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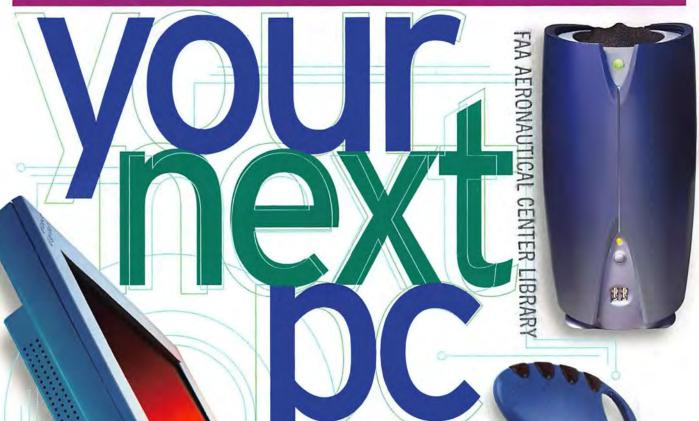
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128 MB 100 MHz SyncDRAM expandable to 384 MB	128 MB 100 MHz SyncDRAM expandable to 384 MB	64 MB SyncDRAM expandable to 384 MB	128 MB SyncDRAM expandable to 384 MB
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10X DVD-ROM Drive	10X DVD-ROM Drive	32X Max CD-ROM Drive	32X Max CD-ROM Drive
3Dfx Voodoo 3 3500 Graphics Card with 16 MB	Voodoo 3 1000 2X AGP Graphics Card with 16 MB	Voodoo 3 1000 2X AGP Graphics Card with 15 MB	Voodoo 3 1000 2X AGP Graphics Card with 16 MB
Sound Blaster Live! Value PCI Audio	Sound Blaster Live! Value PCI Audio	Sound Blaster Live! Value PCI Audio	ESS Solo PC Audio
6.0Mb Max Digital Modem <sup>5</sup>	56K ITU V.90 Modem	56K ITU V.90 Modem	56K ITU V.90 Modem <sup>7</sup>
JBL Pro Premium Speakers w/Subwoofer	Klipsch v.2-400 Watt Speaker System	Klipsch v.2-400 Watt Speaker System	JBL Pro Amplified Speakers
Digital Creativity Imaging Center	Digital Creativity Imaging Center	Digital Creativity Imaging Center	Digital Creativity Imaging Center
6.0 Mbps Home Phoneline Networking Card"	Microsoft Featured Home Collection	Microsoft Featured Home Collection	Microsoft Featured Home Collection
Microsoft Featured Home Collection + MS* Word	Microsoft Word	Microsoft Word	Microsoft Word
Microsoft Windows98	Microsoft Windows98	Microsoft Windows98	Microsoft Windows98
Compaq CV715 17" Monitor (16.0" VIA)	Compaq CV715 17" Monitor (16.0" VIA)	Compaq CV515 15" Monitor (13.8" VIA)	Compaq C V515 15" Monitor (13.8" VIA)
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4X CD-RW <sup>+</sup> and Klipsch 400 Watt Speakers: Add \$175	20.0 GE (7200 rpm) UltraDMA Hard Drive <sup>1</sup> : Add \$108	Intel PC Camera Pack USB: Add \$79	U750 Color Inkjet Printer: Add S149
Compaq CV915 19" Monitor (18.0" VIA): Add \$200	Compaq CV915 19" Monitor (18.0" VIA): Add \$200	Compaq CV715 17" Monitor (16.0" VIA): Add \$70	Compaq CV715 17" Monitor (16.0" VIA): Add \$70
Agfa Snap Scan USB Scanner: Add \$129	HOLIDAY PROMOTION: 4X CD-RW Drive": Add \$1°	HOLIDAY PROMOTION: 4X CD-RW Drive": Add S1	Intel PC Camera Pack USB: Add \$79

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64 MB SyncDRAM expandable to 192 MB	64 MB SyncDRAM	64 MB SyncDRAM expandable to 192 MB	64 MB SyncDRAM expandable to 192 MB
10.0 GB UltraDMA Hard Drive'	6.0 GB UltraDMA Hard Drive	6.0 GB UltraDMA Hard Drive	4.8 GB UltraDMA Hard Drive
6X DVD-ROM Drive*	6X DVD-ROM Drive*	24X Max CD-ROM Drive	24X Max CD-ROM Drive'
ATI Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI Mobility Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory
56K ITU V.90 Modem (PCI) <sup>3</sup>	56K ITU V.90 Modem (PCI)	56K ITU V.90 Modem (PC)	56K ITU V.90 Modem (PCI)
Ultra Hi-Capacity Lilon Battery	Ultra Hi-Capacity Lilon Battery	Ultra Hi-Capacity Lilon Battery	Ultra Hi-Capacity Lilon Battery
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10/100 Base T Ethernet Network Card	Microsoft Featured Home Collection	1C/100 Base T Ethernet Network Card	10/100 Base T Ethernet Network Card
Microsoft Featured Home Collection	Microsoft Windows98	Microsoft Featured Home Collection	Microsoft Featured Home Collection
Microsoft Windows98		Microsoft Windows98	Microsoft Windows98
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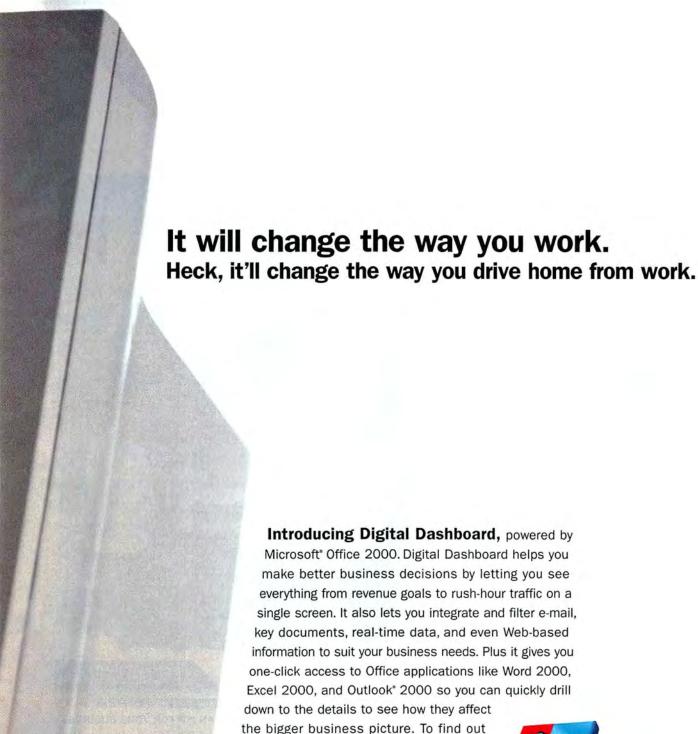




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VOLUME 18 NUMBER 1

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may be able to watch *The X-Files* and order the shirt off Mulder's back—after uploading a scanned photo of yourself to the seller's Web site and trying the garment on. Underfoot, a plush footstool multitasks as a superfast PC; and on the road, your wristwatch handles portable networking. Intrigued?

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CONSUMER ISSUES

If you want to stay hitched to your new PC, don't jump for the first pretty box you see. Our latest survey of *PC World* subscribers reveals which vendors back their

vows with true-blue service and which dump you over the threshold and seek new conquests. Plus: Tales from the online support jungle.



cameras to expose the features and flaws of this year's megapixel contenders. A \$999 Nikon takes our high-end Best Buy while a \$499 Olympus wins the top rating among midrange models.

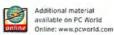
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CONS: JEFFREY PELO

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When CRT monitors went digital, vendors promised a better picture. We didn't see it.

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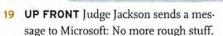


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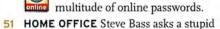


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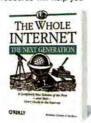
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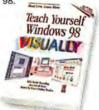
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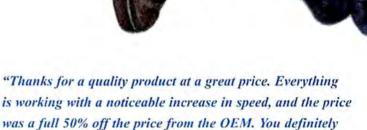
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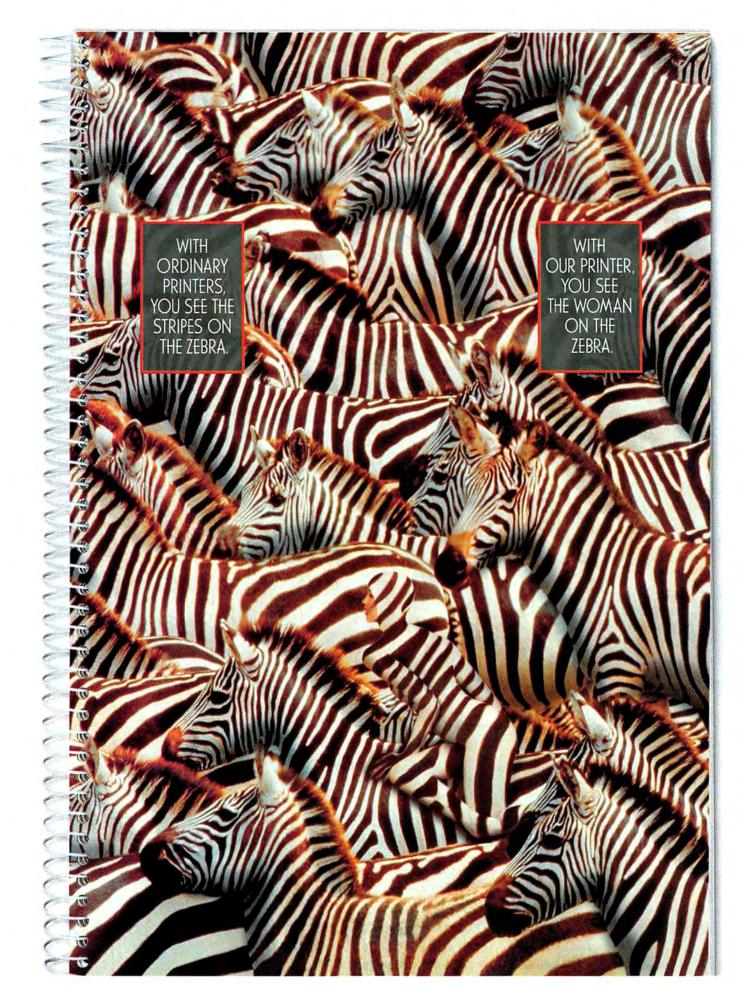
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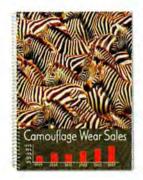
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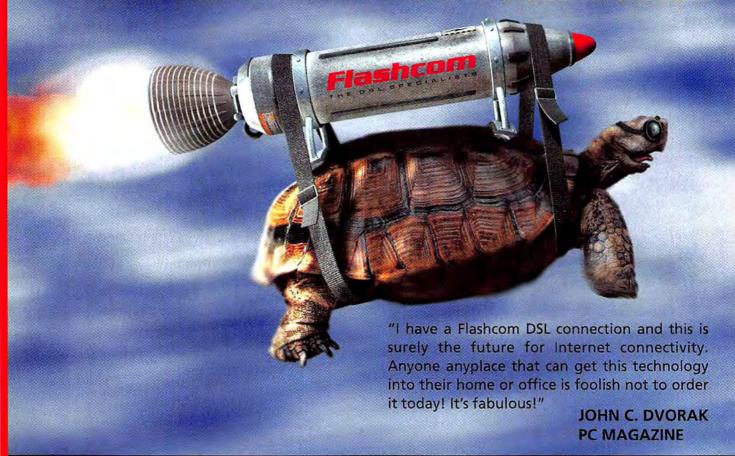
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### DOJ to Microsoft: Play Fair or Else!

ALMOST THREE YEARS AGO, a group of PC World editors gathered around a conference room table while members of Microsoft's marketing team unveiled the latest version of Internet Explorer. At the time, the browser wars were raging. Netscape's Navigator was the better browser by far, commanding a market share of more than 70 percent at the beginning of 1996. IE's share, by contrast,

consisted of less than 10 percent. But at the end of that meeting, we editors filed out of the conference room, stunned. The browser wars were over, we predicted. Netscape was dead.

The product Microsoft previewed was, of course, the first version of Internet Explorer integrated into the Windows operating system. Shortly after the product's release, Navigator began its inevitable decline. Its market share, now at less than 40 percent, continues to fall steadily. How could it possibly compete against a product bundled with the operating system installed on over 90 percent of all desktop PCs?

Microsoft's bundling of its browser and operating system-along with a laundry list of its other business practices-led U.S. District Judge Thomas Penfield Jackson to brand the company a monopolist that repeatedly abused its powers. The cumulative effect of Microsoft's predatory practices, Jackson said, was to quash

competing products, stifle innovation, and harm consumers, all in the interest of protecting its dominant market position.

The conclusions of law, which Jackson is expected to issue early in 2000, will establish-at least for the moment-whether Microsoft broke the law. If no settlement is reached and Microsoft is found guilty of violating the Sherman Act, legal and industry analysts expect the court to order one or more possible remedies. One option is to break the company into several mini-Microsofts, or Baby Bills, each of which would own, develop, and sell the entire range of Microsoft software products and compete against the others. A second option is to break the company along product lines into several smaller companies: one to develop and sell the operating system, a second to sell desktop application software, and a third to sell Internet software and services.

Other possible remedies include forcing Microsoft to license



Every remedy carries risks, but as Microsoft targets the Internet, doing nothing is no solution.

the source code for Windows to other companies, to unbundle the operating system and browser, and to sell Windows at the same price to all PC makers. All options would require Microsoft to change its behavior significantly.

#### THE CASE FOR DOING NOTHING

AS EXPECTED, MANY in the industry heaved a sigh of relief at Jackson's findings. But with typical arrogance, Microsoft insists it did nothing wrong and maintains that the government's effort is fundamentally misguided and is itself the enemy of innovation. Click on Microsoft's Web site, and you'll find the home page of the Freedom to Innovate Network, a supposedly grass-roots group of citizens and businesses dedicated to the noble cause of protecting Microsoft's right to innovate.

Others in the computer industry also urge the government to keep its hands off Microsoft. It's not that this group thinks the monopolist did no wrong. But when forced to choose between Microsoft's bullying and government intervention, its members gravitate toward the former as the lesser of two evils.

Yet another group advocates doing nothing, maintaining that all possible remedies pose problems. Moreover, any remedy that the government might prescribe, the reasoning goes, would be out outdated or meaningless by the time it's implemented, given the likelihood of a protracted appeals process and the phenomenal rate at which both the Internet and computer technology change.

#### NO MORE BUSINESS AS USUAL

TO BE SURE, EVERY REMEDY carries risks. Licensing the Windows source code might result in incompatible versions. A breakup of

Microsoft along product lines might do little to end Windows' hegemony or to break the lock that Microsoft Office has on desktop applications.

But allowing Microsoft to continue to act as it has for the past ten years is no solution, especially as Microsoft targets Internet services and appliances. Read Judge Jackson's findings of fact. The pattern of threats and intimidation is clear. Microsoft must acknowledge that a monopoly cannot use strong-arm tactics to protect its power. If Gates and his corps of programmers and lawyers are as brilliant and innovative as they claim, surely they must be able to come up with creative solutions that safeguard innovation for all companies and consumers. If not, let the government have at 'em.

Cathryn Baskin is editorial director of PC World.

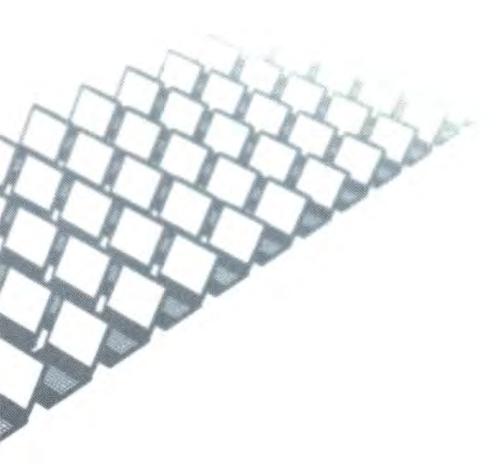




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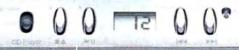














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#### YOUR TAKE ON: Cheap computers • Cable vs. DSL • Spam!

#### **UPGRADES VS. CHEAP PCS**

I DEVOURED "The Lowdown on Upgrades" [November].

Like many other people, I build my own computers. I do so because I want a reliable machine with standard parts that can be fixed with no calls to technical support.

The upgrade industry is dying because of cheap new computers. Are they as good as the ones I build myself? Definitely not. I bought a "free" PC ("free" if you sign up for with an ISP for three years), and it was a big disappointment.

The free PC's keyboard, which is supposed to control functions such as volume and Internet connection, gets confused all the time, bothering me with radio interruptions and interference. On my other computer (a 350-MHz AMD K6-2), I listen to radio stations, perform downloads, compose e-mails, and browse the Web with no radio interruptions. My sound card automatically turns off its audio when I click for my radio, so the transmission is flawless through my 56-kbps

modem. My video card can show movies from my DVD drive. And my hard drive isn't clogged with frills I will never use.

I am raffling it. And I will continue to upgrade my home-built machine.

> Adam Leite. Astoria, New York



version of Tribal Voice's PowWow, but doesn't note that Banter MultiNetwork (on bantu.com) had already been released,

> interoperable with AOL's service.

When AOL discovered this, it then blocked bantu.com's access to its servers. Banter still works with the Yahoo, ICO. and MSN networks.

Also, as a Java applet, Banter can work with almost any Web browser on any OS. There's nothing to download or install, and you can log in from any PC connected to the Internet.

Brodee Wilson, Washington, D.C.

#### A CHATTING ALTERNATIVE

IN "AOL AND Microsoft Have a Spat Over Chat" [Top of the News, November], the author seems unaware of bantu.com's instant messenger. After describing Microsoft's attempt to interoperate with AOL's service, he mentions the upcoming

#### CROSS FIRE

#### Let's Make Spam Illegal

REGARDING November's "Spam! How It Happens, and How to Beat It": If you want to do us all a favor, start by "harvesting" the true identities of spammers like Pete Larson and listing them in your magazine and on your Web site. I'm sure a few of us would love to engage in "dialogue" with these people. For instance, we'd tell them that we'll promise (wink, wink) to remove them from our mailing lists if they reply to our messages with the word "Remove" in the subject box. That's fair.

If these spammers believe they run legitimate businesses, they should have nothing to hide. Remove the veil. The sooner we make mass spamming a federal crime, the better. Aren't there any hungry lawyers who might help litigate these people out of existence? Make the penalties big enough and the answer is yes. That's the only solution to spam.

> Peter Derek Trabuco Canyon, California

#### But It's Free Speech

SPAM CAN BE as annoying to me as it is to most other people. But this letter is in defense of spam's free-speech rights.

My television issues spam between innings, between story lines, between and on top of everything (not to mention the now-ubiquitous network logos).

Even my PBS radio station contains unsolicited ads. Pledge drives may peak above spam on my annoyance meter.

My mailbox is filled with spam-wonderful, colorful, expensive catalogs sent by big retail stores and bigger mail-order houses, each costing much more than the spam message on my screen.

Billboards (roadside spam) line my way to work. We live in a country that protects free speech. We have the right to turn off the TV and radio, keep our eyes on the road, and toss the junk. Yes, it is irritating, but mass e-mailers are paying part of the freight, and the spammers' opportunity is protected-at least in this country.

Dick Lawrence, Southlake, Texas

#### BANDWIDTH: CABLE VS. DSL

IN NOVEMBER'S Home Office ("Move Over, Cable-DSL Has Arrived"), Steve Bass wrote "Some DSL providers will split your one existing copper phone line and use it for simultaneous browsing and voice fax calls. (Just try that with cable.)"

I work for a firm in Texas called Clear-Source, Inc., that will offer analog and digital cable television, local and long-distance phone service, and high-speed data via cable modem, all over a home's existing coaxial line. Most cable modem service is faster than the 384 kbps of DSL (we will guarantee 512 kbps downstream) and costs about \$39 (our price) to \$49 per month; by contrast, DSL in my area will cost about \$59 to \$79.

At any rate, one wire (the coax) has it all. It's based on a hybrid fiber-coaxial network. So other options are available.

Jason Coffee, Waco, Texas

I SUBSCRIBE TO @Home through a cable firm in Toronto for \$40/month in Canadian funds (US\$26). That includes the modem rental. Installation nominally costs Can\$150, but promotional discounts make the actual cost much lower—I

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#### LETTERS

doubt anyone pays more than Can\$50.

For this, I'm supposed to get download speeds of up to 3 mbps (that's right, megabits) and upload speeds of 400 kbps. I haven't done any scientific tests of these claims, but I have downloaded files at very fast speeds. And I have experienced only two brief service interruptions on the company's mail server in three months.

Michael Liotta, Toronto

STEVE BASS'S article was well written and informative. But since the implementation of cable modem and DSL varies widely across the country, it applied only to the Pasadena, California, area where Bass lives and had no relevance to the vast majority of your readers. The article did not make that clear, and I feel you thereby did your readers a huge disservice, perhaps leading some of them into making the wrong choice of high-speed access.

William Wichgers, Seattle Author's response: I agree that I focused mostly on my experience in Pasadena. I heard from many readers about faster and cheaper cable modem and DSL service. Unfortunately, my column simply can't list the dozens of alternative cable modem and DSL services across the country. Instead, see my June column, "Cable Modems: Nice Net If You Can Get It" (www.pcworld.com/jun99/ home\_office), and visit Cable Modem Resources on the Web at rpcp.mit.edu/

#### UPGRADE TIP

~gingold/cable, -Steve Bass

I READ WITH interest your article "Connect Two or More PCs" [Upgrade Guide, October]. I recently performed just such an upgrade on the two PCs in our home office. The article missed a key point, however: The hub is optional. If you are going to connect only two PCs together, you can skip the hub and make the connection with a crossover network cable.

Rick Goulian, Gilbert, Arizona

#### **CROSSED UP BY CROSSLINE**

I WAS EXTREMELY skeptical of a PC vendor called Crossline Commercial until my September issue of PC World arrived, with an advertisement for the company. I ordered and paid for a

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PC Week, February 1999

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ComputerWorld, March 1999

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#### LETTERS

PC, but I've been waiting for six weeks, Crossline's toll-free number is out of service, and its Website is down PC World's November issue has yet another ad for Crossline, promoting a toll-free number that connects to nothing and a Web site that goes www.nowhere.com.

Derek Davis, Millinocket, Maine Editor's response: Your letter is one of many we've received on Crossline, which appears to have ceased operations without warning after advertising in PC World and other publications. While we attempt to deal with advertisers whom we believe to be legitimate and responsible, a company's advertisement in PC World should not be construed as an endorsement on our part. See next month's On Your Side for more about Crossline. -Harry McCracken

#### UP TO DATE IN MOKENA

A LETTER IN THE November issue about computers at the Mokena, Illinois, elementary school-implying that they were outdated and of little valueis extremely misleading. Certain storage rooms with older PCs were converted into classrooms, and it is to these that the letter probably referred.

Most classrooms have Pentium II PCs connected to the district network and the Internet. Pentium III PCs are being installed in seventh- and eighth-grade classrooms. The elementary school also has a computer lab.

> Roger Reardon, Superintendent Mokena, Illinois

PC World welcomes letters to the editor. Send e-mail to letters@pcworld.com.

#### CORRECTIONS AND CLARIFICATIONS

IN DECEMBER'S Top 15 Notebook PCs, we listed the IBM ThinkPad I Series 1480 as the number-two budget model. The product should have been called the IBM ThinkPad I Series 1412.

A review of e-postage products that was announced on our December cover was pulled after our cover deadline. Find a roundup of e-postage product announcements at www.pcworld.com/jan00/epostage.

PC World regrets the errors.

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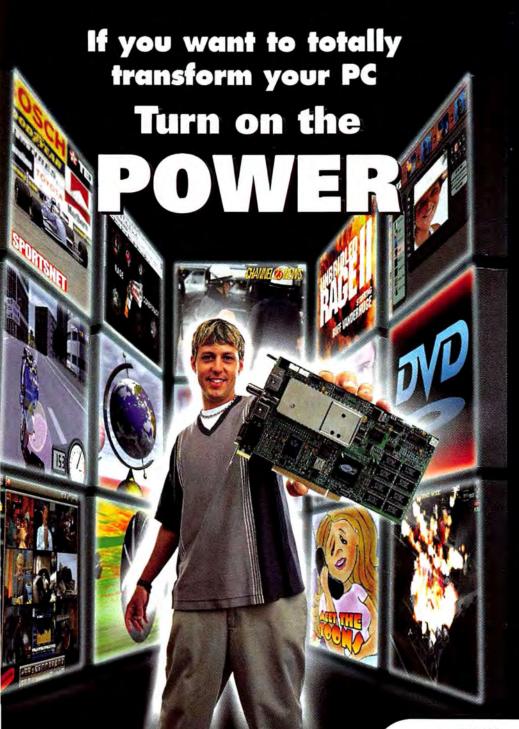
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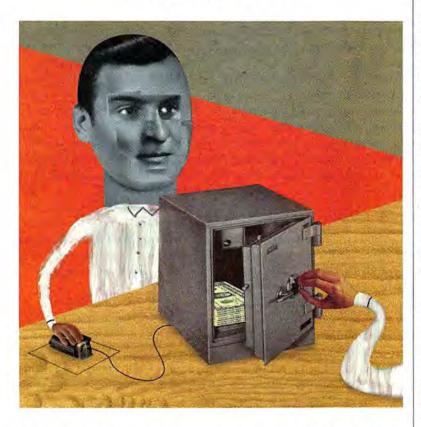
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# **Banking Without Branches**

The rates are great at online banks. But will your money be safe and sound?



BRENT KELLOGG WAS HAPPY WITH his brick-and-mortar bank. But then the Oregon City, Oregon, resident began noticing high-interest, no-fee checking offers from Internet banks. With each checking fee from his local bank, his dissatisfaction grew. Finally he switched to the Internet-only NetBank, and set up automatic payment of his bills. Kellogg assumed everything was fine.

Then, a couple of months later, the trouble began. Kellogg explains: "I received a telephone call from one merchant saying payments on two of my accounts hadn't been made. I got a bad feeling and started calling the other merchants and learned not one merchant had been paid. All had charged me late fees." Kellogg's online checking account, however, seemed to think the bills had been paid.

NetBank eventually overnighted hand-cut checks to Kellogg's creditors, along with letters of apology explaining that the error was due to a technical glitch. But by that time, Kellogg had spent hours on the phone with his bank and creditors. "I'm afraid my credit history is scarred for life." he still frets.

Most traditional banks offer some form of online banking or bill paying. According to research firm Jupiter Communications, 10 percent of U.S. households that have an Internet connection conduct banking online; the company estimates that this figure will jump to 39 percent by 2003. A spate of Internet-only banks hope to catch this business in its infancy-Atlanta-based NetBank (www.netbank.com), First Internet Bank in Indianapolis (www. firstib.com), CompuBank in Houston (www. compubank.com), and Wilmington, Delawarebased WingspanBank.com (www.wingspanbank.com) are among the big ones. These branchless banks provide the same services that old-fashioned banks do, including checking accounts, certificates of deposit, credit cards, loans, and mortgages. (Mortgages and loans are also available from sites like E-Loan.com, MSN HomeAdvisor, and QuickenMortgage.com.)

My conversation with Kellogg hit home. I'm on the eve of a cross-country move, and soon I'll need a mortgage and a new bank account. Was Kellogg's mishap a freak accident that could have happened just as easily offline? Or is it too early to trust your money to the Net? To find out, I talked to bankers, security experts, and financial analysts, and to people who've banked and obtained mortgages online.

#### CHECK OUT THOSE DEALS

IT'S EASY TO understand the lure of the Internet for all matters financial. Paying bills and getting instant transaction histories from your bank is fantastically convenient. And if you're willing to renounce the comfort of banking at a familiar institution down the street, you can score some great interest rates. Just surf the Internet-only bank sites, and you'll see that the deals are good. As I write, the country's average interest rate for an offline checking account is .84 percent, but at WingspanBank.com, for example, I can get 4.5 percent on a no-fee checking account. That's tempting!

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## CONSUMER WATCH

The mortgage sites are just as appealing. According to Jaime Punishill, an analyst at Forrester Research, "Online origination costs are anywhere from a half a percent to a percent cheaper." Not only that, but searching for a mortgage online quickly finds you the best rates in the

entire country. In fact, your chances of landing a good deal improve dramatically if you simply take the results of your online search to a traditional broker or lender (as most of the consumers I talked to did) and say, "Match that!"

Why is banking on the Net cheaper? "The branch system is incredibly expen-

sive," says D. R. Grimes, CEO of NetBank. "The buildings, the people, and the equipment represent about 50 percent of la bank's operating expenses. We can run a bank on the Internet and reduce our expenses by 50 percent."

#### **ENOUGH ABOUT THE MONEY**

RATES AND FEES, of course, are only part of what makes a bank worth considering-you also need to think about accounting accuracy, customer service, security, and privacy. According to Glenda Barnes, marketing director for financial services at security firm CyberSafe, errors are no more likely at a Net bank than at an old-fashioned one. When problems do occur, though, Internet banks may not be the most adept at solving them immediately. "Banks that have been banks before the Internet know how to do banking," she explains. "They already have the processes and people in place before the problems occur."

Stephanie AuWerter, staff editor at SmartMoney.com, concurs, "When we tested things like customer service [in May 1999], the online banks that tended to be the best were [operated by] major consumer banks. The Net banks were good at responding quickly to e-mail, but some didn't have 24-hour customer service-something a lot of investors expect." Still, SmartMoney picked a Net-only bank-CompuBank-as its top choice.

Jim Stewart, the CEO of Wingspan-Bank.com-one of the few Internet banks fledged from a large traditional bank, Bank One-thinks banking on the Net is far more convenient. "If you want to open a checking account, a bill-pay account, and a credit card," he explains, "you can fill out

When problems

do occur, Internet

banks may not

be the most

adept at solving

them, says

CyberSafe's Barnes.

one application, be approved in 60 seconds, get your credit card number right away, and go out and do some shopping." All on your own hours instead of a banker's.

But brick-and-mortar banking has its own conveniences. Net banks don't offer a place to go when you want to make a depos-

it. (Instead, you must set up direct deposit, mail checks in, or transfer funds from another account.) And they don't have ATMs, so you'll have to rely on other banks' machines-which usually means paying a fee to the ATM's owner. If you hit the cash machine a few times a week, those fees will add up. On the plus side, most Net banks don't charge ATM fees themselves, and some rebate a few dollars a month to help cover fees you do pay.

#### SAFETY FIRST

THE QUESTION THAT has me hesitating about Net banking, however, relates to security: How safe is all that personal information I type in when I'm applying for an account or searching for a mortgage? How safe is my money?

"The most obvious risk of banking on the Net is confidentiality," says Cyber-Safe's Barnes. "And the only way a bank or mortgage broker can ensure privacy is to encrypt the data." Of course, all the Internet banks I spoke to, as well as the big mortgage sites, encrypt the confidential data they transmit.

Nonetheless, security does remain an issue. "Consumers are much more vulnerable in the online world than going face-to-face with brick-and-mortar banks," says Anthony Plastino, Internet security engineer at Luminant Worldwide, which provides Internet and e-commerce services to large companies.

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#### CONSUMER WATCH

Several experts told me that consumers' own habits can be the weakest link in online banking. Do you tell your browser to remember passwords for you? If so, a malicious someone who gains access to your PC will be able to spend your money faster than Holly Golightly on the shopping spree of her dreams. And a clever hacker, says Barnes, "can very quickly get your password. Most people use a password that's easy to remember. But your password should be something random."

Still, these security threats don't mean that Net banking is inordinately risky. After all, says Barnes, most of the world's money travels over phone lines, and very little of it gets lost or stolen in the process.

#### **READY TO OPEN AN ACCOUNT?**

DESPITE THE FRIGHT I got from security experts, I've decided to go ahead with online banking, and I'm shopping online for my new mortgage. If you're ready to do the same, take some precautions:

Check a site's privacy policy before you ante up a single iota of informationmake sure the site won't share any of your information without your permission. Once you open an account, be cautious about sharing your social security number or mother's maiden name with anyone, since that information could help a cyberthief gain access to your accounts.

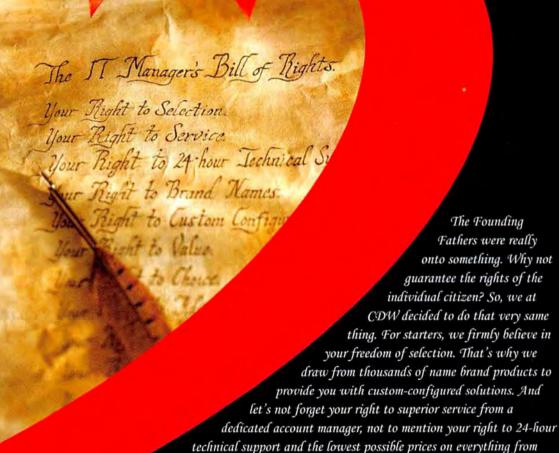
Security expert Plastino advises: "First upgrade your browser to 128-bit security." (You'll find the upgrade at the Microsoft or Netscape site.) "Now you're ready to hit the vendor's site. If you get a message saying the browser can't communicate with the site, don't do business there."

Grill banks on customer service. How quickly do they respond to e-mail? How do you reach a live person? If, like Kellogg, you find that your bills have not been paid, how will the bank respond?

As SmartMoney.com's Stephanie Au-Werter says, "The Web is an amazing tool for finding a good rate on a CD or a mortgage. But that doesn't mean that you shouldn't be careful where you send your money and who you do business with."

Christina Wood is a PC World contributing editor.

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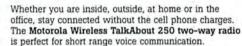
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56K modems are capable of 56Kbps downloads, however, current regulations limit

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# On-Site Service: Don't Count on It

WHEN THE POWER SWITCH on his brand-new Quantex computer went kaput, Jason Padgett of Greensboro, North Carolina, got on the phone to technical support. No problem, the Quantex representative told him—a replacement part would be sent right out. But Padgett wanted

the on-site service touted in his warranty. Sorry, said the rep: The fix was simple, and someone would walk Padgett through it over the phone. "Quantex must have a very high opinion of its customers' technical expertise," grouses Padgett.

It's a common misconception that just because a warranty promises on-site service, a trained technician will arrive at the owner's doorstep to fix a PC if it breaks. Almost universally, a warranty provision specifying "on-site service" means that a technician might make a house call to change parts-solely at the discretion of the manufacturer. And vendors often ask customers to make repairs that aren't too difficult, such as

swapping memory or add-in cards. Trickier installations, such as power supplies, may warrant an on-site technician, but those technicians rarely do anything more than install the ordered parts. "Diagnosis is done by a technician through Quantex's 800 number," says Eric Offenberg, customer relations manager for Quantex.

> Decisions to send on-site help are made "case by case" at Quantex, says Offenberg. "Sometimes a technician will lose track of what parts are difficult to replace." If, like Padgett, you feel that you're being asked to do the impossible, explain your fears to the phone representative. If the rep still won't budge, ask to speak to a manager. Still nothing? Escalate the issue by submitting a request in writing.

I forwarded Padgett's letter to Quantex, and Offenberg

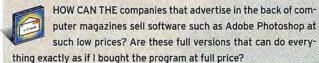
agreed that on-site service should have been ordered to replace the faulty power switch. "In this case, the technician did not take into account the difficulties of the installation process."

### Heads Up...



No More ISP. Jim Shank of Denver was surprised to get an e-mail from EarthLink terminating his account for violating the ISP's acceptable use policy, which prohibits using an account simultaneously from two locations. Arley Baker, director of corporate communications at EarthLink, advises, "Don't share your account with anyone-not even a friend or relative. It can cost you your account." EarthLink reinstated Shank's account, because he says he has no idea who else had been using it... EBay Scam. I heard a report of an elaborate scam on the EBay auction site. A seller builds up a positive feedback rating by selling cheap items such as Beanie Babies. Then it starts selling PCs. Finally, it goes bankrupt, leaving buyers without money or goods. Because EBay is investigating a group accused of perpetrating this fraud, the site can't comment on what it has found. My advice? Look hard at feedback ratings. Has the seller sold similar items before? And use an escrow service for big purchases... Prodigy Gets Busy. I've heard several complaints from Prodigy users about busy signals. Dan Levine, a spokesperson for the ISP, acknowledges the problem but says, "We are aggressively addressing it." By the time you read this, he reports, the company should have doubled the capacity of its network.

#### LETTER OF THE MONTH



Noah Reeder, Los Angeles

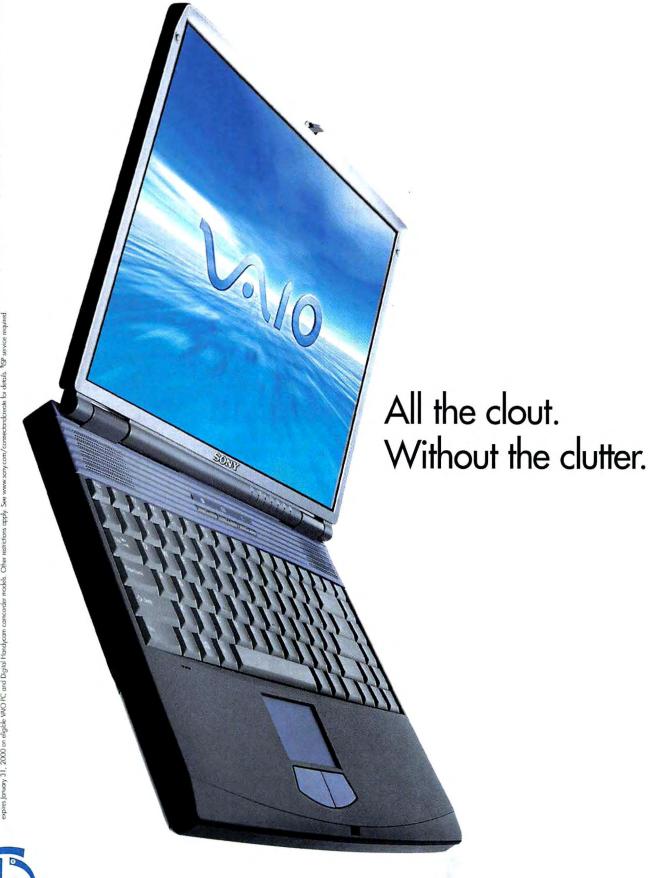
On Your Side responds: Batur Oktay, corporate counsel for Adobe, answers, "In the vast majority of cases we have investigated, recent versions of Adobe

GOTTEN A RAW DEAL?

Or a great one? E-mail the details to onyourside@ pcworld.com. We'll investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for PC World.

software priced substantially below the [retail] price are pirated." Such packages may be NFR (not for resale) or academic editions sold as if they are full retail versions. Oktay says, "Consumers who unwittingly acquire this software will likely get something different from

> what they bargained for." (Technical support, for instance, may be limited or nonexistent.) Before buying any incredibly low-priced software, contact the manufacturer and ask if the advertiser is an authorized reseller.







The Sony VAIO® All-in-One notebook packs some big features into a compact package. With built-in DVD-ROM, hard and floppy drives, plus a V.90 modem and connections, the new Sony VAIO All-in-One has everything you need, all in one place. So you never have to carry external drives or peripherals. In addition to its lightning fast Intel® Pentium® III processor and stereo speakers, the

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- CompuServe® 2000
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- . Microsoft Internet Explorer for Windows 98
- Mindspring Internet Service<sup>6</sup>
- Netscape® Communicator
- · Prodigy Internet<sup>6</sup>

#### Tool Center

- McAfee VirusScon®
- · Sony BatteryScope
- Sony PowerPanel
- . Sony Notebook Setup
- . Sony PPK Setup

#### **Applications**

- · Adobe Acrobat® Reader
- · Adobe PhotoDeluxe® Business Edition
- · Adobe Premiere LE®
- Intuit® Quicken® Basic 99
- Mediamatic DVD Express
- · Microsoft Outlook® 98
- Microsoft Works Suite 99
   Microsoft Word 97
   Microsoft Works 4.5
   Microsoft Money 99 Basic
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   Microsoft Graphics Studio Greetings 99
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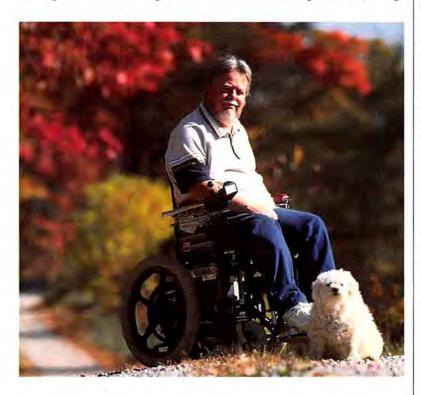
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# Manage Your Multiple Passwords

PROBLEM You have trouble keeping track of all the IDs and passwords you use online.

s o L U T I O N Use a password manager to organize your account information conveniently and securely.



HOWARD THOMPSON IS NO Internet dabbler. In his work with the computer sales and service business he cofounded in Flat Gap, Kentucky, Thompson often uses the Web to order products from wholesalers and to research and submit bids for government contracts. His problem surfaced when he began to have increasing difficulty keeping track of all his passwords and ID names at the myriad Web sites he frequents. More than once, Thompson has had to request a new site password after losing track of his old one. "In some cases it took me two or three days to get back in," he says.

Anyone who surfs the Net regularly has probably experienced Thompson's problem. Many Web sites-whether selling books, disseminating news, or providing an online town hall for communities to meet-require visitors to register with an ID and password. To keep this potential anthill of confidential data under control, many people try to use a single password for all their registrations—an approach that has obvious security risks and won't work if a site requires a format different from the one their single password uses (say, a combination of letters and numbers).

To help him remember which of his passwords goes with which site, Thompson now relies on an easy-to-use freeware utility called PassKeeper (available from PC World Online's FileWorld or from the maker's Web site at www.passkeeper.com) that provides a convenient and secure place to accumulate and organize site log-in information. One side benefit of using PassKeeper or a similar password manager program, Thompson found, is the good security habits it encourages: Once you've found a convenient repository for all your login information, you're more likely to adhere to sound password strategies.

#### MAKING A LIST AND CHECKING IT JUST ONCE

WITH A COMPACT size of only 200KB, Pass-Keeper is one of the most basic of the many password managers available. It requires no Windows setup and no files outside its own subdirectory, so it's easy to run on different machines from a floppy disk.

Once the program is loaded, you simply open it, make a list of the sites where you maintain passwords, and enter the data you want to remember for each site. PassKeeper's basic Windows user interface then displays your list. When you double-click a site name, a window displays the user ID, password, and any notes you've made about the site.

You might wonder how PassKeeper improves on the old-fashioned card file, an address utility, or even a spreadsheet. Its main advantage is its sophisticated encryption: Your passwords and IDs are stored in coded form, and the program itself demands a password at entry.

More-sophisticated utilities offer additional advantages. Whisper 32-which is also free and fairly lean, and is downloadable from FileWorld or from www.ivory.org/whisper.html—supplies extras such as optional password expiration (a feature that reminds you to change your passwords periodically) and a built-in password generator that creates passwords based on criteria you specify.

Whisper 32 also lets you enable automatic backups of your password data files, and the utility's toolbar and keyboard shortcuts make it easy to copy and paste your user name and password into a site's log-in forms to avoid having to retype them each time you visit a site. There's even a place to include URLs in your database files so you can quickly access the sites where you're registered.

Info Keep, a \$25 shareware program that you can obtain from FileWorld or from www.infokeep.net, adds more features still. It can close and lock your files after a specified period of inactivity to protect your password from the prying eyes of intruders or passersby. Unfortunately, Info Keep is a 7MB download, which may frustrate users who have a slow modem.

#### INTERNET EXPLORER'S AUTOMATED TOTAL RECALL

IF YOU USE Internet Explorer 5, you already have one easy option for managing your passwords, AutoComplete. When the browser detects that you've entered a password for a site, AutoComplete will ask you whether you want Windows to remember the word for you. If you respond by clicking Yes, the program will automatically fill in the user name and password the next time you access the Web site. You can enable or disable Auto-Complete in seconds. To do so, simply select Tools/Internet Options/Content, and then click AutoComplete.

The biggest drawback to using Auto-Complete is that anyone else who works at your computer can automatically gain access to sites where you have registered, by using your password and ID. Of course, this is the same risk you run with Web sites that you've allowed to remember your name and password.

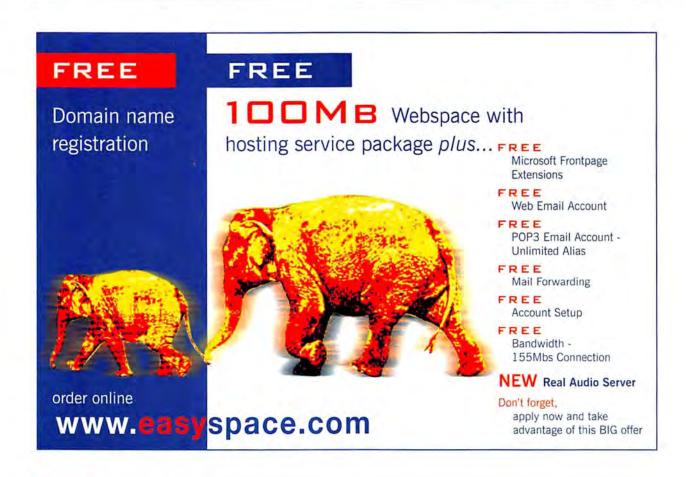
Another problem with depending on AutoComplete is that it offers you no place to record extra notes. So if you use a separate free e-mail account (like the ones offered by Hotmail and Yahoo) to prevent spam from filling up your regular e-mail account, you'll need to settle on a place to store and remember which address you gave to which site.

Before settling on PassKeeper, Thompson scribbled user IDs and passwords in a small notepad-and he still keeps a printed record of his most critical accounts. He's used PassKeeper for three years now and has accumulated log-in information for about 80 sites. Keeping track of the details, even for that many sites, is easy and secure if you use a password manager instead of the nearest scrap of paper.



You'll find files mentioned in this article at www.fileworld.com/ magazine. Mitt Jones is a con-

tributing editor for PC World.



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45	\$ 190	\$ 215	\$ 253	\$ 330	\$ 368
50	\$ 253	\$ 290	\$ 363	\$ 490	\$ 495
55	\$ 360	\$ 413	\$ 550	\$ 835	\$ 940
60	\$ 503	\$ 608	\$ 845	\$ 2,135	\$ 2,400
65	\$ 775	\$ 975	\$1,320	\$ 3,900	\$ 3,900
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40	\$ 148	S 183	\$ 225	\$ 288	\$ 335
45	\$ 225	\$ 300	\$ 360	\$ 450	\$ 513
50	\$ 338	\$ 455	\$ 525	\$ 730	\$ 793
55	\$ 500	\$ 670	\$ 768	\$ 1,560	\$ 2,330
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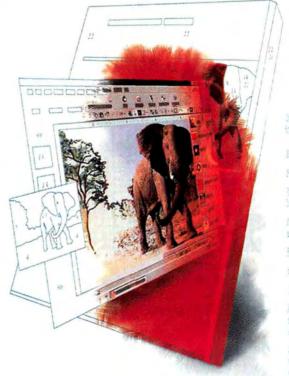
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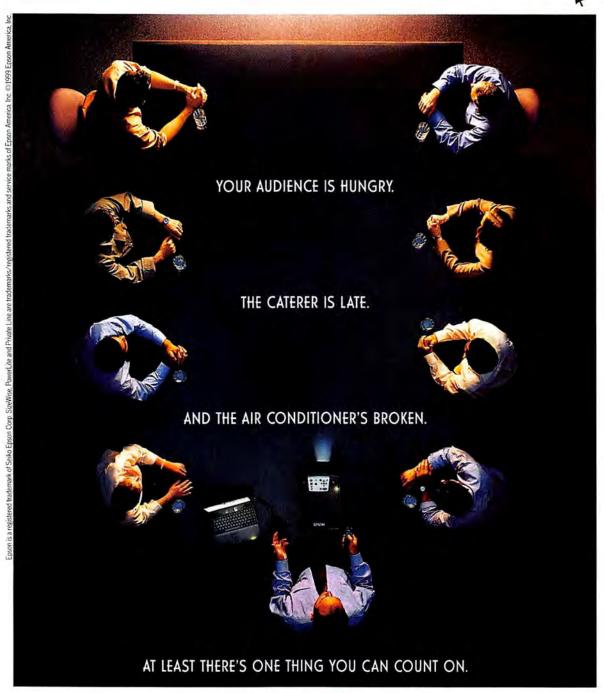
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# Is Your PC Too Slow? Try These Tricks

HERE'S A stupid question: After you load a bunch of programs, does your PC crash frequently or act sluggish and out of sorts (in other words, behave like my editor)? My PC used to do that too, even with 128MB of RAM. Then I discovered the Wonderful World of Memory Tricks, and life was worth living again.

So this month I'm going to tell you about a handful of utilitiesincluding some freebies-that will work wonders for your system.

#### THE DEFRAG RAG

THE FIRST (and easiest) thing you can do to energize your PC is to defragment the hard drive. You're going to laugh, but I defrag my hard drive every four or five days. (I love watching the colors while defragging, especially when ignoring a deadline.) I perform this painless operation after doing maintenance chores like cleaning out crusty old .tmp and .bak files, moving around lots of data, or before installing new programs.

Windows 9x comes with its own defragger, but one I like better is Fix-It Utilities from Ontrack (formerly Mijenix). On my 8GB drive, Fix-It's defragger runs about 40 percent faster than the one in Win 98. And that utility is just one of a dozen worthwhile tools-including a great Windows Explorer substitute called Power-Desk-that you get for only \$34.

The next thing you'll want to deal with is your PC's memory, and you know what

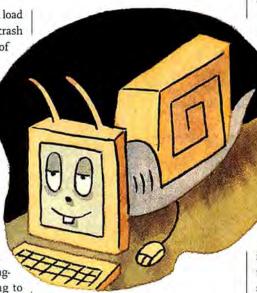
#### Fix-It Utilities

\$34 street; Ontrack Data Int'l; 800/645-3649; www.ontrack.com

PRODUCT INFO NO. 604

#### MemTurbo

\$20 registration; Silicon Prairie Software; www.memturbo.com



My PC used to act sluggish and out of sorts-then I discovered the Wonderful World of Memory Tricks.

I'm going to say: Get more of it. Anything less than 32MB of RAM just isn't enough anymore, and 64MB is better still.

You see, Windows gobbles up real memory faster than a teenager wolfs pizza at an all-you-can-eat joint. When you load lots of apps, Windows runs out of RAM and uses virtual memory-a hard disk cache-to do its dirty work. (If you hear your drive churning as you load files, it's probably using virtual memory.) The more often Windows accesses the hard drive, the slower your PC will perform.

That's why you should use Cacheman to fine-tune your disk cache settings. It can adjust your settings to match the way you work-say, a bigger cache for power users, a smaller one for the rest of us. It's available free on FileWorld or from the author's site at www.outertech.com.

#### YOUR MEMORY IS LEAKING

MOST DAYS I run several apps bumper to bumper: Word, Eudora, Internet Explorer, PowerDesk, and a handful of background utilities. By midday, I've opened and closed other huge apps like Excel and Ventura Publisher. After a while, my PC looks like a data landfill, and I start running dangerously low on resources.

The problem? Some programs are dumb and won't release resources after you've closed them, which means that

> you have less RAM available for other apps. This is called memory leakage; a blacklist of the leakiest software is available at radsoft. net/Workshop/blacklst.htm.

For years, my low-tech remedy was to reboot every so often. But for the last year I've used MemTurbo, a \$20 utility that automatically flushes memory taken up by DLL files no longer being used, and recovers RAM that has leaked out into the bit bucket. Just as important, the utility requires no skill or deep understanding of memory (important, in my case). After I use MemTurbo, my system perks up, I stop getting resource error messages, and I even feel a little taller.

Now, I know what you're asking yourself: Why not simply use Windows 9x's Resource Meter? Don't bother-it's a memory hog. (Isn't that ironic?) Use TClockEx instead—it takes up way less RAM. Then grab PrcView, a neat tool that'll give you detailed views of which applications are running and how much memory they're using. You can download both utilities for free from FileWorld, And for a non-geekspeak tour of system resources, check out www.infinisource. com/win-resources.html.

These days, my PC almost never gives me trouble. Now if only I could do something about my cranky editor.



You can find files mentioned in this article at www.fileworld. online com/magazine. Contributing

Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. He can be reached at steve\_bass@pcworld.



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## Y2K issues linger: The latest on operating systems, suites, and personal finance

# For the Last Time Already, Y2K!

IF YOU'RE AS optimistic (or stubborn) as I am, you'll deal with Y2K by simply ignoring the whole thing. I'm wagering that come January 1, calm will reign o'er my PC and yours. But you never know. If you've been reading PC World's ongoing Y2K coverage, you know that you can do many things that supposedly will minimize the chance of problems. No need to rehash all that-but here's a quick list of updates for major products likely to be affected.



#### **OPERATING SYSTEMS**

Windows 98 Year 2000 Update X2 Microsoft came out with one patch (1.2MB), and then another (635KB); these fix incorrect leapyear calculations, date/time settings, and online connection logging. Pick up the patches from windowsupdate.microsoft.com. Windows 95 Year 2000 Update Like Win 98, Win 95 stumbles over leap years and call logging. Get all the details-including a warning that installing network and other drivers may uninstall portions of the patch (thanks a lot)-at www.microsoft.com/ windows/downloads/bin/w95/y2kw95.txt. Find the 2.17MB fix itself at www.microsoft.com/windows95/downloads/contents/ WURecommended/S\_WUFeatured/wing5y2k/Default.asp.

Windows NT 4.0 Service Pack 6 Service Pack 6 (at www. microsoft.com/ntserver/nts/downloads/recommended/SP6/ allSP6.asp) contains new Y2K patches that correct date handling errors in programs and let NT display the proper system date on January 1. But if you've already installed Service Pack 4 or 5, you don't have to download all 34.5MB of SP6 just to get these fixes.

#### **OFFICE SUITES**

Corel WordPerfect Suite Corel says that versions 8 and 9 (the latter's also known as 2000) are year-2000 compliant, and that Suite 7 is compliant except on minor points. If you want to enter dates in the document summary, for instance, the company recommends using a four-digit year to avoid possible ambiguity. For full details visit www.corel.com/year2000/cwps7\_wing5.htm. Lotus SmartSuite Lotus says that all versions of SmartSuite for

FOUND A HARDWARE or software bug? Tell us about it via e-mail at bugs@pcworld.com.

#### **Author Metamorphosis**

THIS IS MY 64th-and last-Bugs and Fixes column. Since its birth in 1994 (as Bugwatch), it has become one of PC World's most popular departments, thanks in good part to contributions from its readers. Your thoughtful input takes the guesswork out of identifying the most important bugs and fixes and helps us convince software makers to come clean about product flaws.

Starting with next month's column, PC World Contributing Editor Mitt Jones will assume the task of tracking the latest PC pests-please keep the bug reports coming to bugs@pcworld.com. You'll continue to see my byline elsewhere in the magazine, including atop the Internet Tips column. May your system stay up and running, and may all your bugs be minor.

Windows from Release 3.1 forward, as well as all versions of SmartSuite for OS/2 starting with the 96 Edition, are "Year 2000 Ready." This means that some versions will handle two-digit dates correctly, but you have to know which century the program assigns the year to. For example, Lotus 1-2-3 97 assumes that 74 means 1974; but Organizer 5.0 thinks 74 means 2074. For a full explanation, go to www.lotus.com/home.nsf/welcome/y2k.

Microsoft Office 97 Service Release 2b Find a minor update to SR2 (namely, SR-2b) at officeupdate.microsoft.com/Articles/ srzfact.htm. It adds Y2K updates for Outlook 97 and the Jet database engine. For a link to the Outlook fix, visit support.microsoft. com/support/kb/articles/Q197/2/37.asp. For the Jet patch, see support.microsoft.com/support/kb/articles/Q172/7/33.

#### PERSONAL FINANCE

Intuit Quicken Intuit declares Quicken 2000 to be year-2000 compliant, but as with the Lotus products described above, you may need to enter some two-digit dates in a certain way to identify which century they belong to. For details about your product, including earlier versions of Quicken and QuickBooks, see www.intuit.com/corporate/year2000/find\_your\_product. html. Microsoft Money Money 99 and 98 will cope handily with 21st century dates, but as with the Lotus products and Quicken, you'll have to adjust for the way Money interprets two-digit dates. For Money 99, visit www.microsoft.com/technet/year2k/product/ user\_view67528EN.htm. For Money 98, go to www.microsoft. com/technet/year2k/product/user\_view67524EN.htm.



Find files mentioned in this article at www.fileworld. com/magazine. Scott Spanbauer is a contributing editor for PC World.

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#### Customize with these options:

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- 9x5, Next-Business-Day,
   On-Site Service Warranty Upgrade: \$99
- . Compaq Pro 500 UPS: \$199

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- Compag 10/100 Network Controller
- · Creative Labs SBS 2-Piece Speakers
- · Prosignia Internet Keyboard
- · Microsoft Windows 98 (2nd Edition)
- Microsoft Office 2000 Small Business\*\*
- · Free! Trial of Compaq Online Services
- · 3-Year Limited Warranty

# \$1579

#### Lease for: \$53/month

#### Customize with these options:

- · Upgrade to S910 Monitor: \$205
- . Compaq LJ750 Printer: \$149
- 9x5, Next-Business-Day, On-Site Service Warranty Upgrade: \$99

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#### **PROSIGNIA NOTEBOOK 165**

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- · Compag PremierSound
- · Integrated AC Adapter
- · 1 Li-lon Battery
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- Microsoft Office 2000 Small Business
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## \$1799

#### Lease for: \$60/month

#### Customize with these options:

- · TrippLite Super 8+Tel: \$29
- · Global II Carrying Case: \$69
- 3-Year, Parts and Labor, Mail-In Warranty Upgrade: \$199

#### **PROSIGNIA NOTEBOOK 170**

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- 6GB SMART Hard Drive
- 64MB SDRAM (expandable to 192MB)
- 14.1" CTFT (1024 x 768) Display
- · 24X Max CD-ROM Drive
- · Compaq 56K V.90 Data/Fax Modem
- · Compaq PremierSound™
- · Integrated AC Adapter
- 1 Li-Ion Battery
- · Microsoft Windows 98 (2nd Edition)
- · Microsoft Office 2000 Small Business
- · Free<sup>s</sup> Trial of Compaq Online Services
- · 3-Year Limited Warranty

## \$2499

#### Lease for: \$84/month

#### Customize with these options:

- APC Surge Arrest: \$19
- · Value Carrying Case: \$39
- 3-Year, Parts and Labor, Mail-In Warranty Upgrade: \$199

#### PROSIGNIA SERVER 720

- · Intel Pentium III Processor 550MHz
- . 64MB 100MHz SDRAM (exp. to 768MB)
- Wide-Ultra2 SCSI Controller
- 9 1GB Ultra2 Hard Drive
- 5 Bays: 3 Removable, 2 Hard Drive
- · 32X Max CD-ROM Drive
- 10/100 TX LITP NIC
- · 6 Slots: 3 PCI, 1 PCI/ISA, 1 ISA, 1 AGP
- Server Setup and Management Software
- Pre-Failure Warranty\*:
   Processor/Drives
- 3-Year Limited Warranty

# \$1989

#### Lease for: \$67/month

#### Customize with these options:

- Additional 9.6GB Wide Ultra2 SCSI: \$397
- 3-Year, Next-Business-Day, On-Site Service Warranty Upgrade: \$199
- Compaq Pro 500 UPS: \$199

#### **PROSIGNIA SERVER 740**

- · Intel Pentium III Processor 550MHz
- · Dual Processor Capable
- . 128MB 100MHz SDRAM (exp. to 1GB)
- · Windows NT\* 4.0
- 9:1GB Ultra2 Hard Drive'
- Max Internal Storage of 72.8GB<sup>1</sup>
- 8 Bays: 4 Removable, 4 Hard Drive
- 32X Max CD-ROM Drive
- 10/100 TX UTP NIC
- · 6 Slots: 2 PCI, 4 PCI/ISA
- · Server Setup and Management Software
- Pre-Failure Warranty\*:
   Memory/Drives/Processors
- 3-Year Limited Warranty

## \$3159

#### Lease for: \$106/month

#### Customize with these options:

- 9.1GB to 18.26GB Hard Drive' Upgrade: \$227
- Compaq LN16 Laser Printer: \$1049
   3-Year, 9x5, 4-Hour, On-Site Service

Warranty Upgrade: \$640

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\*Prices shown are Compaq prices; reseller and retailer prices may vary. Prices shown are subject to change and do not include applicable state and local sales tax or shipping to recipient's destination. 'Advertised configurations may vary from award-winning configurations. 'For hard drives and storage, GB-billion bytes. 'CD-ROM data transfer rates may vary. 24X Max from 150 KB/s to 3600 KB/s; 32X Max from 150 KB/s to 4800 KB/s. 'TTU V.90 modems (available on select models) are designed only to allow faster downloads from K56flex- or 900-compliant digital sources. Maximum achievable download transmission rates are currently unknown, may not reach 56 Kbps, and will vary with line conditions. 'Some restrictions and exclusions apply: Call (800) OK COMPAQ for warranty details. 'Financing available through Compaq Financial Services (CFS) to qualified U.S. businesses, subject to credit approval and execution of CFS documentation. Monthly payments are based on a 36-month Fair Market Value lease, and do not include taxes, fees, or shipping charges. Other fees and restrictions may apply and CFS reserves the right to charge or cancel this program at any time without notice. 'Compaq Online Services Free 30-day trial requires Internet access capability. ©1999 Compaq Computer Corporation. All rights reserved. Compaq, the Compaq Logo, and Protignia are registered trademarks, and PremierSound is a trademark of Compaq Computer Corporation. Intel, the Intel Inside Logo, and Pentium are registered trademarks and registered trademarks of their respective companies. Operating system pre-installed on all portable products. Compaq is not liable for editorial, pictorial, or typographical errors in this advertisement, 2600/01/00



Big promises have consumer

watchdogs growling.

# Gotcha! Free PCs Can Cost By Christina Wood a Bundle CONSUMER ALERT THE DAILY PAPER. Your

favorite magazine. The Internet. Everywhere you look, you'll find offers for free and supercheap PCs. But are these deals too good to be true? The Federal Trade Commission, the Better Business Bureau. and various state attorneys general seem to think so. These groups have issued warnings to consumers to think twice before buying.

The problems are myriad. Start with the ads and the fine print. The claim some vendors make that these PCs are free is misleading. To get a "free" or supercheap product, you may have to pay the full price for a PC and for several years of Internet service up front and then wait eight weeks for a rebate. Or you may have to commit to a long-term contract with an ISP, which may run 36 months at \$22 per month for a total cost of \$792. Want to cancel the contract? You'll pay a penalty to opt out. Want to upgrade the included

56-kbps Internet service to a high-speed connection? Your choices may be limited.

Even worse, some companies haven't been delivering on their offers. Washington's state attorney general is now suing Microworkz for, among other things, failing to fill customer orders for its supercheap Webzster PCs. And at least one other company took customers' money and never shipped a thing.

#### GOOD DEAL, BAD DEAL

THOUGH SOME vendors are exiting the bargain PC business and others have toned down their advertising claims, the supercheap computer craze shows no signs of abating. For example, at press time, a new entrant, People-PC, opened its doors with a no-money down, \$25-a-month offer for a computer with three years of Internet access.

This past summer, James Drissel, a software programmer from Boerne, Texas, heard a radio ad offering a free refurbished PC just for signing a two- or three-year contract with FlashNet for Internet service. "It seemed like a good deal, so I jumped on it," he explains. But instead of a computer, all he got was a charge to his credit card. After waiting for more than a month and repeatedly calling the company to no avail, he gave up and canceled his order. "I'm really kind of leery of all the free PC offers," Drissel says now.

He's wise to be wary. Some of the companies making these aggressive offers may be too small or inexperienced to handle the demand for their products. In Drissel's case, FlashNet says the problem >



#### Bye-Bye Packard Bell

PACKARD BELL PCs will soon disappear from store shelves. Parent company NEC has decided to stop Packard Bell retail sales in the United States, after losing more than \$1 billion on the brand. At press time, the company had not completed plans to support current Packard Bell PC owners. NEC could handle remaining warranty and tech support concerns, or it may outsource this work, "The company will continue to support its customers and will fulfill all service agreements and warranty commitments," says NEC spokesperson Beth Makosey. Packard Bell PC owners can track the most current information at www. nec-computers.com.

#### Visor Handheld Delays

AFTER A publicity-filled debut on September 14, Handspring's Visor PDA proved easier to admire than to acquire. Due to problems with order fulfillment software, the company was verifying orders in November that customers originally placed between September 14 and October 20. Customers who did receive shipments sometimes got twice as much as they'd ordered; others were charged sales tax when none was due, or were charged extra for a serial cradle cable that should have been

Here's how to avoid being taken.



GET UP-TO-THE-MINUTE NEWS about company products and Internet happenings from PC World Online's News area, Just

point your browser to www.pcworld.com/pcwtoday.

#### PAY AND WAIT

MICROWORKZ customers understand Drissel's experience all too well. When the company launched the sub-\$600 Webzster PC last year, the 30person company was deluged with offers it couldn't fill. Moreover, it didn't issue refunds promptly. "We weren't ready to be that big," says company founder Rick Latman, who admits that the Webzster episode was a "fiasco." Cus-



# Free-PC Buyer's Checklist

IT'S A GOOD time to get a bargain-priced PC-if you know what you're doing and you avoid fineprint traps. Here are some tips on shopping for a free PC:

- . Do the math. Often you can get Internet service-even from the same ISP-for less than you can with a rebate or free PC offer. Ask about other pricing plans and figure out what the entire contract-including credit card interest-will cost you before you commit.
- · Check to see that the computer you'll get is up to snuff. Some PCs may be too anemic for your needs or may require

tomers who purchased the company's \$200 IToaster this summer also endured problems getting their orders filled.

In the worst-case scenario, the vendor takes your money-and delivers nothing. National Research of Muskeaccessories or enhancements that sour the deal.

- Make sure you can get a local access number from the ISP.
- Watch out for cancellation fees, and make sure you're willing to stay with the ISP for the length of the contract.
- If you're willing to sign a long-term Internet service contract, confirm that you'll be able to upgrade to broadband or other service enhancements when they become available.
- Make sure you'll get the support you need. Some offers require that you pay for support or for a warranty.

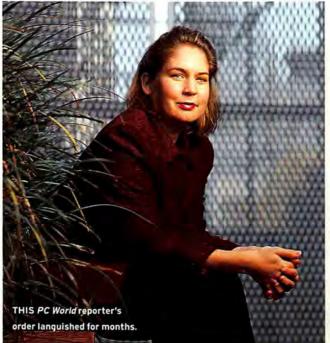
gon, Michigan, allegedly attempted to feed on the free PC frenzy by charging a nonrefundable \$20 "enrollment fee." After investigating this Internet offer, the Better Business Bureau in Grand Rapids, Michigan, reported that National Research received orders for 12,000 free computers.

The consumers sent in their enrollment fees but never received a computer, the BBB says. PC World tried unsuccessfully to contact National Research for this article.

#### MORE BEEFS

EVEN AFTER receiving their ultracheap PC, many customers are unhappy. Better Business Bureaus around the country have received complaints from people whose free PCs didn't work and who subsequently couldn't reach the vendors for support, says Sheila Adkins, public affairs manager for the Council of Better Business Bureaus in Arlington, Virginia. "[A number of consumers | are just getting the runaround," she says.

Louis Smith Jr., a high-tech professional from Staten Island, New York, bought an EMachines' PC for his parents, thinking it would be an easy, inexpensive way for them to get on the Internet. "I spent so many hours on the phone trying to get technical support and troubleshooting a modem problem with that



## How One Reporter Got Burned

IF YOU'RE WONDERING how much a free PC really costs, you may be missing an even bigger pitfall. I ordered a nearly free PC from Microworkz and discovered that just getting such a PC could cost you a monumental effort. Here's my story:

July 20, 1999 I call Microworkz and order the IToaster, for \$196. Neil says I'll receive it on August 15. Neil tells me the IToaster runs the illusive BeOS. Like the Easter Bunny or Bigfoot, BeOS is something most people have heard rumors about but have never actually seen.

August 17, 1999 It's now mid-August-two days since my IToaster was supposed to show. I call Microworkz. After a 10minute wait, Jim answers and says that if I don't receive it by Friday, I should call him and he'll put a track on it.

August 23, 1999 It's been over a month since I ordered my IToaster and a week since its promised arrival. I telephone Microworkz and wait on hold for 14 minutes. Dismita answers. "What's the holdup on my IToast-

## The Smart Shopper's Guide to Fine Print



machine...it wasn't worth the money," he says. In the end, EMachines resolved the problem by sending Smith a check for a new modem, according to CEO Stephen Dukker. Dukker characterizes his company now as being very focused on providing good sup-

port. EMachines outsources all its returns and technical support to a large third-party support company-the same outfit, Drukker says, that handles America Online, Compag, and other big-name players. According to the Better Business Bureau in Orange

County, California, where the PC seller is based, EMachines has resolved most of the complaints the bureau has received about it.

Another source of frustration for many consumers are the rebates that many dirtcheap PC offers involve. At free. Handspring let dissatisfied customers cancel their orders. The company says it was back on schedule in mid-November.

#### AOL Open to All?

THE NATIONAL Federation of the Blind has filed a lawsuit against America Online, charging that the company violates the Americans with Disabilities Act. AOL's Internet service is incompatible with screen access software that describes text and on-screen events out loud for the blind, the suit alleges. The group wants the court to order AOL to redesign its service. AOL representatives declined to address specific charges, but said AOL will release a new version of its software in 2000 that will address the issue. (AOL's Macintosh version already works with text reader software.)



#### **Tidbytes**

Not the iMac, the iPag: Early this year, Compag plans to ship the iPag, a simplified Windows 2000 system designed for businesses. The machine, which will sell for \$499, eliminates some legacy components; for example, it will not have any ports other than USB for peripheral connections. HP's E-PC: Hewlett-Packard has announced that it will roll out a basic Windows 2000 machine for surfing the Internet in March or April; some corporate customers will get to try it out earlier. The system is expected to have a compact, colorful case. At press time, pricing had not yet been determined.

# by the IToaster

er?" I ask. She says the company will ship it next week. If it's not here by Friday, I can call her and she'll track it. Déjà vu.

September 9, 14, 24, 1999

No IToaster, I call the company and each time a different rep tells me, "There's a bit of a back order. We hope to send your IToaster next week. If it's not there by Friday, call and we'll...." Yes, I know. You'll track it.

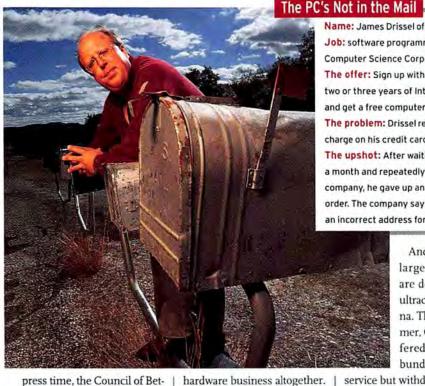
September 30, 1999 My IToaster is still MIA. I get angry. I call the company to vent my frustrations on feckless Microworkz phone staff. But Microworkz has discontinued its tollfree customer support lines. I call long distance to Washington state. The rep (Graham) says the company is no longer selling IToasters direct. "There are some big changes going on with the company." So I ask him, "Do these big changes include going out of business?" Graham assures me that's not part of the plan. I'll get my lToaster on October 18, he says.

October 19, 1999 The PC doesn't arrive. I've been burned by the IToaster, I call the company at 2:40 p.m. Pacific Stan-

dard Time and receive the following message, "Thank you for calling Microworkz customer service. Our normal business hours are from 8:00 a.m. to 5:00 p.m. Pacific Standard Time, Monday through Friday. Please call back during those hours. Thank you." Click.

November 4, 1999 While my credit card has never been charged, I decide that Microworkz has cost me plenty of time-enough for a couple of movies or a golf game-and I cancel my order. Microworkz, I'd like those hours of my life back.

-Michelle Campanale-Surkan



hardware business altogether. Grandahl says FlashNet no longer offers free PCs. Latman says Microworkz is now a software and e-commerce company and hopes to settle with

Washington's state attorney

Name: James Drissel of Boerne, Texas Job: software programmer for Computer Science Corporation The offer: Sign up with FlashNet for two or three years of Internet service and get a free computer.

The problem: Drissel received a charge on his credit card, but no PC. The upshot: After waiting more than a month and repeatedly calling the company, he gave up and canceled his order. The company says that it had an incorrect address for Drissel.

> And at least two large companies are departing the ultracheap PC arena. This past summer, CyberMax offered a cheap PC bundled with Net

service but withdrew the offer when the price of memory jumped and ate up profits. Micron PC launched a free PC offer on the Web but abandoned it in late August.

Still, giveaway PCs are hardly an endangered species. In

fact, some low-cost PC vendors are thriving. EMachines sells its aggressively priced computers in retail outlets like Best Buy and Staples. AOL, CompuServe, and Prodigy offer a \$400 rebate on EMachines units-as well as on other systems-when you sign up for their Internet services. EMachines' positioning seems to be working: Its share of the consumer PC market has shot up from nothing a year ago to 9.5 percent in the second quarter of 1999, making it the number three vendor in this growing category.

Some big-name vendors remain in the rebate game as well. Dell currently offers a rebate similar to the one the largest ISPs are dangling: \$400 back on any Dimension or Inspiron system when you order it and sign up for Dell's Dellnet Internet service.

Other vendors have put together offers that address key consumer concerns. Since some people don't want to commit to three years of lowspeed Internet service, CompuServe plans to allow customers who buy a PC with the ISP's rebate program to upgrade to DSL or cable access once the company offers those services, says CompuServe spokesperson Anne Bentley.

In the end, if you don't want to fork out a lot of money up front, a supercheap PC and ISP bundle may have lots of appeal. If so, you may want to act quickly, as rebate offers tend to be short lived. Just don't get so focused on price that you forget to shop around for the computer and Internet service you want. And remember to read the fine printthat's where a free PC can become too expensive.

# general before going to trial. THE FREE

## Win the Rebate Game

- · Check the expiration date on the rebate offer before you leave the store.
- · Read all the fine print on the rebate before you buy. If the rebate offer is inside the sealed box, ask a salesperson for a copy you can read.
- Make copies of all your receipts and of the offer itself. If something goes awry, you'll have documentation.
- Keep the boxes that the computer and monitor came in. If the vendor loses your paperwork, you may need to send in another UPC code.
- Sign the rebate agreement.

- The ISP cannot sign you up for service without your signature.
- Write or type your correct name and address legibly. The post office will not forward rebate checks.
- Make a note of when you sent in the rebate form and watch the calendar to make sure you get your check within the time promised.
- Watch your incoming mail carefully. Many rebate checks look like junk mail.
- Set aside some dough-you'll probably start paying for your Internet service before the rebate check arrives.

#### **FUTURE OF FREE PCs**

ter Business Bureaus hadn't

received any complaints from

consumers who didn't get

their free PC rebate in a rea-

sonable amount of time (and

PC World received only a few).

But these offers are still rela-

tively new. Rebates on other

computer products-which

are a common sales gimmick

in the industry-generate fre-

quent complaints to PC World.

Mackintosh of Bayonne, New

Jersey, bought a Diamond Rio

MP3 player in part because of

a \$50 rebate. He sent in the

requisite paperwork, but his

money never came. The com-

pany blames its fulfillment

house for such rebate prob-

lems and says that it has since

taken care of Mackintosh's and

other customers' rebate woes.

For instance. Thomas W.

CONSUMERS aren't the only ones dissatisfied with free or nearly free PCs. FlashNet and Microworkz are leaving the

## EarthLink to AOL Members: We've Got Better Mail

PREVIEW EARTHLINK is spending over \$200 million on an ad campaign to convince you that it's hot and beats America Online hands down. Should you listen up? Absolutely. Revamped software, solid services for small businesses, a good customer service rep, and bol-

stered resources from an impending merger with MindSpring (www. mindspring.com) all make EarthLink (www. earthlink.com) deserving of consideration.

The merger, expected to be completed in January, makes EarthLink the nation's secondlargest ISP. But even with a combined customer base of just over 3 million users, compared with AOL's 18 million, it faces quite a battle.

#### **EARTHLINK 5**

THE NEWEST version of the EarthLink software is a strong start. We previewed the package, which debuts in December with benefits for all Net users. For beginners, useful video tutorials demonstrate how to use e-mail, surf the Web, and shop online. More advanced users can easily turn off the annoyingly cute robots.

In addition, for the first time EarthLink users get chat features, and one-window integration of browsing and email functions-a longtime AOL benefit. In fact, version 5 lets you surf the Net, compose e-mail, and create your Web page from a single menu. And

if you don't like EarthLink's interface, you can use your favorite e-mail program-an option AOL doesn't allow.

The \$22-per-month Family Pack service gives you up to six e-mail boxes, a deal that's competitive with other ISPs'

Mo

offerings (AOL offers 7 boxes).

EarthLink offers business reference information and Webhosting programs with full ecommerce features (such as shopping carts). It also recently made it simpler for small businesses to obtain merchant accounts that enable online credit card orders. The Mind-Spring merger also gives

services, AOL refers you to its preferred partner, Verio, or suggests MindSpring, among others. Though AOL says it has plans to improve services, it has yet to release details.

#### **BROADBAND BATTLES**

OVERALL, industry analysts agree that EarthLink's merger with MindSpring

will result in better service for customers.

For EarthLink to be successful in the long run, however, it must accelerate deployment of broadband services, says Boyd Peterson, a vice president for telecom research firm the Yankee Group. America Online has struck many broadband deals, but hasn't rolled out the fast connections to many customers yet.

Meanwhile, the proposed merger between Sprint and MCI Worldcom will most likely be good news for EarthLink. If the Federal Communications Commission approves that merger, then EarthLink Internet access would likely become part of a one-stop shopping bundle from MCI Worldcom, along with wireless, long-distance, and local telephone services. This merger isn't expected to be finalized before 2001, however,

For now, EarthLink's new software and services give Internet newbies, disgruntled AOLers, and small businesses plenty of reason to consider an ISP switch.

—Anush Yegyazarian >



er and e-mail options. Personal start pages are now more customizable; a new "Sidecar" area streams in stock quotes or headlines. Also, simplified spam-fighting tools make it easier to screen junk mail. Soon, EarthLink plans to add Instant Messaging, using, ironically, AOL's IM software.

AOL's strength remains its custom content. EarthLink will license content like search and shopping tools, but won't create its own material.

#### SMALL-BUSINESS EDGE

FOR SMALL-BUSINESS CUStomers, EarthLink has an undeniable edge over AOL. EarthLink members access to MindSpring's Biz programs. These services include consultants who can help you create or improve a Web site (not just offer you templates), and robust high-speed access services, including installing and monitoring a dedicated T1 line.

AOL currently provides small businesses little more than it does any other customer. That includes a home page in AOL's Business Park, multiple addresses, and referrals to business-oriented sites or information. For more comprehensive e-commerce site

# Coming Attractions: The Processors of 2000

ANALYSIS WANT A SNEAK PEEK at the PC industry's scripts for the year 2000? We'd call one of them "There's Something About Megahertz," and it stars a one-gigahertz processor. The industry's cranking up the speed and trying to tease you with fancy words like "copper interconnects" and "Itanium." Here's the inside scoop.

#### MEGAHERTZ MAGIC

AT OCTOBER'S Microprocessor Forum, the annual gathering of CPU clans, we heard one sentiment repeatedly: Consumers can be fooled with a magic rating called megahertz. That is, most buyers do little research when purchasing a new computer-they just pick the machine that has the biggest MHz number. "Megahertz is all people care about," says Glenn Henry,

# Where the Chips Fall

PLOTTING when to buy your next PC? Here are the estimated shipping dates for this year's most anticipated new processors.

- First quarter: 800-MHz AMD Athlon
- Second quarter: 800-MHz Intel Pentium III
- Late second quarter: Intel 64-bit Itanium processors for workstations and servers
- Late second quarter: Intel Timna for bargain PCs, Via chips for bargain PCs
- Fourth quarter: 1-GHz AMD Athlon, 1-GHz Intel Willamette

president of Centaur Technology, maker of low-end CPUs.

That being said, it's up to buyers to know better. Don't confuse CPU clock speed with PC power. An extra 50 MHz

may look appealing, but it doesn't usually boost application performance much. For example, Pentium III-550-based systems we've tested on average run business apps only 5 percent faster than their PIII-500 counterparts do, despite having a 10 percent speed advantage.

Be just as wary when you're considering systems based on bargain-

basement chips. Via Technologies, the new owner of Cyrix and Centaur, plans to produce sub-\$50 chips for sub-\$1000 PCs. Analysts predict these systems will ship midyear with attractive MHz ratings. But they may not run real-world applications as well as those based on Intel's Celeron, because Via's overall chip design may not be as efficient.

Of course, sometimes more speed does amount to more performance. For example, Intel's latest Coppermine PIIIs have high clock speeds plus a 256KB on-chip secondary cache-and this addition to the PIII design is responsible for supercharging Microsoft Office apps. You should see even more impressive speed gains as the year wears on. AMD says to expect 800-MHz Athlon chips early in 2000, 900-MHz Athlons in late first quarter or early second quarter, and 1-GHz Athlons by the fourth quarter. From Intel, analysts expect



800-MHz PIII chips during the second quarter, and the Pentium IV chip, code-named Willamette, by the end of the year. Willamette is expected to handle more simultaneous instructions than the PIII, and to break the 1-GHz barrier. The accompanying chip set will likely support a 200-MHz system bus, like the Athlon's.

#### COOL COPPER

CLOCK SPEED isn't the only hot topic involving processors. AMD has some manufacturing tricks up its sleeve. At its new plant in Dresden, Germany, AMD is sampling .18micron Athlon processors using copper interconnects (today's chips use aluminum). Copper enables lower voltages and accelerates exchanges between transistors. AMD also plans to add an on-die L2 cache to its Athlon chips.

Furthermore, by late summer, the industry marquee will probably feature a lowcost Intel chip code-named

> Timna that integrates graphics and sound capabilities.

> Finally, Intel's Itanium is expected to arrive midyear. This chip, formerly known as Merced, will enable 64-bit computing. Compared to today's 32-bit processors. Itanium can handle more main memory and manage huge chunks of data-such as a 3D model of an airplane or an online

store's customer database. It suits workstations and servers.

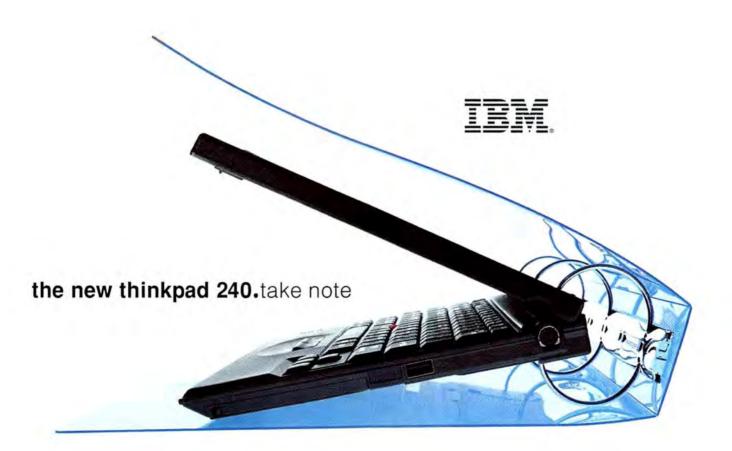
But don't look for Itanium PCs anytime soon. Software has yet to be written or recompiled to accommodate a 64-bit processor. An Itanium machine will run today's 32-bit apps, but it'll run them no faster than a middle-of-theroad PIII system can.

"Itanium won't be relevant for PCs until 2003 at the earliest, more likely 2005," says Michael Slater, an analyst at MicroDesign Resources. So forget about Itanium unless you're designing next year's monster sports utility vehicle.

When considering the PCs of 2000, however, judge them by more than their megahertz ratings-or you could buy a tale with an unhappy ending.

-Laurianne McLaughlin





real light, about 2.9 lbs? real thin, about one inch\*, real ThinkPad\* keyboard, real ports, real power, it's a mini-notebook, it's a real notebook, it's a ThinkPad, real facts: Windows\* 98 (also supports Windows NT\* Workstation\*), mobile Intel\* Celeron\* processor up to 366mhz, from \$1,899.

# Move Over, Mr. Coffee— Here Come Net Appliances

WHAT'S THE PRICE of that Net stock you've been tracking? Better boot up the PC, wait for Windows to load, dial in to your ISP, launch the browser...you get the idea. The PC may be the Swiss Army Knife of the information age, but it isn't the best choice for quick and easy Net access.

Internet appliances—low-cost devices that handle e-mail, Web browsing, and little else—do the job faster. This year, you'll see a plethora of such gadgets, designed for the small office, living room, or kitchen. They won't replace PCs, but do you really need or want a 12GB hard drive, a space-hogging monitor, and a

stable of finicky software wherever you'd like to access the Net?

Even industry giants like Microsoft and Compaq now acknowledge that Internet appliances have a place in the home. Here's a preview of three new devices, and what you can expect to see this year.

#### PLUG AND BROWSE

NETPLIANCE'S I-

opener, a slim terminal-style device consisting of a flatpanel color display and a keyboard, exudes simplicity. Plug it into a power outlet and phone jack, and it'll automatically connect to the Internet and configure itself for e-mail and Web browsing. Netpliance acts as your ISP; the company will enter a local access number into the device before shipping it. Priced at \$199 (plus \$22 per month for the ISP contract), I-opener is shipping now.

Based on my evaluation of a preproduction version, Web pages look good on I-opener's 10.1-inch display, and the proprietary browser is easy to navigate. However, because the unit is tethered to the wall, it's not convenient for, say, reading Bloomberg.com while lounging on the sofa.

A better alternative may be Oubit Technology's Web Tab-

VTECH'S E-Mail
Traveler is for home
and travel use.

let (the product name was not final at press time). Resembling the childhood toy Etch-A-Sketch, this wireless gadget incorporates a 10.4-inch color LCD. It uses radio signals to transmit data to a wall-connected base station. You can send e-mail and surf the Internet using the unit's touch screen, stylus, or bundled wireless keyboard.

QUBIT'S Web Tab-

let moves around the house with you.

Qubit expects the 2-pound product, which was not ready for hands-on testing, to begin shipping between April and

> June for about \$350; the price of the ISP contract has not been set yet.

If you need a device just for sending and receiving e-mail messages—not for Web browsing—VTech Industries has some less expensive options. I tested a shipping version of the \$80 E-Mail Express, a handheld portable de-

vice that connects to a phone jack. Even with a small LCD and keyboard, I found this product acceptable for writing short messages. During the first quarter of 2000, the company also plans to ship the \$150 E-Mail Traveler, a 6ounce handheld unit. It has a touch screen, stylus, and detachable base station with a full-size keyboard. You must use VTech as your ISP; service costs about \$100 per year.

#### IN THE WORKS

A WAVE OF OTHER Net appliances is expected to hit shore during the first quarter of 2000. WebMachines' Quick-Silver, a \$299 console with a 15-inch CRT monitor, is conceptually similar to the I-opener. Landel Telecom will ship a new \$99 version of its Mail-Bug e-mail terminal-\$50 cheaper than its original incarnation. On a more exotic note. Diamond Multimedia, known for its Rio MP3 audio player, is considering a wireless device that would play music from Net-based radio stations.

Not surprisingly, industry titans want a piece of the action, too. Microsoft, for example, wants Net appliances to use Windows CE and is pushing its own vision of the Net appliance, called the MSN Web Companion. And of course, Microsoft would

PC 300PL

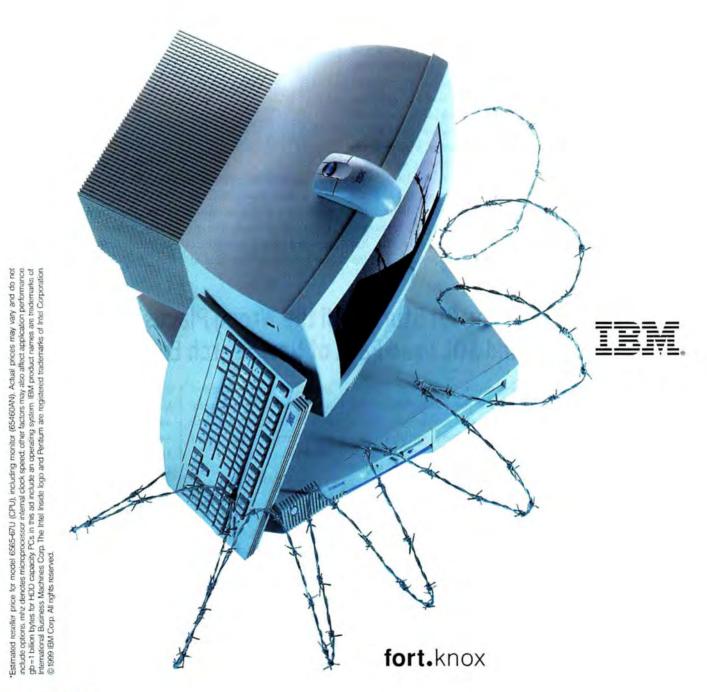
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like hardware makers and/or ISPs to sell the e-mail and Web browsing device in conjunction with MSN accounts.

#### E-Mail Express, E-Mail Traveler

Street prices (not including ISP contract): Express \$80, Traveler \$150; VTech Industries; 888/468-8324; www.vtechworld.com

PRODUCT INFO NO. 716

#### I-opener

Street price (not including ISP contract): \$199; Netpliance; 888/467-3637; www.netpliance.net

PRODUCT INFO NO. 717

#### Web Tablet

Street price (not including ISP contract): \$350; Qubit Technology; 303/864-0767; www.qubit.net

PRODUCT INFO NO. 718

The first devices are planned to ship this summer.

But appliances not using any flavor of Windows may be more popular, since alternative OSs cost less. (Qubit uses the Linux OS in its Web Tablet; Netpliance uses an alternative OS called QNX.)

Compag, too, is considering introducing an appliance with a flat-panel display and e-mail and Web browsing capabilities in the first half of 2000, says spokesperson Hedy Baker. And Gateway, which recently inked an alliance with America Online, isn't likely to let Compag corner this market.

Competition will undoubtedly increase as the number of U.S. households with Net appliances (including set-top



boxes) skyrockets from about 3 million in 1998 to more than 37 million in 2002, as estimated by Jupiter Communications. By then, the idea of

booting up the PC to check a stock price may sound as outdated as cranking up the oven to reheat dinner.

-Jeff Bertolucci

# Looking for Stuff in All the Wrong Places? MSN and AOL Lead Pack of New Search Engines

EVERY SECOND, 25 new Web pages are added to the 1.4 billion already on the Net,

according to the NEC Research Institute. Given this, finding the page you want can be a massive chore, even with the multitude of search engines available. To help you, Microsoft and AOL have revamped their search engines. They're leading a trend to combine the strength of technology with the discretion of human intelligence to deliver meaningful hits to frustrated users.

By employing multiple techniques, Microsoft's MSN (www.msn.com) makes good on its promise-we found what we were looking for quickly every time. In contrast, AOL (www.aol.com) offered results that were no betterand sometimes worse-than those of search-engine mainstay Yahoo (www.yahoo.com).

In addition to the old standbys like Yahoo and HotBot (www.hotbot.com), a flurry of new entrants-some of them with unusual monikers-have popped up, all touting superior search methods. We separate the helpful from the hype.

Most search engines return results in one of two ways: They either "crawl" Web sites to index keywords that appear in the site, as the classic AltaVista (www.

SEARCH NEWCOMER GuruNet gives definitions, background, and useful links.

altavista.com) did (the site now uses a combo of search methods), or they use human editors to hunt down and classify URLs, as Yahoo does,

#### MSN ARSENAL

IN REVAMPING MSN.com. Microsoft rebuilt MSN Search from scratch. The revved-up engine includes "built-in intelnew popularity ranking system, seasonal cues, and the aid of human editors. This everything-in-the-arsenal approach seems to work. Say Thanksgiving is approaching and you're looking for turkey recipes. When you search for "turkey," MSN's engine makes the connection between "turkey" and the time of the year and guesses that you



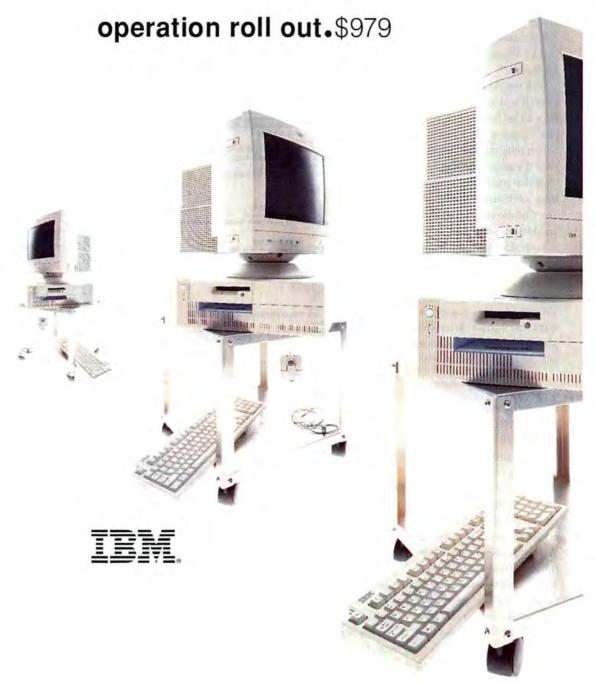
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want recipes, not information about the country. So up top, MSN Search displays Microsoft's recommended recipe and cooking sites. In case it has guessed incorrectly, you also get categories that lead you to sites about Turkey. Plus at the bottom of the page, it lists the most popular sites visited by others who searched for "turkey."

With the HotBot and Yahoo

sites, if you type in "turkey" instead of "turkey recipes," you'll have to dig further to obtain relevant sites. In addition, if you're searching for a topic that has multiple meanings, such as the movie The Ten Commandments, Yahoo and HotBot force you to wade through a lot of religious categories and sites before scaring up a URL or two that you might want. In contrast, Microsoft placed the desired choice in one of its initial five categories.

#### **AOL FALLS SHORT**

NOT TO BE OUTDONE by Microsoft, AOL debuted a new AOL Search that also couples human editors with smarter technology. Central to AOL Search is subsidiary Netscape's Open Directory Project-a Yahoo-inspired, handcrafted index of over a million Web sites assembled by contributors from the Web, AOL Search returns results similar to Yahoo's: The more specific your search, the more accurate the results. With topics that have multiple meanings, you might end up paging through dozens of categories.

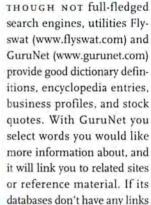
Moreover, AOL's biggest search improvement benefits only AOL members. Before, AOLers could only search within sections-for example, you couldn't look up sports info from the genealogy section. Now you can scour all of AOL from any section, but only members can get access to the ISP's internal content.

#### THE UPSTARTS

GOOGLE (www.google.com) and Oingo (www.oingo.com) are part search engines, part new technologies. When

Oingo recognizes that if you type "cars," you're also looking for automobile sites. It then drafts you into refining your search. If you enter an ambiguous term like "turkey," it will cue you to clarify whether you mean the country, a kind of poultry, or a synonym for "flop." Its interface needs more work, but the site does return pertinent results.

Then there's newcomer



**BROWSER ADD-ONS** 

or references on hand, you can order it to search the Web. And GuruNet works within any Windows application.

Similarly, browser addon Flyswat searches pages you visit and generates links to related content based on key words it recognizes. Flyswat then adds an off-yellow hyperlink to the identified text on the page. The utility's biggest drawback: Because it constant-



returning results, Google considers both the number of sites that link to a given page and the importance of the sites doing the linking. So if you search for "turkey," you will get a list of "turkey" sites that reputable pages link to most often. This is a good approach if you don't have a specific site in

mind, or if you use unambiguous search terms. Otherwise, forget it-you'll be wading in results for weeks.

Like AOL, Oingo searches the Web utilizing the Open Directory Project, but then uses human editors to create a lexicon of associations. So



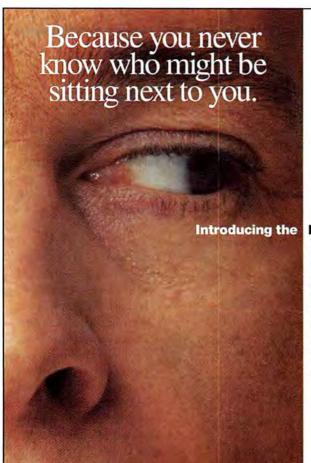
debuting in Jan-

uary. Albert generates a profile of you and your search habits, and then uses that information to help fine-tune your future search results. Like Ask Jeeves (www.askjeeves.com), Albert also permits you to pose your query as a natural language question.

hogs bandwidth. Plus, if Flyswat recognizes too many words, pages may look messy.

The days of hyping millions of hits are over. If you're tired of sifting through irrelevant results, try MSN Search. It may be your best resource to date for getting the information you want, fast.

-Tom Spring



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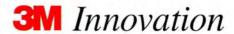
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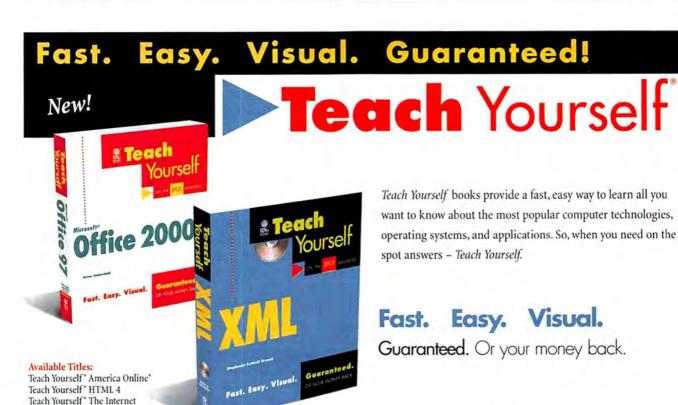
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### Toshiba Will Pay Notebook Owners for Flawed Drives

are entitled to a software patch

to fix the bug and a \$100

coupon for Toshiba products.

If the notebook was under

warranty on or after March 5,

1999, you can choose from

HOW MUCH is your data worth? Well, if you're one of the millions of people who bought a Toshiba notebook in the last 14 years, the answer could be as much as \$668 in cash and coupons. The payments, which could total \$2 billion or more, will settle a class-action suit claiming that Toshiba sold notebooks with defective floppy drives.

The plaintiffs, two Texas men, allege in their suit that Toshiba knowingly used a flawed controller chip that could cause data loss. Their attorneys are also suing a number of other PC makers that used the same controller, including Compaq, Hewlett-Packard, and NEC. Toshiba, which declined to comment for this article, acknowledges that a potential problem exists, but denies wrongdoing.

"The industry wants to believe [the floppy drive is] not a real problem," says a spokesperson for Wayne Reaud, an attorney for one of the plaintiffs. "It is a real problem and it poses real dangers. You can no longer trust the data entering and leaving your machine."

### PLAYING IT SAFE

WHILE A PROBLEM may exist, neither Reaud nor analysts contacted by PC World have reported seeing a case outside the lab in which the flaw in the controller chip actually led to lost data. Martin Reynolds, chief technology analyst for GartnerGroup Dataquest, says that theoretically the flaw could appear when a user stresses the system by run-

ning several demanding programs (like video) while saving data to a floppy. Randy Giusto, an analyst for International Data Corporation, says the suit has little merit, but it costs vendors less to settle.

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YOU PURCHASED OR LEASED A TOSHIBA
DISSIGNED FOLC.

that its floppy controllers don't lose data under normal conditions, Toshiba will provide a free patch, coupons for future Toshiba products, and even a cash rebate to certain customers. If you bought a Toshiba notebook made since January 1, 1985, chances are you'll benefit from the settlement.

The company's Libretto mininotebooks, which lack a

floppy drive, as well as its desktop systems and servers, are excluded from the claim.

The older your notebook, the lower the remuneration. If your laptop's warranty expired before March 5, 1999, you fix, or a coupon for a PC Card floppy drive. These options don't require proof of purchase. One award is available per notebook serial number.

If you do have a proof of purchase and you bought the computer after March 5, 1998, you qualify for a cash rebate of \$210 to \$443, plus coupons, and either the software patch or hardware fix. Users who

bought their notebooks in March 1998 receive the lesser amount; those who bought in December 1999 get the maximum. Claims must be filed by June 3, 2000.

### RELATED SUITS

MEANWHILE, OTHER plaintiffs have filed similar suits against Compag. EMachines.

HP, and NEC. Compaq will fight the charges, said company spokesperson Alan Hodel. An Emachines spokesperson told us that the company has been served with a suit as well, but notes that EMachines didn't begin shipping PCs until October 1998 and didn't ship laptops until November 1999. At press time, NEC spokesperson Ron Fuchs said that the company had received a courtesy copy of the suit, but no formal papers yet. Hewlett-Packard declined to comment.

So what's a Toshiba owner to do? Before the lawsuit, PC World had not heard any complaints about the allegedly defective floppy drives. But why take chances? To make a claim, call 888/353-8138 or visit www.csd.toshiba.com/tais/csd/support/fdc/index.html.

—Alexandra Krasne and Michael Gowan

### **How the Settlement Works**

Toshiba notebooks made in 1985 or later have a floppy-drive controller chip with a flaw alleged to cause data loss. Depending on the age of your machine, here's what you've got coming:

If	then you're entitled to	
your laptop's warranty expired before 3/5/99	a software patch and a \$100 coupon for Toshiba products	
your notebook was under warranty on or after 3/5/99	a software patch and a \$225 coupon for Toshiba products, a \$200 coupon and a hardware fix, or a PC Card floppy drive	
you bought the laptop after 3/5/98 and you have a proof of purchase		

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### "Fastest system ever"



October 1999



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### ViewSonic Launches First Digital CRTs, But They Won't Leave You Breathless

FIRST LOOK

IF YOU'VE shopped for LCD monitors lately, you know that they come in two flavors: analog and digital. In contrast, CRT displays have historically been an analog-only platform. That's about to change.

In January, ViewSonic will introduce the first digital CRTs-monitors that require the same special digital video adapters used by digital LCDs. Other vendors will follow, though not for six months or more. But judging from our tests of a new ViewSonic prototype, most consumers should consider their digital CRT purchases carefully.

First, a quick primer on video signals. All the images that your graphics card produces start out as digital data. Typically, your graphics card converts the digital signals into analog form so your CRT monitor can display them properly. Digital CRTs require an analog format, too. But in these monitors, the circuitry inside the monitor. not the graphics card, does the digital-to-analog conversion.

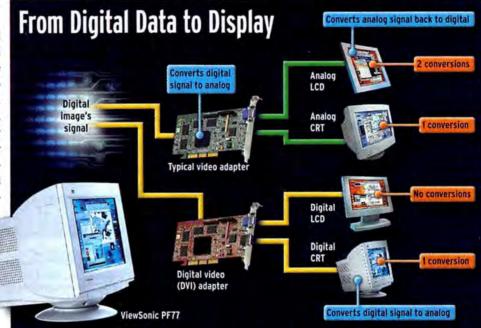
ViewSonic says this should improve image quality. Why? On conventional systems, monitor vendors have no control over the graphics adapter that produces the analog signal. A poor-quality adapter may generate an inferior sig-

### ViewSonic PF77 and PF97

List price: PF77 \$429, PF97 \$625; ViewSonic; 800/888-8583; www.viewsonic.com

PRODUCT INFO NO. 741

nal, which typically degrades further as it travels over the cable to the monitor. Having the monitor convert the digital signal, digital CRT supporters say, will increase the accuracy log)-poor graphics ratings lowered its overall ranking. Images looked flat, grayish, and duller than those of the top-rated CRTs. On the other hand, the PF77 consistently CRT for corporate buyers may be that it will allow standardization on a single video interface. Today most graphics boards only support analog connections. But a few have begun to support digital, using a standard called DVI, or digital video interface. By buying DVI-compliant CRTs, such as the ViewSonic PF77, corporations will be ready for an all-



ALL VIDEO DATA STARTS OUT in digital form. For CRT monitors and analog LCD panels to display the data, it must be converted to analog form. But with every conversion, the signal degrades and image quality declines. Analog and digital CRTs both require one conversion. Digital CRT vendors claim that making the conversion in the monitor (instead of in the video adapter) yields superior image quality.

of color depiction, a concern for people who work with high-end graphics and e-commerce applications.

Though PC World has no test suite for color calibration, in our standard Top 10 Monitors tests, a preproduction ViewSonic PF77 17-inch digital CRT disappointed us somewhat. (Viewsonic also plans to release a 19-inch model, the PF97.) While its text scores were generally good-though never the highest in our test group of eight displays (which included both digital and anascored higher (albeit only slightly) than an analog unit from ViewSonic.

### ADDED BENEFITS

DIGITAL CRTS provide ancillary benefits as well, or so ViewSonic and other vendors claim. If you need to place a monitor far from your PC (for a retail display, say), you can connect a digital CRT to a PC with a cable up to 30 feet long without hurting image quality. The image on an analog monitor degrades after 6 to 8 feet.

A key benefit of the digital

digital future. And DVI has built-in antipiracy protection for DVD movies and other copyrighted content-a big plus for major media firms.

Still, for most consumers, ViewSonic's digital CRT appears slightly ahead of its time. Extra circuitry makes the PF77 \$20 to \$50 more expensive than comparable analog units without delivering significant image improvement.

High-end graphics users may want to investigate, but the rest of us are wiser to wait.

—Yardena Arar ■

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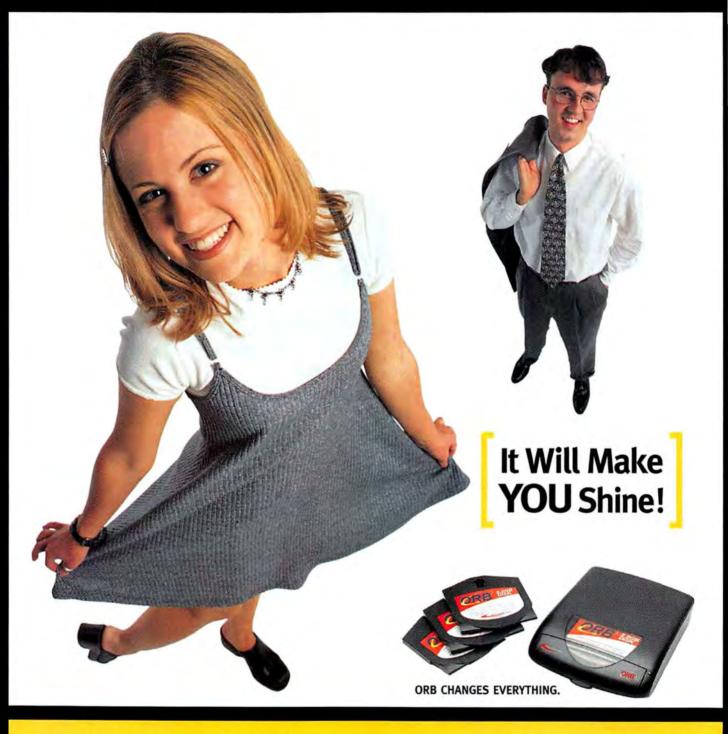
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# FIGES PEGES

The good news is that you can be almost as productive on the road as you can in your office, assuming you make wise technology choices. That task is made difficult, though, by the wide array of products competing for your heart, mind, and wallet. And, status symbols aside, having too much gear while traveling can be worse than having not enough.

But fear not, there are ways to cut through the morass.







Take a deep breath, and then ask yourself: What do I really need to do on the road, and how can technology help? There's a huge difference in price (and weight) between the setup needed to make video presentations to clients or checking some e-mail and keeping a contact list handy. Presentations require a top-of-the-line (read: expensive) PC and a kick-butt monitor, with good-quality speakers and perhaps a sound system. This could cost you \$15,000 or more, versus a few hundred dollars for a Personal Digital Assistant (PDA) like the PalmPilot or one of its ever-increasing kin.

Some questions to ask yourself to help figure it out:

What do I need to do while traveling? (What business functions do I need to do while on the road – writing a business proposal, researching new prospects' businesses, keeping my agenda handy and updated?)

- ► How often do I travel? (People on the road three or four days a week are generally less tolerant of heavy gear than those who venture out once a month.)
- ► Do I need to access my home office computer from afar? Do I need to tap into the Internet to retrieve email? With whom am I communicating, how frequently, and with what types of files (standard text,

photos, or drawings)?

- What type(s) of customer presentations am I doing, if any? Words, versus photos with music?
- ➤ Will this mobile setup be needed by more than one person? How many PCs/phones/ gadgets am I buying?

Okay, now get into your "wish list"

- what you might want in a mobile setup that isn't absolutely essential, but that would improve your quality of life. Hey, traveling on business isn't all it's cracked up to be, as road warriors know only too well. So if a high-quality CD player with boffo speakers will help you relax on those long plane trips by listening to Mozart or the Beastie Boys, and you can afford the extra expense, go for it. SUPPLEMENT SPONSORS:

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The lesson: Know what you want, versus what you absolutely must have to get your job done. "You have to plan to make it work," says Terry Lonier, chief executive officer of Working Solo Inc., a consultancy in New Paltz, N.Y. Even experts sometimes learn the hard way:

continued on page 6

# THE SHOW MUST GO ON

### EPRESENTER IS A ONE-STOP RESOURCE FOR HELP AND EQUIPMENT NEEDS

Does this sound familiar? You're on the road, about to make the Big Presentation to the most important client

of your life. You've organized all the slides and have run through the presentation about 376 times, but something's missing...the WOW!

Or, maybe you've got the WOW! – but the day before your meeting, everything changes. Your company launches a brandnew product line that will make all the difference to your client, and now everything from the product photos to the graphics on the slides is all wrong. You have to change virtually all the slides. No worry, ePresenter has everything from digital cameras to the latest PowerPoint plug-ins to help you meet your deadline.

Proxima Corp., San Diego, has recently launched www.epresenter.com, a one-stop shopping place for presenters, and it's chock-full of the latest products and equipment to make your presentations and meetings shine. You can "Ask Doctor Know" how to fix up your slides in time for the meeting or get the latest presentation tips, tricks, and techniques. You can also buy the latest presentation software or even download a free PowerPoint template.

If your projector needs a tune-up, relax. ePresenter.com stocks replacement lamps, cables, and other accessories for your projector. You can even arrange for leasing, right there on the site, for anything they sell.

There's an information area called "Meeting Miracles" that talks about state-of-the art technology to facilitate all types of meetings, including videoconferencing and collaborative workgroups. And there's a special section on the site for presenters in the government, corporate, and education sectors with information and discounts.



Proxima's www.epresenter.com site is designed to be the one-stop shopping place for road show warriors.



### Or, just one SuperDisk.

Something's telling you your needs are growing. In fact, it's written all over your screen. For increased capacity, nothing makes more sense than the SuperDisk drive - the two-in-one drive compatible with 120 MB SuperDisk diskettes, the equivalent of over 83 floppies, and backwards compatible with your old 1.44 MB floppies. Now, you don't have to throw out the old to get the new.

With the SuperDisk drive, you can still use all of your old floppies and files. And, you can use Maxell SuperDisk diskettes and enjoy the best of our multimedia world. What's more, Maxell SuperDisk diskettes use the same reliable technology as floppy disks and function in virtually the same way.

So don't settle for an ordinary drive. Get a SuperDisk drive. It's the higher capacity drive that hasn't forgotten some very important things. Your old floppies.







### HERE, IN NO PARTICULAR ORDER, ARE SOME OF THE MANY CHOICES AVAILABLE TO YOU IN AN EVER-EXPANDING MARKETPLACE, AS WELL AS SOME UP-AND-COMING TECHNOLOGY TRENDS TO WATCH FOR.

- ► Acer America Corp., San Jose, Calif., ACER TRAVELMATE 340 recently launched its TravelMate 340 notebook family, which sports an ultra-speedy Intel Pentium III 500-MHz processor and a full-sized keyboard. The four-pounder comes standard with all the ports you'll need, including one that hooks up a unique external CD-ROM/floppy drive. A modem and a LAN connection provide SONY CSI PROJECTOR Internet access, and the computer supports video mail and video conferencing. Prices start at \$1,999 for the model 340T.
- ► For connectivity on-the-go, check out the PortStation, also called a Port Expansion System, from Xircom Inc., Thousand Oaks, Calif. Let's say you need to connect to your office computer, your client's network, and your home PC, and they're all on different types of communication systems. No problem. With PortStation, you can mix-and-match Ethernet, 56K modem, cable modem, and ISDN, among others. You can buy a starter kit, which has the most common ports already snapped together and ready to roll, for prices starting at \$139. Or you can order individual modules for your specific needs for prices starting at \$54/port.
- For anyone who needs to give presentations, this is worth checking into. Sony Electronics Inc., Park Ridge, N.J., has taken the wraps off its newest LCD data projector. The CS1 SuperLite is a network-friendly model that allows a computer to control up to 127 different projectors. You





XIRCOM PORTSTATION



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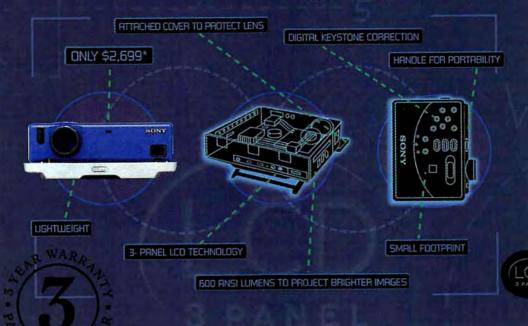
- can launch a presentation with the touch of one button. The device weighs only 6.4 lbs. and it uses three LCD panels for high-quality images. Suggested retail price is \$2,699.
- ► The high-capacity SuperDisk family from Maxell Corp. of America, Fair Lawn, N.J., can hold up to 120 Mbytes of data on one floppy disk, over 83 times the storage capacity of a standard 3.5-inch floppy. These ultra-highdensity disks are great for storing graphics and huge data files that you don't need to keep on your notebook's hard drive.
- ► Castlewood's removable 3.5-inch floppy, called ORB, holds 2.2 gigabytes of data, and is another great choice for multimedia presentations - music, photos, and the like. You don't even need to format the disk, thanks to special software that manages the device.
- ► Over 700 computer vendors are supporting the Bluetooth wireless specification, which means that PCs, PDAs, and cell phones will be able to share information more easily. Products are expected out next year.
- ► Lithium polymer technology will extend the life of a battery. It will also mean some interesting shapes for portable devices, since batteries will no longer need to be rectangular. And more mobile PC makers are giving you the option to have multiple battery packs in your device, for up to nine hours (or more) of battery life.

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continued from page 2

Lonier once lost 250 e-mail messages because she had four different portables. "I still don't know where those messages are," she says. But now she totes only one portable, a Sony Vaio notebook, in addition to her cell phone. "I bought by weight," she says.

### SHOPPING FOR EQUIPMENT

Once you've done the high-level thinking about what you're trying to accomplish, the decisions about indi-

vidual technology pieces will flow fairly easily. Elaine Gasser, a marketing manager for Hewlett-Packard's Jornada line of portables, says the jobs that people do while on the road fall into

I HAVE A THREE-MONTH RULE. IT'S GOT TO INCREASE REVENUE, DECREASE EXPENSES, OR LEVERAGE YOUR TIME — ALL WITHIN THREE MONTHS."—TERRY LONIER, CEO, WORKING SOLO INC.

reviews in magazines.

two broad categories: accessing and referencing information (usually handled well by PDAs) and creating or collecting new information (laptops may be needed here).

Keep in mind that there are different classes of machines – even within the PDA category. Screens and keyboards come in a variety of sizes and shapes. If you're writing that 10-page report for a client, you'll need fuller functionality than if you're hunting and pecking your way through some e-mail. It all depends on what you must

WHO: Randy Kouns, remote access support specialist, Chatsworth Products Inc., Newcastle, Ind.
BUSINESS CAPSULE: Chatsworth manufactures the racks that hold farms of servers in computer rooms, as well as the mounts for the wires in the ceilings.
HOW HE BOES WHAT HE BOES: "My job is to support our 25 salespeople, who travel all the time. The salespeople call on customers and then take measurements of the size of racks or wire mounts that they need. They send those measurements via e-mail to our design people, who then design a system for the customer. The designer sends back the drawing to the salesperson, who then brings it to the customer.

tomer. We just put in a dedicated T-1 line for the sales force, because they weren't getting the speed they needed when dialing into the home office. We're also trying to find a PalmPilot-like device to use as a con-

or the home office. But delving into the wireless service plans can be "very annoying," says Eddie Hold, a senior analyst at Current Analysis Inc. in Sterling, Va. "'Nationwide' service doesn't necessarily mean 100 percent coverage across the country," he says. A provider may have some coverage in the south, some pieces in the northeast, and a fraction of the midwest, and call that "national" coverage.

be able to do, and what you can live without.

This is true across the board, from the smallest cell

phone to the most expensive laptop. Just about every product category has multiple entrants from different

vendors - so do your research. The Web is an amazing

resource - use it to check out the new types of machines

available from the major vendors and to read product

tool and the easiest way to stay connected to customers

To a real road warrior, the cell phone is the ultimate

The only place to start, again, is with your needs.

continued on page 10



CHRIS VOLK

ON-THE-GO PROFILE tact database. We installed Dell Latitude CS models about three weeks ago, and our salespeople are just raving about them."

BEST ADVICE TO ROAD WARRIORS: "Invest in a good antivirus program. And really investigate any hardware or software you're considering buying – try it out to see if it works for you."

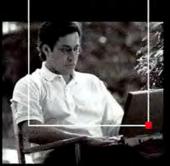


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# GENTAN ZED OR RENT A GEEK

## NEED TO GET ORGANIZED IN A HURRY? OF COURSE YOU DO; YOU'RE ON THE ROAD AND HAVEN'T A MINUTE TO WASTE. THESE SITES WILL HELP.

VIRTUAL OFFICES: These places have popped up like mushrooms in the past six months, and they provide a raft of office services so you can, at a minimum, receive e-mail, keep your calendar, and access your address book from any Web-enabled machine. Some are free; others charge a subscription fee. The free ones are advertiser-supported, so there will be e-ads to wade through.

The higher-end services, like www.hotoffice.com, add to the basic suite of services with features like electronic publishing, group contact managers/calendars, and chat. Monthly fees for the subscription-based services range from \$5 to \$13, often with a discount if multiple people sign up from the same company. HotOffice also offers a free version of its service that is advertiser-supported.

Other virtual offices include www.magicaldesk.com, www.visto.com, and www.zxmail.com.

INFORMATION. PLEASE: What's the difference between El Nino and La Nina, weather-wise? Which cases did the Supreme Court decline to hear last year? This isn't idle chatter, of course — maybe you're trying to impress that potential client or do some research that will help your company make a gazillion dollars. Who has time to surf, right? What separates these sites from the rest of the untamed Web is that real people, experts in their fields, are standing by with the answers. Some you pay, some work for free — but at least you won't have to waste a lot of time figuring out those Boolean search engines. Get your answers at www.allexperts.com, www.expertcentral.com, www.advoco.com, and www.xpertsite.com.

**GETTING THE GEAR:** All of these sites specialize in mobile gear, including some hard-to-find communications gizmos for overseas travel.



The HotOffice Web-based Intranet Service from HotOffice Technologies, Inc., Boca Raton, Fla., is an easy, affordable way to connect colleagues, clients, and vendors from anywhere.

- ► Road Warrior International; www.warrior.com
- ► Konexx Unlimited Systems; www.konexx.com
- ► Mobile Planet; www.mplanet.com
- ▶iGo.com; www.igo.com
- ▶ PC Connection; www.pcconnection.com
- ►TeleAdapt; www.teleadapt.com

**GETTING HELP:** For all those times you've cursed at your computer, here's how to get unstuck.

- ► Service911.com; www.service911.com—Registration is free. Check out the video library, talk to a live support rep, arrange for on-site service, find vendors' toll-free numbers.
- ► PC Crisis Line; www.pccrisis.com—More real live help for your problems; \$3/minute. (For calls over 10 minutes, it's \$1/minute.) You can submit one freebie question via e-mail on the site.
- ► Rent A Geek; www.rentageek.com—Find a computer consultant near you; type in your state and any special knowledge you want your geek to have.

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Get mobile. Stay connected. Go places.



continued from page 6

What key areas are you (or your employees) using your phones in? If it's a 50-square-mile area, go with a great local plan, Held advises. If you truly are traveling across the country, look at the likes of AT&T, MCI, and Sprint - but don't forget to check out some others, like Bell

KNOW WHAT YOU WANT, VERSUS WHAT YOU ABSOLUTELY MUST HAVE TO GET YOUR JOB DONE.

Atlantic Mobile. Again, the Web can be a powerful research tool here.

Other issues related to wireless service include: Are the minutes priced the same no matter when you use

them (day or night, weekend or weekday)? How about long-distance versus local calls? And what happens to any unused minutes in your basic plan - do they roll over to the next month or are they gone forever?

Held says that group-calling plans are really starting to come into their own. AT&T's plan allows a group of up to 50 people to have unlimited calls to each other's wireless phones, as well as to up to five land lines.

The more information you have beforehand, the better focused you'll be able to remain at the computer or telephone store. You'll be able to remember what you need the device to do and won't get sucked into the "isn't this cool" conversation. It's only cool if it works for you. (If you're in a remote area and don't have a store nearby, check out the Web sites of the major PC makers or phone service providers. Many of these sites have searchable lists of stores that sell their machines; to find the store closest to you, type in your ZIP code or call the company's toll-free number and ask.)

If you're buying five or more units, you'll likely be able to work out a trybefore-you-buy deal with the store. For this reason alone, it's a good idea to try to think about all your company's mobile requirements in one fell swoop. Central buying can have power, even in relatively small batches. Talk to the store's manager and make it clear that you want to foster a relationship with this store as a business customer that plans to be around, and growing, for a very long time.

Sometimes, experts say, it's best to think about all your tech requirements together, to see, for example, if

> it makes sense to buy one computer that doubles as a laptop and a home office PC. These machines come with so-called docking stations, which means that, with the click of two buttons, the machine can be easily detached to go on the road. Once you're back home, the portable snaps back into the docking station

and becomes the home office computer again. Any information you've gathered on the road is instantly available. No translation needed, since it's the same machine.

WHO: Burt Koelewin, a field support and logistics officer for Doctors Without Borders.

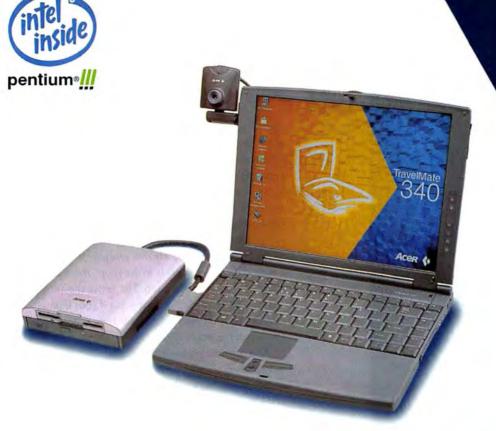
BUSINESS CAPSULE: Doctors Without Borders is an international volunteer organization that provides emergency medicine to refugees and in general supplements the medical infrastructure in developing countries and trouble spots around the world. At any given time the group includes some 2,000 medical and non-medical volunteers working in 80 different countries.

HOW HE BOES WHAT HE BOES: "I support the people in the field; many of the laptops that they use come out of this office [in Holland]. We're using Toshiba 4000/4010 models, mostly because we've used Toshiba for the last 10 years. When we dispatch a team, the country manager and financial person have laptops; the other people on the team share computers. Doctors and nurses are treating people all day long, and don't use the computer [to diagnose]. They input their notes - who they've treated, what prescriptions they gave, etc. The country manager and financial person put that information together to spot trends and request additional supplies or people. Field workers also use the laptops to stay in touch with each other and to get safety information" in case of emergencies or if workers need to be pulled out of a country quickly.

BIGGEST CHALLENGES: "Keeping up with new technology. I sometimes wish the IT world would just stop for a while. We just installed Windows 95, and then we had to go to Windows NT. Next it will be Windows 2000. Also, our computers are used as tools by people who don't know a lot about computers, so our motto is that the software has to be simple and idiotproof. Windows NT helps with this, because we can set up password-protected areas of the system so that people can't delete programs or the boot sequence by mistake. That used to be a problem. Also, computer viruses are a major problem. Even in areas of the world that don't have e-mail, they never throw away an infected floppy disk, so viruses still spread. We've got



a huge virus issue in Afghanistan right now, and I need to go and deal with that. And we can't afford to give people a lot of computer training, because they are volunteers who spend only one or two years with us."



# complete

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we hear you



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### DON'T FORGET THE EXTRAS

Other issues revolve around total cost of ownership. Extra batteries, carrying case, and airline adapter can total an additional \$400 over the price of the device, says Eric Brennan, director of North American portables marketing at Compaq Computer. He calls it the "price per seat" of the gear.

Service and support are major considerations, especially if you're outfitting a number of people. Consider upgrading the warranty from one to three years. If you're truly tech-phobic, you might want the option that gets you a loaner machine the next business day while yours is in the shop. There are round-the-clock options, too. The faster the service, the more you'll pay for it — but if your business depends on your mobile gear, then it's probably worth the peace of mind.

Also consider leasing versus buying. That might be financially advantageous for your business, and it also means that you (usually) get new machines at the end of the leasing period. The financing generally comes directly from the computer store or

**WHO:** Teresa Martin, chief executive officer of Project Cool, Inc., Palo Alto, Calif.

**BUSINESS CAPSULE:** Project Cool (www.projectcool. com) dispenses advice to help everyone from novices to experts develop their own Web sites.

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BEST ADVICE FOR ROAD WARRIORS: "I used to travel 60% and bring everything with me. I've gotten much smarter about what I take, what's essential, instead of taking what I might possibly need. I also take advantage of existing infrastructure — I use other people's Web-enabled PCs to check my e-mail rather than having to bring my own laptop everywhere. Also, re-evaluate your needs every once in a while. We cut our mobile telephone service cost by a third by looking around at the Web sites

ON-THE-GO PROFILE

and discovering one that better met our needs. Once you adopt something, it doesn't mean you're stuck with it forever."

the PC maker, and it's usually a one-stop deal. There are limited forms to fill out, and the store or vendor handles the paperwork.

Focus on what will help you right now, not a year from now. "I have a three-month rule," Working Solo's Lonier says. "It's got to increase revenue, decrease expenses, or leverage your time – all within three months. Otherwise you'll be able to get it faster, better, and cheaper down the road."\*

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MultiSync Monitor	Size (Viewable)	Grille Pitch	Maximum Resolution	Release Date
MultiSync FE700*	17" (16")	0.25mm	1280 x 1024 @ 66Hz	Available Now
MultiSync FE700M* (with multimedia)	17" (16")	0.25mm	1280 x 1024 @ 66Hz	Available Now
MultiSync FE750"	17" (16")	0.25mm	1600 x 1200 @ 73Hz	January 2000
MultiSync FE950"	19" (18")	0.25 - 0.27mm variable	1600 x 1200 @ 77Hz	January 2000
MultiSync FE1250"	22" (20")	0.25 - 0.27mm variable	1920 x 1440 @ 73Hz	January 2000

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http://flat.nectech.com







### **Music Machines Serve** Ear Candy for MP3 Devotees

DESKTOPS HAVE YOU caught the MP3 bug? If so, you may have noticed the flurry of desktop PCs offering features for devotees of the popular Internet music format. Bearing names such as Music PC and Home Music Studio, these machines make playing and recording digital music files easy.

We lent an ear to three of these music machines: shipping versions of Dell's Dimension XPS T500 Music PC Combo and Hewlett-Packard's Pavilion 8575C, and a preproduction edition of NEC's Home Music Studio RS500. All three units came with a 17-inch monitor. a CD-RW drive, and software

for playing music on the PC.

These desktops are being marketed for their music features, not their performance, and their scores on our PC WorldBench 98 test suite of business apps reflect this.

The PIII-500-based Dell with 128MB of RAM earned a middle-of-the-pack 231. The HP, configured with a PIII-550 and 128MB of RAM, came in slightly below average for its CPU rating, at 234. Our preproduction NEC, a PIII-500 with 96MB of RAM, initially turned in a disappointing score of 188, 15 percent slower than we expected for this configuration. But after we removed a file used by the bundled Prodigy Internet software, the score zoomed to 222, which is more typical.

### FIRST LOOKS ARE DECEIVING

THE DIMENSION XPS T500 Music PC Combo's standard beige box looks uninspired next to the sleek cases of the other two units. And the steep \$2359 price tag-about \$500 more than those of the HP and NEC-is downright offputting. But the bundle includes Diamond Multimedia's acclaimed Rio 500 portable MP3 player-a \$269 value. And after a few hours of use, you'll find that Dell's superior components more than com-

pensate for its plain-vanilla wrapper and premium price.

The powerful Altec Lansing ACS340 speakers with subwoofer, a crisp 17-inch flatscreen CRT monitor, and a robust 32MB Diamond Viper V770 graphics card all make for a fantastic multimedia experience. The hardware MPEG-2 decoder and 8X DVD-ROM drive played our test movie flawlessly-even with multiple programs running in the background.

Dell also includes a full version of MusicMatch Jukebox for turning CD music into MP3 files and playing them back (HP bundles a shareware edition with the Pavilion). And Dell consistently scores high for reliability and service.

The \$1758 NEC has several strong points. You get better audio software, including special limited editions of two excellent packages from Sonic



MUSIC MAKERS: NEC's classy-looking Home Music Studio RS500 (left) comes with a good audio software bundle, but it cuts corners on some hardware components; HP's functional Pavilion 8575C is exceptionally easy to set up, but its speakers are mediocre.

### NEC: NOT FOR PLAYING GAMES

BUT NEC CUT costs by giving short shrift to several key components. Unlike the Dell and HP PCs, which ship with 128MB of RAM, the NEC has just 96MB of RAM. And NEC's 13GB hard drive looks shrimpy next to the 20GB drives on the Dell and HP. You get a CD-ROM drive instead of a DVD-ROM unit, and good but entry-level multimedia speakers-a serious drawback for a music machine. Gamers won't like the system's 4MB of graphics RAM, either, NEC omits a Rio player. Finally, opening and closing the side of the bowed case is unduly frustrating.

Hewlett-Packard's Pavilion 8575C comes well integrated, with a slick multimedia keyboard containing controls for everything from one-touch print and fax buttons to a speaker volume knob. Its accessible \$1898 price will appeal to budget-conscious home users, and its carefully color-coded ports help make it the easiest of the trio to set up and get running.

However, you don't get a Rio, and the HP's parts can't match the Dell's. The integrat-



ed graphics with 8MB of RAM, while better than NEC's video hardware, may still be inadequate for many of today's high-resolution games. Colors on the monitor looked washed out, and text was fuzzy. Worse yet, this music-oriented PC's mediocre speakers produce boomy bass and distorted sound at high volume.

### CHOOSING THE RIGHT MUSIC PC

IF YOU WANT a Rio and need a system that will work well for audio, games, and productivity apps. Dell's bundle is solid—and well worth its pre-

### Dell Dimension XPS T500 Music PC Combo

PRO: High-quality components; comes with a Diamond Rio 500 MP3 player and Dell's great reliability and service record.

CON: Expensive; boring design.

VALUE: Well-rounded, practical PC moonlights effectively as a Jukebox and comes with a Diamond Rio 500 music player.

Street price: \$2359

**Dell Computer** 

800/388-8542

www.dell.com

mium. If you already have a portable MP3 device and a decent set of speakers, HP's lower-cost option comes nicely configured and is easy to install. The NEC might be worth considering if you're willing to trade some performance and hardware quality for the superior Siren software and a more affordable package. Just don't expect to play games on it.

Then again, if you don't need a Rio MP3 player or special audio software, you may fare just as well or better with a standard computer and a few shareware programs such as MusicMatch Jukebox or

### Hewlett-Packard Pavilion 8575C

PRO: Easy setup, first-rate multimedia keyboard, cool yet practical design, good price for a PIII-550.

CON: No Rio MP3 player, on-board graphics carry minimal RAM, flatsounding music.

VALUE: Worthwhile for nongamers who already have an MP3 device.

Street price: \$1898

Hewlett-Packard

800/724-6631

www.hp.com

PRODUCT INFO NO. 710

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FOR MORE PRODUCT news and the latest announcements, check out the PC

World Daily News Service at www. pcworld.com/news.

WinAmp. These music machines, after all, are basically creations of their vendors' marketing machines.

> —Michelle Campanale-Surkan ▶

### NEC Home Music Studio RS500

PRO: Impressive audio software bundle, good price, lots of USB expansion ports.

CON: Hard-to-remove case, subpar graphics, mediocre speakers.

VALUE: Good for home users who want to collect, manage, and record music; not for gamers.

Street price: \$1758

NEC

800/524-0819

www.neccsd.com

PRODUCT INFO NO. 711



THESE PRODUCTS have been evaluated using tests designed by the PC World Test Center.

### **OUICK TAKES**

### Fast Color Lasers? Sorry, Not Quite Yet

THE PRICES OF color lasers are tumbling, but these ma-

chines' sluggish print speeds. especially for graphics, limit their usefulness in busy offices. Oki Data's new OkiColor 8 and IBM's Infoprint Color 8. which is based on the OkiColor 8's engine, promise breakthrough speeds of 8 pages per minute for color graphics, and similar (and therefore less impressive) speed for text. Unfortunately, in PC World's first round of tests on shipping units, neither printer came near the rated mark-nor did they significantly outpace lessexpensive competitors.

### NOT SO FAST

MOST COLOR LASERS run color graphics pages through a four-step process-one for each primary color and another for black. Oki's new design reduces the process to one step, hence the advertised speed improvement over the 4-ppm performance of most color lasers. Unfortunately,

### IBM Infoprint Color 8

PRO: Good-looking text and graphics, good warranty.

CON: Expensive: slow text output for a color laser.

VALUE: Slight graphics performance boost over those of competitors fails to justify the unit's humon-

Street price: \$2700 (\$3000 network-ready)

IBM

800/358-6661

www.printers.ibm.com



THESE PRODUCTS have been evaluated using tests designed C E N T E B by the PC World Test Center.



speeds fell so far short of their

ratings is that both printers go

into power-save mode after

only 3 minutes, to allow the

unit to cool off. Because this

feature cannot be disabled (as

it normally is in PC World's

tests), the print times we

recorded include a relatively

lengthy warm-up period. Per-

formance should be better in

a busy office where the print-

er has no time to cool off.

Look for additional test results

in our next Top 10 color laser

GOOD PRINT QUALITY.

**BUT AT A PRICE** 

ALTHOUGH THEIR printing

speeds were disappointing,

the OkiColor 8 and the Info-

print Color 8 did live up to

expectations on output quali-

ty. Text on both machines was

crisp and black, while graphics

were subtly shaded with accu-

rate colors. Though both units

are large and heavy, they're

Another plus: Both come

with attractive warranties. Oki

easy to set up and maintain.

roundup, coming in March.

That turned out to be the case. In our tests to measure text printing speed, the Oki hit 4.7 ppm, and the IBM 4.2 ppm, compared to the 7.5- to 8.8-ppm scores of color lasers ranked in PC World's Top 10 Printers. Even worse, however, graphics didn't print particularly quickly either. The Oki yielded 1.3 ppm and the IBM 0.9 ppm-only a tad faster than speeds of up to 1 ppm for Top 10 competitors that have

pages, so printing text should

be slower than with many

comparable color lasers.

### Oki Data OkiColor 8

PRO: Attractive text and graphics output, \$100 cheaper than the IBM. CON: Warranty not quite as strong as the IBM Infoprint's.

VALUE: As with the IBM, the minor graphics speed gain doesn't justify price premium.

Street price: \$2595 (\$3195 networkready with extra memory)

Oki Data

800/654-3282

www.okidata.com

PRODUCT INFO NO. 712

### A Great Diagramming **Tool Gets Better**

VISIO, long the leading businessdiagramming software package, is getting even better. Major improvements in the latest release, Visio 2000, include a faster drawing engine, a cleanerlooking interface, better manuals, new Web features, and the ability to generate organizational charts from information in a database. My shipping copy also had such nice touches as a dynamic grid that permits precise alignment of new objects in a diagram on the fly. At a street price of \$199 (\$99 as an upgrade), the Standard edition is a fine general-purpose package; the same improvements also apply to the more specialized (and expensive) Professional, Technical, and Enterprise editions. Visio; 800/248-4746; www.visio.com.

PRODUCT INFO NO. 715 -Joel T. Patz

warrants the OkiColor's print head for five years, and IBM warrants the Infoprint's for life. Both vendors cover other parts for one year.

But you pay heavily for these extras: The \$2700 IBM and \$2595 Oki are considerably more expensive than some other manufacturers' models. For example, QMS recently cut the price of its DeskLaser to \$1000. And you don't make up the difference in the cost of supplies such as toners and cartridges: These should run about the same for the IBM and Oki as for competitors.

Unless IBM and Oki Data pare their machines' prices or significantly improve their printing speeds, other options remain better deals.

-Dan Littman

Before Columbus, sailors stuck pretty much to the same old standard routes, fearing they

would fall off the edge of the world and be eaten by sea monsters.

Fortunately, Christopher didn't believe in "standards."

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(NNVAST



### PhotoDeluxe Gets Web Savvy

GRAPHICS ADOBE SYSTEMS' PhotoDeluxe Home Edition 4 should have been called PhotoDeluxe Home Web Edition. The best new features in this popular, entry-level photo editor are those designed to help you share photos over the Internet.

This \$49 package includes a new version of PhotoDeluxe with hundreds of new con-

### Adobe PhotoDeluxe Home Edition 4

PRO: Excellent Web features, hundreds of ready-made projects.

CON: Templates not as well-suited for general business use.

VALUE: Worthwhile image editor for amateurs and home users.

Street price: \$49, upgrade \$39

Adobe Systems

800/492-3632

www.adobe.com

PRODUCT INFO NO. 713



WITH PHOTODELUXE Home Edition 4, you can create a 3D photo image that you can subsequently roll, rotate, spin, or e-mail to a friend.

sumer-oriented templates, clip art, and sample photos, plus step-by-step project guides. In addition, you get Adobe ActiveShare, a basic photo editor and Web-oriented photo manager. It's a free download now, but will cost \$20 starting in early January. Both applications link to popular Web sites, including Adobe's own ActiveShare.com, a photoposting site that provides unlimited storage space.

In my tests with a preproduction copy, I used Active-Share to assemble an album of digital photos. Then I

opened the album in Photo-Deluxe and jazzed up various images using the new lens flare and lighting effects, as well as other features. To post my spiffed-up album on the Internet, I clicked on Photo-Deluxe's ActiveShare Website icon; within minutes of completing a simple registration (at ActiveShare.com), I was uploading the album. Photo-Deluxe's other new Web-sharing talents include the ability to e-mail fancy 3D photographs and slide shows with just a few mouse clicks.

Even without its Web tricks. PhotoDeluxe Home Edition 4 packs enough useful new project materials and photo effects to make it a worthwhile upgrade for casual users. Business and advanced graphics people, however, will be happier with either PhotoDeluxe Business Edition or Adobe's higher-end Photoshop.

-Richard Jantz

### Motherboard on an Add-in Card

UPGRADE IF YOU'VE BEEN thinking about upgrading the CPU on an old PC, you may be justifiably nervous about potential system incompatibilities. PowerLeap's Renaissance/AT skirts those pitfalls with a radically different approach: It's a fulllength ISA card that in effect replaces your motherboard. The PowerLeap card holds a processor, RAM, integrated graphics and sound subsystems, a drive controller, and an array of ports.

To install it, you detach the power connector from your existing motherboard and plug it into the card, along with the cables for your serial, parallel, and USB ports and those for the hard drive, CD-ROM, and floppy disk drives. Then you plug your mouse and keyboard into the rear connector of the card. Your motherboard is now basically a holder for the PowerLeap card. Final configurations weren't available at this writing, but the company expects to offer at least three different models, with AMD K6-2 and K6-III CPUs, and 32MB to 128MB of RAM.

I tested a prerelease, AMD K6-III-450-based card with 64MB of RAM. Installing it in a three-year-old Pentium-166 system was time-consuming (mostly due to Windows setup issues) but problem-free. The effort was amply rewarded: In my informal tests, performance improved nearly fivefold. And while final pricing was not set at this writing, the unit I tested should cost about one-third as much as a new. comparably configured PC.

The big drawback: You can't use add-in boards with the Renaissance/AT. So you'll need an external modem, and you can only add SCSI or network support via USB adapters that go for \$50 to \$75 each. Still, if you're reasonably satisfied with the drives on your aging computer but want to boost performance, this board makes a solid, economical upgrade choice.

-Stan Miastkowski

### Renaissance/AT

PRO: Easy, inexpensive way to upgrade your motherboard.

CON: Can't use other add-in boards, no easy SCSI or network support.

VALUE: Considerably cheaper than a new PC.

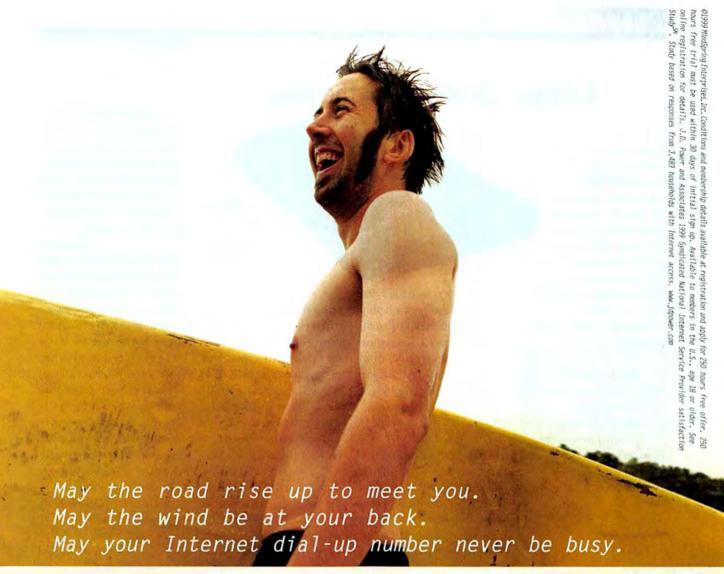
Estimated street prices: \$199 to \$399, depending on configuration

PowerLeap Products

877/278-5327

www.powerleap.com

PRODUCT INFO NO. 714



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### A Zippier 250MB Zip for the Road

STORAGE NEED REMOVABLE storage that's easy to move? Iomega's new Zip 250 USB drive is stylish and slim, and delivers the Mac/PC cross-platform versatility that only Universal Serial Bus can provide. An optional \$40 PC Card interface lets you use the \$180 unit with notebooks that don't have USB ports. And it

### Zip 250 USB

PRO: Super-easy installation, sleek design, compatible across platforms and with 100MB disks.

can handle 100MB Zip disks.

CON: Writing to 100MB disks is slow. VALUE: Cross-platform compatibility and lower cost per MB make this the external Zip drive of choice. Street price: \$180

lomega

800/697-8833

www.iomega.com

PRODUCT INFO NO. 693



A mere 0.75 inch thick, the unit fits handily in a laptop bag and comes with a small removable base so you can use it upright on its side. Even with the required AC adapter or PC Card interface (which supplies power on its own), the drive's traveling weight is less than a pound.

The 250MB disks cost \$14 if purchased in packs of six, which comes out to less than 6 cents per megabyte. In contrast, the older 100MB disks cost 10 cents per MB when bought in similar quantities.

In my tests, performance was somewhat sluggish compared with the internal IDE drive, especially when using the PC Card. And you'll want to upgrade to 250MB disks ASAP: The drive reads 100MB Zip disks speedily enough, but it writes to them at an agonizingly slow pace. Nevertheless, for frequent travelers, offices with both Macs and PCs, or workgroups that need to share Zip drives, the 250 USB's convenience is well worth the small performance penalty.

-Jon L. Jacobi

### QUICK TAKES

### Faster External Storage for PCs and Macs

IEEE 1394, aka FireWire or iLink, is the spec for a port that is emerging as the standard for high-speed external peripherals that USB can't handle. If your system comes with this port, consider one of VST Technologies' new portable Ultra Slim FireWire Hard Drives, available in sizes from 8GB (\$630) to 14GB (\$1000). In my informal tests, an IEEE 1394-equipped Sony desktop failed to recognize a very small and very quiet 10GB model, but Compag and Macintosh PCs recognized the hotpluggable drive without shutting down or rebooting. The drive transferred files at 3 mbps, or about 10 times the real-world speed of USB. This drive should suit users looking for fast additional storage, especially people who work with large files. VST Technologies; 978/263-9700; www.vsttech.com.

PRODUCT INFO NO. 695

-Alan Stafford

### PlexWriter 8/4/32 Speeds Up CD Creation

### CD-R/RW DRIVE

MAKING YOUR own music. data, or back-up CDs just got faster and easier. Plextor's PlexWriter 8/4/32 is not only the first CD-Rewritable drive to offer 8X write speed to CD-Recordable discs and 4X write and rewrite speeds to CD-RW discs, but the first with a maximum CD-ROM read speed of 32X . It's also the first IDE CD-RW drive available from a manufacturer best known for its high-end SCSI drives.

Clearly designed for music fans, the drive comes with nifty software tools, including

one that creates an audio CD from any combination of MP3 tunes, music CD tracks, and way or Windows Media Player music files. With a shipping unit, I created a full (70+ minutes) CD in only 9 minutes, compared to 18 minutes with the 4X drives I've tested.

Users who frequently back up the same large data files, such as regularly updated financial records or customer data, will appreciate the 4X rewritable, floppy-drive-like feature. Simply drag and drop files to it or delete files from it. It took only 30 minutes to format a CD-RW disc (versus 60 to 90 minutes for 2X or slower CD-RW drives). And to top it off, CDs have more than five times the capacity of a standard 100MB Zip drive.

The PlexWriter's CD-ROM performance wasn't stellarin my tests, random access times were 50 percent longer than what today's top performing CD-ROM-only drives achieve (137 ms versus 90 ms). But only gamers are likely to notice; most users could happily employ the PlexWriter as their only CD-ROM drive.

Competition in this area is

heating up. Sony and Smart & Friendly have announced they will offer similar drives. If you want to move up to the best right now, though, the Plex-Writer 8/4/32 tops the list.

-Jeff Sengstack

### PlexWriter 8/4/32

PRO: Fastest CD-R and CD-RW combo yet; slick software tools. CON: Premium price, slow CD-ROM performance may bother gamers. VALUE: Speed and ease of use give it appeal for people who make frequent music CD or data recordings. Street price: \$279

Plextor

800/886-3935

www.plextor.com

PRODUCT INFO NO. 694

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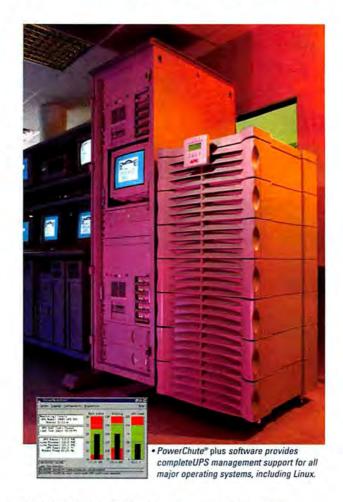
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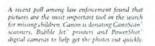
Every day, more than 2,200 children disappear. A staggering statistic. But there is good cause for hope. Working closely with law enforcement agencies across the country, the National Center for Missing and Exploited Children (NCMEC) has achieved substantial success in finding children. Canon is proud to join the effort by donating state-of-the-art equipment to help disseminate photos and information about missing children faster. We urge you to look at these children and see if you recognize any of them. Then take current photos of your own children just in case of an emergency. Because photos are the best way to help find missing children. For more information about this program, visit our Web site at www.picturethemhome.com.















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## Winning Upgrades for Organizer, Goldmine

#### CONTACT MANAGERS

UPDATES TO A pair of popular personal information and contact managers demonstrate that both have paid attention to the needs of their users. Lotus Organizer Release 6, retaining its accessible, loose-leaf notebook look, adds a tab for accessing Web pages. Workgroup-oriented Goldmine 5 offers enhanced usability, integration with Outlook e-mail, and a new tool for distributing marketing materials.

Organizer 6's new features make managing Internet information as easy as organizing phone numbers and snailmail addresses. It can store

#### Goldmine 5

PRO: Top-notch data sharing and synching, data entry shortcuts.

CON: Customization can be tricky. VALUE: Best for workgroups that share and aggregate large contact and appointment databases.

Street price: \$199 (single user); \$895 (five-user license); single-user upgrade \$79 until mid-February 2000, \$99 thereafter

**Goldmine Software** 

800/654-3526

www.goldminesw.com

PRODUCT INFO NO. 687

#### Lotus Organizer Release 6

PRO: Easy to use, handles Web capture and bookmark organization.

CON: Area code updating is not automated.

VALUE: Excellent personal information manager adds slick features for Web users.

Street price: \$79 (\$20 competitive and upgrade rebate available)

Lotus Development 800/346-1305

www.lotus.com/organizer

PRODUCT INFO NO. 688



LOTUS ORGANIZER 6's new Web tab lets you organize favorite sites and store key information such as URLs, user IDs, and passwords.

your user IDs and passwords for your favorite sites: When you click on an entry, the site appears in Organizer's embedded browser. The Easy-Clip icon on your Windows 95, 98, or NT taskbar-previously used primarily for adding contacts on the fly-can capture Web pages as entries in Organizer's newly HTMLsavvy Notepad with only two mouse clicks.

You can publish your calendar and contacts to your Web site automatically at preset intervals, or on demand. New toolbar buttons display Map-Quest maps and directions to contact addresses.

On the non-Web front, Easy-Clip now parses dates and is Y2K-compliant (as is the entire product). New tools let you update contact area codes and synchronize data with Palm devices and some new digital cell phones. Overall, Organizer is as easy to use as ever. But the PIM would be even better if it included the automatic area-code updates offered by some of its competitors.

For its part, Goldmine re-

mains an industrial-strength contact manager for sales professionals and busy offices. But version 5 makes strides in simplifying how the program works, too, helped by new interactive tutorials. New e-mail rules and filters can automatically route messages, reply with out-of-office messages, and combat spam. And you can synchronize contacts and appointments with Outlook.

Goldmine is also more customizable than before, with eight templates for specific industries such as law, financial services, and real estate.

The new Literature and Document Management feature makes it less of a chore to send clients follow-up materials such as brochures. And rather than addressing envelopes one at a time, you can queue up literature requests, print labels and envelopes, and sort by Zip code, all at once. The mail merge interface is much easier to use as well.

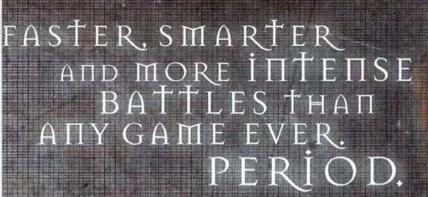
If there is something unusual about relations with a particular contact-say, a disputed account-you can add an alert that appears when other workgroup members view the record. From small changes such as a new undo feature to autocapitalization and autofill, Goldmine 5 greatly improves its usability. It's still slightly harder to pick up than archrival Act, but overall it's a better workgroup PIM. And if your business grows, you can graduate to Goldmine's new FrontOffice 2000.

For heavy-duty Web users, Organizer 6 is a worthy investment. For Goldmine users. the improvements in version 5 justify upgrading.

-Joel T. Patz



POP-UP ALERTS in Goldmine 5 instantly inform all workgroup users of a contact's special status, such as its being a disputed account.







"...QUAKE III WILL REVOLUTIONIZE THE INDUSTRY" - PC MAGAZINE

# A.

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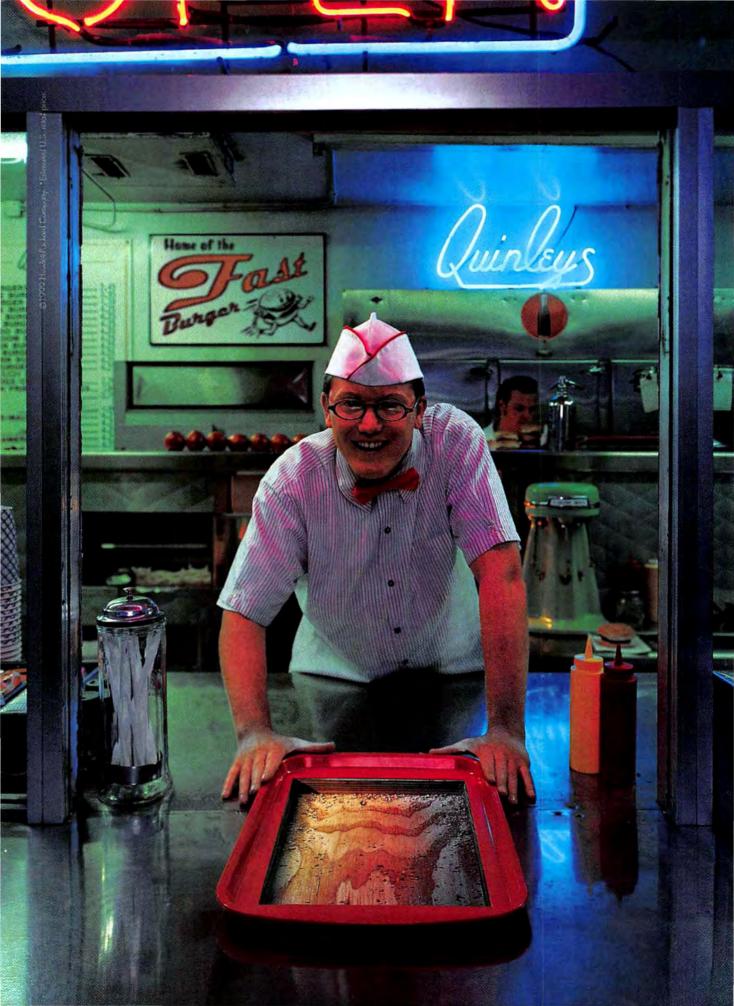




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### Better Brushes for Serious Artists

#### GRAPHICS

METACREATIONS' Painter has always been the next best thing to a studio filled with pencils, paints, and pastels. The latest version, Painter 6. won't bowl you over with lots of weird new brushes, but it does improve existing ones. Alterations made to the program's interface, however, are less successful.

The expanded brush controls and new rendering engine give paintings a more realistic look and feel. Mouse users will enjoy the pressuremimicking controls, but the show stealer is Painter 6's refined pen-tablet support. As with a real brush, the tilt, direction, and movement of a pressure-sensitive pen now alter the shape and density of Painter's brush tips. You can even "load" brush bristles with multiple colors to get truer color variations and unexpected nuances. When I smeared a brush of red and gold through blue, for example, Painter 6 blended in streaks of green, burgundy, and orange.

Other noteworthy changes: a new Palette Knife for scraping colors across the canvas;

#### MetaCreations Painter 6

PRO: Improved brush simulation and type effects.

CON: Awkward Interface, needs ample disk space.

VALUE: Professional-level alternative to paint, pastels, and other natural media.

Street price: \$399; upgrade \$149

MetaCreations

800/846-0111

www.metacreations.com

PRODUCT INFO NO. 689



BETTER BRUSHSTROKES and twistable type make Painter 6's jumbled workspace worth braving for graphics pros, but not for novices.

an improved Impasto brush that paints truer depth and relief; and a Bézier tool for typefaces that warps text strings so

they appear to conform to the contours of 3D objects.

Painter still has its drawbacks. My shipping copy took up a whopping 224MB of hard disk space, and the interface still needed tweaking. To reduce clutter, subpalettes now open inside main palettes via menus. For seasoned pros, this allows easier access to subtler features-but newer users would be better off with roll-up palettes like those in Jasc's Paint Shop Pro.

Painter is faster, responds more naturally, and paints more realistically than its first real competition in ages, Right Hemisphere's Deep Paint. Novices should stick to cheaper and less full-featured packages such as Paint Shop Pro or MetaCreations' own Dabbler. But for graphics professionals who want the look of traditional media, Painter 6 is an imperative upgrade.

-John Goddard

## CorelDraw for the Rest of Us

GRAPHICS

NEED TOP-QUALITY business graphics without a high-end price tag? Take a look at Corel-Draw 9 Office Edition, a scaledback version of the popular drawing package. For \$229, Office Edition provides drawing and photo-editing tools similar to those in the full-featured \$605 version. Although it's still no walk in the park for novices, my preproduction copy had several features that improved its accessibility for average business users.

For example, the New Document dialog box makes it a breeze to jump-start a project. You can choose a project category, preview and select a canned drawing from one of 500 templates, and click a but-

ton to designate the publication medium-say, a Web site or a printed document. For additional guidance, you can turn to a handy online tutor that escorts you through such tasks as creating charts, designing logos and newsletters, and printing and publishing.

CorelDraw 9 Office Edition also comes with Corel Presentations, Corel Bitmap Editor (a downsized version of Corel Photo-Paint 9, the Photoshoplike image editor included in the complete CorelDraw package), and Corel's usual generous bundle of fonts, clip art, and supporting utilities.

Graphics pros will want the original version's more robust image editor and higher-end output capabilities, such as a

color-separation function. And many novices will get a better fit with cheaper, more accessible packages. But for intermediate users, Office Edition's rich tool set, bundled goodies, and powerful capabilities make it a sound investment.

-Richard Jantz

#### CorelDraw 9 Office Edition

PRO: Good business graphics templates, robust tools, helpful tutors. CON: Pricier than other graphics suites aimed at nonpros.

VALUE: Excellent for ambitious entry-level or intermediate users. Street price: \$229; competitive upgrade \$149

Corel

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www.corel.com

PRODUCT INFO NO. 690

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# intel inside

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Aureal Vortex2 PCI Sound, A3D 2.0 Technology
Altec Lansing ACS-21W Speakers
Corel WordPerfect Office 2000
Intel® AnyPoint® Home Network Kit. add \$119

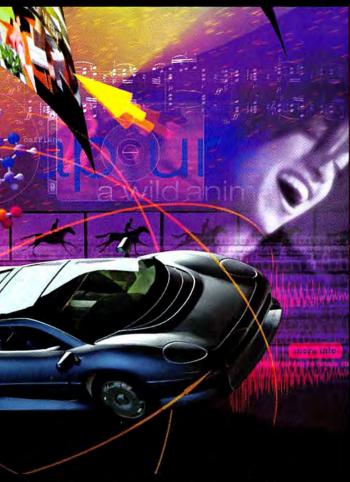
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Integrated Stereo Sound and Speakers
ATI Mobility M Graphics w/4MB
MS Windows 98 2nd Ed., Corel WordPerfect Office 2000

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Quantex Carrying Case

#### **QUANTEX T-1330**

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ATI Mobility M Graphics w/4MB
MS Windows 98 Second Edition
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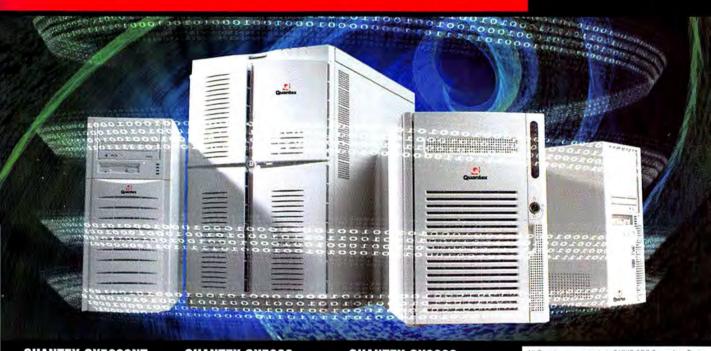
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Starting at

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## Get the Web on a Cell Phone

#### WIRELESS INTERNET

YOU'VE GOT mail. You've got phone calls. You've got appointments, stocks to track, and headlines to read. And with Sprint's PCS Wireless Web service, you can do it all with one svelte cell phone-albeit with some limitations.

PCS Wireless Web is one of

#### Sprint PCS Wireless Web

PRO: Wireless Internet access for digital cell-phone users.

CON: Special phones required; can't browse most sites; typing is no fun. VALUE: Most useful if you're receiv-

ing rather than sending Web data. Street price: Starts at \$10 per month for 50 minutes of access (plus monthly charges for any Sprint PCS Free and Clear voice plan)

Sprint 800/480-4727

www.sprintpcs.com

PRODUCT INFO NO. 691

the first Internet services for the latest generation of digital wireless phones (see "Internet Anywhere," Top of the News, October, www.pcworld.com/ octog/netphones). I tried it out with the \$180 Sprint PCS TouchPoint Phone, but it also works on other phones, some available for \$100 or less.

These devices are like other PCS phones, but with a minibrowser-for the most part a menu-driven affair with choices such as news, shopping, and community. All these will someday link to Web content optimized for handheld devices, but few such sites are active now. I got stock quotes, e-mail, and calendar and contact information from My Yahoo (you must be a registered user). Information arrived surprisingly quickly-but longer e-mail messages tended to be

split into several pages retrieved one at a time.

As for trying to compose lengthy replies on a telephone keypad, it is both time consuming and expensive because you can't do it offline, A \$100 kit for using the phone as a wireless modem with a notebook was limited by its maxi-

mum 14.4-kbps speed: E-mail transfers were so sluggish that my ISP repeatedly timed out the connection.

Prices range from \$180 per month for 1200 minutes of voice or Wireless Web access. to \$40 for 120 minutes of voice and 50 minutes of Wire-



BROWSE BY NUMBERS: PCS Wireless Web uses a menu interface.

less Web access. Extra minutes cost 35 cents each in the priciest plan to 25 cents each in the cheapest.

If Sprint's PCS voice services appeal to you anyway and you're ready to invest in a new phone, then Wire-

less Web could be a fairly inexpensive way for you to experiment with wireless Internet access-especially after all the services become available. But it's considerably more useful for retrieving information than for sending it.

-Yardena Arar

## OmniPage Pro Approaches Perfect 10

USING OPTICAL character recognition software to create editable text from paper documents can be frustrating. But the latest version of Caere's OmniPage Pro reduces the irritation factor considerably.

OmniPage Pro 10 recognizes a document's font size and style much better than previous versions. Version 10 can read recognized text aloud as you proof, and has new controls to scan at a specified interval so you can swap documents on a flatbed scanner without having to pause and restart the software. And the bundled OmniPage Web Personal Edition helps convert your documents to HTML for Web posting.

I challenged OmniPage with simple laser prints, complex magazine and newspaper pages, spreadsheets, and faxes. It made 21 mistakes on 85 words of a wretched fax; while this was painful to correct, Omni-Page's conversion was good enough to be intelligible-and better than retyping the whole thing. On a dense magazine page it made only five spelling errors and formatted the page well. It converted a spreadsheet that lacked grid lines

almost perfectly, even though I skipped the onerous process of indicating rows and columns. Indicating text flow through columns is still no fun, but OmniPage 10 consistently guesses so well that few documents require it.

Caere still can't claim perfection. OmniPage Pro 10 often deletes graphical elements and handwriting or "recognizes" them as text, and it consistently renders dashes as hyphens. But overall, Omni-Page Pro 10 makes good on the OCR promise. The \$100 cost to switch to OmniPage 10 from the OCR packages bundled with virtually all scanners is worth the price. And Caere finally gives a bit of a break to recent customers: OmniPage Pro 9 users can purchase the upgrade for \$79.

—Dan Littman

#### OmniPage Pro 10

PRO: Fairly high accuracy level; good automation tools.

CON: Expensive; still can misinterpret graphics, handwriting, and dashes.

VALUE: A must-have upgrade for serious OCR users.

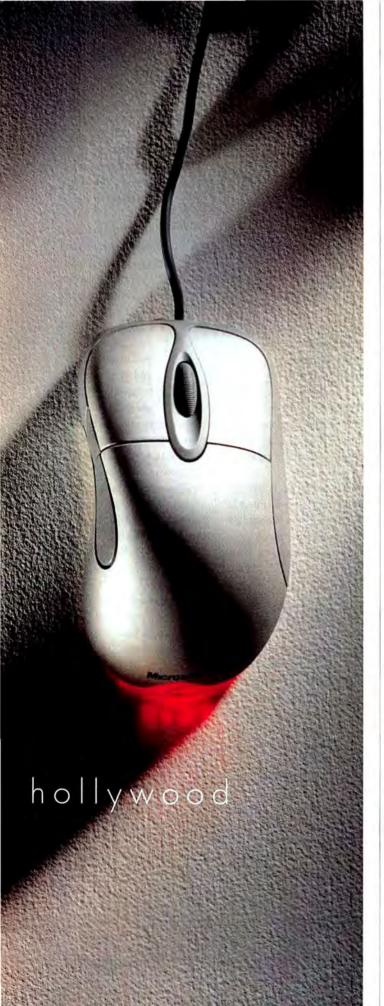
List price: \$500; \$79 upgrade, \$100 upgrade from any OCR software

#### Caere

408/395-7000

www.caere.com

PRODUCT INFO NO. 692



## Easy Net Access to Office PCs

#### REMOTE ACCESS

WHEN YOU'RE away from the office, discovering that you've left a critical spreadsheet, report, or other document on your home desktop can drive you half crazy. Most corporate networks let you dial in to pull files from a server, but a file on your networked, modemless PC might as well be sitting on another planet.

LapLink 2000, the latest edition of the longtime remoteaccess software leader, makes connecting to an office PC over the Internet easier than ever. With previous versions, getting connected involved figuring out and entering IP numbers. Now the program lets you assign your PC a text address (your e-mail address is recommended to ensure a unique identifier).

I tried this out by clicking Publish My Internet Address in the connection menu and then choosing a directory serverwhich can be LapLink's own or any other you can access. On the road, I dialed up AOL, launched LapLink 2000, and entered the address, as well as the user ID and password I'd assigned myself for security. After a longish pause, I was connected.

The new feature has some major limitations, however. The biggest: It's not meant to be used over corporate firewalls. True, I was able to use it on my corporate network. But there's no good way of predicting whether you can get it to work. In addition, if you have installed software that overwrites the Windows 95/ 98 files that make Internet

connections work, you may have to reinstall the original files. Sometimes when I tried to publish the Internet address, I received inexplicable error messages. The program also seemed slow to load and to make connections.

Still, LapLink 2000 offers a full complement of cable, modem, and network connection options for transfers and remote control. It now comes with parallel and serial cables; you don't get both with most competitors. And when it worked, the Internet access feature was the easiest way I've tried to date to connect to my office PC. LapLink 2000 is still the best remote-access package you can buy and is a worthwhile upgrade. But unless LapLink.com (the new name of Traveling Software, which developed LapLink) makes it easier for prospective users with networked PCs to figure out if they can connect over the Internet, I can't recommend it wholeheartedly.

-Tracey Capen

#### LapLink 2000

PRO: Quick, hassle-free file transfers and remote control; Internet connections to some networked PCs easier than ever

CON: Slow to load; Internet features may be blocked by firewalls; may require Windows file updates.

VALUE: Best-of-breed remoteaccess product, but highly touted Internet connection won't work for everyone.

Street price: \$169 LapLink.com 800/343-8080 www.LapLink.com

PRODUCT INFO NO. 685

## Presentations in a Browser

#### PRESENTATIONS

THINK GIVING presentations to far-flung crowds means trekking around the country? Not if you use WebSentric's Presentation.Net. This Webbased service lets you deliver a scape Navigator (versions 4.03 and above) or Internet Explorer (versions 4.01 and above). You narrate the show and take questions via a toll-free teleconference call. And you can employ annotation and white-



REMOTE PRESENTATIONS: Browser-based controls allow you to broadcast a Presentation. Net slide show over the Web.

PowerPoint show to anyone who has a browser-equipped PC-without special software or server setups used in earlier Web presentation systems.

The presenter simply uploads a PowerPoint document to the Presentation. Net site (or use WebSentric's presentation software, which wasn't available at this writing). At the appointed time, attendees can view your presentation in Net-

Presentation.Net

PRO: PowerPoint shows via the Web, no special software required. CON: Beta version rocky.

**VALUE:** Could save presenters lots of time and money.

Cost: 49 cents per participant per

WebSentric.com 650/357-0100 www.presentation.net

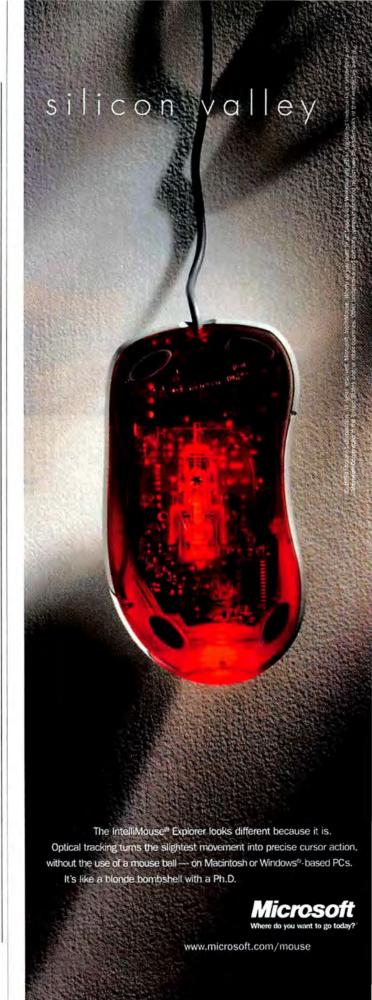
PRODUCT INFO NO. 686

boarding tools as you go.

The beta version I tested was promising but needed work. Conference setup could be more intuitive, and there were occasional display glitches. You won't be able to import every PowerPoint transition, and you can't do animations without using WebSentric's software. WebSentric recommends limiting multimedia audience sizes to two dozen.

Still, the Presentation, Net service should be worth its price of 49 cents per participant (audience plus presenter) per minute. At that rate, a 30minute presentation involving one presenter and four audience members adds up to a tidy \$73.50. That is unquestionably far cheaper than jetting around the nation to deliver your message.

-Harry McCracken





### Free Internet Access From NetZero\*

These Compaq Presario Internet PCs give your family fast, easy Internet access. And now they give it to you free, with unlimited Internet service courtesy of NetZero\* and Compaq. No fees. No gimmicks. No long-term commitments.

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Hi-Capacity Lilon Battery	Hi-Capacity Lilon Battery	
2X AGP for Enhanced Video Graphics	2X AGP for Enhanced Video Graphics	
1 MB L2 Pipeline Burst Cache	1 MB L2 Pipeline Burst Cache	
Microsoft® Featured Home Collection	Microsoft Featured Home Collection	
Microsoft Windows*98	Microsoft Windows98	

\$1499<sup>‡</sup> \$42<sub>per mo.</sub>\* \$1799<sup>‡</sup> \$51<sub>per mo.</sub>\*

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PRESARIO 1600s-450 INTERNET NOTEBOOK PC

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COMPAQ



PRESARIO 1800T INTERNET NOTEBOOK PC WITH MONSOON SPEAKERS

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\$1 SPECIAL: Get the Monsoon MH-500 multimedia speaker system for just \$1 that's two crystal-clear stereo speakers and one heart-thumping subwoofer — when you purchase a Compaq 1600s, 1800T or 1900T Series Internet PC configured with a DVD Drive. Offer good until 1/15/2000.5

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## Attention all modem-plugging, drive-swapping, peripheral-obsessed notebook users: Your all-in-one notebook is ready.

#### The Compaq Presario 1600s Series Internet Notebook PC.

While it may be impossible to be all things to all people, there now exists a notebook which is all things to certain people.

People whose pulses race at the mere mention of features like Accelerated 3D Graphics, JBL Pro Audio, and a fourteen-inch display. People who have been itching for bonuses like one-touch Internet access, DVD, and a superfast 56K modem. People who get an extra charge out of knowing that they can get all this stuff built into one sleek notebook.

This little powerhouse even comes with your choice of an AMD-K6®-2 or K6-III processor, for the kind of high performance you need when you're on the road.

The all-in-one Compaq Presario 1600s Series Internet Notebook PC. The only thing missing from it is you.

	PRESARIO 1600s-475 INTERNET NOTEBOOK PC	PRESARIO 1600s-450 INTERNET NOTEBOOK PC	PRESARIO 1600s-475 INTERNET NOTEBOOK PC	PRESARIO 1600s-450 INTERNET NOTEBOOK PC
	AMD-K6-2 475 MHz Processor	AMD-K6-III 450 MHz Processor	AMD+K6-2 475 MHz Processor	AMD-K6-III 450 MHz Processor
	14.1" TFT Active Matrix Display	14.1" TFT Active Matrix Display	14.1° TFT Active Matrix Display	14.1" TFT Active Matrix Display
	64 MB SyncDRAM	64 MB SyncDRAM	128 MB SyncDRAM	128 MB SyncDRAM
	4.8 GB UltraDMA Hard Drive'	4.8 GB UltraDMA Hard Drive!	6.0 GB UltraDMA Hard Drive <sup>4</sup>	6.0 GB UltraDMA Hard Drive'
	24X Max CD-ROM Drive	4X DVD-ROM Drive	4X DVD-ROM Drive	4X DVD-ROM Drive
	ATI 3D Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI 3D Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI 3D Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI 3D Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory
	56K ITU V.90 Modem (PCI) <sup>1</sup>	56K ITU V.90 Modem (PCI)	56K ITU V.90 Modem (PCI)	56K ITU V.90 Modern (PCI) <sup>2</sup>
	Hi-Capacity Lilon Battery	Hi-Capacity Lilon Battery	Hi-Capacity Lilon Battery	Hi-Capacity Lilon Battery
	2X AGP for Enhanced Video Graphics	2X AGP for Enhanced Video Graphics	2X AGP for Enhanced Video Graphics	2X AGP for Enhanced Video Graphics
Ξ	1 MB L2 Pipeline Burst Cache	Tri Level Pipeline Burst Cache	1 MB L2 Pipeline Burst Cache	Tri Level Pipeline Burst Cache
	Compaq Value Case	Tripp Lite 140 Watt Inverter	Microsoft Featured Home Collection	Compaq Value Case
	Microsoft Featured Home Collection	Microsoft Featured Home Collection	Microsoft Windows98	Microsoft Office 2000 Small Business Edition*
	Microsoft Windows98	Microsoft Windows98		Microsoft Windows98
	\$1999 <sup>±</sup> \$56 per mo!	\$2199 <sup>‡</sup> \$62 <sub>per mo.</sub>	\$2399 <sup>‡</sup> \$67 <sub>per mo.</sub>	\$2599 <sup>‡</sup> \$73 per mo.*
	QuikDock: Add \$99	QukDock: Add \$99	Extra A/C Adapter: Add \$49	Extra A/C Adapter: Add \$49
	4X DVD-ROM Drive*: Add \$150	6.0 GB UltraDMA Hard Drive!: Add \$100	Diamond Phoneline Network USB: Add \$69	Extra Hi-Capacity Lilon Battery: Add \$129
	128 MB SyncDRAM: Add \$200	HOLIDAY PROMOTION: Monsoon Speakers w/Subwooter only \$1 with the purchase of a DVD Notebook	HOLIDAY PROMOTION: Monsoon Speakers w/Subwooler only \$1 with the purchase of a DVD Notebook*	HOLIDAY PROMOTION: Monsoon Speakers w/Subwoofer only \$1 with the purchase of a DVD Notebook <sup>1</sup>

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How will the next advances in computing affect your life and work?

The horizon is crowded with possibilities, from polymorphic viruses to wireless everything. Here's what's in store—we think.

BY GLENN McDONALD AND CAMERON CROTTY

LLUSTRATIONS BY STUART BRADFORD





OR A QUARTER CENTURY, computing technology has advanced at a dizzying pace. Each year, PCs have gotten faster, smaller, cheaper. If the auto industry moved at a similar pace, observers say, we'd all be driving disposable, jet-engine Ferraris by now. But it's probably a good thing this isn't the case, since a system crash at 700 MHz is a lot safer than one at 700 mph. Nevertheless, judging by current evidence, computing technology will continue to accelerate at

an unprecedented rate. Last month we looked back at the history of computing. In this issue we look forward to the developing technologies that will shape our world tomorrow and the players behind them. Will PCs survive Internet madness? Or will they go the way of eight-track tapes and the Apple Newton? Will Microsoft be a formidable force in 2010? Or will the company's OS empire crumble like the former Soviet Union?

Standing at the cusp of the millennium, we've arrived at the era depicted in many sci-fi masterpieces. Much of what was predicted has come true, and even grown mundane. As we look ahead, the hype appears to be denser than the circuits on a Pentium III chip. What say you to molecular computing machines that you can't even see? How about a computer mouse that measures your moods (but regrettably doesn't change

color to match them)? Not all the conceptualizations featured in these pages will come to pass. But fasten your seat belt anyway, because the next few years promise to be a wild ride.

## **NEXT PC**

#### **Exploring the Digital Frontiers**

IN THE FUTURE," predicts the Web site for Matt Groening's animated show Futurama, "people will live twice as long, computers will die twice as fast."

Rumors of the PC's demise may be premature, but they aren't necessarily exaggerated. No one can say for certain whether the PC will survive the coming onslaught of supersmart alternative computing devices—ranging from wireless phones to household appliances. Such products could make the PC less essential, especially if they're simpler to use and don't crash as often.

In the short run, you can expect PCs to become smaller and more powerful, with thinner and lighter screens. And advances in voice recognition could ultimately make museum relics of your mouse and keyboard. But while the aging PC may undergo some cosmetic nips and tucks, it probably won't disappear altogether—at least not in the near future.

#### MOORE POWER TO YOU

MOORE'S LAW, based on a 1965 prediction by Intel cofounder Gordon Moore, states that processing power will double every 18 months or so. That's been the case since Moore's declaration, and there's no sign that this torrid pace will let up.

"We expect Moore's Law to continue, even ten years from now," says Intel spokesman Manny Vara.

Intel's chip release road map, which sets the tempo for the industry, calls for 800-MHz Pentium III desktop processors in the first half of this year, and 1-GHz chips by year's end. AMD plans to produce a 1-GHz Athlon processor by October.

Current processor technology will eventually hit a brick wall, though. Researchers agree that existing lithographic techniques for creating silicon chips are limited—you can fit only so many transistors onto a silicon wafer.

So let's get small. Real small.

#### NOW YOU SEE IT ...

NANOTECHNOLOGY and quantum computing are two areas of research attempting to supplant the silicon chip. Still largely theoretical, these concepts involve using molecular or even subatomic particles as logic components. Instead of relying on



OTTOMAN EMPIRE: Sozo Design's computer/footstool has Intel inside.

circuits to perform calculations, computers would use the position of individual atoms or spinning electrons to crunch numbers, creating extremely powerful "microscopic" computers that would leave today's machines in the subatomic dust.

But what good is a microscopic PC? Robert Morris, director of IBM's Almaden Research Center, says there are certainly practical applications for a miniscule computer—but of course, not one *that* small. "Rather than making these things so tiny that you inhale [them] by mistake," Morris says, "we're putting effort into wearable computers." Microscopic computing would require very little power—perfect for a tiny, wearable PC such as a computing wristwatch, one idea that the Research

Center is pursuing (see "Next Ultraportables," page 124). And, says Morris, quantum computing power would be virtually limitless. It would allow for "massively parallel" computations of the sort foreshadowed by Deep Blue, the supercomputer that beat world chess champion Gary Kasparov in 1997.

Will you need this much brainpower to run Microsoft Office 2005? Probably not; but potential applications for numbercrunching on this scale could include heavy-duty tasks such as weather forecasting and genetic engineering.

#### DISPLAY'S THE THING

THE NEAR FUTURE of display technology can be summarized in three letters: LCD. Flat-panel LCD monitors have several advantages over CRTs: They're lighter, smaller, and capable of higher resolution. Unfortunately, for the next few years at least, LCDs will be prohibitively expensive for many users. Bob O'Donnell, research manager for PC displays with market research firm IDC, anticipates that 15-inch LCDs won't hit the \$500 price point (down from the current \$1000) until 2003. And they will still cost more than CRTs.

Nevertheless, flat panels are the future, and at least one company is looking to take them to the next level. Russ Wilcox is cofounder and vice president of Elnk, a company that aims to produce flexible, paper-thin displays within five years. EInk's Immedia technology consists of liq-

uid ink embedded in paperthin plastic sheets. Microcapsules contain the ink, along with tiny white particles that respond to electrical impulses. A wireless antenna chip in the "paper" transforms radio waves into text and images.

Currently, EInk is field-testing display signs in Illinois and Massachusetts J.C. Penney stores. The signs-measuring 4 feet by 4 feet and made of foam core and plastic-receive an electric impulse that causes the text and

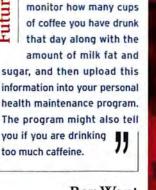
images to change. The company also plans to create an electronic book within five years, with flexible, plastic "pages" that

#### **COFFEE TALK**

In an ideal world the computer will become invisible. The ultimate will be when almost any object that we buy, no matter how inanimate, will contain an embedded processor that will enhance its function. A coffee cup, with embedded sensors

and processing, could monitor how many cups of coffee you have drunk that day along with the amount of milk fat and sugar, and then upload this information into your personal health maintenance program. The program might also tell

**Future Perfect** 



#### Roy Want

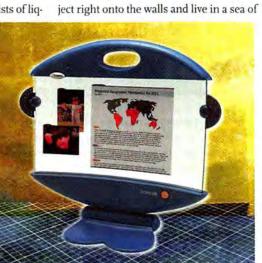
manager of the embedded systems division at Xerox PARC

too much caffeine.

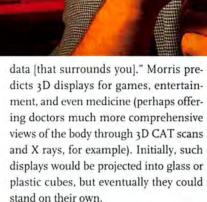
could display downloaded text and erase and reprint themselves. "[The book] would have hundreds of pages you can thumb through, in which all of the text can change," Wilcox says. Attach the

book to your PC and it will download whatever you want to read.

IBM's Morris expects displays to evolve in another way: Instead of smaller, 2D displays, he envisions bigger, 3D images. "One obvious extension would be the projection display," he says. "You could pro-



WE'VE SEEN THE FUTURE: Lexmark's prototype see-through monitor comes with a translucent screen.



#### WILL DRIVES THRIVE?

ONE IMPEDIMENT to generating 3D displays is the tremendous amount of code required to store and project them. Fortunately, as quickly as processors are advancing, storage is moving even faster.

"Right now [hard drive capacity] is increasing at over 100 percent per year, and I think that'll keep up for the next handful of years," says IDC's research manager for disk drive storage, Danielle Levitas. By combining magnetic and new forms of optical storage technology, hard drives capable of holding 100 gigs per platter should ship by 2005, Levitas says.

But will we need all this storage if our lives become Internet-based? Morris

says that if storage technology outpaces communication technology, it makes sense to keep data retrieval local. But if communication technology moves faster, remote servers will be the way of the future. Rather than storing data on computing devices, we'd grab what we need from online storage depots. Imagine keeping your music collection online and downloading Tony Bennett and Limp Bizkit whenever you want, using portable players and MP3 files. Already, virtual Web drives like IDrive.com and FreeDrive.com offer up to 25MB of free storage.

Morris also envisions storage in another dimension. "We're very interested in the idea of holographic storage," he says. "Instead of storing magnetic bits on a disk's surface, we're going to the third dimension. By using lasers and their interference patterns, we're able to store

> information in a crystal and read it at a rapid speed." Holographic storage could produce faster data transfers and more efficient searches by using minute changes in light angles to scan vast amounts of data at once.

> This is no pipe dream. Holographic storage already exists in research labs, Morris says. Its capacities approach those of today's biggest hard drives, and data transfer rates reach 1GB per second. But the tech-

WHAT BUSINESS doesn't want to be the next Amazon.com? Lots of companies are vying for the spot, though consumer retail space online has gotten a lot more crowded since Jeff Bezos turned his shoestring operation into "the world's biggest bookstore." Without a doubt, every new start-up and garage geek on the planet is hoping to rake in millions through e-commerce. Not everyone will strike it rich, but one thing is certain: The electronic marketplace is on the verge of a tremendous growth spurt.

Forrester Research predicts that online retail sales will explode to \$184 billion per year by 2004, up from \$20 billion in 1999. "[The market is] going

## Next Amazon

Hangin' at the Digital Mall

to be big," says Lisa Allen, an analyst at Forrester. She pauses for effect. "It's going to be really big."

VR Shopping Not only will the variety and volume of products you can buy over the Net continue to expand, but your entire experience of online shopping will evolve as well. Think virtual reality is only for games? In the future, you may stroll the aisles for a lug wrench at Home Depot or finger the threads at Saks, all without leaving the comfort of your home. Indeed, services such as these are already being tested by some stores.

As bandwidth into the home increases, e-commerce could develop into far more than a point-and-click experience. Covad, a Santa Clara, Californiabased provider of high-speed DSL services, sees a day when companies will buy bandwidth in bulk, and trade it to consumers in exchange for their loyalty. "The company could communicate over a live video feed to a customer's house," says Abhi Engle, Covad's broadband product manager. Real estate firms, for instance, could offer clients streaming video "walk-throughs" of new houses, a service impossible without broadband. And because DSL is an "always-on" technology, consumers won't have to dial up to shop.

Must-Buy TV Interactive TV, already in the test stage, is another



growing e-commerce avenue. Mark Schmidt, director of marketing for IBM's Home Networking unit, pictures remote-control consoles with built-in flat screens that will allow you to watch your favorite shows and order products featured in them. Imagine watching The X-Files and being able to buy the shirt off Mulder's back.

"We're very close to having a touchscreen monitor that you could carry

around the house with you," says Mark Dwight, a product line manager at Cisco Systems. He envisions a "flat, smooth tablet" networked to other appliances in the home and jacked into the Web. "It takes [shopping by catalog in bed] to the next level," he says.

As for the look of future online stores, tomorrow's shopping experience is likely to be more visually exciting and interactive. Forget about bland, 2D Web displays of widgets and bolts. Instead, look to companies like the Sharper Image (www.sharperimage. com) whose site features a 3D image of a CD player, which you can grab with your mouse, flip around to view from all sides, and even open to take a peek under the lid.

It won't be long before the Gap or Lands' End lets you upload a scanned photo of yourself to its site, then produces a scaled 3D image of you from that photo. You could then "dress" your model in various outfits to assess the style, size, or color before you buy.

After that, it's only a short step before you find yourself virtually strolling the aisles of an online car dealership and kicking the tires of that SUV you've been eyeing. -Michael Grebb

### SPACE IS THE PLACE

**Future Perfect** 

One holographic storage disk will hold millions and millions of holograms. You'll be able to store a large university's entire archives on ten holographic disks. By the time it gets to the desktop, in the outer edge of ten years, transfer rates will be up to 100MB per second. Audio-video applications will drive the need for this type of storage. People are going to need to store hundreds and hundreds of gigabytes of video, and we'll be able to make the media very cheap.

nology is so expensive that it will be several years before consumers can expect to see any practical holographic storage products on the market.

#### **FUTURESPEAK**

VOICE RECOGNITION is often trumpeted as the most natural interface for personal computers, and it continues to be one of the busiest areas of development in the industry. Louis Woo, president and general manager of speech technology powerhouse Lernout & Hauspie, says that hardware and software technologies have reached the point where speech input can be speaker independent-that is, it requires no user training. Building on advances made in both hardware and software noise-cancellation technology, he says, omnidirectional computer microphones that can pick out voice commands from background clatter in a room are emerging. Woo expects voice interface systems to be part of everyday computer use within the next three to five years.

#### THE TOUCHY-FEELY PC

COMPUTERS ARE also quickly becoming adept at recognizing faces, tracking gazes, and even sensing moods. IBM's Blue Eyes research program is built around such biometric technologies, "One of the things we're interested in is attentive user interfaces," IBM research director Morris says. "These are interfaces that pay attention to you as you pay attention to them."

One developing technology, gaze tracking, involves a computer camera, mounted to your display, that follows your iris. Depending on where your eye focuses on the monitor, the computer "senses" what information you want and calls it up without requiring you to click a hyperlink.

Advanced face-recognition systems will have other applications as well. For exam-

#### **Kevin Curtis**

program manager of ple, an always-on holographic storage video camera may development at Bell be used to scan Labs (a unit of Lucent your face every Technologies) time you sit down

to type. If an unauthorized person tries to use your system, your keyboard will lock up. Or recognition systems may further customize your PC experience. "Your display could adjust the font size depending on where you are in the room," Morris says. "It could recognize the faces of various members of your family, and give customized information at a glance."

Another Blue Eyes project is a computer mouse that senses your moods. It will gauge a user's emotional state by measuring pulse, temperature, and skin responses through the fingertips. Potential applications, developers say, include video games and market research. The mouse could tell game makers when a player is excited or frightened, and let marketers know how questionnaire respondents "feel" about their answers.

#### LOOKERS

WHILE THE PERSONAL COMPUTER industry has made great strides in function. form has largely been forsaken. Cabi-

## **Future Schlock**

THE FUTURE has always been with us. Books, movies, television shows, and

even theme parks have all envisioned what tomorrow may be like. These ideas have sometimes been realized in ways their creators could never have imagined. Here are modern equivalents of some past predictions.



SOURCE	FANTASY	REALITY
Forbidden Planet	Robbie the Robot	Web shopping bots
Dick Tracy	Two-way wrist radio	Palm VII
Get Smart	Shoe phone	PDA/cell phone
Neuromancer	"Jacking in"	"Dialing up"
The Time Machine	Time travel	Nick at Nite
Sleeper	Cloning	Dolly the sheep
1984	Big Brother is watching	Jennicam is loading
The Jetsons	Rosie the Maid	Ask Jeeves
Soylent Green	Mysterious nutritional supplements	Olestra
The \$6 Million Man	Bionic implants	Pamela Anderson Lee
Logan's Run	All people die at 30	IPO millionaires retire at 30
Tomorrowland	What if Disney ran the world?	Disney does run the world
Star Trek	Wildly breeding Tribbles	Free AOL disks
2001: A Space Odyssey	Dark, inscrutable monolith	Microsoft



#### WWW.MARS.COM

**Future Perfect** Within ten years, the two-planet Interplanetary Internet will be in operation with several satellites in orbit around Mars. Many robots will have been landed on the surface and at least one e-mail server Ito communicate with them] will likely be on the planet. As many as 2 billion users will be on the Internet, and that many devices will be on the network as well. Intelligent devices will be a normal part of daily life,

performing functions for us such as ordering [groceries]...as

we occupy ourselves with less mundane matters.

Vinton G. Cerf

senior vice president that you can tote for Internet archiaround the office tecture and technology and use with any at MCI WorldCom PC, a printer that

sprays paper as well as ink from its cartridges, and a smart desk that senses your arrival and adjusts itself to your height.

Someday, these gizmos may become a reality. In the meantime, as long as computers continue to get smaller, faster, and more affordable, we shouldn't complain.

By way of comparison, consider another highly popular market in which the goods have become steadily bigger, slower, and more expensive over the years: major-league baseball. Free-agent first basemen seldom, if ever, come with a warranty.

nets, monitors, keyboards, and mice are still beige and bland. We may be buying brand-new Ferraris, but for the most part, they still look like '85 Ford Escorts.

Some new systems-such as EMachines' EOne and high-end, all-in-one systems like NEC's Z1-exhibit cosmetic changes. But future concoctions may overhaul our perception of the PC by taking the machine out of the box. Intel, for instance, is touting the Ottoman PC, a

high-concept home PC that packs a Pentium III system, a flip-up LCD, and a wireless keyboard into a funky footstool that's "inherently suitable next to any sofa or chair." Meanwhile, printer manufacturer Lexmark has partnered with the University of Kentucky College of Fine Arts to design a future office work space. Among its stylish components: a see-through monitor, a folding wireless keyboard (which looks like a high-tech handbag)

IN 1997, ALAN RAMADAN introduced a new way to watch sports, one made possible by the World Wide Web. Throughout the seven-month Whitbread Around the World sailing race. Ramadan's newly formed Quokka Sports (www.quokka.com) broadcast the images and expert commentary that usually accompany sports cover-

## Next Yahoo

#### The Wild, Wild Web

age, but with a twist. Quokka added technical data (some of it in real time) such as navigational notes, boat speed, radio conversations, and e-mail diaries written by the sailing crews. The company mixed it all up and put it on a Web site that drew 1.8 million visitors.

Today, Quokka Sports is no longer an edgy start-up with a fistful of venturecapital dollars. Its list of partners includes TCI/Liberty, Hearst, British

Telecom, and Excite@Home. The site offers a clear glimpse of the future Web. Click on a link for the 2000 Olympics, and you'll see pages filled with a mélange of pictures, charts, bits of text, and at least one video or audio clip. Quokka also created the Race-Viewer, a Shockwave application for motor sports that mixes graphs of the racers' position with textual commentary and a live video window.



WAVE RUNNER: Quokka Sports' Web site offers a look into the future Net.

Multimedia-rich Web sites like Quokka's and RealNetworks' Take5 (www. real.com), which gathers an array of audiovisual programming from the

> Web for users to access in one central place, could be the hottest draws for broadband consumers in the future. More sites will routinely feature streaming media and 3D modeling. The software to deliver such content already exists. Site designers just need to refine it.

and consumers need faster Net connections to view it. - Cameron Crotty

Regen Regen All Zoom Pan Aerial View **Viewports** Named Views. 3D Views 3D Orbit

through work

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## **NEXT ULTRAPORTABLES**

#### Small Is Beautiful

wo decades ago, Coleco's handheld football game was as hightech as portables got. Today we have an epidemic growth of mobile computing devices and digital doodads—laptops, pagers, cell phones, personal digital assistants, digital cameras, subnotebooks, mobile MP3 audio players, and handheld phasers with "stun" and "kill" settings.

Okay, maybe not that last one...yet. But at the current rate of development, we could soon be walking around resembling well-equipped cyborgs. In fact, Xybernaut, a Virginia-based company, already sells a full-featured wearable computer complete with a Xybercam video camera and a small, head-

mounted color display that flips down in front of the user's eye (ideal for the utility worker hanging perilously from a telephone pole). It costs \$5500.

So how will we keep these cool devices from weighing us down? Wireless sys-



PRET-A-PORTABLE: Xybernaut's PC is this season's ready-to-wear fashion accessory.

tems, advanced display technologies, and all-in-one devices will help keep ultraportables, well, portable.

And no doubt about it, wireless connectivity for notebooks is developing rapidly. Apple's new iBook supports a wireless LAN system called AirPort that allows users to share an Internet connection within 150 feet of a hardwired access point. Similarly, Dell is making a wireless LAN card that'll be an option for



EVERYBODY loves to hate Microsoft. Need help getting in the mood? Think back to your first PC and recall the countless hours you've spent staring at Windows error messages since then.

For nearly two decades, Microsoft has almost single-handedly shaped our computing experience. Can any company wrest control from the giant from Redmond? We think so.

Your computing life today probably revolves around a traditional "Wintel" PC, but before you know it you'll have a host of clever devices that don't need Microsoft or Intel inside. This isn't to suggest that Microsoft and Intel will disappear, but the glory days of desktop PC profits may be over.

Instead, providers of Internet services and computing appliances-such as smart handheld devices that let you send e-mail, browse the Web, and conduct wireless transactions—will likely benefit most from this future computing environment. And in a twist of fate that Microsoft opponents will relish, the Gates empire isn't positioned to supply the operating system for many of these handheld gadgets. Who is? Our bet's on Symbian.

Get Smart Phones While Symbian isn't exactly a household name, this company already packs enough might to make Bill Gates shiver in his over-

## **Next Microsoft**

#### Where's Windows?

size sweater. A joint venture among Nokia, Ericsson, Motorola, and Matsushita-four telecom giants that together supply the majority of cell phones in the United States, Europe, and Japan-Symbian is poised to corner the market on operating systems for smart phones, handhelds that look like cell phones but also let you send email and browse the Web.

Assembled by Psion, the PDA leader in Europe, Symbian is busy improving and licensing Psion's EPOC operating system for handheld devices. EPOC appeals to hardware designers because of its low memory requirements and its user interface that is suitable for small screens, says Diana Hwang, IDC's

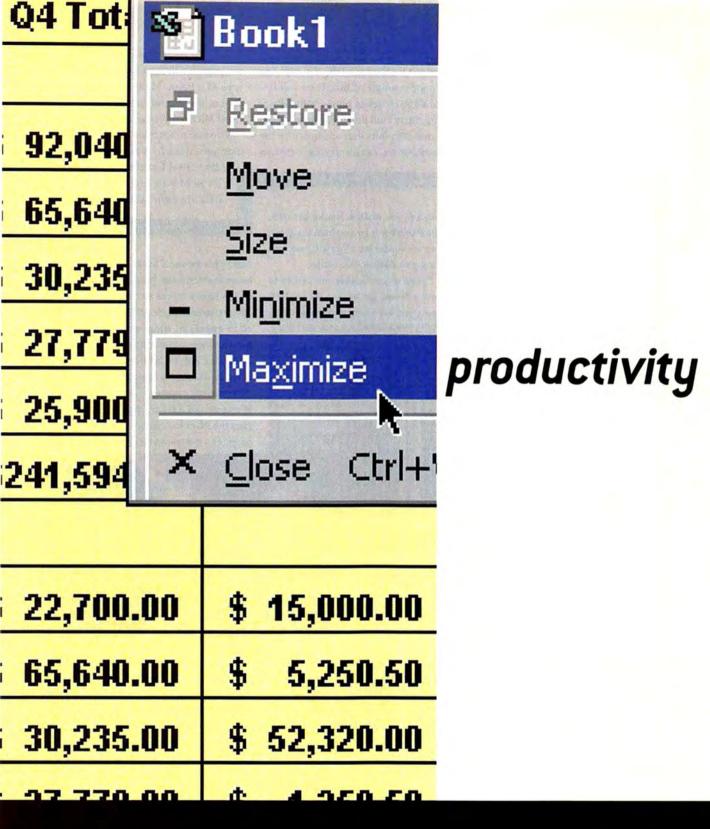
research manager for smart handheld devices. Furthermore, thanks to an agreement with Sun Microsystems, these smart phones will also run Java

> apps and work with Java-compatible gadgets.

No Room for Bill? In contrast, Microsoft's only venture into handheld operating systems, Windows CE, may be too hard-

ware-intensive for smart phones.
Today, Palm PDAs greatly outsell Windows CE devices. Research firm IDC predicts that smart phones will account for some 40 percent of the handheld market by 2003. That's a huge opportunity for Symbian, and a formidable challenge for Microsoft.

Symbian's other competitor, Palm Computing, could be a worthy opponent, especially once it spins off from parent company 3Com. But for now, Palm is working with Symbian, not against it-Nokia is making a pen-based wireless device that melds the Palm and Symbian operating systems. Look for it next year. -Laurianne McLaughlin



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its Latitude notebook line and plans to offer similar wireless options for all of its notebook and desktop PCs. You can bet other companies will quickly follow suit.

Besides wireless, another key buzzword for the future of mobile computing is convergence. Qualcomm's PdQ Smartphone is a good example of this: It's a full-featured digital wireless phone with a Palm III organizer built into the handset. It can autodial numbers that are stored in the Palm organizer, can display text messages

as a pager would, and has all the standard apps of a Palm. Many similar wireless devices are currently in development (see "Next Microsoft," page 124, for details).

Wireless isn't just for far-flung communications, though. A new industry stan-

dard called Bluetooth is designed to let all of your mobile devices swap data via radio waves, provided

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GO AHEAD, LAUGH. By now you've probably heard about the microwave oven that connects to the Net, and the fridge that tracks your grocery list.

Well, don't laugh too hard. Appliance companies-like Samsung (maker of the Internet-ready microwave), Frigidaire

(which, along with ICL, created the smart fridge), and Philips Electronics-are taking this stuff very seriously. And some of the biggest names in computing, including Intel, are sinking big money into digitizing furniture and kitchenware.

Mi Casa Es PC Casa At its recent "La Casa Prossima Futura: The Home of the Near Future" show in New York. Philips Electronics exhibited designs for tomorrow's chefs,

including a speechenabled cook's apron (which lets you turn on the stove with a voice command) and

a thermometer-like sensor that gauges the calories in your meat loaf. Don't expect these gadgets in your kitchen soon, though; the food analyzer and apron won't appear for years, if ever.

Tomorrow's kitchen gets wackier at MIT's Media Lab in Cambridge, Massachusetts. Starting with the premise that "the kitchen is no place for a keyboard, and certainly...no place for a mouse," the lab's Counter Intelligence Project (yes, that's its name) is developing a talking oven mitt that, when thrust into a hot oven to check the chicken, will tell you if your bird is cooked. Other inventions include a spoon that will measure the spiciness of your chili; a refrigerator that will not

only tell you whether you've got milk, but also order it for you from the store; and a countertop that will talk you through a Cordon Bleu recipe.

Count on computing companies to have a strong presence in the post-PC



can't talk to each other. Microsoft hopes that Universal Plug and Play will be the lingua franca to help network devices communicate. UPP is expected to appear in Windows 9x (codenamed Millennium and slated to ship in 2000), as well as future versions of Windows CE and Windows 2000.

For obvious reasons, companies like Microsoft and Intel are determined to keep the PC at the center of the smart home, as a digital cop for all devices on





runs Frigidaire's smart fridge, And Intel is pushing its StrongARM processors for set-top boxes, game consoles, and other specialized machines. Microsoft hopes that Windows CE will be the OS of choice for these devices.

Chat Rooms But the key to the future home is connectivity. Smart appliances won't be much use if they

MY DIGITAL LIFE: Frigidaire's Websurfing fridge; Philips's food analyzer, which checks for allergens; and an interactive chef's helper (above).

a home network. Says Microsoft product manager Keith Kegley, "Right now the PC is the only [device] flexible enough to let all these new technologies coexist.... Because of their ubiquity, [PCs] will be the single common device on every home network."

Sure, it's a rosy picture, but biases aside, it's a safe bet that even tomorrow's high-tech fridge won't outsmart your PC anytime soon. -Dan Miller



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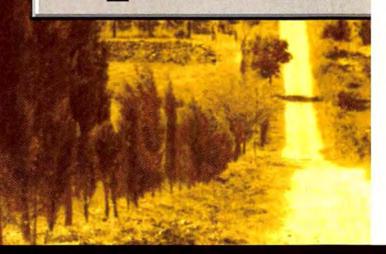


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THINK THE MELISSA virus was annoying? Consider this scenario: An employee at company X receives e-mail containing a snippet of virus code. The recipient opens the message, releasing the virus onto the hard drive, where it sits silently...waiting. When the PC idles for an extended period, indicating that the employee has left for the day, the virus downloads another code, which sifts through the hard drive and for-

wards data to a remote site on the Net. If anyone touches the keyboard, the program shuts down and hides until the next opportunity to strike arrives.

I Spy Until now, computer viruses have been more pesky than pernicious, vandalizing data but rarely stealing it. Soon, experts say, spy viruses will be a real threat. Last June, antivirus companies learned of a virus that works through a screen saver called Pretty-Park.exe. Click on the application, which comes as an e-mail attachment, and, if you're an mIRC user, the virus enters your computer to steal network passwords and other data, then attaches itself to outgoing e-mail.

they're less than 40 feet from one another. You could, for example, take notes at a conference on your Palm device, then wirelessly transfer them to your notebook when you return to your hotel. Look for Bluetooth-ready devices to appear midyear.

The displays on mobile devices will improve as well. Bob O'Donnell, research manager for PC displays with IDC, says advances in organic LEDs (displays that use naturally fluorescent compounds) promise brighter, crisper displays for mobile devices in about five years. These screens will need less power, O'Donnell says, because unlike traditional LCDs, they don't require a backlight.

#### PAGING DICK TRACY

LOOK BEYOND the next five or ten years and you may see some prototypes of the sci-fi stuff currently being pondered in Virile Viruses Experts at Symantec and Network Associates say that new viruses will study their host environment and alter themselves based on it. Last year, both companies reported an increase in the number of polymorphic viruses, those that change their code to evade detection. "For a virus to spread," says Jimmy Kuo, director of antivirus research for Network Associates, "it mustn't call attention to

## **Next Virus**

#### **Tomorrow's Digital Diseases**

itself." That's why showy programs like Melissa, which make a lot of noise, do relatively little damage.

Kuo also reports a proliferation of data diddlers, viruses that undermine the integrity of data by randomly changing bits of it. One of these, called Compat, changes the values in an Excel spreadsheet to within 5 percent of what they should be.

You can easily imagine the potentially destructive power of such a diddler. We wouldn't want one infiltrating our anesthesiologist's computer, let alone the Pentagon's. -Andrew Brandt





research rooms around the country. Robert Morris, director of IBM's Almaden Research Cen-

ter, says his group is banking on the PC wristwatch becoming the ultimate wearable computer of the future.

Researchers could use advanced technologies such as quantum computing to produce superpowerful, watch-size machines that require little battery power.

Working with voice command technology, wireless Internet access, and more hypothetical possibilities like holographic projection displays, designers could do away forever with monitors, keyboards, and other computing peripherals. Users would store data on the Web, which they would access through wireless networking and view using holographic projection. A superfast microprocessor would process the information instantaneously before uploading it from the watch back to the Web. Such machines would do everything that the Joneses' PC does now, but updated for the age of the Jetsons.

However, there's no word yet on that nifty phaser technology.

#### PERPETUAL PERSONA

Future Perfect

Information about you will follow you around online. This will let you maintain your persona and reputation as you move about the virtual world. However, it raises concerns about privacy. Who will control this information? If individually controlled, the system is unreliable—I'm unlikely to share unflattering data about myself. Yet

an externally controlled persona raises the disturb-

ing vision of a society under ubiquitous surveillance.

Judith Donath

assistant professor at MIT Media Lab and director of the Sociable Media Group

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## **NEXT INTERNET**

#### Bigger, Faster, and Universal

HAT DOES half a decade amount to on the Net? A lot. Just five years ago, David Filo and Jerry Yang began the Yahoo list. Microsoft registered the domain name MSN.com, and Netscape released Navigator 1.0. Today there are more dot coms than one-armed bandits in Vegas, and 150 million to 200 million people are online. What a difference the Web makes.

So how will the Internet look in five more years? For starters, the Web will be bigger, flashier, and noisier.

#### EVERYBODY IN THE POOL

AS SURE AS BUGS in a Windows program, more users will be on the Internet five years from now. According to research firm Jupiter Communications. only 37 percent of U.S. households were

But while companies duke it out for wired Net consumers, both camps risk being kayoed by technologies that let users connect with no filaments attached. A recent report sponsored by Nortel and published by the Yankee Group predicts that the number of wireless Internet users-connecting mainly through wireless telephone networks-will grow from 3 million today to 50 million by 2004.

The proliferation of users will also increase data flow. Ameritech, a Southwestern Bell company, runs the Chicago network access point, one of a handful in the nation that ties the Internet together.

Andy Schmidt, the company's senior product manager for the Chicago NAP service, says that Alternatively, Infolibria sells streamingmedia software that bypasses the Net backbone altogether by duplicating Web video and audio files on ISP servers.

#### THE INTERNET, PART TWO

OF COURSE, there's a big difference between having enough bandwidth available for the entire Internet and having it available to you when you need it. As the Internet has become increasingly commercial and crowded, its original usersacademics and researchers-have had a harder time accessing the communication lines. To mitigate this problem, developers of a new project called Internet2 have set aside miles of fiber-optic cable to devote to

#### LOST IN A DATA CLOUD

**Future Perfect** 

The goal for networking in the next decade will be to provide individuals with a data cloud that follows them wherever they go. Whether I am attending a meeting in New York, sitting in my backyard in California, shopping in Tokyo, or meeting with a customer in Thailand, I should never be without any of my digital information. The network challenge [will be to make] this available whenever and wher-

ever I am; the database challenge [will be] storing, organizing,

and retrieving all of this heterogeneous material.

Thomas G. Zimmerman

peak volumes of data traffic (currently flowing at 2.5 gbps) across that NAP have doubled every six to eight months for the last two years.

Will the Web backbone snap under all that weight? "I don't foresee any impending blackout," says Rick Miller, Internet backbone analyst for the research firm Cahners In-Stat. Miller says that enough bandwidth is available today to accommodate growth. But some industry observers warn that the Net could get bogged down as video, audio, and other rich media become more popular. To keep up, we may need "a 100 to 1000-fold improvement in the backbone, and each server may need to be 100 to 1000 times faster," says Abdelsalam Heddaya, vice president of research and architecture at Boston-based Infolibria. researchers' use and to serve as a test bed for future

Internet applica-

researcher at the IBM Almaden Research Center

tions and technologies. The project's participants, which include Nortel, Qwest, and Cisco, expect technologies developed and refined there to facilitate searches on the Internet, improve the reliability of streaming data (video, audio, and the like), and generally create a more stable Net.

Until now, the biggest obstacle to delivering high-quality multimedia over the Internet has been the straw-sized connections that funnel data through the Net. But even the narrowest consumer broadband connections will be roughly ten times faster than the average 56-kbps analog modem. Fatter connections mean wilder. more graphic-intensive Web sites loaded with streaming video and audio clips. Net shopping for everything from clothes to cars will begin to resemble the real-world activity, since buyers will be able to



connected to the Net in 1998; by 2003 this figure will have risen to 63 percentand that's a conservative estimate.

Despite the current wave of interest in broadband connections (through DSL, cable, or satellite modems), Jupiter Communications analyst Zia Daniell Wigder says less than 25 percent of future Internet users will connect to the Net that way. and widespread broadband use will take longer than most people expect. Analog dial-up connections will be free for the asking, Wigder says, and broadband companies will have to sell consumers on paying for a superfast Net connection.

TURNS LIGHT INTO PIXELS.

IMAGES INTO NUMBERS.

CYNICS INTO BELIEVERS.



look at products in detail-probably in 3D.

Shopping won't be the only area of change. In the future, you may get most of your entertainment-movies, music, videos-and news on the Internet. Who knows? By the time George Lucas finishes the next installment of his Star Wars prequel, you may be able to watch the fall of Anakin Skywalker entirely from the Net.

But the greatest gains offered by broadband connections may be around-theclock access to data, resulting in an Internet that is always on in your house. For instance, instead of having to instruct Quicken to surf your bank's Web site and download your transactions, future versions of the program may retrieve the data as the bank's computer processes it. Com-

bine this with the trend toward home networking, and your future abode is likely to contain lots of application-specific devices-all wired to the Net. The very concept of "going online" may give way to an era of instant, universal communication.

Glenn McDonald is a PC World contributing editor. Cameron Crotty, Michael

Grebb, and Joel Strauch are freelance writers. Andrew Brandt is an associate editor and Laurianne McLaughlin a senior editor for PC World. Dan Miller is an executive editor of PC World Online. Michelle Campanale-Surkan contributed to this article.

DESIGNING GAMES isn't child's play. The electronic gaming industry has traditionally pushed the limits of computing hardware and led the way in many software advances. From yesterday's Commodore 64 to today's 700-MHz Athlon machine, we marvel at what our computers can do, then wonder what games we can play on them.

Alex Garden, CEO of Relic Entertainment and creator of Homeworld, a real-time strategy game, says that games will continue to drive technology. "It's likely that the growth of gaming in the new millennium will be more singularly responsible for the newer games look better than their predecessors, they're still as mindless as Galaxian was in 1979.

In the future, graphics cards will do most of the lower-level game processing, letting the CPU focus on intensive work, such as controlling objects' behavior (as opposed to just describing their shapes), says Peter Glaskowsky,

## **Next Game Future Play Time**

development and public adoption of new technology than any other influence," Garden says.

What will faster, more powerful PCs mean for future games? Will we be able to virtually sing with Puff Daddy or explore Middle Earth with digital hobbits? Or will we simply play graphically stunning but nonetheless stale versions of Tomb Raider?

The Next Level The latest line of 3D video cards and the gaming interface DirectX give some indication of what's in store. Graphics card technology has improved faster than any other segment of the computing industry. In only a few years we've gone from watching the pixelated, jagged images of Doom and Doom 2 to the photorealistic aliens and marines of Half-Life. But while

senior analyst for 3D graphics and multimedia at Cahners MicroDesign Resources. Consequently, the behavior of objects will mimic real life more accurately. For example, if lightning struck a tree in a game, the trunk would splinter and the branches and leaves would sway realistically as the weight of gravity took the tree down.

Such effects won't be limited to PCs. Sony is touting the powerful Emotion

Engine CPU in next year's PlayStation 2, which dedicates more processing power to artificial intelligence and to object behavior than to graphics. As a result, we would see more games like the revolutionary (though flawed) Trespasser, whose dinosaurs act out of fear, hunger, or anger instead of following scripted programming. Imagine a game of Quake in which your bot opponents anticipate your moves, rather than just react to them. Though games won't truly imitate life for many years to come, within five or ten years, improvements in hardware and Internet broadband may allow designers to create games that not only entertain us but also challenge us intellectually and emotionally.

Relic Entertainment's Garden sees virtual reality as part of those games. "The next really big immersive leap will happen when a lowcost, high-resolution head-mounted display system emerges. This will remove the final 2D screen barrier that we fight against every day," he says.

In this scenario, we'll fight intelligent, 3D enemies that seem as alive as we are. We'll run, jump, hear, and see, not with joysticks and gamepads, but with the ultimate gaming peripheralsour limbs, our eyes, our ears, and most of all, our minds. -Joel Strauch

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Lease \$59/Mo.

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'CD-ROM speeds are variable. Maximum speed shown. 'Maximum data transfer rate may vary due to the particular modern you are communicating with, telephone lines and communication protocols.

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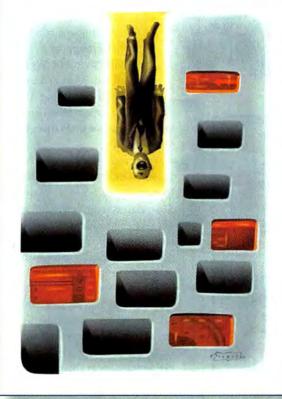








# PC WORLD **NO SAFETY NET**



WITH MORE PC **VENDORS** OFFERING TECHNICAL SUPPORT ON THE WEB, WILL YOU BE ABLE TO DON'T COUNT ON IT.

By **NAOMI WISE** 

SO I'M ON Packard Bell's Web site, several months before the one-time giant said it would withdraw from the U.S. computer market. I'm trying to figure out how to fix a broken clock on my PC, and I'm being followed by a set of animated dentures. These chattering teeth—they look like the wind-up choppers sold in novelty storestout the site's chat room. And I can't turn them off. I comb the site's FAO library for an answer (chomp chomp chomp), but it's not there. I try the search engine (chomp chomp chomp) without success. I even stop by the damned chat room, but it's closed (chomp chomp).

I'm about to throw a shoe at the moni-

tor when I reach the user forum, where I'm greeted by diatribes of frustration. One posting rages: "How do you expect your customers to learn to use your machines? The 800 phone line is always choked....The chat room is virtually never open....Finding the appropriate message is almost impossible....The search tool is a blunt instrument. This is grotesque!"

Welcome to the brave new world of PC service and support. As system prices plunge-and profit margins shrinkmore and more manufacturers are herding customers onto the Web to look for solutions on their own.

Dell, one of the best PC companies

when it comes to providing online help, is flooded with requests for Web support. According to the company, customers download more than 200,000 technical data files each week, and Dell's online. natural-language search engine answers more than 400,000 technical questions per month. When Toshiba's technical support site launched quietly in March 1999, no one could have predicted that it would receive 1.5 million hits by August.

But as PC World's most recent Reliability and Service survey reveals, exchanging hold times for download times isn't necessarily a consumer-friendly solution. (For complete results of the survey, conducted in conjunction with Survey.com of San Jose, California, see the charts on the following pages.) And as we discovered in our own tour of major manufacturers' Web sites, getting answers over the Internet-assuming you have any way to get online in the first place-is no easier than navigating voice-mail mazes and dealing with technicians on the phone.

## **WINNERS & LOSERS**

PC BUYERS, REJOICE! Of the 15 companies we rated, not one fell below Fair. In fact, 4 companies moved up in our overall reliability and service rankings since we last published our results in May 1999, and none headed south. WinBook, which didn't generate enough feedback regarding service to get a rating last time, joins the notebook list with a Fair rating. So

who's on the way up? Dell's work systems move up one notch to Outstanding, giving the mail-order giant two more top ratings than any other PC maker. Also in the work PCs category, HP and Micron claw their way up to Good from Fair. Now hold on to your mouse, because here's something we haven't said since we began surveying PC users online: Acer receives a rating of Fair-a notable improvement over past standings. The data we collected in our most recent survey period indicates the company is moving in the right direction. -Brad Grimes



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

SOURCE: PC World Reliability and Service survey, based on online participants' responses recorded over two periods of time: December 1998 through January 1999, and June through August 1999. Companies are listed alphabetically within each tier. See "A Word About the Star Scores" (page 147) for a description of our methodology.

#### **CUTTING THE CORD**

PC MAKERS have a huge incentive to send you online for support: The arrangement saves them money. When you factor in staffing and other overhead, phone support costs system makers roughly \$15 to \$22 per call, according to Service Strategies, a consulting firm in San

Diego. Those expenses can quickly swallow up the narrow profit margin on a sub-\$1000 machine.

"You can't afford to give unlimited, 2-hours-on-the-phone, toll-free support forever, especially to somebody who paid \$499 for a system," says Michael Griffin, Acer's vice president of customer satisfaction and technical support. By sending users to the Web, PC makers can cut support costs in half, says John Hamilton, president of Service Strategies.

But vendors also say they can provide a better service experience online. "Nobody wants to wait on hold for a technician." explains Don Neske, special projects marketing manager at Quantex. "We want to lower our hold time, and we think we can do that by conditioning our customer to think Web first. Then we want to deliver in-depth information that makes it a viable alternative to phoning in."

Other manufacturers insist that consumers are driving the move toward Web-based support, attracted by the ability to choose when and for how long they search for solutions or fine-tune their machines. "Why not give you the keys to the car and allow you to self-select what you want to be informed about?" says Dell's director for online support, Manish Mehta.

So far, however, PC World readers have been slow to cut the telephone umbilical cord to their PC vendor's support desk. In our survey, respondents said they had attempted to solve their most recent hardware problem online less than 20 percent of the time. Roughly 10 percent of those

who sent e-mail to their PC vendor's support department or posted a question on the manufacturer's Web site never received a response. Of those who got an answer to their online questions, nearly three-quarters of the respondents said the information didn't solve their problem.

Retired Air Force Colonel Carl Abrams of Washington, D.C., easily solved a serious problem with his Compaq desktop PC by going to Compaq's online FAQ page. But the solution to a problem with his two-year old Dell notebook proved to be somewhat more elusive.

"I downloaded a new video driver from the Dell Web site," he says. "As soon as I did that, the computer would only open in safe mode, and it wouldn't print. So I e-mailed Dell, and they very nicely sent a long e-mail with seven different ways to cure the problem. But none of them worked." Eventually, Abrams got the correct answer offline from his software developer son-who got his answer from software giant Microsoft.

#### THINGS THAT MAKE YOU GO 'HUH?'

ABRAMS'S frustrating encounter with Web support is not unusual. Our own informal tour of vendor sites revealed a broad range of sup-

port services, from well-organized (though somewhat obtuse) help centers to completely chaotic obfuscations.

Last fall, we visited the support Web sites of ten leading PC makers, posing

#### ONLINE HELP STILL LAGS

OUR SURVEY respondents turned to online support for help with their problems less than 20 percent of the time. Those who did use online support had a hard time getting the answers they needed.

RESULT OF ONLINE QUERY	Percent '
Never got a response	10
Got a response, but it didn't help	34
Response helped, but didn't solve problem	31
Response solved problem	24

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

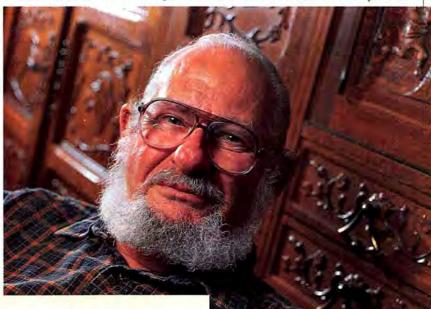
SOURCE: PC WORLD'S JANUARY 2000 RELIABILITY AND SERVICE STUDY

several questions to each. A typical problem: "The clock on my computer is running slow. I reset it every day, but when I reboot, it's slow again." (The most likely diagnosis and solution: The BIOS chip's battery is dying and needs to be replaced.) At each site, we started with FAQs, then

Of the ten sites, only two provided us with quick, detailed, correct answers. In some cases, a solution was buried deep in a FAQ file dense with technical jargon, and we found it only because we knew what we were looking for. For example, answers to the clock question lurked under the heading 'BIOS' rather than under 'Clock'. Had we not known the answer (a problem with the BIOS), we'd never have found it. One flaw of Web support became clear instantly: In cyberspace, no one can hear you say "Huh?"

In general, the sites that offered the clearest, most streamlined navigation and the richest resources

were those run by Compaq, Dell, and Toshiba. At the opposite end of the support spectrum. CyberMax offered little guidance, instead posting patches, FAQs, and other technical help without providing any means to search the site for answers or shoot off an e-mail question.



"DelLvery nicely sent a long e-mail with seven different ways to cure the problem. But none of them Worked

-Retired Air Force Colonel Carl Abrams

used the search function, and then went to any bulletin boards or forums that were open to the public. If we couldn't find an answer on the site, we posted an e-mail query wherever that option was possible.

But no technical support site is perfect, and it's unlikely that any will wean users off phone support completely until significant improvements occur.

#### SEEKING A COMMON LANGUAGE

DELL, WHICH consistently earns high marks for service in our surveys-including marks of Outstanding for both its work and its home PC service in our current survey-also appears ahead of the

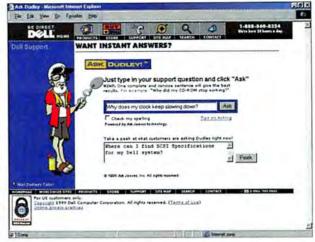
pack in the category of Web-based support. Dell was among the first computer vendors to adopt Ask Jeeves search technology (the company calls it Ask Dudley). allowing users to enter questions in plain English. In our experience, these naturallanguage search tools are rarely any better than old-fashioned Boolean searches, but with a little tweaking, they turn up correct answers at an improved rate. As we went to press. Dell was in the process of redesigning its support site.

Dell also provides a number of diagnostic tools to help users troubleshoot their own computers. The only problem is, you can't use them unless you already know which component is causing the problem. If you know only that you're getting indecipherable error messages, you will do better with one of Dell's other online tools.

What really distinguishes Dell is its online user forums, better known as DellTalk. The forums are exceedingly active, with users both seeking assistance and giving advice. Dell monitors the forums regularly for loaded with expert an-

swers to a wide range of arcane questions.

Dell does a fairly good job of responding promptly to user queries, even when, as in Colonel Abrams' case, the information isn't helpful. Joan Wallace of Sacramento, California, had no trouble getting her Dell notebook fixed online. "My battery was dying, so I tried Dell's Web site," she reports. "They got back to me in a cou-

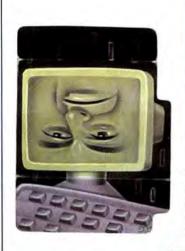


AT DELL'S SUPPORT site, Jeeves the butler appears as Dudley the accuracy, and they're laid-back tech weenie-a useful, although imperfect, troubleshooter.

ple of hours, saying the battery needed to be calibrated. They gave me a program to download, and I was back up and operating within a couple of days."

The Compag site's array of useful information impressed us, but our experience there was far from perfect. Compaq, too, uses Ask Jeeves technology (imaginatively dubbed Ask Compaq). At one point we

> asked Compaq why our system clock kept losing time, thinking it might identify our dying CMOS battery as



READERS RATE

Reliability

# KK PCS

READERS SAY THEY LIKE										
heir work PCs. Dell users are specially pleased.	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	High satis- faction with reliability	Overall reliability score	Short hold time	Ouick resolution	No resolution
DELL Work systems just don't get any more reliable than this.	****	****	****	****	****	****	****	***	****	****
**** GOOD	70.23	Sec. 21	7-3			1000	1		100	1000
GATEWAY Machines are impressive but support technicians aren't.	****	****	****	****	****	****	****	***	****	***
HEWLETT-PACKARD Solid scores even if customers don't always rave.	****	***	****	****	****	***	****	****	****	***
IBM Systems score high, but satisfaction's only so-so.	****	****	****	****	****	***	****	****	****	****
MICRON Shorter hold times for tech support would decrease frustration.	****	****	****	***	****	****	****	**	****	****
*** FAIR				70.50	5					
COMPAQ Systems are not bad, but service isn't great.	****	***	****	****	****	***	****	***	****	****

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

### A Word About the Star Scores

STARS AWARDED correspond to companies' relative rankings, which are based on their raw scores in each of the following 12 categories. For details about the stars and their corresponding scores, see www. pcworld.com/jan00/rs\_update.

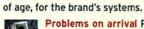


Percent of PCs with problems Percentage of PCs that have had

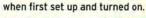
at least one problem requiring repair.



Problems per year Average number of problems per PC per year



Problems on arrival Percentage of PCs that did not work properly





Dead on arrival Percentage of PCs that were nonfunctional when first set up and turned on.



Component failure Percentage of PCs that contained at least one

the culprit. Though Ask Compaq did

come up with a possible solution, it also

returned some daunting alternatives such

as suggesting that the motherboard was

probably defective and should be replaced

When Salt Lake City travel agent Art

Fracchia had a problem with his new Pre-

(possible, of course—but yikes!).

failed component attributable to the system's manufacturer.



High satisfaction with reliability
Percentage of respondents with Percentage of respondents who indicated they were "very satisfied" with their PC's reliability.



Short hold time Percentage of phone service recipients who waited on hold for 5 minutes or less.



Quick resolution Percentage of service recipients whose most

recent problem was resolved by a company in five days or less.



No resolution Percentage of service recipients whose most recent problem was never resolved.



Knowledgeable tech support Percentage of service recipients who

rated the knowledge of the technician helping them as "excellent" or "good."

Sincere effort by tech support
Percentage of service recipients

who rated the sincere effort of the technician helping them as "excellent" or "good."



High satisfaction with service Percentage of service recipients

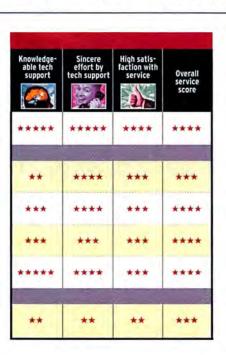
who indicated they were "very satisfied" with the service they received.

Methodology PC World's Reliability and Service survey was conducted in conjunction with Survey.com (formerly World Research) of San Jose, California, and IDC Consulting, PC World's sibling company in Framingham, Massachusetts. The survey was fielded during two different periods: December 1998 through January 1999, and June through August 1999. Over the course of the survey, we received 15,416 reports from verified PC World subscribers describing their PC's reliability and their experiences, if any, in getting service.

Using this data, a team of PC World editors and research experts analyzed the reliability and service performance of each manufacturer's home, work, and notebook PCs based on 12 measures. On each of 6 reliability and 6 services measures, we ranked every company from best to worst. We determined a company's overall ranking based on the sum of its weighted reliability and service scores, as well as on the number of stars it earned in Individual categories.

sario, he turned to Compaq's Web site for assistance, but struck out swinging. "The video would go out randomly-for instance, while I was working on a big spreadsheet. I couldn't get an answer from their Web site, so I e-mailed, and I never got a response from them. I finally fixed it by switching out the part myself."

Compag is particularly proud of the feature it calls My Presario. When you press a special key on the Presario keyboard, you reach a Web site customized for your specific model, with links to FAQs, forums, and more. This individualized data is not unlike the customized information you can get at Dell's site by entering



#### READERS RATE WORK PCs

CAN IT BE TRUE? Our most recent PC Reliability and Service survey indicates that systems used in offices are gradually becoming more reliable. This time around, five out of six companies earned marks of Good or better for their work PCs.

The biggest improvement came in the percentage of PCs with problems. Hewlett-Packard, Micron, and Dell all saw their problem PC rates drop over the two time periods during which we fielded our survey (see "A Word About the Star Scores"). This produced a ripple effect in which, on average, reports of problems on arrival, DOAs, and component failures also dropped.

However, the decline in PC problems didn't translate into a larger chunk of people who said they were very satisfied with the reliability of their systems. Those scores haven't changed significantly since we last reported our results in May 1999. The message from users appears to be that they appreciate fewer problems, but have expected more reliable systems all along.

Many who sought help from technical support are reporting longer waits to get their problems solved. The percentage of Compaq, Gateway, and IBM respondents who reported quick resolutions fell since we last published survey results.

When it comes to servicing work PCs, Micron showed improvement, Gateway slipped a notch, and Dell maintained its strong position. IBM remains the king of short hold times among work PC users, and IBM users are happier than before with the knowledge level and sincere effort displayed by technicians. -Brad Grimes

your own service tag number or choosing your model from a list, but the overarching purpose here seems to be more commercial than diagnostic. For instance, a customized My Presario site includes



Your Personal Store, with offers for RAM upgrades and other impulse buys. You also get links to a selection of Compaq printers you can purchase, as well as to such partner sites as Microsoft Network's Expedia, Home Advisor, and Carpoint. For some reason, you can't ask a naturallanguage question of Ask Compaq from a My Presario site-you can only conduct a keyword search, which can be frustrating.

Toshiba has perhaps the best naturallanguage search tool. At Toshiba's site, Jeeves is known as Iris, and she appears to be the sharpest tack in the box. We posed several identical questions (in addition to our busted-clock query) to Dudley, Compaq, and Iris to compare their responses. Dudley occasionally drew blanks; Compaq usually came up with answers, though not always the ones we were looking for; and Iris nailed the answers with few hitches (your mileage may vary depending on the questions you ask). The best part about Ask Iris is the thorough, step-by-step, plain-English solutions she produces. If for some reason Iris comes up empty, Toshiba encourages users to report their unanswered questions so the company can research the solution and add it to Iris's stock of ready answers.

> Toshiba's support site also lets users view discussions occurring in CompuServe's Toshiba forums. Although

# HOME PCs

ELL DILLES THE DOOST but	Relia	bility						Service				
ELL RULES THE ROOST, but eware of longer hold times om several PC makers.	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	High satis- faction with reliability	Overall reliability score	Short hold time	Quick resolution	No resolutio		
**** OUTSTANDING		1998		AOG		ale.	30010			迷		
DELL The best gets even better.	****	****	****	****	****	****	****	****	****	***		
**** GOOD												
CYBERMAX Held back by faulty parts and long hold times.	**	****	***	****	**	****	***	***	****	***		
GATEWAY Problems from the start, but fast with a fix.	***	****	**	****	***	****	***	****	****	****		
IBM Systems you can depend on; support is only fair.	****	****	****	****	****	***	****	****	***	***		
MICRON Few problems, fine ser- vice—customers are wild about them.	****	****	***	***	****	****	****	***	****	***		
QUANTEX Phones clogged—maybe because PCs don't work out-of-box.	****	****	**	****	***	****	****	**	****	***		
SONY Though machines work great, too many problems go unresolved.	****	****	****	****	****	***	****	****	****	**		
*** FAIR										4		
ACER Service isn't stellar, but it's better than it used to be.	***	***	**	****	***	**	***	**	**	**		
AST Early problems plus long hold times equals unhappy customers.	****	****	**	***	****	**	***	**	***	**		
COMPAQ Settling comfortably into mediocrity—what a shame.	***	**	***	****	****	**	***	***	***	***		
HEWLETT-PACKARD Not bad, but users aren't thrilled with technicians.	***	***	***	****	****	***	***	****	***	***		
NEC Good help is hard to find.	***	****	***	****	****	**	***	**	***	**		

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

CompuServe's popularity has waned, some of the best discussions of PC-related issues continue to take place there. Unfortunately, to post a message, you must have a CompuServe account.

#### LITTLE HELP, PLEASE

THE SUPPORT SITES of several other major PC makers, including Gateway, HP, IBM, and Micron, disappointed us. They offer plenty of information but no easy way to sort through it. Besides drivers and documentation, Gateway's site has an online technical assistant to help you find answers to your questions. Unfortunately, you must know which component in your PC is causing the trouble before you can locate a solution.

We found getting support from HP online to be plain tedious. You can start

Overall service score \*\*\*\* \*\*\*\* \*\*\* \*\*\* \*\*\*

with a keyword search that covers all HP computers, or you can narrow the field by specifying the model names and CPU types. The information you get in return, however, is little more than online manuals, FAQs, and technical notes. And the site provides no obvious way to e-mail a question to a support technician.

Micron's support site similarly spurns handholding, although it recently added a knowl-

edge base to its help tools. When we posed the question about our system clock

slowing down, though, Micron came up with a couple of possible solutions, along with a litany of unrelated details, including information about Zip drives.

But things may be looking up for Micron customers who want help online. The company recently said it would use a whole new system to help launch its connectedsupport.com service. According to Micron, connected support. com will be a more proactive online help tool. It will send targeted notifications to users, provide daily health checks of their systems, and allow them to create personalized support pages



COMPAQ'S MY PRESARIO support site gives you info specific to your model number. It also suggests upgrades you can buy.

with updated drivers, news, and tips relating to their specific computer.

As for IBM's current support site, it's so, well, IBM. It's big, blue, and very technical. When we searched for answers from IBM, we were inundated with information. Much of it read as if it came from a technical manual-not exactly what you want, particularly if PC-speak isn't your mother tongue.

For more user-friendly support options, IBM users must "profile" their systems, which is a Big Blue way of saying they have to register at the site. Only then can they gain access to a moderately helpful, interactive Online Assistant as well as to IBM's online discussion forums.

#### READERS RATE HOME PCs

IF YOU CAN ACCEPT a combined reliability and service score of at least Fair, you can't go wrong today buying a home PC. That's a backhanded compliment: No PC maker was rated as Poor overall in our latest study.

As happened in our survey about work PCs. PC World readers who told us about their home systems reported fewer problems than they have in the past, which is a good sign. Dell improved on an already Outstanding overall score in our May 1999 report. It is the only company to rate as Outstanding in both reliability and service.

Perhaps more noteworthy, Acer moved up from Poor to Fair in overall service and reliability. On the whole, its individual scores remain below average, but the improvement marks a quantum leap in the right direction for a company that typically has received low marks in our survey.

In general, service from home PC vendors appears to be slipping in certain measures. Respondents who called tech support at Gateway, Micron, and Quantex all reported longer hold times. In addition, fewer Gateway users told us that their problems were resolved in five days or less.

The good news? Compaq's service, which rated Poor in our last survey, earned a mark of Fair this time. The company improved to some degree in every service measure, notably in quick resolution. -Brad Grimes

#### Y2K WEB SUPPORT

PC MAKERS are so serious about shifting to online support that they're willing to try several innovative approaches to troubleshooting. For example, Acer, Gateway, and NEC are starting to bundle rescue programs that effectively return a PC to a previous, trouble-free condition when software problems arise. In some cases, users will be able to download these programs from the PC maker's Web site. Acer calls its program Time Machine.



"We invented Time Machine," says Acer's Michael Griffin, "because when people have problems on their machines, no one will stop with the first click. On average," he explains, "[users] make seven more clicks before they realize they've hosed their systems." PC support technicians usually ask people to recount the exacerbated the prob-

lem, but this often makes callers feel slowwitted, according to Griffin.

"We're the only industry in the world that doesn't have a fundamental problem with making our customers feel stupid,"



OF THE NATURAL-LANGUAGE search tools we tried, Iris is our steps that led to and favorite. She delivered accurate answers and detailed solutions.

says Griffin. Programs like Time Machine, he hopes, will let users quietly, anonymously fix their own problems.

Griffin says that Acer is also looking to automate its customer support more

# EBOOK PCs

NO NOTEBOOK MAKER ranks	Relia	bility		-				Servi	ce							
es Outstanding, but some fare petter than others.	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	High satis- faction with reliability	Overall reliability score	Short hold time	Quick resolution	No resolution						
**** GOOD	Par Ace				ACC ACC											
<b>DELL</b> Reliable notebooks backed by solid service.	****	****	****	****	****	****	****	****	****	****						
GATEWAY Despite occasional problems, you gotta love the effort.	***	****	****	***	***	****	****	****	****	***						
IBM Problems here and there, but fast on the phones.	***	****	****	****	***	****	****	****	****	****						
MICRON PCs work out of the box, but oh, those hold times.	***	****	****	****	***	****	****	**	****	***						
*** FAIR				200						11						
COMPAQ Problem-prone portables, slow to be fixed.	**	***	****	****	***	***	***	***	**	***						
FUJITSU Service is still the weak link.	****	****	***	****	****	***	****	***	**	**						
NEC Expect problems to crop up over time.	**	***	****	****	**	**	***	****	****	****						
TOSHIBA Making slow progress in the right direction.	***	***	****	****	****	***	***	****	***	***						
WINBOOK Not bad if you don't mind waiting for answers.	***	****	***	***	***	***	***	***	*	****						

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

extensively so that the technician does not even have to ask questions about a malfunctioning PC. "Where we need to go to

as an industry," he suggests, "is where we don't have to ask for the model numberwhere I get permission to look at your machine and I already know everything that I need to know about it. The Web needs to become like a drivethrough car washyou bring your car in, and the car wash does all the work."

Among the devotees of the car-wash approach is Compag, which currently uses Carbon Copy remote-control software. Carbon Copy lets Compaq technicians access a customer's machine via modem and diagnose its problems. "We've had great success with this system," says Geraldine Rossiter, Compaq's manager of e-service delivery. "About 98

"I couldn't get an answer from Compaq's Web site, so I e-mailed, and I never got a response. I finally fixed it by switching out the part myself.

-Salt Lake City travel agent Art Fracchia



percent of the calls in which we use Carbon Copy end up being resolved the first time that the customer calls."

#### GETTING PERSONAL

SEVERAL COMPANIES are also striving to take personalized help a step beyond Compaq's My Presario. IBM users, for instance, are asked to register profiles at the companies' sites, including information about themselves and their PCs. Toshiba, too, plans to launch an overhauled and personalized site in early 2000.

"We're working on our capability to recognize people when they come back to our site, using any information about their preferences or their system that they would like to share with us," explains Jim Rohrer, a manager for Toshiba's e-business group. "In the future, once someone has been to the site, we'll already know their model, and we will automatically provide a list of software updates and tech notes. On some of our models we'll have a software update tool that will notify you proactively when there's new software

# Overall \*\*\*

#### READERS RATE NOTEBOOK PCs

WITH NOTEBOOK PCs, no news is generally good news. No company moved up or down since our last report, and all remained bunched in the Good to Fair neighborhood overall. A closer look, however, reveals some changes of note.

WinBook, which has struggled in past surveys, appears to be making progress toward righting its ship. In our most recent Notebook survey, the company improved its reliability rating from Poor to Fair. The percentage of WinBook users reporting problems is down dramatically, as is the percentage who said their notebook didn't work properly when first turned on. And though Toshiba didn't move up in overall reliability and service, its problem rate fell.

But while WinBook made headway in its reliability scores, its rating for resolving problems quickly is abysmal. Roughly four out of ten respondents told us WinBook resolved their problem in five days or less, leaving the company with the only Unacceptable score on any service measure.

Meanwhile, Dell slipped a notch from Outstanding to Good for reliability because more respondents reported problems. Even so, Dell's problem rate was the lowest among notebook makers, and the company remains a top dog overall.

Compaq took a hit in some of its notebook service scores but improved in others. Users reported more unresolved problems, but at least they thought the technicians were more sincere when they got the diagnosis wrong. -Brad Grimes



MAKE NO MISTAKE, Web-based tech support is the wave of the future. Instead of talking to a testy, ill-trained humanoid, you'll be getting help from your pal Hal. But today's Web sites aren't quite so advanced, and how you look for answers on the Net makes a big difference in whether you find them.

For starters, it helps to write down what you were doing when you first noticed the problem, and outline the steps you took to correct it. Then, once you reach the company's home page, find the support link and follow these steps:

Face the FAQs. Your first step on the road to recovery should be to peruse the site's Frequently Asked Questions page. If

#### Want the Right Answer? Ask the Right Question TIPS AND TRICKS FOR GETTING TECH HELP ONLINE

you can't find a solution to your problem, look for questions on related topics, and scan the answers for terms you can use to search the rest of the site. (For example, the fix for a faulty system clock may be found under 'BIOS' or 'CMOS'.)

Search the site. Most major tech sites have search engines, but not all of them work the same. Before you search, check the instructions on how to phrase your query to get the best results. For instance, including your PC's model number should filter out a slew of irrelevant answers.

Find the forums. A site's user forums can be a gold mine of helpful advice-or a slag pit of useless drivel. Before posting your question, look for topics related to your problem-preferably postings that drew a lot of replies. The more replies an item gets, the better your chances of finding the right answer. Start by reading the latest response so you can see the final word on the problem. Just remember: Some support sites periodically monitor their online forums and delete blatant errors, but others don't.

E-mail the details. Even when it works perfectly, an e-mail exchange with tech support is not the most efficient way to get help. But the more detail you put in your initial note (specific error messages, the model and serial number of your PC, software version numbers) the less e-mail tag you should have to play. If you don't get an answer in two days, try again. And if that doesn't work, pick up the phonebut don't forget to register a complaint.

Download with care. When you grab patches and drivers off the Web, read the site's download instructions first. Otherwise, you might overwrite important files or introduce a system conflict. And be sure to distinguish between must-have downloads and optional ones. If your system is already running properly, why mess with it? -Naomi Wise and T. J. Byers

available," explains Rohrer. "You won't have to browse the Web: It'll notify you, and you'll have the option of installing that update or not."

Not content to personalize by model alone, Dell plans to redesign its site to suit each user's conscious or unconscious preferences. Customers who choose to create a personalized profile will be prompted to tell the site all about themselves. "The site will be personalized based on the consumer's skill level, expertise, and the way they like to search for information, and the content will be dynamically generated based on their profile," says Dell's Manish Mehta.

#### YOU CAN CALL ME HAL

BUT THE BIGGEST change in online support will be proactive diagnosis. Compaq has already started shipping PCs with a virtual technician code-named Al on the

hard drive. Al and similar programs can keep tabs on your system and alert you when a problem needs fixing.

Some features will address problems without your intervening. Soon Acer and Toshiba will include a self-examining utility that will yell for help (via modem) from the vendor when it detects a problem. Acer's Griffin envisions taking this concept several steps further.

"We need technologies that let basic computers do what Hal could do in Stanley Kubrick's movie 2001: A Space Odyssey. [The PC] continually checks its onboard diagnostics, and when it sees that a failure is about to occur, it automatically dials a Web server and orders a replacement part," explains Griffin. "The server recognizes the PC and sends the needed part. The user receives an e-mail message saying that Federal Express is going to deliver the part on Wednesday, and no one has been involved. There's nothing today in technology that limits us from doing things like that."

Let's just hope that Hal doesn't get all weird and decide to lock us out of our pods. But short of that unlikely 21st century nightmare, Web-based tech support has nowhere to go but up.

"We think we're ahead of the pack when it comes to tech support [in general]," says Mehta. "But it's a low bar. For online support it's an even lower bar, and we've tripped over it. It's our goal to raise that bar higher. If online support is no better than the phone, then the online support standards bar has to be a lot higher."

Naomi Wise and T. J. Byers are freelance writers based in San Francisco. Brad Grimes is a senior editor for PC World. Senior Technical Editor Shane Rau also contributed to this article.

# Tell Us About Your PC...



# ...And You Could Wind Up With a New One

WE TALK A LOT ABOUT THE COMPUTERS WE TEST, BUT NOW PC WORLD WANTS TO HEAR ABOUT THE COMPUTERS YOU USE. THE INFORMATION YOU PROVIDE THROUGH OUR ONLINE SURVEY WILL BE KEPT CONFIDENTIAL AND WILL BE USED ONLY TO HELP US CREATE INFORMATIVE ARTICLES. EVERYONE WHO FILLS OUT THE SURVEY WILL BE ELIGIBLE TO WIN A FULLY LOADED DELL PC WITH A PENTIUM III-600\* PROCESSOR. 17-INCH MONITOR, DVD-ROM DRIVE, CD-REWRITABLE DRIVE, AND EPSON STYLUS COLOR PRINTER.

#### >>> Simply visit our survey page on the Web at www.survey.com/pcworld.html <<

KEEP THIS ISSUE HANDY WHEN YOU VISIT THE WEB SITE BECAUSE YOU'LL BE ASKED TO ENTER YOUR PC WORLD SUBSCRIBER NUMBER, WHICH IS LOCATED ON YOUR MAILING LABEL.

NO PURCHASE NECESSARY TO WIN, VOID WHERE PROHIBITED BY LAW, ALL PRIZES WILL BE AWARDED. WINNER WILL BE CHOSEN AT RANDOM FROM ALL PARTICIPANTS REGISTERED BY FEBRUARY I, 2000. WINNER WILL BE NOTIFIED VIA E-MAIL WITHIN 24 HOURS OF THE PRIZE DRAWING (ON OR ABOUT FEBRUARY 15, 2000). ODDS OF WINNING DEPEND UPON THE NUMBER OF ENTRIES REGISTERED BY THE DEADLINE. ONE ENTRY PER PERSON. FOR A COMPLETE SET OF RULES, SEE WWW.SURVEY.COM/PCWORLDRULES.HTML. AS AN ALTERNATE METHOD OF ENTRY, SEND A POSTCARD WITH YOUR NAME, ADDRESS, PHONE NUMBER, E-MAIL ADDRESS, AND AGE TO PC WORLD, C/O READER SURVEY, 501 SECOND ST., SUITE 600, SAN FRANCISCO, CA 94107. REQUESTS MUST BE RECEIVED BY FEBRUARY 1, 2000.

\* OR FASTER CPU. ALL FEATURES SUBJECT TO AVAILABILITY AT THE TIME OF THE DRAWING.

# Your PC Tune-Up Schedule

While you're waiting to win your new PC, here are some tips to keep the old one up and running.

# THINGS TO DO Every Day

Scan your disk quickly Use a disk scanner, such as Norton Utilities' Disk Doctor or Windows' ScanDisk, to check for crosslinked files and other problems. For a quicker scan, turn off the surface scan option. Put the program shortcut in your Startup folder so your disk gets scanned every time you load Windows.

Do an incremental backup At the end of the day, back up only those files that have changed since the last backup. In a hurry? Do an incremental backup of only your data folder and its subfolders.

# THINGS TO DO Every Two Weeks

Back up your entire hard drive A recent, full copy of your hard drive's contents is your best insurance against data-loss disaster. Put in a fresh backup tape, close all running applications, and launch your backup program. Start a full backup, turn off the monitor, and leave the office—preferably for the night.

Defrag your hard drive Set your defragging software (Norton Utilities' Speed Disk or Windows' Disk Defragmenter, for example) to its slowest and most complete setting, get it started, then turn off your monitor and walk away. A long lunch break will probably be enough time.

Scan your drive Use a disk scanner to check the condition of your hard drive. This time, make sure the surface scan option is turned on.

# Every Month

Test your backup Backup drives and tapes aren't always dependable. About once a month, try to restore a few files from various folders—preferably files that are expendable. If you can't restore them, contact the tape drive manufacturer.

Update your virus definitions Your antivirus program vendor regularly posts updates that help the software spot the latest in malevolent engineering. Grab the updates off the vendor's Web site, or use the program's built-in update tool.

# THINGS TO DO Once

Make emergency boot floppies You'll need them for that horrible day when your hard drive won't boot. Here are the main steps:

- To create your basic Windows 95 or 98 emergency boot disk, insert a floppy, go to the Start menu, and select Settings-Control Panel. Double-click Add/Remove Programs, click the Startup Disk tab, and click the Create Disk button (have your Windows CD-ROM handy). The resulting disk will contain several DOS-based utilities for examining and fixing your system.
- Most major antivirus products like Norton create their own emergency boot floppies. If you have one of these programs, simply follow its instructions.
- Windows, you'll need an emergency boot disk with your 16-bit CD-ROM drivers on it. Windows 98 automatically puts these drivers on the emergency disk. If your PC came with Windows 95 installed, open the Start menu, go to Programs•Accessories•System Tools and see if you have an option called Create System Disks. If not, try to find your old DOS autoexec.bat and config.sys files and your CD-ROM drivers and then save them on a floppy disk.
- Write-protect all your boot floppies and store them in a safe place where you can access them easily.

Buy a surge suppressor A sudden surge in electricity can transform your PC into a piece of avant-garde sculpture. Look for a surge suppressor with a UL 1449 rating of 330 volts or less and at least 240 joules; make sure it has enough outlets to meet your needs.

Also worth considering: a suppressor with phone jacks to go between the wall and your modem.

Buy a tape drive Look for one with a capacity at least equal to your hard drive's. That way, you can back up your entire system without having to switch tapes.

- >>> External drives that plug into the PC's parallel port are generally easier to install than internal ones, and they can be easily shared between computers.
- >>> Test the tape drive by backing up and restoring some files before trusting it to do a real job.

Buy a good set of utilities For thorough, safe disk scanning and defragging, crash protection, and other forms of defense, you'll want a program like Norton Utilities. You'll also want a full antivirus program, like McAfee VirusScan—one that can watch your system and check new files, update virus definitions, scan your hard drive, and eliminate infections.

Organize your hard drive You should organize your data in a way that makes sense to you. Here's how:

- Treate a data folder on your hard drive. If you're using Microsoft Office or Windows 98, you've already got one called My Documents. Rename it **1data** or another name that's meaningful to you.
- Create subfolders in the data folder to store your work logically by project, client name, or whatever works for you.
  - Move your data into the subfolders.
- Set your applications to save new files to your data folder by default.
- Put shortcuts to your data folder and possibly to subfolders within your data folder—on your desktop or in the Start menu. -Lincoln Spector

# Part Professor. Part Cinger.



MouseWorks<sup>®</sup> and TurboBall's<sup>®</sup> smart, customizable buttons help you be more productive, while their sculpted shapes are designed to keep your hand in a more natural position. Smarts that help you work better and good looks designed for comfort...who said brains and beauty don't belong together? For more joto visit www.kensington.com/shape.

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Smart design at work.



# New Year's Resolutions



BY MITT JONES

olaroids may make you the life of the party, but rumors of reprints will earn you friendly calls long after the party's over. Digital photography now offers the best of both worlds-combining the immediacy of a Polaroid with the endurance and flexibility of film.

Digital cameras equipped with an LCD allow you to view captured moments instantly. And you can share digital photos just as easily as you would double prints from a drugstore: Simply e-mail your pictures to friends or post them on the Web. Commercial interests are also well served by digital photography. Real estate and e-commerce companies now routinely use digitally captured images of properties and products on the Web.

And thanks to recent technological advances, today's digital cameras produce better-looking pictures than their predecessors did a year ago-while costing less on average. All but 5 of the 20 products we review here offer a maximum resolution of at least 1152 by 864, or about one million pixels; 4 of them crack the 2-megapixel (two million or higher pixels) ceiling. Better still, prices for 1-megapixel models now begin at \$299. Of the 4 that are truly 2-megapixel, \$699 is the cheapest. A year ago prices for low-end cameras started at \$399.

How much resolution you need

in a digital camera depends on how you intend to use it. If you plan to view snapshots on a monitor or post them on a Web page, a 1-megapixel model will suffice. But keep in mind that you may need to set your monitor's resolution to at least 1152 by 864 to view the entire image at 100 percent. To view a 2-megapixel photo at 100 percent, you'll need a display resolution of at least 1600 by 1200.

If you want to print your digital photos on 8-by-10-inch paper, consider a 2-megapixel model. The additional pixels will give you sharper, more vivid prints.

Despite the bounty of pixels, the 20 models we tested vary widely in their capability to accurately capture color and detail. In fact, our one-page contact sheet of a still-life test might pass for a Sherwin-Williams color chart.

#### TRIGGER HAPPY

WE ALSO SAW considerable differences in the cameras' image-capture rate, download speed, and battery life. Unlike film cameras, digital models must process information each time they take a shot, forcing you to wait at least a few seconds between pictures. Some models offer burst modes that capture a few shots in quick succession, but often at lower resolution settings. We evaluated image-capture rate using the default, single-shot mode.

We also took a look at shutter response time-the delay

Digital cameras are getting sharper, but they're not getting any cheaper. We review 20 of the latest models. plus give tips on the software that can give your cherished photos a professional polish.

between the moment you push the shutter and the instant the camera captures the image. This delay usually lasts from 1 to 2 seconds, but it can vary from shot to shot because some objects lock into focus more easily than others.

For the fastest downloads, check out a camera that supports USB (if you own a USB-capable PC running Windows 95 OSR2 or 98). The speediest USB camera we tested, the Toshiba PDR-M4, transfers images about 30 times faster than the swiftest serial-port models do. But keep in mind that the number of images on your camera can affect download speed.

The cameras we reviewed also varied in battery-life performance. If you use the camera's LCD often, expect its batteries to run out of juice quickly. Some models here have rechargeable batteries, which saves you a lot of money over time. A few of the cameras come with an AC adapter that can help conserve battery power by allowing you to plug in the camera when you're transferring images to a PC or storing a slide show on videotape.

#### **FABULOUS FEATURES**

IF YOU PLAN to shoot distant objects, consider a model with an optical zoom lens rather than a digital zoom. Optical zoom can change what your camera "sees," so you can capture a portion of a scene with greater detail, whereas digital zoom crops the shot, resulting in a smaller, less detailed picture.

For more creative control on the final image, look for a camera that allows you to adjust settings such as focus, aperture (the diameter of the opening in a lens

#### DIGITAL CAMERAS

	Features										
\$500 AND OVER	Street price (10/27/99)	Optical resolution (minimum/ maximum)	Standard memory (MB)/card type	Picture capacity (minimum/ maximum) <sup>2</sup>	35mm-equivalent lens size (mm)/zoom	Aperture range	Shutter speed range (seconds)	Viewfinder	Output methods		
Canon PowerShot Pro70 800/652-2666 www.powershot.com	\$999	768 x 512/ 1536 x 1024	8/CompactFlash (two slots)	3/96	28-70/ 2.5X optical	f/2.0-16	1/2-1/8000	optical, 2-inch LCD	serial, video		
Epson PhotoPC 800 800/463-7766 www.epson.com	\$699	640 x 480/ 1600 x 1200	8/CompactFlash	10/120	38/ 2X digital	1/2.4, 8	1/2-1/750	optical, 1.8-inch LCD	serial, USB, video		
Fujifilm MX-2700 800/800-3854 www.fujifilm.com	\$699	640 x 480/ 1800 x 1200	8/SmartMedia	8/141	35/ 2.5X digital	f/3.2, 8	1/4-1/1000	optical, 2-inch LCD	serial, video		
Fujifilm MX-2900 Zoom 800/800-3854 www.fujifilm.com	\$899	640 x 480/ 1800 x 1200	8/SmartMedia	1/141	35-105/3X optical, 2.5X digital	f/3,3-11	3-1/2000	optical, 2-inch LCD	serial, video		
Kodak DC265 Zoom 800/235-6325 www.kodak.com	\$899	768 x 512/ 1536 x 1024	16/CompactFlash	28/180	38-115/3X optical, 2X digital	f/3-22	1/4-1/400	optical, 2-inch LCD	serial, USB, infrared, vide		
Kodak DC280 Zoom 800/235-6325 www.kodak.com	\$799	896 x 592/ 1760 x 1168	20/CompactFlash	32/245	30-60/2X optical, 3X digital	f/3-9.6	1/2-1/755	optical, 1.8-inch LCD	serial, USB, video		
Minolta Dimage EX Zoom 1500 201/825-4000 www.minoltausa.com	\$549	640 x 480/ 1344 x 1008	8/CompactFlash	3/105	38-115/3X optical, 2X digital	1/3.5-5.6	2-1/4000	optical, 2-inch LCD	serial, video infrared		
Nikon Coolpix 950 800/526-4566 www.nikonusa.com	\$999	640 x 480/ 1600 x 1200	8/CompactFlash	1/32	38-115/3X optical, 2.5X digital	1/2.6-11.4	8-1/750	optical, 2-inch LCD	serial, video		
Ricoh RDC-5000 888/742-6410 www.ricohcpg.com	\$699	896 x 600/ 1792 x 1200	8/integrated (SmartMedia slot)	9/99	38-86/ 2.3X optical	f/2.8-14.4	1-1/500	optical, 1.8-inch LCD	serial, USB, video		
Sony Cybershot DSC-F55 800/222-7669 www.sony.com	\$699	640 x 480/ 1600 x 1200	4/Memory Stick	5/63	37/ 2.5X digital	f/2.8	1/30-1/1000	2-inch LCD	serial, video		
Sony Mavica MVC-FD73 800/222-7669 www.sony.com	\$599	640 x 480/ 640 x 480	1.44/floppy	10/40	40-400/ 10X optical	f/1.8	1/60-1/4000	2.5-inch LCD	floppy disk		
Sony Mavica MVC-FD88 800/222-7669 www.sony.com	\$999	640 x 480/ 1280 x 960	1.44/floppy	4/40	34-270/8X optical, 2X digital	f/2.8	1/60-1/4000	2.5-inch LCD	floppy disk, video		
Toshiba PDR-M4 800/288-1354 www.toshiba.com	\$599	800 x 600/ 1600 x 1200	8/SmartMedia	8/124	35/ 2X digital	1/3.2-8	1/4-1/1000	optical, 1.8-inch LCD	serial, USB, video		
UNDER \$500											
Agfa EPhoto CL30 800/281-2302 www.agfahome.com	\$349	640 x 480/ 1152 x 864	4/CompactFlash	6/36	43/ 2X digital	f/2.8-8	1/30-1/700	optical, 1.8-inch LCD	serial, USB, video		
Canon PowerShot A50 800/652-2666 www.powershot.com	\$499	640 x 480/ 1280 x 960	8/CompactFlash	4/106	28-70/ 2.5X optical	1/2.6-11	2-1/750	optical, 2-inch LCD	serial, video		
Fujifilm DX-10 800/800-3854 www.fujifilm.com	\$299	640 x 480/ 1024 x 768	2/SmartMedia	6/30	40/ 1.6X digital	f/4, 8	1/4-1/5000	optical, 1.8-inch LCD	serial, video		
HP PhotoSmart C200 800/752-0900 www.photosmart.com	\$299	576 x 436/ 1152 x 872	8/CompactFlash	17/80	39/ 2X digital	f/2.8, 5.6,	2-1/500	optical, 1.8-inch LCD	serial, video		
Kodak DC215 Zoom 800/235-6325 www.kodak.com	\$399	640 x 480/ 1152 x 864	4/CompactFlash	12/54	29-58/ 2X optical	1/4-16	1/2-1/362	optical, 1.8-inch LCD	serial, video		
Olympus D-340R 800/622-6372 www.olympus.com	\$299	640 x 480/ 1280 x 960	8/SmartMedia	2/122	36/ 2X digital	f/2.8, 5.6,	1/2-1/500	optical, 1.8-inch LCD	serial, video		
Olympus D-450 Zoom 800/622-6372 www.olympus.com	\$499	640 x 480/ 1280 x 960	8/SmartMedia	2/122	35-105/3X optical, 2X digital	f/2.8-12.6	1/2-1/1000	optical, 1.8-inch LCD	serial, video		



<sup>•</sup> Yes O No

<sup>&#</sup>x27;All vendors offer a one-year warranty. With standard memory.

For more information about all the products in this table, select number 901 on the product information card or visit www.pcworld.com/productinfo.

#### **Best Buys**

SERS WHO want vivid photos at an affordable price should consider the stylish

\$499 Olympus D-450 Zoom. It earns top hon-

diaphragm), shutter speed (the speed at which the shutter opens and closes), and white balance (a function that provides a ors in our sub-\$500 category for vibrant pictures, a 3X optical zoom, and a svelte design.

Serious shutterbugs should opt for the \$999 Nikon Coolpix 950. It wins our Best Buy in the high-end category, thanks to its versatility and sharp, bright picture quality.

reference to true white so that a camera can reproduce other colors accurately).

A hot shoe or flash sync connector, for

attaching an external flash, can provide more light than an internal flash can. These advanced features are usually available in pricey, high-end models.

If you can shell out an extra \$100, consider buying a CompactFlash or Smart-Media card reader-a storage device (from vendors such as Lexar Media, San-Disk, and Microtech) that plugs into a PC's parallel or USB port and functions as an external drive. With a memory-card reader, you can transfer photos to a PC without tying up your camera.

#### FEATURES COMPARISON

The state of the s		100			Sup	port polic	ies
Download time (seconds)	Battery type/re- chargeable	Battery life (hr:min)	Bundled software	Comments	Support hours/ weekends	Toll-free support	Product info number
serial: 56	NIMH/	1:58	Adobe Photoshop LE, PowerShot PhotoStitch, SlideShow Maker, TimeTunnel, Ulead PhotoImpact	PRO: Terrific image quality, voice annotation, AC adapter. CON: Expensive, no built-in flash, few manual controls.	14/●	•	606
serial: 48 USB: 4	2 AA NIMH/	1:39	Epson, Photo File Uploader, Epson Program Loader, Sierra Imaging Image Expert	PRO: Fast, compact, comes with extra batteries, voice annotation. CON: Pricey, considering it lacks an optical zoom lens.	12/0	0	-
serial: 172	lithium ion/	2:04	Adobe PhotoDeluxe Home Edition, Picture Shuttle	PRO: Stylish vertical design, AC adapter. CON: Edge artifacts on images, hard-to-use download software.	11/0	•	607
erial: 236	lithium ion/	1:28	Adobe PhotoDeluxe Home Edition, Picture Shuttle	PRO: Extensive manual controls, AC adapter. CON: Moderate edge artifacts in images, nonintuitive download software.	11/0	•	608
serial: 94 USB: 10	4 NiMH/●, 4 AA/○	3:06	Adobe PhotoDeluxe Business Edition, Adobe PageMill, Kodak Picture Easy Software	PRO: Feature-rich, long battery life, voice annotation. CON: LCD panel blurs easily, bulky, magenta tinge on photos.	11/0	•	609
serial: 81 USB: 17	4 NiMH/●, 4 AA/○	2:23	Adobe PhotoDeluxe Business Edition, Adobe PageMill 3.0, ArcSoft PhotoPrinter Software	PRO: Good image quality, battery life, easy USB transfers. CON: Somewhat expensive, can make skin tones look pink.	11/0	•	610
erial: 323	4 AA/O	0:38	Digita Desktop	PRO: Pleasing image quality, easy image transfers, AC adapter. CON: Cryptic controls, no TWAIN driver, LCD panel blurs easily.	9.5/〇	0	611
serial: 70	4 AA/O	1:28	Interactive Pictures Ipix, NikonView Version 2, PictureWorks HotShots	PRO: Top pick for shutterbugs, extensive manual controls. CON: Slow shutter response, weak docs, no TWAIN driver.	10/0	•	612
usa: 6	4 AA/O	0:56	ArcSoft Camera Suite, Living Album 99	PRO: Loaded with features, good all-around image quality, AC adapter. CON: Awkward USB transfers, short battery life.	15/●	•	613
erial: 85	lithium ion/	1:09	Sony PictureGear	PRO: Easy to use, voice annotation, AC adapter. CON: No opti- cal viewfinder, short battery life, no TWAIN driver.	24/●	•	614
flорру; 4	lithium ion/	3:06	ArcSoft Camera Studio	PRO: Long battery life, easy to use. CON: Low resolution limits image quality, bulky, no optical viewfinder.	24/•	•	615
loppy: 15	lithium ion/	1:28	ArcSoft Camera Studio	PRO: Manual focus ring, respectable image quality, voice annotation. CON: Expensive, hefty, no optical viewfinder.	24/•	•	616
serial: 87 USB: 3	lithium ion/	2:22	Sierra Imaging Image Expert, Camio Viewer	PRO: Eye-catching design, easy to use, fast downloads, long battery life, AC adapter. CON: No zoom lens, no TWAIN driver.	12/0	•	617
serial: 69 USB: 9	4 AA/O	0:25	Agfa PhotoWise	PRO: Easy to use. CON: So-so image quality, shortest battery life here, slowest processing, LCD panel blurs easily.	11/0	•	618
serial: 79	2CR5 lithium ion/O	1:15 *	Adobe PhotoDeluxe Business Edition, PowerShot PhotoStitch, SlideShow Maker, Ulead PhotoImpact	PRO: Classy pocket-size camera, colorful photos, optical zoom capability. CON: Slow shutter response, nonintuitive controls.	14/•	0	619
serial: 60	4 AA/O	3:49	Adobe PhotoDeluxe, Picture Shuttle	PRO: Compact, superb battery life. CON: Slow download speed, no LED status panel, hard to download images.	11/0	•	620
serial: 77	4 AA/O	1:08	HP Photo Imaging, Ulead Cool 360 and Ulead Photo Explorer	PRO: Inexpensive, easy image transfer. CON: Sluggish shutter response and processing, slow LCD blurs easily.	16/•	0	621
erial: 38	4 AA/O	2:39	Adobe PhotoDeluxe Home Edition, Adobe PageMill, ArcSoft PhotoPrinter Software	PRO: Cheapest model with optical zoom lens, easy to use. CON: Mixed image quality results, slow processing.	11/0	•	622
erial: 40	4 AA/O	2:41	Adobe PhotoDeluxe Home Edition, Enroute QuickStitch	PRO: Easy image transfers, respectable image quality, compact. CON: No optical zoom capability or manual controls.	8/0	•	623
serial: 43	4 AA/O	1:02	Adobe PhotoDeluxe Home Edition, Enroute QuickStitch	PRO: Top optical-zoom model, impressive pictures, easy image downloads. CON: Short battery life, cryptic controls.	8/0	•	624

With Canon NB-5H NiMH battery pack.

HOW WE TEST For details on how we test download time and battery life, visit www.pcworld.com/jan00/cameras. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

## Models \$500 and Over

#### Canon PowerShot Pro70

UPSHOT: This camera produces sharp photos, but it provides limited manual settings.

The Pro70 looks like a large, featureladen 35mm camera. Beyond the exterior, this \$999 model distinguishes itself from most other cameras here in two ways: It can accommodate two CompactFlash cards, and it lacks a built-in flash, though it can accept an optional one.

Sans flash, the Pro70 earned relatively inferior marks on our low-light indoor picture test, but it excelled on our indoor still-life test, where it nailed the backdrop color and captured superb detail.

It features manual settings for aperture but not for shutter speed, focus, or white balance. Its LCD panel pivots out and swivels for multiple viewing angles.

#### Epson PhotoPC 800

UPSHOT: Middle-of-the-road price and some advanced features make it a good choice for intermediate users.

The PhotoPC 800 allows more manual control than most cameras priced at \$699, and includes settings for aperture and shutter speed. Although the camera's menu is a bit confusing, its software makes transferring images easy.

This compact model lacks an optical zoom, but Epson offers the \$799 PhotoPC 850Z, which has a 3X optical zoom.

In our image quality tests, the PhotoPC 800 produced pictures with realistic colors and details, but the indoor portrait seemed overly contrasted.

The unit's batteries ran for a subaverage 1 hour and 39 minutes, but Epson throws in an extra pair that you can use while the others recharge.

#### Fujifilm MX-2700

UPSHOT: The MX-2700 is a chic camera for the style-conscious user, but the images it can produce aren't quite up to par.

With an optical resolution of 1800 by 1200 and a distinctive vertical design, the MX-2700 is sure to win fans.

Camera controls are easy to use once you decipher a few icons. But this model lacks an optical zoom, and it produced a few inaccuracies in our test shots, with distracting white artifacts around the edges of some objects. Fujifilm's imagetransfer software makes downloading images a somewhat daunting task.

#### Fujifilm MX-2900 Zoom

UPSHOT: It's a pricey model, yet it offers rich features that photo hobbyists will appreciate.

Like the Canon PowerShot Prozo, the MX-2900 Zoom looks more like a 35mm film camera than a digital model. But unlike the Canon, this \$899 Fujifilm features a hot shoe for an external flash (it comes with a built-in flash as well). The MX-2900 also provides manual controls for aperture, shutter speed, white balance, and focus.

But it transfers images at a slow pace and comes with clumsy download software. It took decent-looking pictures overall, despite a few slight artifacts and unnatural highlights in some areas.

Continued on page 165 >

#### Worth More Than a Thousand Pixels?

ADICAL DIFFERENCES can result from seemingly minor disparities in a digital camera's capabilities. In our image quality tests, our indoor and outdoor photographs revealed the strengths and weaknesses of the cameras we reviewed. Here are some samples:

















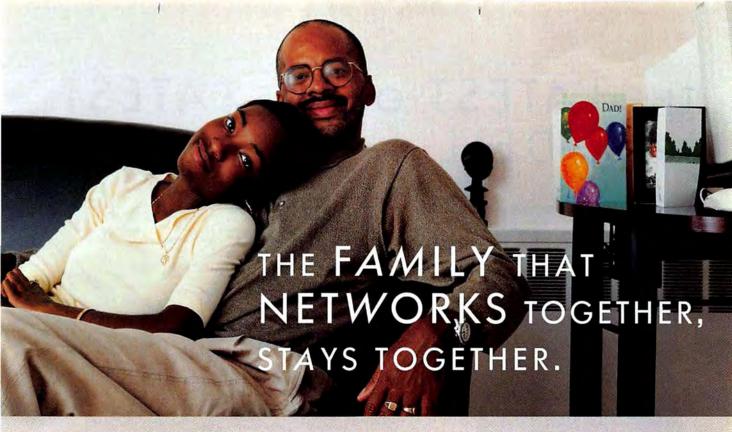








HOW WE TEST: We shot all photos using each camera's maximum resolution and left other specifications at the default settings. We captured our indoor still life and outdoor shots with minimal, professionally arranged lighting, with the flash off and with a tripod. In judging our on-screen and print output, we rated all photos on two criteria: color and detail. We used a fivepoint word-score system (excellent, very good, good, fair, and poor) to judge each criterion.





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- V.90 56K Capable" PCI DataFax Modem for Windows

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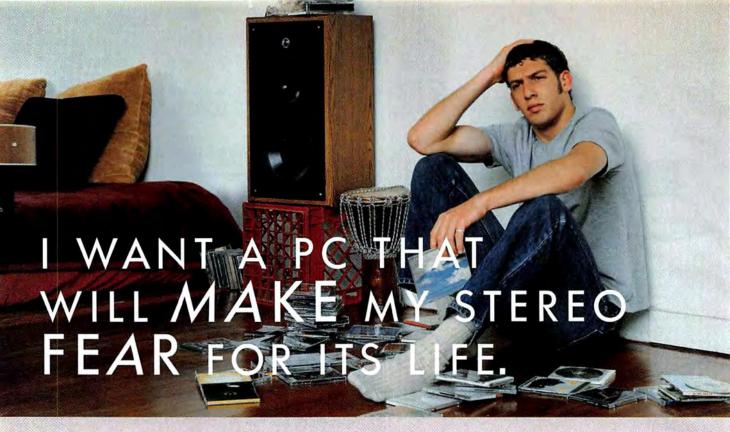
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Continued from page 160

#### Kodak DC265 Zoom

UPSHOT: Not only is the DC265 enormous in size and price, it's also big on features.

This \$899 model comes with a 16MB CompactFlash card (most models here ship with an 8MB cartridge), USB and infrared interfaces (more connectors than any other model here), and rechargeable batteries that lasted for a very laudable 3 hours and 6 minutes.

All things considered, this Kodak camera delivers impressive pic-

tures, although colors on our still-life shot turned out to be inordinately pink.

Mastering the unit's controls requires a bit of study time with the manual, partly because of cryptic LED status messages and icons. Its LCD blurs even with slight camera movement. The DC265 provides no way to specify aperture settings-a drawback for photo enthusiasts.

#### Kodak DC280 Zoom

UPSHOT: This midsize, easy-to-use camera captures crisp, sharp photographs.

The DC280 packs a lot of features for \$799, including rechargeable batteries that lasted a respectable 2 hours and 23 minutes in our test, plus a huge 20MB CompactFlash card—more than any other reviewed here. The camera's controls are reasonably easy to master, and with its easy-to-use download software, transferring photos to a PC is a snap.

In our outdoor shot, the DC280 pro-

duced a detailed background with realistic colors. Our subject's skin tone appeared too pink, however.

#### QUIRKY DESIGNS:

- O Sony Mavica MVC-FD88
- Fujifilm MX-2700
- Minolta Dimage EX Zoom 1500
- Sony Cybershot DSC-F55

#### MinoIta Dimage EX Zoom 1500

UPSHOT: It delivers colorful indoor photos but has an extremely short battery life.

#### Pass the Pictures Around

NCE YOU'VE downloaded your photos onto a PC. it's time to share them.

Several Web sites let you post photos online that your friends can view; the sites also offer e-cards and sell photo-imprinted T-shirts, mouse pads, and calendars.

Kodak's PhotoNet (www. photonet.com) and Seattle Film-Works.com (www.seattlefilmworks. com) provide traditional film processing, scan prints into digital photos, and offer online services such as archiving.

America Online and Kodak offer You've Got Pictures-a service that develops your roll of film digitally and posts it online. AOL sends you an e-mail when your

prints are ready. If you don't have a printer and would like copies of your digital photos, check out EZPrint.com and FotoWire.com.

#### Adobe ecircles.com

PRO: Downloadable image editor; batch uploading tool; chat rooms. CON: No e-cards, prints, or slide show; members-only file sharing.

#### Clubphoto.com

PRO: Easy-to-use interface. CON: No e-cards.

#### Gatherround.com

PRO: Straightforward menus; drag-and-drop batch software; automated photo cube.

CON: No prints or gifts available.



SHOW OFF YOUR PIX: ClubPhoto's site is easy to use.

#### Photoisland.com

PRO: Drag-and-drop uploading; fast offline batch software. CON: Visitors can't view your photos; clunky e-card interface.

#### Photoloft.com

PRO: Easy batch uploader has crop function; link photo editor.

CON: Allows only short caption for photos; no slide show.

#### Zing.com

PRO: Multiphoto drag-and-drop online uploading; lets you create and send automated slide shows. CON: No offline batch software.

-Marty Beaudet



This \$549 Minolta model has a few strengths, but it stands out more for its flaws. Although it generated crisp, true-tolife colors in our indoor shots, our subject's skin tone looked somewhat grainy in the outdoor test image.

Some confusing controls make this camera difficult to use. It lacks an LED status panel, so you need to use the LCD to view camera options. Even worse: In our test, its four alkaline batteries died after 38

minutes-the second-poorest showing among cameras in this roundup.

To connect the Dimage EX Zoom 1500 to a computer, you have to pop off

the module that holds the lens and charge-coupled device, then snap on a unit with the serial port. Although this camera lacks a TWAIN driver, its Digita Desktop software makes transferring photos to a PC an easy process. Unlike most cameras here, the Dimage is short on software extras.

#### Nikon Coolpix 950



UPSHOT: The 950 captures handsome photos and offers advanced features, making it our top choice among high-end models.

Despite the Coolpix 950's high \$999 price, it provides terrific features suitable for serious shutterbugs, including a swiveling 3X optical zoom lens and manual controls for adjusting the aperture, shutter speed, and focal distance settings.

> It captured vibrant and sharply detailed photographs both indoors and outdoors. Under tungsten lighting with no flash, however, it produced a distracting blue tinge on the

image. Its shutter-response time was moderately slow as well.

Although you get a basic image editor and other tools with this camera, the Coolpix lacks a full-fledged TWAIN

# Picture Perfect: Quick and Easy Image Editing

**BULKY FIGURES:** 

Canon PowerShot Pro70

Fujifilm MX-2900 Zoom

Sony Mavica MVC-FD88

O Kodak DC265 Zoom

AVE YOU ever gotten your vacation pictures back only to find that some came out too dark, some appeared too grainy, and the colors in others just weren't as vibrant as you remember? Thank goodness the cameras in this review come with

photo-editing software that let you enhance your images in the following ways:

CROPPING Cut out portions of an image to speed up processing, to save disk space, and to call attention to an area of the picture.

These two settings go hand in hand, often existing on a single palette. Insufficient light can leave your image muddy. When you bump up the brightness, you may

> find detail in certain areas. If a shot is overexposed, add contrast to balance the lights and darks.

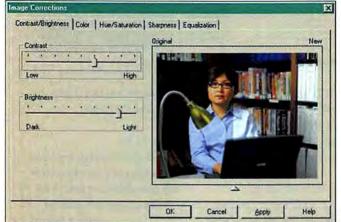
SATURATION Low light or poor camera optics can lead to faded photos. Increasing saturation makes colors richer, but don't boost saturation too much or you'll "burn" the image and may remove details from highlighted areas such as reflections.

LIGHTEN UP: Image editing tools can rescue imperfect images.

■ BRIGHTNESS/CONTRAST ■ COLOR BALANCE Color shift. the mutation of a color into another, is the bane of artists' existence. Even with the best camera, your candy apple-red roadster may be tinged with magenta, or your favorite blue dress may look purple. Use an image editor's RGB controls, not the hue adjustment, to nudge colors back to their intended shade.

> SHARPNESS Digital photos tend to lack the crispness that a film camera can produce. A slight tweak in an image editing tool's sharpness setting may fix the problem, but be careful not to introduce an unwanted halo effect around certain objects.

> > -Marty Beaudet



#### Wake Up Your Inner Artiste: Advanced Image Editing

IGITAL PHOTOGRAPHY is cost-effective and editable. You can enhance blemished photos and add effects to create logos and artwork. Here are ways to spice up your photos:

**■ CLOSE CROPPING** With a lasso tool, cut objects out of an image and save them in a library. Paste these objects into other photos or backgrounds to make photomontages or humorous juxtapositions.

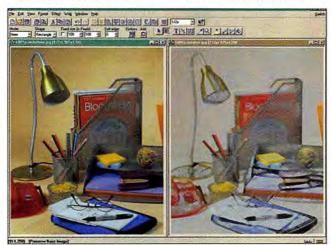
M ARTISTIC EFFECTS Image editors provide effects that can simulate watercolor, pencil-sketch, and impressionist styles. Papertexture effects can make your image look as though it were drawn or painted by hand. Although these effects add subtle vet dramatic touches to photos. some can make them look cheesy.

III SURREAL TOUCHES If you're in an outlandish mood, use posterize and solarize effects for a Haight-Ashbury flavor, while mosaic and stained-glass effects seg-

THE ARTIST'S TOUCH: Apply a pencil-sketch look to your photos. ment an image to simulate traditional artistry, Deformation tools produce cartoonlike results when used on shots of people.

IN STITCHES Enroute's Quick-Stitch (bundled with Olympus cameras) and PhotoStitch (which comes with Canon models) let you arrange multiple adjacent views into a single wide-screen tableau. You can create 360-degree panoramas, which are handy for showing off real estate or giving a tour of a landscape. For best results, use a 50 percent overlap and shoot images from the same location on a single plane.

-Marty Beaudet



driver. Downloading photos to a computer is a laborious process: You have to drag and drop or cut and paste your digital images from the camera to a PC.

#### Ricoh RDC-5000

UPSHOT: Although moderately priced and full of useful features, it has a few quirks.

Thanks to its 2.2-megapixel resolution, the \$699 RDC-5000 captured good detail on our test shots. But colors appeared a little grainy in our indoor shots.

This easy-to-use camera lets you adjust focus and white balance, and it downloads images swiftly. However, its image-transfer utility and its TWAIN driver don't support the USB interface: To transfer images with a USB connection, you must drag and drop or cut and paste from Windows Explorer-a process Ricoh's documentation neglects to mention. Finally, its alkaline batteries lasted for a meager 56 minutes in our test.

#### Sony Cybershot DSC-F55

**UPSHOT**: This camera is fun and easy to use, but it has a few drawbacks.

This \$699 model churned out sharp pictures overall, thanks in part to its 1600by-1200 optical resolution. But in our outdoor scene, the subject's skin tone came out too pink and the sky too blue.

The DSC-F55 features a pivoting lens, but it lacks an optical viewfinder, so you must use the LCD to com-

pose shots. In bright sunlight, the images on the LCD barely show up. The software allows you to transfer photos to a PC only in a cutwent to press, Sony shipped the \$1099 DSC-F505 with a large-barrel 5X optical zoom lens that can be focused manually.)

BASIC BODIES:

- Modak DC280 Zoom
- Ricoh RDC-5000
- Epson PhotoPC 800
- Toshiba PDR-M4

Sony Mavica MVC-FD73

and-paste or drag-and-drop fashion. (As we

UPSHOT: Despite its powerful optical zoom lens, it generates low-quality photos.



Like other Mavicas, the bulky yet easy-to-use MVC-FD73 employs 1.44MB floppies for storage, which means you don't need a serial or USB cable to transfer photos to a PC.

The camera's rechargeable battery operated for a lengthy 3 hours and 6 minutes. Shutter response is almost instantaneous, but because the camera doesn't refocus when you take a picture, changing your image composition abruptly before pushing the shutter will likely result in a blurry image.

With a low 640-by-480 optical resolution, the \$599 MVC-FD73 delivers barely adequate image quality, with heavily pixelated images when printed on 8-by-10inch paper. Another quibble: This model lacks an optical viewfinder, and its LCD is almost unusable outdoors under the glare of a sunny day.

#### Sony Mavica MVC-FD88

**UPSHOT:** Although it produces good-looking photos, it costs too much for what you get.



The \$999 Mavica MVC-FD88 looks like its sibling, the MVC-FD73. But unlike the FD73, the MVC-FD88 delivered bright, vibrant pictures. In our image-quality test, colors looked realistic, though some areas came out somewhat dark.

This model offers a substantial 8X optical zoom lens-the second strongest in this review-as well as voice annotation. However, it forgoes an optical viewfinder in favor of a large, 2.5-inch LCD.

The camera's straightforward controls

#### ULTRA POCKET-SIZE:

- Canon PowerShot A50
- C Kodak DC215 Zoom
- Agfa EPhoto CL30
- @ Fujifilm DX-10

make it easy to use as well. With its optical resolution of 1280 by 960, it can fit only four shots per floppy, so be prepared to tote around a few extra disks.

#### Toshiba PDR-M4

UPSHOT: This affordable model offers speedy downloads and long battery life.

This easy-to-use camera delivers swift image transfers with its USB support.

This \$599 camera also produced colorful pictures, though the sky in our outdoor shot appeared artificially blue.

Its software launches automatically when your PC detects the camera, letting you download photos with one click. Its battery lasted for an above-average 2 hours and 22 minutes, and you can recharge the battery with a bundled AC adapter.

The M4 lacks an optical zoom, but at press time, Toshiba released the \$799 PDR-M5, with 3X optical zoom capability.

### Frame Up Your Photos: Printers That Do the Job

HILE DIGITAL cameras offer you the convenience of viewing your photos instantly, ink jets and dye-sublimation printers give you sharp prints to keep in your wallet and share with friends. Here are some models to consider:

#### Acer FotoPrisa 300P

THIS COMPACT dye-sub printer produces photos with glossy stock and rich colors. But its 4-by-6inch maximum print size and dyesub engine mean that it's good only for photos (whether full-size or tiled onto sheets of stickers); you can't use it to print a résumé.

But its pass-through port could accommodate another printer. This model was difficult to install but simple to use afterward. At \$199, the FotoPrisa is an affordable option if you don't need to print text-based documents. A pack of 25 sheets of paper with a 25-print ribbon costs an extra \$20. Acer Peripherals; 800/379-2237; www.acerperipherals.com

HP PhotoSmart P1100

PRODUCT INFO NO. 737

THE P1100 PROVIDES Smart-Media and CompactFlash slots so you can print photos without a PC. Its \$399 price is mitigated by

great speed and exquisite photos. This dye-sub's straightforward menus make it easy to use, too. An infrared port talks to laptops and IR-equipped cameras. HP; 800/752-0900; www.hp.com

PRODUCT INFO NO. 738

#### Kodak Personal Picture Maker PM100

THIS \$199 INK JET is actually a hopped-up Lexmark Z11 Color Jetprinter. Slots for SmartMedia and CompactFlash cards and an onboard control panel let you print photos and run a Zip drive without a PC. Using simple menus, you can gang photos onto a single page, crop images, and choose resolution and paper type. It also

doubles as a normal printer. But it's slow and can't do justice to great photos. Lexmark; 800/539-6275; www.lexmark.com

PRODUCT INFO NO. 739

#### Sony Digital Photo Printer MS-300

THE EASY-TO-USE MS-300 delivers impressive postcard-size prints and has bays for PC Cards and Sony's Memory Stick. You can also plug the MS-300 into a TV to view or capture images. The steep \$500 price doesn't include paper, ink ribbon, or even a container for the paper. Sony; 800/352-7669; www.sel.sony.com

PRODUCT INFO NO. 740

-Dan Littman

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@√ ≥ 5 7:21 PM

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# NETCA

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## Models Under \$500

BARGAIN SHOOTERS:

2 HP PhotoSmart C200

Olympus D-340R

#### Agfa EPhoto CL30

UPSHOT: This easy-to-use model suffers from lackluster images and short battery life.

The CL30's USB capability simplifies photo downloading: After you plug the \$349 camera into a PC's USB port, Agfa's PhotoWise software automatically detects the camera. And the camera's single-menu navigation control makes it easy to use.

This model, however, generated photos with inaccurate colors and blown-out highlights, and it delivered the shortest battery life here, lasting a puny 25 minutes. The CL30's LCD blurs with significant movement, making it difficult to use when tracking moving objects. It also processes each shot slowly.

#### Canon PowerShot A50

UPSHOT: Color-rich photos and a 2.5X optical zoom lens justify its \$499 price tag.

The PowerShot A50 is a class act, from the back of its svelte metal body to the end of its lens. It produced good-looking photos in our

outdoor shot, but our indoor image appeared moderately dark.

This model also comes with lots of software, including Adobe's PhotoDeluxe. The camera's nonintuitive controls, however, will send most users reaching for the manual. If you buy the A50, consider supplementing your purchase with Canon's \$99 DK110 power supply kit, which includes a rechargeable battery pack and an AC adapter that doubles as a charger.

#### Fujifilm DX-10

**UPSHOT**: Offers the longest battery life in this roundup, and it's affordably priced at \$299.

The DX-10 lasted for an incredible 3 hours and 49 minutes and captured bright, colorful indoor photos. But colors were a bit off on our outdoor shot.

Like many low-priced models, this camera has no optical zoom lens or LED status panel, so you'll need to use its LCD to see how many shots remain. (At press time, Fujifilm announced the \$299 MX-1200, which improves upon the DX-10 by offering a 1280-by-960 optical resolution and a 4MB SmartMedia card.)

#### HP PhotoSmart C200

UPSHOT: It delivers vivid pictures and basic features for a low \$299 price.

> The easy-to-use C200 comes in a solid plastic case. It captured colors accurately,

but some areas of the images looked a little dark and fuzzy.

Tracking moving objects with the LCD can be frustrating, partly because the screen refreshes only a few times per second. The camera transferred images slowly in our test, but HP's bundled software makes the process a breeze.

#### Kodak DC215 Zoom

UPSHOT: This low-cost camera comes with a zoom lens, but expect so-so image quality.

With its simple camera menus, the DC215 is quite easy to use. At \$399, this pocket-size model is the lowest-priced camera here that comes with a 2X optical zoom lens. It also provides an above-average, 2-hour-and-39-minute battery life.

But image quality could've been better: Our subject in the outdoor shot looked as though he had been pasted into the scene.

In addition, our test prints looked blurry and pixelated in some areas.

#### Olympus D-340R

UPSHOT: This pocketable, bare-bones camera is suitable for those on a tight budget.

At \$299, Olympus D-340R is the bargain shopper's best bet. It beats the similarly priced Fujifilm DX-10 and HP Photo-Smart C200 in image quality, capturing pleasing photos overall, although colors in our outdoor scene looked a little faded.

The D-340R offers above-average battery life; its software lets you transfer photos to your PC easily. The camera's somewhat cryptic controls will require you to consult

the manual.

#### Olympus D-450 Zoom



UPSHOT: This camera's affordable price and useful features

make it our top pick among low-end models.

Put the \$499 D-450 on the top of your list if you want a stylish, reasonably priced camera with handy features, including a 3X optical zoom lens. This Olympus model also captured sharp, vibrant photos, but in our outdoor shot, the subject's skin looked a little pale. Once you

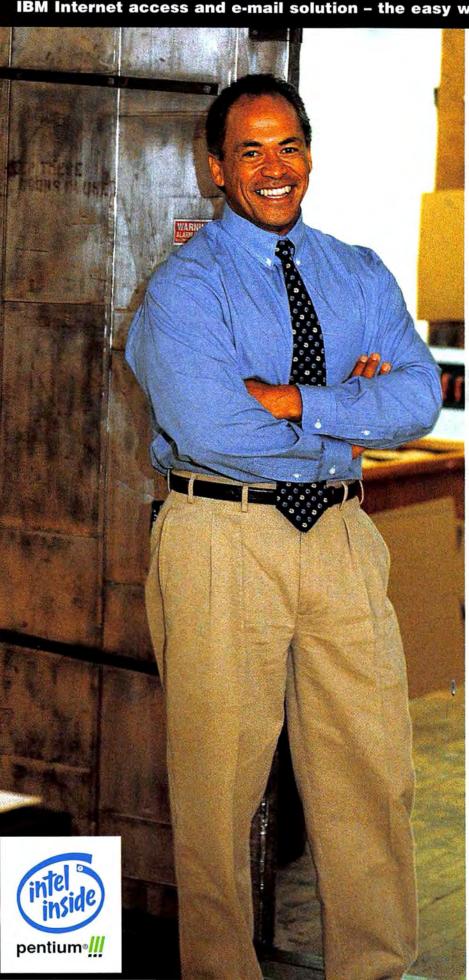
figure out which controls are for which functions, you can adjust the camera's white balance and focal distance settings.

The D-450's software makes for easy, one-step downloads. Unfortunately, this model turned in a relatively short battery life: It lasted just over an hour in our test. And watch for one minor quirk: When shooting indoors, you have to remember to flip up the unit's concealed flash.



For exclusive reviews of CompactFlash and SmartMedia card online readers, visit our Web site at

www.pcworld.com/janoo/cameras. Mitt Jones is a contributing editor for PC World. Marty Beaudet is a Portland, Oregon-based freelance writer. Dan Littman regularly writes our review of Top 10 Printers. Testing performed by Nancy Miller of the PC World Test Center.



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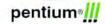
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# When Good Data Goes

You've deleted data,

fried your files, and

hosed your hard drive.

How can you recover? We provide the 911.

eople who use computers are not perfect. They accidentally delete data, format drives, and leave floppies on car seats in the blazing sun. They can also fall victim to chance. Even on a perfectly maintained system, a clever new virus can zap crucial files. No PC has total immunity from mishaps—from inadvertently erased documents to hard drives that expire seemingly without warning. Such calamities can befall any computer, anytime.

Restoring files from a backup may be the only sure way to get your data back. But even if you forgot to back up, all is not necessarily lost. A recovery utility could save the data. We looked at four such tools and found that all could recover at least some files presumed lost. Our saviors!



IF YOU WORK WITH Windows regularly, you've probably learned that it's very easy to erase even large groups of files accidentally. Take a dollop of time pressure, add a pinch of inattention, and whoops!you just erased next year's budget. Recovering files deleted this way isn't tough: Open the Recycle Bin, and drag out the files you want to restore.

But the Bin does impose limitations. At its default setting, it will hold the equivalent of 10 percent of

the drive size (a 1GB drive, for example, sets aside a 100MB Recycle Bin)-plenty for the majority of users. But if you delete a

larger chunk of files, the Recycle Bin may empty itself of the overflow, leaving you no chance to retrieve it. And you can delete files from within Windows 3.1 or DOS applications, beyond the protective custody of the Recycle Bin.

#### UNRECYCLE FILES

ONE PREVENTIVE SOLUTION is to bump up the capacity of the Recycle Bin: Rightclick on its icon, choose Properties, and move the slider to the right. But increase the Bin's size only when necessary. Other files will not be able to occupy that space.

We found a better solution in a couple of third-party packages. McAfee Utilities (\$19) and Norton Utilities (\$50) extend the Recycle Bin's capabilities and can recover otherwise irretrievable data. Both also let you restore deleted files that Windows can't resurrect, such as those expunged from within DOS or killed by old 16-bit applications from the Win 3.x days.

When Windows "erases" a file, it does not overwrite the data immediately but instead leaves it on the disk and hides it. The operating system specifically desig-

# POINT, CLICK, AND FORMAT

ON THE SINKING-heart scale, discovering that you accidentally formatted your data disk is like finding out that was an iceberg you just hit. Unintentionally format-

ting media that contains something irreplaceable happens infrequently, but it does occur. You could mean to format a floppy but instead format the Zip disk holding the presentation for tomorrow's summit-conference. Or maybe a malicious virus wipes out your entire hard disk, or renders it unreadable by blowing away the boot sector.

You won't recover a formatted disk's old contents as easily as you would a deleted file-but with most disks, the data is still there, just unreachable through normal means. Fortunately, Norton's UnFormat and McAfee's Disk Minder can bring nearly any formatted disk back from the dead, even if it's undergone Windows' "Full" formatting.

After you calm down, your first step should be to stop using the disk that's been formatted. If it's a floppy or removable disk (like a Zip or Jaz), eject it immediately, and don't reinsert it until you're



ready to begin emergency recovery procedures. If it's a hard disk, lock down your PC: Don't shut it off, don't do any work, and make sure nobody else touches it.

Getting your data back shouldn't be too tough, provided you've done a little preparation. The McAfee and Norton utility suites both include a small application called Image, which records the file struc-

ture of your hard disk every time you run it. These so-called images function as maps of your disks' data areas. The recovery applications use images stored on the hard drive to restore everything to its earlier, intact status. But you have to make the image before anything bad happens-if you acci-

dentally format an unimaged hard disk, you'll probably be able to recover the lost documents, but you'll definitely need to reinstall Windows and any applications from scratch.

McAfee and Norton also include a utility that creates an emergency boot floppy set. These are not your gardenvariety Windows boot disks:

> They also contain tools that you need in

#### When Disaster Strikes

BACK UP FREQUENTLY. At the very least, copy all your important data files

to a floppy disk or removable media when you finish work each day.

 USE ANTIVIRUS SOFTWARE and make sure it's up-to-date (some viruses can delete data). USE A DRIVE IMAGE PROGRAM daily to store a map of all data on your hard drive.

 DEFRAGMENT YOUR HARD DRIVE REGULARLY. Fragmented files are more difficult to recover because pieces are scattered all over the hard drive.

• IF YOU HAVE TWO HARD DRIVES in your PC, use the boot drive for programs and the other for data. The workhorse boot drive is more likely to fail than the one that gets written to only occasionally.

 USE A CONTINUOUS-BACKUP UTILITY that automatically saves changed data to a removable-media drive, such as lomega's free QuikSync (www.iomega.com/software/featured/quiksync.html).

nates that space as available for other files, and the next time something gets saved, the system overwrites those marked files. Both McAfee's UnErase application and Norton's UnErase Wizard will scan the hard disk for such earmarked documents, produce a list of recently deleted files, and give you the option of recovering a few or all of the files.

In our tests, both Norton's and Mc-Afee's tools managed to recover all the files that we'd deleted, without a problem. But you have to act fast to unerase effectively. Once Windows marks files as usable space, the system can overwrite them at any time.

The McAfee and Norton packages also let you specify file types that you'd never

UnErase Wizard All Protected Files on This Computer Original Location Deleted Type 50 -DirectCD Driv. 9/D/YYYY 11:04:18 AM Short 0.15 DirectCD Driv...
Rescue Disk C:\..ows\SendTo 9/D/YYYY 1:57:08 PM Short 0.15 9/D/YYYY 11:18:26 AM C:\...Norton Utilt... 0.42 Applogind
Applogind C:\..ows\Applog 9/D/YYYY 11:18:28 AM IND File 5.44 C:\..owz\Applog 9/D/YYYY 11:19:20 AM IND File 5.50 Applog ind C\..ows\Applog 3/D/YYYY 204:04 PM IND File 5.50 5.50. Applog ind C:\\_ows\Applog 9/D/YYYY 2/05/10 PM IND File Searching Complete Found: 19 Recovered 0 To recover a file, select it and click Recover To find more deleted files, click Next. Quick View

> want to recover from the Recycle Bin (.tmp temporary files, for example, or Internet browser cache files). The programs will blow these specified types of files away as soon as they enter the Bin, increasing the chances you'll be able to retrieve something you really need.

> Warning! If you suddenly lose data but don't have a recovery utility installed, do

> > McAlee Image

WAVE THE MAGIC WAND: UnErase Wizard searches the hard drive for deleted files and restores them.

not install an unerase utility on the system from which the data disappeared. If you do, the odds are high (and Murphy's Law dictates) that you'll overwrite the very data you're trying to recover. After all, Windows has marked

the file as open to all comers-including the utility itself. To bypass this problem, McAfee and Norton include a special recovery floppy with their suites. You simply boot directly from the floppy and then use the included DOS unerase tools. If you've just deleted the file, you will have the best chance of recovering at least some (if not all) of your lost documents.

order to recover from a major disk crash or an accidental format. You should create these important disks at the time you install the recovery software. Keep the disks in a safe place: In case you hit that iceberg, you'll need them.

#### POST-FORMAT FORGIVENESS

TO TEST both suites' format-recovery capabilities, we fired up an identical pair of Windows 98 PCs, one equipped with McAfee Utilities, the other with Norton Utilities. After creating emergency disk sets, we booted both systems from a DOS floppy, gulped slightly, and typed FOR-MAT C: /S (to put DOS on the hard disk, making it bootable). A few minutes later, we removed the floppy and restarted the two PCs. Each booted to a C> prompt; typing DIR showed an empty disk.

We then booted from the McAfee

**DRIVE IMAGES made** by McAfee Image (shown) or Norton Image can recover data from formatted disks.

and Norton emergency disks and ran Disk Minder and UnFormat, Without an image file, Disk Minder could not restore a single thing.

Norton scanned the hard drive for about 11 minutes and could recover most of the files-but the hierarchy of all the directories was completely shot.

Before we ran through the test the second time, we made an image of the hard drives. In just over 2 minutes, McAfee restored the imaged drive to its preformat

Use this wizard to create an image snapshot of the critical sectors on your hard drives. In the event these sectors are corrupted by a disk crash or virus, Image can use the snapshot to restore your hard Create new image backup Restore drive(s) from saved image Properties

> condition, including all the file icons and directory structures. In an unbelievably speedy process that worked like PC alchemy, Norton's UnFormat took (literally) 5 seconds to do the same thing. Both drives booted up perfectly, with every icon in exactly the right place afterward.

> How easy it is to turn back the clock depends on how up-to-date your image file is. You should run your image utility every time you boot your PC. If you keep your machine running constantly, schedule a time to run the program daily.

> If your images are out of date, your unformat attempt won't retrieve anything that changed since the last image and may not even restore your system to exactly the way it was the last time an image file was made. But even an out-of-date image gives you a good chance of partial recovery.

. DON'T PANIC.

LEAVE YOUR PC AS IT IS. Don't shut it down or make any changes.

IF YOU HAVE TO LEAVE your office, make sure no one else uses your PC.

- DETERMINE WHICH FILES YOU REALLY NEED to recover from the drive. (Windows system files, for example, can be restored from the original installation CD-ROM.) Make a list.
- DO YOU REALLY NEED A DATA-RECOVERY TOOL? If you've lost only some nonessential work that won't take long to regenerate, the best choice may be to write off the lost data and start again.
- ESTIMATE STORAGE NEEDS for recovered files. Buy a new hard drive if you need more than 1GB.
- IF YOU NEED A DATA-RECOVERY TOOL, don't buy anything before you evaluate the value of your data, the difficulty involved in recovering it, and the value of your time.

X

## SEARCHING FOR



WHEN HUMPTY-DUMPTY fell off his wall, he had all the king's horses and men working to put him together again. But if your hard drive suffers a similar fatemechanical failure or physical damageyou may have to take a more proletarian approach. In these cases, roll out the heavy artillery, namely Ontrack's EasyRecovery (\$195) or PowerQuest's Lost & Found (\$69), and roll up your sleeves. Lost & Found can be used only once; a single-use version of EasyRecovery, which recovers five or fewer files, sells for \$49.

Both packages say they can rescue badly damaged data, but when a disk is damaged physically, you'll have a tough time restoring any of the lost data. Sometimes these two programs can retrieve some data from a mechanically damaged hard disk, but they offer no guarantees.

Using a different approach than the McAfee and Norton tools. Lost & Found and EasyRecovery attempt to ferret out data and make some sense of it. The products work from DOS and require you to boot from a floppy disk. Lost & Found includes its own bootable floppy; with EasyRecovery you must create the floppy beforehand. Both packages require you to hook another drive to

your PC to store the retrieved data. Another hard drive is

the easiest solution, but if you're recovering a small disk, removable media will do the trick.

#### DAMAGED DISKS YIELD THEIR DATA

EACH PROGRAM took about 2 hours to analyze our 8GB drive, and both recovered

all data erased with a format.

Unlike McAfee's and Norton's utilities, neither EasyRecovery nor Lost & Found renders your hard disk bootable, and nei-

ther is as easy to use-but that's not what EasyRecovery and Lost & Found were designed for. These power tools can recover data when others throw their digital hands up in exasperation. But even an experienced user will master them.

Ontrack justifies

EasyRecovery's high price with claims that it can deal with badly damaged info (we couldn't confirm or deny this). You can use it on multiple PCs, too-Lost & Found works only one time. And when you desperately need files, nei-

ther utility costs as much as a recovery service.

**DEFENDING YOUR DATA** IF NONE OF THESE tools work, and you can't live without your data, don't head for the nearest bridge: You still might have a chance. Several companies, including Ontrack and DriveSavers (800/440-1904, www.drivesavers.com) offer custom data recovery: They take your bad drive into their lab and coax the data off it byte by byte. These services say they can recover nearly any data, no matter how badly damaged, but the rescue can cost thousands of dollars. DriveSavers says hard disk recovery costs anywhere from \$900 to \$3500, depending on the work involved.

The tools we tested make it relatively simple to recover deleted or formatted data from a hard disk or other media. But though McAfee's and Norton's suites are



need some time to ADVANCED TOOLS like Ontrack's EasyRecovery (above) scan critically mangled data to root out stray files, but they aren't meant for beginners.

excellent first lines of defense, backing up everything regularly is the only sure way to prevent data loss-and avoid that \$3500 restoration of your doctoral thesis or Universal Field Theory formula. Now doesn't that make the prospect of backing up your PC much more palatable?

> Stan Miastkowski is a contributing editor for PC World.

#### igital Disaster Preparedness K

Want to be ready to rescue disappearing data? These products can help.

#### EasyRecovery

PRO: Advanced recovery may succeed where others fail.

CON: Expensive.

Street price: \$195; Lite version (recovers up to five files) \$49; Ontrack, 800/872-2599, www.ontrack.com

PRODUCT INFO NO. 706

#### Lost & Found

PRO: Inexpensive, as long as you need to use it only once.

CON: Intrusive copy protection (can't be used on multiple PCs).

Street price: \$69, PowerQuest, 800/379-2566, www.powerquest.com

PRODUCT INFO NO. 707

#### McAfee Utilities

PRO: Very low price, good datarecovery abilities.

CON: Slower performer than Norton and can be a bit more difficult to use. Street price: \$19. McAfee Software. 408/988-3832, www.nai.com

PRODUCT INFO NO. 708

#### **Norton Utilities**

PRO: The industry standard, easy to use, excellent data-recovery abilities. CON: Can't easily recover data from badly damaged disks.

Street price: \$50, Symantec, 800/441-7234, www.symantec.com

PRODUCT INFO NO. 709

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- 5 Year Limited Parts Warranty with 1 Year On-Site Service AMD\* Athlon" with 3D Now!

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400MHz......859











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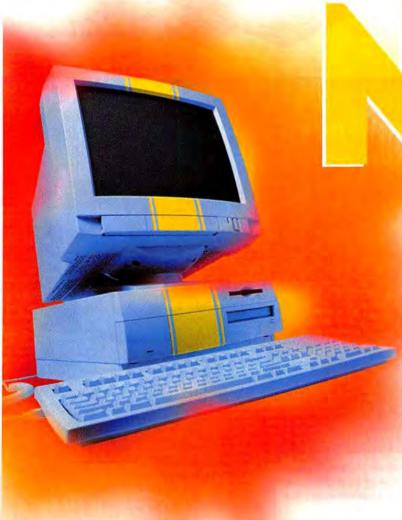


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NEVER HAS SHOPPING FOR A NEW COMPUTER been a more exciting—or more daunting—challenge. The promise of CD-quality music, 3D graphics, and video streaming over high-speed Internet channels has captured our collective imagination. But first-time buyers and those purchasing a second computer for their home often short-change their families in the rush for so-called "value PCs." Before you buy, experts caution, you should carefully consider whether the PC you are looking at will meet your high expectations.

"Buyers have to ask themselves, 'What do my applications demand?'" says Roger Kay, a research analyst for International Data Corp. (IDC), Framingham, Mass., who specializes in desktop PCs. "While value PCs are sufficient for word processing," Kay says, "you will need a performance PC if you plan on doing anything with sound and video."

#### Special Advertising Supplement

Also, to surf the Internet in style, your PC must be able to handle the large and complex data types—including sound and video files—that are beginning to take center stage on the Web. "The

Internet is the wild-card application to consider when you are buying a PC," Kay says, "because that's where you will encounter all of these heavy-weight data types."

For those considering the value PC option, Computer Shopper gave this advice in an analysis last year: "Whether you need to squeeze every nanosecond of performance out of your system or

simply want to stave off obsolescence for an extra six months, do your-self a favor and consider spending at least a couple thousand dollars for a computer that doesn't depend on yesterday's technology."

Value PCs typically lack the processing power, memory, and hard disk space you need to grow with the Internet and new multimedia and gam-

ing applications. And "free PCs"—those offered free in exchange for signing up with certain online services—are no free

lunch either, according to Aaron Goldberg, a technology writer for New York-based Ziff-Davis Inc. Most rope you into long-term contracts for low-bandwidth connections that will be obsolete in the near future. And, Goldberg notes, "streaming video, 3D graphics, voice over IP, and voice recognition will all be far more common within 18 months than they are today. What happens if your machine just can't handle it?"

In a recent Computer Shopper column, Goldberg gives another reason to doubt the life expectancy of "bargain boxes" in an Internetaccelerated world. "You have to worry whether no-name vendors will

> be willing to offer drivers, patches, and updates to the system software," he says. "These are necessary for you to use the future peripherals that haven't even been considered today."

> > For creative people, a value PC's "value" is severely limited. You might be able to use a "value" system to write and print school reports with low-resolution graphics, manage your household finances, or exchange e-mail. But if you want to edit

music, images, and video, "you'll appreciate the brute strength of a high-end

Continued on page 5

#### Enough Power and Speed to Make the Internet Explode on your Screen

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audio, realistic animation, and volumes of rich data—you'll need a Quantex Desktop

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"The Internet is

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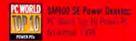
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-Roger Kay, research analyst,

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# **Home Networking Arrives**

IN THE 20 MILLION U.S. HOUSEHOLDS WITH TWO OR MORE PCs, a lack of practical, easy-to-use home networking solutions has prevented users from getting the most performance out of their technology investments. And with high-performance PCs more affordable than ever, International Data Corp. predicts the number of multi-PC households will soar in the coming years.

#### WIRED FAMILIES

Now Quantex and Intel Corp. have made a reality of your home networking dreams. By using the Intel AnyPoint™ Home Networking Kit you can harness the power of your Quantex PCs by sharing files, drives, printers, and other output devices, as well as play multiplayer network games—at office network speeds. All of your PCs can also share the same Internet connection simultaneously.

Quantex provides AnyPoint as an option for use with any of its power desktop PCs. The easy-to-install package includes a pre-installed PCI network card and an AnyPoint Home Network parallel or USB adapter for connecting to a second desktop or notebook. The kit is designed to be set up with absolutely no aggravation—there is no need for you to open up your comput-

er, and no need to install additional wiring. Your AnyPoint network from Quantex simply uses your existing phone lines.

You can use AnyPoint to connect to any other computer simply by plugging in an AnyPoint Home Network Adapter. The adapter is also ready to accommodate your printers, scanners, and other devices. And you can continue to use your existing phones and modems on the network. Your data will move through the network at speeds 18 times faster than a 56-Kbps modem!

Intel's high-performance AnyPoint software loads itself into your computer worry free—and in minutes—with its Install Wizard. To connect all of the other PCs in your home, you simply install the software on each machine from the AnyPoint CD.

Your AnyPoint home network from Quantex will also let you take advantage of the latest high-speed data connection technologies. AnyPoint supports digital subscriber line (DSL) connections, cable modems, and other broadband services. And the network lets you continue to print and exchange files while either talking on the phone, sending and receiving faxes, or surfing the Internet. AnyPoint brings out the best in your Quantex computers by harnessing their power in a fast, flexible home office environment.



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#### Continued from page 3

machine," says Sam Meddis, technology editor for USATODAY.com.

"Aside from providing gaming thrills, a power system also comes in handy for more crash-free multitasking—switching among multiple open apps without overtaxing resources."

#### QUANTEX CAN TAKE THE HEAT

Meddis recently extolled the virtues of the Ultimate Gaming PC from Quantex Microsystems in his weekly *USATODAY.com* column, "On the Web." The Ultimate Gaming PC features Intel's latest 600MHz Pentium III processor, 128MB of RAM, and a 16MB 3Dfx Voodoo3 3500TV video card. To test the system's multitasking capabilities, Meddis simultaneously launched Microsoft Word, Excel, Windows 98 Explorer, Internet Explorer, Outlook,

FrontPage, and Corel WordPerfect. "Then, just for fun, I fired up Activision's Heavy Gear II, about as power-demanding a game as they get," Meddis says in his column.

"Not only did the system maintain its stability (even as I blew away enemy mechanized fighters with my Very Heavy Auto Cannon)," Meddis observes, "but [Norton's] System Doctor reported more than enough resources to spare."

Quantex's performance PCs are designed to support today's—and tomorrow's—applications. The company's power and gaming desktops get their adrenaline from the newest high-speed Intel Pentium III processors. And many of Quantex's systems ship with 128MB of RAM (all of them are upgradable to 768MB).

The Pentium III is Intel's most advanced and powerful processor for desktop PCs. Available at speeds from 733 MHz down to 500 MHz, the latest Pentium III processor features 70 new instructions and increased processing power for superior performance in multimedia and Web applications. Its streamlined components and integrated cache increase the reliability and responsiveness of your graphics applications by increasing frame rates, color depths, and image processing algorithms. With a Pentium III-powered

Quantex computer, you can dart around large, complex, high-resolution images, and edit them without

> the long wait times you expect from slower processors.

> > The same capabilities that make the Pentium III indispensable for working with high-resolution



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images also make it a must-have for viewing quality streaming video over the Internet. And digital video editors will marvel at the processor's ability to support the real-time encoding and editing of MPEG-2 video. Animators and gamesters will find a more detailed, immersive, and fast-moving experience when running their applications on a Quantex PC driven by the Intel Pentium III processor.

The Pentium III also provides greater accuracy and faster response time for applications supporting speech recognition. With a Pentium III-powered Quantex PC, you can enjoy real-time speech recognition for Web browsing, word processing, and scores of other applications. And Quantex further bolsters the blistering performance of its PCs with the latest AGP graphics. The Quantex SM733 power desktop, for example, ships with the nVidia Riva TNT2 32MB AGP graphics card that enables a range of applications, from the hottest 3D games to full-screen DVD playback.

#### BUILD YOUR DREAM MACHINE

Every Quantex PC is fully customizable, so you can build your dream machine from the ground up, beginning with any one of Quantex's base models. Whatever your needs are—from Internet browsing to high-performance gaming, video editing to speech recognition—Quantex can deliver a system that will grow with your family and

adapt to tomorrow's technology.

And, you can be sure that Quantex will be there when you have questions or need support. For example, in July 1999, Quantex earned an A Rating and the Reader's Choice Award from PC Magazine for service and reliability. Quantex desktop PCs ranked with the best for reliability and technical support, while requiring the fewest repairs. In recent years, Quantex has

# Win the ultimate performance PC!

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also garnered PC Magazine's Most Valuable Product Award, Computer Shopper's prestigious Direct Channel Achievement Award for Systems, and numerous other Best Buy, Editor's Choice, and WinList Awards.

All of Quantex's awards validate its mission: delivering performance systems that represent solid investments for families and busi-

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Quantex desktops and notebooks won over 100 awards from the industry's top PC publications in 1999. From "Best Buy" awards to "A" Ratings for Service and Reliability, Quantex consistently delivers a brilliantly engineered system backed by top-notch service and support.



SB466c Business Desktop PC Magazine 5 Star Award August 1999



T-1411 Notebook Mobile Computing First Class Award November 1999



SM600 SE Power Desktop PC World Top 10 Power PC November 1999



SM600 Power Desktop Computer Buyers Guide Best Buy Award November 1999



T-1411 Notebook Laptop Buyers Guide Best Buy Award July 1999



M500 Value Desktop PC World Top 10 Midrange PC November 1999



M466c Value Desktop PC World Best Buy Award November 1999



T-1411 Notebook PC World Top 10 Notebooks October 1999



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SM500 Power Desktop Windows Magazine WINLIST Award August 1999



SM500 Power Desktop PC World Best Buy Award August 1999



I-1410 Notebook Maximum PC Kick-Ass Award September 1999



M-1c Value Desktop Series PC World World Class Award July 1999



M400c Value Desktop PC World Best Buy Award July 1999



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July 1, 1999 Quantex Desktops

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"In the desktop category... Quantex, continuing its impressive improvement since debuting in our survey three years ago, breaks into the "A" category." PC Magazine, July 1999.



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# Fast, Fun, and in a rapidly changing technological world. Forward-Thinking

ou need a high-end system to get the most out of the Internet and your home office applications. "Not very long ago, so-called high-end desktops didn't necessarily include enough RAM, hard disk space, or multimedia capabilities," says Bruce Levine, a retired commercial real estate lawyer. "By purchasing better systems from Quantex, we are buying a measure of protection for whatever is around the bend, and assurance of at least three to four years of usefulness."

Levine's family uses three high-power Quantex systems at their home in Boca Raton, Fla. Levine relies on his Quantex notebook both at home and on the road. His wife, Linda, uses a Quantex power desktop to manage the family's finances and collect art online. And Levine's daughter, Jessica, and his son, Matthew, share a Quantex gaming desktop. With 128MB of RAM and the latest in sound and video technology, these gaming machines are a sight to behold. "If you're into games, this system makes the visual motion more seamless than anything I've ever seen before," Levine says.

#### CONNECTED TO THEIR WORLD

But the kids don't just use their gaming desktop to play the latest Activision titles. They also use it to research school projects on the Internet, and to illustrate and print out homework assignments. "Our children feel that they are part of the rapidly evolving world of computers and part of the cutting edge," Levine says. "This replaces fears of inadequacy with a sense of adventure and wonder and keeps the experience positive."

Levine recently brought his Quantex notebook to Matthew's school for a presentation on investing. He attributes his own ability to retire early to wise investments he made early in life. "I think it's important that kids learn how to invest when they are young," Levine says. "And the laptop is an excellent teaching device. I was able to punch up Morningstar.com and use



Quantex desktops and

"By purchasing better systems from Quantex, we are buying a measure of protection for whatever is around the bend."

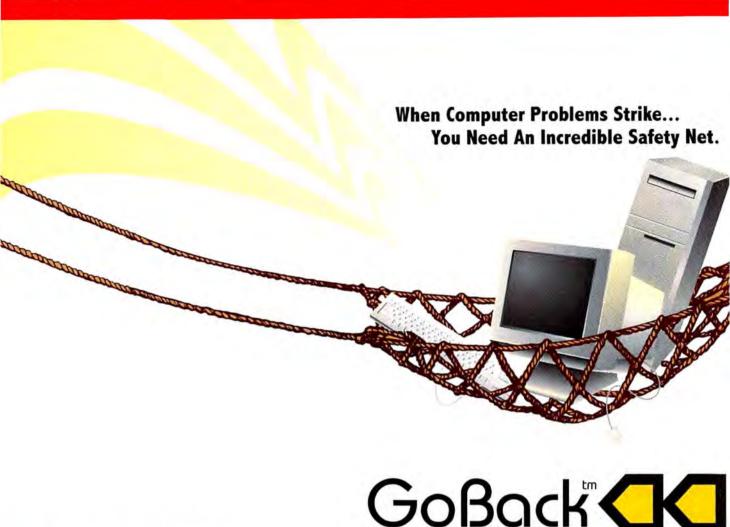
-Bruce Levine, retired commercial real estate lawyer, pictured here with his family in Boca Raton, Fla.

that to get the kids involved in the learning process."

An aspiring novelist, Levine also uses his laptop for his own edification. He has participated in writing programs in Europe and at a local university. The laptop has been Levine's invaluable workmate and companion in the classroom, on the road, and in the air. But one of his favorite features is the notebook's DVD drive. "It's great when I'm on a long flight," Levine says, "to don my Seinnheiser headphones and pop in a movie."

Levine started shopping with Quantex after another online computer superstore sold him a costly but unreliable system, and then failed to provide quality customer service. "Our Quantex power systems help us to feel that we're digesting the everchanging world of computer technology and services in a progressive fashion, instead of being dragged about its borders or just plain left behind," he says. "And the people at Quantex have been concerned, supportive, and pragmatic counselors to us as we try to keep up."

0-8



#### HAS A SYSTEM CRASH OR VIRUS EVER SENT YOUR HEART RACING?

Or a simple mistake caused your blood to boil — and your data to disappear? Chances are your last backup wasn't enough to rescue you.

When computer problems happen — and it's just a matter of time before they do — you need an incredible safety net.
One that allows you to:

- Recover from a major system crash in minutes, without ever having to know what caused the problem.
- Retrieve all the data wiped out by a devastating virus that slipped past your anti-virus program, without calling upon outside support or accessing your most recent backup.

"truly indespensible" Windows Magazine

- Remove all traces of a failed software installation, without going through a tedious, and often unsuccessful, uninstall process.
- Instantly recover a critical file you accidentally deleted or overwrote.

With Wild File's award-winning GoBack software you can do this, and more!

How? GoBack provides immediate recovery from system crashes, virus attacks, failed software installations, Y2K glitches, even user error, by taking the computer back to a time when everything was okay. And because GoBack runs underneath the operating system, you can use it to restore a PC to working order even if Windows won't boot! (No special disks required.)

"peace of mind...must have" PC World GoBack lets you return a computer to virtually any moment in the recent past — five minutes, five hours, even five days ago — making it the only product that offers continuous data protection. Also, immediate retrieval of "lost" files is a mere mouse click away. A PC protected by GoBack is virtually indestructible. You can download and install software, exchange e-mail and delete files without the fear of complications bringing your work to a sudden halt.

With GoBack's exceptional protection, worry-free computing has arrived!



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# Choose an for Your Business

photographer

Full-service ISPs offer everything from

"I HAVE MORE IMPORTANT THINGS to do than hassle with my Internet service provider," says Rick Heflin, a photographer from Loganville, Georgia, who just months ago

> pulled his small business onto the Web at www.ambackroads.com.

> Heflin has the right idea. Small businesses like his are heading online fast. According to Blaine Mathieu, a senior analyst with Dataquest, they'd better be.

Web design to e-commerce plans. Whether you're shopping for a new ISP or want to know how your current provider excels or falters, we have the scoop. By Gregg Keizer Rick Heflin,

"What small businesses really need to know is how to use the Web to retain their current market and build on it," says Mathieu. Attention, in other words, *must* be paid—to your ISP, to your business, and to what you two can do together.

ISPs have rushed to assemble programs that target small businesses. Services once spread out among a slew of firms—site hosting here, Web design and e-commerce there—have been put by ISPs under one roof: theirs. In recent months, for instance, AT&T WorldNet beefed up its Small Business Center, and Prodigy acquired BizOnThe.Net, a small business-specific Web hosting company.

At the same time, big service providers are buying out some smaller ones (see "ISPs@Risk," www.pcworld.com/jun99/isps\_risk). MindSpring and EarthLink's recently announced merger, scheduled for completion in early 2000, will operate under the EarthLink brand name.

Where does that leave you? If ISPs are courting you, you need to know the dif-

ference between a pitch and a promise. You need to know what's suitable for your expanding business in the short term and what's feasible in the long run.

To help you find the best ISP for your business, we dug into the crucial components of Web business services—site hosting, site design, and e-commerce—for 12 national ISPs. We also surveyed more than 5000 *PC World* readers to determine how well those providers serve their businesses. And we followed up by interviewing budding entrepreneurs about their real-world experiences.

The good news? Our respondents were generally happy with their ISPs. But few relied exclusively on their providers for all their Internet chores. Based on our survey, the happiest campers were customers of UUNet, EarthLink, and MindSpring. The least satisfied employed AOL, CompuServe, and Prodigy as their ISPs.

Clearly, you need to answer a lot of questions before choosing the best ISP for your business. Here's how to start.



WHILE MAGICIAN David Neubauer strolls through the cars of Amtrak's Coast Starlight train entertaining passengers with card tricks, his Web site back home pulls in new clients. "When I steer people toward it," Neubauer says, "my Web site helps make the sale."

Neubauer hosts his site (www.dnmagic.com) on EarthLink for the magical sum of \$20 a month. And he loves his provider. "I don't plan on leaving EarthLink," he says. "I've had some problems, but they've been able to solve everything."

Most small-business people we polled express much the same affection for their ISP. Among our respondents who have their business on the Net, 40 percent rely on their ISP's Web hosting package. And three out of four businesses are satisfied with the hosting service their ISP offers.

Which ISP wins the hosting laurels?

#### INTERNET SERVICE PROVIDERS FOR YOUR SMALL BUSINESS

INTERNET SERVICE PROVIDER Summary		All-purpose features					
		Overall satisfaction (%) '	Monthly fee	Trial period (hours/ days)	Toll-free access charge (per hour)	Customized start page	Number e-mai accoun
AOL 800/827-6364 www.aol.com	World's most popular ISP is the least popular one in our survey. This gigantic ISP has no e-commerce tools.	67	\$22	250 hours/ 30 days	\$6	•	7
AT&T WorldNet 800/967-5363 www.att.net	Full-service ISP features a small-biz center but ranks fifth in overall satisfaction.	83	\$22	Unlimited/ 30 days	\$6	•	6
CompuServe 800/848-8990 www.compuserve.com	Farms out hosting and e-commerce to Verio. Is that why some of its customers give this ISP a thumbs down?	75	\$20	100 hours/ 30 days	\$6	•	7
Concentric 800/939-4262 www.concentric.net	Wide range of e-commerce plans still doesn't impress many small-business people.	81	\$20	Unlimited/ 30 days	\$5	•	1
EarthLink 888/327-8454 www.earthlink.com	Rave reviews from readers for its attention to ease of use and customer service.	88	\$20	Unlimited/ 30 days	\$5 after 2 hours	•	1
GTE Internet 800/483-7873 www.gte.net	85 percent of its users are happy as clams—maybe because of the multitude of hosting and e-commerce plans.	85	\$20	None/ None	\$6	0	1
MindSpring 888/677-7464 www.mindspring.com	Excellent service for small-business do-it-yourselfers. Ranks in the top three for satisfied customers.	87	\$20	Unlimited/ 30 days	\$6	•	3
Microsoft Network 800/373-3676 www.msn.com	Like AOL, MSN offers few services for small-business owners.	81	\$22	Unlimited/ 30 days	n/a	•	1
Prodigy Internet 800/776-3449 www.prodigy.com	Decent set of small-biz services, but 1 out of 6 current customers report dissatisfaction.		\$20	250 hours/ 30 days	\$6	•	1
PSINet 800/827-7482 www.psinet.com	Hard to put all your online eggs in this basket, since PSINet doesn't offer dial-up access.	80	n/a	n/a	n/a	0	n/a
UUNet 800/488-6384 www.uu.net			\$25 *	None/ None	\$6	0	1
Verio  888/438-8374 www.verio.com  Lots of choices for small businesses, but middle of the road in customer satisfaction.			\$25	Unlimited/ 30 days	\$6	0	1

● Yes ○ No n/a = not applicable

Based on results of our survey of 5689 *PC World* readers who are ISP decision makers for their business. Number denotes the percentage of respondents who said they were "very satisfied" or "somewhat satisfied" with their overall service.

According to our survey, UUNet, Concentric, and MindSpring do best, with satisfaction rates of 95, 86, and 81 percent, respectively. "I've recommended Mind-Spring to everyone I know," says photographer Rick Heflin. "It's just painless. I travel a lot in my work, and I can access MindSpring from nearly everywhere."

For most small businesses, hosting makes all the sense in the world. Paying a service to host your Internet presence on its servers, maintained by its staff and connected to the Internet via its lines, means you spread out the hardware costs and avoid the need to hire tech help.

#### MAKE THE MOST OF YOUR HOST

DUMPING A BUNCH of HTML files and images onto a server somewhere doesn't translate into a decent business site, however. You'll want to pick an ISP that offers a generous menu of hosting services, helps you put your site on the map, and keeps its servers-and thus your on-the-Web livelihood-up and running.

"When I steer people toward my Web site, it pulls in new clients and helps make the sale."

David Neubauer, magician

An ISP bundles three essential elements in its Web hosting packages: multiple e-mail mailboxes, a predefined amount of server space for your Web site's files, and a

traffic allowance-an accounting of the megabytes downloaded when visitors request a page from your site.

Most ISPs package these components in a multitude of preset hosting plans; generally, the more megabytes you need, the more you pay. MindSpring, for instance, offers a quartet of plans, starting with a low-end package of 30MB of server space and 2GB of downloads for \$30 a month, and maxing out with a 75MB/ 6GB package for \$100 a month. Other ISPs, like EarthLink, take a pay-as-yougrow approach, charging small-business tenants a base fee plus additional tolls for each space and traffic increment.

But for most small organizations, "Space really isn't an issue," claims Bob Imperial, a Raleigh, North Carolina, business owner who designs small-business Web sites and has his own site at www. imperialart.com. "The average business site uses less than 5MB of server space."

According to many small-business owners we interviewed, unless your site is very well established and extremely imagepacked (say with an extensive online product catalog), the most compact and least expensive plan is the one to scout.

Far more important, says Imperial, is the functionality of the host. Ideally, you'll find an ISP that offers ready-to-use CGI scripts for important elements such as an e-mail response form and a site search engine, as well as e-commerce support. If you plan to spruce up the site with multimedia, you'll need a host whose servers support the most popular audio and video streaming technology, 5RealAudio/Video.

Other important features to ask about include tools for tracking how many different people looked at your site daily, weekly, or monthly; e-mail forwarding; and-because of its popularity with designers-support for Microsoft Front-Page server extensions. This capabilitysupported by MindSpring, GTE.net,

#### FEATURES COMPARISON

	Small-bu	siness-spe	cific featur	es		Support
High-speed access	Guaranteed uptime (yes/no)	Web site design	Web site hosting	Shopping cart software	Credit-card processing	Daily toll-free support (hours
DSL	•	0	•2	0	0	24
ISDN/cable/DSL/ TI/frame relay	•	•	•	•	10	24
ISDN	•,	0	• 1	• 2	• 2	17 3
DSL/TI/T3/ frame relay	•	•	•	•	•	24
ISDN/cable/DSL/ frame relay	•	•	•	•	•	24
ISDN/DSL/TI/ frame relay	•	0	•	•	•	24
ISDN/DSL/TI/ frame relay	•	•	•	•	•	24
n/a	n/a	0,	0	0	0	24
DSL	0	0	•	0	•	20
ISDN/DSL/TI/ frame relay	•	•	•	•	•	24
ISDN/DLS/T1/T3/ OC3/frame relay	•	0	•	•	•	24
ISDN/DSL/T1/T3/ DC1/2/3/frame relay	•	0	•	•	•	24

Refers customers to Verio for this feature.

<sup>3</sup> Weekdays; 12 hours

<sup>\*</sup> Separate start-up fee is \$25.

Microsoft BCentral offers Web-design tools.

today probably won't suit your needs tomorrow. Unless you're willing to switch ISPs, pick a provider with a clear upgrade path that runs all the way from basic dialup hosting to e-commerce capabilities.

# Do it yourself

THE FIRST DESIGN QUESTIONS you should ask yourself, Web designer Bob Imperial says, are "What do you want from your ISP? What do you want your Web site to do?" Good advice. Nearly every small-business owner we interviewed said the same thing.

How your Web site looks and (more important) how it works can either bring in business or turn customers away. The trouble is, the road to a great Web presence is as rife with potholes as the one you took to build your business in the first place. No wonder every ISP with two modems to rub together promises to help you design your Web site.

Interestingly, according to our survey, relatively few small businesses take them up on the offer: Only 21 percent of the readers we surveyed use their providers' in-house design services. The rest either go it alone or hire outside designers-and many prefer to contract with a local team.

Naturally, the design assistance (if any) you use affects the route to the right ISP. You need different things from your provider if you're handling the design than you do if you give its staff the gig.

#### ON YOUR OWN

YOU SAY YOU DON'T know HTML from HBO? In many cases, you can build a passable Web site by assembling prefab building blocks that your provider supplies. Many national ISPs offer these click-and-drag tools, which only they have the resources to develop and support.

Verio, and Prodigy, among others-lets them (or you) create a site with threaded discussion groups, for instance.

#### CONVENIENCE AND RELIABILITY

ISPS ALSO TYPICALLY tout aids for tasks such as registering a domain name-the yourcompany.com that stakes your Web turf-and notifying search services that your business is up and online. Except for MindSpring's Complete Web plan, virtually no ISP's hosting plan accounts for the \$70 domain registration fee; instead, you'll pay the fee directly to Network Solutions (www.networksolutions.com).

Drawing attention to your site is much

more important. Most ISPs simply offer tools for registering your URL with search sites. Others, like Prodigy and Mind-Spring, offer tips on marketing your site.

Before you choose an ISP, try to determine how reliable its servers are. The buzzword here is uptime, which refers to the percentage of time the ISP is up and running. Some, like Concentric, claim their service has never been down, but most hedge a bit by claiming a 99.9 percent mark. But don't take the ISP's word -ask around. The reliability leader among our respondents (with an uptime agreement with their ISP) was UUNet; 98 percent were satisfied with its uptime.

> If your ISP fails to deliver on its uptime promises, you may be able to recoup part of the month-

**Shopping Checklist** 



- Word of mouth. Ask small-business acquaintances about their ISP experiences. You'll get the unvarnished truth.
- ☐ Variety store. Does the ISP offer several e-commerce bundles, from basic startups to sophisticated packages? Services that don't may eventually force you to relocate when your business expands.
- ☐ Trial by phone. Test the ISP's technical support with a call or two ahead of time. Is the help desk available 24/7?
- Building blocks. If you want to design your own site, examine the ISP's own click-to-build software before you commit.

- Do it yourself. The more you do on your own (such as creating and maintaining your site), the more control you have over your business. That way, you decrease the chance that outsourcing delays will hurt sales.
- Simplify, simplify. It's tempting to outsource your needs to multiple vendors. Weigh any potential cost savings against the inconvenience of dealing with multiple companies.
- Uptime, downtime. Ask the ISP for its uptime numbers. Get

the service's uptime guarantees in writing, and find out what your recourse is if the ISP fails to keep its promises.

- Location, location, location. Register a domain name that lets customers find you -yourcompany.com is best. Be creativemany domain names are already taken.
- Backup. How often does the ISP back up your site? How are those backups secured? How long will it take to restore the site if the provider's servers expire?
- ☐ Try it out. Before locking yourself into a long-term contract with an ISP, test out its services on a month-by-month basis.

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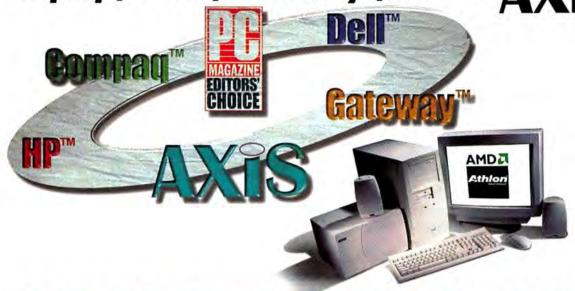
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Some ISPs provide ample self-help software and suggestions. Mind-Spring, for instance, nicely summarizes the five steps you must take to start your site and includes a Web wizard that walks you through creating some basic pages. But you can scratch some ISPs off your list if you want build-ityourself software. Neither UUNet nor PSINet, for

Even the best ISP-based tools, however, can't compete with Web-design software such as Microsoft FrontPage 2000 or NetObjects Fusion. Our advice? If you're determined to do it yourself, use design software, not the ISP's tools. That's what David Thompson did. The Cocoa, Florida, antiques dealer turned first to FrontPage to design his site at www.antiquebrokers.net, but now he works with NetObjects Fusion. "It may have taken me two weeks to do what [Web designers] could in two days, but I saved between \$1800 and \$4000 by doing it myself."

instance, offers make-your-site utilities.

#### WHAT YOUR ISP WILL DO

ONE ALTERNATIVE to doing it yourself is to rely on your ISP's in-house design team. The main advantage of this approach is one-stop shopping. PSINet's WebStart, for instance, promises a designto-maintenance solution, with a package price of around \$2200 for a six-page site. Verio's new VerioExpress takes a unique tack among the national ISPs we studied: For \$300 to \$700, Verio's designers will craft a three- to seven-page site using the same fill-in-the-blank ExpressStart tool that you can use on your own.

Evaluating an ISP's in-house designer doesn't differ from scrutinizing a local firm. Make sure you check out the ISP's portfolio of "sample" sites, if it has one, get a grip on what services the ISP can provide, and get bids. Note: So-called inhouse designers aren't necessarily employed by the provider itself.

But don't expect a work of art if you give the job to your ISP. According to our sur-



vey, only three in ten small businesses that used their ISP's design services were "very satisfied" with the results.

#### GOING LOCAL

THE MAJORITY of readers we interviewed sought outside design help. The reason? As small-business owners they understood that their expertise lay in running their own business, not in designing Web sites.

Rather than turning to ISPs for design consultation, most businesspeople headed to local design firms-primarily because of the personal attention. "You're better off working with designers when you can meet them, talk to them, hear their ideas," says Brent Seltzer, who runs a voice-over business for TV and radio. based in Studio City, California.

In fact, most businesspeople who used

ENTICED BY e-commerce but don't know where to start? Verio's basic step-bystep tutorial tells you what you need to do to get your biz up on the Web.

a local designer said that the design specialist, not they, had selected their provider. While creating your site, the designer will be able to identify specific

requirements-FrontPage server extension support, say, or the amount of server space your business needs-that the prospective provider must meet.

### Setting Up

TALK ABOUT A SEA CHANGE. A couple of years ago, only megacorporations or venture capital-funded startups sold stuff on the Web. Not any more. Even the tiniest business can toss up a virtual selling space in hours-like David Thompson, who vacated his antiques shop to establish a Web-only sales locale on EarthLink. "Why put out \$800 to \$1000 a month just for [physical] space to sell? I could do more business over the Web and have the opportunity to sell to millions, not just the

#### Cost of Maintaining Your Web-Based Business

ISP SERVICE	Cost '		
Setup	\$50		
Simultaneous Web access for up to 10 users	\$99/month		
Domain registration	\$70		
E-mail for up to 10 users	Included		
Web hosting, 30MB server space	\$50 start-up fee, \$30/month		
24/7 telephone support	Included		
Starter e-commerce storefront including credit card authorization	\$50 start-up fee, \$80/month		
Miscellaneous charges (e.g., Web design consultancy fees)	\$300 and up		
First-year total	\$3028 and up		

Based on the average cost of several national ISPs' services.



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When PC Magazine reviewed corporate PC's from all of the industry's top vendors in December ag, Dall, Gateway, HP, IBM, and Micron, AXIS was shown as having the 1998, included Con "Most Bang for the Buck" in both High-End and Mainstream categories.

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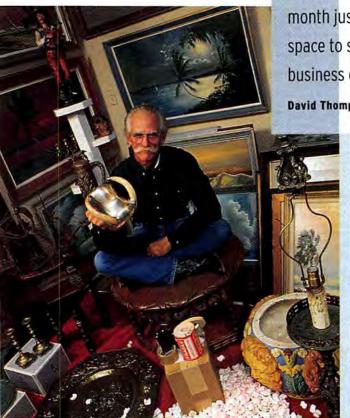
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"Why put out \$800 to \$1000 a month just for [physical] space to sell? I can do more business over the Web."

David Thompson, antiques dealer

ISP you're investigating, look for tools that automatically produce category pages with links to individual items; these pages should also have "Buy" links that take your customers directly to the virtual shopping cart.

In addition, check out the provider's e-commerce catalog builder. Will you be able to create your entire product catalog offline and then crank it out in one whack with the ISP? Or can you link the catalog builder to a database you are already

using to track inventory, as you can with two of EarthLink's plans, for instance? These capabilities and tools will save you a lot of time as you build your store.

thousands who happen to live nearby."

Our findings indicate, however, that few small businesses are ready to follow Thompson's lead. Of the 5689 businesses we surveyed, barely one in six is involved in e-commerce through their ISP directly. Still, judging by our results, providers are doing something right with their e-commerce plans. More than three-quarters of our respondents who use e-commerce features such as shopping cart software told us they liked what they had.

But how do you evaluate your ISP's e-commerce solution? First, you need to inspect how strong its offerings are on a handful of critical components.

#### STOCKING THE STORE

BUILDING AN e-commerce storefront means adding a slew of product pages to your Web site. An ISP that caters to small businesses should provide good click-tobuild software or wizards to handle the chore. MindSpring and Verio sport some of the handiest assistants: Verio even lets you use its store maker in demo mode before you sign up. But no matter which

#### PROCESSING ORDERS

IF YOU PLAN TO SELL products on the Web, you must have an online shopping cart. Owner after owner in our interviews

affirmed that such a cart is the essence of e-commerce. "It [our shopping cart-enabled site| pays for itself, and then some," says Michael Newman, whose Coos Bay, Oregonbased Travis International (www.travisinternational.com) sells specialty medical devices. Newman uses GTE.net as his ISP. "We've increased sales over 500 percent in the last two years, and I think nearly all that is due to our Web site."

You may want a cart that automatically calculates taxes and shipping costs for your customers. Or consider using a cart that notifies you by e-mail triggers each time an order arrives-this might come in handy if you want to respond instantly to your customers. (But if your sales increase dramatically, the alerts may become bothersome.)

Finally, the good part: taking customers' money. Any e-commerce plan worth its salt should handle setting up a merchant account. This is an agreement between your business and a bank that lets you take credit card orders. If you want to go a step further, you can get realtime credit card authorization for verifying that the card number is correct and the account can be charged-this costs extra. But if you're not already set up to take cards, this can be the easiest entry.

Don't forget to scrutinize store security. Are transactions protected by Secure Socket Layer, the current standard? If not, what assurances does the ISP provide that order information, particularly credit card data, won't fall into the wrong hands?

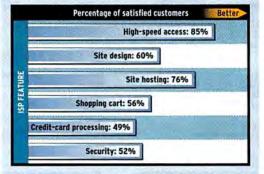
#### **PICKING A PACKAGE**

SMALL BUSINESSES come in all shapes, sizes, and forms. So effective e-commerce had better be able to handle variety.

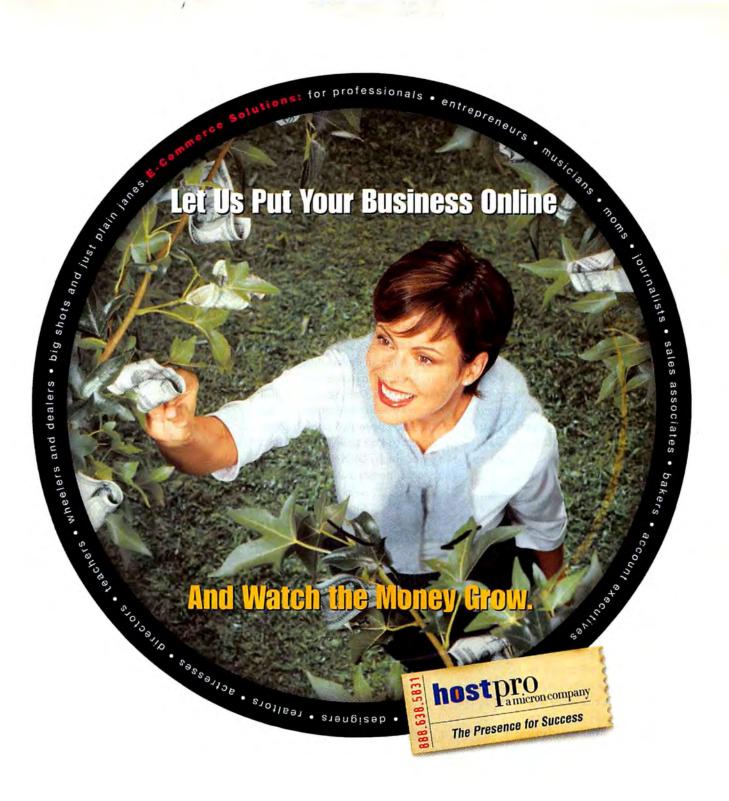
That's why you're smart to head for an ISP offering a smorgasbord of preset e-commerce plans. You can sample the joys of e-commerce by starting out small, perhaps with a limited catalog and without real-time online credit card authorizations. Then as your business expands,

#### Rating Small-Business ISPs

MOST PEOPLE WERE happy with their ISP's access speed, but less thrilled with its e-commerce plans.



Ratings based on results from our survey of 5689 PC World readers who own or work in small businesses.





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you can beef up the site's capabilities to match sales. The key is to find an ISP that can accommodate your growth, so you won't have to switch providers later on.

Several ISPs we checked out take this route. GTE.net's offerings are typical. Its first plan allows a maximum catalog of only 10 products, its second increases that ceiling to 100, and the top-end plan supports an unlimited number of items for sale. Costs range from \$25 to \$600 a month. Concentric, meanwhile, sells four different store plans, priced from \$20 to \$110 a month; and MindSpring sports a trio (starting at \$80 a month).

The most important piece of advice we gleaned from small-business owners engaged in e-commerce wasn't on any ISP's site. "Don't hire an expert," says Oregon entrepreneur Michael Newman. "Learn how to handle the [Web design/ e-commerce store setup| software yourself. You must be hands-on on a daily basis to make changes to your store so you can react to how sales are going."

#### Think about it

SOME ISP characteristics, though hard to quantify, are critical to the success of your online business and to your satisfaction with the provider. Two crucial notes from the field give you even more to ponder.

Service with a smile. More than almost any other trait, the quality of an ISP's support can make or break a working relationship. Brent Seltzer believes in the power of first-rate service, and he offers his top ISP evaluation tip: "When you're down to just one or two ISPs, call their support lines, pick two or three questions and ask each," says Seltzer. "You want somebody who can explain things to you without speaking in engineerese."

Dedicated lines. One-third of the small businesses we surveyed connect to the Internet via a dedicated or high-speed (faster than 56-kbps analog modem) link. Not surprisingly, UUNet, which caters more to businesses that maintain their

> own servers than to those looking to host their site elsewhere, is

the leader here: More than 80 percent of its users pay more for more speed. And more than 90 percent of UUNet's highspeed users are pleased with their service. So if you run your own server, it's worthwhile to check out each prospective ISP's high-speed offers and prices.

But what about faster Internet access so you and your workers can send or receive files in an eye blink? "Certainly, as a lowcost, high-speed alternative, DSL will be the access [service] of choice for small business," says Zia Daniell Wigder, an analyst at Jupiter Communications.

Armed with answers to your questions, and knowing what you'll need from your ISP tomorrow and today, you can move your small business from pencil and paper to e-everything.



Many of the small-business people who responded to our survey chose a local ISP. To read about

this route's benefits, visit www.pcworld. com/janoo/biz\_isps. Gregg Keizer is an Oregon-based freelance technology writer. PC World Research Manager Sandra O'Boyle also contributed to this article.

#### Set Adrift by Your ISP?

THE UNTHINKABLE just happened. Your ISP has vanished like an embezzler with a one-way ticket to Rio de Janeiro. And It's taken your Web site, your e-mail, and your e-store with it.

Whether the ISP pulled up stakes to scam elsewhere or disintegrated more honestly into bankruptcy does not change your dilemma. You, my friend, are in it, and deep. When your ISP bails and flushes your e-mail address down the drain, it's as if your landlord tossed you into the

street and refused to forward your mail.

Reclaiming your losses can be tough, and your options are severely limited. So you need to take preventive measures.

Signs of a fly-by-night ISP. Look for telltale signals: Is there a physical address



listed? Are the offers too good to be true? Fraud? Report it. If you suspect that there's a scam behind your provider's incredible disappearing act, contact Internet Fraud Watch (www.fraud.org/info/repoform.htm) or the Better Business Bureau

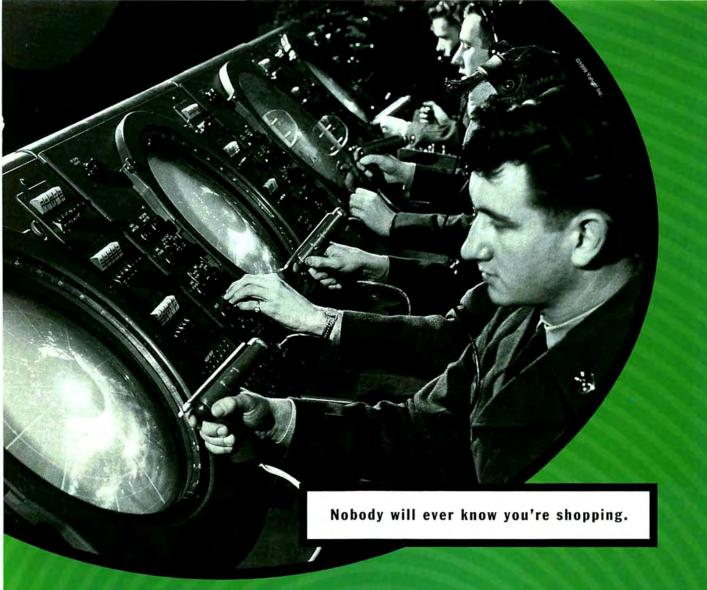
(www.bbb.org/complaints/company/html) immediately.

Ask the age. Though not always an accurate indicator of financial health, checking on the longevity of a business can weed out fly-by-nighters that set up shop only long enough to take your money and then split.

Domain in your name only. Be sure to register a domain that's all your own, with your name, not the name of someone at the provider. If the ISP goes out of business, you can transfer the domain to another ISP and be

up and running again after only two to four hours of downtime.

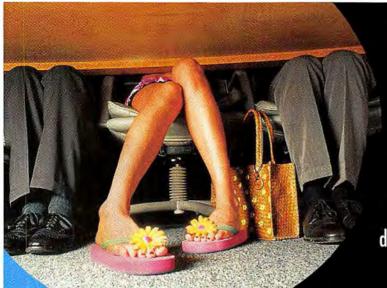
Back up, back up, back up. If you create and maintain your own site, make sure you (or whomever maintains your store) keep local and up-to-date backups of all files.



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\*Source: Forrester Research: \$1.3 trillion is the internet e-commerce sales forecast for 2003.



Once, while standing in the middle of a furniture showroom, Paul Smith, chief of staff at the State University of New York at Brockport, thought, "This stuff looks great, but I wonder if we can get it cheaper somewhere else." Smith surfed the Internet for savings, and found them at FurnitureOnline.com. "FurnitureOnline.com was the site that had the prices and convenience I was looking for," Smith says. "Even with the cost of shipping, their prices were better."



FurnitureOnline.com is the Internet's largest online furniture resource. The company behind it, Advanced Furnishing Concepts, LLC, based in Danville, Calif., has been in the furniture business for over 15 years. You can search for furniture in FurnitureOnline.com's

extensive online catalogue by brand name or product category. FurnitureOnline.com also offers its customers secure online payment, and welcomes phone and fax orders. The company's customer service representatives are available 9 a.m. to 6 p.m. PST, Monday through Saturday.

"FurnitureOnline.com's telephone support is really good-they always follow up with me," says Muna Issa, treasurer for Kingston, Jamaica-based SuperClubs Resorts International Ltd. When the company was moving some of its people to a new 2,500 square foot office space in nearby Ocho Rios, Issa sent FurnitureOnline.com a copy of the floor plan. "They called us right back, and told us exactly what we needed," Issa says.

"FurnitureOnline.com offered me discounts on large orders where the office superstores could not," Issa adds. "They were able to send me what I needed, when I needed it, and at a lower price."

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# TOP 100

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214 Midrange PCs



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241 Graphics Boards



MICRO EXPRESS'S Athlon 550-based MicroFlex-550B (left), and IBM's PC 300GL PIII-600, which uses Via's chip set, outrun the midrange competition.

Edited by Michelle Campanale-Surkan and Mick Lockey SOME OF THE FASTEST, most affordable systems on our charts this month have something other than Intel inside. In fact, you'll find technology from alternative processor and chip set makers all over our desktop charts. Among the ranked systems are several built with an AMD Athlon processor inside (from Micro Express, Polywell, and Sys Technology).

nology) and one (from IBM) that works with Via Technologies' Apollo Pro133 chip set. A slew of other PCs stick with Intel's older BX chip set. Still to come are new

systems incorporating Intel's 820 chip set, which supports the 133-MHz front-side bus, RDRAM, 4X AGP, and Ultra DMA-66 hard drives. Intel finally announced the release of the 820 on November 15, 1999.

The company's tardiness in releasing the new chip set postponed the planned release of

many new power systems (see "Mother-board Foul-Up Delays PIII Systems," www.pcworld.com/dec99/733mhz). At the last minute, some PC manufacturers had to pull back systems that were probably headed for rankings on our *Top 10 Power PCs* chart. Meanwhile, new 700-MHz Pentium III systems reached our test labs later than expected. And since no new major product has arrived to push the prices of older PCs down, prices remain relatively stable this month.

#### VIVA VIA

some PC VENDORS have switched to other chip sets and processors in lieu of Intel's 820. IBM and Micron signed with Via and came away smelling like roses because their systems shipped on time. Patrick Kimball, a Micron spokesperson, says his company's decision was based on cost and performance. "PCs that use the Via and those that use the 820 [and Ram-Bus memory] have a \$200 to \$500 perunit price difference," he says. And these two types of systems differ little in performance. IBM's midrange PC 300GL, the only Via-equipped PC on our charts, is the

first such PC we've tested. We'll look at a Via-powered Micron next month.

Following the 820 debacle, some OEMs say they intend to hold out for the arrival

of Intel's successor to the 820 chip set.

### PERIPHERAL VISION

we've seen some excellent new products on the scanner front. For small and home offices, Epson's Perfection 1200U takes the top spot. It has impressive speed, high 1200by-2400 optical resolu-

tion, and a good \$249 price. Another newcomer, the Umax Astra 2200, also \$249, grabs third place with a robust Webfocused software bundle, including Net-Objects Fusion, Macromedia Fireworks, Photoshop LE, and Presto Page Manager.

If you do a lot of scanning, you'll want an excellent display, too. Hitachi's Super-Scan 650 features one of the shallowest depths we've ever seen for a 17-inch mon-



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puters. In PC World Online's Top 400 section, you'll find comprehensive reviews and ratings for products in 16 categories. You'll also find reviews that are not available in print.

itor—only 14.7 inches. It plugs into our Top 10 Monitors chart at number three.

New lasers pop up all over this month's Top 10 Printers. On the small-business side, Brother's new HL-1240 wins top honors. We liked its speed, sensible design, and \$299 price. NEC ranks number one on the corporate side with its Super-Script 1800N. Two new models from other makers find spots on the corporate list. Lexmark's third-place Optra T612n is the fastest Top 10 printer, and the Oki Data Okipage 18n debuts in the fourth slot.

Most corporate printers operate in networked environments, so we now test these models with installed network interfaces. As a result, the print speeds reported this month differ from those listed previously.

Grace Aquino, Andrew Brandt, Michelle Campanale-Surkan, Cameron Heffernan, Mick Lockey, Kalai Murugesan, Karen Silver, and Alan Stafford contributed to the Top 100 this month. Testing was done by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, and Nancy Miller of the PC World Test Center. See page 14 for contact information.



QUESTIONS ABOUT OUR CHARTS? The following information should answer most of them.

How do the charts work? Each month we test a large number of PCs, printers, scanners, monitors, graphics boards, and modems and compare them with previously reviewed products. Only the best products land on the Top 10 charts, which are refreshed monthly. System configurations are shown as tested. Vendors may have since changed components.

What does the overall rating mean? This 100-point scale reflects results from our handson evaluations and performance tests. A score in the 90s is exceptional, while one in the 70s is above average.

What does the PC WorldBench 98 score mean? It's a measure of how fast a PC can run a mix of common business applications as compared to our baseline machine, a Gateway PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of PC World readers and anonymous support calls made by PC World staff. The policies score is based on vendor support policies.

# TOP 10 POWER PCs

	SYSTEM: \$2000 AND OVER	Month tested	★ Overall rating	Street price (10/8/99)	PC WorldBench 98 performance score	Base configuration
1	Dell Dimension XPS T600 800/388-8542 www.dell.com	Nov 99	84	Average: \$2379	Very good 323	Good: Pentium III-600, 128MB of RAM, 512KB L2 cache, 20.4GB hard drive, 17-inch monitor, Windows NT 4.0
2	Compaq Prosignia Desktop 330 PIII-550 800/345-1518 www.compaq.com	Sept 99	80	Inexpensive: \$2166	Good 246	Very good: Pentium III-550, 128MB of RAM, 512KB L2 cache, 20GB hard drive, 19-inch monitor, Windows 98
3	IBM PC 300PL 800/426-2968 www.ibm.com/pc	Aug 99	78	Very inexpensive: \$2099	Good 232	Good: Pentium III-500, 128MB of RAM, 512KB L2 cache, 13GB hard drive, 19-inch monitor, Windows 98
4	Quantex SM600 SE 800/896-4898 www.quantex.com	Nov 99	77	Inexpensive: \$2199	Very good 260	Good: Pentium III-600, 128MB of RAM, 512KB L2 cache, 18GB hard drive, 19-inch monitor, Windows 98
5	Polywell Poly 800K7-650 800/999-1278 www.polywell.com	Dec 99	77	Average: \$2450	Outstanding 277	Outstanding: AMD Athlon-650, 128MB of RAM, 512KB L2 cache, 27GB hard drive, 19-inch monitor, Windows 98 SE
6	Compaq Prosignia Desktop 330 PIII-600 800/345-1518 www.compaq.com	Dec 99	74	Inexpensive: \$2203	Good 247	Good: Pentium III-600, 64MB of RAM, 512KB L2 cache, 20GB hard drive, 19-inch monitor, Windows 98 SE
7	Axis Systems Orion 100A DVD 800/378-9014 www.axissys.com	Dec 99	73	Average: \$2367	Good 241	Outstanding: Pentium III-550, 256MB of RAM, 512KB L2 cache, 22GB hard drive, 19-inch monitor, Windows 98 SE
8	CyberMax Enthusiast PIII-600 800/437-4596 www.cybermaxpc.com	Dec 99	73	Average: \$2299	Very good 252	Outstanding: Pentium III-600, 128MB of RAM, 512KB L2 cache, 18GB hard drive, 21-inch monitor, Windows 98 SE
9	Sys Performance 600A 800/613-9963 www.sys.com	Nov 99	71	Average: \$2399	Outstanding 345	Good: AMD Athlon-600, 128MB of RAM, 512KB L2 cache, two 9.1GB hard drives, 17-inch monitor, Windows NT 4.0
10	HP Vectra VLi8 MT PIII-550 800/752-0900 www.hp.com/desktops	Sept 99	70	Inexpensive: \$2107	Good 244	Satisfactory: Pentium III-550, 128MB of RAM, 512KB L2 cache, 13.5GB hard drive, 17-inch monitor, Windows 98
<b>3</b>	Best Buy Pe	rcent of overa	II rating >	Price: 15 percent	Performance: 20 percent	Base configuration: 10 percent

A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 205.



A FEW ATTRACTIVE values spice this month's power chart. Polywell trimmed \$100 off its Poly 800K7-650's price tag; and IBM's PC 300PL and Axis Systems' Orion 100A

DVD shed \$260 and \$160, respectively. But PC prices are going up overall. The average power system this month costs \$18 more than last month.

# 1 DELL DIMENSION XPS T600



WHAT'S HOT: The Dimension XPS T600 earns a PC WorldBench 98 score of 323, making it one of the

fastest Windows NT boxes to pass through our labs. The T600, which repeats as our number one power PC, has a CD-Rewritable drive and an Iomega Zip 100 drive, and it comes network ready with a 3Com network interface card. The flat-faced, 17inch Dell UltraScan P780 Trinitron screen displays sharp text and images.

WHAT'S NOT: The side panel, secured by thumbscrews and squeeze latches, requires some fiddling to remove or replace correctly. Inside, long cables partly block access to the RAM and expansion slots. The sound quality of the Altec Lansing ACS340 subwoofer-and-satellite system is merely adequate.

WHAT ELSE: Dell's thorough documentation includes a well-organized user manual and excellent online help. Color-coded ports and matching cables make setup a breeze. Dell's QuietKey keyboard and the Microsoft IntelliMouse are quiet and easy to work with. The PC ships with Microsoft Office 2000 Small Business Edition.

BEST USE: The T600 makes a solid, powerful centerpiece for any small office.

## 2 COMPAQ PROSIGNIA DESKTOP 330 PIII-550



WHAT'S HOT: The score of 246 on our PC WorldBench 98 test suite is slightly above average for a PIII-

550 machine running Windows 98. The system includes great multimedia extras: a Diamond NVidia Vanta graphics board, a Sound Blaster Live audio card, and an Iomega Zip 250 drive. The 19-inch Compaq S900 monitor has impressive display quality: Text and images remain crisp even at 1600 by 1200 resolution.

WHAT'S NOT: In addition to one open drive bay, you'll find just one ISA, one PCI, and one combination slot free.

WHAT ELSE: The Prosignia Desktop 330 ships with Microsoft Office 97 Small Business Edition and Norton AntiVirus Deluxe software, and the system's 20GB hard drive will hold them and any other software you want. The solidly constructed keyboard is a pleasure to use.

We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

<sup>&</sup>lt;sup>3</sup> For more information about all of the products listed in this table, select number 904 on the product informa-tion card or visit www.pcworld.com/productinfo.

Extra features	Design and expandability <sup>2</sup>	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)	Product info number
<b>Very good:</b> Diamond Viper V770D Ultra graphics board with 32MB of RAM, 2X CD-RW drive, V.90 modem, network card, lomega Zip 100 drive, Microsoft IntelliMouse	Satisfactory: midsize tower case, 3 open drive bays, 3 open slots	Outstanding	Good/ Good	24/7, toll-free	3/1	F
Good: Diamond NVidia Vanta graphics board with 16MB of RAM, 12X–52X CD-ROM drive, V.90 modem, lomega Zip 250 drive, Microsoft IntelliMouse	Good: midsize tower case, 1 open drive bay, 3 open slots	Good	Fair/ Good	24/7, toll-free	3/1	650
Good: S3 Trio Voodoo3 2000 Interactive graphics board with 16MB of RAM, 17X-40X CD-ROM drive, network card, lomega Zip 100 drive, Microsoft IntelliMouse	Good: midsize tower case, 2 open drive bays, 5 open slots	Good	Good/ Good	24/7, toll-free	3/1	-
<b>Very good:</b> NVidia RIVA TNT2 Ultra graphics card with 32MB of RAM, 8X DVD-ROM drive, V.90 modem, network card, ergonomic keyboard, Microsoft IntelliMouse	Good: midsize tower case, 6 open drive bays, 4 open slots	Good 4	Good */ Good	24/7, toll-free	3/1	651
Good: Diamond Viper Y770 graphics board with 16MB of RAM, 6X DVD-ROM drive, V.90 modem, lomega Zip 100 drive, Logitec three-button mouse	Good: midsize tower case, 3 open drive bays, 4 open slots	April 1	Fair */ Fair	24/7, toll-free*	3/5	652
Good: Diamond NVidia Vanta graphics board with 16MB of RAM, 6X DVD-ROM drive, V.90 modem, network card, Microsoft IntelliMouse	Satisfactory: midsize tower case, 2 open drive bays, 2 open slots	Good	Fair/ Good	24/7, toll-free	3/1	653
Very good: Diamond Viper V770 graphics board with 32MB of RAM, 6X DVD-ROM drive, 4X CD-RW drive, V.90 modem, lomega Zip 100 drive, Microsoft IntelliMouse	Good: midsize tower case, 2 open drive bays, 4 open slots		Good */ Outstanding	24/7, toli-free	3/3	654
Good: 3dfx Voodoo3 3000 AGP graphics board with 16MB of RAM, 8X DVD-ROM drive, V.90 modem, lomega Zip 100 drive, microphone with stand	Good: midsize tower case, 5 open drive bays, 4 open slots	Fair <sup>4</sup>	Good */ Good	24/7, toll-free	3/1	655
Good: Matrox Millennium G400 DH graphics board with 32MB of RAM, 17X–40X CD-ROM drive, network card, dual-wheel mouse, RAID, two hard drives	Good: midsize tower case, 4 open drive bays, 3 open slots		Fair '/ Good	24/7, toll-free *	Varies */5	656
Satisfactory: integrated Matrox MGA-G200 AGP graphics with 8MB of RAM, I3X-32X CD-ROM drive, network card	Good: midsize tower case, 3 open drive bays, 5 open slots	Good	Good/ Fair	24/5, toll-free 7	3/1	657
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support a	and warranty: 15	percent	

'Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs. For tech support quality, this rating may also depend on our anonymous support-quality calls.

Support ceases to be 24/7 after the first

Six years on CPU and main RAM, three years on other parts.

Free technical support ends after one year.

BEST USE: The Prosignia hits the target for small-business users who are unwilling to settle for inferior, integrated components.

3 IBM PC 300PL

WHAT'S HOT: At \$2099. the IBM PC 300PL is the most affordable system on the Power Chart. A 13GB hard drive and an Iomega Zip 100 drive provide ample space for data storage. IBM bundles its own ViaVoice dictation software and Lotus SmartSuite as well.

WHAT'S NOT: We had varying degrees of success reaching representatives during our anonymous calls to tech sup-

port. When we did get through, the technicians were generally knowledgeable but sometimes sounded impatient.

WHAT ELSE: This midsize tower from



storage capacity for you and a strategically selected handful of your coworkers.

> IBM includes a built-in ethernet connection. It offers two open bays and five open expansion slots. The system's PC World-Bench 98 score of 232 is average for a PIII-500 machine running Windows 98.

BEST USE: The PC 300PL would work well as a speedy, low-priced system for business users in a networked office.

# 4 QUANTEX SM600 SE

WHAT'S HOT: Achieving a PC World-Bench 98 score of 260, the Quantex whizzed through our benchmark tests as the fastest Pentium III system we've tested running Windows 98. At just \$2199, this loaded system offers lots of RAM and hard disk space, a DVD-ROM drive, a 19-inch monitor, and an NVidia RIVA TNT2 Ultra video card that handles MPEG decoding. The Altec Lansing ADA 305 satellite-and-subwoofer system makes music and movies sound great. The

case interior is spacious, well laid out, and components are easy to access.

WHAT'S NOT: You don't need tools to open the case, but three thumbscrews plus an old-school, all-metal wraparound

enclosure don't make for easy entry. Labels for the rear ports are inconveniently located on a separate diagram pad. WHAT ELSE: The clear documentation includes a helpful setup poster but no hard-copy software manuals. Though the 19-inch flat-panel DiamondTron CRT monitor yielded razor-sharp text in our tests, colors looked slightly faded, and we noticed a dark patch in the lower left corner. The system includes three open internal and three open externally accessible drive bays, but it has few options for additional adapter cards, with only one free PCI slot and three open ISA slots (a modem, a network card, and a sound card occupy three other PCI slots).

BEST USE: With ample storage and connectivity, the SM600 SE would work well in just about any office.

# **5** POLYWELL 800K7-650

WHAT'S HOT: The Polywell earned an Outstanding PC WorldBench 98 score of 277, though that figure falls a few points shy of the scores of other Athlon-650 systems we've looked at. The Poly offers ample

expansion room and uninhibited access to components in its neatly cabled interior, with four open slots and three open drive bays (one filled bay holds a Zip 100 drive).

WHAT'S NOT: At \$2450, the 800K7-650 is the most expensive PC on the chart. The 19-inch DecaView G400 monitor yields fuzzy text and dull colors at all resolutions, though it's fine for nondemanding tasks. The silver case looks like something spraypainted at Bubba's Body Shop.

WHAT ELSE: The one-piece cover opens without tools, but you must remove the entire thing to reach the interior. The Aiwa TS-CD40 speakers, made of unimpressive materials, deliver adequate sound. Video playback on the 6X DVD-ROM drive is smooth, even with other applications open, but movies did not start automatically in our tests. Polywell bundles Lotus SmartSuite 97 with

BEST USE: Even with its mediocre monitor, this powerful system should be able to drive any small office for many moons.

the 800K7-650.



MOVIE MACHINE: Four-point speakers and a DVD-ROM drive make the Axis Orion 100A DVD a thriller.

# 6 COMPAQ PROSIGNIA DESKTOP 330 PIII-600

WHAT'S HOT: At \$2203, the Prosignia Desktop 330 PIII-600 carries a \$500 lighter price tag this month. The 19-inch Compag Sooo monitor is easy on the eyes at all resolutions, with crisp, clear text and images even at 1600 by 1200 resolution. Typical of Compaq, the Prosignia ships with several fine manuals, including a thick book on ergonomics and a quicksetup guide. The solid keyboard makes typing easy; programmable keys give you one-button access to e-mail, the Internet, and frequently used applications.

WHAT'S NOT: The interior, though well laid out, offers limited expansion room: two open slots and two free drive bays. The 6X DVD-ROM drive in our test system didn't fit snugly into the slim tower's front panel; some space showed above and below the drive. The Prosignia's 64MB of RAM is stingy for such an expensive system-and only half the memory offered by its PIII-550 sibling.

WHAT ELSE: The Prosignia's PC World-Bench 98 score of 247, though impressive, lags behind the performance numbers of other PIII-600s we've tested. Playback on the 6X DVD-ROM drive is smooth except for an occasional pause while other applications start up. The easy-to-set-up Cambridge SoundWorks SBS52 speakers pump out rich sound. Compag's software bundle includes Microsoft Office 2000 Small Business Edition. The case comes off easily, after you remove a few thumbscrews.

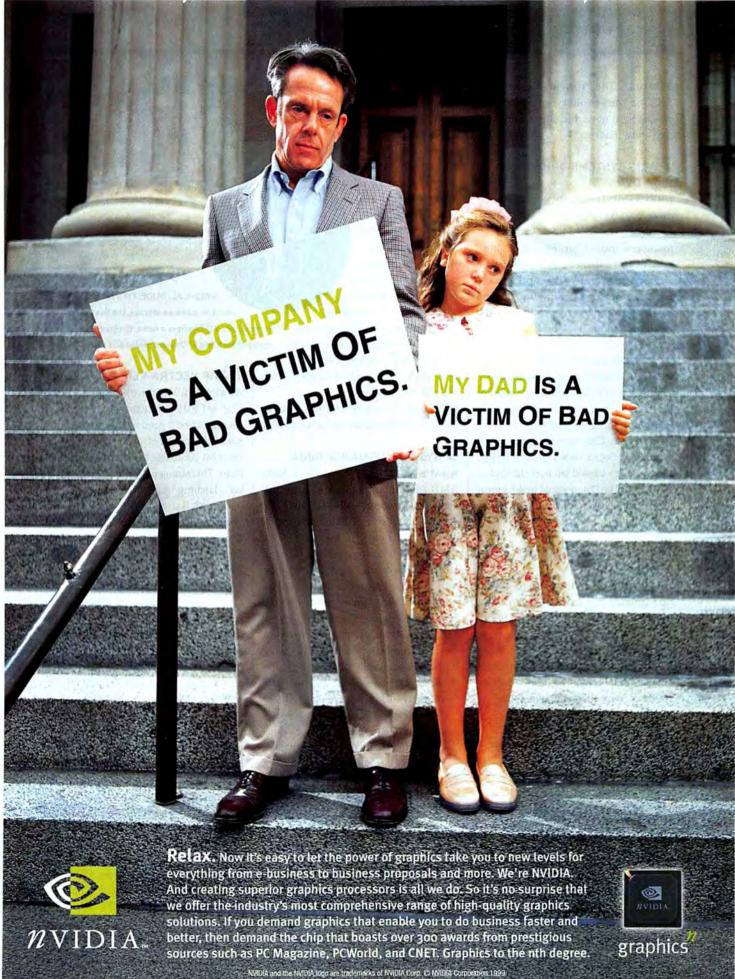
# What Ever Happened to Flat-Panel LCDs?

TECH TREND FLAT-SCREEN LCD MONITORS were supposed to be inexpensiveor at least affordable-by now, and we expected them to begin appearing in some Top 10 Power Desktops configurations. But what with the popularity of budget notebooks and manufacturing difficulties (such as a shortage of appropriate glass), LCD panels are more expensive than ever. Our Top 10 Monitors charts indicate that a sub-\$1000 LCD monitor, for example, costs about 15 percent more this year than last. And, analysts believe demand for flat panels will outstrip supply for at least another year.

The scarcity of flat panels has led to rapid development and lower prices for flat-screen CRT monitors, according to Bob O'Donnell, research team manager for PC display and multimedia technologies at International Data Corporation. All the major monitor manufacturers, including Mitsubishi, NEC, Samsung, Sony, and ViewSonic have introduced flat CRT monitors. NEC, for example, is discontinuing its ChromaClear family of CRT monitors and coming out with a line of flat CRT displays to fill the void. We've reviewed several flat CRTs for our Top 10 Monitors chart within the past six months, and we've been pleasantly surprised at their image quality.

Now, they're starting to ship with PCs that are earning places on our desktop PC charts. Our number one power system, the Dell Dimension XPS T600, comes with a flat-screen CRT monitor (the Dell UltraScan P780) and earned top-notch graphics scores. Similarly, Quantex's fourth-ranked SM600 SE system comes with a flatfaced DiamondTron NF monitor.





Circle 216 on card or go to www.pcworld.com/productinfo

BEST USE: The Prosignia Desktop 330 PIII-600 comes with everything a small office might need, including a network card and a modem.

# 7 AXIS SYSTEMS ORION 100A DVD

WHAT'S HOT: The Orion packs a Zip 100 drive, 6X DVD-ROM drive, and 4X CD-RW drive. The ViewSonic G770 19-inch monitor displays clear text and graphics even at 1600 by 1200 resolution. The Cambridge SoundWorks 1000 speaker system, driven by a Creative Labs Sound Blaster Live audio card, provides terrific surround sound. DVD video playback is great, even with other programs running. WHAT'S NOT: To open the case, you must take the top off first, then the side panels. The system's PC WorldBench 98 score of 241 is a few points below average for a PIII-550 running Windows 98.

WHAT ELSE: The ergonomic Microsoft Natural Keyboard allows smooth typing. Rear ports are labeled but not color-coded. BEST USE: The Orion would make a great presentation system, thanks to its formidable multimedia features.

# 8 CYBERMAX ENTHUSIAST PIII-600

WHAT'S HOT: Though average for a PIII-600 running Windows 98, this model's PC WorldBench 98 score of 252 is still very fast. The interior offers expansion room galore, with four open slots and five free drive bays (a Zip 100 drive occupies an additional bay). The Altec Lansing speakers crank out respectable sound.



ADD IT IN: CyberMax's Enthusiast PIII-600 invites expansion with five open bays and four free slots.

WHAT'S NOT: Reattaching the solid, one-piece metal case can be hard. In our tests, the 8X DVD-ROM drive with software decoder wouldn't play movies until we changed the resolution to 800 by 600 (most

players can change resolution automatically), and playback slowed slightly when other apps were running.

WHAT ELSE: The 21inch CyberMax AT 398 monitor, powered by a 3dfx Voodoo3 3000 graphics

card, blurred at 1600 by 1200 resolution, but text and images looked crisp at lower resolutions. At this price (\$2299), CyberMax bundles Corel

WordPerfect Office 2000. BEST USE: This powerful multitasker suits small offices that need a big screen.

# 9 SYS PERFORMANCE 600A

WHAT'S HOT: The Sys uses a 600-MHz AMD Athlon chip to rack up a recordbreaking PC WorldBench 98 score of 345, easily beating comparable Pentium III systems running Windows NT. Two 9.1GB hard drives connect to a Promise Ultra66 PCI card in a RAID configuration to speed up certain disk-intensive operations. Plug two monitors into the Matrox Millennium G400 DH (for dual head) video card, and you can view your desktop across both displays. Sys's labor warranty is unusually long.

WHAT'S NOT: Faded colors and fuzzy text from the 17-inch Sys Technology SPM17

> MS display sandbag the system's graphics potential. Sys provides minimal hardware documentation. Sys cuts tech support from 24 hours daily to 9 hours on weekdays after the first year.

> WHAT ELSE: You need a screwdriver to get inside the all-metal case. The soft-touch keyboard comes with a removable wrist rest.

BEST USE: With a better monitor (or two), the Sys would make a killer 2D graphics PC-you could keep your work on one monitor and your tools on the other.



Performance 600A offers a niche-but-nice PC equipped with two 9.1GB hard drives and a RAID card.

# 10 HP VECTRA VLIB MT PIII-550

WHAT'S HOT: The strictly-business Vectra VLi8 MT PIII-550 ships with many of the essentials you'll need in a networked corporate environment. At \$2107, it's one of the most affordable systems on the power chart. This strong performer's case opens via a latching hinge (à la Apple's Power Macintosh G<sub>3</sub>), and PCI slots reside on a one-piece locker that slides out of the case. Our readers rated the reliability of HP's desktop PCs as Good in our latest survey. WHAT'S NOT: The company offers free tech support only for the first year, and no tech support on weekends. The integrated audio and video chips included with the PC will suffice for typical business applications, but more demanding apps may require more AV power.

WHAT ELSE: Dedicated buttons on the keyboard allow you to launch applications or adjust sound volume.

BEST USE: Hewlett-Packard's businessoriented PC works well in networked environments where IS departments must repair and upgrade a legion of machines quickly.

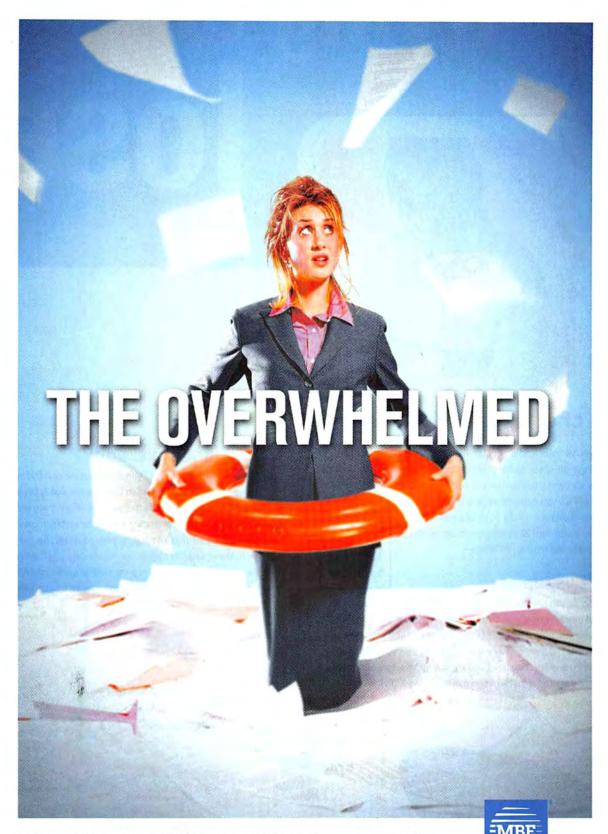
#### ALSO NEW THIS MONTH



WE EVALUATED the following systems along with the others, but they didn't online score high enough to reach the Top 10

Power PCs chart. For write-ups, visit PC World Online (www.pcworld.com/t10pcs).

- ABS Ultimate Workstation I
- Cumetrix A-760



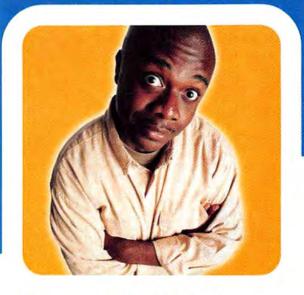
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# "Trying to



# Get the speed YOU need.

If you've been holding out for the cable or telephone company to bring high-speed Internet access to your neighborhood, chances are it's been a while. Which is a shame, because if you'd chosen

DirecPC\*, you could be surfing at up to 400 Kbps **right now**. That's up to 14 times faster than a standard 28.8 modem and almost three times faster than an ISDN line.

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# It's easy.

How do you get started? Just visit us at www.direcpc.com to find a retailer near you. If you can't find a store in the neighborhood, call us at 1-800-DIRECPC. We'll send you your dish, satellite modem, software and everything else you need. We can arrange professional installation for you, too. Either way, getting started is just a phone call or a mouse click away.

# How does it work?

The engineers at Hughes figured out that the real bottleneck in the speed of the Internet wasn't the request **out** to the Web — telephone modems handle that just fine. Everything slows down when the Web tries to use the telephone system to send you **back** the media-rich information you requested. So, we use a much faster satellite connection for sending you the Web content you want. Check out the diagram — this is the system that makes DirecPC the fastest Internet access available nationwide.





# DirecPC gets pushy.

Sure, you love the idea of surfing the

Web at up to 400 Kbps. But what if you could get your favorite Web sites and Usenet Newsgroups delivered straight into your PC by satellite — automatically, without even having to tie up your phone line to ask for them? That's just what DirecPC's Turbo WebCast™ and Turbo NewsCast™ services do — so you're never behind on the news and information that's important to you. The best thing about these two services? They're free with your paid subscription to any Turbo Internet™ service package.



# The good news.

No other high-speed Internet access provider offers so much for so little. Take a close look at our service pricing — we're sure you'll find a package you like.

Service Plan Details	Resid	lential	Business
Name of Service Plan	Executive Surfer	Family Surfer	Office Surfer
Price of Service Plan (Including (SP)	\$29.99/Month	\$49.99/Month	\$129.99/Month
Price of Service Plan (Without ISP)	\$19.99/Month	\$34,99/Month	\$109.99 Month
Hours of Service (Availability)	24 Hours a Day	24 Hours a Day	24 Hours a Day
On-Line Time (Hours of usage for Turbo Internet)	25 Hours / Month	100 Hours/Month	200 Hours Month
Additional Hourly Bate (Including ISP) Additional Hourly Rate (Without ISP)	\$1,99 Hour \$.99 Hour	\$1,99,Hout \$.99,Hour	\$1.99/Hour \$.99/Hour
DirecPC Services			
Turbo Webcast: Broadcast delivery of popular Websites to your PC's hard drive	Included	Included	Included
Turbo Newscast: Broadcast delivery of up to 30,000 Usenet Newsgroups to your PC's hard drive	Included	Included	Included
Turbo Internet: Fully interactive access to the Internet at speeds up to 400Khps	Included in Online Time	Included in Online Time	Included in Online Time
Free E-mail Accounts	1	1	4
Networking (Number of Seats)	N/A	N/A	4

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You already know how great the Internet is — you're just looking for a way to go faster. DirecPC is the fastest Internet access available nationwide. It's affordable, and it's available everywhere. So, if you're still plugging away with an old-fashioned telephone modem, you need to ask yourself:

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# **TOP 10 MIDRANGE PCs**

	SYSTEM: \$1200 TO \$1999	Month tested	Overall rating	Street price (10/8/99)	PC WorldBench 98 performance score	Base configuration
1	Micro Express MicroFlex-550B 800/989-9900 www.microexpress.net	NEW	83	Very inexpensive: \$1299	Outstanding 256	Good: AMD Athlon-550, 128MB of RAM, 512KB L2 cache, 18GB hard drive, 17-inch monitor, Windows 98 SE
2	Dell Dimension XPS T500 800/388-8542 www.dell.com	Dec 99	83	Average: \$1639	Very good 229	Satisfactory: Pentium III-500, 128MB of RAM, 512KB L2 cache, 13.6GB hard drive, 17-inch monitor, Windows 98 SE
3	Quantex M500 800/896-4898 www.quantex.com	Sept 99	81	Inexpensive: \$1499	Very good 230	Good: Pentium III-500, 128MB of RAM, 512KB L2 cache, 13GB hard drive, 19-inch monitor, Windows 98
4	Gateway GP6-466c 800/315-2536 www.gateway.com	Oct 99	81	Very inexpensive: \$1264	Good 207	Good: Celeron-466, 64MB of RAM, 128KB L2 cache, 20.4Gt hard drive, 17-inch monitor, Windows 98
5	Micron Millennia Max 600 800/642-7667 www.micronpc.com	Dec 99	79	Average: \$1814	Outstanding 250	Satisfactory: Pentium III-600, 128MB of RAM, 512KB L2 cache, 13.6GB hard drive, 17-inch monitor, Windows 98 SE
6	Axis Systems Orion 100H DVD PIII-500 800/378-9014 www.axissys.com	Nov 99	74	Average: \$1693	Very good 237	Good: Pentium III-500, 128MB of RAM, 512KB L2 cache, 13GB hard drive, 19-inch monitor, Windows 98
7	Kingdom Pinnacle 500 800/385-3436 www.kingdomcomputers.com	Oct 99	74	Very inexpensive: \$1247	Very good 231	Satisfactory: Pentium III-500, 128MB of RAM, 512KB L2 cache, 13GB hard drive, 17-inch monitor, Windows 98
8	IBM PC 300GL PIII-600 800/426-2968 www.ibm.com/pc	NEW	73	Expensive: \$1999	Outstanding 255	Satisfactory: Pentium III-600, 128MB of RAM, 512KB L2 cache, 13.6GB hard drive, 17-inch monitor, Windows 98 SE
9	Sys Performance 450K3 800/613-9963 www.sys.com	Oct 99	72	Inexpensive: \$1549	Very good 231	Good: AMD K6-III-450, 128MB of RAM, 256KB L2 cache, 13GB hard drive, 17-inch monitor, Windows 98
10	NEC PowerMate ES 5250-500k 888/632-8701 www.nec-computers.com	NEW	71	Expensive: \$1882	Very good 228	Satisfactory: Pentium III-500, 128MB of RAM, 512KB L2 cache, 12.8GB hard drive, 17-inch monitor, Windows 98 SE
0	Best Buy	ercent of overa	all rating >	Price: 17 percent	Performance: 18 percent	Base configuration: 10 percent

A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 205.



THREE NEW SYSTEMS make the midrange chart this month. The new number one, Micro Express's inexpensive Athlon-550-equipped MicroFlex-550B is faster than many

machines on our power chart. Like IBM's PC 300GL it uses the new PC-133 SDRAM. The PC 300GL—the first PC we've tested to use the Via chip set—debuts in eighth place. NEC's new PowerMate ES5250-500k, a PIII-500 with Intel's BX chip set closes out the chart at number ten.

# 1 MICRO EXPRESS MICROFLEX-550B



WHAT'S HOT: Powered by an AMD Athlon-550 processor, the Micro-Flex-550B earned an impressive

NEW PC WorldBench 98 score of 256. substantially better than the scores of all Pentium III-550 PCs we've tested, and even a bit higher than any PIII-600 system. You'd expect this kind of power to break the bank, but the MicroFlex-550B will set you back only \$1299. Its extensive documentation includes a quick-setup guide and a thorough manual. The welldesigned, neat interior boasts four open slots and four free drive bays, providing ample room for upgrades. The software decoder and 6X DVD-ROM drive played our test movie automatically and smoothly, even with other applications running. WHAT'S NOT: To access the interior, you must loosen a screw, remove the top of the tower, and slide off the side panel. Of course, reassembling the case requires

just as many steps. The keys on the large, solid keyboard make a lot of noise when you type on them and approach the upper size limit for comfortable typing.

WHAT ELSE: Color quality of the 17-inch Impression 7VX monitor is subpar, but it displays readably crisp and clear text at most resolutions. The Altec Lansing ACS-44 speaker set has powerful, slightly topheavy satellites and a robust subwoofer. BEST USE: The fast, well-equipped Micro-Flex-550B makes a great workhorse for a

# **Z** DELL DIMENSION XPS T500

budget-conscious office.



WHAT'S HOT: The XPS T500's PC WorldBench 98 score of 229 is a couple of points above average for

a PIII-500 system with Windows 98. The easy-open case conceals a tidy interior. Dell received ratings of Outstanding for reliability and Good for service in our latest reader surveys. The 8X DVD-ROM

We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

For more information about all the products listed in this table, select number 905 on the product information card or visit www.pcworld.com/productinfo.

Extra features	Design and expandability <sup>2</sup>	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)	Product info number
Very good: ATI Rage Magnum graphics board with 32MB of RAM, 6X DVD- ROM drive, V.90 modem, scroll mouse	Satisfactory: midsize tower case, 4 open drive bays, 4 open slots		Fair */ Outstanding	24/7, toll-free	4/4	658
Good: ATI Rage Fury graphics board with 32MB of RAM, 6X DVD-ROM drive, V.90 modem	Good: midsize tower case, 4 open drive bays, 4 open slots	Outstanding	Good/ Good	24/7, toll-free	3/1	-
Good: Joytech S3 Savage4 graphics board with I6MB of RAM, 17X-48X CD-ROM drive, V.90 modem, lomega Zip 100 drive	Outstanding: midsize tower case, 5 open drive bays, 5 open slots	Good 4	Good '/ Good	24/7, toll-free	3/1	659
Very good: integrated ATI Rage 128 Pro VR graphics with 8MB of RAM, 8X DVD-ROM drive, network card, lomega Zip 100 drive, scroll mouse	Good: midsize tower case, 4 open drive bays, 2 open slots	Good	Fair/ Outstanding	24/7, toli-free	3/3	660
Good: Diamond Viper Y770 graphics board with 16MB of RAM, 8X DVD-ROM drive, V.90 modem	Satisfactory: midsize tower case, 5 open drive bays, 4 open slots	Good	Good/ Outstanding	24/7, toll-free	Varies 3/3	661
Good: ATI Rage Fury graphics board with 32MB of RAM, 6X DVD-ROM drive, V.90 modem	Good: midsize tower case, 3 open drive bays, 4 open slots	4	Good */ Outstanding	24/7, toll-free	3/3	662
Good: APAC Multimedia Yoodoo Banshee graphics board with 16MB of RAM, 17X-40X CD-ROM drive, V.90 modem, LS-120 drive, ethernet connector	Good: midsize tower case, 2 open drive bays, 2 open slots	-4	Fair */ Fair	Varies ', toll-free	Varies 1/1	663
Satisfactory: Number Nine SR9 graphics board with 16MB of RAM, 20X-48X CD-ROM drive, DVI interface	Satisfactory: desktop case, 1 open drive bay, 3 open slots	Good	Good/ Good	24/7, toll-free	Varies 5/1	-
Good: 3dfx Yoodoo3 2000 AGP graphics board with 16MB of RAM, 17X-40X CD-ROM drive, network card	Good: midsize tower case, 5 open drive bays, 4 open slots		Fair */ Good	24/7, toll-free *	Varies '/5	664
<b>Very good:</b> ATI Rage Pro graphics board with 4MB of RAM, 4X DVD-ROM drive, network card, LS-120 drive, Logitech mouse	Satisfactory: midsize tower case, 3 open drive bays, 5 open slots	Good	Good */ Poor	24/7, toll-free	3/3	665
Extra features: 10 percent	Design and expandability; 15 percent	Reliability: 15 percent	Support a	and warranty: 15 p	ercent	

<sup>&#</sup>x27;Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs. For tech support quality, this rating may also depend on our anonymous support-quality calls.

Six years on CPU and main RAM, three years on other parts.

drive comes with a hardware decoder card and plays movies very smoothly.

WHAT'S NOT: Dell's M780 17-inch monitor maxes out at 1280 by 1024 resolution, where smaller text shows blurring. (Text is sharp and legible at lower resolutions.) WHAT ELSE: At \$1639, this reasonably priced Dimension comes with Microsoft Office 2000 Small Business Edition. Color-coded, labeled, and icon-marked ports-plus an assortment of component manuals and an illustrated setup guidemake getting up and running a snap. The T500's average-size (13.6GB) hard drive provides ample storage for most uses.

BEST USE: The Dell Dimension XPS T500 is a terrific choice for growing businesses that require top-notch service.

# 3 QUANTEX M500

WHAT'S HOT: You'd be hard-pressed to find a better-appointed multimedia powerhouse. The 6X DVD-ROM drive, Aureal Vortex2 sound card, and Joytech S3 Savage4 graphics board make the M500 a capable authoring station. And it's fine for watching movies, thanks to the accompanying 19-inch DiamondTron flat CRT monitor.

WHAT'S NOT: Quantex's warranty on the M500 covers labor for just one year. In our anonymous calls to Quantex's tech support line, representatives frequently gave incomplete answers to our test questions.

WHAT ELSE: The M500's PC WorldBench 98 score of 230 is aver-

age for a Pentium III-500 system running Windows 98. Quantex throws in an Iomega Zip 100 drive.

BEST USE: The M500 makes a fast presentation system or a choice executive workstation for the Big Cheese.



4 GATEWAY GP6-466C

midrange PC. At just \$1299 it won't break the bank.

WHAT'S HOT: The GP6-466c ships with many corporate accoutrements but sells for an affordable \$1264. Hardware includes an Iomega Zip drive and a net-

Five years on CPU and main RAM, three years on other parts.

<sup>12.5</sup> hours on weekdays, 8 hours on Saturday.

Support ceases to be 24/7 after the



BETTER THAN NEIGHBORHOOD WATCH: Micron's Millennia Max PIII 600's case lock keeps intruders out.

work card. The software bundle consists of Microsoft Office 97 Small Business Edition and some utilities.

WHAT'S NOT: Inside the system's cavernous case, we found limited expansion options. This Gateway's motherboard is far too small for the surrounding case, so it doesn't reach the bottom of the case, and the lowest two expansion slot openings don't lead to any slots.

WHAT ELSE: Gateway's fine documentation and setup guides offer solid troubleshooting info and useful diagrams. The high-quality 17-inch EV700 monitor supplies convenient on-screen controls, and the Cambridge SoundWorks SBS52 speakers pump out rich sound. The GP6-466c's PC WorldBench 98 score of 207 is average for a Celeron-466 computer.

BEST USE: The GP6-466c gives small to medium-size businesses a low-cost, networkable alternative to high-end PCs.

# 5 MICRON MILLENNIA MAX 600

WHAT'S HOT: The Millennia's mammoth case opens easily-push down a handle on the back, and the side panel slides off, push up the handle to reattach the panel. The 8X DVD-ROM drive starts movies automatically and plays them smoothly, even with other applications running in the background. Micron includes a wellillustrated user manual and CD-ROMbased reference materials.

WHAT'S NOT: You can't set items on the case's concave top, and cables obstruct access to the RAM slots. The 17-inch

Micron 700VX monitor produces bright colors but slightly blurry text, and its maximum resolution is only 1280 by 1024-at a very low 60-Hz refresh rate; if you're sensitive to screen flicker, beware. (A sharper Trinitron monitor costs \$99 more.) Advent's AVoog three-piece speaker set-especially the satellite speakers-musters only weak volume.

WHAT ELSE: The Millennia's PC WorldBench 98 score of 250 is plenty fast, though only average for a PIII-600. The flimsy-feeling keyboard permits smooth, quiet typing. The system ships with Microsoft Office 2000 Small Business Edition.

Accessing expansion cards for upgrades is a breeze: Loosen a thumbscrew on the metal rail, and you're in.

BEST USE: The Millennia Max 600 fills the bill as a powerful, bare-bones, easily upgradable multimedia system.

# 6 AXIS SYSTEMS ORION 100H DVD PIII-500

WHAT'S HOT: The Orion's 237 PC World-Bench 98 score ranks at the high end among Pentium III-500 systems. Text and images on the 19-inch ADI PC-959 remain crisp and clear even at the maximum resolution of 1600 by 1200. The software-decoded 6X DVD-ROM drive offers smooth playback, whether you run with other apps simultaneously or not.

WHAT'S NOT: Though solidly built, the midsize tower case lacks tool-free entry, and you must remove the entire case from the chassis in one big piece. Axis bundles no business applications with the system. WHAT ELSE: The large case affords a decent amount of expansion room-four open slots and three open bays. Despite its flimsy wrist rest, the keyboard allows you to type quietly and smoothly.

BEST USE: The Orion would make a powerful multimedia system for a small or home office.

## **7 KINGDOM PINNACLE 500**

WHAT'S HOT: The Kingdom's manuals include good glossary and troubleshooting sections. The attractive software bundle packs Corel's WordPerfect Suite 8, Compton's 99 Encyclopedia Deluxe, National Geographic Trip Planner Deluxe, and a demo game pack to complement the graphics board. At \$1247, the Pinnacle is the least expensive PC on the midrange chart for the second straight month.

# **Memory Matters**

TIECH TREND MEMORY IMPROVES EITHER by evolution or by revolution, according to Avo Kanadjian, senior vice president of memory marketing at Samsung, PC-133 SDRAM (like its proprietary cousin, VC-133 SDRAM from NEC) follows PC-100 and PC-66 as the next evolutionary step in synchronous dynamic random access memory. This new type of RAM can be seen inside two of the systems on our midrange chart, such as our top-ranked Micro Express MicroFlex-55B, and IBM's eighth-place PC 300GL PIII-600.

Dean Hays, director of marketing at Via Technology, says that although PC-133 SDRAM will support a higher frequency than PC-100-and is therefore faster-it won't quite achieve the fourto-three increase the rating numbers imply. It will, however, represent only an incremental improvement-not a breakthrough advance.

The next revolutionary step will be

the RamBus, which has a completely different architecture and interface and, according to Intel, should run twice as fast as PC-100 memory. "We have a number of customers who prefer an evolutionary step at this time," Kanadjian says. "PC133 could be viewed as an eventual replacement for PC-100 the way that PC100 replaced PC66," Kanadjian says. At least until RAMbus works its way into the motherboards of the masses.









# the revolution

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With new **Sound Blaster Live!** MP3+, you'll instantly turn your PC into a home stereo quality, digital jukebox. This superior sound card comes bundled with exciting Internet audio software that lets you encode MP3's and much more. All at an incredible price!

Plug in the latest Cambridge SoundWorks® speaker system, **SoundWorks® Digital**, and your Internet audio will sizzle with rich, full sound. This powerful subwoofer speaker system digitally connects to Sound Blaster Live!™ sound cards for crystal clear audio.

Let Creative®, the leader in PC audio, take the guess work and distortion out of downloadable music. The difference will amaze you.

THE DIFFERENCE WILL AMAZE YOU





CREATIVE COM



TAKE IT FROM THE TOP: The silver bar at the top of the NEC's PowerMate ES 5250 contains buttons for on/off, sleep mode, and volume control, as well as a headphone jack and an external USB port.

WHAT'S NOT: Despite the stellar video card, text on the 17-inch Kingdom 77i monitor looks fuzzy even at 1024 by 768 resolution. The case won't open without tools, and keys on the Microsoft ergonomic keyboard we received tended to stick.

WHAT ELSE: This machine's PC World-Bench 98 score of 231 matches the average for similarly configured PIII-500 systems running Windows 98. Although it ships with a V.90 modem, the Kingdom has an integrated ethernet connector for networked offices. The system also includes an LS-120 drive.

BEST USE: The WordPerfect Suite, threepiece MLi 450 speaker set, and excellent graphics acceleration make the Pinnacle prime for a small office environment.

# 8 IBM PC 300GL PIII-600

NEW WHAT'S HOT: Powered by a PIII-600 processor and the Via chip set, the 300GL managed a PC WorldBench 98 score of 255-a few points above the average for similarly equipped PIII-600s running Windows 98. At \$1999, it costs less than most systems with similar performance capabilities. Three large thumbscrews make opening the desktop case a breeze, and the detailed system manual contains lots of excellent diagrams and troubleshooting information.

WHAT'S NOT: The low price comes at the expense of features. For example, the PC 300 GL contains neither a network interface nor a modem. The integrated speakers generate weak, tinny sound. WHAT ELSE: The 17-inch IBM G74 monitor produces inconsistent re-

sults. Text remained sharp

even at the maximum resolution of 1280 by 1024, but image colors were washed out. Though the Number Nine SR9 graphics card features a digital output jack (for connecting flat-panel displays), the

analog monitor we received required an adapter that stuck out several inches from the system's back. The PC 300GL offers three open slots and a single open drive bay.

BEST USE: The PC 300GL is a fast, basic system for offices with extra modems or network cards lying around.

## 9 SYS PERFORMANCE 450K3

WHAT'S HOT: The 450K3's score of 231 on our PC WorldBench 98 tests is the best by a K6-3 450-based PC-and better than any PIII-450 we have tested. Sys's SPM-17-MS 17-inch monitor and 3dfx Voodoo3 2000 card provided crisp images at all but the highest resolution.

WHAT'S NOT: There's no system manual, and rear ports are labeled with stickers that could fall off.

WHAT ELSE: This big midsize tower PC with lots of expansion room offers great performance at a decent price.

BEST USE: The Voodoo3, great monitor, and Sound Blaster AWE64 sound card make the Sys a great presentation system.

# 10 NEC POWERMATE ES 5250-500K

NEW WHAT'S HOT: The PowerMate ES 5250-500k's well-designed midsize tower case puts various controls at your fingertips. A silver bar at the top houses on/off and sleep buttons, a volume control, and a headphone jack. A front-mounted USB port resides next to the bar. The top-notch documentation includes a quick-setup guide, an ergonomics pamphlet, and a thick, heavily illustrated system manualbut nothing for individual components. The LS-120 drive provides an additional storage option. The interior has substantial expansion room, with five open slots and three open bays.

WHAT'S NOT: The 4X DVD-ROM drive autoplayed our test movie, but the playback became choppy when we attempted to run other programs simultaneously. The system's PC WorldBench 98 score of 228 is slightly below average for a PIII-500 system running Windows 98. Expansion cards go in upside down, complicating installation, and wiring partially obstructs access to them.

WHAT ELSE: The NEC S770 17-inch monitor produces less-saturated color and brightness than most we've seen. In our tests, text looked sharp at 1024 by 768 resolution but blurred at the maximum resolution of 1280 by 1024. The big, sturdy

BETTER LEFT UNSEEN? IBM's PC 300GL PIII-600's digital video interface requires a special dongle to work with the PC. Good thing it's situated in back and out of view.

keyboard features an attachable wrist rest. BEST USE: With a competitive sticker price of \$1882, the network-ready Power-Mate ES 5250-500k will work well for offices that don't need a screamer.

#### SO NEW THIS MONTH



WE EVALUATED the following systems along with the others, but they didn't score high enough to make the Top 10 Midrange PCs

chart. For write-ups, visit PC World Online (www. pcworld.com/t10pcs).

- Acer AcerPower SN 600
- PC Connection Epig BPS 8000
- Quantex SB500c



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# TOP 10 BUDGET PCs

	SYSTEM: UNDER \$1200	Month tested	★ Overall rating	Street price (10/8/99)	PC WorldBench 98 performance score	Base configuration
1	Micro Express MicroFlex-50C 800/989-9900 www.microexpress.net	Aug 99	81	Expensive: \$1199	Outstanding 222	Good: Pentium III-450, 64MB of RAM, 512KB L2 cache, 18GB hard drive, 17-inch monitor, Windows 98
2	Quantex M466-2c 800/896-4898 www.quantex.com	Sept 99	78	Average: \$1099	Good 209	Good: Celeron-466, 64MB of RAM, 128KB L2 cache, 13GB hard drive, 17-inch monitor, Windows 98
3	Gateway E-1400 Celeron 500 800/315-2536 www.gateway.com	NEW	76	Average: \$1029	Very good 211	Satisfactory: Celeron-500, 64MB of RAM, 128KB L2 cache, 6.8GB hard drive, 15-inch monitor, Windows 98 S
4	Dell OptiPlex GX100 800/388-8542 www.dell.com	Dec 99	76	Expensive: \$1160	Good 260	Good: Celeron-500, 64MB of RAM, 128KB L2 cache, 6.4GB hard drive, 17-inch monitor, Windows NT 4.0
5	Micron Millennia 466 800/642-7667 www.micronpc.com	Oct 99	75	Expensive: \$1196	Very good 213	Good: Celeron-466, 64MB of RAM, 128KB L2 cache, 13GB hard drive, 17-inch monitor, Windows 98
6	Micro Express MicroFlex-40B 800/989-9900 www.microexpress.net	Nov 99	74	Average: \$999	Very good 215	Good: AMD K6-III-400, 128MB of RAM, 256KB L2 cache, 9.1GB hard drive, 15-inch monitor, Windows 98
7	PC Connection Epiq BPS4000 Celeron 466 800/800-0011 www.pcconnection.com	NEW	73	Inexpensive: \$927	Good 206	Good: Celeron-466, 64MB of RAM, 128KB L2 cache, 6.4GB hard drive, 17-inch monitor, Windows 98 SE
8	Axis Systems Orion LX/CVE Celeron 400 800/378-9014 www.axissys.com	Nov 99	69	Average: \$1008	Good 193	Good: Celeron-400, 64MB of RAM, 128KB L2 cache, 8.4GB hard drive, 17-inch monitor, Windows 98
9	NEC PowerMate VT 300 888/632-8701 www.nec-computers.com	Aug 99	69	Average: \$1123	Satisfactory 181	Good: Celeron-366, 64MB of RAM, 128KB L2 cache, 8.4GB hard drive, 17-inch monitor, Windows 98
10	Compaq Prosignia 320 Celeron 466 800/345-1518 www.compaq.com	Oct 99	69	Expensive: \$1172	Good 202	Good: Celeron-466, 64MB of RAM, 128KB L2 cache, 6.4GB hard drive, 17-inch monitor, Windows 98
0	Best Buy Pe	rcent of overa	II rating >	Price: 22 percent	Performance: 13 percent	Base configuration: 10 percent

<sup>&#</sup>x27;A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 205.



THE ONLY PENTIUM III-BASED system on the budget chart, Micro Express's MicroFlex-50C, keeps a firm grip on its number one Best Buy title. Two newcomers, the

Gateway E-1400 Celeron 500 and the PC Connection Epiq BPS4000 Celeron 466, debut in third and seventh place, respectively.

# 1 MICRO EXPRESS MICROFLEX-50C



WHAT'S HOT: Retaining its number one position on the budget chart for the fifth straight month,

Micro Express's Pentium III-450-based MicroFlex-50C outperforms every other Windows 98 system on the budget chart. Complement that performance with a good 17-inch monitor and great Altec Lansing ACS44 speakers, and the MicroFlex-50C comes ready to rock. With four open drive bays and six open slots, the system offers plenty of space for expansion, and the rugged case slides open easily without the aid of tools. Micro Express warrants its parts and labor for four years.

WHAT'S NOT: Although most of the Micro-Flex-50C's internal components sit in plain view once you open the hood, the hard drive bays could be easier to access. WHAT ELSE: The ATI Rage 128GL graphics board can send video from a DVD movie to a television set via the included S-Video or RCA cables-without a separate decoder card.

BEST USE: The \$1199 MicroFlex-50C makes an excellent presentation system for small-office users on a budget.

# 2 QUANTEX M466-2C



WHAT'S HOT: Powered by a Celeron-466 CPU, this \$1099 Quantex machine earned a 209 on our

PC WorldBench 98 test suite-slightly above average for systems that have this configuration. Inside, you get a whopping six open slots and six open drive bays, and the cables are bundled together and pulled out of the way.

WHAT'S NOT: The 17-inch Quantex AT897C monitor that accompanied our test system displayed badly blurred text at its 1600 by 1200 setting and looked somewhat fuzzy even at a less strenuous 1024 by 768 resolution.

WHAT ELSE: The accompanying 6X DVD-ROM drive provides smooth, uninterrupted video playback, even when other applications are open.

BEST USE: A small office with budget constraints could do much worse than this quick, multipurpose system.

We define vertical cases as towers (taller than 20 Inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

For more information about all the products in this table, select number 906 on the product information card or visit www.pcworld.com/productinfo.

Extra features	Design and expandability <sup>2</sup>	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)	Product info number
Good: ATI Rage 128GL graphics board with 32MB of RAM, 5X DVD-ROM drive, V.90 modem, MS IntelliMouse	Outstanding: midsize tower case, 4 open drive bays, 6 open slots		Fair */ Good	24/7, toll-free	4/4	666
Good: 3dfx Voodoo3 2000 graphics board with 16MB of RAM, 6X DVD-ROM drive, V.90 modem	Outstanding: midsize tower case, 6 open drive bays, 6 open slots	Good *	Good */ Good	24/7, toll-free	3/1	667
Good: integrated Intel 810 graphics with 4MB of display cache, 12X-24X CD-ROM drive, network card, Wake-on-LAN, chassis intrusion, MS IntelliMouse	Satisfactory: desktop case, no open drive bays, 2 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3	668
Good: integrated Intel 810 graphics with 4MB of display cache, 10X–24X CD-ROM drive, network interface card, Wake-on-LAN, easy-to-service case	Satisfactory: desktop case, no open drive bays, 2 open slots	Outstanding	Good/ Outstanding	24/7, toll-free	3/3	-
Good: integrated NVidia RIVA 128 graphics with 8MB of RAM, 17X–40X CD-ROM drive, V.90 modem, MS IntelliMouse	Satisfactory: minitower case, 1 open drive bay, 2 open slots	Good	Good/ Outstanding	24/7, toll-free	Varies ³/3	669
Good: Diamond Monster Fusion graphics board with 16MB of RAM, 12X-40X CD-ROM drive, V.90 modem, MS IntelliMouse	Satisfactory: midsize tower case, 4 open drive bays, 4 open slots		Fair */ Good	24/7, toll-free	4/4	670
Satisfactory: Integrated Intel 810 graphics with 4MB of display cache, 20X-40X CD-ROM drive, Y.90 modem	Good: midsize tower case, 6 open drive bays, 3 open slots	• • •	Fair */ Good	24/7, toll-free	1/1	671
Good: Intel 740 graphics board with 8MB of RAM, 17X-40X CD-ROM drive, 1/90 modem, MS IntelliMouse	Satisfactory: midsize tower case, 3 open drive bays, 4 open slots	4	Good */ Outstanding	24/7, toll-free	3/3	672
Good: ATI Xpert98 graphics board with 8MB of RAM, 14X-40X CD-ROM drive, network card, MS IntelliMouse	Good: minitower case, 2 open drive bays, 3 open slots	Good	Poor */ Outstanding	24/7, toll-free	3/3	673
Good: NVidia Yanta graphics board with 16MB of RAM, 16X-32X CD-ROM drive, 1/90 modem, Zip drive, MS IntelliMouse	Satisfactory: minitower case, no open drive bays, 2 open slots	Good	Fair/ Good	24/7, toll-free	3/3	674
Extra features: 10 percent	Design and expandability. 15 percent	Reliability: 15 percent	Support	and warranty: 15	percent	

<sup>\*</sup>Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs. For tech support quality, this rating may also depend on our anonymous support-quality calls.

# 3 GATEWAY E-1400 CELERON 500

MHAT'S HOT: This pint-size managed desktop takes up little space. And by standing the \$1029 Gateway E-1400 on its optional base, you can transform it into a minitower. Press two buttons, and the case slides off effortlessly to display a well-organized interior with almost all devices hooked up to edge connectors instead of cabling, for quick, modular-style snap-out removal.

WHAT'S NOT: You must fiddle with the case to make it fit snugly on its chassis. Despite its neat appearance, the interior offers little expansion room, with two open slots and no free bays. The 6.8GB hard drive is small even for a budget system, and the 15-inch Gateway EV500 monitor echoes the compactness of the rest of the system and produces fuzzy text and dull colors at 800 by 600 resolution. WHAT ELSE: The Cambridge Sound-

Works SBS52 two-speaker audio system installs painlessly and cranks out crisp sound. Gateway supplies adequate documentation, including useful tech support and quick-setup guides, but it omits some individual hardware manuals. The E-1400's PC WorldBench 98 score of 211 is typical of the Celeron-500 PCs running Windows 98 that we've tested.

BEST USE: Corporate buyers looking for a compact system with management features will like the E-1400.

# 4 DELL OPTIPLEX GX100

WHAT'S HOT: The \$1160 Dell OptiPlex GX100, one of the few Celeron-based Windows NT systems vendors have delivered to the PC World Test Center, exceeded our expectations in lab tests. Equipped with a Celeron-500 processor, the Opti-



Plex raced to a PC WorldBench 98 score of 260, higher than the average for PIII-450 systems running NT. The solidly constructed QuietKey keyboard permits

Five years on CPU and main RAM, three years on other parts.



EASY OFF: The Dell OptiPlex GX100 has buttons on its sides that let you remove the case for upgrades.

smooth, soft typing. With an integrated network interface, a case lock, and Wakeon-LAN management features, this machine ships business-ready.

WHAT'S NOT: This computer offers little expansion room: no available drive bays, one open RAM socket, and two free PCI slots. Its system manual covers Windows NT minimally and includes no information on the OptiPlex's hardware or on any component other than the monitor (you can find documentation for all of these things online, however). The system uses an unimpressive notebook-style CD-ROM drive; though excusable in a portable, weight-saving environment, it's too rickety for a desktop system.

WHAT ELSE: Gaining access to the interior of this smallish desktop case is a breeze—simply press a button on each side of the rather flimsy plastic case, and lift off the top. The case goes back on smoothly, too, though it doesn't fit snugly. Dell's 17-inch M770 monitor displays crisp text and bright colors at the standard 1024 by 768 resolution, but the integrated video chip requires you to choose between high resolution and good color depth—you can't have both.

BEST USE: With its compact size, integrated network interface, and management features, the speedy OptiPlex GX100 seems destined to fill many a stall in corporate cubicle farms.

## 5 MICRON MILLENNIA 466

WHAT'S HOT: The Micron Millennia 466 posted a 213 on our PC World-Bench 98 tests, the highest score turned in by a Celeron-466 system running Windows 98. The diminutive minitower case features color-coded rear ports for easy setup, and the vendor throws in a free year of training at its Micron University Internet service.

WHAT'S NOT: Text and images on the 17-inch 700VX monitor blurred at the highest resolution of 1280 by 1024. Integrated sound and video chips, a scant two free slots (one PCI and one ISA), and the lack of an AGP connection discourage attempts at multimedia upgrades. The standard case requires a screwdriver to open.

WHAT ELSE: Micron's substantial software bundle includes Microsoft Office 97 Small Business Edition, Micron Easy Internet, Symantec's Norton AntiVirus, and a tutorial CD-ROM.

BEST USE: An attractive combination of speed and affordability (\$1196) makes the Millennia 466 a good choice for small-office/home-office users.

## 6 MICRO EXPRESS MICROFLEX-40B

WHAT'S HOT: Powered by an AMD K6-III-400 processor, the \$999 MicroFlex-40B posted a PC WorldBench 98 score of 215, one of the fastest finishes we've seen from a system using that chip. The chassis of this spacious, easy-to-navigate midsize tower houses 128MB of RAM (most PCs at this price have only 64MB). The Impression 5VX monitor displays sharp images at all resolutions.

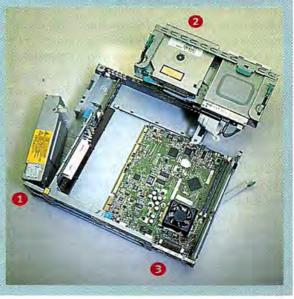
WHAT'S NOT: You don't need a screwdriver to crack the case, but the box is still puzzling to open. And the accompanying documentation offers users little help—it provides a setup poster, an adequate (though somewhat generic) system manual, and a CD-ROM version of the manual. The reset button looks confusingly like the wake-up button.

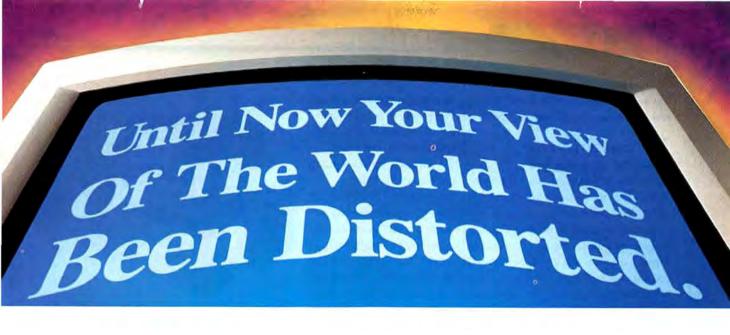
WHAT ELSE: Only Norton AntiVirus comes bundled with the system; all other applications are sold à la carte. You'll get acceptable sound and video for gaming from the Altec Lansing ACS44 speakers and Diamond Monster Fusion video card, though the latter amounts to overkill in view of the 15-inch monitor.

# Coming Apart at the Seams

TECH TREND YOU WON'T SCRAPE your knuckles getting into Gateway's modular E-1400. This is one of the easiest-to-service PCs we've seen, with few cables to work around and with components that come off easier than slippers at bedtime.

- 1 Power supply: If the power supply ever fails, just pop it out and replace it. The computer's design allows for fast and easy removal.
- 2 Drive bay cage: This holds the CD-ROM drive, hard drive, and floppy drive. It disconnects in a snap. Cabling is minimal; instead, the drives use edge connectors.
- 3 Motherboard: You don't need tools to perform upgrades and handle standard maintenance on components on the motherboard. It slides out easily.



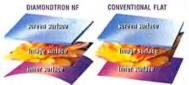




The award-winning Diamond Pro 900u (19-inch CRT/18.0-inch DVI\*) is truly distortion-free with a perfectly flat screen surface.

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unprecedented improvement in viewing pleasure. Not to mention the dazzling brightness, razor-sharp clarity and stunning color accuracy which puts Mitsubishi in a class by itself. With no curvature, reflections and glare are also eliminated. The result is remarkably realistic, natural-looking flat images. Your energy can now be spent being more creative and more productive. For added versatility, DIAMONDTRON NF monitors feature a unique self-powered USB hub which allows you to switch all connected USB peripherals between



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Diamond Pro 900u July 1999

Diamond Pro 2020u I June 1999

Diamond Pro 2020u Diamond Pro 90 June 1999 Jan. 19, 1995 BEST USE: The MicroFlex-40B is good if you want to replace an older, slower model and already have the software you need.

# 7 PC CONNECTION EPIO **BPS4000 CELERON 466**

NEW WHAT'S HOT: At \$927, the Epig BPS4000 is the cheapest system on the chart. This well-constructed midsize tower carries excellent documentation. including a quick-setup guide, manuals for all hardware, and a system manual containing lots of helpful diagrams.

WHAT'S NOT: Its 206 score on PC World-Bench 98 is slightly below average for a Celeron-466 system. The Pionex Technologies P7oS 17-inch monitor displays dark images and extremely blurry text at 1024 by 768 resolution, and the picture is poor even at lower resolutions. You have to remove three screws to reach the interior. The flimsy Midiland MLi-691PA speakers produce weak, distorted sound. WHAT ELSE: The interior offers a generous amount of expansion room, with three open slots and six open bays. The system includes a microphone but no software beyond the operating system.



UPGRADE NIRVANA: Micro Express's MicroFlex-40B has four free bays and slots in its easy-access interior.

BEST USE: Drawn by its low price and decent performance, a small office could forgive the Epiq's flaws and make room for it.

# 8 AXIS SYSTEMS ORION LX/CVE **CELERON 400**

WHAT'S HOT: For the nice price of \$1008, you get a Celeron-400 system that outperformed all similarly configured PCs on our PC WorldBench 98 tests. This budget system also leaves you plenty of room to grow, with three open drive bays and four free slots. The Altec Lansing ACS43W speakers pump out respectable sound.

WHAT'S NOT: The 17-inch ADI VD-697 monitor displays adequate pictures at resolutions up to 800 by 600; but at 1024 by 768, text fuzziness causes visual discomfort. Our test unit didn't have much in the way of hard-copy manuals (Axis says it plans to include a system manual soon). Documentation

is available on the PC's hard drive, but you're out of luck if the drive fails (unless you've printed everything).

WHAT ELSE: The Orion's interior is spacious, but you need a screwdriver to get there, and you have to manhandle the allmetal housing to remove and replace the case. Stamped icons identify rear ports. The Keytronic keyboard flexes more than we'd like; and though the keys do allow smooth typing, they rattle a bit.

> BEST USE: The modestly priced Orion is somewhat rough around the edges, but it would make a capable small-office system.

#### 9 NEC POWERMATE VT 300

WHAT'S HOT: This system sells for a tolerable \$1123. Its case is easy to open-just loosen a few thumbscrews to get inside. The welldesigned chart, color-coded cables. and labeled connectors on the back make setup painless. NEC's crystalline 17-inch monitor displays sharp text and graphics, even at resolutions as high as 1280 by 1024.

WHAT'S NOT: With a PC World-Bench 98 score of 181, the PowerMate VT 300 drifts near the bottom of the pond among budget chart makers.

WHAT ELSE: The system's default configuration includes neither a modem nor an ethernet card; for an additional \$50, however, you can add either device. For our test computer, we specified a network interface card, because we wanted to



CHEAP TRICK: PC Connection's Epiq BPS4000 climbs aboard the chart on the strength of its affordable \$927 price.

make the system's configuration comparable to others on the chart.

BEST USE: Small to midsize businesses that don't need a screamer will appreciate this affordable PC.

# 10 COMPAQ PROSIGNIA 320 **CELERON 466**

WHAT'S HOT: This Prosignia ships with great extras, including an Iomega Zip drive and an NVidia Vanta graphics board. The 17-inch Compaq S700 monitor impressed us with crisp text and images. Compaq's support has improved. In our recent tech calls, reps went the extra mile to thoroughly explain answers to our many questions.

WHAT'S NOT: Some of our test system's front bezel pieces-the floppy drive faceplate and eject button, in particulararrived loosely mounted in their bays. The PC conspicuously lacks labels and colorcoding on the rear ports. With only two open slots, the computer suffers from limited expandability. Its PC WorldBench 98 score of 202 is one of the lowest we've seen for a Celeron-466 system running Windows 98.

WHAT ELSE: The \$1172 Prosignia 320 Celeron 466 ships with Office 2000 Small Business Edition but a small 6.4GB hard drive to accommodate it. Compaq includes a solidly constructed keyboard. BEST USE: Compaq's improved support

makes this model a good bet for small businesses and home offices that prefer to buy from a well-known vendor.

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# TOP 15 NOTEBOOK PCs

	POWER NOTÉBOOK: \$2700 AND OVER	Month tested	★ Overall rating	Street price (10/8/99)	PC WorldBench 98 performance score	Faster	Base configuration
1	Gateway Solo 9300LS 800/315-2536 www.gateway.com	Dec 99	89	Average: \$3320	Good	193	Outstanding: Pentium II-400, 15-inch active screen, touchpad, 128MB of RAM, 126B hard drive
2	Dell Latitude CPi A366XT 800/388-8542 www.dell.com	May 99	87	Inexpensive: \$2798	Satisfactory	184	Good: Pentium II-366, 13.3-inch active screen, touchpad, 64MB of RAM, 6.4GB hard drive
3	Dell Inspiron 7500 C466VT 800/388-8542 www.dell.com	Dec 99	84	Expensive: \$3501	Very good	202	Very good: Celeron-466, 15-inch active screen, touchpad, 64MB of RAM, 25GB hard drive
4	Micron TransPort NX PII-400 800/642-7667 www.micronpc.com	Oct 99	81	Expensive: \$3498	Very good	202	Outstanding: Pentium II-400, 15.1-inch active screen, touchpad and eraserhead, 128MB of RAM, 14GB hard drive
5	NEC Versa SX 888/632-8701 www.nec-computers.com	Nov 99	82	Average: \$3108	Good	192	Very good: Pentium II-400, 14.1-inch active screen, touch- pad pointing device, 64MB of RAM, 6GB hard drive
	MIDRANGE NOTEBOOK: \$1700 TO \$2699	Percent of over	all rating >	Price: 14 percent	Performance: 20	percent	Base configuration: 5 percent
1	IBM ThinkPad I Series 1480 800/426-7255 ext. 4751 www.ibm.com/pc/us	NEW	79	Average: \$2399	Very good	183	Very good: Celeron-466, 14.1-inch active screen, eraserhead, 64MB of RAM, 6.4GB hard drive
2	Micron TransPort Trek2 800/642-7667 www.micronpc.com	Sept 99	77	Average: \$2299	Very good	184	Good: Celeron-400, 14.1-inch active screen, touchpad and eraserhead, 64MB of RAM, 4.3GB hard drive
3	Sony VAIO PCG-F340 888/315-7669 www.sony.com/pc	NEW	- 77	Very inexpensive: \$1799	Very good	187	Good: Pentium II-366, 13-inch dual-scan screen, touchpad, 64MB of RAM, 6.4GB hard drive
4	Micro Express NP7400 800/989-9900 www.microexpress.net	NEW	77	Inexpensive: \$1899	Very good	189	Very good: Pentium II-400, 14.1-inch active screen, touchpad, 64MB of RAM, 6GB hard drive
5	Fujitsu LifeBook E Series PII-333 877/372-3473 www.fujitsu-pc.com	Aug 99	75	Inexpensive: \$1999	Good	176	Good: Pentium II-333, 13.3-inch active screen, ErgoTrac pointing device, 64MB of RAM, 6.4GB hard drive
	BUDGET NOTEBOOK: UNDER \$1700	Percent of over	all rating >	Price: 17 percent	Performance: 17	percent	Base configuration: 5 percent
1	Toshiba Satellite 2595CDS 800/867-4422 www.buy.toshiba.com	Nov 99	85	Average: \$1399	Very good	170	Good: Celeron-400, 13.1-inch dual-scan screen, eraserhead 64MB of RAM, 4.3GB hard drive
2	HP Pavilion Notebook PC 800/322-4772 www.hp.com	NEW	80	Expensive: \$1699	Outstanding	185	Good: Celeron-433, 12.1-inch active screen, touchpad, 64MB of RAM, 4.8GB hard drive
3	Compaq Prosignia Notebook 150 800/345-1518 www.compaq.com	Nov 99	79	Average: \$1499	Good 153	3	Good: AMD K6-2-380, 12.1-inch active screen, touchpad, 64MB of RAM, 4GB hard drive
4	Chem USA ChemBook 7200 800/866-2436 www.chemusa.com	Aug 99	78	Average: \$1579	Very good 1	65	Good: Celeron-333, 12.1-inch active screen, touchpad, 64MB of RAM, 4.8GB hard drive
5	Sceptre Soundx 5200 800/788-2878 www.sceptre.com	Nov 99	73	Average: \$1379	Satisfactory 141	]	Satisfactory: AMD K6-2-380, I2.1-inch active screen, touchpad, 32MB of RAM, 4GB hard drive
	Best Buy	Percent of over	all rating >	Price: Z0 percent	Performance: 14	narcant	Base configuration: 5 percent

Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.

<sup>2</sup>For more information about all the products listed in this table, select number 903 on the product information card or visit www.pcworld.com/productinfo.

3 Five years on CPU and main memory, one year on other parts.



IT'S A FIRST: An IBM laptop wins a Best Buy. Big Blue missed this honor in the past because its systems usually cost more than similar offerings from other companies. But

IBM has lowered its prices dramatically with the new ThinkPad I Series designed for home users. This month the \$2399 ThinkPad I 1480 ascends to the top spot on our midrange chart with superior scores for its combination of speed, performance, battery life, and affordability.

# 1 GATEWAY SOLO 9300LS



WHAT'S HOT: Its thin, sleek design dazzles, and the Solo 9300LS's 12cell lithium ion battery outlasts

other laptops' power packs. With a second battery in its multipurpose bay, the Gateway should run as long as some Windows CE devices. It lasted 5 hours and 6 min-

Extra features	Design and ease of use	Battery life (hours:min)	Travel weight (pounds) '	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)	Product info number		
Very good: 4X DVD-ROM drive, V.90 modern, lithium ion battery, multipurpose bay takes second battery	Excellent: slick multimedia design	Outstanding: 5:06	Average: 8.6	Good	Good/ Good	24/7, toll-free	3/3	638		
Good: 10X-20X CD-ROM drive, x2 PC Card modem, lithium on battery, multipurpose bay takes second battery	Very good: easy to upgrade	Satisfactory: 2:15	Average:	Good	Good/ Outstanding	24/7, toll-free	3/3	-		
outstanding: 4X DVD-ROM drive, V.90 modem, lithium ion battery, multipurpose bay takes second battery, Zip drive	Excellent: vast storage possibilities, screen overbite	Good: 2:34	Very heavy: 10.4	Good	Good/ Good	24/7, toll-free	3/3	-		
fery good: 4X DVD-ROM drive, V.90 PC Card modem, thium ion battery, multipurpose bay takes second battery	Average: accepts many add-in devices	Satisfactory: 2:26	Heavy: 9.9	Good	Good/ Fair	24/7, toll-free	Varies 3/1	639		
satisfactory: 2X DVD-ROM drive, x2 modem, lithium ion attery, multipurpose bay takes second battery	Very good: lots of add-in possibilities	Satisfactory: 2:03	Light: 6.7	Fair	Fair/ Fair	24/7, toll-free	3/3	640		
Extra features: 5 percent	Design and ease of use: 10 percent	Battery life: 8 percent	Weight: 8 percent	Reliability: 20 percent	Support	and warranty: 10 p	ercent			
Good: 4X DVD-ROM drive, V.90 modem, lithium ion battery	Average: ThinkLight LED built into screen	Outstanding: 3:44	Average: 8.1	Good	Good/ Fair	24/7, toll-free	1/1	-		
iood: 12X-24X CD-ROM drive, V.90 modem, lithium ion attery, multipurpose bay takes second hard drive	Very good: versatile desk- top replacement			Good: 2:38	Average: 8.7	Good	Good/ Fair	24/7, toll-free	Varies 1/1	641
iood: 10X–24X CD-ROM drive, V.90 modem, lithium ion attery, multipurpose bay takes second battery	Average: port replicator comes standard	Satisfactory: 2:23	Average: 8.1	4	Fair */ Good	24/7, toll-free	1/1	642		
Good: 2X DVD-ROM drive, V.90 modem, lithium ion battery	Average: noisy keyboard, multimedia-heavy	Very good: 3:09	Heavy: 9.2		Fair '/ Good	24/7, toll-free	4/4	643		
Outstanding: 12X-24X CD-ROM drive, V.90 modem, lithium on battery, two shared bays (one holds second battery)	Very good: two versatile bays	Satisfactory: 2:25	Average: 8.2		Fair */ Fair	24/7, toll-free	1/1	644		
Extra features: 5 percent	Design and ease of use: 10 percent	Battery life: 8 percent	Weight: 8 percent	Reliability: 20 percent	Support	and warranty: 10 p	ercent			
Satisfactory: 12X-24X CD-ROM drive, V.90 modem, lithium on battery	Average: built-in speakers	Very good: 3:12	Average: 7.7	Fair	Fair/ Fair	24/7, toll-free	1/1	645		
Satisfactory: 10X-24X CD-ROM drive, V.90 modem, lithium on battery	Average: all-in-one with external CD controls	Good: 2:42	Average: 7.4	Good	Good 5/ Poor	24/7, toll call	1/1	646		
Satisfactory: 12X-24X CD-ROM drive, V.90 modem, lithium on battery	Very good: superb built-in sound	Satisfactory: 2:19	Average: 8.1	Fair	Fair/ Fair	24/7, toll-free	3/1	647		
satisfactory: 10X-24X CD-ROM drive, V.90 modem, lithium on battery	Average: best feature is great keyboard	Very good: 3:20	Average: 6.9	4	Fair '/ Fair	24/7, toll-free	1/3	648		
Poor: 10X-20X CD-ROM drive, V.90 modem, NiMH battery	Average: CD player controls accessible with case closed	Satisfactory: 2:22	Average: 8.1		Good 3/ Fair	9/5, toll-free *	1/1	649		
Extra features: 5 percent	Design and ease of use: 10 percept	Battery life: 8 percent	Weight: 8 percent	Reliability: 20 percent	Support	and warranty: 10 p	ercent			

Insufficient data to give a rating.

Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

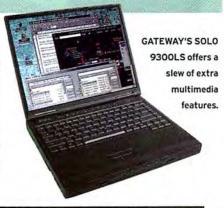
\* Free tech support ends after one year.

utes in our tests, 1 hour and 22 minutes longer than this month's longevity runner-up, IBM's ThinkPad I Series 1480.

WHAT'S NOT: Its PC WorldBench 98 score of 193 is quick for a notebook but below average for a PII-400.

WHAT ELSE: The 9300LS has many of the discontinued 9150LS's audiovisual extras yet weighs one pound less. Like the 9150LS, the 9300LS sports TV-in and TV-

out ports and a Dolby jack for connecting a Surround Sound stereo system. Other features include buttons for playing audio CDs, an IEEE 1394 port for capturing digital video (you supply the editing software), and programmable shortcut buttons at the top of the keyboard for launching apps. Another nicety: A charge indicator on the outside of the notebook lets you check the juice level without >



removing the battery. The Solo 9300LS's \$3320 price is average for this class. BEST USE: Presenters and digital editors will appreciate this beautifully designed,

#### MIDRANGE NOTEBOOK

# I IBM THINKPAD I SERIES 1480

full-featured notebook.



WHAT'S HOT: IBM's latest round of ThinkPads, including this topof-the-line Celeron-466 notebook,

NEW add some flashy new features. The ThinkLight, a tiny LED built into the top edge of the screen, illuminates the keyboard just enough to let you type in a darkened meeting room or in bed next to a sleeping companion at night. You can also protect the back of your notebook's screen in style with interchangeable plastic covers available in seven colors.

WHAT'S NOT: I Series ThinkPads don't have port replicator connections, so they make inconvenient desktop-replacement units. You can't upgrade the hard drive. WHAT ELSE: The 1480 crams more features into a case that's a quarter-inch thinner than the first generation of I Series notebooks. Four programmable buttons at the top of the keyboard launch applications and Web sites. IBM has also beefed

up the DVD-ROM drive controls: External buttons let you listen to music without turning on the notebook-and also let you stop, pause, and flip through songs. A new LCD window built into the top edge



PLAY THAT FUNKY MUSIC:

Controls on the exterior of the HP Pavilion Notebook PC allow you to play audio compact discs, even if the unit is turned off.

**New This Month** 

THOUGH THEY'VE been available for several months now, Pentium II-400 notebooks are still costly-\$2900 on average. A dramatic exception is

> the Micro Express NP7400, which lands in fourth

place on our midrange list. The new NP7400 costs just \$1899-a terrific price for a fast notebook with a DVD-ROM drive, a 14.1-inch screen, and a slew of multi-

media connections, including a game port. You also get a relatively lengthy four-year warranty on both parts and labor, where many notebook companies cover you for just three years. However, at 9.2 pounds, it's the heaviest on the midrange chart.

A new PII-366 notebook, Sony's VAIO PCG-F340, debuts as the number three midrange system. This is on the strength of its low price (\$1799), bundled digitalediting software, and included lightweight port replicator, an option for which most companies charge at least \$100.

Hewlett-Packard's first laptop designed for home users, the \$1699 Pavilion Notebook PC, claims second place in our budget category. The system is costly for home use and has poor support policiesincluding the only toll-call service on the chart. However, home and office users who can overlook those details should give it a look. HP bundles home-office software, a 12.1-inch screen, and a separate set of audio controls for playing CDs.

Contributing Editor Carla Thornton regularly covers notebooks for PC World.

# ALSO NEW THIS MONTH



WE EVALUATED the following systems along with the others, but they didn't online score high enough to reach the Top 15

Notebook PCs chart. For write-ups, visit PC World Online (www.pcworld.com/top400).

- AMS Tech Roadster 15CSA400
- Compag Prosignia 150 AMD K6-2-475
- Fujitsu LifeBook E380

LET THERE BE LIGHT:

The IBM ThinkPad I Series 1480 comes with the Think Light, a small LED that allows typing in bed or in a darkened meeting room.

of the screen lets you read which track is playing when the lid is closed. Buyers score some good software loot, too, including Lotus Smart Suite Millennium, Norton AntiVirus, and Quicken 99.

BEST USE: Home users won't go wrong with the ThinkPad 1480. It's a great combination of convenience, comfort, entertainment features, and bundled software.

#### BUDGET NOTEBOOK

## 1 TOSHIBA SATELLITE 2595CDS



WHAT'S HOT: The Toshiba's 13.1inch screen is impressive for a \$1399 laptop. In our tests, its bat-

tery lasted a long 3 hours and 12 minutes. The system also sports programmable shortcut keys.

WHAT'S NOT: A cursor trail, the only giveaway that the screen is dual-scan, may annoy some users. The hard drive must

> go back to the manufacturer if you need to upgrade.

WHAT ELSE: This all-in-one unit offers few opportunities to expand. The keyboard and crescent-shaped mouse buttons (arranged vertically) are comfortable and easy to use, and Toshiba bundles lots of software.

BEST USE: With its long battery life, the Satellite is a good choice for budget-conscious travelers.

#### KINGSTON® TURBOCHIP® PRODUCTS

are designed as plug-and-play upgrades that extend the life of your desktop or mini-tower by increasing system performance by as much as 280%. Call your Kingston sales representative at 800-259-8969 to find out why the best deal on a faster system is upgrading the system you already own.



#### TURBOCHIP 366

Upgrades AMD\* and Pentium\* based systems running 166MHz and up with the latest 3D multimedia capabilities and 366MHz of processing power.



#### TURBOCHIP 233

Upgrades most Pentium based systems running 75MHz and up with genuine Intel 233MHz MMX Pentium processing power.



### TURBOCHIP 133

Upgrades most 486 based systems to 133MHz of 5x86 processing power with built-in coprocessor and 16Kb internal cache. TurboChip 133 is rated at Pentium 75-plus performance.



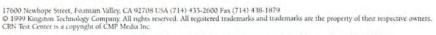












# TOP 15 HOME PCs

Dell Dimension XPS T600 800/388-8542 www.dell.com Quantex M600 800/896-4898 www.quantex.com	Month tested Dec 99	★ Overall rating	Street price (10/8/99)	PC WorldBench 98 performance score ' Faster	Base configuration 2  Pentium III-600, 128MB of RAM, 512KB L2 cache, 20,4GB
200/388-8542 www.dell.com 200/388-8542 www.dell.com 200/396-4898 www.quantex.com		92			Pentium III-600 128MR of PAM 512KR I 2 carbs 20 4GR
300/896-4898 www.quantex.com	(AUTHO)		\$2399	Very good 256	hard drive, midsize tower case, 19-inch monitor, Windows 9
	NEW	88	Very inexpensive: \$2049	Very good 256	Pentium III-600, 128MB of RAM, 512KB L2 cache, 20.4GB hard drive, midsize tower case, 19-inch monitor, Windows 9
BM Aptiva E Series 595 800/426-7235 ext. 4690 www.ibm.com	Dec 99	87	Inexpensive: \$2228	Outstanding 271	AMD Athlon-600, 128MB of RAM, 512KB L2 cache, 20.4GB hard drive, minitower case, 17-inch monitor, Windows 98
Compaq Presario 5900Z 00/345-1518 www.compaq.com	Dec 99	86	Very inexpensive: \$2041	Outstanding 267	AMD Athlon-600, 128MB of RAM, 512KB L2 cache, 13.5GB hard drive, midsize tower case, 19-inch monitor, Windows 9
Sony VAIO Digital Studio PCV-R539DS 888/315-7669 www.sony.com/pc	Dec 99	85	Average: \$2348	Good 233	Pentium III-550, 128MB of RAM, 512KB L2 cache, 17GB hard drive, minitower case, 17-inch monitor, Windows 98
MIDRANGE SYSTEM: \$1200 TO \$1999 Pe	rcent of overa	II rating >	Price: 10 percent	Performance: 20 percent	
Deil Dimension XPS T500 800/388-8542 www.dell.com	Dec 99	95	Average: \$1639	Good 228	Pentium III-500, 128MB of RAM, 512KB L2 cache, 13.6GB hard drive, midsize tower case, 17-inch monitor, Windows 9
Gateway Essential 500 00/315-2536 www.gateway.com	Dec 99	88	Inexpensive: \$1599	Very good 230	Pentium III-500, 128MB of RAM, 512KB L2 cache, 13.6GB hard drive, midsize tower case, 17-inch monitor, Windows 9
Micron Millennia C500 000/642-7667 www.micronpc.com	Dec 99	88	Inexpensive: \$1421	Satisfactory 199	Celeron-500, 64MB of RAM, 128KB L2 cache, 8.5GB hard drive, minitower case, 19-inch monitor, Windows 98
Quantex M500c/810 00/896-4898 www.quantex.com	Dec 99	87	Inexpensive: \$1379	Good 213	Celeron-500, 128MB of RAM, 128KB L2 cache, 13GB hard drive, midsize tower case, 19-inch monitor, Windows 98
CyberMax Enthusiast 450N 800/437-4596 www.cybermaxpc.com	Dec 99	84	Inexpensive: \$1499	Satisfactory 206	AMD K6-III-450, 128MB of RAM, 256KB L2 cache, 17.2GB hard drive, midsize tower case, 19-inch monitor, Windows 9
BUDGET SYSTEM: UNDER \$1200 Pe	rcent of overa	II rating >	Price: 20 percent	Performance: 15 percent	
Micron Millennia C466 800/642-7667 www.micronpc.com	Dec 99	85	Average: \$1077	Outstanding 203	Celeron-466, 64MB of RAM, 128KB LZ cache, 4.3GB hard drive, minitower case, 15-inch monitor, Windows 98
Dell Dimension L400c 000/388-8542 www.dell.com	Dec 99	85	Inexpensive: \$909	Good 185	Celeron-400, 64MB of RAM, 128KB L2 cache, 6.4GB hard drive, minitower case, 15-inch monitor, Windows 98
Sony VAIO Digital Studio PCV-R532DS 888/315-7669 www.sony.com/pc	Dec 99	81	Expensive: \$1148	Very good 195	Celeron-466, 64MB of RAM, 128KB L2 cache, 10GB hard dri minitower case, 17-inch monitor, Windows 98
Gateway Essential 400C 800/315-2536 www.gateway.com	Dec 99	81	Average: \$999	Good 182	Celeron-400, 32MB of RAM, 128KB L2 cache, 6.5GB hard drive, minitower case, 15-inch monitor, Windows 98
Emachines ETower 40013 377/566-3463 www.e4me.com	Dec 99	80	Very inexpensive: \$605	Good 182	Celeron-400, 64MB of RAM, 128KB L2 cache, 6.4GB hard drive, minitower case, 15-inch monitor, Windows 98
	Sony VAIO Digital Studio PCV-R539DS  Sony VAIO Digital Studio PCV-R539DS  SB8/315-7669 www.sony.com/pc  MIDRANGE SYSTEM: \$1200 TO \$1999  Pe  Dell Dimension XPS T500  800/388-8542 www.dell.com  Sateway Essential 500  900/315-2536 www.gateway.com  Micron Millennia C500  900/642-7667 www.micronpc.com  CyberMax Enthusiast 450N  900/6437-4596 www.cybermaxpc.com  BUDGET SYSTEM: UNDER \$1200  Pe  Micron Millennia C466  800/642-7667 www.micronpc.com  Dell Dimension L400c  900/388-8542 www.dell.com  Sony VAIO Digital Studio PCV-R532DS  988/315-7669 www.sony.com/pc  Gateway Essential 400C  900/315-2536 www.gateway.com  Emachines ETower 40013  177/566-3463 www.e4me.com	Dec 99  MIDRANGE SYSTEM: SIZOO TO \$1999  Percent of overa 800/388-8542 www.delt.com  Dec 99  Dec 99	Sony VAIO Digital Studio PCV-R539DS   Dec 99   85	Second   S	Dec 99   85   Second   Secon

A system's performance word score is relative to the scores earned by other PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 205.



SOME CLICHÉS ARE TRUE. We've heard "desktop power has never been cheaper" for ages, but the PCs on this month's charts bear that adage out. For just \$1599, Gate-

way's Essential 500 packs a fast PIII-500 CPU, 128MB of RAM, a DVD-ROM drive, and an ink jet printer. Budget-conscious buyers will find solid Celeron-400 systems (with 15-inch monitors) for as little as \$605.

#### POWER HOME PCS

# 1 DELL DIMENSION XPS T600



WHAT'S HOT: The Dimension XPS T600 is an all-around great machine. Although not the fastest

system we've seen, it earned a relatively high PC WorldBench 98 score of 256more than speedy enough for standard

<sup>2</sup> We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

Extra features	Setup/ ease of use	Graphics	Reliability/ support	Comments	Product info number
Outstanding: Diamond Viper Y770 Ultra graphics board with 32MB of SDRAM, 8X DVD-ROM drive, V.90 modem, lomega Zip 250 drive	Outstanding/ Good	Very good	Outstanding/ Outstanding	PRO: Great graphics, strong performer, high-quality speakers. CON: A bit pricey for what you get, paltry software bundle.	-
Very good: 3dfx Voodoo3 3000 graphics board with 16MB of SDRAM, 6X DVD-ROM drive, V.90 modem, Philips CD-RW drive	Good/ Satisfactory	Good	Good/ Good	PRO: Great price for the configuration, excellent 3D graphics. CON: Little setup help, drivers for keyboard buttons not installed.	627
Good: Number Nine SR9 graphics board with 8MB of SDRAM, 4X DVD-ROM drive, V.90 modem, Sony CD-RW drive	Satisfactory/ Very good	Good	Good/ Fair	PRO: Fastest system here, vivid graphics, easy-to-use DVD playback. CON: A bit slow on 3D games, monitor slightly blurry.	
Good: 3dfx Voodoo3 3500 graphics board with 16MB of SDRAM, 8X DVD-ROM drive, V.90 modem	Good/ Good	Good	Fair/ Fair	PRO: Superb speed, vibrant graphics, amazing sound system. CON: Drive bay cover can be a nuisance, no free ISA slots.	628
Good: ATI Xpert 128 graphics board with 16MB of SDRAM, 8X DVD- ROM drive, V.90 modem, Sony CD-RW drive	Outstanding/ Satisfactory	Good	Good/ Fair	PRO: Good graphics performer, lots of useful video editing software. CON: Middle-of-the-road speed and sound.	629
Extra features: 15 percent	Setup/ease of use: 5 percent	Graphics: 15 percent	R & S: 35 percent		
Good: 3dfx Yoodoo3 3000 graphics board with 16MB of SDRAM, 3X DVD-ROM drive, V.90 modem, lomega Zip 100 drive	Outstanding/ Very good	Good	Outstanding/ Outstanding	PRO: Strong on 3D graphics and audio, second-fastest midrange PC. CON: A bit expensive compared to its peers.	-
Outstanding: 3dfx Voodoo3 3000 graphics board with 16MB of DRAM, 6X DVD-ROM drive, V.90 modem, ink jet printer	Satisfactory/ Very good	Good	Fair/ Good	PRO: Fastest midrange PC, runs 3D games well, built-in ethernet port. CON: Low-quality monitor.	630
Sood: integrated NVIdia RIVA 128 graphics with 8MB of SGRAM, 7X-40X CD-ROM drive, V.90 modem	Good/ Very good	Satisfactory	Good/ Good	PRO: Good monitor, excellent audio, includes ethernet card. CON: Middling performance, only 64MB of RAM.	631
Good: integrated Intel 810 graphics with UMA, 6X DVD-ROM drive, 190 modem, lomega Zip 100 drive	Good/ Very good	Satisfactory	Good/ Good	PRO: Bargain price, good monitor, WordPerfect Office 2000. CON: Slow 3D graphics performance, mediocre speakers.	632
<b>fery good:</b> Apollo Savage4 graphics board with 16MB of SDRAM, I.8X DVD-ROM drive, V.90 modem, lomega Zip 100 drive	Good/ Good	Good	Fair/ Good	PRO: Good speed for the price, terrific speakers and monitor.  CON: Slow with 3D games, lacks color-coded ports.	633
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 35 percent		
Satisfactory: integrated NVidia RIVA 128ZX graphics with 8MB of GGRAM, 17X-40X CD-ROM drive, V.90 modem	Satisfactory/ Good	Satisfactory	Good/ Good	PRO: Fastest budget system here, multimedia keyboard. CON: Limited expandability, poor-sounding speakers.	634
Satisfactory: integrated Intel 810 graphics with UMA and 4MB of 8D cache, 17X-40X CD-ROM drive, V.90 modem	Very good/ Very good	Good	Outstanding/ Outstanding	PRO: Good price, small but expandable case, built-in ethernet port. CON: Limited range of software titles.	
satisfactory: integrated Intel 810 graphics with UMA, 8X DVD-ROM irive, V.90 modem	Outstanding/ Very good	Satisfactory	Good/ Fair	PRO: Has 17-inch monitor, includes Word and Adobe PhotoDeluxe. CON: Not enough power for real digital video editing.	635
iood: integrated ATI Rage 128 graphics with 8MB of SDRAM, 4X-40X CD-ROM drive, V.90 modem, ink jet printer	Satisfactory/ Very good	Good	Fair/ Good	PRO: Clearly marked cables ease setup, price includes ink jet printer. CON: Scanty 32MB of RAM, messy interior.	636
Gatisfactory: ATI Rage Pro Turbo graphics board with 4MB of GRAM, 14X-40X CD-ROM drive, V.90 modem	Good/ Good	Satisfactory	.1.	PRO: Lowest-priced system here, reasonable performer for its class. CON: Tight drive-bay access, problems with service and support.	637
Extra features: 5 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 35 percent		

For more information about the products listed in this table, select number 902 on the product information card or visit www.pcworld.com/productinfo.

business applications such as Microsoft Word and Lotus 1-2-3. This system also provides first-rate graphics performance, producing smooth AVI video playback and good-looking images in 3D games. Color-coded cables ease setup, and the well-written manual will walk you through beginner and advanced topics as well as basic troubleshooting. To top it all

off, the XPS T600's bundled Altec Lansing speakers and subwoofer generate rich, full sound.

WHAT'S NOT: Although our test system's 19-inch monitor displayed sharp text and good color, DVD movie images looked a bit dark. The scanty software bundle consists of Microsoft's Works Suite 99.

WHAT ELSE: You can use the includ-



**DELL'S SPEEDY DIMENSION XPS T600 has** rich sound, and Dell offers top-notch service.

<sup>\*</sup>Insufficient data to give a rating.

ed 250MB Iomega Zip drive to back up files on the enormous 20.4GB hard drive. Adding new cards is a snap; the XPS T600's easy-to-remove cover gives you hassle-free access to the roomy interior, where you'll find three available PCI slots and one open drive bay.

BEST USE: An excellent hedge against PC obsolescence, this system comes with room for expansion and enough horsepower to handle any small-office/homeoffice application.

#### MIDRANGE HOME PCs

# 1 DELL DIMENSION XPS T500



WHAT'S HOT: This Dell uses a 3dfx Voodoo3 3000 card to generate strong graphics (and provide a TV-

out port). It relies on a Turtle Beach Montego II sound card and Altec Lansing ACS340 speakers to produce crisp sound. An uncomplicated CD-player interface makes adjusting audio settings a breeze. The T500 also has a 100MB Iomega Zip drive-handy for backing up files or shuttling data between work and home.

WHAT'S NOT: At \$1639, it's the priciest midrange home PC in this review.

WHAT ELSE: The PC WorldBench 98 score of 228 means that it's plenty fast for most office applications. Video playback was good. The system comes bundled with Microsoft Works Suite 99 and a game-Descent FreeSpace.

BEST USE: The Dimension XPS T500 is a good all-around workhorse for office tasks and games. But if you're a first-time buyer, you may be disappointed by the thin software package.



ONE OF THE TOP-PERFORMING midrange PCs, Dell's Dimension XPS T500 also has good video playback.

#### RUDGET HOME

### MICRON MILLENNIA C466



WHAT'S HOT: With a Celeron-466 processor and an integrated NVidia RIVA 128ZX graphics chip set,

Micron's Millennia C466 ranks as the fastest system in the budget category, with a PC WorldBench 98 score of 203. The unit's keyboard conveniently sports a volume knob, a CD player control, and Internet access buttons.

WHAT'S NOT: You need a screwdriver to remove the cover to get to its one free memory slot, one open PCI slot, and one open ISA slot. The power supply restricts access to the CD-ROM drive and the one externally accessible drive bay that remains open. The Advent AVoog speakers accompanying the system sound a bit tinny and flat.

WHAT ELSE: Well-marked cables and connectors help guide novices through setup. The manual provides instructions and specifica-

tions on system maintenance but is written for experienced users. Microsoft Works Suite 99 is the only notable applications software bundled with the system.

BEST USE: With above-average performance for its class, the Millennia C466 is a good choice for cost-conscious users who need a basic workhorse for standard office apps.

# New This Month

A COUPLE OF new systems this month did not nab our top spots but still merit

> serious consideration. The \$2049 Quantex M600 power system is a real steal. Packed with a Pentium III-600 processor, 128MB of RAM, a 20.4GB hard drive, and both a DVD-ROM drive and a CD-RW drive, it's ready to tackle any task. The system plays as hard as it works, thanks to a terrific graphics subsystem powered by a card from 3dfx. The card helped produce exceptionally smooth and fast images on our 3D game tests, and it also gives you a TV-out port. Novices will be frustrated, though,

because this system lacks setup help. And though the keyboard contains programmable buttons for launching applications such as an Internet browser or e-mail, ours did not come with the drivers needed to make them work. The price includes three years of on-site service and a threeyear warranty on parts and labor.

Sony's \$1548 VAIO PCV-R536DS missed our midrange chart but offers a good compromise between features and



MICRON'S MILLENNIA C466 has a keyboard that includes a handy volume knob and CD-player controls.

price-particularly if you're a budding digital video artist. This system gives you all the video-editing software tools of Sony's higher-priced model, the \$2348 PCV-R539DS, and more power than the company's low-end \$1148 PCV-R532DS. Once you get beyond dabbling, however, you'll probably want more storage than the 10GB you get with the R536DS. To handle large image files, you might also need to add a CD-RW drive or some other form of removable storage.

PC World Contributing Editor Kirk Steers and freelance writer Joel Strauch both contributed to this review.

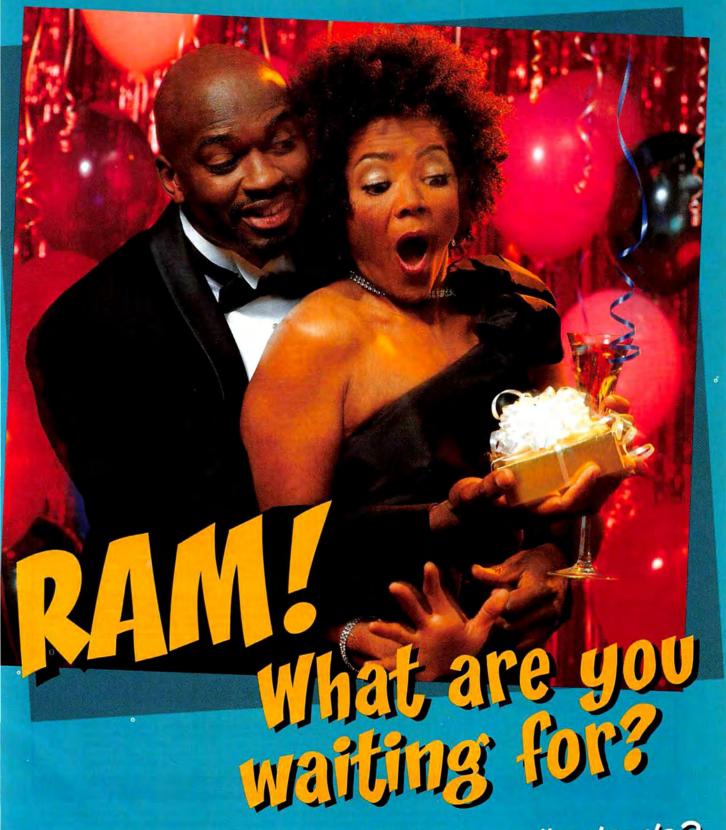
#### ALSO NEW THIS MONTH



WE EVALUATED the following systems along with the others, but they didn't score high enough to reach the Top 15 Home PCs

chart. For write-ups, visit PC World Online (www. pcworld.com/top400/newhomepcs).

- ABS All in Wonder 2/PIII-550
- ABS Supreme 3D 2/PIII-450
- Axis Orion LXV DVD
- Axis Terra MX12 K6-III-450
- NEC Ready 9944



Do you have enough RAM to really dazzle?

www.RAMmatters.com

"We found on Dell Dimension PCs that a 266MHz Pentium II with 96MB of RAM was similar in performance to a 550MHz Pentium III with 32MB of RAM." ZDTag, the ZD Testing and Analysis Group



# TOP 10 PRINTERS

	SMALL-BUSINESS/HOME LASER	Street price (10/8/99)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/color graphics	Comments	Produc info number
1	Brother HL-1240 800/276-7746 www.brother.com	\$299	86	8,2/3	Very good/ Good	FEATURES: Rated 12 ppm. Standard 2MB of RAM, 600-by-600-dpi maximum resolution, 250 sheets input, 150 output. SUMMARY: Our new small-business/home Best Buy is inexpensive and produces terrific text and respectable speeds. It's also small and quiet, a bonus in packed office spaces. Unfortunately, it has no ethernet option.	696
2	Oki Data Okipage 10ex 800/654-3282 www.okidata.com	\$399	82	8.5/2.8	Good/ Good	FEATURES: Rated 10 ppm. Standard ZMB of RAM, 1200-by-600-dpi maximum resolution, 250 sheets input, 100 output. SUMMARY: This quick personal LED printer produces good output overall, though text can look slightly jagged, and you must buy extra RAM to support the highest resolution. Good documentation helps balance sloppy design.	697
3	Lexmark Optra E310 800/539-6275 www.lexmark.com	\$399	81	6.6/3.1	Good/ Very good	FEATURES: Rated 8 ppm. Standard ZMB of RAM, 1200-by-1200-dpi maximum resolution, 150 sheets input, 100 output. SUMMARY: This well-designed Lexmark boasts versatile paper-handling capabilities and an easy-to-use driver, but it runs slower than you'd expect for its price, and its control panel is a bit convoluted.	698
4	Xerox DocuPrint P8 800/832-6979 www.xerox.com	\$249	79	6.8/4.2	Good/ Adequate	FEATURES: Rated 8 ppm. Standard 512KB of RAM, 1200-by-600-dpi maximum resolution, 250 sheets input, 100 output. SUMMARY: The cheapest here, the tiny, quiet P8 works well for home use. Print quality is better on text; grays look detailed but blocky. Text speed is okay for the price, and it's the fastest at printing graphics on the S0HO chart.	699
5	HP LaserJet 1100se 800/752-0900 www.hp.com	\$399	79	7.2/2.3	Very good/ Adequate	FEATURES: Rated 8 ppm. Standard 2MB of RAM, 600-by-600-dpi maximum resolution, 125 sheets input, 100 output, SUMNARY: Good text speed and crisp letters at every point size help land this laser on the chart for the first time. Don't count on it for graphics, however, with its slow speed and somewhat rough grays. A scanner attachment is also available.	700
	CORPORATE LASER		One for				
1	NEC SuperScript 1800N 800/632-4636 www.nectech.com	\$999	85	11.3/3.7	Excellent/ Good	FEATURES: Rated 17 ppm. Standard 20MB of RAM, 1200-by-1200-dpi maximum resolution, 1100 sheets input, 250 output. SUMMARY: The networked version of October's Best Buy, this model produces the same perfect text and detailed, if slightly dark, gray-scale images. Best of all, it comes with ethernet and a duplexer for under a thousand bucks.	701
2	Ricoh Laser AP1400 800/637-4264 www.ricoh-usa.com	\$799	84	10/3.3	Very good/ Good	FEATURES: Rated 14 ppm. Standard 8MB of RAM, 1200-by-1200-dpi maximum resolution, 350 sheets input, 250 output. SUMMARY: Text-printing speed isn't bad for the price-especially after a drop of almost \$100-and it delivers clean output all around. Liabilities include disorganized manuals, awkward installation, and a hard-to-insert toner cartridge.	702
3	Lexmark Optra T612n 800/539-6275 www.lexmark.com	\$1476	83	12.5/4.7	Very good/ Very good	FEATURES: Rated 20 ppm. Standard 16MB of RAM, 1200-by-1200-dpi maximum resolution, 600 sheets input, 250 output. SUMMARY: The quickest corporate model at both text and graphics printing, this new-comer boasts outstanding paper-handling options and strong print quality on both text and gray-scale graphics. Pricey, but includes ethernet.	703
4	Oki Data Okipage 18n NEW 800/654-3282 www.okidata.com	\$1199	83	12.4/4.2	Very good/ Good	FEATURES: Rated 18 ppm. Standard 32MB of RAM, 1200-by-600-dpi maximum resolution, 630 sheets input, 250 output. SUMMARY: Speedy performance and a reasonable price help land this new LED printer, which includes ethernet, on the chart. It delivers crisp text print quality, and graphics look far better than with other Oki Data models.	704
5	Brother HL-1660e 800/276-7746 www.brother.com	\$1300	79	10.7/3	Excellent/ Good	FEATURES: Rated 17 ppm. Standard 8MB of RAM, 1200-by-600-dpi maximum resolution, 650 sheets input, 250 output. SUMMARY: We tested this former number three on our network, and it runs faster on graphics but slower on text. Text still looks gorgeous. Oddly, you must buy its network card separately and install it yourself (price here includes NIC).	705
			4				



HOW WE TEST The overall rating for both small-business/home and corporate printers is based on print quality (25 percent), price (25 percent), features (15 percent), speed (10 percent), service and support (10 percent), and ease of use (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



YOU MAY THINK OF black-and-white lasers as stodgy, but they're lively this month. Since we last covered monochromes, in October, five chartmaking printers have been discontinued and six

new models have materialized to compete for the openings. The arrivals include Brother's HL-1240, which grabs the top SOHO chart slot, and two corporate models: the Lexmark Optra T612n in third place, and the Oki Data Okipage 18n in fourth. Also of note, the PC World Test Center shifted to ethernet-based testing for corporate models, which yields different performance rankings than our previous tests.

#### CORPORATE WORKHORSES

IT'S A FIRST for us: a fast corporate model with ethernet interface and internal duplexer (which prints on both sides of a page) for under \$1000. The NEC SuperScript 1800N, our corporate Best Buy, costs a low \$999. If you bought a duplexer and an ethernet card as add-ons, you'd pay \$200 to \$400 each. The NEC doesn't scrimp on quality, either, printing gorgeous letter-perfect text, tight lines, and detailed (if slightly dark) grays.

Lexmark's Optra T612n outpaces all the other printers on the chart, and with sharp letters and smooth graphics, it rivals the NEC in output quality. Though it's expensive at \$1476 (with ethernet but no duplexer), other features add value. For example, you can password-protect a file before printing it, so the file waits safely in printer memory until you type a secret code. Extensive paper-handling options for the T612n include a 2000-sheet paper well (about \$900) and both 250-sheet and 500-sheet duplexers (about \$300 each).

Oki Data's Okipage 18n comes close to the Lexmark in performance, pumping out text at 12.4 pages per minute and graphics at 4.2 ppm. It prints sharp, readable text and reasonable grays-the

Achilles heel of earlier Oki Data models, which used LED arrays instead of lasers (as does the 18n). Our only complaint: confusing menus are exacerbated by a faint LCD panel.

We also looked at QMS's new 2560 BX this month. If you need tabloid-size (11-by-17-inch) printing-a boon with spreadsheetsit's worth the relatively high \$1529 price (the main reason it didn't make the Top 10). At 13 letter-size pages per minute in our tests, the 2560 BX spits out text faster than any printer on the chart. To top it off, this model is a paper-handling wonder. It holds 750 tabloid sheets (more than any other corporate laser); the many options include a 2500-sheet input feeder (\$1200), a duplexer (\$400), and a gizmo that staples, punches holes, and collates (\$1500). The 2560 BX's robust text also stands out, though gray-scale graphics lack detail.

#### SMALL PRICES, SMALL OFFICES

ON THE SOHO FRONT. Brother's HL-1240 wins the gold with its above-average 8.2-ppm text speed, impressive \$299 price, and handsome output. The printer is small and quiet, and its CD-ROM includes useful setup and maintenance videos. Our only criticism of the HL-1240 is its auxiliary feed, which handles just one sheet at a time and has no supporting tray. The printer has no ethernet option.

Lexmark's new Optra M410n, which



FOR THE THRIFTY price of \$299, the Brother HL-1240-our new SOHO Best Buy-delivers top-notch output and impressive speed.

just misses the SOHO chart, costs a hefty \$829, but that price includes an ethernet interface-a godsend for networked businesses. In fact, the Optra M410n seems much like a corporate model, with the same full-featured control panel as the T612n. But at 8 ppm on text it's better suited to a smaller workgroup. Offices of any size will like the M410n's print quality-its text is particularly stunning.

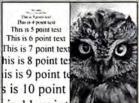
Our lab tested one other newbie this month, Kyocera's FS-1200. It also has that corporate feel, with its 9.8-ppm text speed (faster than any other SOHO model we've seen) and steep \$599 price, which does not include an ethernet card (\$299 extra). But, like all Kyocera models, the FS-1200 has beefier parts than most other SOHO printers, which should lower its long-term total cost of ownership, especially if you put it to heavy use (see our TCO chart at www.pcworld.com/jul99/printcosts). It prints sharp text and detailed graphics, and Kyocera offers numerous paper-handling options, including a duplexer for a hefty \$699. However, I found the FS-1200's control panel baffling and the auxiliary input tray difficult to use.

As small offices proliferate throughout the U.S., we expect to see more printers that straddle the line between SOHO and corporate. Regardless of your office's size, if you need a printer with networking capability and high speeds but can't afford a high-end laser, the Lexmark M410n and Kyocera FS-1200 are worthy candidates.

-Dan Littman

### PRINT QUALITY SAMPLES

# Tidy Text and Good Grays



This is 6 point text his is 7 point text nis is 8 point ter is is 9 point te is 10 point



This is 5 point text This is 6 point text This is 7 point tex his is 8 point te is is 9 point to is 10 point

#### BROTHER HL-1240

Our new SOHO Best Buy produces smooth text and detalled (if slightly light) gray-scale imagesparticularly impressive given the printer's low price.

#### LEXMARK OPTRA T612N

A newcomer to our corporate chart at number three, the Optra T612n turns out sharp letterforms-especially at larger sizes-and even, precise grays.

#### OKI DATA OKIPAGE 18N

The Okipage 18n's text seems light but is still clearly readable. Gray-scale graphics show details well, despite an odd crosshatch pattern.



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# **TOP 10 SCANNERS**

	SOHO SCANNER	Street price (10/29/99)	Overall rating	Scan quality	Scan speed–B&W at 300 dpi/color at 600 dpi (seconds per page)	Comments	Produc info numbe
1	Epson Perfection 1200U 800/463-7766 www.epson.com	\$249	99	Very good	9/67	FEATURES: USB, 1200 by 2400 dpi, 11.3-by-16.8-by-3.5-inch case, 9.9 pounds, 8.5-by-11.7-inch scanning area, optional transparency adapter. SUMMARY: Epson's latest addition to the Perfection series delivers outstanding resolution and faster performance than Epson 636 models, along with superb scans.	<u>-</u>
	Epson Perfection 636U 800/463-7766 www.epson.com	\$199	98	Yery good	12/74	FEATURES: USB, 600 by 2400 dpi, 11.3-by-16.8-by-3.5-inch case, 19.9 pounds, 8.5-by-11.7-inch scanning area, optional transparency adapter. SUMMARY: First-rate quality and features, easy USB installation, and lifetime support make for a strong contender. Also available in a faster, SCSI version for \$100 more.	-
3	Umax Astra 2200 800/562-0311 www.umax.com	\$249	90	Good	26/99	FEATURES: SCS1 and USB, 600 by 1200 dpi, 12.2-by-18.4-by-3.9-inch case, 8.5 pounds, 8.5-by-11.7-inch scanning area, includes transparency adapter. SUMMARY: A top pick for e-business tasks, includes great software for building Web sites and handles transparent and reflective materials right out of the box.	719
	Microtek SlimScan C6 800/654-4160 www.microtekusa.com	\$90	89	Very good	36/81	FEATURES: USB, 600 by 1200 dpi, 10.4-by-16.4-by-1.7-inch case, 7.7 pounds, 8.5-by-11.7-inch scanning area, no transparency adapter. SUMMARY: This low-cost, lightweight unit is the only CIS (non-CCD) scanner on the chart. Impressive scan quality, choice software, and good support keep it on the list.	720
,	Microtek ScanMaker X6 800/654-4160 www.microtekusa.com	\$100	88	Good	34/50	FEATURES: USB, 600 by 1200 dpi, 11.5-by-17.3-by-3.2-inch case, 11 pounds, 8.5-by-11.7-inch scanning area, optional transparency adapter. SUMMARY: Speedy color scans and overall performance keep this veteran on the chart, Strong software and well-rounded features sweeten the deal.	721
5	HP ScanJet 5200Cse 800/722-6538 www.scanjet.com	\$299	87	Very good	24/80	FEATURES: Parallel and USB, 600 by 1200 dpi, 12-by-19.1-by- 4.9-inch case, 12.5 pounds, 8.5-by-11.7-inch scanning area, optional 35mm slide adapter. SUMMARY: Versatile but pricey scanner delivers admirable scan quality, includes useful soft- ware, and has an easy-to-use design.	722
	Acer AcerScan Prisa 620UT 800/379-2237 www.acerperipherals.com	\$149	86	Good	27/112	FEATURES: USB, 600 by 1200 dpi, 12-by-18-by-4-inch case, 9,5 pounds. 8.5-by-11.7-inch scanning area, includes transparency adapter. SUMMARY: This all-purpose device works with transparent and reflective materials but runs slow on color scans. \$99 without a transparency adapter (AcerScan Prisa 620U).	723
	CORPORATE SCANNER		40.00				
	Umax Astra 2400S 800/562-0311 www.umax.com	\$299	95	Good	12/67	FEATURES: SCSI, 600 by 2400 dpi, 13.2-by-23.3-by-5.9-inch case, 14.6 pounds, 8.5-by-14-inch scanning area, optional transparency adapter. SUMMARY: Fast performance and outstanding support earn this legal document-capable unit a Best Buy. Scan quality, software, and price are other strong points.	724
	Canon CanoScan FB 1200S 800/652-2666 www.ccsl.canon.com	\$299	94	Very good	20/74	FEATURES: SCSI, 1200 by 1200 dpi, 11.5-by-18.1-by-3.7-inch case, 8.8 pounds, 8.5-by-11.7-inch scanning area, optional transparency adapter and ADF. SUMMARY: \$200 price drop helps Canongain a notch on the corporate competition. The FB 1200S boasts great color and detail, but it's a tad slow overall.	725
}	HP ScanJet 6350C 800/722-6538 www.scanjet.com	\$499	94	Very good	13/76	FEATURES: SCSI and USB,* 1200 by 2400 dpi, 12.3-by-19.6-by- 7.6-inch case,* 15.8 pounds, 8.5-by-11.7-inch scanning area, includes transparency adapter and ADF. SUMMARY: A great choice for OCR, this speedy model includes an automatic docu- ment feeder, scans 35mm slides, and produces top-quality scans.	726
1984	Best Buy For expanded				v.pcworld.com/jan00/t10sca	nners. All products:	90

HOW WE TEST All scanners are tested with default settings under Windows 98 on a Dell Dimension V333 (Pentium II-333) PC with 64MB of RAM, using each scanner's bundled software. Overall score is based on scanned image quality (28 percent), scanning speed (25 percent), ease of use (17 percent), features (15 percent), support (10 percent), and price (5 percent). Speed tests are timed from the start of scanning until cursor control is regained. Data based on tests designed and conducted by the PC World Test Center.

Dimensions are listed in the following order: width, depth, and height.

2 Scanner was tested with USB interface.



OUR SOHO CHART rings in the new year with two new scanners priced at \$249, including the number one Epson Perfection 1200U—the first 1200-by-2400-dpi scanner to top our SOHO chart. Setting a new standard for software bundles, the thirdplace Umax Astra 2200 adds a flair for the Web with NetObjects Fusion 4 and Macromedia Fireworks 2. Versatile scanners from Umax, HP, and Canon continue to rule our corporate chart.



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# TOP 10 MONITORS

	17-INCH MONITOR	Month tested	Street price (10/15/99)	Overall rating	Quality of text/graphics	Comments	Product info number
1	Mitsubishi Diamond Plus 71 800/843-2515 www.mitsubishi-display.com	Nov 99	\$349	90	Excellent/ Excellent	FEATURES: 15.9-inch viewable area, .25mm stripe pitch Dia- mondtron tube, up to 85-Hz refresh rate, Plug and Play ready, TCO '95 compliant, three-year warranty, 12-hour daily toll-free sup- port. SUMMARY: Competitive price, best picture quality. Easy-to- navigate controls are set on retracting panel.	676
2	Dell UltraScan P780 800/388-8542 www.dell.com	Nov 99	\$374	86	Very good/ Excellent	FEATURES: 15.9-inch viewable area, .2425mm variable stripe pitch FD Trinitron tube, up to 100-Hz refresh rate, Plug and Play ready, TcO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Reasonable price, vibrant graphics, sleek case. Large text is sharp, but small type blurs on big spreadsheets.	-
3	Hitachi SuperScan 650 800/441-4832 www.hitachidisplays.com	NEW	\$329	86	Very good/ Excellent	FEATURES: 16-inch viewable area, .26mm dot pitch tube, up to 85- Hz refresh rate. TCO'99 compliant, three-year warranty, 11.5-hour weekday toll-free support. SUMMARY: Low-priced model with space-saving design offers brisk colors and crisp text but short support hours. On-screen controls require extra button pressing.	677
4	liyama VisionMaster Pro 410 800/394-4335 www.liyama.com	Nov 99	\$429	85	Very good/ Very good	FEATURES: 15.7-inch viewable area, .2527mm variable stripe pitch Diamondtron NF tube, up to 115-Hz refresh rate, Plug and Play ready, CO'95 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: Strong text and graphics; pricey, short support hours. On-screen controls require menu scrolling.	678
5	Samsung SyncMaster 700p Plus 800/726-7864 www.samsungmonitor.com	Nov 99	\$359	85	Very good/ Very good	FEATURES: 15.6-inch viewable area, .26mm dot pitch tube, up to 120-Hz refresh rate! Plug and Play ready.* TCO'95 compliant, three year warranty, 24-hour toll-free support. SUMMARY: Competitive price, handsome design, and intuitive on-screen controls. Image quality is strong, but SuperScan 650 offers slightly sharper colors.	679
6	Compaq P700 800/345-1518 www.compaq.com/monitors	Nov 99	\$458	85	Very good/ Very good	FEATURES: 16-inch viewable area, .2425mm variable stripe pitch FD Trinitron tube, up to 110-Hz refresh rate. Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Pricey, but has adjustable, sophisticated controls; excellent 3D. Support includes three years of free on-site service.	680
7	ViewSonic GF775 800/888-8583 www.viewsonic.com	Nov 99	\$319	84	Good/ Good	FEATURES: 16-inch viewable area, .2427mm variable stripe pitch FlatTron tube, up to 116-Hz refresh rate. Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: 550 off inexpensive flat CRT, but image quality traits competitors'. A good choice if you don't do extensive graphics.	681
8	CTX PR711F 877/857-7846 www.ctxintl.com	NEW	\$359	84	Very good/ Very good	FEATURES: 15.9-inch viewable area, .2425mm variable stripe pitch FD Trinitron tube, up to 117-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: Balanced picture quality, USB ports; short support hours, on-screen controls lack numeric gauges.	682
9	DecaView GF387 888/707-6688 www.decaview.com	NEW	\$369	84	Very good/ Very good	FEATURES: 15.9-inch viewable area, .25mm stripe pitch Diamond- tron tube, up to 119-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 10-hour weekday toll-free support. SUMMARY: Crisp text at small point sizes, accurate colors; tech support hours are shortest here, hard-to-use on-screen controls.	683
10	MAG InnoVision 796FD 800/827-3998 www.maginnovision.com	NEW	\$329	84	Very good/ Good	FEATURES: 15.6-inch viewable area, 2425mm variable stripe pitch FD Trinitron tube, up to 119-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 11-hour weekday toll-free support. SUMMARY: Flat CRT offers crisp text, easy tilt and swivel case, nice thumbwheel control. Support hours are short.	684
	Best Buy For reviews of prod	ucts that didn	't make the ch	art, visit www	.pcworld.com/t10mo	onitors. All products:	907

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned with pages. The overall rating is based on text and graphics quality (25 percent), features and ease of use (20 percent), price (25 percent), and service and support (5 percent). The best pos-

1 Highest refresh rate at 1024 by 768 resolution. 1 Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play. 1 Uses an aperture grille with a variable pitch that is smaller at the center than around the perimeter.



OF THE FOUR newcomers on this month's chart, Hitachi's SuperScan 650 ascended highest, thanks to its low price, gorgeous colors, and crisp text. Its short depth makes it ideal for the spaceimpaired. CTX's PR711F, DecaView's GF387, and MAG InnoVision's 796FD deliver sharp images on flat CRTs but come with brief support hours. Models from ADI, Eizo Nanao, and Panasonic fell short. Next month: more of the latest 17-inchers.

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# TOP 10 GRAPHICS BOARDS

Matrox Millennium G400 32MB 800/361-1408 www.matrox.com/mga TI Xpert 2000 05/882-2600 www.ati.com	Sept 99 Dec 99	\$199	85	Very good	Very good	Very good	FEATURES: 32MB of RAM, 300-MHz RAMDAC, Matrox G400 chip, bundled image editor, 30 modeling tool, and 30 game. SUMMARY: Speedy card lets you run apps simultaneously on two displays. A slightly slower 16MB version costs \$50 less.	727
05/882-2600 www.ati.com dfx Voodoo3 3500TV 00/234-4334	Dec 99	\$99	84		))	ferromentum repr	the state of the s	*********
00/234-4334		THE REAL PROPERTY AND ADDRESS OF THE PARTY AND		Good	Very good	Good	FEATURES: 32MB of RAM, 250-MHz RAMDAC, ATI Rage 128 chip, bundled 3D game, SUMMARY: Rea- sonably priced card provides solid performance, making it suitable for basic graphics tasks as well as occasional 3D gaming.	728
	Nov 99	\$249	84	Very good	Excellent	Very good	FEATURES: 16MB of RAM, 350-MHz RAMDAC, 3dfx Yoodoo3 chip, TV tuner, bundled video editor and 3D games, SUMMARY: Fast in 3D and produces attrac- tive images despite lacking support for 32-bit ren- dering. Also lets you view and capture video files.	729
latrox Marvel G400-TV 00/361-1408 ww.matrox.com/mga	NEW	\$299	84	Excellent	Excellent	Excellent	FEATURES: 16MB of RAM, 300-MHz RAMDAC, Matrox G400 chip, TV tuner, bundled image editor, video editing tool, and 3D games. SUMMARY: Video features, including the ability to capture and view video on a TV screen, balance steep price tag.	730
TI Xpert 128 05/892-2600 ww.atl.com	Aug 99	\$79	83	Good	Good	Good	FEATURES: 16MB of RAM, 250-MHz RAMDAC, ATJ Rage 128GL chip, bundled graphics plug-in and 3D games. SUMMARY: Lowest-priced AGP board here. An affordable choice for people who use standard office apps and occasionally play games.	731
dfx Voodoo3 3000 00/234-4334 ww.3dfx.com	July 99	\$150	83	Good	Very good	Good	FEATURES: 16MB of RAM, 350-MHz RAMDAC, 3dfx Yoodoo3 chip, bundled 3D games. SUMMARY: Affordable card runs 3D games well. But unlike some of its peers, it doesn't support 32-bit color for displaying more realistic effects.	732
reative Labs 3D Blaster RIVA NT2 Ultra 00/998-1000 ww.creative.com	Sept 99	\$200	63	Good	Good	Very good	FEATURES: 32MB of RAM, 300-MHz RAMDAC, NVidia RIVA TNT2 Ultra chip, no bundled applica- tions. SUMMARY: Solid performance in office apps and very fast in games, though a tad slower than some of its competitors.	733
CI BOARD								
3dfx Voodoo3 2000 800/234-4334 www.3dfx.com	Oct 99	\$100	91	Very good	Excellent	Very good	FEATURES: 16MB of RAM, 300-MHz RAMDAC, 3dfx Voodoo3 chip, no bundled applications. SUMMARY: Top PCI upgrade choice for diehard gamers. Pro- vides the fastest 3D performance among all PCI cards we've tested.	734
LSA Erazor II 00/272-3572 ww.elsa.com	June 99	\$80	82	Good	Good	Good	FEATURES: 16MB of RAM, 250-MHz RAMDAC, NYidia RIVA TNT chip, no bundled applications. SUMMARY: Least expensive board on the PCI chart performs well in day-to-day graphics jobs, but it's a little slow in 3D games.	735
latrox Millennium G200 SD CI 00/361-1408 ww.matrox.com/mga	Feb 99	\$119	76	Good	Very good	Good	FEATURES: 8MB of RAM, 250-MHz RAMDAC, MGA- G200 chip, bundled 3D modeling tool, image edit- ing application, and 3D game. SUMMARY: Speedy in both business graphics and 3D games, and offers useful software extras.	736
To the state of th	Il Xpert 128  JS/882-2600  Ww.atl.com  If X Voodoo3 3000  JS/882-2600  JS/882-2600	### Aug 99  ### Au	Septiment   Sept	Septiment   Sept	Sept 99   Sept	Septiment   Sept	NEW   \$299   84   Excellent	NEW   \$299   84   Excellent   Excellent   Excellent   Excellent   Video editing tool, and 3D games. SUMMARY: www.matrox.com/mga   NEW   \$299   84   Excellent   Excellent   Video editing tool, and 3D games. SUMMARY: www.matrox.com/mga   NEW   \$299   83   Good   Good

HOW WE TEST We test boards under Windows 95. Business tests include PC WorldBench 93, a PowerPoint test, and a Macromedia Director script. Our 3D score is based on four games, each evaluated on frame rate and image quality. For AGP cards we add a texturing test using Caligari's TrueSpace3. We test AGP boards in an NEC Direction 333 with a PII-333 and 64MB of RAM.

We test PCI boards in a Micron Millennia Mme PC with a Pentium MMX-233 and 32MB of RAM. Overall rating is based on performance (AGP 55 percent, PCI 50 percent), features (25 percent), price (AGP 10 percent, PCI 15 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



ANY CARD HERE will pump out sparkling graphics on your PC monitor. But if you want to capture images from your TV or VCR, or view games on a big TV screen, try Matrox's easy-to-use

\$299 Marvel G400-TV or 3dfx's \$249 Voodoo3 3500TV AGP boards. Both combine graphics acceleration and video and TVtuning capabilities. Want to attach an extra monitor to your PC? Consider our AGP Best Buy, the Matrox Millennium G400. ■

# HERE'S HOW



WINDOWS TIPS

SCOTT DUNN

# Make Windows a Safety Zone

FOR YEARS, READERS have been asking me how they can protect the security and privacy of their Windows settings and files without upgrading to NT. This is like asking how you can secure your home without putting doors in the doorways. Okay, maybe it's not that bad. In truth, you can take several measures to discourage (if not prevent) interlopers from messing with your Windows system and

files. Not surprisingly, the most effective of these require you to shell out some cash. Lock the door. When Windows prompts you for a password at start-up, you may think it's protecting your system, but it's not. Your name and password only tell Windows which user is logging on and which set of preferences to use. Anyone

can get to the default desktop simply by clicking Cancel at the password prompt.

Since this password protection is far from adequate, here's a work-around: First, make sure your system discourages tampering when it is running and you're away from your desk. Choose Start-Settings-Control Panel. Double-click Display

and then click the Screen Saver tab. Make a selection from the Screen Saver dropdown list, and click Settings. Check Password protected and click Change. Enter a new password in each box and click OK. Then locate the .scr file corresponding to your chosen screen saver, right-drag it to your \Windows\Start Menu\Programs\ StartUp folder (your path may differ), and choose Create Shortcut(s) Here. The next time you start Windows, the screen saver will start and prompt you for a password. Secure the network. If you're set to share drives or folders with others on a Microsoft network, you can control how accessible these resources are.

Open My Computer, right-click the drive or folder you want to let others use, and choose Sharing (or choose Properties and then click the Sharing tab). Select Shared As. Type a name that will identify the drive or folder on the network, and then select an access type-Read Only, Full, or Depends on Password. Each option lets you enter a password that users must supply to access the shared item. If you select Depends on Password, you can designate both a Read Only and a Full-Access password and then decide who can be trusted with which password (if any). Don't store any files you don't want to share in the shared drive or folder. Note: This kind of sharelevel security may not be available on Netware or other networks; ask your system administrator about how to protect your files in non-Microsoft network systems. Establish policies. Your best free tool for limiting what others can do on your PC is the System Policy Editor. To protect a single system, start by setting up multiple profiles, as if you were going to let other users work on the machine, each with a unique batch of settings.

In Windows 95, double-click the Passwords icon in Control Panel and click the User Profiles tab. Select the second option



FIGURE 1: USE SYSTEM POLICY EDITOR to restrict the environment of those who skip your password.

(it starts with users can customize their preferences), then any other options as desired. Follow the prompts to restart the computer. When prompted, type in a name and password, followed by a confirmation of the password. Windows will ask if you want to set up a new profile for this identity. Click Yes. In Windows 98, things are simpler: In Control Panel, double-click the Users icon and follow the on-screen directions in the Enable Multi-user Settings wizard to create a new profile.

Once you've created a profile for yourself, you're ready to use System Policy Editor to restrict those who don't know your password. (If you haven't installed this tool, search for the poledit folder on your Windows CD-ROM in \tools\reskit\netadmin, or download it from www.microsoft.com/windows95/downloads.) Since you'll be using it to modify the Windows Registry, back up user.dat and system.dat and any .pwl files-preferably to removable media you can keep in a secure place-before you go any further.

Now restart your computer. At the password prompt, click Cancel. Since this is your intended configuration for unauthorized users, set restrictions in this environment. Customize the taskbar and Start menu, removing any items you don't want others to use. Then select Start-Run, type poledit, and click OK. Choose File. Open Registry. Double-click the Local User icon. Navigate through the tree diagram and use the various check boxes to apply restrictions that will prevent damage to your system (see FIGURE 1). Experiment with the settings, but leave yourself a way out in case you decide later to revert to a single-user system; this environment is what you'll get if you do.

To make such a trap door, go to the Local User\System\ Restrictions branch (Win 95) or the Local User\Windows 98 System\Restrictions branch (Win 98). Check Only run allowed Windows applications. click the Show button below this entry, click the Add button in the Show Contents dialog box, type poledit.exe, and click OK

twice. Leave yourself a way to run this application (by not disabling the Run box, for instance, or by moving poledit.exe to an obscure folder that's still accessible from Windows). When you're finished. click OK, then choose File. Save and File. Exit. Now anytime intruders click Cancel at the password prompt (Win 9x) or type a new name and password to create a new profile (Win 95), they'll get an extremely limited version of Windows.

Though far from fallible, this approach will make intruding as difficult as possible for any snoop who wants to try.

Protect files. Most users don't want to turn their entire system into a miniature Fort Knox; they just want to password-protect individual files or folders-something Windows won't allow. To prevent accidents or discourage well-meaning family members and coworkers from reading or changing files, you can make the files read-only and hide them from view. First right-click any file and choose Properties.



FIGURE 2: PLAY MOVIE AND AUDIO FILES in any folder by editing the Folder.htt file and using Web view.

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DON'T MISS ADDITIONAL HERE'S HOW information at www.pcworld.com/ heres\_how.

Check the boxes for Read-only or Hidden or both, and click OK. To make the hidden files invisible, choose View. Options

> (Win 95) or View-Folder Options (Win 98) and click the View tab. Select Hide files of these types (Win 95) or Do not show hidden files under Hidden Files in the Advanced settings list (Win 98). Click OK. Of course, you may have to reverse some or all of these steps if you want to edit the files yourself. In that case, your best course may be to keep sensitive files on a floppy or Zip disk.

> Use utilities. For the best in Windows 9x security, try a thirdparty security product. Many

of these let you password-protect files and folders, wipe a file from your hard disk, and prevent others from using your system. PGP Personal Privacy (\$45 shareware from McAfee) encrypts disks, folders, e-mail, and more, to keep your data safe from prying eyes. Download it at File-World or from www.McAfee.com.

#### PREVIEW MULTIMEDIA FILES

IF YOU HAVE Windows 9x with Internet Explorer 4 installed, you can preview many common Webrelated files right in the folder window. First, select View and make sure that as Web Page is selected. Then pick a file to see a preview of it, including file details, displayed to the left of the file list.

But not all file types are viewable-or in the case of multimedia, playable. Movie and sound clips, for example, don't play when you click their icons. To reverse that, in Windows Explorer, go to the \Windows\ Web folder. Choose View-Customize this Folder. When the Customize this Folder box opens, make sure Create or edit an HTML document is selected and click Next twice. When the file opens in Notepad, choose Search-Find. Type wantmedia and click Find Next. The search should locate a line that begins 'var wantMedia = false' (but with extra spaces for formatting). Replace the word 'false' with true. Select File Save and then File Exit. In the Customize this Folder dialog box, click Finish. If you have any Explorer windows open, you'll have to close and reopen them. After you do, pick a movie (.avi, .mov, .mpg) or sound (.au,



FIGURE 3: GET A ONE- OR TWO-PAGE print preview of a Web page with IE 5 by using MS FrontPage or FrontPage Express.

way) file and then click the play WINDOWS button that appears in the preview area (see FIGURE 2).

### SAVE PAPER WHEN **PRINTING FROM IE 5**

USERS OF

IE 5 often complain about the browser's lack of a print preview function like the one found in Netscape Navigator. Without this function, printing a part of a Web page becomes a crapshoot (will the wanted passage fall on page 2

or 3?). Instead of wasting paper printing the entire Web page to make sure you get the small part you need, try this work-around: When you want to print a Web page in IE 5, choose File Edit with Microsoft FrontPage Editor. When the page finishes loading

into FrontPage (included with Microsoft Office 2000) or FrontPage Express (included with IE 5), choose File Print Preview (see FIGURE 3). Click Next Page until you see the information you want printed. Click Zoom In if you need a closer inspection; and click Two Page to see two pages at once. When you've determined the page number of the portion you need,

> either click Print, or return to IE 5 and choose File. Print. Then enter the desired page number in the 'from' and 'to' boxes under 'Print range', and click OK.

> The downside? If the link you click opens a conventional file type, such as a JPEG graphic or a text file, the Edit with Microsoft FrontPage Editor command won't appear on the File menu. In the case of text files, rightclick the link in the browser and choose Save Target As, specify a convenient location, and click Save to store the file on your PC.

# A Free Fix for Notepad

THOUGH MICROSOFT has improved Notepad to let users customize font and preserve Word Wrap settings between sessions, it continues to be plaqued by the absence of a search-and-replace feature and an inability to



handle files much over 45KB. If you want a good replacement, try EditPad, a nimble text editor for Windows 9x and NT. EditPad overcomes the traditional Notepad limitations and provides additional features, including tools for converting text between upperand lowercase, chang-

ing tabs to spaces and vice versa, saving as e-mail (if you have appropriate MAPI server software, such as Microsoft Exchange or Outlook), and customizing colors. The tabbed interface makes it easy to see which documents are open and to switch between them in a flash. Technically, this is not freeware-you must send a thank-you paper postcard to its author, Jan Goyvaerts. The program is available on FileWorld or from www.igsoft.com.

> Then locate and select the saved file. Press <shift> as you right-click the file icon and choose Open With. Select WordPad from the list and click OK. In WordPad, choose Print Preview and follow the same instructions as you would for FrontPage. Delete the saved file when you're done.

> FrontPage Express can display only certain kinds of Web formatting, so your Web page may look distorted or may not display at all—especially if it uses frames. You'll fare much better if you install the full version of FrontPage 2000. Still, on many Web sites, using FrontPage Express can help you make an educated guess about printing the right page.



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tips to scott\_dunn@pcworld.com. We pay \$50 for published items. Scott Dunn is a contributing editor for PC World and a principal author of The PC Bible, 2nd Edition (Peachpit Press, 1995).

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# Selectively Share Your Printer With Colleagues

SO THE COMPUTER WHIZZES downstairs finally installed that nifty color printer you've been waiting for. Because you're such a pal, you're willing to let some of your colleagues in nearby cubicles print on it, but you don't want everyone in the office chewing up precious consumables with their hefty downloads. Fortunately, Windows NT lets you control who gets to print on your printer-and when.

Assuming the printer is already installed on your system, your next step is to share the printer with other users on the LAN. Open the Printers folder (by selecting Start. Settings. Printers). right-click the printer you want to share, select Sharing, and click the Shared button. Now the printer is shared, but not with anyone specifically. To let anyone use your printer, click the Security tab, then the Permissions

button to open the Printer Permission dialog box, and select Everyone from the list of user groups. Click OK. To limit access

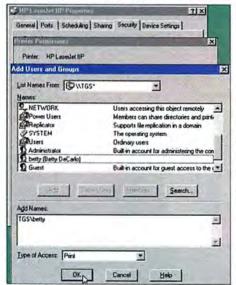


FIGURE 1: LET OTHERS use your printer by creating user accounts for them and sharing selectively.

to a few friends. you have to create accounts for them first on your system by using NT's User Manager: Select

Start · Programs · Administrative Tools (Common). User Manager. To share the printer

> with one of those accounts, open the Printer Permission dialog box and click the Add button, Now choose Show Users, select the appropriate user name, click Add, then hit OK (see FIGURE 1). Click OK twice more to complete the task.

To limit printer sharing to times when

you'll be at work to keep an eye on things, right-click the printer icon and choose Properties, then click the Scheduling tab. Scroll through and choose times from the From and To lists, and click OK.

### MORE ON THE COMMAND LINE

LAST MONTH'S column included a primer on using Windows NT's Command Prompt to perform tasks faster and more easily. Here are a few more commandline tricks you'll want to add to your bag: Find files based on content. Sure, you can find any file containing the word aardvark by choosing Start-Find-Files or Folders, entering aardvark in the 'Containing text' field, and clicking Find Now. But the findstr command also provides output options that the graphical user interface doesn't (type findstr /? on the command line for help). One of findstr's best options is redirecting the results of a search to a text file. For example, if you enter the command

# Find a Windows NT User Group

SOMETIMES, ONLY the advice or quidance of another human being can help you resolve issues you may have with your Windows NT system. Fortunately, no matter where you live in the world, there's a Windows NT user group populated with friendly experts ready and willing to share their NT secrets, gripes, product demos, and other things with you. To locate a user group in your local area, check with the Worldwide Association of NT User Groups at www.ntpro.org/wantug/ memberlist.asp.

findstr /s /i /m "aardvark" \*.txt >aardvark.txt, you'll not only search the current directories and its subdirectories for .txt files that mention the marsupial, but you'll also save the results in the file aardvark.txt.

Create a repair disk. Whenever you make changes to Windows NT's configuration, you should create an updated emergency repair disk. Then, if NT ever becomes unbootable, you can use the disk to boot and repair the OS. Enter rdisk at the command prompt, then click Create Repair Disk and follow the prompts.

Edit that ASCII. Notepad works fine, but getting to the point where you can see and edit the file requires navigation. To open a file instantly for editing, type edit filename. To open the file in a separate window (leaving the command line ready for more action), enter start edit filename. Note: If the file doesn't reside in the current directory, you need to specify the full path to the file before entering the file name.

Read this. Though designed for system administrators, Eric Pearce's Windows NT in a Nutshell has a lengthy chapter on using the command line, plus gobs of tips for troubleshooting and tweaking networks, user accounts, and file permissions.

Send your questions and tips to nttips@ spanbauer.com. We pay \$50 for published items. Scott Spanbauer is contributing editor for PC World.

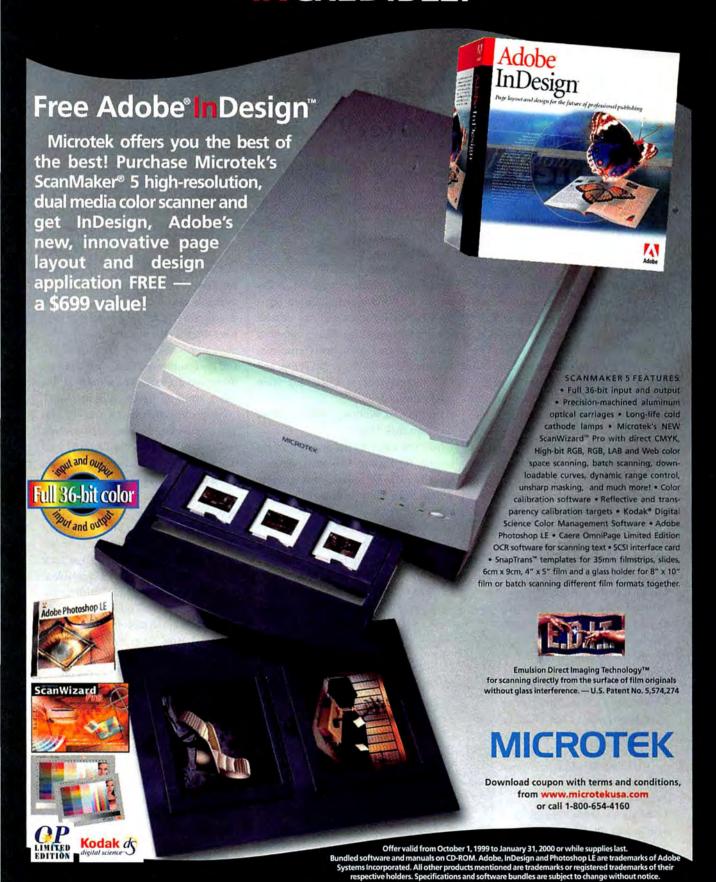
## Windows NT in a Nutshell

List price: \$25; O'Reilly & Associates; 800/998-9938; www.oreilly.com

PRODUCT INFO NO. 601



# **INCREDIBLE.**



# YOUR QUESTIONS ON: Enabling Microsoft Fax . Creating universal associations

# Make a Disk for Full System Recovery

IS IT POSSIBLE to make a CD that I could later use to re-create my hard drive, complete with my applica-

tions and configurations? I'm thinking of getting a CD-RW drive to create such a disc.

> Lance Schafhausen Rochester, Minnesota

WHAT YOU WANT is a way to back up everything except your data (you should back up the latter separately on a regular basis). That way, if your PC crashes six months from now, you can restore Windows and your applications and not end up with a bunch of ancient documents.

You don't need a CD-Rewritable drive to do this. Any large-capacity removable storage device, like a Zip or Jaz drive, will do.

The best way to back up everything except data is with a backup program, one that supports Windows 9x. I'll provide detailed instructions for Microsoft Backup, which comes with Windows 98, but much of the advice that follows applies to other backup programs as well.

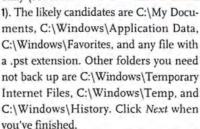
If you don't have Backup installed-and you probably don't-put the Windows CD-ROM in the drive. Click Add/Remove

Software. At the Windows Setup tab, double-click System Tools. Check Backup, then click OK twice. When the installation is done, reboot.

To launch the program, select Start-Programs-Accessories-System Tools. Backup. If you are asked whether you want to add a backup device, click No. Check Create a new backup job, and click OK to launch the Backup Wizard. Now choose Back up selected files, folders and drives, then click Next.

Now you must select the files you wish to back up-or more precisely, the ones you don't. Start by checking the hard drive, indicating

that you want to back up everything on it. Then deselect the folders and files you already back up daily (see FIGURE



On the next window, click All selected files, then click Next.

Now you must tell the program where to store the backup. Obviously, the best place is a CD-Recordable or removable storage drive. However, many CD-R and CD-RW drives let you write to them only with special file-copy software. If you're using such a drive, you'll have to create the file on your hard drive first and copy it to your removable media later. If your CD-R or CD-RW drive came with Adapt-

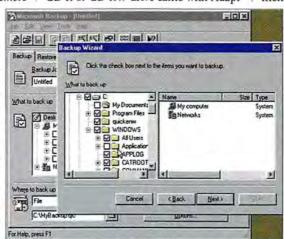


FIGURE 1: TO CREATE A SYSTEM restoration disk, back up Windows and your applications, but not data.

# Automate Paychecks in Quicken

PAYCHECKS REPORT income (your pay) and expenses (the deductions) and should be entered as both in Quicken. If this sounds complicated, use Quicken's Payment Wizard to set up a regular paycheck entry that will track money coming in and going out. In Quicken 98 and 99, select Features Banking Set Up Paycheck to launch the wizard. In Quicken 2000, select Banking Banking Activities • Set up my Paycheck as a register transaction. Now if Quicken would only increase the size of the check.

ec's DirectCD, you can use that software to enable your backup program to write directly to a CD. Assign a drive, then click Next. On the next window that appears, make sure both options-for verified files and for compressed files-are checked. When you get to the last window in this dialog, name the backup and click Start.

During the backup process, stay nearby. You may be asked some questions (yes, you do want to back up the Registry). And if one disk isn't big enough, the program will prompt you to put in another.

If you had to take the preliminary step of backing up the file to your hard drive, you'll have to copy the backup file from the hard drive to a CD. If the file is too big, use a file-splitting program such as Marc Bjorklund's free File Splitter (available at members.xoom.com/mbjorklu/file\_split-

ter or on FileWorld) to divide it up into 645MB pieces.

A final item you'll need is a bootable floppy with CD-ROM support. If you have Windows 98, select Start. Settings. Control Panel. Double-click Add/Remove Programs. Click the Startup Disk tab, then click the Create Disk button, and follow the prompts from there. If you have Windows 95, consult the instructions at www.pcworld.com/ margg/answers.

Now if disaster strikes, you'll be ready. Start by reinstalling Windows, Backup, and possibly drivers for your mass storage device; then

restore everything from the backup file. Depending on the situation, you may need to restore your data as well.

#### WHERE'S MICROSOFT FAX?



TO MY ANNOYANCE, I've discovered Win 98 doesn't include Microsoft Fax. Must I buy a fax program?

James Warner, Bensenville, Illinois WINDOWS 98 does come with Microsoft Fax. It's just hidden on the Windows CD-ROM in the \tools\oldwings\message\us folder and doesn't get installed by default.

But Microsoft Fax requires Windows Messaging, Microsoft Exchange Client, or Outlook 97 to work. (To install Windows Messaging, run wms.exe.)

Run awfax.exe to install Fax, then select Start-Settings-Control Panel. Double-click the Mail icon and click the Add button. If you don't want to use Windows Messaging for your e-mail, uncheck Microsoft Mail but leave Microsoft Fax checked. Click Next and follow the wizard.

For more, see last month's Got a Problem? (www.pcworld.com/dec99/gap).

#### UNIVERSAL ASSOCIATION



CAN I GET NONASSOCIATED files to open for viewing in a particular program-Notepad, for example-by

double-clicking them?

David Lee, Austin, Texas BY DEFAULT, double-clicking an unassociated file brings up the Open With dialog box. You can change that default, but I wouldn't recommend you give Notepad these honors for viewing files. A fileviewing program such as QuickView (which comes with Windows) or Jasc Software's vastly superior QuickView Plus makes considerably more sense for accomplishing this job because such programs are able to look inside a file and decide how best to display it (see FIGURE 2).

Whatever program you decide to use, creating a default association requires editing the Registry-not a task to be taken lightly. First make a fresh backup of

#### QuickView Plus

List price: \$59, upgrade \$29; Jasc Software; 800/622-2793; www.jasc.com PRODUCT INFO NO. 675

the Registry. Then select Start-Run, type regedit, and press <Enter>. Navigate the left pane to HKEY\_CLASSES\_ROOT\Unknown\shell\openas\command. In the right pane, double-click (Default). In the Edit String dialog box, press (Control)-C to copy what's there, then type in the appropriate command to launch your program:

Notepad: c:\windows\notepad.exe %1 QuickView: c:\windows\system\viewers\ quikview.exe %1

QuickView Plus: "c:\program files\ quick view plus\program\qvp32.exe" %1 (Don't forget the quotation marks.)

In the left pane, click the openas folder, press <F2>, and rename the folder something appropriate, like view.

Now go to the shell folder. Select Edit. New-Key and name your new key openas. In this new folder, select Edit. New-Key and name the key command.

With the command folder selected, double-click (Default) in the right pane. Press (Control>-V to paste in the command you copied before-C:\WIN-DOWS\rundll32.exe shell32.dll, OpenAs\_RunDLL %1. Then press (Enter) and close RegEdit.

Now when you double-click an unassociated file, the preview program of your choice will come up. If you want to bring up the Open With dialog box, just rightclick the file and select Open with,

#### **OVERCOME HALTED DEFRAGS**



CAN'T DEFRAGMENT my hard drive, Windows' Disk Defragmenter keeps restarting the job but never gets around to finishing it.

John G. Marson, Tampa, Florida I RECEIVE lots of mail about ScanDisk and Defrag. Several things may cause these apps to stop short of completing their tasks. See if any of these fixes work: Walt longer. Disk Defragmenter appears to freeze at the 10 percent mark. Actually, it's just figuring out how to organize your files and will start actively running again in a few minutes.

Scan the disk, If Defrag repeatedly dies on you, run ScanDisk: Select Start. Programs. Accessories System Tools Scan Disk. Make sure the Thorough option is checked before you click Start. If ScanDisk can't finish its job either, exit Windows and try the DOS version: Select Start-Shut Down-Restart in MS-DOS mode. At the DOS prompt, type scandisk and press (Enter).

Close all your programs. You should have nothing else running when you perform a disk scan or defrag. After you exit from all your applications, press (Control>-(Alt>-<Delete> to bring up the Close Program window. Close every item listed-except



FIGURE 2: DOUBLE-CLICK AN UNASSOCIATED file and bring up your preferred file viewer.

Explorer and Systray-by highlighting each item and clicking End Task.

Turn off your screen saver. Right-click the desktop and select Properties. Click the Screen Saver tab. For your screen saver, select (None), then click OK.

Clear out your hard drive. The more space you leave, the easier it is for these utilities to do their work. Empty your browser's cache and history folders. Delete all the .tmp and .chk files you can find. (Not sure where they are? Run the Find utility from the Start menu.) Uninstall any program you never intend to use. Finally, when you've deleted all these superfluous files. don't forget to empty the Recycle Bin.



Find files from this article at www.fileworld.com/magazine. online Send your questions and tips to

answer@pcworld.com. We pay \$50 for published items. PC World Contributing Editor Lincoln Spector writes the syndicated column Gigglebytes.

# Your calendar on the Web • Publish an e-zine • The best newsreader—free

# Ready to Get Serious About E-Mail Privacy?

YOU MAY HAVE heard about e-mail encryption-you may even have tried it and given up because it was too confusing (okay-too geeky). It's time you tried it again. With programs like Pretty Good Privacy and the encryption systems built into Internet Explorer and Netscape Communicator, you can scramble your messages so only the recipient can read them,

or digitally sign them to prove you're who you say you are.

But signing and encrypting mail involve extra steps and, in some cases, extra expense. If your messages usually aren't sensitive, why bother?

The short answer: If you don't, someday you may wish you had. Sure, it's unlikely that someone has singled out your mundane missives for scrutiny from among the millions zipping around the Net. But it's easy to become a target. And if you use your

employer's mail system, you probably already are. When you negotiate a salary increase, discuss personal matters, advise clients on sensitive issues, or conduct other legal and ethical but private affairs using e-mail, the only way to ensure your privacy is to use encryption.

### GO WITH PGP

THE ENCRYPTION system built into Windows (via Internet Explorer) works much like Pretty Good Privacy's, but I advise you to skip it, for several reasons. (If you want to try it anyway, look for helpful tips in "Postmasters" at www.pcworld.com/ dec99/email\_tips.) First, using it costs money-you have to purchase a digital ID certificate from a third-party certificate provider. Second, few e-mail programs aside from IE and Communicator support the digital IDs. And third. PGP is a more secure encryption system

than the one included with Windows.

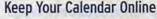
How can I say that? Both systems use encryption keys large enough

w.com



source program. Legions of doubting Thomases pore over its public source code to satisfy themselves that the NSA will never break asunder what PGP has

encrypted. Unless Big Brother has induced mass hypnosis among privacy geeks, PGP has no back door. By the time the men in black decipher your gibberish, you will be ancient history. And to ice the cake, PGP is easy to use. It comes with plug-ins for Outlook, Outlook Express, and Eudora, as well as with a Windows system tray icon that enables you to encrypt or sign the text contents of any window on your screen (see FIGURE 1).



WITH E-MAIL, office suites, and backup software turning into Web-based services, it was only a matter of time before your PIM went Web. The free AnyDay.com service stores your appointments, tasks, and contacts; lets you schedule meetings with other AnyDay users; e-mails you reminders of due dates and meetings; and syncs with your handheld or desktop PC's PIM. But unlike the calendar on your PC, AnyDay automatically adds weather forecasts, TV shows, and sports events to your schedule. Don't tell the boss.

If you decide to give PGP a try, I recommend starting at MIT's PGP distribution site, web.mit.edu/network/pgp.html. After you fill out a form declaring that you are a U.S. or Canadian resident (to comply with U.S. munitions law), you can download the latest freeware version (6.5.1 as I write this column). The Windows 9x/NT version weighs in at a hefty 8MB. Outside North America, find international versions of PGP at www.pgpi.net.

When you first set up PGP, you get to choose which optional elements you want to install (including e-mail program plugins and the PGPnet virtual private networking module). All you really need are the Key Management module and plugins for your mail programs, if any. You may also want the user guide. (If you install PGPnet, select Start-Programs-PGP-PGPkeys after your PC reboots to continue installation.) The installer will ask you to



FIGURE 1: ENCRYPT OR DECIPHER text anywhere on your screen using Pretty Good Privacy's PGPtray utility.

choose an encryption type and strengthuse the defaults, Diffie-Hellman/DSS, and 2048 bits. When prompted, pick a "passphrase" you won't forget but no one else with access to your computer will guess. And don't write it on a sticky note or any other place. When the installer tells you to send your public key to the key server, do it. That's how other PGP users will communicate with you securely.

You can start signing, encrypting, and decrypting messages right away, or simply ignore PGP until that fateful day when you decide to order some, er, personal items from an online store. To sign outgoing messages or decrypt and verify the authorship of incoming ones, choose Decrypt/Verify in the PGP menu that the plug-in added to your mail program, or click the PGP system tray icon (select Start-Programs-PGP-PGPtray if you don't see the padlock icon) and choose Current Window. Decrypt & Verify.

To encrypt outgoing messages, you must first download the recipient's public key and add it to your Keyring database. Launch the PGPkeys utility from the sysPGP FAQ at www.cam.ac.uk.pgp.net/ pgpnet/pgp-faq. Simson Garfinkel's PGP: Pretty Good Privacy is an excellent primer on public-key encryption and Pretty Good Privacy, though parts of it are a bit out-ofdate. For the most current information available and for access to other PGP users, visit the alt.security.pgp and comp. security.pgp.discuss newsgroups.

### BECOME AN E-MAIL **PUBLISHING MAGNATE**

SAY YOU'RE AN expert in restoring wooden tennis rackets. You know everything there is to know about keeping a venerable Davis Imperial in top shape, and you've put it all there on your Web site in hopes that someone, anyone, will see it and get in touch.

But they don't call and they don't write. Maybe you're working the wrong medium. If you have a lot of information to share, try doing what many major Web sites do: Publish an e-zine. E-mail newsletters are an inexpensive, easy way to reach a large audience. And instead of waiting for readers to come to you, you

send your message directly to them.

Chris Pirillo, who publishes Lockergnome (an e-zine), has written the definitive book on the subject. Poor Richard's E-Mail Publishing: Creating Newsletters, Bulletins, Discussion Groups, and Other Powerful Communication Tools unites commonsense advice

with clear explanations of e-mail technology. Pirillo suggests that you start your list using the e-mail account and software you already have. Then he shows you how to create interesting plain-text and HTML newsletters, and how to attract new subscribers. Once your publication attracts a big following, Poor Richard's will help you switch to software for managing larger lists and an Internet service provider that can handle the load. The book is packed



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Being an online marketing maven, however, doesn't mean you have to join the ranks of the cybersleazy. Pirillo makes it clear up front that he's antispam and recommends against buying lists of names from brokers. Not surprisingly, much of his advice focuses on how to treat subscribers well. Don't click Send without it.



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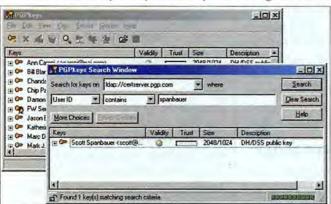


FIGURE 2: USE THE PGPKEYS program to download other PGP users' public keys onto your Keyring from public key servers.

tem tray PGP menu, the Start menu, or the PGP plug-in menu; choose Server. Search; enter your search criteria (an exact e-mail address is best); and click OK. When you find the key you're looking for, drag it into the main PGPkeys window (see FIGURE 2). To encrypt a message, choose PGP. Encrypt and sign now, or click the PGP system tray icon and choose Current Window. Encrypt & Sign.

If you need help, start with the official

#### PGP: Pretty Good Privacy

List price: \$30; O'Reilly & Associates; 800/998-9938; www.oreilly.com

PRODUCT INFO NO. 625

Poor Richard's E-Mail Publishing: Creating Newsletters, Bulletins, Discussion Groups, and Other **Powerful Communication Tools** 

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PRODUCT INFO NO. 626

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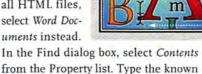
# Find Files Even If You've Forgotten Their Names

YOU CREATED a document last month or maybe a year ago, and now it's nowhere to be found. You know you saved it on your hard disk but can't remember the file name or the folder where you put it. If that's your dilemma, Word 97 or 2000 can help you. All you need is one unique word or phrase that appears in the document, such as the name of an addressee

or a company name. Windows' Find tool in the Start menu could perform this task. but Word's tool offers more options to speed up the search. Also Word's File Find feature restricts the search to only Word documents, while Windows' searches all files. Here's how to find that missing file, fast:

Word 97: Select File-Open. In the Open Dialog box, select a drive for the search from the 'Look in' list, Choose Word Documents in the 'Files of type' list. Type a word or phrase you know appears in the document in the Text or Property field. Leave the 'Last modified' field set at the Any Time default. Click Advanced twice, and in the Advanced Find dialog box, mark the Search subfolders check box, then click Find Now (see FIGURE 1). Word displays a list of files that match your criteria in the Open dialog box; double-click the file you are looking for to open it. If there are multiple files listed, click the Preview icon in the Open dialog box, and click each file to see its contents. When you find the right one, click Open.

Word 2000: Select File Open. In the Open dialog box, select All Word Documents in the 'Files of type' list, then select Tools-Find. If you want to exclude all HTML files, select Word Documents instead.



ment in the Value field. then click Add to List. Select a drive from the 'Look in' list, and mark the Search subfolders check box. Click Find Now. Once Word displays a list of files that match your criteria in the Open dialog box, double-click the desired file to open it. If you're not sure which file you need from that list, click the arrow next to the Views icon, and select Preview. Click each file to see its contents.

word or phrase from the docu-

When you find the right one, click Open.



WORD 97 AND 2000 come with a set of default style formats for headings and other types of text. You may want to



FIGURE 1: THE ADVANCED FIND dialog box lets you search for text or other properties in Word documents on an entire disk.

# Simple Document? Try WordPad

IF YOU NEED to write a short, simple document, speed up the creation process by using WordPad rather than a heavy-duty word processor. With all Word's basic features, and a nearly identical interface, Word-Pad is a fast-loading program that won't hog your computer's memory. To run it select Start Programs Accessories WordPad. To ensure that your WordPad document is compatible with your version of Word, select Word for Windows 6.0 in the 'Save as type' list of WordPad's Save or Save As dialog box.

change them to suit your own documents. Here's a quick way to customize them.

Start by typing text and then apply the style you want to it. Or you can select some text already in that style. With the text selected, click the Style box on the formatting toolbar (no need to use the dropdown Style list), and Press (Enter). In the Modify Style dialog box, click OK without making any changes (see FIGURE 2).

### **CREATE INSTANT CHARTS** FROM TABLES

YOU PROBABLY think the only way to create a graph or chart is from within your spreadsheet. Surprise! You can create graphs in the leading word processors as well. If your data is in a word processing table, you can use it to create a simple chart in seconds. You can modify it later, if necessary. Creating the chart requires just two simple steps in Word 97, Word 2000, or WordPerfect 8.

Word 97 and 2000: Click and drag to highlight the table data you want to put into your chart, making sure to include the row and column labels. Then select Insert. Picture. Chart. A neat 3D chart with a legend for the row labels will appear just below the table, in default format (see FIGURE 3). To resize the chart, drag its sizing handles. If you want to

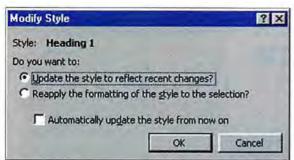


FIGURE 2: MAKE YOUR FAVORITE STYLE the default by highlighting the text and updating it in the Modify Style box.

change the chart type, just double-click the chart, then right-click and select Context. Chart Type.

WordPerfect 8: Make sure your word processing table contains only the data needed for the chart, with labels in the first row and column. Click anywhere in the table. and select Insert-Graphics-Chart.

WordPerfect will create a default 3D chart, just below the table. To resize the chart, drag the sizing handles. To change the type of chart or alter labels or other parts of the chart, double-click the chart, then right-click the part of the chart that you want to change, and select Commands from the context menu.

## SCAN IMAGES DIRECTLY INTO A DOCUMENT

IF YOU USE any TWAIN-compliant scanner or video input device and have Word 2000 or WordPerfect 8, you can scan images directly into your documents without going through the steps of scanning an image, saving it as a file, then inserting the file into your document. This timesaving and disk space-saving technique works best with images that will appear only in a single document:

Word 2000: Position the cursor where you want the graphic to appear in your document. Select Insert. Picture. From Scanner or Camera. If you have more than one TWAIN device installed, select the one that you want from the Device list, then click Insert or Custom Insert. Depending on your scanner software, Custom Insert may be the only button enabled. Scan the image as usual, using your scanner or video capture software, and close the software once the image is captured. The

image will appear in your document automatically, and from there you can format it. Word will save the graphic as part of the document.

WordPerfect 8: Position the cursor where you want the graphic to appear. If you have more than one TWAIN input device, select Insert-Graphics. Select Image Source to choose the device you want to use. Then click OK. Select

Insert-Graphics-Acquire Image. Scan the image as usual using your scanner or video capture software. When the image is captured, close the software. You can

format or manipulate the image from within the document. WordPerfect converts the image into its own graphics format and saves it as part of the document.

### CREATE YOUR OWN **GRAPHICS GALLERY**

IN ANY WORD processor. you can easily create a gallery of your most frequently used graphical images, available for instant access. Rather than searching the computer for a company logo, scanned image, chart, or other graphic, find an image by loading graphic there, you can simply

copy and paste or click and drag it into any document. Here's a simple process for setting up your custom gallery.

Create a new, blank document using your program's File New command. Insert any graphics that you use frequently, one at a time. Below each graphic, type a title that's easy to remember.

Adjust the size of each image to match its intended use, and make any other changes using your program's graphics manipulation tools. Then save the file with a name that begins with an exclamation point, such as !ArtGallery.doc. This will put it at the top of the file list.

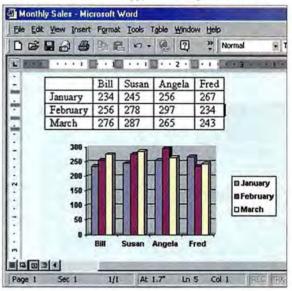
Whenever you need to use one of these

standard images, open your gallery file and search for the graphic by title. Then select and copy the image into the Clipboard and paste it into your document.

Hint: As you import other stock images into your documents, also copy them into your graphics gallery for future use.

## SAFEGUARD YOUR PREFERENCE SETTINGS

WHEN A HARD disk disaster strikes, you stand to lose a lot, but one loss you can easily prevent is that of the customized interface for your word processing program. All you need to do is simply copy the file that contains the customization data to a floppy disk and put it aside for



your custom gallery. Once FIGURE 3: A COLORFUL 3D CHART is just two steps away in you've located the desired Word or WordPerfect, as long as you have data already in a table.

emergencies. In all versions of Word, the preference settings file is normal.dot. In WordPerfect 8, it's wp8us.wpt. To find the file in Word, select Tools-Options, and look under the File Locations tab. Then go to the specified folder and copy the file to a floppy. To find it in WordPerfect 8, select Tools. Settings, double-click the Files icon, and look under the Template tab.

We welcome your questions and tips and pay \$50 for published items. George Campbell (george\_campbell@pcworld. com) is a PC World contributing editor. You can visit his Web page at www. osomin.com.

# Perform Math Operations Without Formulas

SPREADSHEETS, by their nature, rely on formulas to manipulate numbers. But creating formulas isn't always the most efficient way to modify a range of values. For example, suppose that you have a worksheet containing a column of prices for various products, and you need to increase all prices by 5 percent.

Excel provides two ways to accomplish this. The "traditional" technique goes something like this: Insert or find a blank column near the prices. In that column's first cell, enter a formula to multiply the price in that row by 1.05. Copy the formula down the column. Then select and copy

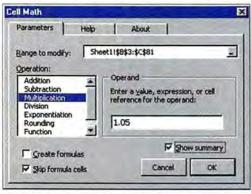


FIGURE 1: THE CELL MATH add-in lets you perform mathematical operations without using formulas.

the entire column of formulas, select the original prices, and choose Edit-Paste Special. Select Values to overwrite the original prices with the formulas' results. And finally, delete the column of formulas.

The other, slightly more efficient approach also uses the Paste Special dialog box. To increase a range of values (prices, in our example) by 5 percent, enter 1.05 into any blank cell. Select the cell and choose Edit-Copy. Then select the range of values and choose Edit - Paste Special. Choose Multiply and click OK. Then delete the cell that contains the 1.05.

If you need to do this sort of thing frequently, you may want to download a copy of my Cell Math from FileWorld. This tool, which works with Excel 97 or later, is more efficient because it lets

you perform any type of mathematical operation in a single step.

When the Cell Math add-in is installed, you'll have access to a new menu command. Select the cells you want to modify, then issue the Tools-Cell Math command to display the Cell Math dialog box (see FIGURE 1). Choose an operation from the

list, and enter an operand. The operand can consist of a value, a cell reference, or an expression (such as C9/12). For the pricing example, you would select Multiplication, and then enter 1.05 for the operand. Click OK. If the results aren't exactly what you expected, select Edit. Undo.

#### TWO-WAY LOOKUPS

ALL SPREADSHEETS support lookup functions, tools that return a value from a table by looking up another value in the table. An income tax table is a good example. You can

write a formula that uses Vlookup() to

determine the tax rate for a given income amount.

The lookup functions in Excel and 1-2-3 are only appropriate for one-way lookups, however. If you need to perform a two-way lookup, you'll need more than the standard functions. FIGURE 2 shows a simple example. The formula in cell H4 looks up the entries in cells H2 and H3 and then returns the corresponding value from

# Resize Excel's Sheet Tabs

IF YOUR EYESIGHT isn't what it used to be, you may want to increase the size of the sheet tabs displayed in your Excel workbooks. This parameter is determined by a systemwide setting. To change it, select Start \* Settings \* Control Panel and doubleclick Display. In the Display Properties dialog box, click the Appearance tab, and choose Scrollbar from the Item list. Adjust the sheet tabs until they're the size you want. Be aware that this setting affects the scroll bars in all your applications.

the table. The formula in H4 is =index(A1:E 14, match(H2,A1:A14,O), match(H3,A1:E1,O)).

The formula uses the Index() function, with three arguments. The first is the entire table range (A1:A14). The second uses Match() to return the offset of the desired month in column A. The third argument uses Match() to return the offset of the desired product in row 1.

Excel users can also take advantage of natural-language formulas. For example, enter =June Sprockets to return Sprocket sales for June. If natural-language formulas aren't working, select Tools. Options, click the Calculation tab, and place a check mark next to Accept labels in formulas.



Find files in this article at www. fileworld.com/magazine. Cononline tributing Editor John Walken-

bach (john@j-walk.com) is the author of Excel 2000 Bible (IDG Books, 1999). He maintains The Spreadsheet Page at www.j-walk.com.

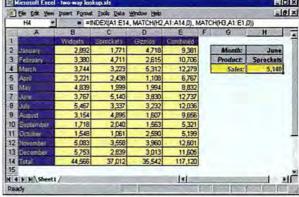


FIGURE 2: THE FORMULA IN H4 performs a two-way lookup to determine the sales for a particular month and product.

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# Update your system ◆ Degauss your monitor ◆ Clean out PCs you give away

# Take Care of Your PC or Watch It Die

PCS REQUIRE maintenance. For example, you need to regularly purge old, unused files and applications. Slack off, and your PC will be prone to crashes or perform more sluggishly. But PC maintenance goes beyond cleaning up the clutter and waxy yellow buildup of files and programs. Because both the hardware in your PC and the software it uses are often works in progress-with revi-

sions and patches soon appearing-hardware drivers and operating system files must constantly be updated.

One big argument for moving up to Windows 98 from Windows 95 or 3.1 is that Windows 98 makes getting updates easier than ever. The Windows Update utility for Windows 98 on Microsoft's Web site consoli-

dates all of Windows' improvements, bug fixes, and other upgrades in one place. Simply click the Windows Update icon at the top of the Start menu to go to Microsoft's update site.

If you don't find Windows Update on your Start menu, point your browser to windowsupdate.microsoft.com. Note that Windows Update works only on browsers supporting ActiveX (that is, Microsoft Internet Explorer 4 or higher).

Once you've registered your system online with Windows Update, just click the Product Updates link, and Windows Update will return a list of possible upgrades, categorized into groups, for your PC and for the version of Windows you have (see FIGURE 1). You'll find the most important downloads in the Critical Updates section, which features fixes for

important bugs, Y2K problems, security leaks, and the like.

Other sections are also worth a look. For exam-

ple, under Picks of the Month you'll find the Windows Critical Update Notification

> utility, which alerts you through a pop-up window (whenever your Web connection is live) when new critical files have been posted to the site. This section also tells you how to download and install Internet Explorer 5 with just a few mouse clicks.

To download an update, click the check box to the right of a listing. You can check as many updates as you want; clicking the Download button will download and install all of them.

But before you hit that Download button, make sure that you disable any antivirus software you may have running. This precaution is necessary because new files and patches that Windows Update



# Play the Field

DOES YOUR MONITOR screen have areas of discoloration that mysteriously move and change shape like Jupiter's spot? They're most likely caused by magnetic fields that accumulate on monitors when users run them continuously. The fix is easy: Just neutralize these rogue fields by pushing the degauss button-often labeled with a picture of a magnet-on the front of your monitor. If there's no button, turn your monitor off and on once. Most monitors automatically degauss their screen when they power up.

installs are often mistaken for intruding viruses. Also, always click the Read this first link at the end of each update's description to obtain any special instructions for downloading, installing, and uninstalling that update.

You can uninstall some updates from the Update Web page. Just click the Show Installed Updates button at the top of the page and scroll down until you find the update you want; then click the Uninstall button located to the right of the update's descriptive paragraph. In other cases, you must uninstall updates by using the Add/ Remove program in Control Panel.

#### FASTER DRIVERS ARE BETTER

UPDATING THE drivers that the operating system uses to access and control your PC's hardware components can speed up your system's performance as well as pre-

> vent potential crashes and internal conflicts. Component manufacturers are constantly adding improvements and fixes to their device drivers, and most of the time getting the updated drivers is simply a matter of downloading them from the companies' Web sites.

Finding the correct updated driver is another story, however. First you have to



FIGURE 1: THE WINDOWS UPDATE utility on Microsoft's Web site makes it easy to download updates, bug fixes, and other upgrades.

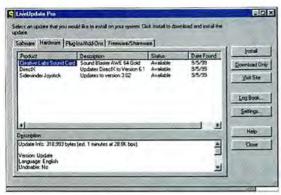


FIGURE 2: NORTON WEB SERVICES scans your PC and finds drivers in need of an update-for \$30 a year.

identify the version of each driver running on your PC. Then you have to hop around from Web site to Web site, looking for more recent versions to download.

A couple of services will do this tedious job for you. For \$30 to \$50 a year you can subscribe to either Norton Web Services from Symantec or McAfee Clinic from Network Associates and receive regular file updates for both your software applications and hardware drivers. Each service provides a program that scans your PC and then retrieves updates for any outdated files. You select which files to download online (see FIGURE 2).

Of the two, McAfee Clinic goes further by offering an online-based, constantly updated virus scan service, hard drive cleaner, performance optimizer, and technical support yellow pages with a database of tech support contacts and numbers for hundreds of hardware and software manufacturers. The bulk of the utility software resides on McAfee's servers; only a small

part of the software is actually loaded on your hard drive.

To be absolutely certain that all outdated drivers get updated, however, you'll probably want to do the work yourself. It'll also save you some money. Below are a few tips to help you get the job done more efficiently.

First, make a list of the drivers in your system. Again, Windows 98 has made this task vastly easier than in previous versions with its System Information utility. Launch it from

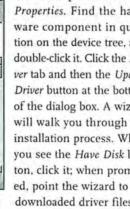
Start - Accessories - System Tools - System Information. Double-click Components in the dialog box's left pane, and then select a hardware component (see FIGURE 3). To the right you'll find the name, date, and version number of each driver.

Then go to Drivers HeadQuarters at www.drivershq.com to find the component vendor's Web site. Its handy list of links will help you quickly find the component maker's site and point you toward the right driver download page.

Once you've found an updated driver, you need to download and install it. Most drivers download as part of an executable program that, when run, automatically installs the new driver. If you're not sure whether the driver you want will download this way, look for a readme file with installation instructions.

But even if you have to install the driver manually, don't worry-it's easier than you might think. Open Device Manager by right-clicking the My Computer icon on

> the desktop and selecting Properties. Find the hardware component in question on the device tree, and double-click it. Click the Driver tab and then the Update Driver button at the bottom of the dialog box. A wizard will walk you through the installation process. When you see the Have Disk button, click it; when prompted, point the wizard to the downloaded driver files. It will do the rest.



#### GONE FOR GOOD?



MY SMALL COMPANY is donating some older PCs to a local nonprofit organization. Each system's hard

disk has very sensitive business data that must be removed. Will deleting just those important files be enough to keep prying eyes from recovering them? Or do I have to erase the entire hard disk (which would include the operating system)?

Robert Johnson, Chicago DELETING FILES only prevents a casual user from accidentally stumbling across them. Outsiders may still find copies of your sensitive data, accidentally or intentionally. Swap files, backup files, and Windows .tmp files can hold duplicates of your old files-not to mention that deleting a file just tags it for deletion; the file can remain on your hard disk for days or even months until another file overwrites its space. (In theory, high-tech spies can recover files that have been overwritten as many as six times, but that is a remote concern for most of us.)

Even the most unsophisticated snoop has a good chance of recovering a deleted file using file recovery utilities like Unerase Wizard, part of Norton Utilities 2000, or undelete.exe, a handy DOS utility found on the Windows 95 CD-ROM (but not the CD-ROM of Windows 98).

To keep your data really safe, you need to truly wipe out the sensitive files. A number of utilities do this. Look on File-World or at www.jetico.com for the free BCWipe (bcwipe.exe); or if you have Norton Utilities, use the WipeInfo utility.



Find files from this article at www.fileworld.com. Send your questions and tips to kirk\_steers

@pcworld.com. We pay \$50 for published items. Kirk Steers is a PC World contributing editor.

#### McAfee Clinic

Price: \$50 per year; Network Associates; 408/ 572-1500; www.networkassociates.com

PRODUCT INFO NO. 602

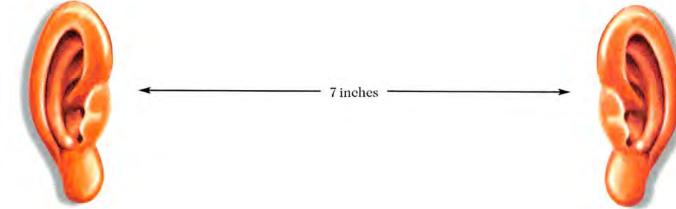
#### **Norton Web Services**

Price: \$30 per year or \$4 per month; Symantec; 800/441-7234; www.symantec.com

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FIGURE 3: FIND A DEVICE DRIVER'S KEY INFO-including name, version, and date-in Windows' System Information utility.



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# Install a CD-RW Drive

THE CD-REWRITABLE DRIVE continues to be one of the most popular PC upgrades. A CD-RW drive can repeatedly read, write, and erase files from \$4 to \$7 optical discs, while it can also read files on standard CD-ROMs and read and permanently write files to \$1 CD-Recordable discs.

Compared to last year's models, typical CD-RW drives write twice as fast and cost \$100 to \$150 less. Manufacturers indicate a CD-RW drive's speed by three numbers. A 6X/4X/24X drive, for example, writes to CD-Rs at a maximum of 6X, writes and rewrites CD-RWs at a maximum of 4X, and reads CD-ROMs at a maximum of 24X. The faster the write speed, the more expensive the drive.

External models that connect through a parallel port or Universal Serial Bus port are considerably slower than internal IDE models, though easier to install. Internal and external SCSI drives, the most expensive and the most difficult to install, offer the best performance.

Here's how to install the most popular CD-RW drives, IDE drives (\$150 to \$250) and parallel port drives (\$250 to \$300).

Stan Miastkowski is a contributing editor for PC World.



Prepare for Installation.

Whether you're installing an internal IDE drive or a parallel port drive, back up your hard drive before you begin. Some internal IDE CD-RW drives include software that analyzes your PC's IDE setup and sug-



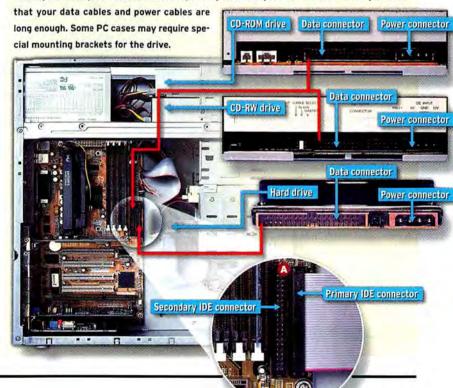
gests how to install your drive. If your drive came with such software, use it and print the results. If you have an IDE drive, go to Step 2. If it's a parallel port drive, go to Step 4.

2 Plan for connecting and mounting your internal IDE drive. Turn off your PC, unplug it, and remove the cover. Use an antistatic wrist strap to work inside your PC.

You'll find two IDE connectors (primary and secondary channels) on your motherboard (A). In most PCs, the IDE hard disk connects to the primary channel, and the IDE CD-ROM drive connects to the secondary channel, both via data cables. If this is the way your PC is set up, then you'll need only to connect your new CD-RW drive to the same cable as used by your CD-ROM drive. If that cable has no extra connector on it, use the cable that came with the CD-RW drive to connect both drives to the secondary channel.

Some PCs have both the hard drive and the CD-ROM drive connected to the primary IDE channel. If that's the case in your PC, and you have no other devices on the secondary channel (like an internal IDE Zip drive), plan to disconnect the CD-ROM drive from the primary IDE channel and reconnect it to the secondary channel, with your CD-RW drive.

Select the externally accessible drive bay where you'll mount your CD-RW drive. Most PCs have their CD-ROM drive mounted in the top externally accessible bay, with the hard drive mounted below it in an internal bay. In most cases, the new CD-RW drive belongs in the bay directly beneath your CD-ROM drive. Depending on where your CD-RW drive must go, check



Set jumper, connect cables, and mount an internal CD-RW drive.

Check your CD-RW drive and make sure its jumper is set to master. If you plan on continuing to use your CD-ROM drive, set its jumper

CABLE SELECT

MASTER

SLAVE

to slave. You may have to remove and then replace the CD-ROM drive to do so.

> Slide your new CD-RW drive into its bay and screw in its mounting screws. Then connect its data cable. Make sure the

cable's colored (usually red) wire goes to the pin nearest the power connector (some data cable connectors have a

plece of protruding plastic to prevent connecting in the wrong direction). Then connect the power cable to the CD-RW drive. Lastly, If your CD-RW drive came with an audio cable and your sound adapter has a free connector (on the sound card or on the

motherboard if your adapter is integrated) for its end of the cable, attach one end of the audio cable to the connector and the other end to the CD-RW drive. If the sound adapter has no free connectors and you don't mind losing sound from your CD-ROM drive, disconnect the CD-ROM drive's end of the audio cable and connect the cable to your CD-RW drive. Leave the cover off your PC until you're sure everything's working correctly. Go to Step 6.

> 4 Set up the parallel/printer port for an external parallel port CD-RW drive. For maximum performance with your parallel port CD-RW drive, your parallel/printer port needs to be set to EPP (Enhanced Parallel Port). Boot your computer and go to your BIOS setup menu; procedures for accessing this menu vary, but you usually need to press the <Delete> key during start-up. You'll probably find the printer port setting in a section called

> > Integrated Peripherals or something similar. Make sure it's set to EPP. (Some BIOS setups. like the one shown here, don't have a single EPP setting. In these cases, use the combination ECP/EPP setting.)

OM PCI/ISA BIOS (<P5HX-B>) INTEGRATED PERIPHERALS AWARD SOFTWARE, INC.

HDD Block Mode Slot IDE 2nd Channe hip Primary PCI I hip Secondary PCI I Maste Slave ry Maste ry Slave FDD Controller

Mode Parallel Parallel

6 Install software and start burning discs. Turn on your PC and install the drivers and applications that came with your new drive. Then test the drive to make sure that it can read standard CD-ROMs and audio CDs and can read and write to both CD-R and CD-RW discs. For CD-RW discs, copy some dummy files to them and try deleting the files. If you connected the CD-RW drive's audio cable to your sound adapter, play an audio CD to test for sound.

If your PC doesn't recognize the drive, turn off the PC and double-check all your connections. You can also select Start Settings Control Panel, doubleclick the System icon, and click the Device Manager tab. If the icon for your new drive is shown with an exclamation point next to it, there might be an internal conflict preventing the drive from working properly. Select Start+Help, type hardware troubleshooter in the search box, and follow the directions. If you still have trouble, contact tech support.

6 Hook up the cables. Turn off your PC and place the parallel port CD-RW drive on top of or next to your PC. If you have a printer connected to your system's parallel port, disconnect it and plug it into the printer port on the back side of the CD-RW drive. Hook up the included large cable to the parallel port on the rear of your PC and to the marked connector on

the rear of the CD-RW drive.





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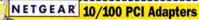
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Order#	Model	Processor		HD		Modem	0/S	Price
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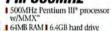
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pentium-	No.		/M/AB	K Des	ktop	s		-
Order#	Processor			CD/DVD			0/S	Price
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#E0262	EEN DIII	CA.	O ACD	EV DVD	ECV	10/00	115n 00	11 000

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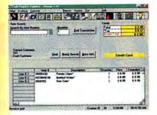
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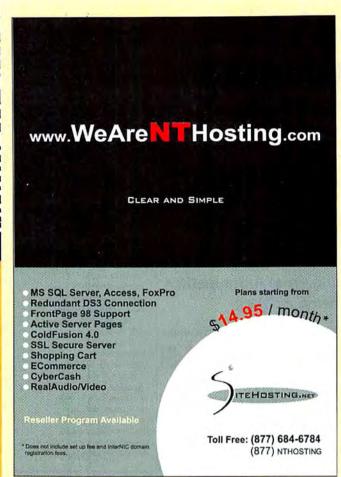
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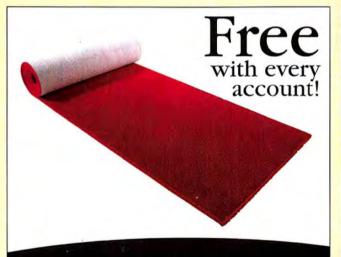
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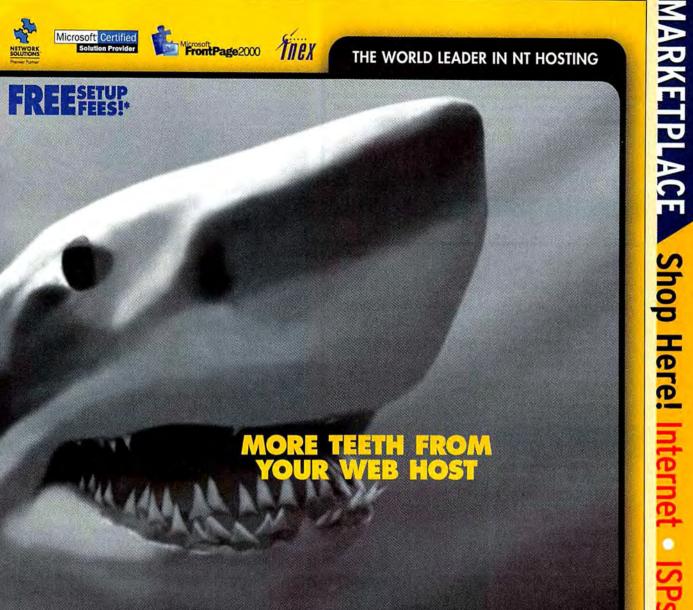


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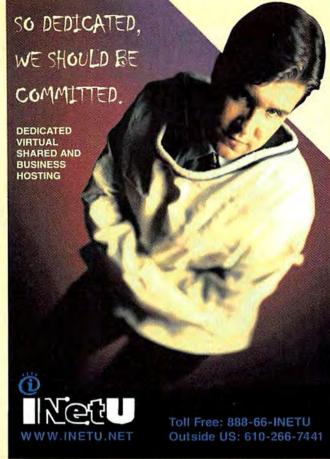
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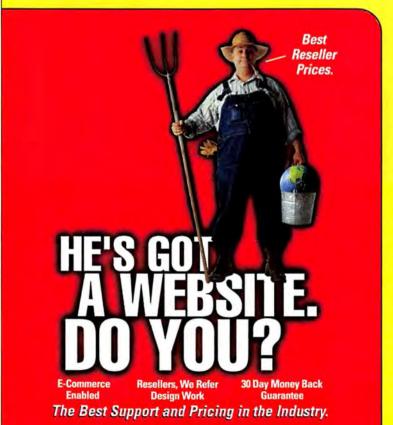
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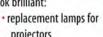
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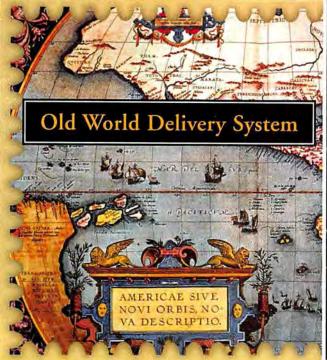
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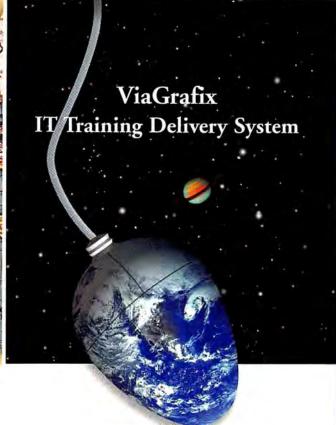
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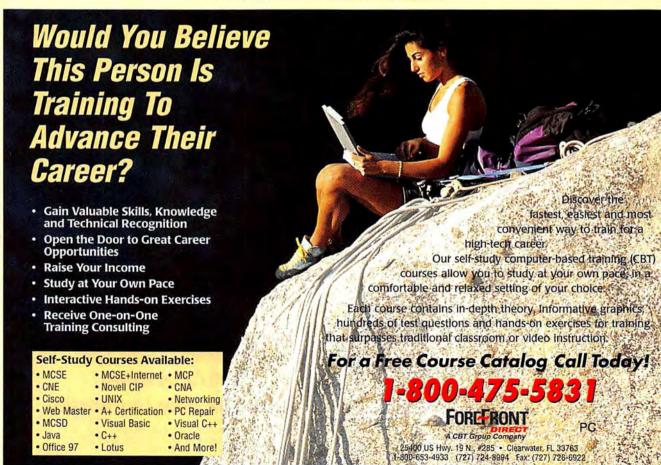
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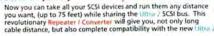
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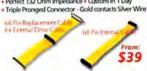
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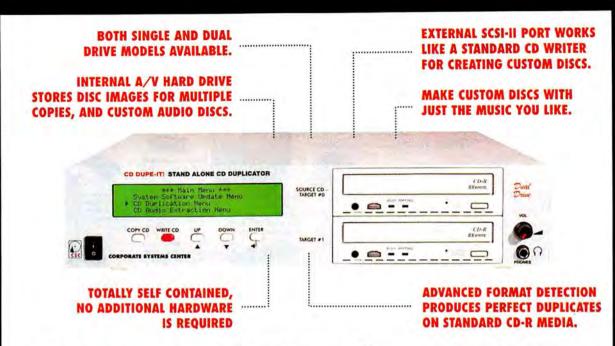
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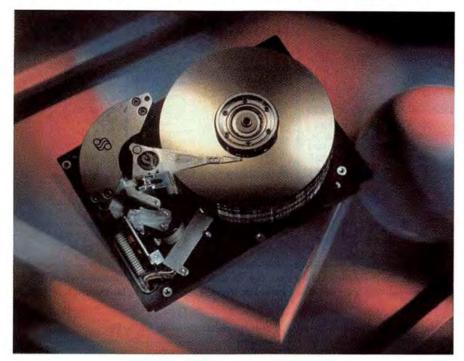
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32Meg	-	-	74	79	79	99
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4.0GB	9.1GB IBM 7200 rpm 289
6.4GB119	9.1GB IBM 10K rpm
8.4GB129	18GB IBM 7200 rpm499
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Thinkpad 390, 570, 600, 770, ED (SDRAN	t) 32/64/128Meg	89/169/369	-/21
Thinkpad 700, 720, 750, CL57SX	4/8/16/32Meg	59/89/129/219	134
Thinkpad 701, 701C, 701CS		19346999	119/-
Thinkpad 755C.CE.CD.CS.CDV.CSE.CV		59/79/129/219	134/24
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Thinkpad 7606, ED, EL, ELD			134/24
Thirkpad 760XD, 760XL	6/16/32/64Meg	29/49/79/139	134/24
Thinkpad 7650, 765L		29/49/79/129	134/24

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G6-Prof. M MMedia System - E00		6/22/44/75
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pson Action Laser 1100, 1500	2	5		9	-	29	49	- 1	-	
ason Action Laser II	59	341	25	1.0	119	100	100	190	Ob.	١.
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pson 1006, 1505, 5000, 5200	-	30	-	60	-	-	- V	140	-	
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P Design Jet 130, 2500	13	1 5	1.5	19	-	29	59	99	-	ш.
P Design Jet 600 6500	12	1 5	1.01	19	0	39				1.3
P Design Jet 650C PS	- 1	1 -	1 -	12	1 -	39	65	99	-	
P Design Jet 100, 750C, Pkin, 755	-	1 -	10	119	1.2	29	55	99	1 =	n a
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lers 500007 CS \$10005 CDT \$20007 \$30007	8/16/32/48/54/128Meg	22/44/79/119/149/289	221/239
903 300001, 03, 310000 (11, 31000001, 3100001, 31000001, 310000000000	M16/33/64/128Med	22/44/75/149/289	259
ACTS TODOS, TODOT (SDRAM)	A/16/32Meg	5999149	279/259
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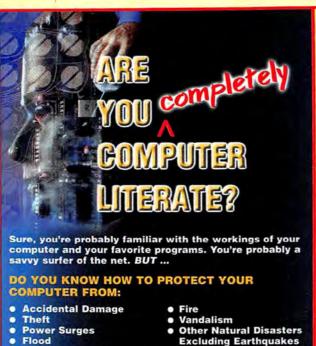
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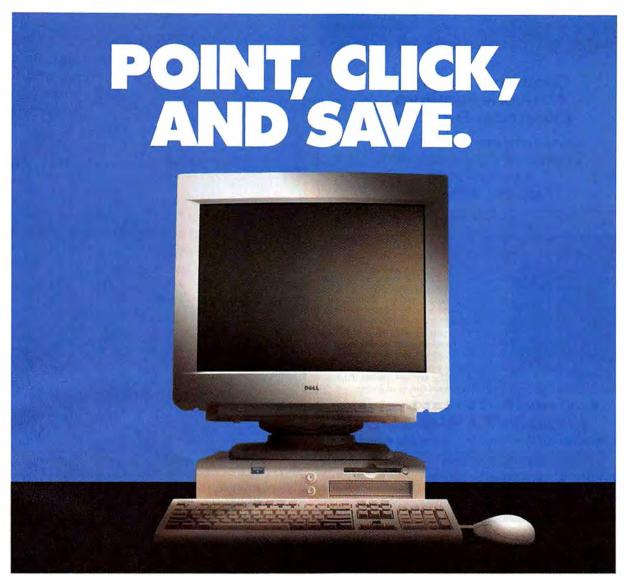
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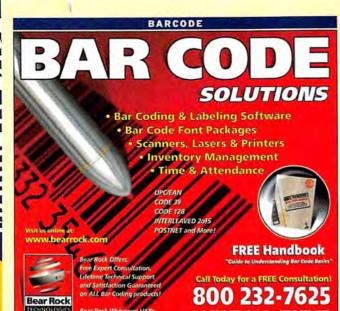


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# What's Next for PCs? **Nobody Knows**

FORECASTING THE HIGH-TECH future is a lot like predicting the local weather two weeks from Tuesday: It's easy to cobble up prognostications that sound reasonable, but real-world specifics inexorably conspire against accuracy.

Take the long-standing predictions of a high-bandwidth future. It doesn't take a degree in quantum physics to anticipate that many of

us will be getting bigger data pipes one day, but it's hard to guess how soon that will happen. Unexpected factors keep getting in the way.

A friend of mine recently tried to get cable Internet access. He had the lowest-tech problem imaginable: A wire had to snake invisibly from the living room to his home office. The first human installer was too obese to fit in the crawl space; a skinnier replacement was too dim to figure out how to hook things up. As long as people have to install it, you can bet broadband connectivity won't happen overnight.

Likewise, wireless data schemes will become an increasingly big deal as time goes on, but here too we can expect bottlenecks. I've tried several of the latest cell phones with data capabilities, and surfing the Web on a tiny screen at 14.4 kbps isn't exactly a karmic high. Besides, if cell phones are so great, how come people always ask, "Are you calling on a cell phone?"



Thanks to well-oiled hype machines, products still in the pipeline will look far better than those that already exist.

#### **NET APPLIANCES MAY NOT APPLY**

SO HERE'S ONE of the few predictions I feel confident about making: Thanks to well-oiled hype machines, products still in the pipeline will continue to look far better than those that already exist. What's sexier-a future device that promises to let you surf the Web with ease, or a bloated Windows 98 computer with all its known problems? The forthcoming machine wins-until it gets here and you discover its own quirks and limitations.

The classic example is the infamous Internet appliance. For many moons, pundits have been pushing Net appliances that are supposed to be simpler, more reliable, and cheaper than today's PCs. Sounds great, but nobody has flocked to buy the few Web or e-mail devices on the market. WebTV isn't bad, but though it's been around for three years. fewer than a million people actually use it.

How come? Consider this scenario: My wife wants to give a WebTV unit to one of her aunts. First we have to find out if her aunt's phone jack is anywhere near her TV; we're worried about Auntie tripping over the phone wire. Assuming we find the jack and trust Auntie to install the thing, we run into another issue: Who pays the monthly fees for this gift that keeps on giving?

Engineers tend to save problems involving usability and other human factors for last. I recently suggested to the publicity director of a major consumer electronics firm that she tape an episode of my TV show while she was out of town. Her response: "Don't go there."

If we can't figure out how to make a VCR usable for intelligent human beings, what chance do Internet appliances have? My two cents: Don't sell PCs short. They may be unreliable and hard to master, but nothing beats them for versatility or price/perfomance ratio.

#### THE NEXT SHALL BE LAST

THE "EVERYTHING goes digital" trend will only accelerate. But the real question is what it means for our lives. If its net effect is that we get to buy our cars and T-shirts online instead of from showrooms or catalogs, the growth of digital technology won't matter much.

And if digital technology does turn out to matter-as I believe it will-there will inevitably be trade-offs. Are we willing to trade cheaper phone bills for poorer-sounding calls? Will automation decrease the ranks of the employed and the

employable? Will teleconferencing save our highways and flyways from gridlock, or make us crave more time in the presence of friends and colleagues? The answers are far from clear.

So are many of the questions. After all, the gift of prophecy can fail even a media-anointed wonder man like Steve Jobs. Remember, he christened his second computer company NeXT.

It wasn't.

PC World Contributing Editor Stephen Manes is the cohost of Digital Duo, a series appearing on public television stations nationwide. For program information, see www.digitalduo.com.

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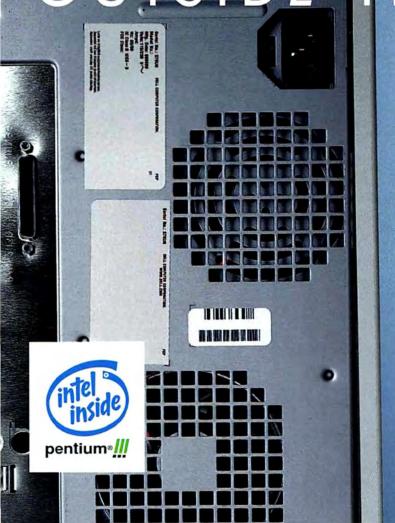
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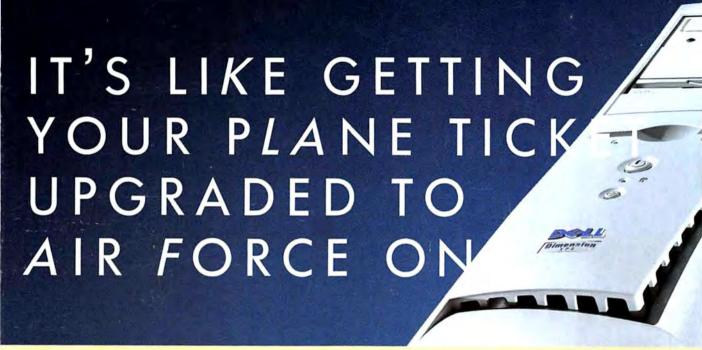
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- 320V Sound Card and Speakers
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- 3-Year Limited Warranty', 1-Year NBD On-site' Service

\$1899 Susiness Lease \* S64/Mo., 36 Mos.

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- HP® OpenView® NNM Special Edition
- 3-Year NBD On-site Service; 7X24 Telephone Tech Support

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- NIC and Integrated SCSI Controller; 40X Max CD-ROM HP\* OpenView\* NNM Special Edition
- 3-Year NBD On-site Service; 7X24 Telephone Tech Support

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Small Business Upgrade Bundle, add \$1897. Bundle Includes: Microsoft\* BackOffice Small Business Server 4.5, Modern, Training on CD-ROM and System Support

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- Intel® 3D AGP Graphics = 64V Sound Card & Internal Speaker
- OptiFrame Small Form Factor Tool-less Chassis
- Integrated 3Com\* 10/100 NIC, MS\* Windows\* NT 4.0
- Remote Client Manageability Support via DMI 2.0s
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- Intel® 3D AGP Graphics
- OptiFrame Small Form Factor Tool-less Chassis
- Integrated 3Com\* 10/100 NIC, MS\* Windows NT\* 4.0
- Remote Client Manageability Support via DMI 2.0
- 3-Year Next-Business-Day On-site Service



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Advanced Performance, Specialized Graphics

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- Xircom® RealPort® CardBus Ethernet 10/100
- + 56K Capable" Modem, add \$299

#### DELL® INSPIRON™ 3500 Notebook

- Intel® Celeron™ Processor at 400MHz 14.1® XGA Active Matrix Display
- 32MB SDRAM, 4.8GB' Ultra ATA Hard Drive
- Modular 24X Max' Variable CD-ROM and Floppy Drive
- NeoMagic\* MagicMedia™ 256ZX AGP Video
- Lithium Ion Battery
- Microsoft\* Works Suite with Money Basic
- Microsoft\* Windows\* 98, Second Edition
- 3-Year Limited Warranty<sup>2</sup>

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Mobile Desktop

- Intel® Geleron® Processor at 433MHz
- 15" XGA Active Matrix Display
- 32MB SORAM, 4.8GB' Ultra ATA Hard Drive
- Removable Combo 24X Max Variable CD-ROM and Floppy Drive
- 2X AGP 4MB ATI RAGE Mobility P3D Video
- Lithium Ion Battery
- Microsoft\* Works Suite with Money Basic
- Microsoft\* Windows\* 98, Second Edition
- . 3-Year Limited Warranty

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- NEW SB Live! Value Digital with MusicMatch\* Jukebox Enhanced Version™
- NEW Harman Kardon HK-595 Surround Sound Speakers with Subwoofer
- NEW Conexant" V.90 56K Capable" Telephony Modern
- 1-Year Delinet\*\* Internet Access\* with 20MB of Online Backup<sup>1)</sup>

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- 6.4GB Ultra ATA Hard Drive
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- NEW 16MB ATI Rage 128 Pro
- 48X Max\* Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound ■ harman/kardon HK-195 Speakers
- V.90 56K Capable" PCI DataFax Modem for Windows



Dell Recommended Upgrade

- NEW SB Live! Value Digital with MusicMatch\* Jukebox Enhanced Version<sup>™</sup>
- Altec Lansing ACS-340 Speakers with Subwoofer
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- Intel® 3D AGP Graphics
- 40X Max<sup>5</sup> Variable CD-ROM Drive
- SoundBlaster 64V PCI Sound Card with MusicMatch® Jukebox Standard Version<sup>26</sup>
- harman/kardon HK-195 Speakers
- V.90 56K Capable" PCI DataFax Modem for Windows



\$899 Se-VALUE CODE: 03702-501208

Dell Recommended Upgrade:

- 6.4GB' Ultra ATA Hard Drive
- NEW 17" (16.0"" viewable, .28dp) E770 Monitor
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Mobile Desktop

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- 64MB 100MHz SDRAM 15" XGA Active Matrix Display
- 4.8GB Ultra ATA Hard Drive
- Removable Combo 24X Max<sup>2</sup> Variable CD-ROM and Floppy Drive
- 2X AGP 8MB ATI RAGE Mobility "-P 3D Video
- 3D Positional Sound with Wavetable
- Internal PCI 56K Capable<sup>11</sup> V.90 Fax Modem
- MusicMatch\* Jukebox Standard Version®

Dell Recommended Upgrades:

- Removable Combo 6X Max<sup>43</sup> Variable DVD-ROM and Floppy Drive with FREE DVD Movie Offer , add \$169
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- 2X AGP 8MB ATI RAGE Mobility ~- M1 3D Video 3D Positional Sound with Wavetable
- MusicMatch® Jukebox Standard Version®

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Inspiron\* 7500 (R500VT) -PC Magazine's Editor's Choice Award, 10/99

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- 2X AGP 4MB ATI RAGE Mobility"-P 3D Video
- Lithium Ion Battery
- Microsoft\* Works Suite with Money Basic
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