mg	124.00	119.00	119.00
16 x 36 64 mg	249.00	244.00	244.00
32 x 36 128 mg	699.00	689.00	689.00
1 x 32 4 mg	34.00	29.00	29.00
2 x 32 8 mg	54.00	49.00	49.00
4 x 32 16 mg	109.00	104.00	104.00
8 x 32 32 mg	199.00	189.00	189.00
16 x 32 64 mg	509.00	499.00	499.00
1 x 32 4 mg EDO	29.00	29.00	—
2 x 32 8 mg EDO	54.00	49.00	49.00
4 x 32 16 mg EDO	109.00	104.00	104.00
8 x 32 32 mg EDO	199.00	189.00	189.00

DIMMS (168 pin)

256 x 36 1 mg	60NS	70NS	80NS	APPLE	8Meg	59.00
512 x 36 2 mg	19.00	19.00	19.00	1 x 64	16Meg	111.00
1 meg x 36 4 mg	36.00	34.00	34.00	2 x 64	32Meg	225.00
2 x 36 8 mg	44.00	39.00	39.00	4 x 64	64Meg	449.00
4 x 36 16 mg	74.00	69.00	69.00	16x64	128Meg	1995.00
8 x 36 32 mg	124.00	119.00	119.00			
16 x 36 64 mg	249.00	244.00	244.00	DELL, OPTILEX, GXPRO 200	3.3V ECC, EOD	106.00
32 x 36 128 mg	699.00	689.00	689.00	3.3V ECC, EOD	16Meg	209.00
1 x 32 4 mg	34.00	29.00	29.00	3.3V ECC, EOD	32Meg	329.00
2 x 32 8 mg	54.00	49.00	49.00	3.3V ECC, EOD	64Meg	709.00
4 x 32 16 mg	109.00	104.00	104.00			
8 x 32 32 mg	199.00	189.00	189.00	DELL & GATEWAY		
16 x 32 64 mg	509.00	499.00	499.00	3.3V SDRAM	8Meg	100.00
1 x 32 4 mg EDO	29.00	29.00	—	3.3V SDRAM	16Meg	200.00
2 x 32 8 mg EDO	54.00	49.00	49.00	3.3V SDRAM	32 Meg	448.00
4 x 32 16 mg EDO	109.00	104.00	104.00			
8 x 32 32 mg EDO	199.00	189.00	189.00			

ECC SIMMS

Pentium Pro 72 Pin (install in pairs) / SIMMS	159.00	64Meg	2349.00
16Meg	319.00	128Meg	4628.00

AST MEMORY

Advantage 610, 810, 816	4Meg/8Meg/16Meg/32Meg/64Meg	39/78/124/248/469
Advantage Adventure 4000	4Meg/16Meg	39/124
Advantage Adventure 6000	4Meg/8Meg/16Meg/32Meg/64Meg	39/78/124/248/469
Advantage Adventure 8000	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Advantage Pro 488 SX33, SX25	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Bravo LC 5100, 5133, 5166 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	39/69/144/249
Bravo MS 5100, 5133, 166 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	39/69/144/249
Bravo M-T 6150 (pairs)	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Mantana LT, V (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/124/229
Premia 4/25, 4/20, MTE 433 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/124/229
Premia 4/660, SE 433, 4/66 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/124/229
Premia LX P/60, MX 4/66, P75	4Meg/8Meg/16Meg/32Meg	34/59/119/219

NEC MEMORY

Ready 5010, 7010, 7020, 9010, 9022 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Ready 9510, 9520, 9532, 9530, 9532 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Ready V22 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	39/69/124/249
Image P60, P90, O, P100E (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/124/249

HEWLETT PACKER MEMORY

Netserver 486LC-5/133LC (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/129/249
Netserver LH 486SX33 - 486DX266	4Meg/8Meg/16Meg/32Meg	49/79/129/249
Netserver LH Plus 5/133, 5/166 (EOD, ECC)	16Meg/32Meg/64Meg/128Meg	Call
Netserver 4/33ML - 5/100ML (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/249
Netserver 5/15LS - 5/133LS (4 pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/249
Pavilion 5010-710 (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/129/249
Vectra 500 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra VA 6/190, 6/200 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra V22 9715 - 5/133 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra XA 6/180, 6/200 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra XM4 Series	4Meg/8Meg/16Meg/32Meg	49/79/139/269

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Thinkpad 340, 345, 355, 360, C, CE	4Meg/8Meg/16Meg	49/109/189
Thinkpad 365C, CS, CD, E, EO	4Meg/16Meg	79/209
Thinkpad 365X, 365XD	8Meg/16Meg/32Meg	109/189/339
Thinkpad 500, 510G05	4Meg/8Meg/16Meg	109/192/219
Thinkpad 500, 510G05	4Meg/8Meg/16Meg/32Meg	149/192/339
Thinkpad 700, 720, 750, CL57SX	4Meg/8Meg/16Meg/32Meg	49/109/183/279
Thinkpad 701, 701C	4Meg/8Meg/16Meg/32Meg	69/109/169/249
Thinkpad 730T, TE	4Meg/8Meg/16Meg	49/109/189
Thinkpad 755C, CE, CD, CS	4Meg/8Meg/16Meg/32Meg	49/109/179/339
Thinkpad 760C, CD, L, LD	4Meg/8Meg/16Meg/32Meg	99/179/339
Thinkpad 760E, ED, EL, ELD	8Meg/16Meg/32Meg	109/189/339

COMPAQ MEMORY MODULES

Deskpro 486/25, 33L, 50L	2Meg/8Meg/32Meg	39/99/249
Deskpro 3251, 331, 42/515, 661	2Meg/4Meg/8Meg	39/69/89
Deskpro 386, 486 M Series	2Meg/4Meg/8Meg	39/69/89
Deskpro M Series Expansion Board	DK (no memory)	119.00
Deskpro 450, 4100, 575, 590, 5100, 5133	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Deskpro 575, 5120, 5133, 5150, 5160 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/139/249
Deskpro 2000, 4000, 6000 Series (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/139/249
Deskpro 5/60M, 5/66M, XE560 (quads)	2Meg/4Meg/8Meg/16Meg	39/49/69/139/239
Deskpro XL (pairs)	4Meg/8Meg/16Meg/32Meg	39/49/69/139/239
Deskpro XL, 6150, 6200 (ECC, pairs)	8Meg/16Meg/32Meg/64Meg, 128Meg	Call
Prosignia 510, 520, 524, 660, 720, 724, 860	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Prosignia 920, 924, 954, 974, 978, 992	4Meg/8Meg/16Meg/32Meg	34/59/109/219

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635T	133MHz	12.1" Active	16MB/1.3GB	Opt.	3999*

* Includes Windows for Workgroups or Windows 95

TOSHIBA



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430CDS	120MHz	11.3" Dual Scan	16MB/1.2GB	10X	2499
420CDT	100MHz	11.3" Active	8MB/1.2GB	6X	2899
430CDS	120MHz	11.3" Active	16MB/1.2GB	10X	3399



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- 120 & 133MHz processors
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500CS	120MHz	12.1" Dual Scan	16MB/1.3GB	Opt.	\$2499
510CDS	133MHz	12.1" Dual Scan	16MB/1.2GB	10X	3699
500CDT	120MHz	12.1" Active	16MB/1.3GB	6X	4167
510CDT	133MHz	12.1" Active	16MB/2.1GB	10X	4999

IBM



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760EL	100MHz	11.3" Dual Scan	8/810MB	Opt.	\$3399
760ED	133MHz	12.1" Active	16MB/1.2GB	4X	5399
760E	150MHz	12.1" Active	16MB/2.1GB	Opt.	5699
760ED	133MHz	12.1" Active	16MB/2.1GB	6X	5999

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Model	CPU	Screen	RAM/HD	CD	Price
365XD	100MHz	10.4" Dual Scan	8/810MB	4X	\$1999
365X	120MHz	10.4" Active	8/810MB	Opt.	2299
365XD	120MHz	10.4" Active	8/810MB	4X	2499
365XD	133MHz	11.3" Active	8MB/1.4GB	6X	3499

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digital



Digital HiNote VP 500

HiNoteVP & VP 500

Model	CPU	Screen	RAM/HD	CD	Price
HiNoteVP	120MHz	11.3" Dual Scan	8MB/1.08GB	Opt.	\$1499
VP 500	120MHz	11.3" Dual Scan	8MB/1.08GB	6X	2449
VP 500	120MHz	11.3" Active	8MB/1.08GB	6X	2949
VP 500	133MHz	12.1" Active	8MB/1.44GB	6X	3599

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Ultra II	150MHz	11.3" Active	16MB/1.44G	Opt.	4659*
Ultra II	133MHz	11.3" Active	16MB/1.35GB	Opt.	4699**
Ultra II	150MHz	11.3" Active	16MB/1.44G	Opt.	4799

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LTE 5000

Model	CPU	Screen	RAM/HD	CD	Price
5250	120MHz	10.4" Active	16/810MB	Opt.	\$3169
5280	120MHz	11.3" Active	16MB/1.35GB	Opt.	3859
5300	133MHz	12.1" Active	16MB/1.35GB	Opt.	4349
5380	133MHz	12.1" Active	16MB/2.2GB	Opt.	5439
5400	150MHz	12.1" Active	32MB/2.2GB	Opt.	5539

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5-Year TAP Warranty... \$459.97



LTE 5000

Model	CPU	Screen	RAM/HD	CD	Price
1020	120MHz	11.3" Dual Scan	16MB/1GB	6X	\$2799

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Model	CPU	Screen	RAM/HD	CD	Price
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9080	133MHz	12.1" Active	16MB/1.3GB	6X	4499

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Model	CPU	Screen	RAM/HD	CD	Price
W100D	133MHz	11.2" Wide Dual Scan	16MB/1.1GB	Opt.	\$2999
W100T	133MHz	11.2" Wide Active	16MB/1.1GB	Opt.	3499

SUPER LIGHT MODEL

NEC



NEC Versa 6030X

Versa 6000

Model	CPU	Screen	RAM/HD	CD	Price
6010H	133MHz	11.3" Active	16MB/1.08GB	6X	\$3649
6030H	133MHz	12.1" Active	16MB/1.3GB	6X	4999
6030X	133MHz	12.1" Active	16MB/1.4GB	6X	5399

Versa 4200

Model	CPU	Screen	RAM/HD	CD	Price
4200	100MHz	10.4" Active	8/810MB	Opt.	\$2999
4230	133MHz	10.4" Active	8MB/1.0GB	6X	3899

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Hitachi Mx Notebook

Hitachi E™

Model	CPU	Screen	RAM/HD	CD	Price
E100D	100MHz	11.3" Dual Scan	16/810MB	Opt.	\$1799
E133DN	133MHz	11.3" Dual Scan	16/1.08GB	Opt.	1999
E133T	133MHz	11.3" Active	16/810MB	Opt.	2599

Hitachi Mx™

Model	CPU	Screen	RAM/HD	CD	Price
MX133T	133MHz	12.1" Active	16MB/1.35GB	8X	\$3999
MX150T	150MHz	12.1" Active	16MB/2.1GB	8X	4699

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Extensa 600

Model	CPU	Screen	RAM/HD	CD	Price
600CD	120MHz	12.1" Dual Scan	8/810MB	6X	\$1819

TravelMate 6000

Model	CPU	Screen	RAM/HD	CD	Price
6020	120MHz	11.3" Active	8MB/1.08GB	Opt.	\$3199
6030	133MHz	12.1" Active	16MB/1.35GB	Opt.	3699
6050	150MHz	12.1" Active	16MB/1.35GB	Opt.	3899
6050NT	150MHz	12.1" Active	32MB/2.1GB	10X	4699*

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Ascentia P

Model	CPU	Screen	RAM/HD	CD	Price
A41	120MHz	11.3" Dual Scan	16MB/1.0GB	6X	\$2199
A42	120MHz	12.1" Active	16MB/1.0GB	6X	2799
P50	133MHz	12.1" Active	24MB/1.0GB	6X	3899*
P50	133MHz	12.1" Active	24MB/2.1GB	6X	4299*

Ascentia J

Model	CPU	Screen	RAM/HD	CD	Price
J20	100MHz	11.3" Dual Scan	8/810MB	Opt.	\$1299
J55	133MHz	11.3" Active	16MB/1.0GB	Opt.	2399

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Olivetti Echos Notebook

Echos

Model	CPU	Screen	RAM/HD	CD	Price
Echas	100MHz	11.3" Dual Scan	8MB/1.3GB	6X	\$1999
Echas	100MHz	10.4" Active	8MB/1.3GB	6X	2299
Pra	133MHz	12.1" Dual Scan	16MB/1.3GB	8X	3499
Pra	133MHz	12.1" Active	16MB/2GB	8X	3999
Pra	150MHz	12.1" Active	16MB/2GB	8X	4999

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HP OmniBook 800 Notebook PC

HP OmniBook 800

Model	CPU	Screen	RAM/HD	CD	Price
800CS	100MHz	10.0" Dual Scan	16/810MB	Opt.	\$2449
800CT	133MHz	10.4" Active	16MB/1.4GB	Opt.	4279

HP OmniBook 5500

Model	CPU	Screen	RAM/HD	CD	Price
5500CTS	120MHz	10.4" Active	16MB/1.35GB	Opt.	\$3129
5500CTS	133MHz	12.1" Active	16MB/1.35GB	Opt.	4029
5500CTS	133MHz	12.1" Active	16MB/2GB	Opt.	4379

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S66	166MHz	16MB/3.2GB	8X	2169*
S74	200MHz	16MB/2.5GB	8X	2229
S78	200MHz	16MB/3.5GB	8X	2499*

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Model	Size	View	Resolution	Price
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4712	166MHz	24MB/2.5GB	6X	1899
4716	200MHz	32MB/2.5GB	8X	2199

Presario Monitors

Model	Size	View	Resolution	Price
Presario	14"	12.9"	1024 x 768	\$399
Presario	15"	13.5"	1024 x 768	479
Presario	17"	15.6"	1280 x 1024	749

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Model	CPU	RAM/HD	CD	Price
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7360	200MHz	32MB/3.8GB	16X	2499

Monitors priced separately

TOSHIBA

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PENTIUM

Model	CPU	RAM/HD	CD	Price
7130	133MHz	16MB/1.6GB	8X	\$1299
7160	166MHz	16MB/2.1GB	8X	1599
7200	200MHz	16MB/3.0GB	8X	2199

Infinia Monitors

Model	Size	View	Resolution	Price
Infinia	15"	13.78"	1280 x 1024	\$459
Infinia	17"	16.23"	1280 x 1024	759

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9404	200MHz	16MB/2.0GB	8X	1999

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SDT-7000 DDS-2 DAT internal	919.00

SyQuest

EZ135 135MB IDE internal	119.23
EZ135 135MB SCSI external	119.23
EZ135 135MB external	119.23
EZ135 135MB cartridge	19.99
EZFlyer 230MB SCSI external	291.47
EZFlyer 230MB external	291.47
EZFlyer 230MB cartridge	29.39

MULTIMEDIA

ADS Cadet AM/FM stereo data receiver	66.15
ADS TV Superscan 2 PC to TV converter	291.13
Connectix QuickCam for Windows	97.36
Connectix Color QuickCam for Windows	222.66
EXP 8X CD w/game port PCMCIA	377.51
EXP 8X CD w/sound module PCMCIA	498.84
Microsolutions 4X CD parallel	219.67
Microsolutions 6X CD w/sound parallel	357.76
Microsolutions 8X CD parallel	337.55
NEC 4X 4X CD 7-disc changer external	354.60
NEC 6X 6X CD external	243.82
NEC 6X 6X CD internal	335.65
NEC 8X 8X CD internal IDE	151.71
NEC 8X 8X CD internal SCSI-2	341.76
NEC 8X 8X CD external SCSI-2	449.51
Panasonic portable 4X CD SCSI	399.00
Sony portable 4X CD Discman	302.98
SunMoonStar 8X CD internal IDE/ATAPI	135.24
SunMoonStar 8X CD portable	271.88

INPUT DEVICES

Alps Desktop GlidePoint	66.86
Alps GlidePoint Windows 95 keyboard	95.58
Calcomp Drawing Slate II 6x9 w/pressure pen	195.34
Calcomp Drawing Slate II 12x12 w/pressure pen	217.66
Epson PhotoPC digital camera	399.00
Epson ActionScanning System II	376.41
Epson ES1000C color scanner	572.37
Epson ES1200C Pro color scanner	1138.56
Hewlett Packard ScanJet 4s	198.41
Hewlett Packard ScanJet 4p	499.90
Hewlett Packard ScanJet 4c	857.90
Kodak DC20 Digital Science Camera	299.00
Kodak DC25 Digital Science Camera	499.00
Kodak DC50 Digital Science Camera	899.00
Logitech MouseMan 96	55.51
Logitech Cordless MouseMan 96	61.22
Logitech SurfMan Internet controller	84.58
Logitech TrackMan Marble	84.76
Logitech PageScan Color Pro scanner	307.76
Microtek PaperViz compact scanner	98.17
Microtek ScanMaker E3 color flatbed	309.26
Microtek ScanMaker E6 std. color flatbed	556.72
Microtek ScanMaker 35t Plus	731.66
Play Snappy video still capture	195.97
Umax PageOffice Color scanner	239.88
Umax Vista-S6E scanner	292.93
Umax Vista-S12 scanner	712.10
Visioneer PaperPort Vx scanner	277.21
Visioneer PaperPort Ix scanner	304.36

MONITORS

Mag Innovision DX1595 PnP 15" 28mm	349.28
Mag Innovision DX1795 PnP 17" 28mm	612.61
Mag Innovision DX15T 15" 28mm	394.49
Mag Innovision DX1795E 17" 28mm	529.00
Mag Innovision MXP17F 17" 28mm	713.22
Magnavox CM2099 14" 28mm	244.24
Magnavox CM2015 15" 28mm	299.87
Magnavox CM1215 15" 28mm	316.80
Magnavox 107B 17" 28mm	602.55
Magnavox 20CM64 20" 31mm	849.00
NEC XV15+ 15" 28mm	473.13
NEC XV17+ 17" 28mm	759.05
NEC XE21 21" 28mm	1705.69
NEC XP21 21" 28mm	1943.57
Sony Multiscan 15sx 15" PnP 25mm	369.34
Sony Multiscan 15sll 15" PnP 25mm	439.58
Sony Multiscan 17sfl 17" PnP 25mm	729.23
Sony Multiscan 17sell 17" PnP 25mm	929.76
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ViewSonic 15G511 15" 27mm	259.49
ViewSonic 17G5 17" 27mm	616.79
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ViewSonic P810 21" 25mm	1472.44
ViewSonic P815 21" 25mm	1653.43
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ATI Graphics Xpression PCI 2MB	93.68
ATI Graphics Xpression ISA 2MB	95.87
ATI Graphics Pro Turbo PCI 2MB	175.28
ATI Video Xpression PCI 2MB	83.27
Diamond Stealth 3D 2000XL 4MB PCI	176.43
Diamond SpeedStar64 2200 2MB ISA	94.84
Matrox Millennium PCI 2MB VRAM	182.31
Matrox Millennium PCI 4MB VRAM	251.15
Matrox Mystique PCI 2MB VRAM	167.71

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Intel OverDrive Pentium 150MHz upg for 5/90	319.20
Intel OverDrive Pentium 166MHz upg for 5/100	456.23

PC CARDS

3Com Etherlink IIIC	135.44
3Com Etherlink III 28.8 Enet 10BT	339.85
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P50 5/133 8MB 1.2GB 11.3" active 4X CD	3236.67
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Smartlabel Pro	229

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Bravo MS-T, P-133 1.2G 16M	1429
Bravo MS-T, P-200, 2G 16M	2199
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Deskpro 2000 P-100 1.2G 8M	1149
Deskpro 2000 P-166, 1.2G 8M	1651
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Deskpro 4000 P-120, 1.6G 16M	1528
Deskpro 4000 P-133, 1.6G 16M	1649
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See Compaq Server Listings Below	
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PC350 P-100 1.2GB 16M	1349
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PC750, P-166, 1.2G 16M	2039
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Manhattan CP, PP-200, 2G, 64M	8649
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Prosignia 300, P-120, 2.1G, 16M	2463
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Ascentia J50 P-133 8/800M 10.4" TFT	2419
Ascentia P30 P-100 1.2G 8M 4xCD 11.3 Dual	2259
Ascentia P50 P-133 1.2G 8M 4xCD 11.3 Act	3499
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Lie 5380 P-150 32M/2.16G 12.1" Act Cir	5577
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C120T P-120 1GB 8M 11.8" TFT	2695
E100D P-100 810M 8M 11.3" Dual	1798
E133DN P-133 1G 16M 11.3" Dual	1968
E133T P-133 810M 16M 11.3" TFT	2589
M133T P-133 1G 16M 11.8" TFT 6xCD	2968
IBM	
365XD P-120 1.08G 8M 11.3" Dual	2499
365X P-133 1.08G 8M 11.3" Dual	2503
560 P-100 810M 8M 11.3" Dual Scan	2598
560 P-120 810M 8M 12.1" TFT	3629
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650CT P-133 1.2G 16M 11.3" Active	3939
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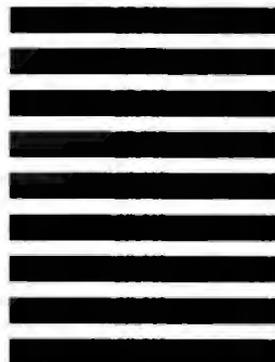
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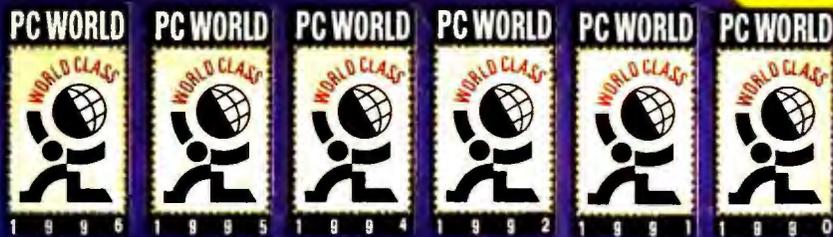
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1103	Pentium/133	SENS 810 P-133	16MB/1.3GB	3599
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16Bit ISA Bus Master Advansys (ABP5140)	\$95
32Bit PCI Bus Master Advansys (ABP940)	\$125
32Bit PCI PIO Adaptec (A2920KIT)	\$149
32Bit PCI Bus Master Adaptec (A2930KIT)	\$179

5 - CHOOSE YOUR BLANK MEDIA

5 Pack (CDR74-5)	\$40
20 Pack (CDR74-20)	\$149
50 Pack (CDR74-50)	\$359
100 Pack (CDR74-100)	\$699
300 Pack CDR Labels, template software, and applicator	\$59

• CD RECORDERS •

These COMPLETE KITS include drive, controller, software, and 1 recordable CD disk. Smart Storage Solutions kit includes 5 FREE recordable CD disks!

Smart Storage Solutions	2X Write 4X Read	\$499
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Smart & Friendly	2X Write 4X Read	\$529
Teac	4X Write 4X Read	\$829
Smart Storage Solutions	4X Write 4X Read	\$889
Yamaha	4X Write 4X Read	\$819

• CD ROM DRIVES •

SCSI

Brand	Spin	Model	Speed	Int	Ext
NEC	4X	CDR222	200ms	\$99	\$189
Plextor	6X	PX63CS	145ms	\$269	\$359
Philips	8X	PC80S	195ms	\$225	\$325
NEC	8X	CDR1410	145ms	\$219	\$309
Plextor	8X	PX83CS	115ms	\$339	\$429
Pioneer	10X	DRU10XSCSI	140ms	\$225	\$315
Plextor	12X	PX12TS	105ms	\$319	\$409
Plextor	12X	PX12CS	105ms	\$349	\$439

ATAPI IDE

Brand	Spin	Model	Speed	Int	Int kit
NEC	8X	CDR1400	140ms	\$110	\$140
Mitsumi	8X	CRMCFXB00	150ms	\$110	\$140
Acer	10X	AC910A	150ms	\$125	\$155
Pioneer	10X	DRA10X	140ms	\$135	\$165
Lite On	12X	LTN126A	155ms	\$129	\$159
Acer	12X	AC612A	125ms	\$149	\$179
CyberDrive	12X	CYBER12X	150ms	\$115	\$145
Mitsumi	12X	CRMCFX12X	150ms	\$175	\$205

IDE CD ROM CHANGER

NEC	4X	CDR4X4	4 Disk	250ms	\$99
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SCSI CD ROM CHANGERS

Nakamichi	8X	MJ48S	4 Disk	150ms	\$399
Pioneer	4.4X	DRM-624X	6 Disk	190ms	\$359

• TAPE DRIVES •

QIC MINICARTRIDGE (SAVE \$10 with hard drive purchase)

Includes DOS/Win backup software and 1 free tape.

800MB Seagate	TST800R	\$119
3.2Gig Seagate	TST320ORFT	\$215

PRINTER PORT MINICARTRIDGE

Includes DOS/Win backup software.

800MB Seagate	TST800RP	\$160
3.2Gig Seagate	TST320ORP	\$259

IDE or SCSI TRAVAN (SAVE \$10 with hard drive purchase)

Includes DOS/Win backup software and 1 free tape.

4-8GB Seagate	TST8000(A)	\$379
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SCSI 4mm DAT

2GB Hewlett Packard	C1534AI	\$609
2-4GB Seagate	C4324RP	\$679
2-4GB Hewlett Packard	C1536AI	\$699
4-8GB Sony	SDT5000AI	\$809
4-8GB Seagate	C4326NP (DDS2)	\$859
4-8GB Hewlett Packard	C1533AI	\$929

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48-96GB Seagate	C4586NP 12 tape autoloader		\$2399

SCSI 8mm DAT

3.5-7GB ExaByte	EXB8205XL	\$1269
7-14GB ExaByte	EXB8505XL	\$1889
7-14GB ExaByte	EXB8700LT	\$1029
20-40GB ExaByte	EXB8900	\$5499
70-140GB ExaByte	EXB10H 10 tape autoloader	\$5439

SCSI DLT 20-40GB Quantum DLT4000 \$4699

BACKUP SOFTWARE (SAVE \$10 with hard drive purchase)

NovaStor's NovaBack CD contains software for DOS, Win 3.1, Win 95, OS/2, Warp, and Macintosh	\$79
NovaStor's NovaDisk CD contains software to backup to disk drives and removables	\$79
Seagate Arcada for Windows NT (call for netware version) workstation/single server/enterprise	\$239/499/869
TAPEDISK, allows DAT drive to be used as hard drive under DOS/Win 3.1, Win 95	\$189

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• IDE HARD DRIVES •

IDE	Speed	RPM	Brand	Model	Wty	Price
540MB	14ms	3600	Seagate	ST3541A	3	\$139
631MB	14ms	3600	Seagate	ST3630A	3	\$145
850MB	10ms	4500	Western Digital	WDAC28B50	3	\$165
850MB	14ms	3600	Seagate	ST3851A	3	\$155
1200MB	10ms	5400	Fujitsu	M1636T	3	\$195
1275MB	12ms	4500	Seagate	ST31276A	3	\$189
1280MB	11ms	4500	Quantum	TM31280A	3	\$195
1281MB	11ms	5200	Western Digital	WDAC21200	3	\$199
1330MB	12ms	4480	Maxtor	M71336A	3	\$195
1623MB	14ms	3600	Seagate	ST31621A	3	\$212
1624MB	10ms	5200	Western Digital	WDAC21600	3	\$219
1670MB	11ms	4480	Maxtor	M71670A	3	\$215
1700MB	10ms	5400	Fujitsu	M1623T	3	\$215
1700MB	12ms	4500	Seagate	ST31720A	3	\$215
1700MB	11ms	4500	Quantum	SR31700A	3	\$219
2004MB	11ms	4480	Maxtor	M72004A	3	\$255
2100MB	11ms	5200	Western Digital	WDAC22100	3	\$265
2100MB	9ms	5400	Fujitsu	M1624T	3	\$249
2132MB	12.5ms	4500	Seagate	ST32132A	3	\$270
2168MB	10.5ms	4500	Quantum	TM32160A	3	\$259
2500MB	9ms	5400	Fujitsu	M1638T	3	\$259
2550MB	15ms	3600	Quantum	BF2500A	3	\$242
2559MB	11ms	5200	Western Digital	WDAC32500	3	\$275
2560MB	11ms	5400	Seagate	ST5250A	3	\$292
2700MB	12ms	4480	Maxtor	M72700A	3	\$305
3166MB	12ms	5200	Western Digital	WDAC33100	3	\$325
3254MB	10.5ms	4500	Quantum	TM33200A	3	\$325
3500MB	12ms	4480	Maxtor	MB3500A	3	\$419
3840MB	10.5ms	4500	Quantum	TM33840A	3	\$389

• SCSI HARD DRIVES •

SCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31055N	3	\$349	\$409
1280MB	12ms	4500	Quantum	TM31280S	3	\$279	\$339
2050MB	8.5ms	7200	Micropolis	MC4221	5	\$545	\$599
2050MB	8.5ms	7200	Micropolis	MC4221AV	5	\$600	\$660
2110MB	10.5ms	4500	Quantum	TM32110S	3	\$375	\$435
2147MB	9ms	5400	Micropolis	MC4421	5	\$369	\$429
2147MB	9ms	5400	Micropolis	MC4421AV	5	\$459	\$519
2147MB	8ms	7200	Seagate	ST32550N	5	\$729	\$789
2150MB	9ms	5400	Seagate	ST32155N	5	\$479	\$539
2150MB	8ms	7200	Seagate	ST32171N	5	\$739	\$799
3254MB	10.5ms	4500	Quantum	TM33200S	3	\$449	\$509
4294MB	8ms	7200	Seagate	ST15230N	5	\$885	\$945
4294MB	8ms	7200	Micropolis	MC3243	5	\$829	\$889
4294MB	8ms	7200	Micropolis	MC3243AV	5	\$885	\$945
4350MB	8ms	7200	Seagate	ST34371N	5	\$1145	\$1205
4400MB	8ms	7200	Fujitsu	M2954S	5	\$819	\$879
4550MB	8ms	7200	Quantum	XP34550S	5	\$999	\$1059
4550MB	7.9ms	7200	Micropolis	MC4345	5	\$999	\$1059
9080MB	11ms	5400	Seagate	ST410800N	5	\$1779	\$1879
9091MB	8.5ms	7200	Micropolis	MC3391	5	\$1799	\$1859
9100MB	12ms	5400	Micropolis	MC1991	5	\$1599	\$1699
9100MB	12ms	5400	Micropolis	MC1991AV	5	\$1699	\$1799
9100MB	9ms	7200	Seagate	ST19171N	5	\$2085	\$2145
9100MB	8ms	7200	Quantum	XP3900S	5	\$1599	\$1659

WIDE SCSI

1050MB	9ms	5400	Seagate	ST31055W	5	\$379	\$509
2050MB	8.5ms	7200	Micropolis	MC4221W	5	\$629	\$759
2050MB	8.5ms	7200	Micropolis	MC4221WAV	5	\$689	\$819
2150MB	9ms	5400	Seagate	ST32155W	5	\$529	\$659
2150MB	8ms	7200	Seagate	ST32171W	5	\$779	\$909
4294MB	8ms	7200	Micropolis	MC3243W	5	\$929	\$1059
4294MB	8ms	7200	Micropolis	MC3243WD	5	\$899	\$1029
4294MB	8ms	7200	Micropolis	MC3243WAV	5	\$1039	\$1169
4350MB	8ms	7200	Seagate	ST34371W	5	\$1189	\$1379
4550MB	8ms	7200	Quantum	XP34550W	5	\$999	\$1059
9091MB	8.5ms	7200	Micropolis	MC3391W	5	\$1999	\$2129
9100MB	11ms	5400	Seagate	ST410800W	5	\$2029	\$2219
9100MB	9ms	7200	Seagate	ST19171W	5	\$2149	\$2279
9100MB	12ms	5400	Micropolis	MC1991W	5	\$1699	\$1889
9100MB	12ms	5400	Micropolis	MC1991WAV	5	\$1839	\$2029
9100MB	8ms	7200	Quantum	XP3900W	5	\$1599	\$1659

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640MB Fujitsu (230MB backwards compatible)	\$555
650MB Toray 4xCD and 640MB Optical comb.	\$499
Call about Rebate (expires 12-31-96)	
2.6Gig Smart Storage Solutions	\$1649
2.6Gig Maxoptix	\$1699
2.6Gig Hewlett Packard	\$2199
52Gig Maxoptix (does not include free disks)	\$4549

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Internal SCSI/External SCSI	\$339/\$399
1.5Gig 1 free disk Internal SCSI/External SCSI	\$399/\$499
100MB Zip	
External SCSI with 1 disk/Ext Parallel with 1 disk	\$189/\$189
1 GB Jaz	
Internal SCSI with 1 disk/Ext SCSI with 1 disk	\$379/\$469

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Table listing desktop memory products with prices, including AST Computer, Compaq, Dell, and Gateway 2000.

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Table listing notebook memory products with prices, including AST, Canon, Compaq, Hewlett Packard, Hitachi, IBM, NEC, Olivetti, Sharp, Texas Instruments, Toshiba, and Zenith.

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Table listing printer memory products with prices, including Canon, Compaq, Hewlett Packard, and Lexmark.

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Table listing workstation memory products with prices, including Hewlett Packard, Silicon Graphics, and Sun.

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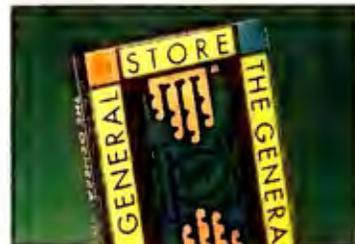
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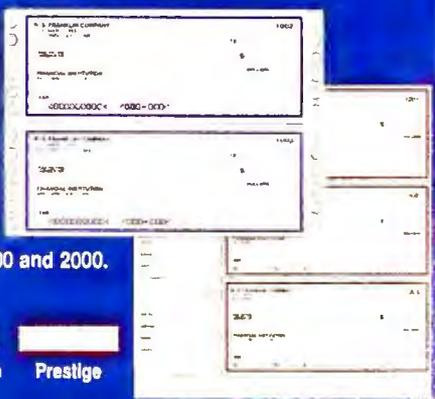
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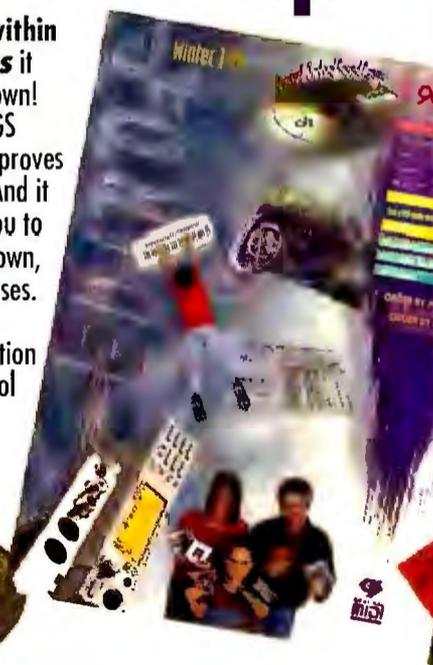
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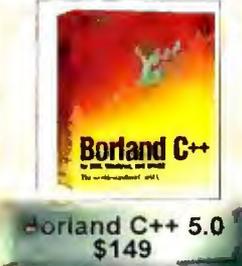
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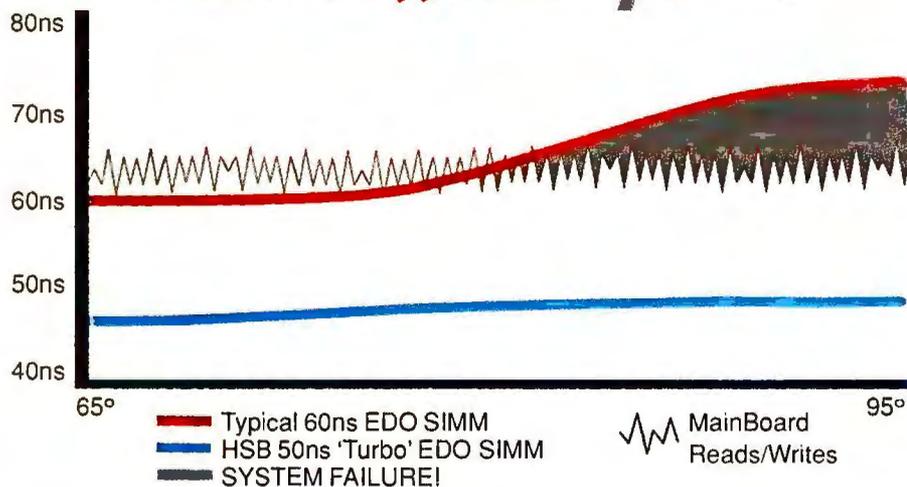
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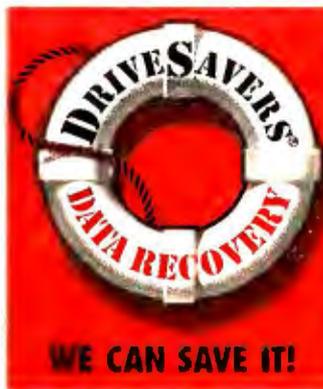
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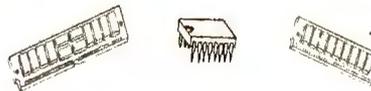
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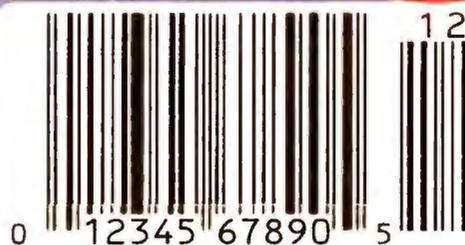
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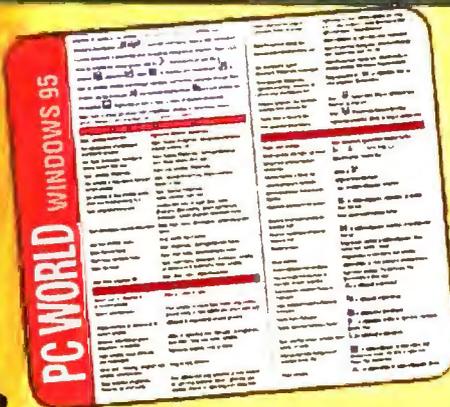
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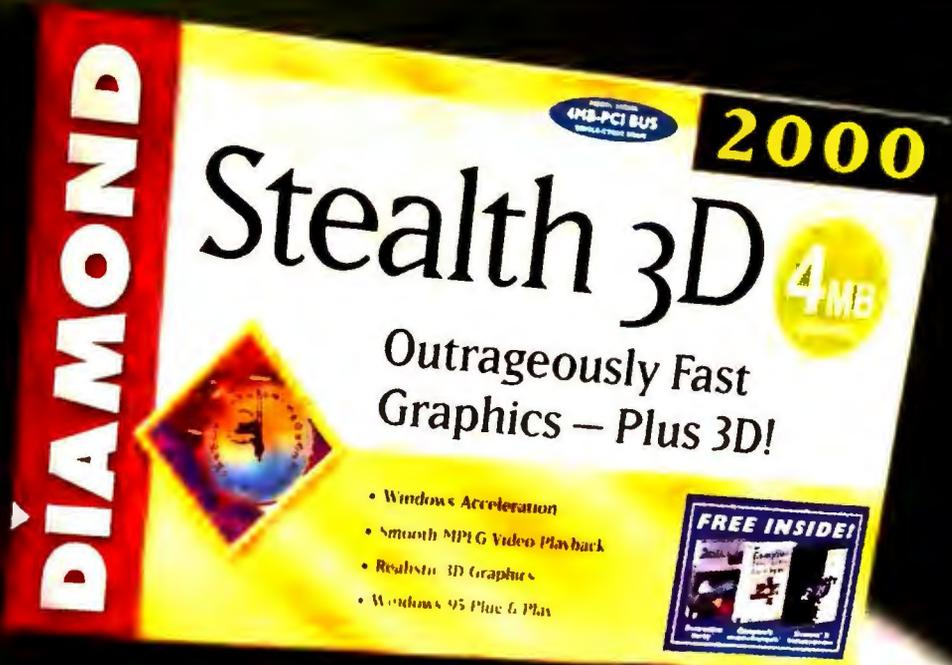
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Network Computer: Does Not Compute

THE SINGLE MOST TELLING THING I saw at last fall's Comdex was a demo of an early Java version of Corel's WordPerfect. It was running on a Sun Javastation, one of those much-heralded network computers (NC for short) that can't even boot up without a network connection. If you believe the hype, these devices will lead us into a bold new era of computing. I decided to see for myself.

"How do you print something?" I asked the demonstrator. Printing, he explained, was being worked on for the next version of Java.

"How about fonts?" I inquired. There were three for display and three for printing, he assured me, but Adobe was working with Sun to provide more—one of these days.

"So will this thing have all the features of the Windows version?" I asked. He explained that Corel was following "the 80-20 rule," where 80 percent of the people typically use only 20 percent of a program's features.

Conclusion: If all the hype about network computers worries you, relax. Unless you consider Bill Gates the devil incarnate, or your boss has swallowed the NC line, or you're shopping for a cheap e-mail and Web-browsing device for someone who will never need a real computer, chill out. The PC is still very much alive.



If all the hype about network computers worries you, relax. The PC is still very much alive.

SMART TERMINALS, FOOLISH CHOICES?

THE NETWORK COMPUTER STORY splits neatly into two camps. On the consumer side, NCs mean information appliances—cheap e-mail terminals built into telephones, and cheap Web browsers that use TV sets as displays. These devices have plenty of problems, largely because they coexist with an Internet that keeps adopting new standards they can't keep up with. But if you accept their limitations, they can do the jobs they're intended for. Nobody is likely to confuse them with real computers.

In the corporate world, that sort of confusion is intentional. Here, NCs are touted as a way to control burgeoning support

costs. But when you read the specs, the machines sound suspiciously like old-fashioned graphics terminals, with the ability to run Java programs tacked on.

Bill Gates must be experiencing waves of déjà vu, since much of Microsoft's earliest income came from selling versions of BASIC to run programs on so-called smart terminals. Shortly thereafter, PCs conquered the world by empowering users with better software than they could roll on their own or find on the mainframe. Smart terminals retreated into the shadows.

Still, they remained handy in special situations, as network computers may prove to be. At companies where a lot of people do a lot of data entry, NCs may well improve on current terminals, if only because they can run useful programs instead of just displaying screens.

But remember who's pushing these terminals: companies like IBM and Oracle that make big money selling big servers and programs that run on them. What's been cagily omitted from the NC debate is the fact that when you remove stuff from the workstation, you have to provide it somewhere else on the network.

With the NC, a hard disk is an extra-cost option, if you can get one at all. But when you don't have local storage, your machine is totally dependent on the network and the server. When the network's down, NC stands for *No Computing*. Guess what? The same outfit that sells you the NC will be delighted to sell you ways to increase network capacity and reliability.

And though the NC promises to be more dependable than the PC (at least when the network's working), it delivers nowhere near the same functionality. Printing? Fonts? Notebook models? Someday soon.

Or maybe not. The NC concept comes from the same folks who boasted a couple of years ago that video-on-demand service direct to our homes was just months away. Got it yet? Me neither.

Still, that video service may arrive long before you get an office-strength network computer on your desk. Until then, I suspect your networked computer, better known as a PC, will do just fine.

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



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— *Business Week,*
November 4, 1996 —

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