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They're Not Where You Might Think



Sony's New PlayStation II Cool, But Not

Quite the PC of the Future



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- Plug and Play lets you automatically install new hardware with minimal configuration.
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- Hot docking lets you dock or undock your laptop without rebooting.
- IrDA support enables wireless communication between Windows 2000– based computers and infrared devices.



- Windows file protection prevents core system files from being overwritten by application installs or user error.
- Self-healing applications enable Windows 2000 Professional to fix problems that occur while installing or using an application.
- Reduced reboot scenarios. Most scenarios that required users to reboot in Windows NT and Windows 98 are eliminated.

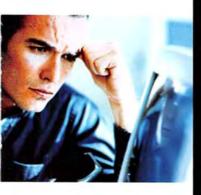
EASY TO USE

- 25% faster performance than Windows 98 on systems with memory of 64MB or more.
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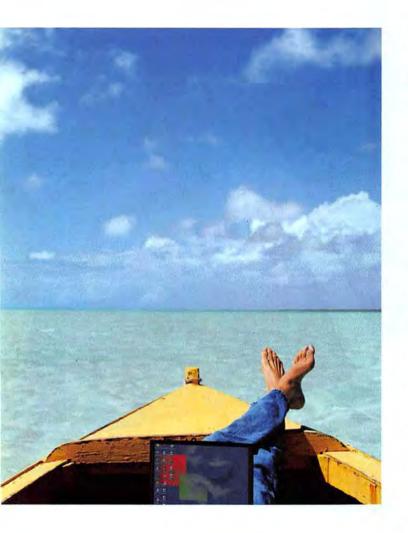
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or taking more

vacation?



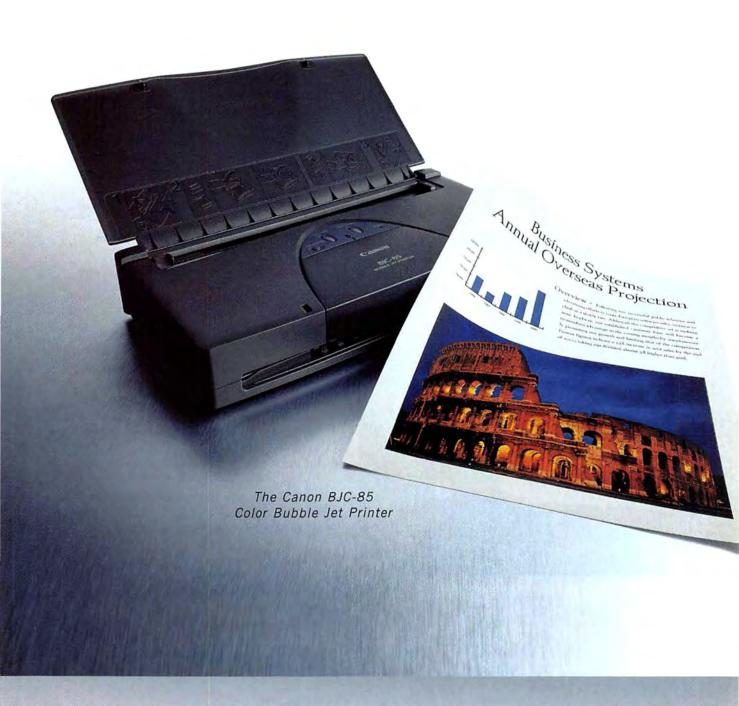
Where do you want to go today?



In today's digital economy, the boundaries between work and free time are blurred. Which is why we created Microsoft® Windows® 2000 Professional. It offers a whole new level of built-in mobility with advanced features like hibernation mode, Plug and Play, and offline files that let you work whenever you want, from wherever you are. It's also the most dependable version of Windows ever. In fact, according to an independent study by National Software Testing Laboratories, Windows 2000 Professional is 13 times more reliable than Windows 98. It delivers the reliability of Windows NT® and also provides Windows file protection and selfhealing applications to keep you up and running. And it offers all this in the familiar and easy to use Windows environment. So, does the future of business mean work will become more like vacation, or vice versa? With the reliability, mobility and ease of use offered by Windows 2000 Professional, the decision is yours. To learn more, go to: www.windows2000anywhere.com







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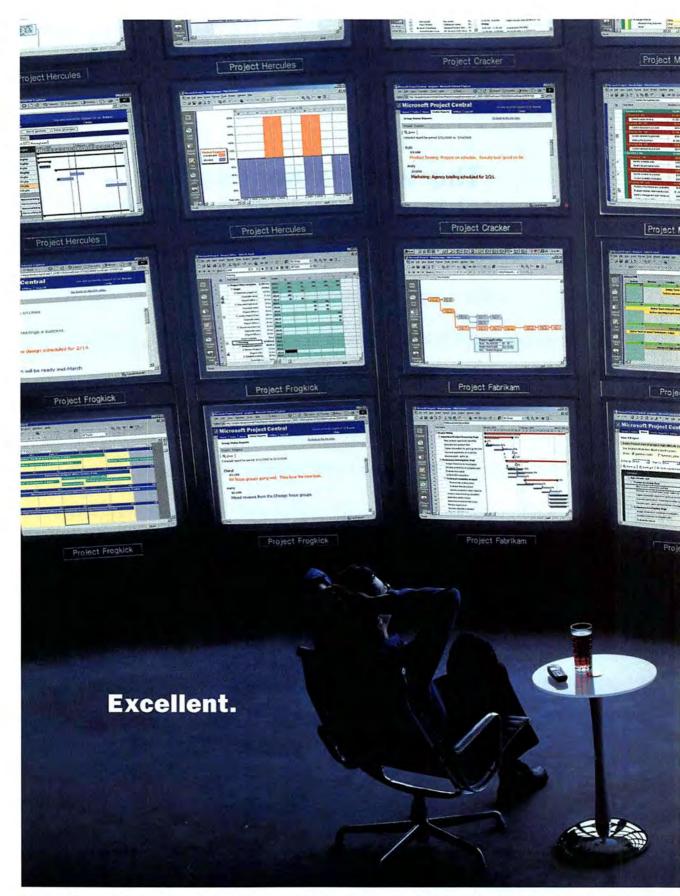
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Optional Scanner Cartridge

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A Portable Family

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Microsoft

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CONSUMER ISSUES

At the dawn of the new millennium. privacy still exists-barely. But don't assume you're flying under the radar. Who threatens your privacy online, and why? We examine information collection and security issues in the computer age, identifying problem areas and consulting experts to learn how the situation could improve.

121 PRIVACY 2000: STEALTH SURFING

HOW-TO You dislike being monitored, but you don't want to give up the Net. So how do you lower your profile to minimize risks? We offer practical tips on everything from controlling cookies to privatizing your e-mail. Fight back!

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139 HOME WIRED HOME

R E V I E W A home network lets you share files, a printer, and an Internet connection. But for a long time, high prices and

installation difficulties dissuaded many people from jumping aboard. At last, prices are falling-and you don't need expert help to set up your home network. We examine five phone-line kits and one wireless system, and spot a Best Buy.



160 THE BUYING GAME

CONSUMER ISSUES

Planning to shop for a PC sometime soon? Our exclusive survey of 3000 PC World readers reveals the best and worst places to buy. Find out how retail, Web, and phone sellers rate. You may be surprised.



Additional material available online at ww.pcworld.com

177 HAMMER TIME!

ONLINE AUCTIONS

Tired of waiting for customers to get the message and beat a path to your door? Sell-



ing via Web auctions can be a lucrative strategy. Is it for you? Our handy guide walks you through eight steps of business-to-consumer auctioning online. Retail can't touch this!

COVER Photography by Marc Simon

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68 GAME CONSOLES CHALLENGE PCs

Sony's PlayStation 2 lives up to the ballyhoo with dazzling graphics and tantalizing expansion potential. The line starts here.

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TOP 100 Lower-cost PCs crank up with processors that not so long ago dominated our Top 10 power and midrange charts-including 600-MHz or faster Pentium IIIs and Athlons.

200 POWER PCs

TOP 10 The Quantex SM800, our new number one, offers an 800-MHz Pentium III CPU and top-of-the-line accessories (like a 12X DVD-ROM drive)-for \$2179.

208 MIDRANGE PCs

TOP 10 Three new systems—with processors running up to 750 MHz-shake up the lower half of our chart this month.

214 BUDGET PCs

T Q P 1 0 NuTrend's Athlon Force 2 and Quantex's M650 bring unprecedented processing power to the budget chart.

220 NOTEBOOK PCs

T O P 1 5 New Best Buys appear on all three price levels of our chart this month, and more units are offering USB options.

224 HOME PCs

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TOP 10 GeForce is with you on a half-dozen boards gracing the June chart, including the Cardexpert GeForce 256 DDR.

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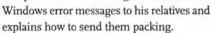


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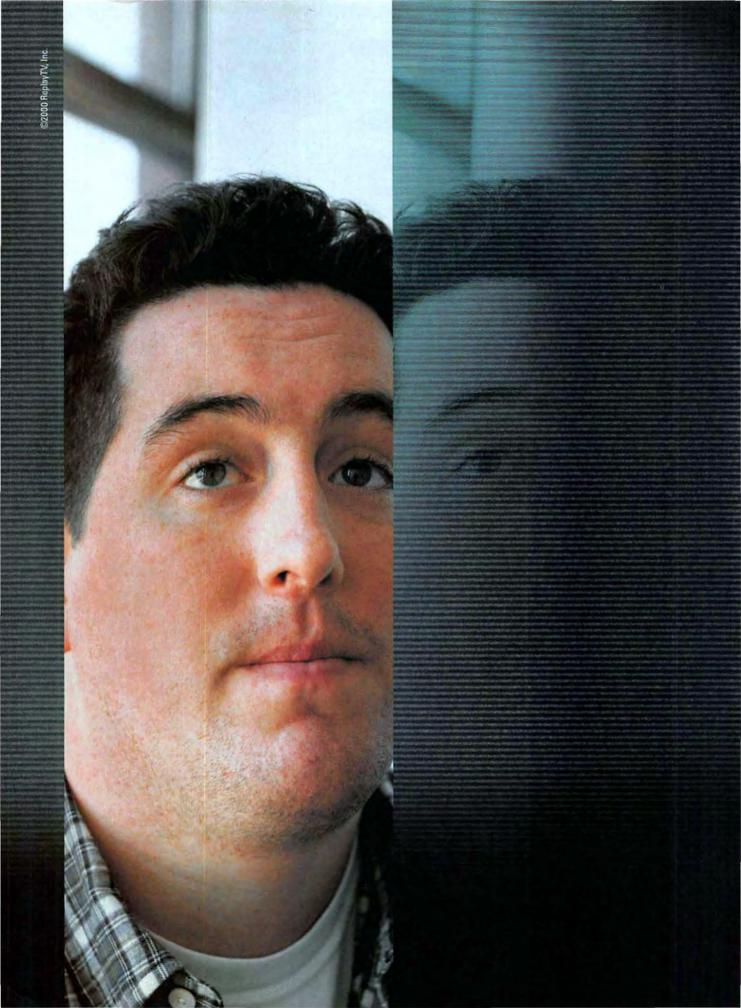
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The Bloom Is Off the Web's Rose

HOW MANY TIMES has someone told you, "Hey, you can do that on the Web"? The first time, you may have wanted to read the latest issue of your favorite magazine without running down to the newsstand. Then maybe you wanted to buy a couple of books cheap. Now it's to find a mortgage, order groceries, or download your favorite music. Gee whiz, it seems like you can do everything on the Web.

Which doesn't automatically mean that you will—or should. Frankly, the Web's gee-whiz period is over. You don't need to look at the disappointing stock valuations of dot coms like EToys and Webvan, or follow the ups and downs of the NASDAQ to know the proverbial rubber has met the road. Now Web sites have to be more than gimmicky. They still don't have to turn a profit (unless, of course, you own their stock). They just have to make your life better.

Sure, nowadays you can sit down at your PC, navigate the aisles of an online grocer's sluggish Web site, and have Cheerios and milk delivered to your door as promptly as a pizza from Round Hut. But does taking that route make sense for everyone? Not at all. Now don't get me wrong. With twin two-year-olds, my wife and I are happy to wade through our online grocer's site and pay full price for produce we haven't even thumped just so we don't have to drag toddlers

through a real store. But my bachelor brother up the street correctly shuns the siren call of Web delivery with a big "So what?"

BAH, HUMBUG TO THE WEB

WHEN DID WEB cheerleading become Web skepticism? For me, it happened in stages. First, I had to determine whether subscribing to the Wall Street Journal Interactive Edition was worth 59 bucks a year. As great as the WSJ is, I decided that I could get the news elsewhere online for free. Then I began noticing that every third CD I ordered from Amazon.com showed up in a cracked jewel case. In fact, the Elmo video I ordered online for my boys just arrived—and fell out of the box in three pieces. That never happened at my local Tower Records.

When I bought a new Dell PC online recently, I couldn't discover the tax and shipping costs until after I'd placed my order



Web sites still don't have to turn a profit (unless you own their stock). They just have to make your life better.

and Dell sent me an e-mail with the final tally—and Dell is a good online store. Finally, in light of stories that credit card numbers had been stolen from e-commerce sites, I decided not to buy a Rio player at a site I'd never used before (despite the great price) because I didn't want my Visa number sitting on yet another server.

Scenarios like these color a person's decision about whether to "do that" on the Web. In the past, we at *PC World* have explored the pitfalls and benefits of using the Web to do all sorts of things. We've looked at travel planning sites, home buying sites, health information sites—all in an effort to determine whether what's online is better than the real world.

This month, we pit Web sites that sell PCs against their retail and telephone-order counterparts in "The Buying Game: Best and Worst Places to Shop for a PC." Besides doing our own shopping, we surveyed more than 3000 PC World subscribers to hear what they thought of their experiences. Bottom line: The Web is good for expert shoppers—and it's nearly always better than retail. But for many people, picking up the phone and talking to a real live salesperson is the best choice.

In April, we launched a column by Senior Editor Harry McCracken called Web Savvy. Every month, Harry will look critically at a new or developing Web site genre. Always in the back of his mind will be the question "Is this good for consumers?" In this issue, Harry tackles the MP3 craze. As promising as MP3 downloads are, Harry is a Beatles fan, and there's a dearth of legitimate Fab Four tunes online (music pirates, of course, have better luck).

SOMEBODY IS WATCHING YOU

PERHAPS THE BIGGEST black eye the Web has received involves the lack of online privacy. News stories disclose Web sites collecting personal information, selling it, or losing it to hackers. Our latest special report, "Privacy 2000: In Web We Trust?" is no exception. Contributing Editor Daniel Tynan details the trials and tribulations of regular Web surfers in a sea of information sharks. He also hunkers down with a security expert whose hacking skills expose the Web's weak links.

Despite the Web's growing pains, I use it every day. But it takes time and effort to figure out what's worthwhile and what isn't. The Web is still in its infancy, and there's plenty to love about it. But if Web sites are to sell the average consumer on their virtues, they have to be as good as or better than their alternatives. Otherwise, few people will want to "do that" online.

Brad Grimes is PC World's executive editor for features.



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ILLUSTRATION: ROBERT NEUBECKER

YOUR TAKE ON: PC trepidation + Clueless technicians • Online bill paying

DON'T THROW AWAY THE WINDOWS CD

I WAS SHOCKED when I read Lincoln Spector's suggestion to "throw away the Windows CD" [Answer Line, April]. Sure. copying the Windows folder from the CD-ROM to your hard drive is a great timesaver when it comes to additional installations, but when a hard drive goes bad, your Windows CD is the difference between a potentially revived PC and an overpriced doorstop.

Marc Drumm, Newark, Delaware

HAVING JUST finished a drawer-by-drawer search for software or licenses to ensure that we are "legal," I find Spector's throw-it-away advice odd. The physical medium used to be the primary way to prove that you had a legal right to use the software. Five years ago, you had to show your Netware diskettes if you wanted to obtain an upgrade price.

Paul A. Thomas, via the Internet

Editor's response: An editing error imparted a more flippant tone to this item than we intended. We agree that software CDs should be stored, not discarded. -Michael Lasky

TAX ONLINE SALES?

"ATTENTION Net Shoppers: Cybersales Taxes Loom" [Top of the News, April] implies that not taxing the Net could mean unfilled potholes in your town. But remember that by purchasing online, you avoid having to drive all over town looking for the same item at the right price. The savings means less time driving,

less wear and tear on roads and your car. less fuel burned, and less traffic. Also, time saved by searching online allows time for other pursuits. The benefits of online purchases are virtually endless. Net sales should remain tax-free forever.

> Vernon Thiede Bakersfield, California

I SHOP ONLINE mainly when I can't find an item locally. You didn't mention that e-shoppers pay shipping fees rang-

> ing from \$4 to \$20-plus for each purchase. The shipping fees equal, for the most part, what I would pay in local taxes. I would almost eliminate my shopping online altogether if a sales tax were added to the shipping fees I already pay.

> > Krista Sunday, Houston

LIKE CLIMBING MT. EVEREST

STEPHEN MANES'S column "A Brief Personal History of PC

Bugs" [Full Disclosure, February] hit home for me, as I'm sure it did for most of your readers. I have found that calling tech support is a last resort, rather than the first step in problem solving. Manes asks whether any other industry besides computers generates so much trepidation about its products and their effects. I

HOT BUTTON

Best Free Stuff Online? Readers Chime In

I'M AN OLD FOGY with a new computer whose last remembered definition of surfing was a day at the beach! Your April "Best Free Stuff Online" issue was a delightful discovery for me. Especially helpful were the reviews of free ISPs and phone services.

Annette Morgan, Ocala, Florida

I COULDN'T BELIEVE that you listed only three free ISPs ["Beyond Free-Mail," April]. Just off the top of my head, I can think of juno.com, bluelight.com, freewwweb.com, worldshare.net, and worldspy.com. The last two don't have any annoying banner ads-and I can usually connect at 50 kbps, something I can't do with NetZero or Freei.net, two of your recommendations.

Sandy Orr, Gurnee, Illinois Editor's response: Our April review wasn't meant to be an exhaustive survey of free ISPs, but you were one of many readers who recommended services besides the ones we

covered. May's Internet Tips looked at some of these other contenders, as will an upcoming Web Savvy column. -Harry McCracken

YOUR ARTICLE ON free PCs ["Free PCs: The Price You Really Pay"] failed to recognize that for beginners, these offers are wonderful. And the true cost is lower than the article indicates. The \$22-per-month charge for three years covers not only the computer but also three years of unlimited Internet access with a top provider. Finally, the article failed to estimate the discounted price for credit. Instead of paying \$700 for a system, pay \$100 out of pocket, put \$600 in a savings account at 5 percent, and make the monthly payments out of the account.

Robert Pickett, Carmichael, California

THERE IS ANOTHER excellent freebie to add to your list of sites that donate to charities: www.hungersite.com sends a food donation to hungry areas every time you enter its site (limited to once a day). In its thank-you note, the site lists the corporations that make the contributions. These contributions, which come from all over the world, are made through the United Nations World Food Program. Each day, when I sign on to the Internet, I click this site right off the bat.

David H. Barnhouse, Pittsburgh

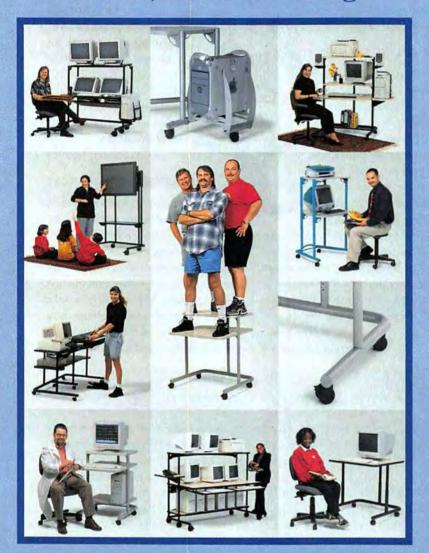
I WAS AMAZED your special issue made no mention of Sun's StarOffice, a free download for personal use. In my opinion, it's a superb multiplatform package. It not only features a Web browser and an e-mail client (in addition to all the usual desktop productivity apps), but it also is reasonably sized and introduces new concepts in desktop integration. It's a fantastic piece of software, especially if you consider how many bugs there are in most other suites.

Antonio Ferraro, via the Internet

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LETTERS

don't believe there is. When friends of mine take that giant step and buy their first PC, I encourage them and show great enthusiasm, just as I would for a friend who planned to climb Mt. Everest for the first time. Hey, it *might* all work out fine.

Peggy Sherman, Greenville, Florida

WINDOWS 2000 COMPATIBILITY CHECKING

YOUR MARCH cover story on Windows 2000 lists eight Web sites that you say offer the straight scoop on the new OS. For me, the ultimate site on compatibility with Windows 2000 (as well as with NT 4) is http://ntcompatible.cjb.net. Not only does it list compatible hardware and software, but it offers test results for hundreds of software titles that were test-run on a machine with Windows 2000. And for some of the software and games that aren't compatible, it offers a patch or fix. Branden Hampton, Planada, California

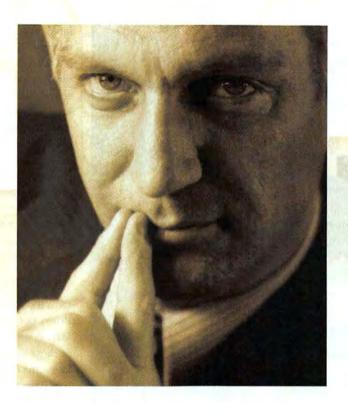
SERVING THOSE WHO SERVE

THE U.S. E-COMMERCE companies that crow about the great choices they offer the consumer should think again. I'm activeduty military, serving in Europe. All mail arrives here via the U.S. Postal Service. but the problem isn't with the USPS; it's with the thousands of e-commerce sites, including the majority of computer hardware/software/parts/accessories sites that will not deliver to an APO address. I've gotten excuses from "the postage rates are too high" to "we don't have the manning to support that type of shipping." Shipping charges to us in Europe, at least, are lower than what they would be via UPS or FedEx to many stateside addresses. And as for "manning," they must think it takes several extra people to fill out the customs slip and attach it to the top of the box.

> Christie D. Martinez, TSgt. U.S. Air Force

ISP TECH SUPPORT

YOU HAVE PUBLISHED letters from people who have signed up with a nonlocal ISP and are unhappy about its technical support [Letters, April]. I am a technician for an ISP that has service in many states; I do not work directly for the ISP,



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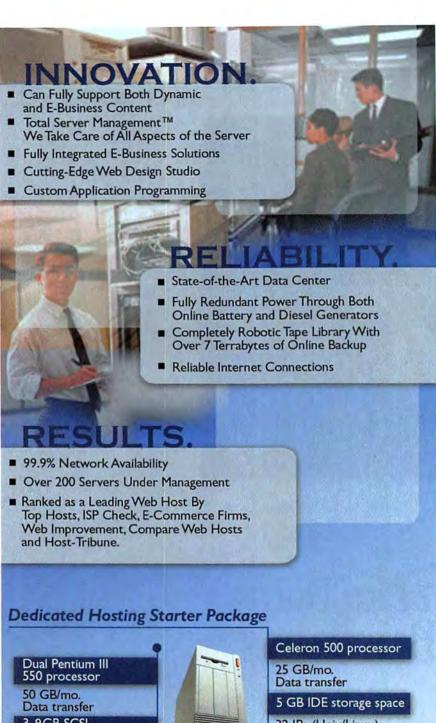
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LETTERS

however, but for the company that the ISP contracts with for technicians. I was not hired for my technical skills and neither were my fellow technicians.

Chances are, when a person calls technical support and gets technicians who sound clueless, they are clueless. They know only what they are taught in a twoweek training class, and they aren't expected to learn even that. Their primary job is to keep call times down to 10 or 11 minutes, and registering a complaint is next to impossible. If you want good technical support, you are better off choosing a local ISP or asking the ISP before signing up if it has in-house technicians.

Name withheld by request

KEEP TRACK OF YOUR MONEY

IN THE ARTICLE "Pay Bills Online: Pricey but Convenient" [New Products, March], you failed to note that with most of these payment services, consumers lose some control of their money. When I tell Paymybills.com or an online bank to pay a bill, they debit my account and cut a check from theirs. My bank and financial software think the bill has been paid. But I have no way of tracking the payment.

Let's say I owe my grandmother \$1000 and I tell Paymybills.com to send her a check. But she doesn't cash it and doesn't tell me. I am never notified that the check did not clear, unless I ask the service to research it. Paytrust.com, on the other hand, cuts a check using my account information and assigns a check number. This way I can always see what checks have cleared my account.

Kirk Tavener, Bellevue, Washington

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

CORRECTIONS AND CLARIFICATIONS

IN "BROADBAND OR BUST" (May), we should have stated that T3 lines are rated at up to 45 mbps.

The May Top 10 Midrange PCs chart should have said Dell's Dimension XPS T600r comes with Microsoft Office Small Business Edition.

The Tektronix Phaser 850 reviewed in April on page 84 is a solid-ink color printer.

PC World regrets the errors.

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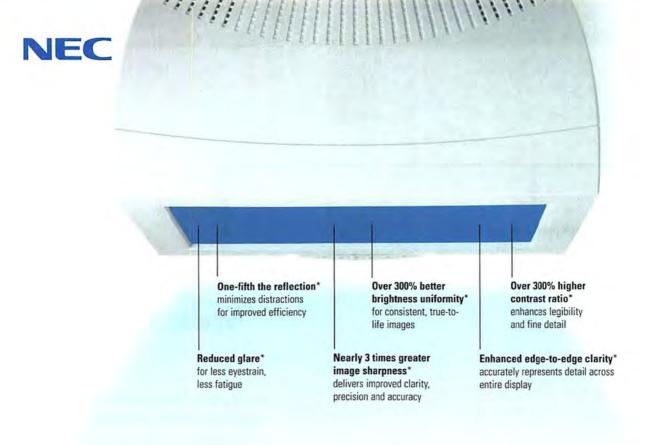
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† Estimated street price for the MultiSync FE700

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Get Your Vendor to Do Right by You

Angry with your computer's manufacturer? Try this simple plan for resolving things happily.



YOU OWN A COMPUTER, so you know about frustration. Crashes, cryptic error messages, and lethargic Internet connections are bad enough. But when ordinary PC aggravations develop into acrimonious disputes with vendors, things can get ugly.

I've occupied the desk at PC World's complaint department for a long time, and I've heard the horror stories. I've seen faltering computers and uncaring vendors turn mild-mannered businesspeople and even a priest or two-into furious consumers bent on revenge. Recently, for example, I spoke to Susan David of Fall River Mills,

California. After two years of trouble with a malfunctioning computer from Gateway, she wanted the company to know she wasn't going to take it anymore.

"I've e-mailed them. I've talked to them on the phone, I've written to the president," she explains. As a last resort she took the company to small-claims court. But she admits that it has not been a satisfying experience. Gateway responded with an injunction to move the suit to arbitration. That means David has to hire a lawyer to continue. The cost is nearing the price of a new PC and, says David, "[Suing] takes a lot out of you. I can't even look at a black-and-white cow anymore without feeling sick. But I want what is right. It's the principle of the thing."

Is there a better way to settle a grievance with a computer company? To find out, I offered PC vendors a cloak of anonymity if they would give me the skinny on getting problems resolved. Whom should you call? What should you say? What shouldn't you say? I've taken their responses and mixed in a little advice of my own.

Unfortunately, no plan is foolproof. As a consumer you're a warm-blooded human grappling with a cold corporation. Still, this plan will nudge the odds in your favor.

INITIAL CONTACT

EVERYONE I SPOKE TO agreed that your first step should be to place a calm call to the vendor's customer service or technical support. Though you may be angry or even desperate over a work disaster, you want your problem resolved quickly. And it's hard to get help from someone who's mad at you. So no matter what you think of the company, the phone rep you talk to, or the advice you receive, try not to blow your top. In fact, some companies permit their representatives to hang up if you start hollering and swearing; others instruct reps to give obstreperous callers a two-minute time-out on hold. Neither response will improve your mood-or get your computer fixed.

On the other hand, don't be too trusting. Keep a notepad handy to document your actions from the start—this record may prove vital later on. Write down the date and time of every call you make or receive, the name of every person you speak to, and the advice each gives you.

Give your initial contact at the vendor at least two tries to set things right. Well-intentioned people do misplace messages, and e-mail can get routed to the wrong place-or you may

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CONSUMER WATCH

reach a representative who's new on the job (or who desperately needs a vacation). So if at first you don't succeed, call again.

LET'S TRY THAT AGAIN

IF YOU'VE GIVEN YOUR first contact a reasonable chance but your gripe hasn't been satisfactorily addressed, it may be time to ratchet things up a notch and ask to speak with a supervisor. Or ask what the company's procedures are for escalating a complaint—and then follow them.

If you've done that and haven't obtained satisfaction, the people I spoke to suggested writing (not calling) the company's

If you feel you're being

ignored or that you and

your PC maker can't work

out the dispute on your

own, seek outside help.

president. The president probably won't handle your problem personally, of course, but many companies have a staff dedicated to dealing with letters received from unhappy customers.

Your letter should clearly and calmly state the problem and (this is important) identify what would resolve it. Do you just need a part replaced quickly, and you're willing to do the installation yourself? Do you want on-site service? Have you had so many problems with your PC that nothing short of a replacement system will satisfy you? Be specific, and keep copies of all correspondence. Lots of people write to company presidents just to blow off steam; if you want action, say so.

Be reasonable, too. Many vendors told me that some consumers consider this an opportunity to ask for the moon. It may be realistic to hope that a vendor will reimburse your shipping costs, or toss in some extra memory when it fixes your system. If you've suffered a truly terrible experience, especially with a PC that's still under warranty, the company may even replace it with a newer, faster model.

But there are some things a company just won't do. Take the case of Gateway customer Susan David. She felt that she should receive compensation for some part of the two years of hassles and lost work she has suffered as a result of her struggles with her lemon computer.

Greg Lund, manager of corporate com-

munications for Gateway Consumer, expressed sympathy for David's situation but says, "From a legal point of view, she wants more than she is entitled to. We offered her a replacement system. She wants not only a system but an upgrade, and to be paid for the time she has lost."

Any PC user who has had a brush with a malfunctioning machine or a buggy program can identify with David's predicament. But in all my years of helping people resolve their computer problems, I have never seen anyone obtain the kind of recompense she's seeking. Many warranties explicitly state that the manufac-

> turer is not responsible for lost time.

Date your letter to the president and send it by certified mail or by a courier such as Federal Express that requires a signature for delivery.

This won't guarantee that your letter has been read by someone who can (or will) solve your problem, but at least you'll have documentation that the letter arrived.

BRING IN THE BIG GUNS

IF YOU HONESTLY FEEL you're being ignored or that you and your computer maker will never work out the dispute on your own, seek outside help. One candid suggestion I got from a well-known mailorder vendor is to alert your credit card company to the controversy. If you bought the computer recently and paid by credit card, this gives the manufacturer a financial incentive to make you happy. It also puts the credit card company in the position of mediator, since it will contact the computer company and ask it to resolve the situation. If the company wants to get paid, it must respond to this request.

You can also report the vendor to the Better Business Bureau, which provides dispute forms at www.bbb.com. Don't plan on going straight to the BBB at the first sign of trouble, though. "The first thing we do is ask consumers if they have tried to resolve the problem on their own," says Sheila Adkins, the BBB's public affairs manager. "If there is no satis-





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CONSUMER WATCH

factory response from the company, then they should file a complaint with the BBB. The BBB will bring both parties to the table and try to get the problem resolved."

Be patient. This process can take several weeks and does not always work. Still, Adkins says, "In most cases we can get both parties to come to an agreement."

COURT OF LAST RESORT

ONLY WHEN ALL ELSE fails should you think of taking your grievance to court. But first, check your warranty. It may contain a clause stipulating that you waive your right to take disputes to court and agree to submit disputes to an arbitrator chosen by the PC maker. (This was the case with David's Gateway warranty.)

For facts on the pros and cons of going to small-claims court, and advice on how to do it right, see Nolo Press's Web site (www.nolo.com). Ralph Werner, author of Nolo's Everybody's Guide to Small Claims Court, says you should carefully consider whether it's worth the money: "On top of the court fees, you should ask yourself what you think your free time is worth. You will invest about 10 to 20 hours preparing. The next question is, Can you collect if you win? That depends on where you bought the computer. If you bought from a fly-by-night vendor, will they be around when you get the judgment?"

Don't sue just to exact revenge. "A lot of people get madder when they go into court," says Werner. "There are often better ways of dealing with anger. Run a mile or hit a punching bag."

In fact, that's good advice from the getgo: Wait until you're calm before picking up the phone or writing a letter. Dealing with an obstinate vendor may seem like warfare. But you're more likely to win through diplomacy than aggression.

And remember, the most powerful weapon you have is your buying power. All PC companies depend on repeat business. If a vendor doesn't make a goodfaith effort to resolve your complaint, don't buy from that company again—and let it know it has lost you as a customer.

Christina Wood is a PC World contributing editor.

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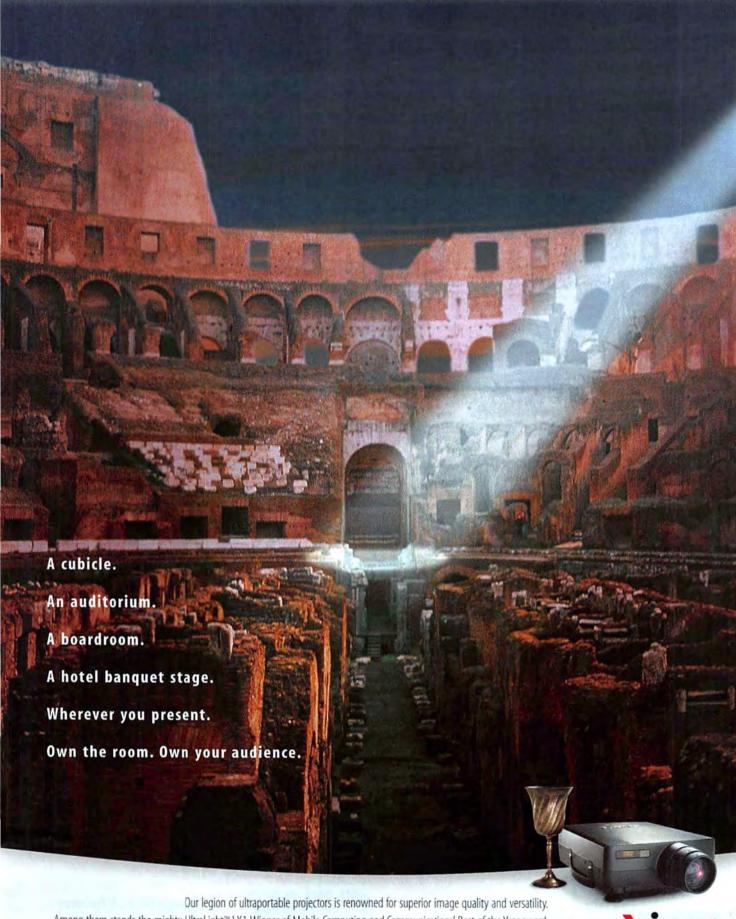
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Tax-Free Internet? Don't Count on It

RON HOLMAN OF North Attleboro, Massachusetts, was startled recently when he was charged sales tax for a shrink-wrapped copy of Norton SystemWorks 2000 he ordered from Symantec's Web site. Says Holman, "I was under the impression that Internet sales are not taxable."

Like most tax matters, it's not that simple. "Sales tax for items purchased online works exactly like it does for [other] mailorder purchases," says Heather Rosenker, executive director of the Advisory Commission on E-Commerce in Washington, D.C. "Under existing

sales tax law, if you buy a product from a company that has a physical presence in your state of residence, you will be taxed at that state's rate." Because Holman lives in Massachu-

setts, where Symantec

has offices, he was charged that state's tax of 5 percent. Adding to the confusion, many Web stores don't add tax to the total when you're checking out; you may only see the tax on your credit card statement.

Some companies with facilities in many states sidestep sales taxes by setting up separate companies to handle e-commerce. For instance, Barnes and Noble's bn.com Web site is a separate corporation,

> so only residents of the four states where bn.com has warehouses and offices are charged sales tax for online purchases.

> > However, all states that charge a sales tax have a use tax, which taxes items bought outside of the state. including online purchases. But collecting this tax has been difficult.

especially since many tax-

payers don't even know about it. "I refer to it as a forgotten tax," says Bert Whitehead, tax attorney and president of financial advisor firm Cambridge Advisors.

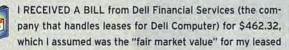
If you're dead set against paying tax when shopping for software, there is a loophole: download the software. Taxes can be applied only to physical products.

Heads Up...



Moviesaver.com Update: Last December, we reported on a reader who was overcharged \$100 by Moviesaver.com, a Web site that sells videos and DVDs. Since then, I've heard from more readers who say they have been similarly burned by Moviesaver. com and Shoppershand.com, an affiliated site. My e-mails to both sites went unanswered, and phone numbers listed on the sites weren't functioning. However, at press time, both sites were still taking orders. Buyer beware... Beef Central: Got a consumer gripe but don't know where to turn? Try PlanetFeedback.com, a new Web site that lets you air grievances online and fire them off to the folks who are at fault. Templates guide you through writing a complaint; the site also offers consumer news, tips, and resources, as well as product and service ratings... As Seen on TV: I've gotten more than a dozen letters from disgruntled customers of Video Computer Store/Computer Personalities, a reseller that hawks computer products on television infomercials. Complaints include shipping delays, incomplete orders, and outdated items being sold as new. The company says that these are isolated incidents, but if you are tempted during latenight channel surfing, consider catching the next wave over to Conan.

LETTER OF THE MONTHS



PC. But when I called DFS, I was told that I owed this amount for keeping the PC three months past the lease's expiration. I asked why I was

not notified that my lease had ended, and was told, "It's in the contract you signed." With my other leases, I receive a notice before expiration.

> Scott D. Harrison Hoboken, New Jersey

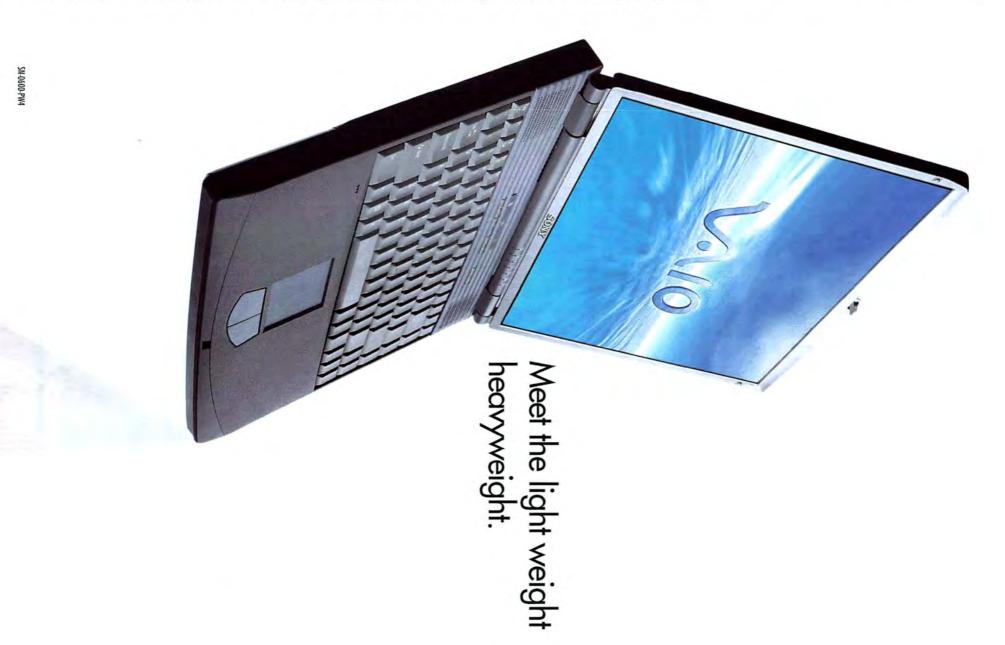
GOTTEN A RAW DEAL?

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

On Your Side responds: Lindsay Maresh, senior corporate communications analyst at Dell Financial Services, declined to clarify the company's policy regarding notification of lease expirations. However, a DFS customer support representative confirmed that keeping track of the expiration date is the leasee's responsibility. (By contrast, Gate-

> way and Micron alert customers well before a lease ends.) Harrison has reluctantly accepted DFS's offer to forgive him two months' leasing fee if he buys the PC. The lesson? Before signing a lease, read the fine print.

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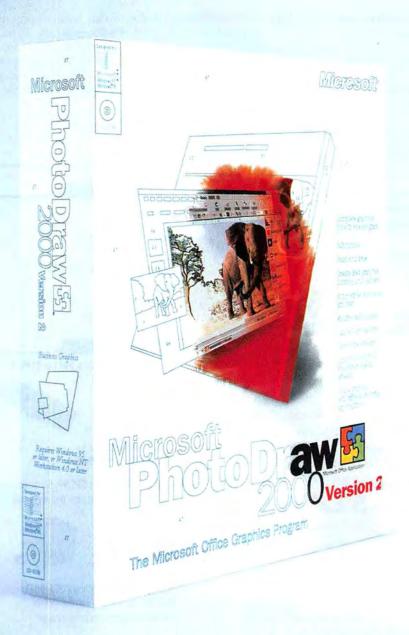
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Bye-Bye Record Store, Hello Web Music?

THROUGHOUT A LIFELONG music addiction, I've poured money into an unending parade of audio formats—vinyl (33 and 45 rpm), eight-track, cassette, and CD. And it now looks like recorded music as we knew it may be supplanted by music that has no physical form at all: digital

downloads, Portable MP3 players such as Diamond's Rio are already a hit. Tomorrow, who knows? Everything from living-room stereos to clock radios could be wired to play digital songs that we buy on the Web.

Of course, if you're oblivious to intellectual-property laws, the age of downloadable

audio is in full swing. Tunes are flying off the Web as fast as pirated Britney Spears tapes off a street vendor's table. Consider the ingenious but questionable Napster (www.napster.com), which lets its users swap MP3 music files across the Net with point-and-click ease-copyrights be damned. Already an institution on college campuses everywhere,

> Napster is the target of a lawsuit by the Recording Industry Association of America.

Me, if I can find my kind of music on the Internet, I'm more than happy to pay for it. (Hey, Iggy Pop needs to eat, too.) But I will not be bestowing my compact discs

on the Salvation Army anytime soon.

ELVIS IS MISSING

WITH MORE THAN 250,000 downloadable songs-all legal, all free-MP3.com seemed like a logical spot to begin a virtual-music shopping excursion. However,

GIMME FIVE

Web Shopping Review Sites



THERE MUST BE 15 kajillion shopping sites on the Web, maybe more. So who deserves your business?

Find out at these sites, which rate online stores for selection, price, and service.

- 1. RatingWonders.com: Ordinary netizens and the site's own reviewers judge hundreds of Web stores in more than 75 categories; good store policy info, too.
- 2. ResellerRatings.com: More than 14,000 shoppers provide often fearlessly critical evaluations of 1100 mail-order hardware and software merchants.
- 3. Gomez.com: Astute evaluations of online book stores, travel agents, toy emporiums, and more from the much-respected research firm.
- 4. BizRate.com: The grading curve seems overly generous at this user-review site, but plentiful facts on store policies and a shopping rebate program make it worth a visit.
- 5. ShopNow Consumer Guide (www. 2020consumer.com): Real shoppers' ratings presented as slick bar charts, plus a shopping bot and consumer tips; would benefit from higher voter turnout.

On the Net...



At Your Service: Need your house painted? Your poodle groomed? Your wedding photographed? Then take a gander at Handshake.com and EFrenzy (www.efrenzy.com), new sites designed to put folks who need services in touch with those who provide them. The biggest benefit: competing price quotes from multiple companies... Green Stamps Get Wired: S&H Green Stamps are back-and online-at Greenpoints.com. You get 20 points for every dollar spent at 1800Flowers.com, Borders.com, and Dell.com, among other sites, Collect 129,600 points, and a twoperson kayak could be yours... Amazon Annoyance: Alexa (www.alexa.com), a Web navigation tool that was once one of my favorite browser plug-ins, has not been improved by its strange, intrusive new ZBubbles feature. The main purpose seems to be to nudge you to shop at Amazon.com (which now owns Alexa) no matter where you go on the Web. Gee, thanks.

precious few of its tracks are by musical superstars or even semi-well-known artists; not a problem for the acoustically adventurous, but vexing if (like me) you like your music comfortably familiar.

So I moved on to Listen.com, a site bankrolled in part by that arbiter of musical fashion, Madonna. This nifty search engine for MP3s (and competing formats, such as Liquid Audio) links only to aboveboard stuff, with lots of tracks by namebrand performers. True, the selection is hit-or-miss-sometimes bizarrely so. You can download 384 songs by Miles Davis but zero by Wynton Marsalis; there's music by the Animals, Byrds, and Eagles but not by the Beatles, Monkees, or Turtles. And there are multiple tracks by the Chairman of the Board but nary a one by the King or the Boss.

Many of the music files that Listen.com links to are free downloads. Others, however, cost around a buck apiece at such sites as Musicmaker.com and EMusic (www.emusic.com). How smoothly, you might ask, goes the download process? My purchases at EMusic (a couple of Herman's Hermits ditties) went off without a hitch. Over at Musicmaker, though, I paid good money for Marlene Dietrich's "Falling in Love Again," and all I got was an unplayable 28-byte file. I'm not sure what went wrong; Musicmaker customer service ignored my e-mails.

FROM CD TO WEB

FOR THE TIME BEING, I guess I'll meet the Web music revolution halfway. I'll put my archaic compact disc collection online—courtesy of a (mostly) cool MP3.com feature known as My.MP3.com. What makes it work is a free software download called Beam-It. Stick a CD in your PC's CD-ROM drive, and Beam-It adds its con-

tents to a personal music library that you can listen to anywhere you've got a Net connection. The process takes seconds per CD. Rather than actually copying the disc, Beam-It unlocks a replica that's already stored on MP3.com's servers. Of the 40 CDs I've tried to have replicated so far, around 90 percent were available. (Among the missing: a Carole King disc and the *Great Muppet Caper* soundtrack.)

At its best, My.MP3.com's Hi Fi mode comes close to CD quality, at least to my non-audiophile ears. But it devours bandwidth, so songs tend to sputter. (Even my cable modem has trouble keeping up.) The less glitch-prone Lo Fi mode has a tinny, AM radio-like sound but still makes for pleasant background noise.

As with Napster, the music industry has its knickers in a twist over My.MP3.com. Already, the RIAA is suing—despite the fact that the service aims to give you access to songs you paid for on CD. And you can't e-mail bootlegs to your buddies.

FVI

WHO SAYS THE WEB is so popular? More than 95 percent of the people on the planet don't have access to the Internet.

SOURCE: NUA INTERNET SURVEYS

since music is delivered as streaming audio that can't be saved to a hard drive.

My take: Beam-It fans need feel no more guilty than folks who bought VCRs back when Hollywood tried to outlaw that emerging technology. And I'm sure the knotty legal issues surrounding online music will get untangled. Maybe even soon, given the America Online—Time Warner merger that will make AOL one of the biggest music publishers on earth.

Insert your own "You've Got Songs!" quip here—and tune in tomorrow for further developments.

Contact PC World Senior Editor Harry McCracken at websavvy@pcworld.com. ■



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ou know the drill. Another system crash. Lost data. Downtime. Now that computers are more complicated and user errors are more prevalent, you've got a slim chance keeping up with it all... unless you've got SecondChance from PowerQuest.*

With SecondChance, you've got the power to quickly and easily roll back to when the system worked right, and restore it to that

point in time. That means saving lost data, reducing complications and cutting downtime, not to mention decreasing ownership costs.

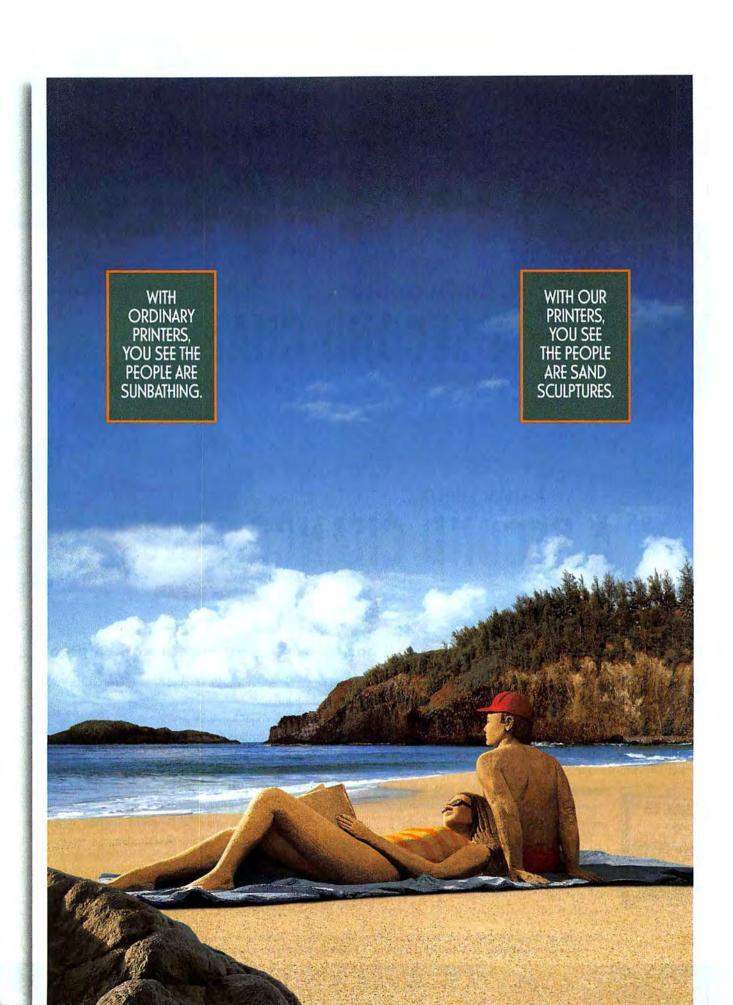
Here's how it works—SecondChance acts as a first line of defense against system errors by periodically taking "snapshots" of the system and automatically tracking any changes. That way, it's possible to return to when the system worked properly and easily undo harmful or unwanted changes with a click of the button.

What's more, SecondChance is:

- Easy Once installed, SecondChance lets you "set it and forget it," since snapshots are taken automatically.
- Fast With the Checkpoint Viewer, you can quickly look at your system when it worked right - then it's a click of the button and the system is picture-perfect again.
- Effective When it comes to restoring systems, nothing is as simple as SecondChance, since it gives you unlimited opportunities for system recovery.

And getting another chance is what SecondChance is all about. In fact, now computer systems and IS managers have all the chances they need.

Available at CompUSA, Staples, Best Buy, Fry's, Micro Center, and other fine retail stores: or call PowerQuest at 1-800-379-2566 or +1-801-437-8900 for more information.







It's true. The couple enjoying the sand is actually made from it. As are their clothes, glasses and book. Even the blanket they're lying on. It's all sand. Meticulously sculpted, painted and photographed to fool the eye. So when the artists who created this difficult illusion wanted to reproduce it for a brochure, there was only one printer they could trust with the job. An Epson. As you can see here, it captured not just the vibrant color of the setting but also the incredible detail in the sculptures. And turned what could have been a nightmare of a project into a day at the beach.

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Banish Those Gnarly Windows Errors

OKAY, KIDS: What do General Protection Fault, Page Fault Error, and Blue Screen of Death have in common? Right-Bill Gates thinks they're all rare occurrences. Not on my PC, they're not. After I switched from Navigator to Internet Explorer and added a bigger hard drive, a gnarly Windows 'invalid Page Fault in Kernel32.DLL' error kept popping up whenever I closed IE.

Let's face it: Everyone gets occasional error messages. Think of them as the price of doing business with Microsoft (and unless Bill uses Linux, he gets 'em, too). Usually, I ignore these little love notes from Windows and hope they'll go away. But sometimes, like my relatives at Thanksgiving, they don't get the hint. If you get error messages more than five times a month, it's time to take action.

With help from a Microsoft support technician and Rod Ream, my user-group troubleshooter, I resolved all my errors. I also have a cure for some of your Windows blues (and no, it's not Linux).

WARDING OFF PROBLEMS

YOU MAY NOT know it, but you can ward off some errors by adhering to a few simple rules. First, when booting up, let your hard drive come to a complete stop before you do anything. Windows does housekeeping at this time-scanning the Registry and loading Startup programs. Second, let all apps finish loading before you use them (closing them midstream is just as bad); otherwise, modules and drivers may get stuck in memory, causing errors.

When you do get an error message, close the system as usual, using Shut Down. Then when you reboot, run Scan-Disk (Start · Programs · Accessories · System Tools. Scan Disk) and correct any reported drive problems. This may take care of the problem underlying that particular error



Usually, I ignore these little love notes from Windows and hope they'll go away.

message and possibly deflect future ones.

If a Windows error appears often, try to identify a pattern. Note what programs are active when the error message appears. If you have Windows 98 or Office, use System Info to see what's running on your PC (select Start-Programs-Accessories-System Tools). Or try Process Viewer (free at www.fileworld.com/magazine). In the case of my kernel error, Process Viewer showed that an ActiveX helper file was running-a vital clue (more on that later).

You can also use Windows itself to gather more data. After you start your system and the power-on tests finish-but before Windows 98 begins-hold down (Ctrl) (in Win 95, press <F8> after 'Starting Windows 95' appears) and choose logged. Windows will merrily record your computer's start-up procedure to a text file and save it to the root folder; use Explorer's Show all files to view this. Then scan for the word "fail" in this document to find the files and devices that may be loading improperly.

CASH OUT THE CACHE

IF YOUR BROWSER crashes frequently, or if that dreaded 'invalid Page Fault at Kernel32.DLL' error appears, you probably have corrupt files. In this case, begin by dumping your browser's history and cache files. In IE 5, select Tools. Internet Options, and click Delete Files (in IE 4.72. Internet Options appears under the View

menu). Then choose Clear History. Next, check your ActiveX Controls. Click Settings, View Objects, and then change the View to Details. That's where I discovered three 'damaged' ActiveX items. Once I removed them, my kernel32 errors disappeared.

In Netscape Navigator, select Edit. Preferences, click Navigator, and then Clear History. Next, move down to Advanced, click Cache, and click Clear Disk Cache. Close Navigator and use Windows Explorer to get to your Navigator folder (typically, C:\Program-Files\Netscape\Navigator\Program).

Rename the Plugins folder as Plugold, and then restart Navigator, which should create a new Plugins folder. If Navigator no longer crashes, you can either gather fresh copies of your plug-ins or start copying the old files from Plug-old into your new folder, one at a time. Be sure to restart Navigator after each new addition, and monitor for problems until you find (and eliminate) the culprit.

Still experiencing problems? Another cause might be new DLLs battling older ones. You can find some solutions in my September 1999 column (www.pcworld. com/sep99/home_office). For help with even more esoteric problems, check out the Microsoft Knowledge Base at http:// search.support.microsoft.com. It's easy to use and surprisingly helpful.

These days, the majority of my error messages are gone. And my relatives? I just offer them Linux lessons after dinner. and the house clears out.



Find files from this article at www.fileworld.com/magazine. Contributing Editor Steve Bass

is president of the Pasadena IBM Users Group. You can reach him at Steve_Bass@ pcworld.com.

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Deskpro EP — Best of the Best WinMag.com, September 1999

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Office 2000 service release • Web security fixes • Norton AntiVirus patch

Office 2000 Update Needs Updating

IT DIDN'T TAKE LONG for bugs to pop up in Office 2000. Frustrated users reported Word 2000 locking up and Excel 2000 refusing to retain AutoSave settings, for instance. Nine months later, Microsoft issued its first service release to fix the suite's problems. SR-1 doesn't add any productivity features to Office 2000, but it fixes over 300 glitches in Word, Excel, FrontPage, Outlook, PowerPoint, and Access.

But don't grab SR1 and run: If your PC once ran Office 2000 on Windows NT and you've

since upgraded to Windows 2000, Microsoft urges you not to install SR-1. Such users have run into isolated problems with Internet Explorer, including difficulties with searching and clicking on hyperlinks. You're better off waiting for the SR-1 Update, which promises to fix these flaws. The SR-1 update should be available at officeupdate.com by the time you read this.

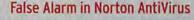
Also, if your system contains a prerelease version of Office 2000 and you try to upgrade to SR-1, you might have trouble installing SR-1. Even worse, some of your Office apps might disappear. To avoid problems, Microsoft says you need to uninstall your existing copy of Office 2000, reinstall the final version (and only the final version) of Office, and upgrade to SR-1.

If you're cleared to install SR-1, you can get the free upgrade from officeupdate.microsoft.com/2000/downloadDetails/ O2kSR1DD.htm. The download's size ranges from 26MB to 40MB, depending on the applications you've installed. Corporate system administrators should go to www.microsoft.com/office/ ork/2000/journ/SR1Installation.htm.

Don't be surprised, however, if trying to install SR-1 turns out to be prohibitively difficult. In multiple attempts, we never got more than a quarter of the way through the download process. Our advice? Order the update on CD-ROM at order4.microsoft. upgrade.com/office2k_sr1/office2k_sr1.asp. Microsoft offers it for free, with no shipping or handling fee. While installing SR-1, you'll need to insert the original Office 2000 CDs. So if your system came with Office 2000 preloaded, you must get copies of the CDs from your PC vendor, unless you already have them.

BUGGED

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



IT'S BAD ENOUGH that Symantec's Norton Anti-Virus versions 5.0 and 2000 have falsely detected the Blankey or Bloodhound. Unknown virus in some systems. But the cure AntiVirus imposes is almost as severe as a virus itself. If users have altered the "quarantine" function of the app, they may lose data. Symantec spokesperson Vincent Weafer reports that all LiveUpdate virus-definition downloads after March avoid the snag. So if you haven't updated yet, do so now to avoid the problem. For further details, go to www.symantec.com/ techsupp/custom/mysupport.cgi, select your version of Norton AntiVirus, and click Go. Then choose Online Virus and Hoax Encyclopedia, and run a search on Bloodhound.Unknown. Or call Symantec's fee-based tech support at 800/927-3991.



MICROSOFT'S FIXES FOR SAFER BROWSING

IF YOU'RE AFRAID someone may try to peek up your modem while you surf the Web, get the following recent Microsoft patches for Internet Explorer and ancillary software apps. One corrects a hole that could allow a rigged Web site or e-mail message to wreck your PC. The other corrects problems that could expose at least some of your files to ill-intentioned Web site operators.

The Microsoft Clip Art Gallery, which comes with many Microsoft apps, including Office 2000 and Works 2000, lets users download additional clip art from other sources in files that use Microsoft's standard CIL format. Through a Web site or e-mail-and without your knowledge-a hacker could introduce a file using the CIL format to wreak havoc with your system.

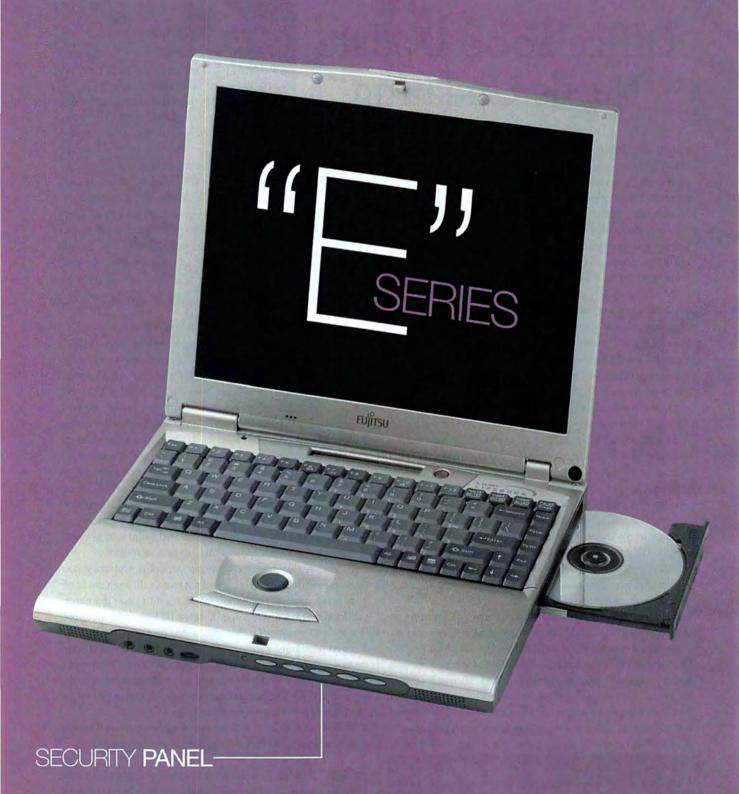
For a link to the 96KB download, point your browser to cgl.microsoft.com/clipgallerylive/pss/bufovrun.htm.

B U G A villainous Web site operator could exploit a weakness in Internet Explorer 4.x and 5.x to rifle through some of your personal files. The hacker would need to know the name and location of your files, and these would have to be viewable in a browser window (for example, as. txt, .htm, and .js files are). But that possibility is less remote than it sounds. Much of your most sensitive data-including passwords and e-mail messages-are stored in standard locations by popular software packages. For the complete details, go to www.microsoft.com/ technet/security/bulletin/msoo-oog.asp.

Download a 1MB patch at windowsupdate.microsoft. com or www.microsoft.com/windows/ie/security/patch5.asp.



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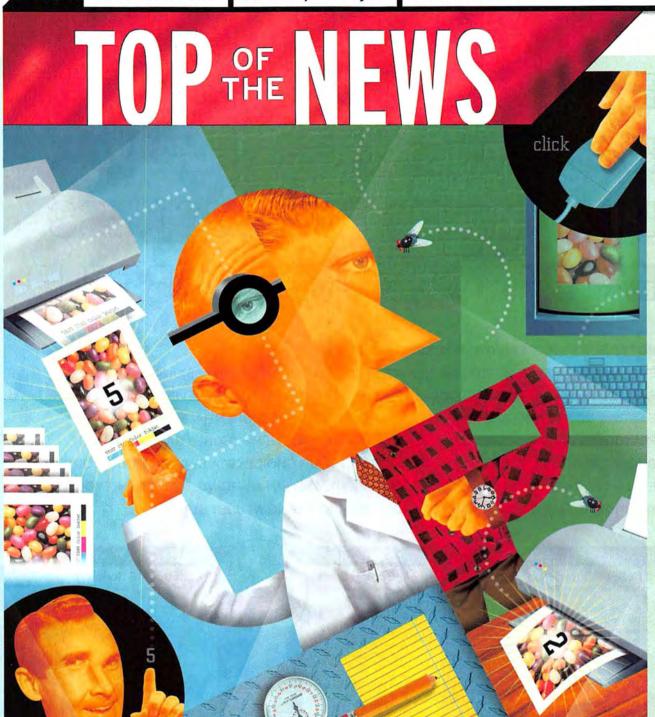
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Product Pipeline

➤ New 3D Graphics: Gamers take note-both ELSA and 3dfx have announced their latest graphics cards, featuring new functions to enrich 3D gaming and design. Both should be available in May. 3dfx will have its new Voodoo5 5500 AGP (\$299) with 64MB of RAM. ELSA's new Gladiac board, sporting NVidia's latest graphics chip set, the GeForce2 GTS, will come in two varieties: a \$350 version with 32MB of RAM, and a \$449 version with 64MB.

Tidbytes

> EBay Cracks Down on Fraud: Last March, news broke that scam artists operating on EBay, the major auction site, artificially pumped up their user feedback ratings in order to defraud buyers. EBay subsequently launched an investigation. Despite customers' financial losses, Gomez Advisors analyst Marty DeBono says the biggest loser was EBay itself because of the doubt cast on the site's user rating system. ➤ Download Sony's Hits: Sony Music Entertainment has joined its industry cohorts' plans to sell digital music downloads. Sony will offer over 50 songs for \$3.59 each (\$2.49 introductory price). Songs can be obtained at Sony's site (in late April) and such retail Web sites as Tower Records (in May), but initially in Sony's proprietary secured format only.

Speed ratings for today's color ink jet printers look impressive. But PC World tests often show a big gap between rated speeds and real-life results. We look inside the ratings game.

COLOR INK jet printers seem to live in two worlds.

First there's the world of printer company test laboratories, where machines whip out documents and photos at mach speed. Then there's the world the rest of us live in, where printing out a simple letter or photo can test the patience of a stoic.

WHAT GIVES?

WE ANALYZED two years' worth of published PC World tests of the top color ink jets. We discovered that the printer companies are waging a "specmanship" contest in which the speeds consumers get rarely match the units' rated speeds. Instead, in PC World tests, the ink jets average between 40 and 73 percent of rated text speeds, depending on the vendor.

We arrived at these numbers by taking the published performance data for the 24

By Dan Littman

printers that earned a spot on PC World's printer charts between February 1998 and April 2000. The data includes text and graphics speed ratings provided by the printer companies, and speeds for text and graphics printing as determined by PC World tests. We looked at the four companies whose machines appeared most often on the charts: Canon, Epson, Hewlett-Packard, and Lexmark.

In PC World's text-printing tests, HP's printers came closest to their rated speeds. Its models tested, on average, at 73 percent of the company's rated speeds. The Epsons averaged 53 percent of rated speeds in our tests, and Canon's and Lexmark's printers checked in at just 40 percent.

In graphics tests, results ranged from 22 percent of rated speed for Epson to a mere 12 percent for Lexmark. HP's printers averaged 18 percent of rated speed, while Canon's averaged 14 percent.

Why such wide discrepancy between vendor ratings and PC World results? The industry has no standard for rating color ink jet printer speed, so vendors make their own rules. For example, some vendors test in draft mode. HP's printers come closest to PC World text results partly because the company provides ratings for normal-mode text printing. Some vendors test by printing from DOS instead of from everyday applications.

"We try and make our tests as fair and representative as possible," says Carolyn Ticknor, president of HP's Imaging and Printing Systems. "But what customers, who use a variety of applications, experience may well be different. [PC World's] tests mayand I emphasize may-be

1658

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more representative of what a user sees," Ticknor says. "In almost every test, we are the most conservative in the industry." HP and the other vendors face the dilemma of a lack of uniform standards, she adds. "We want to be fair to the customer, of course, but also be fair to ourselves."

STANDARD UNLIKELY

LEXMARK engineer Rhenzi Keys predicts "there would be significant hurdles" in creating a standard. Vendors would have to agree on the PC platform, applications, size and complexity of job, and driver

HEWLETT-PACKARD DeskJet 812C

settings. HP and Epson told us they'd welcome a standard but said it would be tough to get the companies to agree on details.

Tom Miller, senior product delivery manager at Canon Computer Systems, notes also that each company might want to capitalize on its own technology.

Given today's situation. explains Charles LeCompte, president of Lyra Research, a printer market-research firm, "print speeds are completely

subjective. That doesn't mean there's no test that a given printer performed at [a quotedl speed, but the test is completely arbitrary."

Aggressive ratings aren't a new tactic in the computer industry. For years, monitors

carried confusing specifications; you could find two "17-inch" monitors with different amounts of screen real estate. But after enough protest from consumers, manufacturers began to report

actual viewable area in ads, so shoppers could understand the specs and make comparisons. For color ink jet shoppers, there's no common, easily understood speed standard.

PERFORMANCE GAP

WITHOUT QUESTION, color ink jet printers run faster than they did in 1998. They also produce higher-quality output. But the divide between PC World performance results and the vendors' rated speeds hasn't narrowed much over time. (See the comparison of printers from April 1998 and April 2000 at left.) Why did we consider only the records of printers that reached PC World's printer charts? Having already identified these as the best products on the market, we felt they represented a fair, relevant sample. Consider Hewlett-Packard's DeskJet 812C, which captured first place on our April 2000 Top 10 Printers chart. HP rates the 812C at 5.1 text pages per minute; PC World tests clocked it at only 3.7 pages per minute. With graphics documents, HP claims 3.1 pages per minute; but in PC World's tests, the 812C produced only a halfpage per minute.

Lexmark's Z51 Color Jetprinter placed third on that same April 2000 chart. Like the HP, it's a good value among its peers. Lexmark says it prints text at 10 ppm; PC World clocked it at 3.9 ppm.

TOP COLOR INK JET PRINTERS TEST REPORT

Speed Ratings and Test Results Are Far Apart

PRINTER VENDORS' SPEED ratings continue to fall short of real-world performance. Newer printers do inch closer to rated performance, as shown in this sample of printers tested in April 1998 and April 2000.

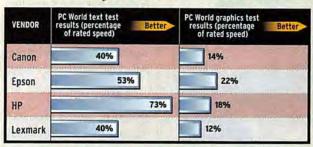
		TEXT			GRAPHICS		
	PRINTER 1	Rated print speed	PC World test results	Percentage of rated speed	Rated print speed	PC World test results	Percentage of rated speed
	Canon BJC-4300	5.0	2.0	40%	2.0	0.3	15%
PC WORLD APRIL 1998 ISSUE	Canon BJC-4550	5.0	1.9	38%	2.0	0.3	15%
	Canon BJC-7000	5.0	2.3	46%	3.5	0.3	9%
	Epson Stylus Color 800	8.0	3.8	48%	7.0	1.1	16%
	HP DeskJet 722C	5.0	4.1	82%	1.5	0.3	20%
	Average of five printers	-		51%	-	-	15%
PC WORLD APRIL 2000 ISSUE	Canon BJC-6000	8.0	4.4	55%	5.0	1,1	22%
	Epson Stylus Color 760	7.0	3.8	54%	6.0	1.2	20%
	HP DeskJet 812C	5.1	3.7	73%	3.1	0.5	16%
	HP DeskJet 882C	5.1	4.3	84%	3.6	0.8	22%
	HP DeskJet 932C	4.5	3.6	80%	2.0	0.7	35%
	HP DeskJet 970Cse	6.5	4.3	66%	5.3	0.7	13%
	Lexmark 3200 Color Jetprinter	6.0	2.2	37%	2.5	0.4	16%
	Lexmark Z11 Color Jetprinter	4.0	2.2	55%	2.5	0.4	16%
	Lexmark Z51 Color Jetprinter	10.0	3.9	39%	5.0	0.5	10%
	Average of nine printers	-	- 1	60%	-	-	19%
		Pages p	er minute	Faster	Pages p	er minute	Faster

Printers listed in alphabetical order. Data included only for printers from Canon, Epson, HP, and Lexmark.

DISPATCH

PRINTERS TEST REPORT

The Big Four: 1998 to 2000



T E S T HOW WE CALCULATE THE AVERAGES For each vendor, we took the highest performance score for each color ink jet that made our printer charts between GENTER February 1998 and April 2000 and averaged those scores to get the vendor's overall score. Included were eight Canon printers, six HPs, five Epsons, and five Lexmarks.

One reason: Lexmark's rated text speeds reflect tests run in draft mode-a lower-resolution setting that prints faster. It's an approach Canon and Epson also take in the quest for high speed ratings.

WE TEST, THEY TEST

TO UNDERSTAND any rating, you need to understand the testing process-a printer can be tested in many more ways than you might realize. And many testing scenarios don't mimic everyday work.

PC World's color ink jet testing methodology is designed to approximate real-world tasks. We use a series of 11 documents of different lengths, some containing text and graphics, others containing only graphics. We create and print these documents from apps including Microsoft Excel and Word, Adobe Photoshop, and CorelDraw. We print one Word document in both draft and normal modes; all others we print in normal mode only. From a Pentium III-450 PC, we print each document twice, reboot the system to clear any caching, run two more rounds of tests, and average the four scores. The combined document scores create test results for both text and graphics.

PC World times from the moment the user clicks Print to the moment the paper hits the output tray-a method known familiarly as "click to clunk." But the big-four print-

er vendors measure time "feed to clunk"-



beginning when the feed mechanism picks up a sheet of paper. Printers generally delay feeding paper until the driver software is already rasterizing a document (converting it into dots); as a result, the feed-to-clunk method shaves some time off recorded speed.

There are technically sound reasons for taking this approach, says Canon's Tom Miller: "A faster processor will rasterize faster; or moreefficient cache management [might affect print speed]....

From an engineer's perspective it's very difficult to reproduce that data." Feed to clunk times are reproducible with a range of PCs, Miller adds.

That's true, but of course the ordinary user has to wait out

the whole time. "If the manufacturers are basing their claims on such [feed-to-clunk] methods, then they should include a caveat," says Wayne Hubbell, president of Compu-Metric Labs, an independent company that tests printers

> for Lyra Research and for a number of printer vendors. "It is not unreasonable to measure performance this way, but they should point out that real-

world users will obtain slightly lower performance."

Canon and HP follow another procedure that does not mimic routine printing. Instead of printing from an app like Word, they prerasterize a

document by saving it as a print (.prn) file. Then they issue a DOS command to shoot the file from the system's parallel or USB port to the printer. This procedure bypasses the application, the driver software, and Windows.

Don Okerlund, HP's Desk-Jet Division product manager, says that the company tests

Site to See: FlipDog.com

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Dog.com uses a proprietary search technology to sniff out job postings from employer Web sites. Job listings are housed in a huge, easy-to-search database, and the site provides personalized automated Job-Hunters. One caution: All that info can be overwhelming.

Top PC World Downloads

O Clean System Directory

72KB, 8992 downloads

Saves disk space and improves system performance by deleting unused DLL files.

All Icons

3.66MB, 5677 downloads

Over 4000 icons for Windows 95; includes games, rock stars.

O Direct X 7.0a

6.19MB, 5277 downloads

Microsoft's upgraded 3D multimedia technology improves force-feedback performance and input device compatibility.

RegRepair 2000

1.25MB, 4766 downloads

Repairs Registry files and font files, and fixes other errors.

South Park Solitaire

534KB, 4311 downloads

Features 12 decks of cards with your favorite South Parkites, and a flashy "Vegas Mode."



this way because the test-

ing is replicable, even with older PCs. "This methodology takes some of the variables out of the testing; it does not rely on the operating system, the computer, the application."

In contrast, Lexmark and Epson print from applications, as PC World does.

THE DRAFT CARD

PRINT RESOLUTION affects speed too—whether you print from applications or whether you start with prerasterized files. Canon, Epson, and Lexmark all quote speeds recordlution draft mode for text and for graphics—something that you might not

realize. (One additional note: Epson rates its printers' speed in "fine mode" for photos.)

For example, a consumer comparing printers might try looking up their specifications on the appropriate vendors' Web sites. We checked out the specs for four printers that ranked on PC World's April 2000 Top 10 Printers chart—the Canon BJC-6000, the Epson Stylus Color 760, the HP DeskJet 932C, and the Lexmark Z51 Color Jetprinter—at the respective companies' Web sites. We could not find the words "draft mode" listed

on the company's normalmode ratings). But those numbers appear only on Hewlett-Packard's detailed specification sheets and on its Web site. The company's advertising and its packaging reflect the draft-mode ratings.

CONSUMER CATCH

UNFORTUNATELY, manufacturers of color ink jet printers find themselves in an increasingly difficult spot, Charles LeCompte says. New models must carry faster ratings than old ones, or they won't sell.

"The speeds they quote keep going up, so I think they're getting themselves into a bind," says LeCompte. "The customers definitely care about speed. And it's leading to some preposterous things. Maybe at 12 pages per minute people will still believe you, but what do you do when you introduce another printer that's faster? Do you say it's 14 pages per minute? Or say 12 ppm, even though it really is faster than the other one you already called 12 ppm?"

For now, there's simply no easy way for consumers to decipher ink jet speed ratings. Based on what we've found, you should use rated speeds only to compare color ink jet printers from the same vendor. You should also consider test results from independent sources, including *PC World*, before making your purchase.

If enough consumers complain, vendors may change their ways. At the least, they could provide more information for comparison shopping. Above all, when you shop for a color ink jet, don't take rated speeds at face value—or the printer may seem a world apart from what you expected.

Canon, Epson, or Lexmark specifications. We did see phrases such as "up to 10 ppm." (Epson notes that it does specify "economy mode" on the customer tear pads that you find near printers in retail stores.) As many of you know, draft-quality printing is acceptable for personal documents but is generally not desirable for producing anything you'd share with others. That's why

Hewlett-Packard, unlike the other three vendors, publishes ratings for draft, normal, and best-quality output (As we discussed earlier, we base our comparisons

PC World runs its tests almost

exclusively in normal mode.

Fast or Slow? Depends on the Test

PAGES-PER-MINUTE speed ratings are a product of how a printer is tested. As an example, this table compares *PC World's* ink jet printer testing method with the one used by a major vendor—Canon.

TEST STEP	PC World	Canon
1. Timing starts	When tester clicks Print	When feed mechanism picks up sheet of paper
2. Print from	An everyday application such as Word	DOS, by copying a .prn file to the printer
3. Quality mode	Normal	Draft
4. Timing stops	When paper hits output tray	When paper hits output tray

More Frills, Few Thrills in Microsoft's Windows Millennium Beta 3

BETA HAS THE multimedia bug bitten you? Then Microsoft's forthcoming successor to Windows 98 Second Edition, Windows Millennium Edition, may be for you. Windows Me Beta 3 sports a souped-up digital media player and a digital camera interface, plus a basic video-editing program.

But while Beta 3 has come a long way from Beta 2 (see "Win 2000 Too Much? Wait for the Millennium," www. pcworld.com/maroo/win2k), it's business as usual below decks. Windows Me may look like the relatively crash-proof Windows 2000, but it sits atop the same shaky MS-DOS foundation as Windows 95. And with many of Windows Me's innovations available as free downloads (including Internet Explorer 5.5 and Windows Media Player 7), you may want to pass on the upgrade, which is slated to ship in the second half of the year.

CALLING ALL MEDIA

WINDOWS MEDIA Player 7 cribs features from several leading free and shareware players, most notably Nullsoft's Winamp. Media Player searches your drives for media files (MP3, .wav, and CD audio files; and AVI, MPEG, and QuickTime video). It uses an online database to organize audio files by artist and recording. It can rip or convert CD audio to Windows Media (.wma) files stored on your hard disk. But it can't create the more widely accepted MP3



NOT NEW, BUT IMPROVED: Windows Media Player 7 is one of the better extras in Windows Me Beta 3, but you can download it for free.

files, a bit of Microsoft arrogance that could drive Windows users to third-party rippers that do support MP3.

Other Windows Me innovations won't be offered as free downloads. If you have a scanner or digital camera that works with Microsoft's Windows Image Acquisition interface, a software/hardware standard somewhat akin to the popular TWAIN, you'll be able to scan or select images over a simple cable connection-no need to download

them to your hard disk first. Microsoft says more than half the digital cameras on the market will be WIA-compatible when Windows Me ships.

MINI-EDITING ROOM

IF YOU'RE the family videographer, Windows Me's Movie Maker could turn you into an auteur. Though less full-featured than packages such as Avid's Cinema, Movie Maker allows you to assemble camcorder or VHS clips into short movies, complete with audio tracks (your computer must have a video capture device and a roomy hard drive). But Movie Maker can't export the movies back to tape-it can only save them in Microsoft's asf file format.

Windows Me boasts other enhancements: It can save the current memory state to disk and resume later, or it can return to the configuration of a previous day. But like Windows 98 SE's improvements, most of these won't have a big impact on your quality of life.

-Scott Spanbauer

A Free-Be Worth Checking Out

IF YOU'VE WEATHERED Windows and limped through a Linux installation, Be Inc.'s BeOS 5 can seem a blessing. Now a free 43MB download at free.be.com, BeOS 5 Personal Edition is a clean, fast, compact, and stable general-purpose operating system that leaves Windows in the dust as a platform for high-end multimedia authoring. It's also easier to set up than previous versions: It installs and runs from within Windows 98 and does not require a separate partition or boot loader.

Hardware compatibility is still a big problem, as is a lack of mainstream apps-only Gobe Software offers a Be office suite. But Be Inc. recorded over half a million downloads within a week of launching BeOS 5 Personal Edition, which could renew developer attention. And Linux's success is encouraging for Be. Like Linux, BeOS is expanding hardware support with drivers for USB, FireWire, and digital cameras.

BeOS 5 Personal Edition's utilities include e-mail, a Web browser, and a CD burner. For \$70 list (from Gobe Software), BeOS Professional Edition on CD adds tech support, a printed manual, Real-



Player G2, the ability to create MP3 files, and a prerelease video recorder utility. If you have enough patience for the download (or enough money for the CD-ROM), BeOS 5 is a nearly painless excursion. Gobe; 800/691-1156; www.gobe.com.

Netscape 6-Slick New Browsing Machine Challenges Internet Explorer

NETSCAPE IS back. After a three-year hiatus (not counting point releases), the browser that helped put the World Wide Web in gear is revving up again, so radically altered that its creators decided not only to change its name (to what people were calling it

anyway), but also to skip a release number. Instead of Netscape Communicator 5, the moniker you might have expected, the product is now called Netscape 6. We looked at the first public beta, released in early April; there's been no word on when the final version will arrive.

The changes are dramatic. Improvements include a

slimmed-down footprint (the typical download. which doesn't include Java, is less than half the size

of Communicator 4.7's); a slicked-up user interface; the only current third-party e-mail client for America

Online; an intriguing integration of Web search tools and instant messaging; and much more. Once the various bugs are ironed out (and right now, it has quite a few), the upgrade should be a no-brainer for current Netscape users. But whether Netscape can woo back those who've defected to Microsoft Internet Explorer over the last few years is another question (Microsoft's market share now exceeds 80 percent, according to the Web

research service StatMarket. com). Aside from the e-mail support for AOL, slightly better privacy features, and such frills as a command for translating Web pages into other languages and the ability to customize the browser internicator 4.7 and 17.2MB for a typical IE install. Netscape 6 got thin in part by dropping Communicator's least-used components (when was the

last time you invoked Netcaster?) Skinny taskbars but also by abanput most of Netscape 6's

scape calls them tabs) on the left-hand side of the screen that hold Web information and applications you want to access quickly from within the browser. These customized minipages are somewhat akin to the Web clippings you get on Internet-enabled mobile devices. Netscape 6 comes preloaded with a handful of tabs,

> including ones for CNN headlines and for Netcenter stock quotes; and you can add more from any Web site that creates them, by using

free programming tools that Netscape provides. Netscape says that nearly 500 tabs were available at launch. If you don't want to see My Sidebar, it collapses with a simple mouse click on the side of its frameno complicated menu item checkoffs required.



face, Netscape offers little that current Internet Explorer users don't already enjoy.

SLIM BUT ROBUST

IN MANY WAYS, Netscape 6 is about getting back to basics. For starters, the basic browser without Java is compact in a way browsers haven't been since the glory days of Navigator 2. And even with Java, the full download of Netscape 6 tops out at 16.5MB, still smaller than the 18MB for Commudoning Communicator's code base in favor of the newer Gecko engine, which is both smaller and faster than its Communicator predecessor. Complicated Web pages seem to load faster (we could not test this observation formally).

The attractive, contemporary-looking interface offers many more customization options than the competition. Most prominent among them is My Sidebar-a collection of small, tabbed windows (Net-

BUDDY SYSTEM

IF YOU'VE forgotten that AOL acquired Netscape Communications last year, Netscape 6 provides several visible memory jogs. One of the preset My Sidebar tabs, Buddy List, lets you send instant messages from within the browser to

fellow AOL/Netscape Instant Messenger subscribers, even when you're not sitting at your own computer. Because Buddy Lists are now stored on Netscape's servers online, you can access them from any NIMequipped machine.

The Buddy List integration doesn't end there. When you compose messages in Netscape Mail, the software will check for recipients who are on your Buddy List. If they're online, you can send the

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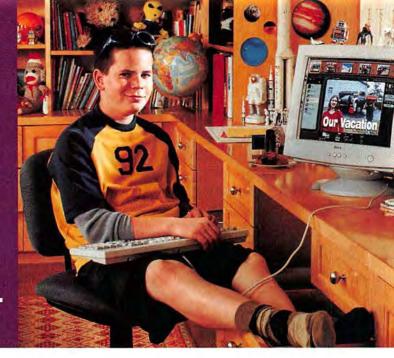


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e-mail as an instant message and start a chat session, circumventing some time-consuming e-mail exchanges.

Netscape Mail delivers several other brand-new goodies. not least among them the ability to send and receive AOL e-mail-it's the only current

third-party e-mail client that lets you do this. Like most e-mail programs. Netscape lets you manage multiple AOL, IMAP, and POP3 e-mail accounts. But unlike the competition, Netscape generates separate inboxes and folders for each account-a nice

feature for people who would like to keep business and personal e-mail separate or who share a computer with others. A popular feature of most newer e-mail programs is included as well: When you read your e-mail, Netscape automatically stores the senders' addresses so you can send them mail later by simply typing the name in the To: field when you start composing. But one important feature is missing-rules that allow you to sort messages into folders as they arrive.

SEARCH ME

NETSCAPE HAS worked on its search features, with mixed results. As in Navigator 4.x. the field where you enter URLs doubles as a search field; just enter keywords, and you get search results. If you enter a well-known name-of a company, university, product, or even city-Netscape will either go straight to its Web site or present a list of likely URLs. Also, as before, you can perform certain specific searches by using special keywords. But new keywords make this feature more useful than ever. For example, if you are shopping for something, type shop or buy in the Search bar followed by the name of the item; Netscape will then bring back results from AOL's shopping search engine.



If the first set of results works well for you, you will love Netscape Search. But if it

doesn't, things can get confusing in a hurry. You can press a button to receive additional results, which start with a list of sites reviewed in Netscape's Open Directory project (this project is a Yahoo-like opensource directory that contains write-ups by volunteer editors). The results also appear in the Search tab of My Sidebar, where they remain until you search on new keywords.

You can refine your search by category-arts, sciences, references, and the like. Eventually, you reach another button, which lets you search with Google, a popular and effective search engine. You can configure Netscape to search several sites at the same time, but some of the tools that it uses (MapQuest and Netscape Jobs, for example) aren't even search engines. Most annoyingly, the browser doesn't let you choose another search engine as the default: You can only bookmark it.

EXTRAS, EXTRAS

NETSCAPE 6's security options are better than Communicator 4.7's, and they match or exceed those in IE 5.x. You can automate site log-ins via a master password, and easily view and set cookie controls on a site-by-site, cookie-by-

> cookie basis by clicking the Personal Managers menu item under Tools.

Netscape 6 retains Composer, an entry-level Web-page authoring tool. Other new features

> Don't be surprised if Netscape 6

pops up on a TV set or mall kiosk in a couple of years.

are Net2Phone software for PC-to-phone calls, the ability to customize the browser interface's look using Themes. and a translation command for conjuring up computergenerated versions of Web pages in foreign languages.

New in Netscape 6

- Small size (8.5MB without Java) can speed up installation.
- Gecko technology renders Web pages rapidly.
- Mail program supports America Online e-mail and multiple accounts.
- Integrates AOL Instant Messenger and e-mail.
- My Sidebar tabs provide users with quick and easy access to customized Web information and applications.
- · Password and cookie managers allow you to automate log-ins and protect your privacy on a site-by-site basis.

(Themes were not available with our prerelease copy.)

Several built-in irritants are present in addition to the bugs. In a package with so many new features, the lack of tool tips to help people learn the new icons and buttons is glaring. It's not always obvious how to use the new customization options. Also, importing an existing AOL Buddy List isn't the easiest task in the world. That said, Netscape 6 isn't excessively difficult to learn, and as soon as it be-

comes more stable. users should find it more fun to use than Communicator, If Microsoft's conviction on antitrust violations results in the removal of Internet Explorer from

the Windows desktop, Netscape could regain its popularity, if only because it's a slightly quicker download.

Even if Netscape 6 doesn't initially win big on PC desktops, it may achieve success in an increasingly diverse Webbrowsing universe. "They have a really strong chance of leveraging that core browser engine," says Jupiter Communications analyst Lydia Loizides, an unabashed Gecko fan.

Netscape 6 is launching simultaneously for the Windows, Macintosh, and Linux platforms, and Gecko has no serious competition from Microsoft's Windows CE in the Web appliance universe, where Linux is rapidly gaining popularity. So, while Netscape 6 may not be the browser for your desktop, don't be surprised if it pops up on a TV set or mall kiosk in a couple of years. This slick, smart browser could still be a contender.

-Yardena Arar

FIRST LOOK

A MILLION units sold in a single weekend. Long lines. Government warnings about illegal exports. Sony's hugely hyped PlayStation 2 launched in Japan in March and should arrive stateside this fall. It joins Sega's Dreamcast in the vanguard of new Internetready game consoles powerful enough to perform traditional PC functions, including Web browsing. Microsoft plans to join the fray next fall.

The Japanese launch of PlayStation 2 had problems— a bug in some memory cards, another bug that illegally allowed users to play DVDs from other countries. Neither problem is expected to affect the product's U.S. release.

THE PLAY'S THE THING

PLAYSTATION 2's slick black exterior looks sharp, but what sets gamers aquiver is the PS2's CPU—the 300-MHz Emotion. With twice the floating-point performance (a type of calculation used heavily in 3D graphics) of a Pentium III-700, the PlayStation can drive

3D games with graphics power unheard of on to-day's computers—at a fraction of the price. Polygons are the building blocks of 3D games, and the PlayStation 2 pushes them around faster than anything else can (see "Consoles Scream Past PCs").

The early PS2 games— Street Fighter Ex and Ridge Racer V—that we tested on a Japanese unit ran impressively, but not far beyond the level of Sega's Dreamcast. Though PlayStation 2 games far surpass PC games in graphics quality, the actual game play is nothing special. This limitation should change as developers gain familiarity with the system.

DVD playback was on a par with that of a stand-alone DVD player. The PS2 even includes an optical digital connector so you can hook the console up to your stereo for a full DVD audio experience.

Perhaps the most tantalizing aspect of the PlayStation 2 is its potential for expansion via its USB and high-speed I.Link (Sony's name for IEEE 1394) ports. No specific prodPUSHIN' PIXELS: PlayStation 2 graphics look great, first games are so-so.

ucts have been announced, but likely additions include a keyboard, a mouse, a hard drive, and broadband Internet access. Still, Microprocessor Report editor-in-chief Keith Diefendorff says consumers may not want to do traditional PC functions on game boxes.

Sega recently announced a \$200 rebate for its Dreamcast (PS2's main competitor) for those who sign up for two years of Internet access at \$22 a month. Though less powerful than the PS2, the Dreamcast ships with Web browsing software and a built-in 56-kbps modem.

THE X-BOX FACTOR

MICROSOFT'S first gaming console, the X-Box, will be based on a modified Windows NT kernel and will ship with PC-like hardware such as a Pentium III-600. The X-Box will also support Internet access and DVD-movie playback. Details are hazier about Nintendo's Dolphin console, also due next fall. If you love games and need only basic Internet tools, your next PC may be a game console.

—Eric Dahl

Additional reporting by Grace Aquino and Tom Mainelli.

Consoles Scream Past PCs

SYSTEM	Price	СРИ	Total memory	Polygons/ second	Drive(s)	Connectivity
PlayStation 2	\$300 (estimated)	300-MHz Emotion Engine	38MB 1	75 million	4X DVD-ROM	2 USB ports; I.Link 1394 port; Type III PCMCIA card slot
Dreamcast	\$199	200-MHz Hitachi SH4 RISC CPU	26MB ²	3 million	12X GD-ROM 5	56-kbps modem
X-Box	Competitive with game consoles	600-MHz Pentium III	64MB	300 million	4X DVD-ROM; 8GB hard disk	USB port; 100-mbps ethernet
Dell Dimension XPS B733r	\$2589	733-MHz Pentium III	128MB ³	15 million *	12X DVD-ROM; 20GB hard disk; 100MB Zip	2 USB ports; 56-kbps/ DSL modem

³²MB main memory, 4MB video, 2MB sound.

⁵ Proprietary Sega format.

^{2 16}MB main memory, 8MB video, 2MB sound.

³ Not including 64MB memory on graphics board.

^{*} Drawn by the NVidia GeForce 256 graphics chip.

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CONSUMER ALERT

JUST KNOWING THAT YOU need something from a government agency-a renewed driver's license or a building permit, for example-is usually enough to wreck an otherwise lovely day. Some sort of hassle seems inevitable. whether it's an inconvenient location, limited hours, complex forms, or a wait that feels like eternity. You're dealing with the government, after all. But things may be changing. State, local, and even federal government agencies have finally heeded the cries of millions across the country and begun to move some of our more onerous tasks online.

LET'S GET DIGITAL

ARIZONA'S Democratic Party made history in March when it held the first binding U.S. elections in which voters could cast their ballots online. But less publicized digital revolutions have been going on all over the country. Residents in most parts of the country can download copies of government forms from state and county Web sites. And the federal government and most states allow online tax filing. Many states have gone far beyond that, offering electronic delivery of myriad services.

In Maryland, for example, residents can pay state taxes, register new businesses, verify the tax registration numbers of business partners, check property ownership, and renew vehicle registration over the Net. Indiana citizens can check for unclaimed property, register to vote, pay taxes, renew vehicle registration, and check medical and dental licenses online.

Folks in Alaska, Arkansas, California, New York, Pennsylvania, and Wisconsin can register their cars on the Web. Virginia citizens can renew Many departments and agencies have their own Web sites. Late last year, President Clinton made plans for the creation of a single Web site that would give citizens access to the most frequently requested federal forms and lots of other

"Internet voting will open up underrepresented minority sectors...to active participation in the voting process."

-Kelsey Begaye

their driver's licenses over the Net, while residents of Pennsylvania can renew them at 30 touch-screen terminals around the state. Already, Nebraskans can go online to buy hunting and fishing

licenses and order vital-statistics records, and Governor Mike Johanns says they will soon be able to do the same to renew driver's licenses and professional certificates.

Although most U.S. e-government activity has been happening at the state and local levels, the federal branch is pushing its own e-projects. information about government services, including federal officials' e-mail addresses.

E-VOTING

CLEARLY, ONLINE voting will be the next big step. Arizona was a strong start. Election. com, which ran the Arizona primary, says that nearly half of the 85,970 ballots were cast online; government officials see those votes as a major step in bringing the Internet into the governmental process.

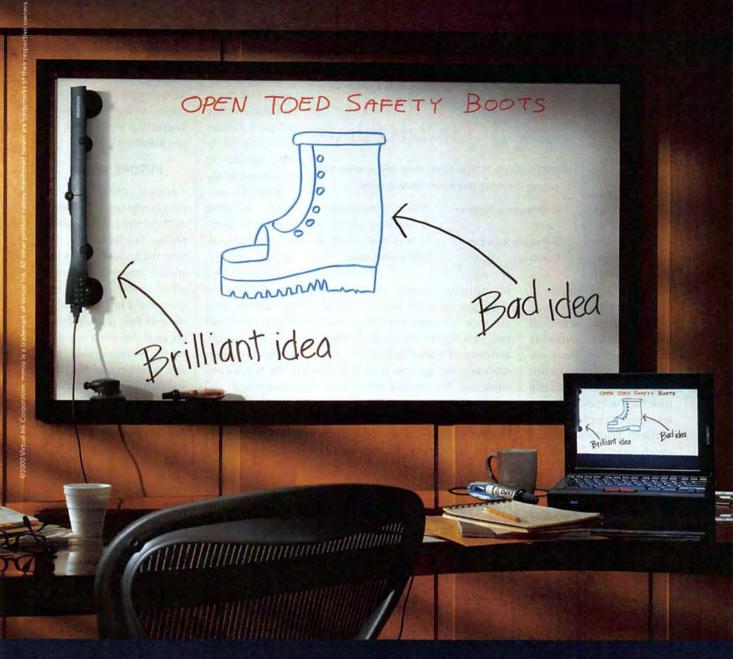
"The way we are doing business now, there are a number of obstacles to participation," said Navajo Nation President Kelsey Begaye, who cast his primary vote online. "The Internet eliminates those obstacles and makes participating much easier."

Begave said that members of the Navajo Nation used to have to travel to the organization's geographically scattered polling sites in order to vote. He himself had to drive 4 hours to reach one. Typically only about 40 percent of the people in his Navajo chapter could make it to the polling places, and even fewer showed up if weather or other factors made travel difficult. Begaye expects all that to change: "Internet voting will open up underrepresented minority sectors of the population to

active participation in the voting process."

He's not the only one excited by the possibilities. Earlier this year, a task force convened by California's Secretary of State Bill Jones released a 34-page re-

port on the feasibility of conducting elections for state offices on the Net. The report followed an earlier review that Jones commissioned to examine how tasks involving government services-including paying traffic tickets, enrolling children in public school, updating drivers' licenses, and applying for building per-



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mits-could be performed online.

Although Jones has expressed reservations about introducing Internet voting too quickly, California's Riverside and Monterey counties offered online voting in the state's March primary, using 100 state-controlled

touch-screen terminals in shopping malls. Riverside officials have already announced their intention to completely replace the county's traditional punch-card voting booths with touch-screen terminals in time for use in next November's general election.

Indeed, petitions are being circulated for a California bal-



OVER 1400 VISITORS to PCWorld.com told us which of 15 bureaucratic chores they'd most like to do online.

- Renewing a driver's license.
- @ Registering a car.
- O Voting.
- Registering to vote.
- Ordering copies of vital records (such as birth certificates).

lot initiative measure that would give voters the right to cast their votes online in federal, state, county, municipal, and district elections. If sponsors can collect 420,000 valid signatures, the measure will go before the voters this fall.

Serious obstacles block full implementation of e-voting, though. Alfie Charles, Jones's aide and a member of his electronicvoting task force. says that e-voting still has a number of security problems similar to those found in other types of e-commerce, including verifying the identity of voters, ensuring voter secrecy, and preventing

hackers from attacking the system. Smart cards and other secure identification methods may play a role in the solution.

Charles says that after closely watching the Arizona primary, California officials still have reservations. "[Arizona officials] didn't have as many of the legal requirements as we do here," he notes. "There were no reports of hacking, but there is concern about that happening in a major election.... Although it was an interesting test, I think the jury is still out."

FUTURE VISION

THOUGH IT's unlikely that your computer and modem will have replaced the familiar polling booths even by the time the 2004 elections roll around, expect more states to offer less-controversial services in the interim. Within the next four years, chances are good that you'll be enjoying the benefits already available to residents of Maryland and Indiana. And some time soon, we'll all be able to exchange many of our hours in line for minutes online.

-Bill Wallace

Microsoft Windows CE, Take 3: More Beauty, Same Beast

FIRST LOOK

WHAT'S THE difference between a laptop and a personal digital assistant? If the PDA is based on the Palm operating system-designed for keeping schedule, address book, and other personal information handy-the difference is huge. But increasingly, handhelds running Microsoft's Windows CE blur the line between laptop and personal information manager.

Windows CE palmtops have not been a howling success-International Data Corpora-

HP Jornada 540 series

Street price: \$499 (with 16MB of RAM) to \$599 (with 32MB of RAM); Hewlett-Packard; 800/443-1254; www.hp.com/jornada

PRODUCT INFO NO. 728

tion analysts say Palm OSbased devices command more than three-quarters of the PDA market. So Microsoft has a new name for the latest batch: Pocket PCs. They boast the sleekest hardware to date, and the new CE 3 operating system offers such praiseworthy advances as visible menu bars and improved security options. Also new is the reader software for perusing electronic books. Future CE 3 devices will support GPS, the Bluetooth wireless standard, and wireless services through MSN Mobile.

We checked out one of the first Pocket PCs, a preproduction Hewlett-Packard Jornada 545-the initial entry in HP's 540 series.

Priced from \$499 (with 16MB of RAM) to \$599 (with 32MB of RAM), the 540-series Jornadas carry such extras as PeaceMaker software to permit infrared business-card exchanges with Palm devices.



HP Jornada 540

The Jornada 545 is the smallest color Windows CE device to date, and its display rendered crisp, clear text in Reader. Otherwise, the 540 series doesn't differ much from its predecessor, the 430se.

If you would like to read books, browse the Web, or run a spreadsheet on a device you can fit into a pocket or purse, the latest Windows CE palmtops are more appealing than ever. But how many people are willing to sacrifice the simplicity of the Palm for the fripperies of Windows CE? Judging from Palm's market share and recent decisions by both Everex and Philips to stop making Windows CE

palmtops, the answer is, not many.

Alexandra Krasne

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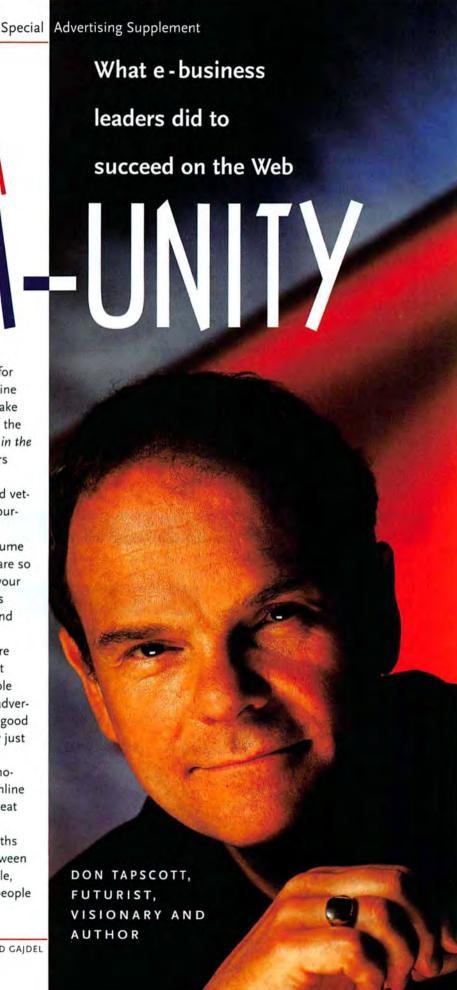
COMMERCE SERIES. PART II

BUILDING A

oday's Internet has little patience for slow thinkers or slow movers. Online businesses on the Web need to make things happen in Internet time. At the E-Business and Beyond: Succeeding in the New Economy conference, speakers and seminar leaders will share their insights to help upstarts, start-ups and veterans avoid the Net's pitfalls as they pursue profits online.

"The most common pitfall is to assume that your company and your product are so interesting that users will care about your branding message. They don't," warns Jakob Nielsen, Ph.D., user advocate and principal, Nielsen Norman Group in Mountain View, Calif. "[Users] only care about what's in it for them. They don't want to wait for photos of happy people using your product. They don't want advertising language that brags about how good and revolutionary the product is. They just want the facts."

Nielsen and other experts say to innovate, don't imitate. Don't treat your online customers the same way you would treat them if they visited a physical store. Instead, leverage the Internet's strengths to compensate for the differences between the real and virtual worlds. For example, online retailers must inspire trust in people they will never meet.



COMMERCE SERIES,

PART II

"The issue isn't so much the loss of face-to-face contact," says Paul Saffo, director of the Institute for the Future in Menlo Park, Calif. "The issue is how to best create a sense of community and gain your customers' trust." Saffo believes that only by possessing a clear insight into their customers' needs and interests can online entities assure themselves of continued customer loyalty.

Sometimes, however, a successful strategy is so obvious that companies overlook it in the scramble for more sophisticated solutions. "One way to generate customer loyalty is to promptly ship what people have ordered," says Wayne D. Bennett of Bingham Dana in Boston, Mass. "This may sound too simple, but on the Web today, people usually get service that's so bad that anybody who can get the product to the customer has a huge lead."

GET THE SALE; KEEP THE CUSTOMER

On the Web, where competitors are just a click away, the ability to attract and retain new customers determines who will be left standing at the end of day.

Saffo advocates agility as a success strategy. "You need velocity and flexibility to succeed," he advises. "So get out there and make it happen now. Assume that you're going to get it wrong up front, but that next time you'll get it right."

Nielsen advocates resisting the impulse to confuse your needs with your customers' needs. "Don't get so excited about the collection of market-

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Don Tapscott,

futurist, visionary and author, envisions a time when the Internet will touch every part of our lives, not just our wallets. In his role as the chairman of the Toronto, Ontario-based Alliance for Converging Technologies, Tapscott predicts that the Internet will insinuate

and wealth for shareholders. Participation in the b-web phenomenon is not optional; it is imperative."

ON THE NEED FOR RELATIONSHIPS

"What's so valuable about that face-toface contact between [the customer] and the sales people?" Tapscott

itself into the fabric of society in ways we can barely imagine today.

ON RE-DEFINING THE NET

"Ten years ago I was accused of overhyping the Internet. It turns out that, if anything, I under-hyped it. The biggest problem is that people don't understand what e-business is. They come to me and ask 'How do I create a great Web site, one that's "sticky," attracts lots of eyeballs, and can be used as a portal?' I tell them that the last thing in the world you want is a great Web site. And eyeballs are the wrong body part. It's the heart that you're afterrelationships are what really count.

"No, the key to competing in this new economy is the Business Web and the new form of wealth is Digital Capital. B-webs are new organizational models that describe how companies and individuals come together on the Internet to create value for customers

believes that face-to-face contact is only

one element of a multifaceted relation-

Р

ship that includes personalization, service, and anticipatory responses from the seller. "If I wander around a store for a half-hour looking for books, is that worthwhile [to me]? I can do that in two minutes online and reinvest the time I save doing other things."

ON FUTURE CUSTOMERS

"Today, the technology revolution is intersecting with the demographic revolution. In 1977 the boomers started having kids. There are 80 million kids in the United States between the ages of two and 22. They are the 'Net Generation' and they are the first generation to grow up bathed in bits. They think differently and will be a huge force for change as they become software-and-services component. So rather than just purchasing a product, you [will] purchase an entire experience.

more accustomed to doing business

ON THE UNIVERSALITY OF

"In five years, many to most products

will be imbued with services delivered

over the Net. Cars will become mobile

network appliances, always connected. We think of the Internet as something that comes over the computer. That's just a tiny piece of it. Internet services will touch all kinds of physical things.

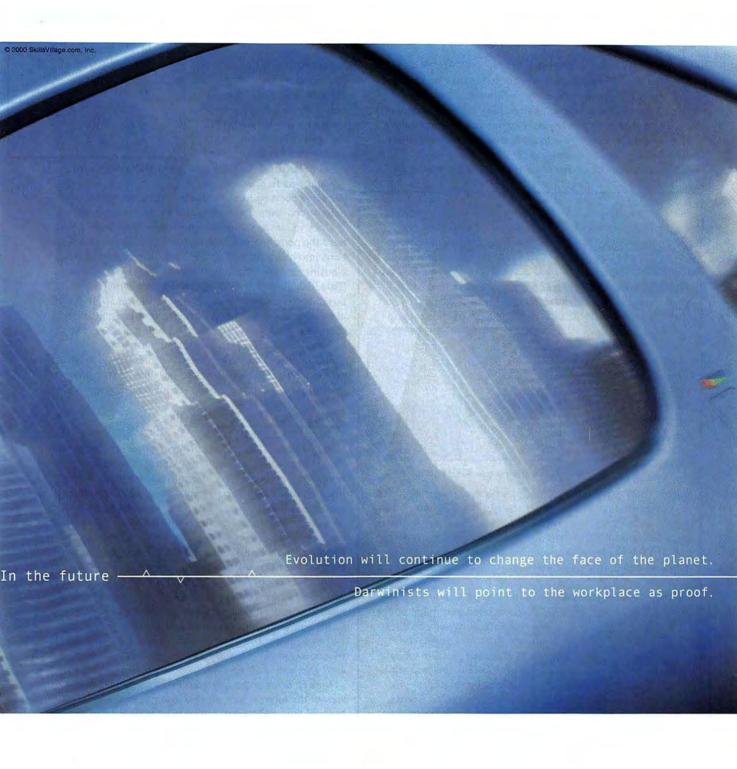
Anything that you purchase will have a

on the Internet."

THE NET

[The concept of] open source will allow customers to have a say in creating their own products. We'll see opensource textbooks created by teachers contributing text from across the country. And we'll see an open-source airplane, a next-generation jumbo jet [cooperatively] designed in cyberspace.

"A question to ask yourself is how might your product be created by an open source-enabled competitor? Or, conversely, how could you include your customers to help you create or enhance your own products? This is where the real action is. The Internet is more than just selling stuff online."



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A new force at work.

COMMERCE SERIES, PART II

ing data that you lose the sale," he says. "And don't get in the user's way with intrusive questionnaires that ask questions that don't relate to the fulfillment of their order."

Successful online companies have come to understand that they need a clearly-defined mission and an intuitive understanding of how to fulfill customers' expectations before they can exploit a niche.

While much of that understanding lies in managing

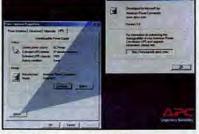
EVERY BATTER DREAMS OF THE MOMENT WHEN HE'LL SEND THE BALL sailing high over the centerfield fence. And batters know that

Covering all the Bases

can happen only if they keep their eyes

on the ball. That same scenario applies to your data and to your computer equipment: if you don't keep a watchful eye on your resources today, an unexpected loss could cause you to strike out tomorrow.

West Kingston, R.I.based American Power Conversion (APC) provides more ways to protect your data from curves than any other power protection product vendor. APC's PowerChute plus is an uninterruptible power



APC's Interactive Assistant

supply (UPS) which affords Windows 2000 users the highest level of protection against power spikes, dips, surges and outages. To ease system management, APC's Interactive Assistant provides step-by-step videos and text-based instruction describing UPS installation and maintenance. Users can also troubleshoot common UPS problems over the Web through APC's

For another level of peace of mind and protection against



www.hostpro.com

disruptions, you might prefer to outsource your e-business site hosting. Los Angeles, Calif.-based HostPro offers a suite of affordable and scalable hosting solutions. HostPro's 24x7x365 access ensures that your customers will always have fast access to your site. HostPro's unique control panel gives you easy

and instant site management tools to update and change your content. This real-time dedicated hosting enables you to focus your energy and resources on your core business of meeting your customers' expectations.

So, go ahead and look to the future. Just remember to make sure that you have covered all of your data-bases today.

human nature, it also includes managing the technology. For example, successful companies monitor traffic patterns on their Web sites to verify that the sites deliver a consistent and pleasant experience for customers. Small focus groups www.skillsvillage.com can alert you to how well



you're responding to fast-changing customer needs and perceptions, even those generated by your competitors.

Once you understand your customers' expectations, you need the personnel who can translate your company's solutions into reality. To find qualified people with crucial skills, e-businesses can look to the Internet for answers. Santa Clara, Calif.-based SkillsVillage.com is an Internet-based business-to-business skills procurement forum. In this virtual meeting place, independent contractors and consultants (Contractor Villagers) can meet with hiring managers and human relations professionals (Client Villagers). SkillsVillage.com's forum enables IT professionals to participate in peer-group discussions to exchange ideas, gather information, and obtain answers to job-related questions.

MONEY ISN'T EVERYTHING

Managing prices rates lower than customer satisfaction on the list of priorities for building a strong Internet business. Although most customers expect to find bargains on the Internet, many sites succeed even when their competitors charge less than they do. "Don't overvalue being a low-cost provider," cautions Saffo. "Amazon.com is not the cheapest place to buy books on the Internet. Their customers come back to them because Amazon knows how to build a relationship based on trust and community."

Price reductions for your customers can result from integrating new distribution models. As a distribution mechanism, the Internet is unparalleled, according to Ken Goldstein, senior vice president and general manager of Disney Online. "The Internet is the single most efficient distribution channel in history. You tell us what you want... we'll give it to you," he says.

Nielsen takes an equally practical, if somewhat darker, view of the Internet as a distribution mechanism. He believes that the Internet can be used to distribute "anything that is pure information, or where the current provider is uniformly hated by the customers." As an example, Nielsen predicts that Internet services that substitute for cable television will be a major growth area as soon as bandwidth restrictions ease.

NO END IN SIGHT

Over the past two years, the Web achieved mainstream market status and inaugurated the third societal revolution,



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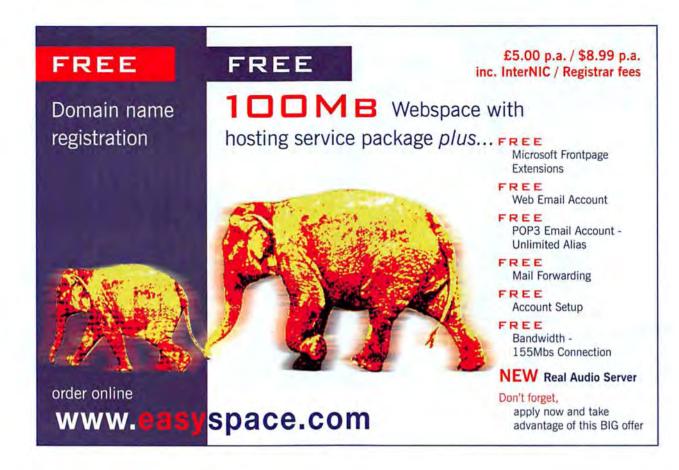




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THE ELECTRONIC

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COMMERCE SERIES, PART II



www.easyspace.com

a far-reaching transformation that many experts believe will dwarf the Agricultural and the Industrial Revolutions.

The increasing ease and lowered cost of registering domain names promises to speed even more online product and service providers onto the Web.

One of the leading ISP, site-hosting and domain registry services, UK-based EasySpace, uses high-performance Linux-based servers to provide low-cost, high-availability access to hosted Web sites. With service centers in key cities worldwide, EasySpace's communications architecture utilizes multiple Internet backbones, including UUNet, Sprint, Qwest, and Exodus, as multiple T3 data paths, helping to eliminate frustrating bandwidth restrictions faced by online customers.

However, Internet marketers have yet to overcome the public's lingering perception that the highest-quality infor-

mation and goods are not to be found on the Web. This perception is due in part to the Internet's history as a conduit for distributing free information. While this mindset is troublesome for many vendors, it is particularly vexing for vendors of pay-per-view content.

Bennett offers hope for a brighter future because consumers will ultimately come to recognize that value is integrally linked to compensation. "Contrary to predictions, information will not become free. Bad information will be free, but people will not bother to create good information or useful answers without compensation," he predicts. To make that happen, forward-looking companies must say to their customers, "Yes, we expect to make a profit at what we do."

As the commercial sector of the Internet continues to grow and mature, it will transform itself from a mechanism focused primarily on the sale of services and merchandise (e-commerce) into one that uses Internet technology to improve all business processes (e-business). E-business includes links to supply-chain partners and to online procurement. Companies that can achieve profitability and retain customer loyalty will not only survive, but thrive.



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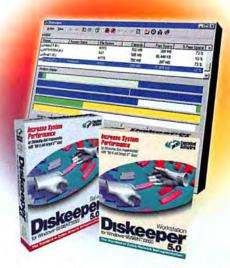
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High-Tech Frames for **High-Tech Photos**

DIGITAL FRAMES

FORGET PHOTO printers. Want a really easy way to display all those cool pictures you've shot with your digital camera? Enter Ceiva Logic and Digi-Frame, whose digital picture frames promise to take care of that task-and provide you with a simple way to keep your personal photo gallery up to date automatically.

The \$249 Ceiva Picture Frame and Digi-Frame's \$599 DF-560 digital picture frame have active matrix LCD panels, and both automatically display a series of color photos. How each of them works and what you'll see on screen varies tremendously, however.

SHARE THE WEALTH

CEIVA'S PRODUCT is an incredibly simple, stand-alone device requiring no computer, setup, or maintenance. Just plug it into a nearby phone jack, and it automatically connects to Ceiva's Web site, downloads up to ten images into the frame's memory, and displays these on its 5-by-7-inch screen (approximate size). A unique, embedded serial number in each unit directs the product to your authorized pictures.

Uploading your shots to www.ceiva.com is no more difficult than to other photo sites, and you can display your own pictures, or borrow a few

from a friend or relative who also has a Ceiva frame. To use the device, you need a Web account with Ceiva (\$3 per month for a local number; \$8 for toll-free). Images are updated daily, in the middle of the night, so you can see new pictures each morning. There are two user controls: One lets you adjust brightness and the other enables you to set the amount of time each picture will be displayed on screen.

WE GOT OPTIONS

UNLIKE CEIVA, Digi-Frame has slots for digital camera CompactFlash and Smart-Media memory cards, and it automatically reads and displays these cards when they're installed. Users can also connect to a Mac or PC serial port and download JPEG files from the hard drive, from an attached digital camera, or from any photo Web site.

The unit comes with Digi-Frame's own download utility. Downloads are slow, however, and the controls are fairly rudimentary. To top it off, you have to fool with COM port settings to make the whole thing work-no USB yet.

On the plus side, you can program the 3.5-by-4.5-inch display (approximate size) in various ways: different wipes (transitions between pictures), black and white or sepia tone, several special effects, and an automatic color fill to eliminate harsh black lines if the image's aspect ratio (width and height) differs from the frame's. The unit can display up to 500 different images.

You can even program a self-running slide show on your computer and download it to the Digi-Frame memory card. Other options let you page through the pictures, view a series of thumbnails and slate them for display, and

> delete images from the card. Digi-Frame automatically displays all images in the correct orientation.

For \$399, Digi-Frame also offers the DF-390, which has a somewhat smaller screen, a bit less memory, and not quite as many controls, but otherwise matches the DF-560's features.





BOTH FRAMES GIVE YOU an easy forum for displaying your digital photos. Ceiva's image is larger, but Digi-Frame's is brighter.

Ceiva Picture Frame

PRO: Relatively inexpensive, very easy to use.

CON: Few user controls, ten-image limit, monthly fee.

VALUE: Good choice for displaying and sharing Web photo albums.

Street price: \$249 (plus fees)

Ceiva Logic

877/693-7263

www.ceiva.com

PRODUCT INFO NO. 721

DF-560

PRO: Multiple picture sources, lots of options, up to 500 images.

CON: Pricey, smaller viewing area than Ceiva, basic upload software.

VALUE: Gives polished results without changing pictures every week.

Street price: \$599

Digi-Frame

914/937-4090

www.digi-frame.com

PRODUCT INFO NO. 722

PHOTO FINISH

THE CEIVA Picture Frame is virtually goof-proof, its display is larger, and its colors are richer than the Digi-Frame DF-560's-but it can't do as much as the Digi-Frame, and its monthly fee does add up. Overall, the Digi-Frame wins the nod from us because of its superior versatility and picture capacity.

-Daniel Grotta

84 Ceiva Picture Frame, Digi-Frame DF-560 digital frames

IBM ThinkPad T20

Polywell 800K7-1000 PC; Proxima DP6850 projector

88 Microsoft Streets & Trips 2001; Wizcom QuickLink Pen Personal Scanner

Toshiba SD-R1002 CD-RW/DVD-ROM Drive; Agfa EPhoto CL30 Clik digital camera

94 DeLorme XMap Business, Microsoft MapPoint 2001: AlphaSmart 3000 keyboard

99 Apple PowerBook 500; RIM 850 Wireless Handheld

MyPlaceWare.com; Timbuktu Pro 2000

101 ThinkFree Office; NEC Super-Script 4650N printer; Konexx Mobile-USB analog converter



FOR MORE PRODUCT news and the latest announcements, check the offerings

of the PC World Daily News Service at www.pcworld.com/news.

playback. Unlike the 600 series, the T20 needs a \$47 cable with a parallel connection to use the floppy drive externally.

The \$3699 T20 is pricier than many high-end units, but it offers a richer feature set in a 6.5-pound package-right on target for a performancehungry business traveler.

-Anush Yegyazarian

First 700-MHz Notebook: IBM's New ThinkPad

NOTEBOOK

CLEAR THE passing lane, there's a new speed demon on the road-IBM's new ThinkPad T20, a lean, mean computing machine with Intel's latest mobile CPU, the 700-MHz Pentium III SpeedStep. Set to replace IBM's ThinkPad 600 series, the T20 line sports a new case and more features for busy travelers.

The 700-MHz SpeedStep CPU led a preproduction T20 to a PC WorldBench 2000 score of 138, the best ever for a Windows 98 laptop and nearly 7 percent higher than the average of five PIII-650 notebooks we've tested in the past. Like Intel's other SpeedStep CPUs, the new chip will step down to a battery-saving clock speed (550 MHz) when it's not plugged in. Unless you do CPU-intensive tasks, however, disable this option and enjoy the performance-you won't lose more than a few minutes of battery life. With SpeedStep enabled, the unit lasted a respectable 3 hours, 21 minutes on our battery test.

Right off the bat, you'll see a new Bluetooth-ready UltraPort connector on the T20's screen lid. Bluetooth is a wireless protocol that lets PCs and cell phones, for example, talk to each other; you'll need a card

(the PC Card version is due out in July) to use the functionality. Currently, you can use the port to attach a \$106 digital camera that takes stills

A POWERFUL punch

in a portable ThinkPad package.

and video. (The camera also connects via the USB port.) With the bundled software, you can take snapshots and send video e-mail. I found the package intuitive and had the camera running in minutes.

Other advances include a built-in ethernet port and a new place for the on-switch: It's above the keyboard rather than on the side, so it's less likely to get switched by acci-

dent. You also get a programmable ThinkPad button. By default, it launches an easy-touse program called Access ThinkPad, which holds system information

> to a quartet of IBM portals, including one with a smallbusiness focus. S3's Savage IX8 AGP graphics chip set with 8MB of RAM drives the brilliant 14.1-inch LCD. Our unit also had a goodsize 12GB hard disk and

and links

128MB of RAM.

Though not backward-compatible, the media bay modules (including a second battery, a hard disk, and CD-RW and LS-120 drives) are interchangeable with those in the new ThinkPad A20 series of portables (which replaces the ThinkPad 700 and 390 lines). Most modules are also hotswappable. Our system didn't come with DVD player software, so we didn't test DVD

IBM ThinkPad T20 (model 41U)

PRO: Fast; brilliant screen; good battery life.

CON: User must buy adapter cable to use floppy externally; not all media modules are hot-swappable.

VALUE: Great for power-hungry salespeople and execs.

Street price: \$3699

IBM

800/426-7255 ext. 4751 www.ibm.com/pc/us/thinkpad

Speed to Spare With Polywell's 1-GHz Athlon

THE RACE TO 1 GHz was fast and furious, but systems packing that heat have been slow to arrive on store shelves. However, 1-GHz Athlon systems are available now, and to judge from our tests, they live up to expectations. The most recent model we've examined, the \$3388 Polywell 800K7-1000, is the fastest we've seen. It posted a sizzling PC WorldBench 2000 score of 162, which is a negligible 3 points slower than our reigning WorldBench champ-a preproduction 1-GHz Intel Pentium III-based IBM Aptiva machine.

Polywell's silver-colored case has no screws to hinder access to the interior-press two release levers on the sides and the entire cover slides off easily. There's plenty of room to add memory and PCI cards. One external 5.25-inch drive bay and one internal 3.5-inch bay are available as well.

This richly configured system offers a very generous 256MB of SDRAM as well as a Promise RAID card that controls a pair of 20GB IBM Ultra DMA 66 hard drives for mass storage. The two drives are treated as a single 40GB unit

Polywell 800K7-1000

PRO: Top-notch performance, loaded system.

CON: Not cheap; may be more power than most users need.

VALUE: Great if you need the

bleeding edge.

Street price: \$3388

Polywell Computers

800/999-1278

www.polywell.com

PRODUCT INFO NO. 723

(RAID o), effectively doubling bandwidth and increasing sustainable throughput. The setup is overkill for most users, but it costs little more than a single 40GB drive; and if you're using data analysis programs or other disk-intensive apps, you'll get an edge. The unit also has a fast ELSA Erazor X2 3D graphics board, a combination 8X DVD-ROM/40X CD-ROM drive, an Iomega Zip 100 drive, a sharp 19-inch ViewSonic monitor, and a V.90 modem.

Polywell provides a threeyear warranty on most-but not all-parts. The system also comes with standard 24-hour tech support for the first year.

Considering its opulent features and killer performance, the 800K7-1000 is a great value at \$3388-especially if you're working with intensive graphics or engineering applications. If your power needs are less extreme, consider the same 800K7 with a slower. but still muscular 700-MHz CPU-for \$940 less.

-Jon L. Jacobi

Brighten Up Your Large-Group Presentations

TODAY'S sub-5-pound projectors are fine for road warriors who make presentations to audiences of a dozen people or less. But to deliver a presentation that has enough brightness

conference room, you need a more powerful machine.

for a larger audience

in a lecture hall or

Enter the Proxima DP6850, a \$5999 LCD projector with native XGA (1024 by 768) resolution and a motorized zoom lens and focus. It costs more than others in its class but it also has a 190-watt UHB (ultrahigh-brightness) lamp that can generate a whopping 1500 ANSI lumens of lighttwice as much as the competition. This allows the DP6850 to project bright images measuring up to 24.3 feet diagonally from a distance of 35 feet. You can also use the DP6850 at much closer distances (2 feet is the minimum image size, at a distance of 3.6 feet), but this 13.2-pound unit is primarily designed for largegroup presentations.



HEAVY HITTER: The 13.2-pound Proxima DP6850 delivers bright (1500 ANSI lumens) images in medium-size conference rooms.

The DP6850 features the usual complement of inputs and outputs for sound and video. But unlike many projectors, it also has extra RGB video and sound inputs that allow multiple, simultaneous laptop hookups-useful if several people will be making presentations at one gathering. The Proxima's easy on-screen controls-color balance, rear and ceiling projection, and more-are accessible both on top of the projector and via the unit's handy remote control.

I tested the DP6850 with a

500-MHz Pentium III laptop, viewing a collection of PowerPoint presentations and digital photographs as well as an episode of cable TV's The Sopranos on a tabletop screen (at distances of 5 and 8 feet) and a highly reflective white wall (20 feet away). The results were consistently impressive: bright and pleasing images with rich color and excellent contrast.

If you're looking for a versatile machine that projects rich images in conference rooms and classrooms, the Proxima DP6850 is an excellent choice.

-Richard Jantz >

Proxima DP6850

PRO: Very bright, vibrant color, optical zoom lens.

CON: May be too heavy for some, carrying case costs extra.

VALUE: Excellent projector for

large conference rooms. Street price: \$5999

Proxima

800/447-7692

www.proxima.com

PRODUCT INFO NO. 724







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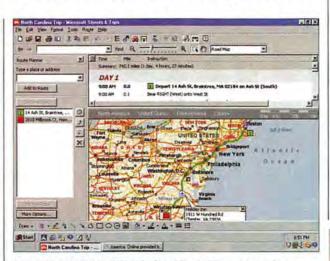
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Cruisin' With Microsoft Streets & Trips 2001

PLANNING A trip to Yellowstone, or want directions to a great seafood place while you're traveling? In either case, Microsoft's Streets & Trips 2001 can help you get there. Armed with more than 6.3 million miles of streets and highways in the United States and Canada, the program can pinpoint virtually any address on the map and generate turn-by-turn directions. And now you can save those directions as a Web page to share over the Internet with colleagues or for future reference. On the downside, while you can download maps to your Windows CE device. Palm users are still out of luck.

Streets & Trips' strength is its ability to route you from point A to point B, particularly over long distances. Version 2001 has expanded the program's travel planning capa-



STREETS & TRIPS 2001's redesigned Route Planner opens in a separate pane and simplifies the task of revising your travel plans.

bilities. For starters, it now includes data for every postal code in Canada, so you'll be able to plan trips that take you through our great neighbor to the north. (The program will only locate addresses within cities that have a population of 10,000 or more.) New GPS support allows you pinpoint to

your exact location on the map when you hook up a GPS device to your laptop. Finally, the redesigned Route Planner makes it easier to add locations and revise your itinerary.

Other new features include improved drawing tools that let you annotate your map with callouts or points of interest. Users tired of swapping discs will be happy to learn they can load the entire program, maps and all, onto their hard drive for quicker access. The cost is a huge chunk of hard disk—up to 835MB.

If you need local directions, you're better off firing up your browser and going to a consumer-friendly site like MapQuest.com. But if you're planning a cross-country trip, Streets & Trips 2001 makes a great traveling companion.

-Cathy Kenny

Microsoft Streets & Trips 2001

PRO: Lets you share directions with others over the Web, new GPS support, easier to revise plans.

CON: Loading data and program on PC takes 835MB; no Palm support.

VALUE: Good choice for long-distance travel, especially to Canada.

Street price: \$45

Microsoft

800/426-9400

www.microsoft.com/streets

PRODUCT INFO NO. 725

OCR on the Run: QuickLink Pen Scanner

PEN SCANNER

BUSINESS CARDS, memos. charts, magazine articlesyou want the information you collect while away from your desk, but you don't want to lug a notebook or all that paper back to the office. Wizcom Technologies offers a better way to capture and organize text information: the \$130 QuickLink Pen Personal Scanner, a compact and practical handheld text scanner with built-in optical character recognition capabilities. The pen's internal memory can store up to 1000

pages of scanned text for eventual transfer to your PC. And unlike many pen scanners, it doubles as an address book

Wizcom QuickLink Pen Personal Scanner

PRO: Very light, syncs well with PC. CON: Not cheap, takes user a while to get the hang of scanning.

VALUE: Nice option for frequent,

on-the-go scanning needs.

Street price: \$130

Wizcom Technologies

888/777-0552

www.wizcomtech.com

PRODUCT INFO NO. 726

and syncs easily with desktop PIMs, browsers, word processors, and spreadsheet apps.

The included Wizcom software, which communicates with your PC via the bundled serial port interface or infrared, makes syncing the unit to your PC simple. The pen itself can be hot-plugged, so you don't need to reboot each time you attach it. If you buy the QuickLink Pen directly from Wizcom's Web site, the company will throw in a \$30 USB adapter free. The pen integrates 2MB of flash memory,

which is user-upgradable to 4MB for \$50 or to 8MB for \$79. The 3-ounce pen scanner runs on two AAA batteries.

The device takes some getting used to. In my first tests with a shipping unit, the error rate was unacceptably high for a portable device equipped with few buttons for making changes. But with some practice, I reduced the error rate to less than 5 percent—fine for any OCR package.

If you collect a lot of text material away from the office, the QuickLink Pen can lighten your load and help you get that information organized.

—Joel Strauch >



Join the Internet Revolution with an E-Powerhouse from Quantex



Standard Features: 3.5" 1.44MB Floppy Drive, Microsoft Windows 98 Second Edition, Internet-Ready Keyboard, MS Mouse, New ATX Mid-Tower Caso, 2 USB Ports. 3-Year Limited Warranty & 24/7 Toll-Free Technical Support



QUANTEX SM933z

Cutting-Edge Performance Desktop

New Intel® Pentium® III Processor 933MHz New 128MB RDRAM Memory

40GB 7200rpm Ultra ATA-66 Hard Drive 19" Monitor w/Diamondtron NF CRT (18" vis. 25ag) nVidia GeForce 256 4X AGP Graphics w/32MB, TV-out CD-Rewritable Drive

12x Max Variable Speed DVD-ROM Drive 56K V.90 Internet Fax/Modem

10/100 PCI Network Card—Broadband Ready New Sound Blaster Live! Value Digital PCI Audio New Cambridge SoundWorks FPS2000 Digital Speakers Microsoft Office 2000 SBE

\$2999

Business lease:\$109/Mo., 36 Mos.

QUANTEX SM866x

Cutting-Edge Performance Desktop

New Intel® Pentium® III Processor 866MHz
128MB SDRAM Memory, PC133 Ready
30GB 7200rpm Ultra ATA-66 Hard Drive
19° Monitor w/Diamondtron NF CRT (18° vis, 25ag)
Matrox G400 AGP Graphics w/32MB (DualHead display)
CD-Rewritable Drive

12x Max Variable Speed DVD-ROM Drive 56K V.90 Internet Fax/Modem

10/100 PCI Network Card—Broadband Ready Sound Blaster Audio PCI 128 Sound Altec Lansing ACS-33 Speakers w/Subwoofer

Microsoft Office 2000 SBE

Business lease:\$84/Mo., 36 Mos.

OUANTEX SM800s

Cutting-Edge Performance Desktop

Intel* Pentium* III Processor 800MHz 128MB SDRAM Memory, PC133 Ready 30GB 7200rpm Ultra ATA-66 Hard Drive 17" Monitor w/Diamondtron NF CRT (16" vis, 25ag)

nVidia Riva TNT2 AGP Graphics w/32MB, TV-Out Internal Zip Drive

12x Max Variable Speed DVD-ROM Drive 56K V.90 Internet Fax/Modem

10/100 PCI Network Card—Broadband Ready Sound Blaster AudioPCI 128 Sound

Altec Lansing ACS-33 Speakers w/Subwoofer Microsoft Office 2000 SBE

\$1899

Business lease:\$69/Mo., 36 Mos. SI-QUOTE NUMBER: pcw06s21

Peripheral Upgrades: Canon MultiPass C560 Printer/Scanner; Fax/Copier_add \$299, 48-bit USB Color Scanner_add \$99, MS Sidewinder Precision Pro-Joystick_add \$49, Lexmark Z51 Color Printer...add \$149

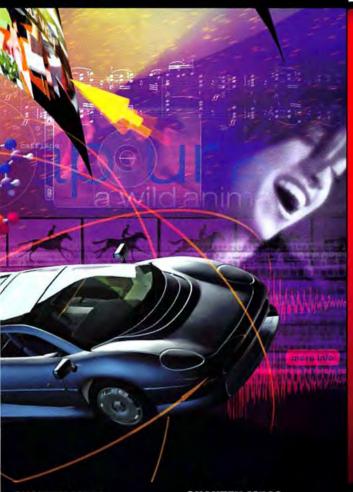


Your new Quantex PC comes equipped with the latest software plug-ins' which allow you to immediately begin enjoying the streaming video, 3D animation and music technologies of Intel[®] Pentium[®] III processor-optimized sites.

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Quantex SM933z Performance Desktop Pictured'



Power, performance, pure adrenaline-pumping speed.

That's what the Internet Revolution demands. And that's exactly what these Quantex multimedia desktops deliver.

At their heart is the astonishing Intel® Pentium® III processor, with speeds up to a scorching 933MHz! Suddenly, you're seeing web graphics in brilliant 3D and experiencing full-screen, full-motion video. You can even run the most cumbersome multimedia applications in record time. And the Internet itself becomes a more productive—not to mention, more dazzling—place to be. You get all this, plus Quantex's award-winning service and reliability.

QUANTEX M733t

Affordable Desktop Solution
Intel® Pentium® III Processor 733MHz
128MB High-Performance SDRAM Memory
15GB Ultra ATA Hard Drive
17" Monitor w/on-screen display (15.8" vis)
Intel 2D/3D Graphics Accelerator
Internal Zip Drive
3rd Generation DVD-ROM Drive
56K V.90 Internet Fax/Modem¹
Dynamic Wavetable Stereo Sound

\$1299 Business lease:\$47/Mo...36

Corel WordPerfect Office 2000

Business lease:\$47/Mo., 36 Mos. _-QUOTE NUMBER: pcw06m39

3-Piece Stereo Speakers w/Subwoofer

QUANTEX M566c

Affordable Desktop Solution
Intel® Celeron® Processor 566MHz
64MB SDRAM Memory
10GB Ultra ATA Hard Drive
17® Monitor w/on-screen display (15.8® vis)
Intel 2D/3D Graphics Accelerator
48x Max Variable Speed CD-ROM Drive
56K V.90 Internet Fax/Modem
Dynamic Wavetable Stereo Sound, Speakers
Corel WordPerfect Office 2000
Upgrade to 3rd Generation DVD-ROM for \$69
Upgrade to 128MB SDRAM for \$99

\$899 ___QUOTE NUMBER: pcw06m04



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Standard Desktop Features: Floppy Drive. 2 USB Ports. ATX Mid-Tower Case, Chassis-lock. Removable Hard Drive Chassis & Power Supply, 104-Key Keyboard. MS Mouse, 3-Year Limited Warranty & 24/7 Toll-Free Technical Support



QUANTEX W-1500

Desktop Replacement Notebook

New Pentium® III Processor 700MHz featuring Intel® SpeedStep® Technology 15" XGA TFT Active Matrix Display 128MB SDRAM Memory

New 18GB Ultra ATA Hard Drive

Modular 6x Max Variable Speed DVD-ROM Drive PCI 56K V.90 Internet Fax/Modem*

ATI Mobility P Graphics w/8MB, TV-Out Quantex Deluxe Carrying Case Included! MS Windows 2000 Professional MS Office 2000 SBE

\$2999 Business lease:\$109/Mo., 36 Mos.

E-QUOTE NUMBER: pcw06w42

QUANTEX W-1400

Desktop Replacement Notebook

Intel® Pentium® III Processor 650MHz featuring Intel® SpeedStep® Technology 14.1° XGA TFT Active Matrix Display 64MB SDRAM Memory 12GB Ultra ATA Hard Drive

Modular 6x Max Variable Speed DVD-ROM Drive PCI 56K V.90 Internet Fax/Modem¹ ATI Mobility P Graphics w/8MB, TV-Out

Quantex Carrying Case
MS Windows 2000 Professional
Corel Office 2000

\$2399

Business lease:\$87/Mo., 36 Mos. --QUOTE NUMBER: pcw06w16

QUANTEX T-1400

Affordable Road Warrior Power

New Intel® Celeron® Processor 450MHz 14.1® XGA TFT Active Matrix Display 64MB SDRAM Memory 6GB Ultra ATA Hard Drive

Modular 24x Max Variable Speed CD-ROM Drive ATI Mobility M Graphics w/8MB 56K V.90 Internet Fax/Modem* Quantex Carrying Case MS Windows 98 Second Edition Corel WordPerfect Office 2000

Upgrade to Microsoft Office 2000 for \$129

\$1799

Business lease:\$65/Mo., 36 Mos.

Peripheral Upgrades: T-Series Mini-Docking Station...add \$149 W-Series Mini-Docking Station...add \$249 Smart Lithium Ion Battery...\$119. PCMCIA Network Card...\$129. Quantex Deluxe Carrying Case...\$89. Targus Defcon1 Security Lock...\$49 Canon BJC-85 Portable Color Printer...\$299.

Quantex Business systems feature Windows 2000 Professional pre-installed for a whole new dimension in business computing with greater reliability, ease-of-use, mobile functionality and performance than any other OS available.

Quantex PCs —rocket fuel to propel your business in the e-business age



Quantex W-1500 Notebook & SB733s Business Desktop Pictured

Move your business forward at Net speeds with rocketfast Quantex PCs fueled by Intel's fastest Pentium® III
processors and Windows 2000. Plug a Quantex W-Series
Desktop Replacement Notebook into our mini-docking
station and accomplish anything you would with your
desktop—with the added bonus of taking it with you. Or if
you're the type that never knows where work might take
you, go for a thin, space-saving Quantex T-Series Road
Warrior Notebook equipped with all the on-the-go power
you'll ever need. Looking to do e-business on a budget?
Quantex SB-Series Business Desktops offer the reliable,
stable platform you're looking for, at a sensible price.
Quantex notebooks and business desktops—they're the
high-octane fuel your business needs to really move ahead.

OUANTEX SB733s

Sensible Business Desktop

Intel® Pentium® III Processor 733MHz

New 128MB RDRAM Memory

20GB 7200rpm Ultra ATA Hard Drive

19® Monitor w/Diamondtron NF CRT (16® vis, 25ag)

nVidia TNT2 Vanta AGP Graphics, 16MB

48x Max Variable Speed CD-ROM Drive

Intel 10/100 PCI Fast Ethernes Controller w/WOL

Advanced Creative Labs Sound

Microsoft Office 2000 SBE

Microsoft Windows 2000 Professional

\$1999

Business lease:\$73/Mo., 36 Mos. :-QUOTE NUMBER: pcw06b46

QUANTEX SB650_v

Sensible Business Desktop

Intel* Pentium* III Processor 650MHz
64MB High-Performance SDRAM Memory
15GB Ultra ATA Hard Drive
17" Digital Monitor w/On-Screen Display (15.8" vis)
Intel*2D/3D Graphics Accelerator
48x Max Variable Speed CD-ROM Drive
Intel*10/100 PCI Fast Ethernet Controller w/WOL
Dynamic Wavetable Stereo Sound
Microsoft Windows 2000 Professional
Upgrade to 128MB SDRAM for \$99

\$1099

Business lease:\$40/Mo., 36 Mos. 21-QUOTE NUMBER: pcw06b44



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GSA Contract #GS-35F-0049K



The Amazing Quantex Servers Built for Internet Overachievers

It's going to take more than just any run-of-the-mill server to give your users the type of web experience they're hungry for—content that's instantly available, seamless performance, better-than-ever richer graphics and sound. Enter the Quantex QX Series Servers. In addition to being almost infinitely scalable, these servers are designed around Intel's Pentium. Ill processor (with speeds up to 800Mhz), support up to an 8-way processor configuration, provide ultra-high availability, and deliver reliability unsurpassed. There's no contest. The QX-Series is the unbeatable solution for hosting and delivering the fullest, richest Internet experience possible—day in and day out.



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QUANTEX OX5000ws

Reliable Web Server

Intel® Pentium® III Processor 650MHz-800MHz
Dual-Processor Upgradeable
Intel L440GX+ Server Board
128MB ECC SDRAM (2GB Max)
9GB Ultra2/LVD SCSI Hot Swap HD (180GB max)
Dual Channel Ultra2/LVD SCSI Controller
Dual Peer PCI Buses; 6 PCI, I ISA Slot
5 Hot-Swap Drive Bays; 4 Fans
Microsoft Windows 2000 Server
Microsoft Front Page Web Creation & Management Tool
Microsoft Internet Information Server
Intel® EtherExpress® Pro 100 Ethernet Adapter

Starting at 2599
Business lease starting at: \$94/Mo., 36 Mos.

-QUOTE NUMBER: pcw06q51

QUANTEX QX5000

Workgroup Server

Dual-Processor Upgradeable
Intel L440GX+ Server Board
128MB ECC SDRAM (2GB Max)
9GB Ultra2/LVD SCSI Hot Swap HD (180GB max)
Dual Channel Ultra2/LVD SCSI Controller
Dual Peer PCI Buses; 6 PCI, I ISA Slot
5 Hot-Swap Drive Bays; 4 Fans
Intel® EtherExpress® Pro 100 Ethernet Adapter
Chassis-Intrusion Switch; Drive Bay Lock
Add AMI MegaRAID 466WS for \$399

Add NetWare 5.1 Server plus 5 connections for \$949

Intel® Pentium® III Processor 650MHz-800MHz

Starting at \$1899
Business lease starting at: \$69/Mo., 36 Mos

QUANTEX QX3000

Branch Office Server Intel® Pentium® III Processor 600MHz

Intel 440BX Chipset
Intel T440BX Server Board
128MB ECC SDRAM
9GB Ultra-Wide SCSI Hard Drive
Integrated Ultra-Wide SCSI Controller
3 PCI Slots, 1 ISA Slot, 1 Shared PCI/ISA Slot
Mid Tower Server Case; 3 Internal 3.5" Bays,
3 External 5.25" Bays
Intel* EtherExpress* Pro 100 Ethernet Adapter
Add APC SmartUPS 700VA for \$349
Add Novell NetWare Small Business Suite 5 for \$899

Business lease: \$51/Mo., 36 Mos.

SI-QUOTE NUMBER: pcw06q34

Standard Features: Floppy Drive, 48x Max Variable Speed CD, ISC Management Console, Emergency Management Po 104-Key Keyboard, MS Mouse, 3-Yr Limited Warranty, 24/, Toll-Free Dedicated Hardware Technical Support



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GSA Contract #GS-35F-0049K



Phone Hours: M-TH: 8a.m.-Midnight (EST); Friday: 8a.m.-9p.m (EST); Saturday: 10a.m.-7pm (EST). GSA Contract #GS-35F-0049K

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Pass the Data and the Popcorn, Please

DVD/CD-RW DRIVE

BACK UP your hard drive, play and record audio CDs, and watch movies using the same optical drive? That scenario was pure fantasy until Ricoh released the first combination DVD-ROM/CD-Rewritable drive earlier this year (see April New Products, www. pcworld.com/aproo/ricoh_np). Now that product is getting serious competition from the Toshiba SD-R1002 Combination CD-RW/DVD-ROM Drive. We reviewed a shipping model.

Like the Ricoh drive, the SD-R1002 is rated to write CD-RWs at 4X speed and to read CD-ROMs and DVD-ROMs at up to 24X and 4X, respectively. The IDE-based drive writes CD-Recordables at only 4X, compared to the Ricoh drive's 6X. but in most other ways. the new Toshiba drive outperforms its rival. And you're not paying anything extra for the Toshiba drive, either.

You'd be hard-pressed to find a better all-around CD reader than the Toshiba SD-R1002. It installed Microsoft Office 2000 in just 4 minutes 3 seconds, read 430MB of data

Toshiba SD-R1002 Combination CD-RW/DVD-**ROM Drive**

PRO: A single drive plays DVDs and writes and reads all CD media. CON: Costs a bit more than separate CD-RW and DVD-ROM drives. VALUE: Handy if you want the convenience of an all-in-one drive.

Street price: \$350 Toshiba America

888/900-1530

www.diskproducts.toshiba.com

PRODUCT INFO NO. 703

from CD-R media in 4 minutes 21 seconds, and read 100MB from CD-RW in 1 minute 35 seconds-performance comparable to that of a fast 32X CD-ROM drive.

Toshiba bundles Adaptec's Easy CD Creator 4.02 and DirectCD 3.01 for CD mastering chores and packet writing, so you can treat the CD-RW like a floppy drive. The unit's CD-R and CD-RW performance was average for a 4X/ 4X drive. CyberLink's Power-DVD 2.5 software MPEG-2 decoder played DVD movies smoothly, with clear images.

The SD-R1002 carries a oneyear warranty, and tech support is available 12 hours each weekday. Calls are on your dime, but the concise, detailed documentation should reduce your need to call. If 4X CD-R speed is fast enough for you, or if you're low on drive space. you'll love the SD-R1002's allin-one convenience.

-Jon L. Jacobi

Clik Your Way to More Photos

DIGITAL CAMERA

IF YOU'RE an inveterate shutterbug, you'll like Agfa's \$499 EPhoto CL30 Clik digital camera. Thanks to its built-in 40MB Iomega Clik drive, the EPhoto supplies plentiful storage for your images, so you can snap more often bet-

ween downloads. And at 25 cents per megabyte. Clik disks cost less than traditional media like compact flash, which run \$3 to \$4 per MB. While the

Iomega drive may attract highvolume shooters, the camera weighs a hefty 13 ounces, is a bit clunky to hold, and needs extra time between shots.

A single disk stores up to 60 full-resolution (1152 by 864 pixels) or 360 low-resolution (640 by 480 pixels) frames. Once it's full, you can swap out a Clik disk in seconds and start shooting again.

The EPhoto takes four AA batteries. Because of the Clik drive's hefty power demands, the batteries drain faster than on many other digital cameras. You won't find advanced controls, either: The EPhoto is simple, with three-way manual zone focus-macro, portrait, and distant-and a 2X digital zoom. You have to unscrew the front of the camera to attach optional filters or an auxiliary wide-angle or telepho-



tage: You get a built-in flash.

This 1-megapixel unit produces an 1152 by 864 image, which Agfa's PhotoGenie software can bump up to 1440 by 1080. Generally, image quality on the shipping unit I tested was good and colors were pleasing; enhanced contrast improves sharpness. But images look grainy when shot in less than ideal light.

What sets the CL30 apartand justifies its cost-is its Clik drive. Clik disks handle like standard memory cards, but have to rev up to speed, so

you have to wait a bit longer between shots than with most cameras. The camera behaves as if it were just another drive when you hook it up to the PC via its USB cable, however, so

> you get fast and easy data transfers.

The CL30 may be just right for users who take lots of pictures or who want a

AGFA'S NEW EPHOTO comes with a 40MB lomega Clik drive built in.

basic backup solution along with a camera. But for others. its low-cost media won't offset its awkward handling and sluggish shooting speed.

—Daniel Grotta >

EPhoto CL30 Clik

PRO: Relatively low cost, high capacity, easy to use, good software. CON: Slow shooting speed, awkward to hold, limited features.

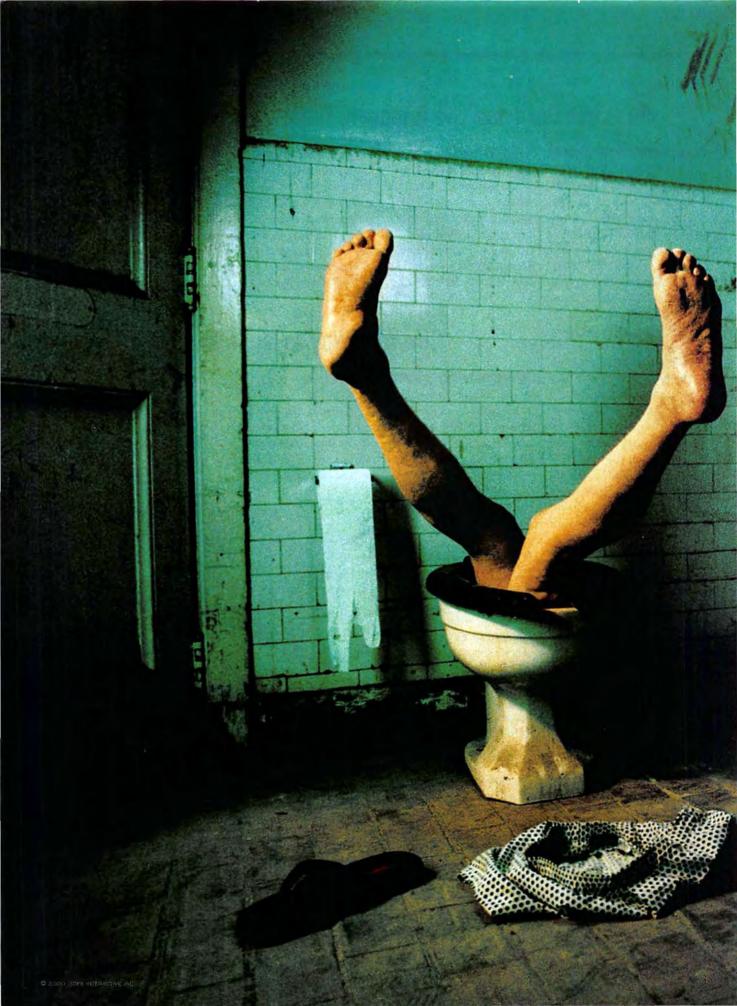
VALUE: Best for users who shoot lots of pictures between downloads. Street price: \$499

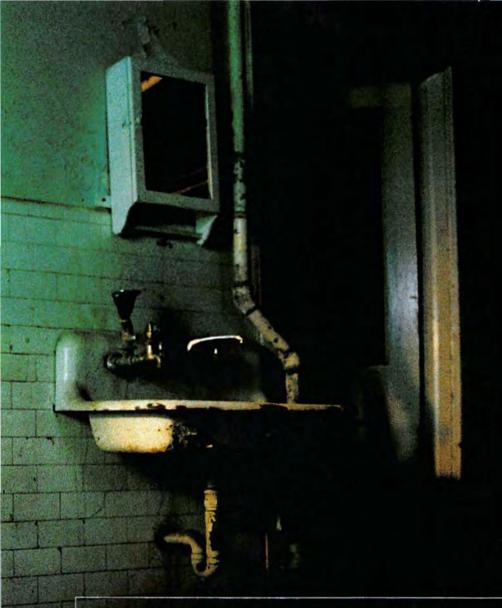
Agfa

888/281-2302

www.agfaus.com/dtp

PRODUCT INFO NO. 704





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FILL RATE: TEAR THROUGH LEVELS,
BURN THROUGH SCENES.



"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.



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.

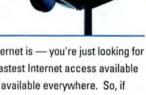
No other high-speed Internet access provider offers so much for so little. Take a close look at our service pricing - we're sure you'll find a package you like.

Service Plan Details	Residential		Business
Name of Service Plan	Executive Surfer	Family Surfer	Office Surfer
Price of Service Plan (Including ISP)	\$29.99/Month	\$49.99/Month	\$129.99/Month
Price of Service Plan (Without ISP)	\$19.99/Month	\$34.99/Month	\$109.99/Month
Hours of Service (Availability)	24 Hours a Day	24 Hours a Day	24 Hours a Day
On-Une Time (Hours of usage for Turbo Internet)	25 Hours /Month	100 Hours/Month	200 Hours/Month
Additional Hourly Rate (Including ISP) Additional Hourly Rate (Without ISP)	\$1.99/Hour \$.99/Hour	\$1,99/Hour \$.99/Hour	\$1.99/Hour \$.99/Hour
DirecPC Services			
Turbo Webcast: Broadcast delivery of popular Websites to your PC's hard drive	Included	Included	Included
Turbo Newscast: Broadcast delivery of up to 30,000 Usenet Newsgroups to your PC's hard drive	Included	Included	Included
Turbo Internet: Fully interactive access to the Internet at speeds up to 400Kbps	Included in Online Time	Included in Online Time	Included in Online Time
Free E-mail Accounts	1	1	- 4
Networking (Number of Seats)	N/A	N/A	4

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own), and you get almost 200 channels of crystal-clear satellite TV from DIRECTV® as well as Turbo Internet from DirecPC. Just call 1-800-DIRECPC or stop by www.direcpc.com to find out more.



Direc

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:

What are you waiting for?

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Circle 97 on card or go to www.pcworld.com/productinfo

Two Ways to Map Your Business

MAPPING

BUSINESS mapping programs do much more than tell you how to get to your next appointment-the data they provide can help you understand your business better, too. We compared Microsoft's substantially upgraded MapPoint 2001 with the latest release of an old pro, DeLorme's XMap Business (shipping copies of each). The one for you depends on your mapping needs.

Both MapPoint and XMap include street-level data for the entire continental United States, plus demographic information, direction and routing capabilities, and some business-specific data. Both programs install from one CD and then require you to use a different data disc when run-

Microsoft MapPoint 2001

PRO: MS Office 2000 integration, speedy, current demographic data. CON: Pricey, very limited local business listings, no Palm support.

VALUE: A fast, useful tool for presentations and reports.

Street price: \$250

Microsoft

800/426-9400

www.microsoft.com/office/mappoint

PRODUCT INFO NO. 705

XMap Business

PRO: Includes U.S. white- and yellow-page directories, inexpensive, supports Palm and Win CE devices. CON: Sluggish performance, resource hon.

VALUE: Strong overall package if performance isn't a big concern.

Street price: \$100

DeLorme

800/452-5931

www.delorme.com/xmap

PRODUCT INFO NO. 706



MICROSOFT MAPPOINT 2001 offers a host of new features, including new street-level maps of cities in both the United States and Canada.

ning the program. Both also offer support for GPS devices and for personal digital assistants. Not surprisingly, Map-Point supports only Windows CE devices; XMap works with both CE and Palm devices, with the help of a free download from Solus.

In speed and performance, the \$250 MapPoint has the clear edge. We tested both programs on a zippy 600-MHz Athlon PC with 128MB of RAM. XMap won't even load if less than 50 percent of system resources are available, and it takes twice as long as MapPoint to perform routine operations like calculating crosstown driving directions.

YOUR TRADE-OFFS

IF YOU PLAN to use demographic data in your mapping activities, MapPoint again has the edge, thanks to its licensing agreement with Claritas, a leading provider of such statistical information. The Claritas database includes 1980, 1990, 1999, and projected 2004 demographic breakdowns, while XMap is limited to 1990 U.S. Census data.

MapPoint can also integrate with Office 2000 applications. Specifically, it can act as an OLE object. Both programs import data from Office 97 versions of Access, Excel, and Outlook; MapPoint also supports SQL Server 6.5 or above.

For its part, XMap can perform most MapPoint functions despite costing \$150 less. Though its eight CD-ROMs (versus two for MapPoint) may make it look more cumbersome, those discs contain a lot more data-a complete set of national white- and yellowpage directories, so you can search for addresses by phone number. MapPoint includes only a handful of business listings-primarily hotels and restaurants-and no whitepage directory data. XMap also lets you run very detailed searches by yellow-page category for specific types of businesses-a feature we found extremely useful when one of

AlphaSmart 3000

WANT TO TAKE electronic notes without shouldering the weightand cost-of a notebook? Check out the slim, translucent \$199 AlphaSmart 3000, About the size of a notebook PC keyboard, the AlphaSmart packs 1MB of memory and can store up to 100 text pages and eight separate files. As you type, text appears on a legible, four-line, 40-characterswide LCD screen, AlphaSmart uses an included USB cable to upload its files easily into almost any program in a PC or Mac. You place the cursor where you want the text to appear on your PC app window, and press (Send). The maker has added features to the 3000 model, including the ability to cut, copy, and paste within and between files: it also costs \$50 less than the previous model (the AlphaSmart 2000). The shipping version is rated to run for up to 500 hours on three regular AA batteries, and at 2 pounds the unit won't weigh you down-making it a good laptop alternative for travelers. AlphaSmart: 888/274-0680; www.alphasmart.com.

PRODUCT INFO NO. 711

-Vince Vitale

our editors needed to track down an auto mechanic convenient to her home.

FINAL DESTINATION

IF YOU USE mapping tools primarily for reports and presentations, or if speed and performance are high priorities for you, MapPoint 2001 is your best bet. But XMap Business is preferable for most users. Between its significantly lower price and its trove of nationwide phone-book data, you're getting a great deal.

—Gordon Meyer ▶

CONFIDENCE THUMBS-UP FOR INTERMEDIA'S QUALITY & SERVICE!

boardwatch

w.intermedia.com

#1 rated Internet backbone, Boardwatch magazine 1999

Network Computing

#1 rated Managed Security, Network Computing magazine 1998

TeleChoice

#1 rated overall ISP TeleChoice survey 1999, and #1 in customer service 1998



Pinnacle Award winner for service and innovation, X-Change and Phone+ magazines



Top 25 ISP, Data Communications magazine 1999 and 1998



"Dynamic 100" Top Technology Company rankings, Forbes ASAP magazine 1999 and 1998



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Connect with Confidence SM

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COMPUTERS
CHANGED THE WORLD.

FINALLY, THE FAVOR IS RETURNED.



Power(Book) Up, Roll Film, Edit, and Go

NOTEBOOK

APPLE'S NEW PowerBook 500 raises the features ante for mainstream users and gives video editors a portable platform with more power and convenience than its predecessors. And now you can even integrate your Apple notebook into your wireless

network-with some effort.

We tested a \$3499 shipping model carrying a new 500-MHz PowerPC CPU, a 14.1-inch TFT screen, a 12GB hard drive, a 6X DVD-ROM drive, and an ethernet port and a modem. New features (besides the CPU) include 2X AGP graphics with 8MB

of video memory, and two FireWire (IEEE 1394) ports, which digital video equipment commonly employs for high-speed data transfer.

We used a Canon digital video camcorder and Apple's \$999 video-editing application, Final Cut Pro, to capture and edit movies. The

hardware dropped no video frames when capturing, and the powerful software was reasonably easy to use. The PowerBook's standard RAM (128MB), however, is barely enough to run Final Cut Pro with virtual memory turned off, as the app recommends. For serious editing, upgrade to 256MB (\$160). Unfortunately for users who aren't editing-savvy, the easy-to-use iMovie-which Apple bundles with iMacs-isn't available with the PowerBook and isn't sold separately.

The newest PowerBook is compatible with Apple's 11mbps AirPort wireless networking product. The \$99 networking card is easy to set up, as are the PowerBook and the \$299 external Base Station, the first time-but not if you try to change the configuration: The three apps crashed repeatedly when we tried to convert the Base Station from a dial-up to a network connection. A 90-minute call to tech support finally solved the problem. Apple is working on a new version of the software.

But for portable, professional-quality video—or just plain powerful computing, this PowerBook cooks.

-Alan Stafford

Get E-Mail Messages in Your Pocket

WIRELESS E-MAIL

NEVER MIND a message in a bottle—try e-mail delivered straight into your pocket. That's the aim of Research in Motion's pager-size RIM 850 Wireless Handheld. We reviewed a shipping unit.

The RIM receives wireless services from American Mobile. Its ELink Agent beams e-mail to the RIM pager from any POP3 e-mail account. The device costs \$359, and unlimited e-mail delivery runs \$60 a month plus a one-time \$25 network activation fee. A limited-use plan runs \$25 per month for the first 24,000 characters

THU, NOU S THU, N

transmitted, plus a surcharge for each additional character.

You configure the RIM 850 via American Mobile's Web site, telling it which accounts to access and how often, and identifying the filters it should apply so that the system will forward only e-mail you want. Regrettably, the site's interface makes setting the mail options unnecessarily complicated.

Our RIM 850 unit had 2MB of flash memory; a sixline monochrome screen; and one of the neatest, most usable keyboards we've seen in a handheld. You can program the unit's autotext feature—which corrects some common typing errors automatically—to accelerate typing by inserting text in place THE RIM 850'S keyboard is usable despite the device's compact size.

of your personal shorthand. In addition, you can use

the trackwheel to navigate the RIM's menu with ease.

A copy of each message you get stays on your e-mail provider's server for later download. You receive only the first 2KB of long messages; you can access the rest on demand in 2KB blocks. You can receive and forward attachments, but you can't view them on the RIM.

The unit comes with a serial port cradle—no USB yet. The cradle lets you use Puma Technology's Intellisync app to synchronize the RIM's built-in address book and calendar with desktop apps.

The price is a bit high, and the service could be easier to set up—but if you prize convenience, this is worthwhile.

-Alan S. Kay

PowerBook 500

PRO: Fast, mobile video editing platform.

CON: Wireless networking setup can be difficult to modify.

VALUE: A strong platform for video pros and power users.

Street price: \$3499

Apple Computer 800/538-9696

www.apple.com

PRODUCT INFO NO. 707

RIM 850 Wireless Handheld

PRO: Compact design, usable keyboard, mail filtering.

CON: Receives and views e-mail in 2KB blocks, no USB port.

VALUE: Pricey, lightweight option for people who need to read and send e-mail everywhere.

Street price: \$359 (plus fees)
Research in Motion

800/494-1727

www.rim.net

PRODUCT INFO NO. 708

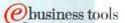




Introducing the first IBM NetVista desktop: the x40 available at ibm.com

It's what happens when several good ideas come together. And a few old, complicated ones get the axe. The end result is a powerful little charmer that's 75% less desk-hungry than traditional desktop pc's — a nice complement to a machine that was engineered to be internet-ready, human-friendly, and refreshingly simple. The all-in-one NetVista x40. The first page of the next chapter of personal computing. Buy at ibm.com or 1800 426 7255.

entium III processor up to 667mhz1/64-512mb sdram / 10-20gb2hdd / cdrom / 15" TFT screen / \$1899-\$22993





MEET NETVISTA.

Intel®F

Hold Your Meetings Over the Web, for Free

INTERNET SERVICE

MEETINGS ARE the ties that bind business. Without meetings-no matter what Dilbert says-commerce grinds to a halt. Today, widely dispersed participants can meet without spending a fortune getting together. MyPlaceWare.com, a no-cost e-meeting service, lets you host meetings of up to five people on the Web, using nothing more complicated than a Java-enabled browser.

MyPlaceWare's meeting interface is a Java display that lists participants and has a window for slides. Meetings are structured around presentations that the host uploads in any PowerPoint format, but other tools enable the service to trump simple on-the-Web slideshows. You can preside over gatherings with a whiteboard, insert live Web pages into the conference, and show everyone an active application.

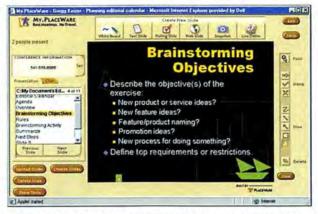
Once slides are uploaded, the presenter clicks to post them on others' screens. Transitions, however, don't make the trip. For flexibility, you can upload multiple presentations and then swap them during the meeting, but combining shows entails both selecting

MyPlaceWare.com

PRO: Free Web meeting service lets you present PowerPoint slideshows or broadcast applications in action. CON: Five-participant maximum per meeting; slideshows lack transitions. VALUE: Saves time and travel costs, and fulfills most meeting needs.

MyPlaceWare 888/526-6170

www.myplaceware.com



MEET ME ON THE WEB: MyPlaceWare lets you present slideshows and display running applications in your online meetings.

and copying individual slides.

You can add slides on the fly, too, and stick live Web pages into the presentation (though you can't take other meeting participants on a tour of the site). The site also lets

you broadcast an application, a neat trick: You maneuver a frame atop the app, and anything within the frame shows on others' consoles. Display speed depends, of course, on connection speed. When we relied on a poky 28.8-kbps modem, for instance, slides popped up almost as soon as the presenter finished clicking, but apps lagged 4 or 5 seconds behind.

Aside from the five-participant maximum, there are no restrictions: You can hold as many meetings as you want, and each can run up to 4 hours. If you need more features, a pay-as-you-go version (which should be available by the time you read this) will let you boost the number of attendees, permanently retain slideshows, and record complete sessions.

The freebie MyPlaceWare lacks extras like audio conferencing or file transfer-which software presenters like Net-Meeting have-but for this price, we aren't complaining.

-Gregg Keizer

Timbuktu Pro 2000: Easier Remote Access

REMOTE CONTROL

PROGRAMS LIKE Netopia's Timbuktu let you access your PC away from the office just as if you were sitting at your desk. In the latest version, Timbuktu Pro 2000, Netopia improves on an already good product's ease of use with such features as dial-up connectivity and the ability to search for a remote user without entering an Internet Protocol address. And you still get the old standbys, including the ability to exchange files, send notes, chat, and converse aloud (using a microphone).

Older Timbuktu versions made you enter the remote user's IP number to connect. With Pro 2000, you can enter an e-mail address, and Netopia's Internet Locator Service will match it with the user's current IP number-even if it's dynamically allocated.

The new Windows version adds Lightweight Digital Access Protocol support, which the Mac version lacks. Select an LDAP server (Netopia has one) and search for "Bob"; every Bob registered on the server will appear. The system works quickly, but it's best for companies that have their own LDAP server.

Optionally, you can connect by right-clicking on a system in your network neighborhood. If you're scanning for a Mac from your Windows PC. be warned: You'll need to use

the Internet Locator Service or have the IP number handy.

Timbuktu earns its keep many times over and jumps ahead of competitors like LapLink and PCAnywhere with its support for cross-platform environments.

-Alan Stafford

Timbuktu Pro 2000

PRO: New version makes locating other users easier, LDAP support.

CON: Can't see Macs without help, a tad pricey.

VALUE: Fantastic for cross-platform telecommuters and IS staff. Street price: \$190 (\$160 download) Netopia

800/485-5741

www.netopia.com

PRODUCT INFO NO. 709

ThinkFree: Useful, Free Companion to Office

APPLICATION SUITE

FREE WEB-BASED productivity suites come in handywhen you're online. Otherwise, you're out of luck. That's not the case with ThinkFree Office: It has the requisite Web component but also includes a downloadable counterpart that works offline. Better yet, its three apps are file-compatible with Microsoft Office, and the company sets aside 20MB of online storage space where you can park files.

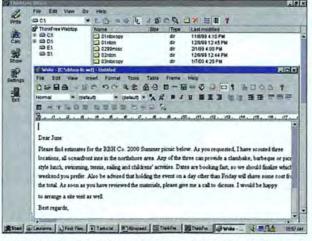
Downloading the Java-based suite (about 2.5MB) from ThinkFree's Web site took me about 17 minutes with a 56kbps connection; you must also download the individual applications-Write (word processor), Calc (spreadsheet), and Show (presentations). Each download takes about 5 minutes over a 56-kbps modem. The good news: The lengthy setup time is the product's main drawback. My Word 2000 documents easily opened in ThinkFree Writeand vice versa-with only formatting losses. Saving documents was slightly trickier: I could save to my Web space or C: drive effortlessly, but I had some difficulty navigating to local subdirectories.

Unlike other online suites.

ThinkFree Office

PRO: Free, works online or off, filecompatible with Microsoft Office. CON: Full download takes about 30 minutes over 56-kbps connection. VALUE: Convenient, free tool. Free

ThinkFree.com 408/861-9494 www.thinkfree.com



THINKFREE'S SUITE HAS an interface much like the one in Microsoft Office, so there's nothing new to learn before you start working.

ThinkFree performed acceptably over a 56-kbps connection. I noticed a slight slowdown when using ThinkFree's word processor online, but I experienced almost no delay with Calc-even when I was employing the Chart Wizard.

ThinkFree offers a good alternative to shrink-wrapped apps and makes files conveniently available anywhere you have a Net connection.

-Liane Gouthro

Make Digital Phones Analog-Friendly

QUICK TAKES

DIGITAL PHONE lines offer convenient features, but they can be lethal to a modem without an analog converter. Konexx's \$129 Mobile-USB offers a small (4 inches), lightweight (3 ounces), but somewhat convoluted fix. For power, the Mobile-USB uses your laptop's USB port, instead of an AC adapter or batteries (as the previous version did). But the bundled USB cable is short, at just 3 inches. You also have to remove the telephone's handset from its cable, place the cable in the Mobile-USB, and then connect the PC modem to the other end of the device. Confused? I was, even though I had an illustrated map. But once everything was set up, my analog modem worked on a previously verboten digital phone. Konexx; 800/275-6354; www.konexx.com.

PRODUCT INFO NO. 712 -Michael S. Lasky

NEC's Color Laser Joins the Internet Age

PRINTER THE SAME engine that won two NEC models places on a recent PC World Top 10 Printers chart drives the NEC Super-Script 4650N. The 4650N offers remote printing and a fair price. Not a bad deal, eh?

I tested a \$2700 prerelease 4650N model, which includes 96MB of RAM, a 2.1GB hard drive, and an ethernet interface. The basic (\$2000) 4650 has only 32MB of RAM without ethernet or hard drive.

Catching up to the competition, the 4650 series features IP addressing so you can send documents across the Internet for printing. The 4650N can also print Adobe Acrobat and several Microsoft Office files without your having to install those applications.

The 4650N produces very black, very crisp text. Its graphics retain excellent detail but print too dark-more so at 1200 dpi than at 600.

The PC World Test Center has not yet tested the 4650N. However, several identically rated NECs tested for March hovered around 9 ppm on text-tops for color lasersand 1 ppm on graphics. The 4650N should do about the same. Two complaints: NEC's control-panel menus are exceptionally confusing, and if you want to print legal-size documents, you'll have to spend \$130 on a special tray. Otherwise, the 4650N has the right features and price to make a good office laser.

-Dan Littman

NEC SuperScript 4650N

PRO: Excellent text quality, remoteprinting capability.

CON: Dark graphics, difficult control-panel menus.

VALUE: Good deal for businesses that need color and remote printing.

Street price: \$2700

NEC Technologies

800/632-4636

www.nectech.com

PRODUCT INFO NO. 710



A year and a half ago we took a comprehensive look at privacy abuses on the Net.

Today, with e-commerce booming, the **situation** is worse.

BY DANIEL TYNAN

IN THE REAL WORLD, nobody knows what TV commercials you watch or which sitcoms you surf. When you go strolling through the mall, no one's making note of the stores you visit or the clothes you try on. But on the Internet, Web sites are doing all of this and more. And that makes some people mad as hell.

Jeffrey Wilens is so outraged that he filed a class action suit against RealNetworks for allegedly violating his and other consumers' privacy. The attorney from Mission Viejo, California, claims in his suit that the company's RealJukebox software secretly recorded the titles of music CDs and MP3 tracks he played on his PC, then sent the data back to Real-Networks-creating a detailed profile of Wilens' musical tastes. The suit, filed last November, seeks damages of at least \$500 for each RealJukebox user in California.

"I don't accept the concept that there is no privacy on the Internet," Wilens says. "I think rogue companies need to learn to modify their behavior."

RealNetworks flatly denies Wilens' charges. "Contrary to media reports, we have never monitored user behavior or listening habits," says Keela Robison, product manager for the Seattle-based company. However, she admits that RealJukebox

did create a unique identification number for each user and stored the numbers in the same database that holds user names and e-mail addresses. Theoretically, these numbers could track where people go on the Web. The company quickly released a patch that disabled the software's ability to issue the IDs. but that wasn't enough to satisfy Wilens and others who had filed a total of a dozen suits against RealNetworks at press time.

Meanwhile, six other lawsuits are pending against Internet advertising network DoubleClick for creating online profiles of consumers. And three similar suits have been filed against Alexa, an Amazon subsidiary. With few other avenues of recourse at their disposal, users have taken to the courts to fight for their right to privacy. But the battle has just begun.

A Not-So-Private Little War

WELCOME TO PRIVACY in the new millennium, where surfers are caught in a tug-of-war with Web sites over who owns their personal data and what can be done with it. In the year and a half since PC World published its special report "Privacy in the Internet Age" (www.pcworld.com/ sep98/pcprivacy), e-commerce has exploded, doubling in volume each year. And as the Net gradually becomes the medium most Americans use to get news,

E-COMMERCE'S DIRTY LITTLE SECRET

IN LESS TIME than it takes to fill an online it card numbers from CD Universe and others. shopping cart, Eran Reshef types a command These incidents are hardly flukes. into the URL of a large Web retailer and gains keystrokes, and he's changed the price of a \$3000 computer to \$300. "Since it's an automated process with no human looking in," Reshef explains, "no one would discover the change. The company would simply ship the product and charge me the [altered] price."

The cherub-faced, former Israeli army intelligence officer smiles as he shows us how he



hacked into dozens of e-business sites over the past year. From online brokers and banks to shopping and news sites, Reshef found the doors that Web site designers forgot to lock. If he wanted to, he could easily move money between accounts, post bogus news reports, and scoop up a wealth of information about the visitors to these Web sites.

But Reshef isn't a hacker; he's a security expert. His company, Perfecto Technologies in Santa Clara, California, sells products designed to thwart application hacking-in which attackers bypass a site's firewall to assault its scripts, applets, and code. Companies hire Reshef to probe their sites for weaknesses. And he knows what few e-business firms will admit: No Web site is truly secure.

Breaking and Entering

IN RECENT MONTHS, electronic vandals have temporarily shut down some of the biggest sites on the Web and stolen thousands of cred-

Reshef says Perfecto has audited more access to the site's source code. A few more than 50 brand-name sites and found security breaches in all of them. On eight of those sites, he was able to access any file-including sensitive customer information. On two sites, he was able to execute financial transactions using other people's accounts. On two others, Reshef gained full administrative control. The longest amount of time it took to crack a site was 10 hours; the shortest was 10 minutes.

> Because confidentiality agreements prevent Reshef from naming the companies he audited, we could not verify his claims. But all the security experts we contacted said such vulnerabilities exist in thousands of Web sites.

> One half to three-quarters of all commercial sites can be hacked, estimates John Pescatore, a research director for the Gartner Group in Stamford, Connecticut. Jim Finn, principal of Unisys Worldwide Enterprise Security Practice in Reston, Virginia, puts that figure even higher. Finn says he's tested computer vulnerabilities for more than 200 banks. retail chains, and foreign governments, and has always found a way in. "Unless the computer's disconnected and sitting in the basement, it can be broken into."

Too Much, Too Soon

ONE REASON sites are so vulnerable is that companies are pulling out the stops and scrambling at Internet speed to get online. As a result, designers leave behind files and tools that hackers can use to break in. Another reason is plain ignorance, says Pescatore. "There's a lot of stupidity built into the CGI code [used to transfer content to] Web sites."

But even the best security measures may not thwart all attacks.

"Security is not about absolutes, it's always about how many layers [hackers] have to go through to get to something," says Elias Levy, chief technology officer for Securityfocus.com in San Mateo, California. Levy says most companies are just not doing enough.

"A hacker only has to be lucky once," agrees Nigel Tranter, vice president for Perfecto. "[Sites] have to be lucky all the time." These days, the same could be said for consumers.

buy groceries, rent movies, obtain medical advice, and possibly vote for presidential candidates, what little personal privacy they once had may soon disappear.

In some cases, we have only ourselves to blame. Millions of people voluntarily give out personal information to Web sites in exchange for free goods and services. These days, you can get e-mail accounts, Web hosting services, Internet access, even high-speed DSL connections without ever cracking open your wallet. But to take advantage of such offers you must surrender bits and pieces of your identity, from your name and e-mail address to your buying and reading habits. Businesses then market this information to advertisers, or in some cases, to anyone else who may want it.

At the same time, it's increasingly difficult to trust any site to keep your personal information safe from intruders. Lax security at many Web vendors has made the Internet a hacker's paradise. In the past six months, dozens of major Web sites have suffered theft of credit card information and acts of vandalism such as last February's spate of denial-of-service attacks. As PC World has discovered, even the biggest e-commerce sites can fall prey to crackers-hackers who attack with criminal intent (see "E-Commerce's Dirty Little Secret," at left).

In addition, the Web has spawned a booming industry of companies peddling so-called investigative services and software. Loads of personal informationfrom your Social Security number to your driving records-can be purchased online for a pittance by anyone interested in tracking you down or assuming your identity. In most cases, the sale of this data is perfectly legal. But the results can sometimes be deadly (see "They Know Everything About You" on page 107).

Sure, you can try to protect yourself by giving out false information or using services

that cloak your identity and IP address as you surf, post to newsgroups, and send e-mail (see "The Eyes of Richard Smith" on page 108). But as soon as you hand over your credit card to pay for a book or a vacation, your anonymity is gone.

In fact, the biggest threat to your privacy today isn't crackers, stalkers, or data brokers. It's the legitimate online businesses-such as advertising networks. retailers, and others-that are creating detailed profiles of who you are and what you do when you are on the Web.

Profiles in Commerce

CONSUMER PROFILING isn't new. For years, mail-order firms have been tracking the products you buy so that they can send you catalogs specific to your interests. Shopping club cards allow supermarket chains to keep detailed records of

While the practice of profiling is widespread in the offline world, its scope was limited until now because mail-order firms weren't able to easily pool their data-say, to combine records of your supermarket purchases with a list of your magazine subscriptions. But on the Net, it's fairly simple to create a record of every site you visit and every transaction you make. As a result, Web profiles can contain an unprecedented amount of information about your interests and activities.

"Say you go to a book site," says Evan Hendricks, editor and publisher of the Privacy Times newsletter in Washington,



Jeffrey Wilens, an attorney from Mission Viejo, California, is taking RealNetworks to court over an alleged privacy violation. "I don't accept the concept that there's no privacy on the internet," he says.

the groceries you purchase. And specialinterest magazines, like the one you're reading now, regularly sell lists of subscribers to third-party marketers (for information on how to remove your name from PC World's lists, see page 14).

D.C. "[Profilers] can see what you looked at and what you bought. Do those books reflect political opinions, sexual preference, [or] health conditions?"

Critics paint a range of dark scenarios if Web profiles were ever to become

available for sale on the open market. Corporations, for instance, could use profiles to screen out job applicants based on health advice they may have sought on the Web. Say an applicant filled out a health self-assessment form on a medical advice site and listed a family history of colon cancer. Conceivably, the site or its partners could market that information to employers. Or say the applicant bought medicine at a site like Drugstore.com or posted messages to an HIV chat group. All this information could be added to the user's profile, and employers could lower their insurance premiums by not hiring employees who could potentially have serious illnesses. "Those kinds of economic decisions can and will be made." says Fred Druseikis, chief architect for HealthMagic, a Winter Park, Florida, company that provides secure systems for sharing medical records over the Internet.

Click and Engage Technologies, which deliver banner ads to thousands of Web pages and may collect information about you without your knowledge.

These firms use tracking cookies to determine which banner ads you see when you access a Web page. Here's how it works: The first time you view a page with a DoubleClick banner ad on it, the ad deposits a cookie on your hard disk. Then any time you view another page containing a DoubleClick ad, the cookie on your hard drive sends the URL of that page back to the ad agency's server; thus begins a detailed clickstream-a history of some of the places you've visited on the Net. Currently, this clickstream isn't matched to your individual identity. Instead, each cookie contains a globally unique identifier (GUID), which lets the ad server track your movements without identifying your actual name or e-mail address.

"Companies like DoubleClick... [are] getting a lot of information that's frankly none of their business."

"In terms of how information is collected and used on the Internet," says Marc Rotenberg, executive director of the Electronic Privacy Information Center (EPIC) in Washington, D.C., "to allow detailed secret profiles to be created is disastrous."

Theoretically, such profiles could also become subject to subpoena or be hijacked by an unscrupulous company or individual. "In a divorce or child custody case, your spouse could use your surfing habits against you," says Larry Sontag, a Seattle-based privacy consultant and author of It's None of Your Business (PMI Enterprises, 2000). "This information could be available to hackers, employees of a company who may be having a bad hair day, or any crook with access to the Internet," Sontag adds. "The lack of privacy means that [this data] is available to both honest and dishonest people."

Double Trouble

THE BIGGEST PROFILERS on the Internet are companies whose sites you may never have visited-networks like Double-

In this way, DoubleClick has amassed information on the surfing habits of 100 million users, while Engage boasts a database of 52 million profiles. For more on how cookies work, see www.pcworld. com/aproo/cookies. (Note: PCWorld.com uses DoubleClick to serve ads. If you want to opt out of DoubleClick's cookies, visit www.privacychoices.org.)

Last fall, however, DoubleClick quietly revealed that it planned to link the names of surfers, their e-mail addresses, and other personal information about them to their clickstreams. The New York-based company said that it would combine these profiles with additional data about the purchasing histories and habits of some 88 million U.S. households. DoubleClick obtained this data when it bought the offline market research firm Abacus Direct last November.

According to senior vice president Jonathon Shapiro, DoubleClick's intention was merely to target ads to specific users. "The whole goal here is to make advertising work by getting the right message to the right user at the right time," he says.

But the reaction from consumers and privacy advocates was swift and vociferous. EPIC filed a complaint with the Federal Trade Commission, alleging that DoubleClick was "engaging in unfair and deceptive trade practices by tracking the online activities of Internet users." The FTC and attorneys general in New York and Michigan initiated inquiries into the company's practices, and as we went to press DoubleClick had been named in six civil suits for alleged privacy breaches.

In response to the backlash, the company suspended its plans to merge profiles with personally identifiable information. In a statement appearing on DoubleClick's Web site last March, CEO Kevin O'Connor admitted that he had "made a mistake" in attempting to identify users. He also vowed that "until there is agreement between government and industry on privacy standards, we will not link personally identifiable information to anonymous user activity across Web sites."

But privacy advocates warn that DoubleClick's change of plans is just a temporary reprieve. "I think you have to read the language of DoubleClick's reversal very carefully," says Robert Ellis Smith, publisher of Privacy Journal in Providence, Rhode Island. "They have simply agreed to defer their plans until the heat's gone. The company did not agree to cease combining online and offline information in the foreseeable future [or] say that it is an unfair marketing technique."

Are You Being Followed?

DOUBLECLICK and RealNetworks are not the only sites accused of tracking users' activities across the Web. Amazon.com is embroiled in a similar controversy involving Alexa Internet, a San Francisco-based software firm that the e-tailing giant purchased in June 1999. Amazon plans to use Alexa's software in its ZBubbles shopping service. The free software's menu bar sits on top of your browser as you surf, suggesting similar sites to visit and letting you share information with other shoppers. But it also captures the Web address of each page you view-and according to security expert Richard Smith (see

THEY KNOW EVERYTHING ABOUT YOU

IT ENDED IN MURDER, and it started on the ly bank or credit card statement for \$95. A Internet.

So says Tim Remsburg, stepfather of Amy Boyer, a New Hampshire woman who was tracked down and murdered last fall by a cyberstalker who had known her in high school.

Remsburg places part of the blame for his stepdaughter's death on Docusearch.com. which sold Boyer's Social Security number to Liam Youens for \$45. Youens used that information to find out where Boyer worked. Then he went there and shot her to death before turning the gun on himself.

information brokers can sleep at night knowing they've got Amy's blood on their hands," Remsburg says.

But Docusearch.com, which declined comment, didn't break any laws.

The Business of Net Snooping

CULLING DATA from public and private sources is not only legal but part of a flourishing industry. There's a burgeoning trade in clearly not every plucking information from commercial databases. One company, TR Information Services, advertises that it can deliver anyone's month-

company called A1 Trace promises a list of anyone's stocks, bonds, and mutual funds-including account numbers-for \$309.

I tested one online service called A.S.A.P. Investigations, All I gave them was my name and previous address: Within an hour, the firm delivered my Social Security number, physical descriptions of my wife and me, details of the cars we own, and nearly every former address and employer I've had. A.S.A.P compiled the profile from a half-dozen Web sites selling my past for a price. "We can find out anything," "I don't see how do-anything-for-a-buck says Robert Reichert, the company's president.

> Reichert says that he doesn't offer his services to the general public. Most of his customers are lawyers looking to recover hidden

assets for child support from deadbeat parents, or they are creditors looking for debtors who have skipped town. But online investigator is as discriminating about its clients.



"Anyone can start a business, call themselves a private investigator, and hang a shingle online," says Reichert.

It's Just Business

THANK PCs and the Internet for making it cheaper and easier to pull together diffuse personal facts, says Robert Ellis Smith, publisher of Privacy Journal.

Information brokers typically buy addresses, unlisted phone numbers, and Social Security numbers from credit bureaus like Equifax and Experian. State governments sell public data such as driving records, which often contain Social Security numbers. (As of June 2000, states will not be able to sell such information without the driver's consent.)

In addition, banks and financial service companies can buy, sell, trade, and share their customers' financial information, including account numbers and balances. Courts have consistently ruled that this information is the property of the company, not the customer. However, many banks have curbed the practice because of public outcry.

There's also the issue of identity theft. Armed with your name and Social Security number, an impostor can open a bank or charge account and destroy your credit. Approximately 400,000 Americans will suffer identi-

> ty theft this year, say privacy experts. "Our traditional notion of personal privacy is gone," says Andrew Shen, policy analyst with

the Electronic Privacy Information Center.

But privacy advocates can claim some victories, such as new federal restrictions on the use of credit reports and driving records. And Congress recently banned the practice of pretexting-obtaining personal information about others under false pretenses.

Victoria Streitfeld, spokesperson for the Federal Trade Commission, says the FTC polices the Internet for illegal information brokers and makes arrests when necessary.

But for Tim Remsburg and his stepdaughter, the FTC's efforts are too little, too late. "What happened to Amy's right to privacy?" he asks. Indeed, what happened? -Tom Spring

This article was adapted from a longer piece published on peworld.com. To read it in its entirety, go to www.pcworld.com/janoo/ info_brokers.

Tim Remsburg, below, places part of the blame for the murder of his stepdaughter Amy Boyer, above, on an online data broker that sold Information to Liam Youens, who used it to track her down.



"The Eyes of Richard Smith" below), these URLs can contain a wide variety of personally identifying information.

For example, when you use a search engine like AltaVista, the URL for the results page contains a text string including the terms you searched for. Depending on

how the Web site's search engine works, a URL could contain your name or e-mail address, too, as well as the titles of books you may have bought, flights you may have booked, and health conditions you may have researched-all of which, Smith says, get sent up the wire to Alexa. (Smith

uncovered a similar problem having to do with DoubleClick cookies. A recent example involved Intuit, whose Quicken Web site was inadvertently forwarding users' financial information to DoubleClick. Intuit quickly plugged the leak, and DoubleClick says it didn't store this infor-

THE EYES OF RICHARD SMITH

untamed-then Richard Smith is the closest thing we have to a town sheriff. In the past year, the Phar Lap Software CEO turned security guru has uncovered what appear to be privacy breaches in the practices of RealNetworks, Amazon, and DoubleClick. He also coauthored a report revealing that numerous tect our fundamental right to privacy? health sites share visitors' personal data without their consent. Last September, Smith retired from Phar Lap to focus on Net security and privacy issues. He spoke to us by phone from his Brookline, Massachusetts, home.

PCW: You've become the unofficial guru of Internet security. How did this happen?

Smith: My interest in privacy really started with the flap about the Pentium III serial number [in January of last year]. I ended up looking at the use of ethernet address tracking numbers and was surprised at how often they were being used as GUIDs. They're almost like a Social Security number for your computer. The number itself doesn't say who you are, but the fact that it goes into databases all over the Web is depressing.

PCW: What, in your opinion, is the biggest threat to consumers on the Net?

Smith: As you surf the Web, sites across the board are watching what you do, creating profiles, learning all about you. I'm concerned that all of this data is going to be combined in one big database.... The biggest problem is that a lot of tracking is not disclosed.... Companies like DoubleClick... [are] getting a lot of information that's frankly none of their business.

PCW: Will recent calls by the government for a stronger security infrastructure on the Net lead to even less privacy for consumers?

Smith: Certainly. There's a real interesting trade-off between anonymity and privacy. What we're really talking about is [setting] up a system so that no matter what we do on the

IF THE INTERNET is like the Old West-wild and Web we're always tracked. No such thing as hidden IP addresses. [This makes it] real easy to track crime. The flip side is...that you can attack someone...and no one knows who you are. I am troubled by the lack of responsibility due to anonymity on the Web.

PCW: Do we need federal legislation to pro-

Smith: It's silly to think something as big as the Net won't need regulation, while roads and other parts of commerce do. In privacy, we do need some regulation because of all the tracking going on and the ability to share that infor-

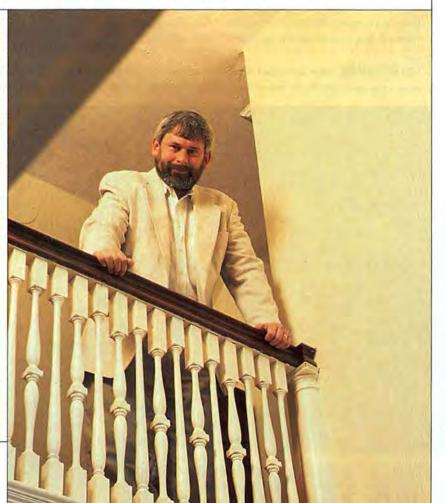
mation. It can't be too heavy handed, but we need some rules of the road to make clear what's acceptable and what's not.

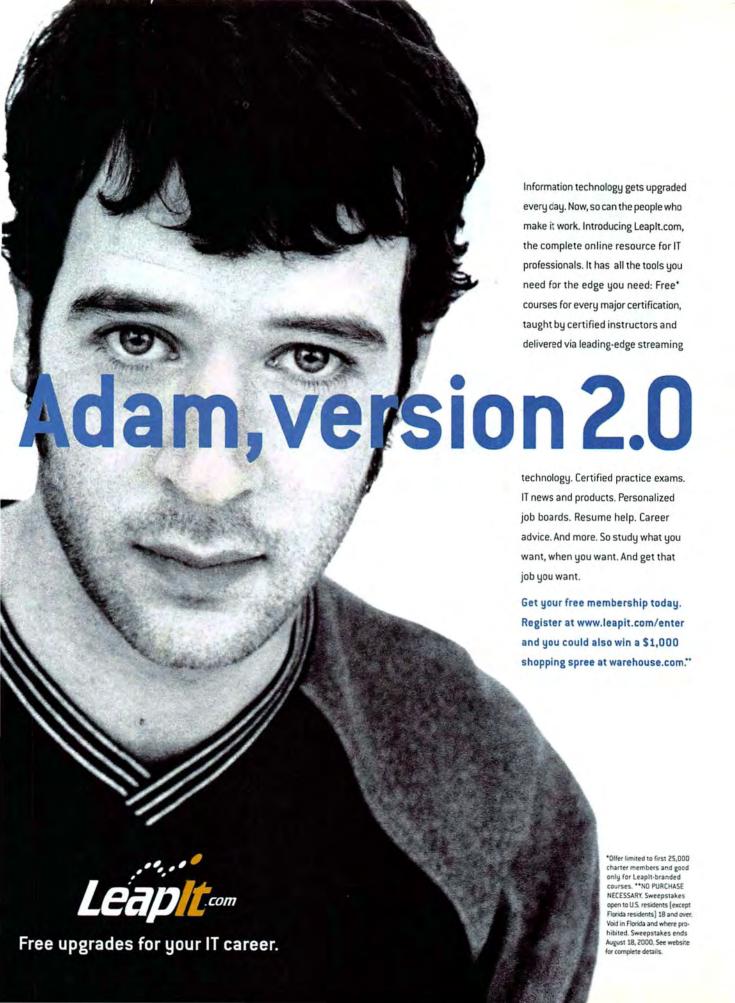
PCW: What advice would you give wary Netizens today?

Smith: The main thing is: Computers, like elephants, never forget. Be careful what information you provide Web sites If you're registering your toaster, there's no need to tell them your yearly income. Be careful what you say in newsgroups. You can write something today, and three years later really regret it.

Remember, the Net is still new. It's like a 12year-old kid, still trying to find its way. A lot of issues-like hacking, privacy, and security-will get worked out over the next five years.

Richard Smith, privacy advocate and former software company executive, warns consumers, "As you surf the Web, sites across the board are watching what you do...learning all about you."







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mation; but DoubleClick did not provide details of what exactly is stored in its profiles.) At press time the FTC had opened a formal inquiry into Alexa's information gathering practices, and the company has been named in three consumer lawsuits.

According to Dia Cheney, director of corporate communications for Alexa, the company stores its users' Web trails anonymously and keeps this data separate from personally identifiable information, such as e-mail addresses, that users may have provided when they registered the software. She would not comment on Smith's allegations, saying they were part of the FTC inquiry. "We are cooperating

despite privacy policies against the practice. The study, published in January of this year, looked at health-specific entities such as AllHealth and WebMD, as well as high-traffic portals like AltaVista, Excite, and Yahoo. Its key finding:

"On a number of sites personally identified information is collected through the use of cookies and banner advertisements by third parties without the host sites disclosing this practice. There are also instances where personally identified data is transferred to third parties in direct violation of stated privacy policies."

For example, the report states that some sites provide health assessment tests. For considered a complete policy-one that provides consumers with a statement about the site's data collection practices, an opt-out clause, access to the information collected, a description of how the site secures data, and phone numbers or email addresses that consumers can use to contact the company. What's more, privacy statements can be changed at will, often without notification to users or affiliated sites, EPIC's complaint to the FTC notes that DoubleClick changed its policy three times in the past three years.

"If you want to find out how a company feels about your personal privacy, don't look at their privacy statement, look at their

> business model," says Rick Jackson, CEO of Privada, a San Jose, California-based maker of products that allow consumers to surf the Web anonymously. A former executive at Net Gravity,

Jackson helped engineer that marketing firm's merger with DoubleClick last October, despite personal reservations about some of DoubleClick's marketing methods. The more an information-gathering company knows about you, he says, the more money it makes: "That's their business model. If it's a question of profit versus privacy, profits come first every time."

"You have to be a kind of Jeffersonian citizen of the Web.... If you're just a passive consumer, they will drive right over you."

fully with the informal FTC investigation on a voluntary basis," she says. "Historically, Alexa has always been concerned with protecting consumer privacy."

Policies Are No Insurance

SO FAR, MOST of the attention has been focused on getting sites to post privacy policies that state what information they collect and what they do with it. But both RealNetworks and Alexa have been accused of violating their own policies about keeping user information anonymous. If such claims are true, the sites could be held liable for committing fraud, says Professor Gerald Ferrera, who teaches a course in cyberlaw at Bentley College in Waltham, Massachusetts.

"Promises made in the privacy policy are as much a part of the transaction as what is delivered to the consumer." Ferrera says. If a company fails to observe its policy, it can be sued under the federal Consumer Fraud and Abuse Act, as well as various common laws and state and federal consumer protection statutes.

But policy breaches may be more common than most people realize. A study of 21 health advice sites coauthored by Richard Smith and sponsored by the California Healthcare Foundation found that many sites share sensitive information.

six of these sites (OnHealth, AllHealth, CVS, Yahoo, HealthCentral, and Inteli-Health), the tests are actually conducted by a third-party firm, a fact that is not made clear to visitors. Third-party firms that collect the data (including personally identifying information) are often not covered by the host site's privacy policy; so, theoretically, these third parties could sell your health information to marketers, insurers, or potential employers. In other cases, the report found that sensitive data such as e-mail addresses was inadvertently embedded in the URLs that were being sent to advertisers and ad networks.

In short, Internet privacy policies offer consumers very little protection. "Six months ago, just having a privacy policy was considered pretty honorable," says Abner Germanow, a research manager at International Data Corporation in Framingham, Massachusetts. "Today, most policies are pretty worthless."

A Georgetown University study, published in June 1999, examined 361 commercial Web sites and found that nine out of ten ask you to supply at least one piece of personal information, such as your name, e-mail address, or postal address. But only two-thirds of the sites in the survey offered privacy statements. And less than ten percent had what researchers

Legal Remedies

UNTIL NOW THE federal government has adopted a hands-off approach to Internet privacy-watching and waiting for the Web industry to regulate itself. Organizations like Truste still say that this is the right course to take. Truste, based in Cupertino, California, oversees privacy policies for more than 1300 Web sites, including those belonging to RealNetworks and Amazon.com's Alexa (PCWorld.com is also a Truste licensee). According to Bob Lewin, CEO of Truste, RealNetworks' response to allegations of privacy abuses demonstrates that self-regulation works.

Lewin says that Truste convinced Real-Networks to issue a patch that prevents its software from assigning a unique identification number to each user. Truste also persuaded the company executives to appoint a chief privacy officer and to release RealPlayer 7.0 using an opt-in

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model, so that consumers must actively choose to create a unique ID number, rather than the more common opt-out model used by the majority of Web sites. "We did all of that in the space of one week," Lewin says. "You show me any government body that moves that fast."

Unfortunately, Truste's influence is limited to its licensees, which don't include such Internet heavyweights as Amazon. com and DoubleClick (see "Should You Trust Truste?" on page 116). And while Truste does perform quarterly audits of its members' Web sites to ensure that the stated privacy policy on the site matches the member's practices, the organization does not specify what kinds of information members can collect, nor what they can do with that information once they have it. "The problem with self-regulation is that it rewards bad actors," says EPIC's Rotenberg. Once a Web site begins generating revenue by selling user profiles and personal information, he explains, other Web sites will have to follow suit in order to remain competitive.

"There's no way any number of companies will be able to protect human rights through a business model," says Privacy Times publisher Evan Hendricks. "When things go wrong, people need a [legal] remedy. Right now we don't have that."

Although several states have already enacted their own privacy statutes, there is no comprehensive federal law governing personal privacy. But the situation may change this year. Congress is currently debating a dozen bills designed to regulate different types of personal data, from medical records to financial matters.

Senator Robert Toricelli (D-New Jersey) recently introduced a bill that would require Web sites to obtain users' permission before installing devices such as cookies that track their movements on the Internet. And last February, Senators Richard Shelby (R-Alabama) and Richard Bryan (D-Nevada) banded together with Representatives Edward Markey (D-Massachusetts) and Joe Barton (R-Texas) to form the Congressional Privacy Caucus. This bipartisan group is expected to draft new privacy legislation that will be based on the principles of user notification, consent, and access.

Privacy wonks, however, are skeptical of what the federal government may cook up. "I think the best place for legislation in some ways is at the local or state level," says Tom Maddox, editor of PrivacyPlace.

> com, a Berkeley, California, site specializing in privacy issues. "Federal laws tend to be big, fat, unwieldy... sledge-

hammers swatting at gnats. They usually miss the gnat and hit the rest of us."

Technology to the Rescue?

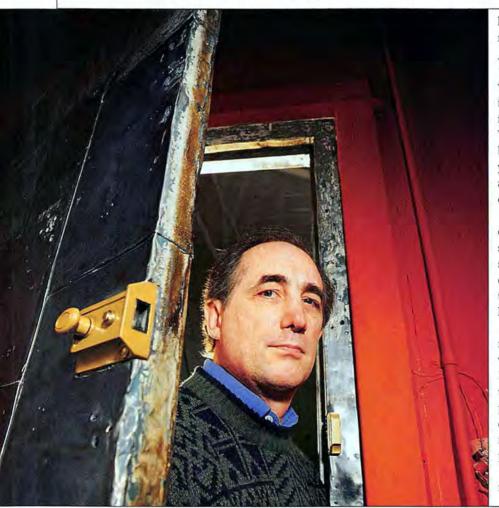
YOU CAN OPT OUT of DoubleClick profiles. You can avoid using software that follows your footsteps on the Internet. You can crumble every cookie before your browser takes a nibble from it. And still you are at risk from the next site, the next advertiser, the next marketer who sees dollar signs in your data.

One thing is certain: Online data gathering will not go away. Too many Web sites are depending on the revenues from selling user data or delivering specific demographics to advertisers. The question is whether you'll have any say in what happens to your information.

"The real issue is, who's in control of my online profile, who can access it, and who's selling it?" says Germanow. "When I show up at a travel site, do I want them to know who I am and what frequent flyer program I belong to? Yes. When I'm doing research on AIDS because I have a friend in the hospital, do I want that as part of my profile? I don't think so."

Today, even vendors who sell products for protecting anonymity admit that

Larry Sontag, a Seattle-based privacy consultant, is concerned about the implications of Web profiles. "In a divorce or child custody case your spouse could use your surfing habits against you," he says,



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there is no easy solution for e-commerce. Programs like PrivadaProxy and Zero-Knowledge's Freedom can protect your identity while you browse, chat, or send email, but according to Privada's Jackson, "As soon as you decide you want to buy something, you're left unprotected."

Both companies say they are working on schemes to allow consumers to shop anonymously and expect to introduce products within a year. Zero-Knowledge's Austin Hill sees a future in which shopping agent software can assure a Web site that you have the credentials to make a purchase, then negotiate what data you

are willing to give up in return for a good price.

"What if you had the most accurate version of your profile under your lock and key?" asks Hill, president of the Montreal firm. "Your credit information, EBay reputation, frequent flyer miles, how much shopping you do. You'd be able to leverage that data, build relationships with merchants, and still maintain your privacy."

Hill believes that consumers need to start thinking about Internet privacy the same way they think about viruses. "You don't use a computer unless you have antivirus software," he says, "and you shouldn't give away data without protecting yourself. Every time you fill in a Web form or a registration card, make sure that the data is 100 percent necessary for completing the transaction, and that the company will protect it." When enough consumers refuse to give away their personal information for free, he adds, merchants will have to respond.

"You have to be a kind of Jeffersonian citizen for the Web," agrees Maddox. "Be aware, be educated, take personal action. If you're just a passive consumer, they will drive right over you."

Daniel Tynan is a contributing editor for PC World, and Eric Dahl is a staff editor for PC World. Tom Spring is senior reporter for PCWorld.com.

SHOULD YOU TRUST TRUSTE?

ever. So if your favorite site carries a privacy seal of approval from an independent organization like Truste, you should feel safer, right? Maybe not. Internet giants like Microsoft, Deja, and RealNetworks all have sites approved by Truste. But each made news last year by engaging in practices that allegedly violated user privacy. Which raises the question: How far can you trust a seal from Truste?

A handful of organizations dole out Web privacy seals. Truste is one of the largest, with



licensees paying from \$299 to \$4999 for a seal that says their privacy policy passes Truste's muster. BBBOnline and CPA Webtrust also charge for audits and seals, as do the top six CPA firms. (Other organizations-such as Enonymous.com-do not charge, but they rate sites on the basis of certain levels of privacy offered under the terms of their policy.)

But as events cited in these pages show, simply posting a policy and seal doesn't mean a site won't violate your privacy. And critics say Truste monitors members inadequately once it grants a seal. Instead, it relies on consumers and privacy advocates like Richard Smith (see "The Eyes of Richard Smith" on page 108) to report privacy violations.

The RealNetworks incident, for instance, was resolved after being brought to Truste's attention, but Smith says that the credit goes to the media and consumers. "[Truste isn't] really an enforcement organization," Smith says. "Mostly, the press coverage is what gets companies to change privacy policies."

Truste does perform quarterly checks of company I'm dealing with? -Eric Dahl

WEB PRIVACY IS more important now than sites. But CEO Bob Lewin admits that Truste doesn't look at a site's books to make sure it's not selling data, or at its programming code to ensure data siphoning isn't taking place. "[T]o do those things would be a bit more expensive than what we do today," he says.

> "We've done a satisfactory job," he adds, "but I agree that we can do better."

Critics also question Truste's impartiality. The organization was created by the industry it oversees, and critics argue that it relies on its sponsors-Microsoft among them-to support it. Lewin denies this, saying, "Eighty-five percent of our funding comes from license fees.... [N]o single sponsor has the financial clout to influence this organization."

In its three years of existence, Truste has never revoked a seal. And Lewin says less than 2 percent of Web businesses that approach it for a seal are rejected.

Sealed for Your Protection?

SO WHAT DOES a privacy seal in general say about a site? "It tells you the site did have to answer questions about privacy, [and] that it does have a privacy policy," says Ari Schwartz, policy analyst at the Center for Democracy and Technology. "But a seal doesn't grant you any more control over your [personal] information than at any other Web site." A Web site can still collect and in some cases sell your data, as long as it tells you it's doing so.

And most privacy policies don't cover thirdparty involvement in a site. So a firm like DoubleClick can do what it wants, and until now the host site hasn't been obligated to tell you about it. Also, Truste's license doesn't cover software downloads like RealJukebox or Windows 98. (Last year Microsoft was discovered to be collecting user information through its registration wizard.) Truste announced recently that it plans to expand its policies to include software and third-party contractors.

In the end, privacy seals tell you that a Web site has a privacy policy and may be held legally accountable for breaking it. How likely a site is to follow its privacy policy is a separate issue, and unfortunately it's one you still have to address by asking yourself a basic consumer question: How well do I trust the



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■ 1-Yr Next-Business-Day On-site Service®

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Tips, tricks, and slick little products to help you browse, shop, and send e-mail incognito.

ALL RIGHT ALREADY, we all know there's no privacy on the Web. Online intrusion is like the proverbial weather—everybody talks about it, but nobody ever seems to do anything about it.

You can defend your online privacy, however. In fact, you must: The simple act of browsing can leave traces of you all over the place, enabling sites to gather information about you without your knowledge. >

PRIVACY SPECIAL REPORT

Whether the offense is spam in your mailbox, Web cookies on your hard drive, or word of your online identity becoming as widespread as ragweed pollen, you are not helpless. Fortunately, you have numerous ways to combat privacy invasions-from simple browser-setting tweaks to more robust and customizable

third-party software to a Web service's solutions. You can just say no to those attacks on your anonymity.

Because Internet privacy attacks come at us from every direction, the best way to defend yourself is to take on each enemy individually. Accordingly, we'll explore, one by one, the various options available for controlling Web cookies, spam, and your online identity. Maintaining online privacy and security may be tricky, but you can do it. First, be sure to take the online privacy quiz on page 123 to see just how paranoid you should be. We've also includ-

ed tips for making your AOL experience safer (see page 126). And if you have a DSL or cable modem connection, pay special attention to the

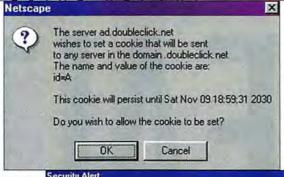
section on broadband security (page 134).

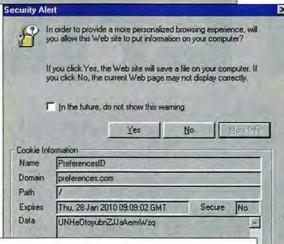
Before You Do Anything Else...

Your first step toward achieving security online is to make sure your browser supports the highest level of encryption.

The standard Internet Explorer and Netscape browsers use 40- or 56-bit encryption for secure socket connections-the ones whose URLs begin https:// (note the s at the end). That's weaker than it could be: The optimum legal setting is 128-bit.

To check the encryption depth of your installed version of Internet Explorer, select Help. About. You'll see the current Cipher Strength listed. If it's 40-bit, click the Update Information link for a small download that upgrades the browser to 128-bit encryption. (Unfortunately, there is no encryption upgrade patch, so you will have to install a new full version.)





IF YOU SET your browser to prompt you before accepting cookles, you'll get warnings like these. The cookie is set to last for ten years, and the issuing site can track your activity during that entire time.

> In Netscape Navigator, when you have an online connection, select Help. Software Updates to open a Netscape site; click the Your Installed Software link to find the Cipher Strength. If it's 56-bit, select Upgrade To Netscape Communicator to obtain 128-bit protection.

Control Cookie Intake

Web sites give you these little data tracking beacons. But you can tell them where to go.

No matter what level of encryption you have, you can maintain some degree of control over the way the browser handles cookies. At their simplest, cookies-small data files sent by a Web site and written to your hard disk-identify you when you return to a site, making your reentry quicker. Or they can be more insidious, tracking everything that you do both on the sending site's pages and wherever else you go on the Web. Don't get too excited about per-session cookies-they disappear after you leave a site, and they cannot be used to track you.

Tweak your browser: Both Netscape Navigator and Internet Explorer provide limited options for disabling cookies. If you turn off cookie acceptance altogether, you'll be stopped in your tracks online. Yahoo, Amazon. com, and the New York Times de-

mand identity confirmation at almost every link, while Hotmail flatly refused to let us in unless we enabled cookies.

In IE 5, you can either raise the browser's security level to maximum or create a custom setting. To specify maximum security, select Tools. Internet Options. Security and move the slider to the top of its range-but bear in mind that this setting will prevent ActiveX and Java from automatically working, and it will prevent you

from entering certain sites. Custom settings provide more flexi-

bility, and they're easy to implement. Select Tools-Internet Options-Security and click the Custom Level button; scroll to the Cookies section and click Prompt under 'Allow cookies that are stored on your computer'. To turn this setting on in IE 4.0, select View-Internet Options-Advanced and check the box that says Prompt before accepting cookies.

In Netscape Communicator, select Edit-Preferences and click Advanced. Under Cookies, click either Disable Cookies, Warn me before accepting a cookie, or Accept only cookies that get sent back to the originating server (an option that prevents other sites, such as advertising partners, from viewing your cookies). Netscape's cookie-warning dialogs tell you where the cookie comes from (the site that you're visiting or its banner advertising service) and how long the cookie is scheduled to last (for example, DoubleClick, the New York Times, and Yahoo set their respective cookies to last for ten years; Amazon. com's stop working after two weeks).

In Internet Explorer you can delete the cookies already in place on your hard drive by emptying the directory (usually c:\Windows\Cookies). In Netscape, shut down the browser and then select Start. Find-Files and Folders. Enter cookies.txt in the search box and click Find Now. Select all the files listed and press the <Delete> key. Once you're cookie-free, you'll be prompted each time a Web site wants to send a new cookie your way.

Cookie-free doesn't mean problem-free, however. For a breakdown of the type of problems you can expect, check out the table "Do Your Browser Settings Provide Enough Privacy?" on page 124.

Cut out cookies: To enter some sites, you have to use cookies, but that doesn't mean you have to keep the cookies after you leave. Third-party software can supplement browser cookie controls. You can schedule Webroot's Window Washer, for example, to purge cookies (as well as temp files, history files, Recycle Bin files, your browser cache, and more) at regular intervals, or when you start or close Windows.

You can also have Window Washer keep some cookies if you trust the issuing site to use them wisely. Right-click the program's Tray icon; select Settings from the pop-up menu to open the main window; and in the Standard Wash Items list, click the Options button for the browser you're using. In the next dialog box, click the Cookies To Keep button to bring up a box with a list of cookies from various sites. Select one to see its contentswhich may include details such as your e-mail address but usually consist of mumbo jumbo codes. Click Add to Keepers for the sites you trust, but leave out any you don't like the look of. All cookies not specifically approved will be purged whenever you select Wash Now from the main Window or click the Tray icon.

Other downloadable shareware programs-Cookie Pal, Cookie Cutter, and Cookie Crusher, among others—use your browser's cookie settings to refuse cookie requests, add filters for accepting or declining cookies from specific sites, and alert you visually or audibly whenever a cookie arrives. Commercial packages such as ESafe Desktop and personal firewall

POP QUIZ: HOW PRIVATE ARE YOU ONLINE?

FEEL LUCKY, PUNK? Well, maybe you shouldn't. Take our quiz to see whether you're an easy mark. Tally your points to see how hot things are for you on the Paranoid Thermometer.

Have you signed up at a free membership site?

- If yes, collect 2 paranoia points. If you didn't check the privacy policy or read the text next to each check box, collect 10 more points. Many sites want your address, phone number, and income range-and share this information with other companies.
- Have you used a credit card online? If yes, assign yourself 2 points. The real danger comes from doing business with sites that don't store your credit card info behind a hack-proof firewall.
- Have you used a debit card online? If yes, 10 points. Though debit card services limit losses through theft, your checking account can be cleaned out while the service investigates fraudulent debits.
- Have you sent a credit card number or other personal data via e-mail? If yes, 10 points. E-mail is intrinsically less secure than a transaction conducted at an e-commerce site. And you never can tell who's going to forward your e-mails.
- Do you use your real name and e-mail address when posting messages? If yes, collect 10 points. Spam companies are notorious for harvesting visitors' addresses from Usenet and other forums.
- Have you checked all the white-pages sites for your name? If yes, 10 points. If no, 10 points. Online directory services cross-reference your home

data with that of neighbors and local businesses, andcalling all stalkers-provide links to maps.

Have you installed Web apps that know when you're online?

If yes, 3 points. Like the Pentium III processor, Web applets may carry a unique serial number that can be used to identify a computer.

- Do you open e-mail file attachments? If yes, 5 points. Harmless though the attachment seems, it could contain Trojan-horse software that exposes your PC to attack from the Internet.
- Do you use chat rooms? If yes, 3 points. Log in to chat or IRC sites, and "script kiddies" can employ a program to gather your AOL screen ID and steal your password.
- Do you use Windows networking or filesharing software on your online PC? If yes, 10 points. Windows 9x networking opens up the NetBIOS port to anyone who wants to access your PC. Hackers can probe systems for open ports and gain read/write access to your hard disk.

SCORE



Any secrets you had are secrets no more.

41 - 60 Pretty cocky, aren't you? Better be more circumspect.

31 - 40 You're cautiousbut you could stand to be a little more so.

0 - 30 You've got nothing to worry about. You must already

be paranoid.

PRIVACY SPECIAL REPORT

software like Norton Internet Security 2000 ensure that cookies are accessible only to the site that issues them. They prompt you when a cookie is about to be written, allowing you to accept or refuse it permanently (this action creates a profile for the site that automatically deals with the site's cookies as you specify).

Browse Incognito

One way to stay anonymous on the Web is to lower your browsing profile.

Think that most of your Internet activity -browsing, shopping, posting messages, sending e-mail-is private? Think again.

Give your PC a privacy test: Any time you're connected to the Net, your PC is open to the world. Gibson Research's

ShieldsUp site (www. rc.com) features the 'Test My Shields' and 'Probe My Ports' links that establish a secure connection and show you a Web page with the information that a hacker could find out about your computer and LAN. You will likely see your name, your IP address, and the number of

"ports" on your computer that could allow anyone who has the right software to

scope out your hard disk and its contents.

Don't share your files: Hackers can gain access to your computer when your PC is set to share files and printers. Even if you

SeSafe Desktop Watch ? X INFO CONFIG EXTREME ANTI-VIRUS

OVERZEALOUS FIREWALL PROGRAM: ESafe Desktop had to turn off the firewall to accept a Microsoft security update for Windows.

> aren't on a network, your PC's settings may be configured to allow file sharingand hacker entry. To turn off access to file and printer sharing in Windows 9x,

DO YOUR BROWSER SETTINGS PROVIDE ENOUGH PRIVACY?

	SECURITY SETTING	Amazon.com	NYTimes.com	Windows Update	Yahoo
	Low	No warnings provided	No warnings provided	No warnings provided	No warnings provided
	Medium-low	No warnings provided	No warnings provided	No warnings provided	No warnings provided
illernet Explorer	Medium (recommended)	Security-alert prompt (can be turned off perma- nently)	Security-alert prompt (can be turned off permanently); redirection warning (when info about you is sent to a different server on site); Focalink and DoubleClick cookies	No warnings provided	Security-alert prompt (can be turned off permanently); logging on to My Yahoo or Yahoo Mail produces redirection warning (switching server on same site)
illiei liei	High (blocks cookies completely)	Security-alert prompt (can be turned off permanently)	Security-alert prompt (can be turned off permanently)	An ActiveX control on this page is not safe—page fails to load	Security-alert prompt (can be turned off permanently); logging on to My Yahoo or Yahoo Mail fails completely
	High, modified to prompt for cookies	Prompts up to four times on some pages	Prompts up to four times per page visited; slow loading	An ActiveX control on this page is not safe—page fails to load	Cookie prompt; can't log on to My Yahoo unless you select <i>Remember my ID &</i> <i>Password</i>
Second Second	Accept only cook- ies that get sent back to the origi- nating server	A little slow, but no apparent change in access	A little slow; only NYTimes.com cookies saved	Cannot load (no ActiveX support)	A little slow, but no apparent change in access
5	Disable Java and JavaScript	No apparent change in access	No apparent change in access	Cannot load (no ActiveX support)	No apparent change in access
Netscape Navigator	Prompt for cookies	Prompts up to four times on some pages	Prompts up to three times per page visited	Cannot load (no ActiveX support)	Search and Web mail pages prompt once for cookies; My Yahoo prompts up to three times per page; refusing cookies results in failure to load pages
Netsc	Disable cookies	Security-alert prompt	Security-alert prompt; slow, but each page works	Cannot load (no ActiveX support)	Security-alert prompt (can be turned off permanently); logging on to My Yahoo or Yahoo Mail fails completely
	No Java or JavaScript, cookies, or style sheets	Security-alert prompt	Security-alert prompt; slow, but each page works	Cannot load (no ActiveX support)	Security-alert prompt (can be turned off permanently); logging on to My Yahoo or Yahoo Mail fails completely
What the site does when you log on		Writes a cookie that each subsequent page refers to	Writes and reads cookies for itself and its advertising banner partners (Preferences.com, DoubleClick, and Focalink)	Opens page containing ActiveX controls; downloads page containing ActiveX program Critical Components Installer	Writes a cookie that each subsequent page refers to; adds log-on information to the cookie if you set My Yahoo to remember you



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select Start. Control Panel, double-click the Networks icon, and select the Configuration tab. Click the File and Printer Sharing button, and make sure that both boxes in the dialog box are unchecked.

Study the trail you've left: The simplest way to block intruders from your PC is to install a firewall (see "Always On, Always Open to Attack," page 134). But firewalls only defend PC ports that allow file sharing; they don't hide your browsing habits. To see what information you're giving away, check Privacy.net's Anonymizer analysis page (www.anonymizer.com), which lists the sites you've visited and any cookie-related information they deposited on your PC. For real anonymity, you need an anonymous browsing service that cloaks your identity-or lets you establish an alias that nobody can trace back to you-and routes all your activity through its own anonymous servers.

Surf anonymously for free: Anonymizer is the most venerable free anonymity service. Enter any Web address at www. anonymizer.com, and the site will take you there but conceal your IP address and other identification.

Unfortunately, the free version of the service slows the browsing process, carries ads, does not let Java or JavaScript apps execute, and more important, does not access FTP sites or secure http sites, such as Web merchants' order-taking pages.

Surf anonymously for a fee: Anonymizer's premium fee-based service works faster and lets you access secure http sites and execute "friendly" Java and JavaScript apps; it costs \$15 for three months, \$50 for one year. Zero-Knowledge Systems' Freedom 1 and Privada's PrivadaProxy provide anonymity online via software/ Web site combos and add other benefits.

PrivadaProxy's Web Incognito service lets you set up an alias to use online and inter-

poses a proxy server between you and any site you visit. You can set up as many online identities as you like for a monthly fee of \$5 each. The software allows you to configure settings for cookies and e-mail filtering, but your browser must be set to run through a proxy server. In Internet Explorer, select Tools. Internet Options. Con-

HOW TO MAKE YOUR AOL ACCOUNT PRIVATE

HACKERS LOVE to target America Online. These gate-crashers can seriously compromise your account. Here are areas to patrol:

E-mail controls: Your AOL address doesn't take long to reach mass e-mailers. To control the e-mail you receive, log on with the master screen name, click the Mail Center icon, and

select Mail Controls. Pick a screen name, and examine your control options: You can block all e-mail, block mail that originates outside AOL, or reject mail from specific domains or members you list; or you can filter out all e-mail addresses except those you list.

Downloads: If you try to download any program from e-mail, AOL's Download Sentry warns you that executable downloads could contain viruses or Trojan horses-but it won't stop you from downloading them. So be wary what you download from strangers-and even from friends.

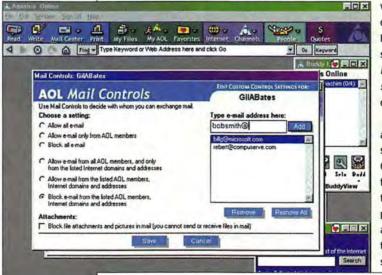
E-mail links and attachments: Most people don't think twice about clicking an HTML link in an email. Malicious JavaScripts can lurk on any Web page, and many of the sociopaths who code them delight in targeting AOL users. If e-mail from a stranger contains attachments or links, forward the e-mail to TOSSPAM, AOL's spam-alert address.

Instant messages: AOL Instant Messenger allows Internet users and AOL's 20 million members to communicate instantly. Control the flow of Instant Messages, Select keyword Buddy, and click Privacy Preferences. You'll be presented with the same control options you have

> with e-mail in Mail Controls. You can exclude any combination of Internet and AOL users from sending IMs. Finally, click the Buddy List and Instant Message radio button to have your criteria accepted.

> Chat rooms: AOL hackers have a script program that culls screen names from People Connection chat rooms and either adds them automatically to spam lists or sends unsophisticated Instant Messages asking for "password verification." So create a dedicated screen name for chat sessions,

> > and set up stringent mail and IM controls for that account.



SPAM BUSTING, AOL-STYLE: Public screen names breed spam. Use Mail Controls when it reaches rain-of-toads proportions.

nections. LAN Settings. In Netscape, select Edit - Preferences - Advanced - Proxies, doubleclick Advanced, and select Proxies.

Freedom 1 uses a network of anonymizing servers and strong encryption on your PC to confound any site that tries to

ACHIEVE UTIMATE TECHNOLOGICAL DOMINATION.



AND STILL HAVE MONEY LEFT OVER FOR A PRINTER.

MILLENNIA MAX 800

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- 32MB nVidia TNT2 Pro AGP graphics
- 128-voice Wavetable sound
- 2-piece standard speakers
- 3Com 56K WinModem
- 5-year/3-year Micron Power limited warranty
- Microsoft® Windows® 98
- Microsoft Office 2000 Small Business



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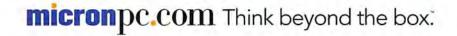
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Of course, the Millennia MAX 800 has a legendary past: Its family recently won two awards in *PC Magazine*'s "Best of '99" competition. So don't wait. Deploy the planet's mightiest PC today by calling 1-800-494-8905, or visiting Micronpc.com. And be sure to ask about our full line of HP printers. After all, no crazed worldwide scheme is complete without one.

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Intel Pentium III processor 600MHz	Intel Pentium III processor 800MHz	Intel Pentium III processor 866MHz	
64MB 133MHz SDRAM	64MB 133MHz SDRAM	128MB 133MHz SDRAM	
10GB ⁰ ATA-66 (7200 rpm) hard drive	10GB ⁽⁾ ATA-66 (7200 rpm) hard drive	30GB ⁽⁾ ATA-66 (7200 rpm) hard drive	
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2-piece standard speakers	2-piece standard speakers	2-piece standard speakers	
3Com 56K WinModem	3Com 56K WinModem	3Com 56K WinModem	
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Microsoft Windows 98 Microsoft Office 2000 Small Business	Microsoft Windows 98 Microsoft Office 2000 Small Business	Microsoft Windows 98 Microsoft Office 2000 Small Business	

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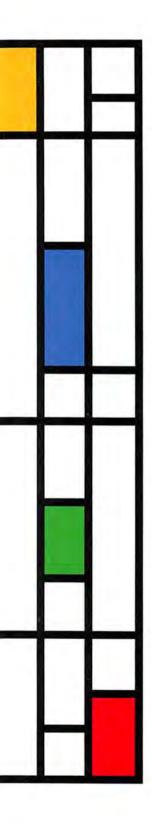
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When a leading U.S. healthcare provider needed to add secure Internet access to its router-based network, and then looked for the ideal platform ...

PRIVACY SPECIAL

trace your connection back to your PC. Online aliases, known as nyms, supply a browsing identity and an encrypted e-mail account (yournym@freedom. net). Five nyms with a one-year life span cost \$50. Instructions are routed through one, two, or three intermediate servers, slowing browsing but simplify-

ing mail cryptography and spam control.



HOW'S THIS FOR IRONY? Even a security product's registration form asks for permission to call you. Read form options carefully to avoid unwanted phone, mail, and e-mail solicitations.

Eliminate Spam

When it comes to inviting spam, you are your own worst enemy. But you can stop most of the annoying clutter.

No matter how cautiously you fill in personal information forms to register at sites you visit often, junk e-mail seems sure to follow. The two types of spam are e-mail you request ("get news of the latest airfare bargains") and annoying, unso-

mail addresses from sites, so limit the use of your regular e-mail address when you post messages online or list a contact email address on your own Web site.

Read before you sign: Some online merchants try to trick you into consenting to receive e-mails you have no interest in. Your defense: Carefully read the wording of any check box that refers to "news of updates" or "news from select partners."

Set up filters: Blocking messages from bulk e-mailers requires a filter. In Outlook Express, select Tools. Rules Wizard and set up a folder for junk mail (such as your Deleted Items folder); then right-click any in-box message you don't like the looks of, and select Junk E-mail. Add to Junk Senders. This consigns future mail from that address to your junk mail folder. In Eudora 4.2, right-click an open message or message summary, and choose Make Filter from the

> menu. Use the Make Filter dialog to instruct Eudora to delete messages like the one that you've

selected. In Netscape, Select Edit Message Filters, and identify criteria that mark a message as unwanted mail. These identifying marks may include the sender's email address, initials as a heading, multiple exclamation marks, or words such as "quick bucks" in the content.

Set up industrial-strength filters: If your address ends up being sold to bulk e-mailers, you need software that maintains lists

> to filter out bulk e-mailer addresses and message content. The shareware Spam Buster 1.8 and the trial download Spam-Killer 2.77 are past PC World Best Buys, and they're available for download from FileWorld.

Spam Buster intercepts more messages than SpamKiller, including some that aren't junk mail, but you can preview intercepted files before deleting them. Both programs provide a button you can click to report abuse of an e-mail account to the domain's postmaster.

It's often hard to tell whether you need to click or unclick a check mark to opt out of the mailing list. Read carefully!

licited get-rich-quick, porn, and other pushy sales pitches. The former is easy to stop, but you'll need a digital machete to excise the latter.

Create an extra address: Avoid revealing your main e-mail address at Web sites and online message boards. Sign up at a free e-mail service like Excite Mail, Hotmail, or Juno and use that address when you register at sites. The free address will then become a receptacle for spam. These services let you filter out known bulk e-mailers, so you can reduce the flow further. Yahoo does this automatically; others require a little intervention. With Excite Mail, for example, click Preferences. Email, scroll to the Spam Controls, and click Refuse mail from known junk mailers. Bulk e-mailers often use software to harvest eIt's often hard to tell whether you need to click or unclick a check mark to opt out of the mailing list.

Unsubscribe cautiously: Once you're on a legitimate company's mailing list, it's usually not difficult to unsubscribe. Typically the unwanted message includes instructions to e-mail your request to a special address or to reply to the message with the word unsubscribe in the subject area. But be warned: If the message obviously came from a bulk e-mailer (a mail subject line with a sensational promise or lurid appeal such as "Make Big \$\$\$" or "XXX Girls" is usually a giveaway), don't follow the unsubscribe instructions. Doing so just verifies that your e-mail address is active, which makes it more valuable for unscrupulous people to resell.

Privatize E-Mail

It's a crime to open other people's mail-but not on the Web. Still, you can make your e-mail harder to open.

You've probably heard that you shouldn't put anything in an e-mail message you wouldn't put on a postcard. That's sound advice. Your boss and your IS department can lawfully read any e-mail sent to a

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Female Premiums

Age	10 YEAR	15 YEAR	20 YEAR	25 YEAR	30 YEAR	
35	\$ 103	\$ 138	\$ 170	\$ 200	\$ 233	
40	\$ 133	\$ 175	\$ 213	\$ 253	\$ 298	
45	\$ 190	\$ 243	\$ 290	\$ 348	\$ 418	
50	\$ 255	\$ 320	\$ 428	\$ 495	\$ 643	
55	\$ 360	\$ 418	\$ 585	\$ 1,280	\$ 2,618	
60	\$ 503	\$ 608	\$ 880	\$ 4,313	\$ 4,313	
65	\$ 818	\$ 983	\$ 1,970	\$ 5,400	\$ 5,400	
70	\$1,363	\$ 2,010	\$ 3,820	\$ 7,055	\$ 7,055	
75	\$2,613	\$ 5,158	\$ 6,840	\$ 9,500	\$14,613	

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"Get quotes on the spot. New source for best buys in insurance. One way to get to know the market." - Kiplinger's Personal Finance

"...provides rock-bottom quotes for life insurance." - Forbes

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Male Premiums

Age	10 YEAR	15 YEAR	20 YEAR	25 YEAR	30 YEAR	
35	\$ 115	\$ 143	\$ 183	\$ 243	\$ 290	
40	\$ 145	\$ 193	\$ 258	\$ 340	\$ 410	
45	\$ 210	\$ 305	\$ 385	\$ 480	\$ 578	
50	\$ 330	\$ 495	\$ 600	\$ 730	\$ 1,193	
55	\$ 500	\$ 695	\$ 825	\$ 1,910	\$ 3,333	
60	\$ 783	\$ 1,123	\$ 1,265	\$ 5,023	\$ 5,023	
65	\$1,330	\$ 1,790	\$ 3,130	\$ 6,470	\$ 6,470	
70	\$2,435	\$ 3,658	\$ 5,370	\$ 8,518	\$ 8,518	
75	\$4,105	\$ 8,100	\$ 8,100	\$11,323	\$20,488	

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- Los Angeles Times

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Inc. on every term life quote. Buy from the company of your choice when you want and on your terms. Use the Quotesmith.com high speed insurance price comparison service before you buy or renew any insurance policy.

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Final premiums and coverage availability will vary depending upon age, sex, state availability, hazardous activities, personal and family health history. The non-tobacco use premiums shown above may include; Banner Life Ins. Co., Rockville, MD, form RT-97; Central States Health & Life, Omaha, NE, form L10; First Cotony Life Ins. Co., Lynchburg, VA, forms One-20 and ULFCL99; First Penn-Pacific Life, Hoffman Estates, IL, forms BT-1000Aa (6/95); Golden Rule Ins. Co., Lawrenceville, IL, form GRI-L-17.1; Jackson National Life Ins. Co., Lansing, MI, form L1665; John Hancock Variable Life, Boston, MA, form 98TLIFE; North American Co. for Life & Health Ins., Chicago, IL, form L5108A; Security-Connecticut Life, Avon, CT, form 11420; Sun Life Assurance Co. of Canada (US), Wellesley Hills, MA, form SPL-1996-0; Transamerica Occidental Life, Los Angeles, CA, form 1-306 11-199; United of Omaha Life Ins. Co., Omaha, NE, forms 65481-0799 and 65691-1199. Premium rates shown above are not applicable to residents of FL, NJ & NY - 5500 guarantee is subject to the lems and conditions detailed at www.quotesmith.com. Policy forms vary by state. California and Ultah do Quotesmith.com insurance Services: CA #0827712, #0A13858; UT #90093. Some premiums shown are graded premium life policies and/or term-like universal life policies. Term life premium rates always escalate after initial rate guarantee period. Quotesmith.com, Inc. is not a licensed agent or broker for all companies shown at www.quotesmith.com. All rates shown subject to change or withdrawal without notice.

corporate e-mail box. But since e-mail hops around in unencrypted form between servers on the Internet and ends up in online e-mail boxes that are extremely vulnerable to hacking, anyone intent on invading your privacy can read it.

Lock it up: If you have nothing to hide but occasionally send a sensitive message, you can attach the message as a passwordprotected Microsoft Word file (select Save As, and from the dialog box click either Tools or Options), and send the password in a separate message. Or you can use a zip compression utility (which also has a password-protection option) to compress a file in any other format. When you create a zipped file, click the Password button and enter a password. To extract that file, you must first type the password. These techniques aren't ideal—the encryption that's used in Word and WinZip isn't particularly complicated, and you have to send your password in unencrypted form.

Get all keyed up: You can achieve a more robust level of e-mail security by using key pair encryption. The sender encodes mail with one key-the recipient's "public" key-and the recipient decodes it using a unique "private" key. You never know the other party's password, and they never know yours. It's much like a bank's safe deposit box: To open, it you need your key and the bank's key. For details about practical uses of key-pair encryption, check out our March Got a Problem (www.pcworld. com/maroo/gap).

Probably the best-known encryption program is PGP (Pretty Good Privacy), which lets you pick a level of encryption from a range of 768 bits to 3072 bitsmuch higher than the 40- or 60-bit level of encryption in your browser. PGP is distributed in various forms, including PGP Freeware, a download for noncorporate use that integrates with Eudora and Outlook Express. If you use another e-mail client, you can copy messages to the Clipboard and then encrypt the contents of the Clipboard by using a little program in your Windows tray called PGPKey. In general, the higher the encryption level, the slower the process, so something in the middle of PGP's range-say, 1024 bits-is usually best (that is, it protects like Fort Knox and doesn't take forever to use).

ALWAYS ON, ALWAYS OPEN TO ATTACK

YOU HAVE DSL OR CABLE INTERNET ACCESS-two of the biggest, baddest, broadest pipes to the Internet a consumer can have. And you don't have to wait for dial-up and disconnect dialog boxes because your Internet connection's always on. Convenient? You bet it is. But



it also makes you susceptible to port-scanning scripts that probe IP addresses looking for a point of entry into your PC or home network.

Minimize risk by turning off your PC when you're not using it. If it's off 10 hours a day, your cable or DSL modem's permanent connection ceases to be a hacker's cat-flap. BlackICE Defender (\$40, www.networkice.com) monitors network access to your PC. You'll probably see a dozen or more unsolicited "pings" (attempts to determine whether your IP address is active) per day from hacker scripts or other sources. Most are random attempts from hacker scripts looking for open ports on your PC.

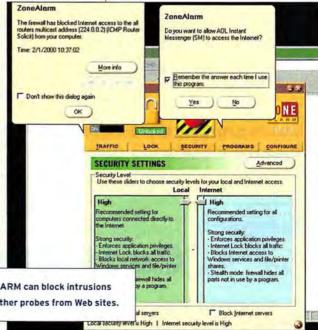
Personal firewall software isolates your com-

connection by filtering out information, blocking open ports, and halting programs with ActiveX controls and JavaScript routines. Aladdin Knowledge Systems' ESafe Desktop 2.2 (\$50, www.aks.com) one-stop firewall, virus scanner, and Web/mail-content filter puts Web pages, e-mail downloads, and floppy disks entering your system into a "sandbox" until they pass quarantine. It slows down things a little, but peace of mind is worth a lot. Other personal firewall and security systems include Norton's Internet Security 2000 and Zone Labs' ZoneAlarm 2 (a free download for personal use from www.zonelabs.com or FileWorld). The @Home network has established an Online Security center promoting McAfee's personal firewall software (a \$30-per-year subscription service), based on Signal9's ConSeal Private Desktop software. WinProxy 3 proxy server software includes a firewall for sharing a broadband connection among PCs on a network. WatchGuard SOHO puts a proxy server and firewall software in a 5-mbps networking box (\$449 for a ten-user license with one year of software updates, tech support, and Web-usage tracking, then \$95 a year).

· WatchGuard Technologies; 800/734-9905; www3.watchquard.com

PRODUCT INFO NO. 605

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Hush-hush sweet e-mail: End-to-end encryption without the hassle of separate keys is available with the free HushMail e-mail service at www.hushmail.com. Web-based HushMail uses encryption as

strong as PGP's default setting (1024 bits). Encryption and decryption take place inside your system, via a PC-based Java app, so everything on the Web remains indecipherable even to sophisticated hackers. Both

sender and recipient must use HushMail accounts-a minor inconvenience.

Use a digital shredder: Register for a free secure e-mail account at www.10n1mail.

edom uses random data created by mouse rements to generate a cryptographic key that is used ecure your Nym's privacy. Click Start to begin. During the key generating process you must move your mouse around within this dialog. You can also click the mouse buttons and type randor keystrokes for more random input. Depending on the speed of your computer, this may freedom Key Generation FREEDOM

HOW'S THIS FOR HIDING YOUR TRAIL? Zero-Knowledge's Freedom 1 uses anonymous servers and encryption to protect your privacy.

com. The site's software encrypts mail up to 2048 bits and uses a virtual private network to connect your PC and the mailbox. The virtual shredder obliterates messages immediately after the reader closes them, or after a specified interval. The service is free, supported by advertising in the email client software, and very secure.

Make Chat Safe

When you talk on the Web, everybody can hear. Try digital whispering.

When you participate in an online community-whether it's a chat room, a newsgroup, or an instant messaging service-you forfeit privacy. Though you choose the people you want to chat with,

those you don't want to deal with can contact you or lurk and find out about youbecause it's an open community. At worst, people with software that gathers email addresses from Web sites or chat address from finding your screen name.

Keep it secret: These measures will not protect the privacy of your instant messages or files you exchange using AIM 3 and other chat clients. The only way to

If newsgroups or chat rooms demand your e-mail address, don't give them the real one-you can fake a return address.

channels may collect your information and sell it to bulk e-mailers.

Fake your return address: When newsgroups or chat rooms demand your e-mail

> address, don't give them your real one. Deja.com's newsgroup service will provide you with an e-mail address you never need check. Or you can subscribe to a free e-mail service and turn on its full spam filter to prevent unwanted e-mails.

> Turn IM off when you're not on: Don't run AOL Instant Messenger, ICQ, Yahoo Pager, or other instant messaging chat software all the time. With AIM, your chat name is active on the messaging server, and people can tell that you're online and how long you've been

> > there, or that your connection has been inactive for a given period of time. Don't

run the program every time Windows starts up. Select Start. Run, type MSCONFIG, and press (Enter). Under Startup, locate the offending software, click its box to remove its check mark, click OK, and then restart Windows.

Restrict access: With AIM and other chat services, casual acquaintances who know your e-mail address can easily tell when you're online and when you're away from your office. Restrict their access by not broadcasting your presence: Select File My Options - Edit Preferences, click Controls, and under 'Who can contact me', name only the people on your buddy list, create an even smaller list of people, or block everybody if you wish. At the bottom of the screen, select Nothing about me to prevent people who know your e-mail

protect your conversations and exchanged files is to encrypt them. Boomerang Software's free Secure Shuttle Transport chat client uses RSA encryption and its own secure servers to shuttle the information. It doesn't share buddy lists with other chat software, so you have to convince your most confidential chatting buddies to migrate too. But for conversations you really don't want overheard, it's worth it.

Threats to privacy aren't only online. Any time you buy a house, renew your driver's license, or change long-distance carriers, someone is selling your name to telemarketers or junk snail-mailers. It's a database nation out there-you've got to be on your guard not to get sucked in.



Find files mentioned in this article at www.fileworld.com. Addionline tional privacy and security tips

can be found at www.pcworld.com/jun00/ privacy. Matt Lake is a freelance writer operating behind a secure firewall somewhere in the eastern United States. He's not saying exactly where.

Anonymizer Premium

List price: three months \$15, one year \$50; Anonymizer.com; www.anonymizer.com

Freedom 1

List price: five identities per year \$50; Zero-Knowledge Systems; 514/286-2636; www.freedom.net

PRODUCT INFO. NO. 603

Norton Internet Security 2000

List price: CD-ROM \$60, download \$5; Symantec; 800/497-6180

PRODUCT INFO. NO. 604

PrivadaProxy

List price: \$5 per identity per month; Privada; www.privada.net



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Kodak DC215 Millennium 2000 Zoom Digital Camera \$349.998 or \$13/month®

NOTEBOOKS

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Drive Part #10K3505, ServicePac Part #30L9188; ThinkPad 600 Model #2645-4EU. Memory Upgrade Part #20L0255. SelectaBase Part #12L92467, ServicePac Part #30L9197; IBM price does not include tax or shipping. Subject to change without notice. 'SuccessLease offered and administered by third-party providers of business financing approved by IBM Global Financing. SuccessLease terms and conditions provided by the third-party. Monthly lease payments based on 36-month term, full payout lease, to qualified business customers installing in the US. Documentation fee and first month's payment due at lease signing. Taxes are additional. Other terms and financing structures are available. Offer may be withdrawn or changed without notice. Options must be leased with system unit. "This product not manufactured by IBM and IBM provides no warranty or support for this product. The manufacturer's warranty, if any, is included in the product documentation. "Some software may differ from its retail version (if available), and may not include user manuals or all program furctionality. For non-IBM software, applicable third-party licenses may apply. Warranty, service and support for non-IBM products, if any, are provided by third parties. IBM makes no representations or warranties regarding non-IBM products. Weight and thickness may vary due to vendor components, manufacturing process and options. Weight includes battery and travel cover. "Price available direct from IBM only with purchase of Think?ad or PC 300GL models, and does not include shipping or tax. Offer valid through 6/30/00 or while supplies last. Cannot be combined with any other promotions. Available in US only,



Home \//irp | Home

It's easier than ever to connect your various home PCs and

peripherals. But which of today's networking kits should you choose?

By Stan Miastkowski



THE PROSPECT OF setting up a network petrifies even some geeks, but Intel's AnyPoint makes it easy. Any-

Point's excellent documentation and tutorials

make it the best package for novices of the seven reviewed here.

If this is your first experience setting up a network or installing an adapter card in your PC, you'll appreciate AnyPoint's installation CD-ROM, which explains the concepts and holds your hand through

the entire procedure. Simple, step-bystep screens take the mystery out of

sharing drives, printers, and an Internet connection. For backup, you get the best documentation package here, plus toll-free technical support. The thorough manual, which comes both in print form and on CD-ROM for faster searching, supplies extensive troubleshooting information.

Dad's crunching spreadsheet numbers

on his PC upstairs. Mom's writing a grant proposal on her machine downstairs. Junior's browsing the Internet in his room. But what happens if Dad wants to get on the Net, or if Mom wants to use the color printer that's attached to Junior's computer? This family needs a home network.

> With a network in place, everyone in the house can share printers and files without shuffling floppy disks or a Zip drive. The most attractive feature: Your entire family can share a single Internet connection and surf at the same time.

> Sounds great, but installing a wired network can be a pain. If all the PCs are in the same room, you can hide the ugly ethernet cables behind the furniture. Usually, though, the PCs are in different parts of the house,

forcing you to drill holes in the walls for stringing cables through and to connect other pieces such as faceplates and hubs. You must also decipher arcane network settings in Windows. Fortunately, some

networking alternatives don't need ethernet cables. These solutions make it much easier to connect all the computers in your home without punching through the walls.

Home networking kits come in three versions besides the traditional ethernet-based design. Phone-line networks use your home's existing telephone wiring-without interfering with phone calls (they operate at a higher frequency than telephones do). Power-line networks operate across the same wires and outlets that your appliances use, but they suffer from poor performance and are not considered further here. Wireless networks

Best Buy

PRODUCT	Street price (3/10/00)	Operating systems supported	Support policies	Comments	Productinfo number
PHONE-LINE KIT					
3Com HomeConnect 800/637-3266 www.3com.com	Kit \$150; each additional adapter \$80	Windows 98, 98 SE ²	Toll; 15 hours each weekday, 6 hours Saturday	Easy setup, but host machine must use Windows 98 SE to share an Internet connection. Includes CD-ROM of Microsoft games.	631
Diamond Multimedia HomeFree 800/468-5846 www.diamondmm.com	Kit \$130; each additional adapter \$70	Windows 95, 98, NT, 2000	Toll; 14 hours daily Monday-Thursday; 12 hours Friday; 8 hours Saturday	Affordable; easy setup; includes software MP3 player.	632
Intel AnyPoint 877/649-5817 www.intel.com	Each adapter \$79	Windows 95, 98	Toll-free; 13 hours each weekday, 8 hours Saturday	Fastest, easiest setup of phone-line products; useful installation video, great manuals, extensive Web-based support.	633
Linksys HomeLink Phoneline 10M 800/546-5797 www.linksys.com	Kit \$121; each additional adapter \$66	Windows 95, 98, NT, 2000	Toll-free around the clock	Hardest phone-line product to install; Internet-sharing software includes firewall and Web site filtering; comes with Descent 3 game.	634
Netgear Phoneline10X 888/638-4327 www.netgearinc.com	Each adapter \$65	Windows 95, 98	Toll-free around the clock	Relatively easy setup; supports cable and DSL broadband connections; skimpy documentation; limited Web support.	635
WIRELESS KIT					
Dell 4800LT 800/388-8542 www.dell.com	Each PCI adapter \$179; each PC Card \$139	Windows 95, 98	Toll-free around the clock	Easy setup; frees you from all wires; expensive and mediocre performer compared to phone-line networks.	636
CONVENTIONAL WIRED ETHERNET	KIT				
Netgear DB104 Network Starter Kit 888/638-4327 www.netgearinc.com	Kit \$120; each additional adapter \$20	Windows 95, 98, NT	Toll-free around the clock	The least-expensive option, but its completely manual setup is not for network beginners.	-

dividual adapters come with a phone cable and software

use radio waves and require no physical connections. All three types of kits have been available for a couple of years, but they've been plagued by slow speed, high cost, or both.

The latest home networking kits tout speeds of 10 or 11 megabits per second (mbps), substantially faster than the older 1and 2-mbps products. The new specs equal those of a conven-

tional 10Base-T ethernet network. That kind of bandwidth lets you listen to MP3 audio files located on another computer on the network. It also allows you to do several network-challenging tasks at once. For example, you can print

a file to a printer connected to another computer, copy a file from a third PC, and download a file from the Internet—all at the same time. Multitasking finally hits the home market.

Falling prices are another inducement to set up a network.

Phone-line adapters cost \$70 to \$80 each-more than conventional ethernet cards-but they obviate the need for an expensive hub, which ethernet networks require. Wireless networks cost as much as \$180 per computer still,

but their price should drop this summer as more kits arrive.

PHONE IT IN

TO SEE HOW WELL these kits work, we put six of them through their paces. We looked at five 10-mbps phone-line networks:

3Com's HomeConnect, Diamond Multimedia's HomeFree, Intel's AnyPoint, Linksys's HomeLink Phoneline 10M, and Netgear's Phoneline10X. We also tested an 11-mbps wireless home network, the Dell 4800LT (the only wire-

less kit available by our deadline). For a baseline comparison, we also tested a typical entry-level networking kit that uses ethernet cables, Netgear's DB104 Network Starter Kit. By the time you read this, networking products that connect your computer's USB port to your phone line will hit the market; they'll cost about the same as the PCI card versions.

Intel's AnyPoint phone-line network won our Best Buy rating, thanks to its easy setup, overall speed, and value. Though few of the products we tested were hard to install, none could beat the AnyPoint's thorough installation software and documentation. Granted, at \$158 for a two-PC network, AnyPoint is the most expensive phone-line product we looked at. But it's still \$200 cheaper than Dell's wireless network.

The five phone-line networks we tested averaged at least twice the speed of Dell's 11-mbps 4800LT wireless network. Their main drawback: Every PC must be situated near a phone outlet. The look-ma-no-wires Dell 4800LT let us roam the house and yard with a laptop. But if you get too far away from the server with a wireless product, performance degrades-or breaks off entirely because you lose the connection.

Networks Compared

Traditional Wired Network



PRO: Inexpensive (starting at \$60 per PC) and fast /###/ ~ (up to 100 mbps-or 1 gbps with high-end equipment). Standardization lets you mix hardware from different vendors. Easy to expand.

CON: Running wires through walls is

difficult and expensive. Running wires in plain sight is ugly. Requires central hub or switch. Software can be difficult to set up.

Home Phone-Line Networks



PRO: Reasonably priced, at just \$60 to \$79 per adapter card. Easy to in-

stall and operate. Uses existing telephone wiring, which eliminates the need to install separate cables.

CON: Each PC must be near a phone

jack. Not as fast as a traditional ethernet LAN, and old or poorly installed phone wiring can degrade performance. Few vendors market products for connecting notebook PCs.

Wireless Local Area Networks



PRO: Wires are completely unnecessary, so PCs don't have to be situated near a phone jack or ethernet port. Easy to install and use, and works with notebook PCs. With a notebook, allows limited roaming, even outside.

CON: Currently more expensive than phone-line and conventional wired ethernet networks. Slower than phone-line and wired networks, with speed falling as distance increases.

INSTALLING THE HOME NETWORK

TO TEST INSTALLATION and performance of each product, we set up a network of three identically configured PCs in a typical home, one in a room downstairs and the other two in separate upstairs bedrooms. The two upstairs PCs were 11 feet apart (as measured through a wall); the downstairs PC was approximately 17 feet from each of the upstairs PCs (measured through the ceiling). We tested the desktop versions of Dell's wireless product, plus a PC Card version for notebooks, which we installed in a Dell Inspiron 5000 laptop.

All of the products require you to remove the cover on your PC, install a PCI adapter card, and connect a cord from the card to a phone jack. Then you must install driver software for the adapter card and set up file, printer, and Internet sharing. In all cases, the PC with the modem and phone-line connection becomes a server for Internet sharing, while the other networked PCs



become clients. The server PC must be turned on and logged on to the Internet if you want to enable everyone in the family to surf and print as they please. Functioning as the Internet connection point for multiple PCs consumes some of a system's CPU cycles, but we didn't notice any appreciable slowdown on the server. (For an alternative to leaving your PC on, see "Home Servers Serve Up Files for Connected Users," page 152.)

Any product here will share a modem or broadband connec-

tion among multiple connected computers. To set up sharing, you can use Windows 98 Second Edition's Internet Connection Sharing, but you must add it in the Add/Remove Programs control panel (Windows 98 SE doesn't install it by default). Several of the products include third-party applications to make setting up sharing even easier.

Though we got our network running within a couple of hours in each case, the kits varied widely in ease of setup. Intel's AnyPoint phone-line network and Dell's 4800LT wireless LAN were simplest to install, followed closely by 3Com's HomeConnect and Diamond Multimedia's HomeFree. NetGear's Phoneline10X has an automated setup that obscures some installation details, which might confuse network newbies. If you want to see everything that's going on, you may be disappointed by the product's lack of detailed documentation. Linksys HomeLink's manual installation is almost as challenging as that of Netgear's wired ethernet network kit.

To add the Dell laptop to our wireless network, we installed a driver and inserted the PC Card, which carries a built-in antenna. None of the phone-line companies offer PC Card adapters for laptops, but Xircom says that, by the time you read this, its Real-Port PC card will allow connections to phone-line networks.

WIRED ETHERNET STILL RULES

TO TEST EACH PRODUCT's speed, we copied, opened, and printed files across the network. As you might expect given its 100mbps rating, Netgear's wired network easily captured the performance honors. It was two to three times faster than the phone-line networks on some tests, but not ten times faster as its rating seemed to promise (it did transfer data up to ten times faster than the Dell wireless network). For example, a PC

> equipped with the Netgear ethernet setup copied a 36MB file from another PC on the network in only 14 seconds. In contrast, the phone-line products took an average of 40 seconds, and the Dell wireless network took 1 minute and 34 seconds.

> Among phone-line products, 3Com's HomeConnect maintained a slight advantage, beating the others by 5 to 10 seconds

in many tests. But for the most part, we could barely distinguish one phone-line network's performance from another. That's not surprising, since these kits all support the same HomePNA (Phoneline Networking Association) 2.0 specification-a standard created by a consortium of networking companies-and they all use the same Broadcom controller chip.

Dell's 4800LT wireless network turned in a somewhat disappointing performance compared with the phone-line setups. Though rated at 11 mbps-slightly faster than the 10-mbps phone-line products-the wireless system took more than twice as long to perform most tasks (except printing, where speeds were similar). For instance, the Dell network copied a 47MB folder from the server to another PC in a little over 2 minutes, compared with a minute or less for the phone-line networks. When we put the systems under stress by working with applications on

These kits all support the same HomePNA (Phoneline Networking Association) 2.0 specification-a standard created by a consortium of networking companies-and they all use the same controller chip.

each PC while they were sending files over the network, the Dell setup bogged down dramatically, taking almost 40 percent longer to copy the same folder to the server. The phone-line products handled the increased load better-their times remained relatively consistent. For example, 3Com's HomeConnect slipped slightly from 46.3 seconds to 47.4 seconds.

We won't know whether slower performance is characteristic of wireless networking systems until more home wireless LAN products become available for testing. (We did not examine Apple's AirPort because it works only with Macintoshes. For a preview of Lucent's Orinoco Home Networking System, see "More Options Are Coming for Wireless Home Networks," page 147.) But the likeliest explanation for the Dell network's leisurely performance numbers is that wireless LANs gradually lose speed as the distance they traverse increases. Transfer rates slow further when radio waves pass through walls and other barriers. Though Dell says that 4800LT-equipped PCs should be able to

communicate across as much as 150 feet of space, they must be within 20 feet to achieve top transmission speed.

We conducted two other experiments, both designed to test transmission quality. In the first, testers played Quake 3 Arena head-to-head. Overall, the game looked fine to us on the phoneline networks and on Netgear's ethernet product. The occasional choppiness was probably due to a delay in hard disk access rather than to network limitations. Quake was slightly jerkier on Dell's wireless network, but not bad enough to spoil the game.

To test the effect of phone use on a phone-line network, we tried copying files between two PCs while simultaneously making a call on the same line. Somewhat surprisingly, every network except 3Com's ran slightly faster, not slower (3Com's performance stayed the same). According to Broadcom, which makes the chip that all the phone-line products use, the effect of telephones and fax machines on a phone-line network's performance cannot be predicted. If your telephone wiring is more than 15 years old, however, it may downgrade performance.

TEST REPORT

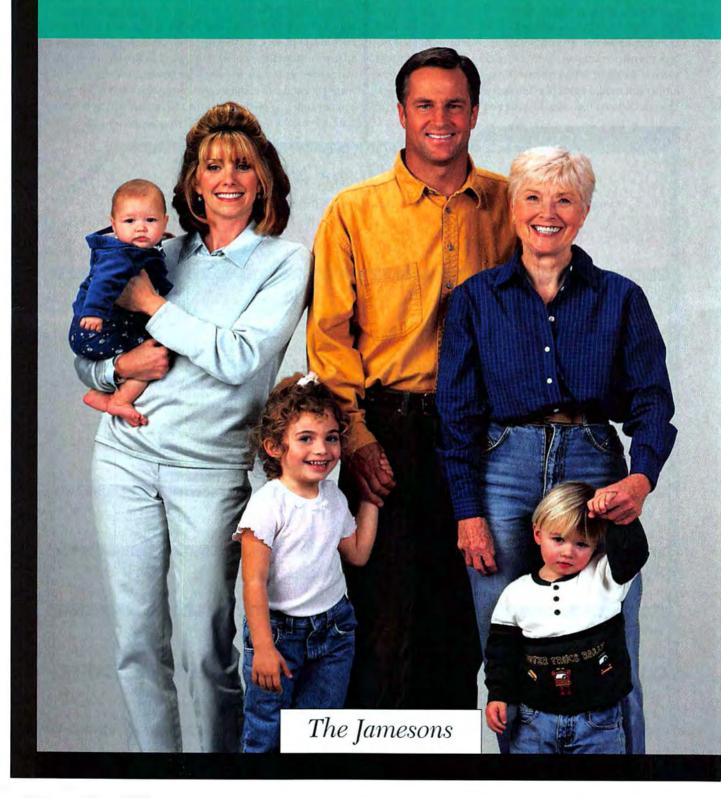
How Fast Are Home Networks?

Phone-line kits beat Dell's wireless kit, but can't match the speed of a wired ethernet LAN.

	3Com HomeConnect	Diamond Multi- media HomeFree	Intel AnyPoint *	Linksys HomeLink 10M	Netgear Phoneline10X	Dell 4800LT	Netgear DB10 Starter Kit
	10-mbps phone line	10-mbps phone line	10-mbps phone line	10-mbps phone line	10-mbps phone line	11-mbps wireless	wired 10/100 ethernet
BASELINE TESTS CONDUCTED ON ONE PC	2 1000 100 100					-	
Copy 36MB file to empty directory	23.13	21.52	22.33	22.39	22.34	22.61	21.21
Copy 47MB folder to empty directory	30.06	30.27	29.32	30.45	29.68	30.41	31.05
Open 36MB Photoshop file	25.92	27.96	26.10	25.93	26.15	26.50	26.30
Print 36MB Photoshop file	170.84	160.02	163.25	161.58	161.81	159.94	161.08
ACCESS FILES FROM SERVER ON UPSTAIRS PC	URIN						
Copy 36MB file from server	33.95	42.61	39.09	45.68	42.44	94.07	14.01
Copy 47MB folder from server	46.30	60.27	52.31	61.71	59.20	125.11	20.89
Open 36MB Photoshop file on server	44.56	55.93	48.06	57.97	55.48	112.60	24.54
Print 36MB Photoshop file on server	167.35	166.97	163.90	168.15	165.27	173.09	163.74
WIRELESS DISTANCE TEST: ACCESS FILES FROM S	ERVER ON UPSTAIR	S PC					
Copy 36MB file from server	n/a	n/a	n/a	n/a	n/a	73.38	n/a
Copy 47MB folder from server	n/a	n/a	n/a	n/a	n/a	96.90	n/a
COPY DATA FROM DOWNSTAIRS PC TO SERVER UP	STAIRS WHILE PLA	YING MP3 FILE					
Copy 36MB file	34.08	34.87	34.33	41.31	42.75	75.32	14.07
Copy 47MB folder	46.71	47.77	48.32	56.26	57.71	100.53	21.22
COPY DATA FROM SERVER TO OTHER UPSTAIRS P	C WHILE PC IS BUSY	/ ²					
Copy 36MB file	34.15	43.14	41.05	47.04	44.02	132.39	13.78
Copy 47MB folder	47.40	59.42	53.46	61.30	58.15	170.00	21.71
*Best Buy n/a = not applicable	Better	All times are i	n seconds; smaller	is better.	Red numbers	indicate fastest sp	eed.

HOW WE TEST. We set up a network of three Quantex Pentium II-350 PCs with 64MB of RAM and Windows 98 SE in a typical home—one unit downstairs and two upstairs in separate bedrooms. We loaded each with Adobe Photoshop 5.5, Quake 3 Arena 1.11, and RealNetworks RealPlayer 7. We connected a printer and modem to one upstairs PC, which we designated as the server. For the Dell wireless kit, we added a notebook equipped with the necessary hardware. Reference system. 2Each PC ran a batch flie that simulated typical use.

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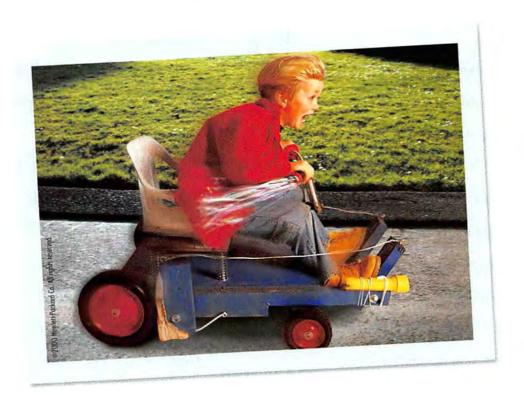
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3COM HOMECONNECT

what's hot: If you follow the directions (see below for what happens if you don't), HomeConnect is easy to get up and running. The installation software provides easy-to-understand choices every step of the way. The kit also includes an excellent quick-start guide. Like any network, 3Com's product lets you use Windows Explorer to access other PCs' hard drives; but HomeConnect's HomeClick Network Center utility goes a step further by offering a dedicated window that shows which drives and printers are available on which PCs. As a bonus, 3Com throws in a CD-ROM of game samples.

WHAT'S NOT: The host system must be running Windows 98 SE to share an Internet connection. Client PCs do have the option of using Windows 95 or Windows 98, but HomeConnect won't let you designate a PC with Windows 95 or even the first edition of Windows 98 as the host. That's because HomeConnect depends on Microsoft's Internet Sharing software, which is

included only with the second edition of Windows 98. To smooth the way for users of older versions of Windows, however, Home-Connect comes with a single-license upgrade from Windows 98 to Windows 98 SE. The other phone-line products bundle a third-party utility to let you share the Internet connection, because Microsoft's utility is harder to use. Microsoft's software instructs you to install the HomeClick software before adding the adapter card, but it doesn't tell you what will happen if you reverse the order. If you install the card first, the installation won't work, and you'll have to remove the card and start over.

WHAT ELSE: HomeConnect is the only product here that automatically installs the network software drivers required for its adapter cards, without making you use Windows' Add New Hardware Wizard. After you've installed the basic setup software and restarted your PC, HomeConnect searches for printers on the network and asks whether you want to share them. Setting up Internet access is also largely automatic; the software asks you if you want to share the Internet connection on the server PC.

Home Networking Systems

More Options Are Coming for Wireless Home Networks

FAST WIRELESS networks for the home are less common than 10-mbps phone-line kits, but a formidable newcomer will soon arrive.

Lucent Technologies' 11-mbps Orinoco Home Networking System is based on a \$179 PC Card, which you can use in a notebook computer to roam free and stay connected. Or you can install it in a desktop system, with a \$69 adapter card. Unlike Dell's wireless product, the 4800LT, Lucent sells ISA adapters for older PCs.

CROSS-PLATFORM LANS

ORINOCO WORKS WITH both Windows and Macintosh computers, so with the right software (such as Miramar Systems' \$199 PC MacLAN), you can set up a cross-platform network. Lucent also makes the hardware for Apple's wireless product, AirPort, whose cards cost only \$99. Apple builds part of the circuitry (including the antenna) into its newer systems, however, and leaves this circuitry out of the AirPort cards; as a result, Airport cards won't work in PCs. Meanwhile, older Macs-which lack the new circuitry-can use Orinoco cards.

Most home networks require that the PC with direct access to a modem and phone line act as server for the other PCs. The server must remain on at all times so the other PCs can access the Internet. A residential gateway does away with that re-

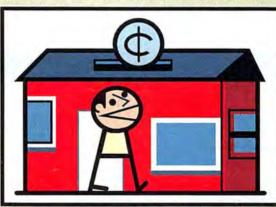
quirement. Lucent's \$349 RG-1000 Residential Gateway is a small stand-alone box that does not need to be connected to a PC. It has a built-in 56-kbps modem for dial-up Internet access and an RJ-45 jack for direct connection to a cable or DSL modem. So you can leave the box on, and all client PCs can access the Internet through

it, rather than through a host PC. Dell should be offering a similar product dubbed the Base Station by the time you read this; pricing for it wasn't available at press time.

We tested preproduction versions of Lucent's PC Card network adapter and the RG-1000 Residential Gateway. (Desktop adapter cards were not yet available, and neither was Orinoco's automatic setup software for file and printer sharing.)

We installed the PC card in our test notebook, hooked up the residential gateway to a standard, preexisting phone line, and plugged the gateway into an AC outlet.

The software for enabling Internet access through the gateway was a snap to install.



On a machine accessing the RG-1000 (the Dell notebook in our case), we entered two numbers: a serial number and an encryption code (the latter for security). Then we entered our ISP's phone number, our user name, and a password. Within minutes we were walking around the house with our untethered notebook, browsing the Internet and pulling files off the server.

Lucent claims that Orinoco-equipped PCs can access each other and the RG-1000 from 1500 feet away, ten times farther than the Dell wireless network's maximum range.

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- 48X Max CD-ROM Drive¹

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- Microsoft Windows® 2000 Professional
- · 64 MB SDRAM
- · Kingston 10/100 PCI Ethernet Adapter

Option B: Small/Home Office

- Microsoft Windows® 98
- 128 MB SDRAM
- 56K V.90 Modem for Windows²
- · Amplified Stereo Speakers

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- . 3Com Fast EtherLink XL PCI Adapter

Option B: Small/Home Office

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DELL 48001T

WHAT'S HOT: The only wireless network kit we examined for this story, the Dell 48ooLT is almost as easy to install as AnyPoint's phone-line network-and it frees you to set up PCs anywhere in the house (unless your house is the Gates mansion; distance can be a problem). The only clue that your PCs are networked is the 4-inch-tall rubber antenna that extends from each card. Best of all, you can network your laptop in two simple steps. First set up a desktop PC as your Internet access server, then insert

Dell's wireless PC Card into your laptop-and you'll be able to share files, print documents, or surf the Internet from virtually anywhere in your home, or even outside on the deck.

WHAT'S NOT: Performance didn't meet our expectations-or the product specs. Sending small files from one PC to another without wires took twice as long as on the slowest phone-line net-

work. And the 48ooLT bogged down even more when we assigned each PC nonnetwork tasks. Also, at \$179 for each PCI card and \$130 for the PC Card, a Dell wireless network can cost more than twice as much as a phone-line network. The server must be on for the client machines to access the Internet (but Dell plans to offer an external base station this summer that will permit client-toclient and Internet access whether the server is off or on).

WHAT ELSE: Wireless LANs use radio waves, so installing them requires a couple of extra steps. You must set each client PC with the same encryption code so that data sent over the network cannot be intercepted and read by others. When you install the server software, you may either write down the code and type it in yourself on each network PC, or create a floppy disk that automatically inserts the correct entry on the other machines on the network. While the product bears Dell's name, it works with other vendors' PCs as well. Should you run into problems, Dell's documentation ranks with the best. A video on the CD-ROM walks you through the installation and troubleshooting tips. A 42-page getting-started manual amplifies on a fold-out poster that covers the basics.

DIAMOND MULTIMEDIA HOMEFREE PCI

WHAT'S HOT: At only \$130 for a two-PC kit and \$70 for each additional PC, HomeFree is among the most affordable products here. Like Intel's AnyPoint and 3Com's HomeConnect, it's also easy to set up, with virtually auto-



matic installation. Diamond throws in a software MP3 player so you can listen to music files stored anywhere on your network. Another plus: HomeFree can create a directory on each PC and let you restrict other network users' access to it.

WHAT'S NOT: Like 3Com's Home-Connect, Diamond's HomeFree bundles the Internet Explorer browserbut it's the older version 4.01, which is less secure than IE 5 (so you'll have to download the newer version once you get set up).

WHAT ELSE: HomeFree is the only product we tested that requires you to specify which drives on each PC you

wish to make available to others (other products automatically assume that you want to share all drives). HomeFree's approach is not a bad idea, especially if it helps remind you that your hard drive contains sensitive information-your finances, say, or private correspondence. Diamond does a fine job with documentation, including a four-page fold-out installation brochure and a

> thick getting-started manual. The CD-ROM has a useful FAQ section and an expanded Adobe Acrobat version of the getting-started guide.

Wireless LANs use radio waves. so installing them requires a couple of extra steps. You must set each client PC with the same encryption code so that data sent over the network cannot be intercepted.

INTEL ANYPOINT Home Network PCI

WHAT'S HOT: AnyPoint's setup was the most automated and least troublesome among the products we tested,

thanks in large part to a great instal-

lation routine and terrific documentation. If you're a novice, the guided-tour video on AnyPoint's installation CD-ROM is well worth watching before you crack open your PC to add the expansion card. One foldout poster covers hardware installation, and another does the same thing for the software. You also get a comprehensive manual. Installation took us only 20 minutes per desktop system (compared with 30 to 45 minutes per PC for the other products). And setting up the network to use a broadband connection couldn't have been easier.

WHAT'S NOT: The AnyPoint does cost a little more than the other phone-line products. A two-PC network costs \$158, \$37 more than the Linksys HomeLink kit, the cheapest here.

WHAT ELSE: We liked AnyPoint's Network Sharing and Mapping utility. It lets you choose which drives and printers to share and automatically assigns a letter to drives available on other PCs. Sharing an Internet connection is easy, too. Specify whether the PC you're installing the software on is a server or a client, and AnyPoint handles everything else, including tweaking the settings on the client machines' browsers. For now, you're limited to networking desktops; Intel doesn't offer a notebook version.

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LINKSYS HOMELINK PHONELINE 10M

WHAT'S HOT: Though it's not our pick for beginners, HomeLink offers prospective buyers several inducements. First of all, it's the cheapest phone-line product

here—only \$121 for a two-PC network. For users concerned about protecting their new network from Internet-based attacks, HomeLink's LANBridge utility adds a basic firewall that isolates the server and all client PCs. Parents who want to keep tabs on their children's surfing habits will appreciate SurfWatch, a bundled software filter that blocks access to sites based on content and restricts client PCs' Internet access to certain hours.

WHAT'S NOT: We had no major problems setting up HomeLink, but we don't recommend it if you've never installed a network, because you must input all the settings manually. You also have to install adapter card drivers, set up network protocols, enable

Server-Based Networks

Home Servers Serve Up Files for Connected Users

YOUR HOME NETWORK is in place, and everything works great. You no longer have to carry the files you want to print from one PC to another on a floppy, and the kids don't squabble over the Internet connection. But you've noticed a few small problems. Locating a particular file on another PC is a challenge, especially if that machine is turned off. As a result, everyone in your family keeps duplicate copies of Internet downloads, including large digital video and MP3 files. And there's a bigger problem: Because you set up your PC as the Internet server, you can't turn it off or even reboot it after installing software without warning everyone else first.

Extravagant though it may seem, the answer is a home network server. Just as in the corporate world, a server at home functions as a handy centralized, dedicated location for file storage. But you don't want the kind of traditional general-purpose server your company uses-after all, you aren't a network administrator and don't have thousands of dollars to spend on specialized hardware and software. You want something simpler and cheaper-and manufacturers are beginning to oblige by offering products, ranging from \$99 software solutions to \$500 hardware appliances that drop easily into home networks.

SERVICE À LA CARTE

THE TRADITIONAL network server is a PC with lots of memory; a large, fast hard drive; and a complex network operating system. In the next year, expect to see products that save you from having to buy such a muscled, dedicated PC. One type of alter-

native product will be a preconfigured software application that provides a single function or a group of related functions, such as a Web server, a combination firewall and router, or file and print services. You'll provide a PC that meets the minimum (and often extremely modest) configuration for

the package, and the streamlined software installation will do the rest of the work.

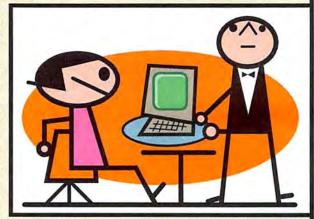
Cybernet Systems' NetMax FireWall, for example, gives your network both a turnkey Internet firewall and a router/gateway package for less than \$100. All of the traffic originating from your network goes through

the firewall, and all of the clients share a single ISP connection. Your server PC need not have a monitor, a sound card, or many other basic home-PC features.

WASHER, TOASTER, NETWORK

NETWORK APPLIANCES combine software with custom hardware. A network appliance file server requires no monitor, video system, CD-ROM drive, keyboard, mouse, or separate operating system. Instead, it needs just a power cord and an ethernet connection. Because network appliances have to appeal to home users, you can expect these units to be relatively inexpensive, simple to install, and reliable. And because they run on the network itself and not as application software on a server, they should encounter fewer compatibility problems with other services and drivers.

If you want to add disk space to your network but don't want to open up a PC, configure drives, or designate one client to hold files, a network-attached storage file server offers a quick and easy solution. NAS



servers can be configured to support more than one networking protocol, permitting cross-platform file sharing. And the NAS file server should be left on-even when your PCs aren't. Quantum's NAS, called the SnapServer 1000, provides 10GB of file space for about \$500.

Gateway plans to sell a home server of its own within the year, and other mainstream PC companies should eventually follow suit. Now where was that file?

-Robert Hummel

. NetMax Firewall; \$99; Cybernet Systems, 734/668-2567; www.cybernet.com

PRODUCT INFO NO. 637

· SnapServer 1000; \$499; Quantum, 888/343-7627; www.quantum.com PRODUCT INFO NO. 638



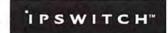
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NetGear's standard wired

ethernet network is inexpensive

and fast, and it lets you add

PCs to the network

wherever a cable can go.

file and printer sharing, and share and map hard drives yourself. Though the manual covers installation in detail, it can get confusing, and a single mistake can prevent the network from functioning. If you use the firewall and filtering options, you'll spend at least 45 minutes setting up the server. Linksys doesn't include

a hard copy of the manual; it comes only on the installation CD-ROM.

WHAT ELSE: For users who are working with higher-end operating systems at home, HomeLink can run on Windows NT 4.0 and-according to Linksys-Windows 2000. On the other hand, the manual we received contained no installation instructions for the latter operating system. Hard-

core gamers will appreciate the bundled copy of Descent 3, a combination flight simulator and Quake-like multiplayer game.

NFTGFAR DB104 NFTWORK STARTER KIT

WHAT'S HOT: NetGear's standard wired ethernet network is inexpensive and fast, and it lets you add PCs to the network wherever a cable can go. NetGear's \$120 two-PC kit includes two 10/100-mbps network cards, two 25-foot ethernet cables, and a 4-port hub. In our tests it transferred data two to three times faster than the phone-line networks and up to 13 times faster than the Dell wireless LAN.

WHAT'S NOT: Despite its name, the Starter Kit isn't for beginners. It comes with no automatic installation software, just a floppy disk with drivers. Documentation consists of nothing more than a foldout that describes how to install the adapter card, cables, hub, and driver. The Starter Kit leaves users clueless about how to set up file and printer sharing. Windows help does tell you what to do, but that information isn't easy to find.

WHAT ELSE: We found the Starter Kit easy to install-as ethernet networks go. But if you're interested in setting up a simple two-computer network, you can forgo the hub and connect the PCs directly via a crossover ethernet cable. The kit doesn't include a crossover cable, and the manual doesn't mention it at all, but you can find the necessary cabling at virtually any computer dealer. Prices start at around \$10 for 25 feet of cable, and go up as the length of the cable increases.

NETGEAR PHONELINE 10X

WHAT'S HOT: Phoneline10X is fairly easy to set up, with the same type of automatic instal-

lation software we found on most network kits we tested. Setting up printer and drive sharing is straightforward. We also liked that the software asked what type of Internet connection we were using (we could choose modem, cable, DSL, or even "none of the above").

WHAT'S NOT: The only documentation included with the Phoneline10X is a six-page foldout covering basic hardware and software installation. Unfortunately, the steps shown for installing the hardware driver concentrate on Windows 95. The process for Windows 98 is somewhat different, though you probably won't

> have any problems with it if you pay attention to the installation screens.

> WHAT ELSE: We ran into a glitch with the setup software-it failed to give our client PCs Internet access. A technical support person had to help us tweak the browser settings to overcome this problem. But despite its skimpy manual, NetGear provides thorough on-screen explanations of

some networking concepts that no other company covered.

Stan Miastkowski is a PC World contributing editor. Robert Hummel is a computer programmer, author, and commentator based in New Hampshire.



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EBUNINE



ILLUSTRATIONS BY CHRIS PYLE

Best and Worst Places to Shop for a PC

LMOST MOMENT BY MOMENT, computers get cheaper, faster, more feature-rich. So why don't they get any easier to buy? Alas, figuring out where to purchase a PC remains a tricky proposition. That's true even if you happen to know exactly what system you want-and only more so if you require some assistance zeroing in on the perfect PC.

Actually, deciding how and where to buy a PC is tougher than ever, since the distinctions between different varieties of computer seller are rapidly blurring. Already, mail-order titan Gatewaywhich operates 240 Gateway Country retail stores nationwide-is getting ready to take over the PC departments in all 1000 OfficeMax locations.

At the same time, companies like Hewlett-Packard and IBM, long synonymous with store-bought PCs, are now selling custom-configured models by Web and phone. And CompUSA, the nation's only computer superstore chain, is looking less like a computer superstore these days-it's added movies, MP3 players, and camcorders. (It also changed its Web store name to Cozone.com, then back to CompUSA. com, in less than six months.)

In short, the times they are a-changin'. But the fundamental questions about shopping for a PC remain: Where can you find the facts and advice that you need to make the right choice? Should you schlep to a variety of retail stores, launch your Web browser, or pick up the phone to compare prices? How do the major players compare for selection, service, and price? Where should you spend your cash the next time you need a PC?

SURVEY SAYS

TO FIND OUT, we asked some experts-namely, more than 3000 PC World subscribers who have purchased one or more computers in the last year. The majority of our survey respondents described themselves as either intermediate or advanced PC users. Using

an online survey, we asked these battlehardened consumers to rate their shopping experiences. And they reported back to us on important criteria like selection, salesperson knowledge and courtesy, and postpurchase service and support. Then we went shopping ourselves-at retail stores, on the Internet, and over the phone-to get a firsthand feeling for the state of the market. (Our experiences mostly jibed with what readers had to say.)

On one level, our survey showed that most PC shoppers are content: Approximately nine out of ten would buy again from the same seller. Even at Comp-USA, the retail store with the lowest percentage of customers who would return, 79 percent would buy again.

RETAIL, WEB, OR PHONE?

THAT'S NOT TO SUGGEST that every seller pleases everyone equally. Far from it. Customers had strikingly different things to say about the companies they bought from. Those who shopped by Web or phone reported better results in every major category than those who shopped at retail. And on average, the most satisfied buyers turned out to be phone shoppers.

From brick-and-mortar to click-and-order, our exclusive survey reveals where you should spend your money. BY ROBERTA FURGER AND ADIFE MCEVOY

Consider the evidence we report in "Happiness Is ... " (below) and elsewhere throughout this article. Readers gave mailorder vendors Dell, Gateway, Micron, and Quantex above-average reviews for overall satisfaction. And the only retailer that rated as high is really a mail-order vendor in disguise: Gateway Country, which custom-builds PCs for later delivery. At the same time, Best Buy and CompUSA, two of the biggest retail chains, trailed the pack both in overall satisfaction and in critical categories such as salesperson knowledge and postsales support.

What about price? We found that costs often don't vary much from venue to venue. That's true whether you're shopping for a sleek home system packed with multimedia extras or an office workhorse that you configure yourself. (See "Price Patrol: How PC Costs Compare," page 170.) Nonetheless, you can still uncover a good deal if you do some research, a job that's much easier since the advent of shopping bots such as MySimon.com.

The bottom line: Shopping for a PC can be a grueling, time-consuming experience-or a surprisingly pleasant one. Read on, and we'll help make sure you emerge from the process unscathed.



What's hot Drive to your nearest computer store and walk out with a PC.

What's not Service is often so-so, limited choice of brands and models at most chains. Best for Shoppers who need a PC right away; those who want to try before they buy.

BEFORE JAMES POPKO, a social worker in West Hollywood, California, was ready to buy a new PC, he spent weekend after weekend scouring the Sunday circulars

Uncharted Aisles

until he found the right computer at the right price. And then, advertisement in hand, he headed to the nearby Circuit City. Not to window shop, but to buy.

Contrary to the popular image of retail PC shoppers, Popko wasn't looking for advice or technical assistance. He just wanted a good deal and a friendly salesperson who would get him in and out of the store in short order, with a reliable PC in tow. Most of the retail shoppers we spoke to expressed similar wishes.

But instant gratification may be the sole meaningful advantage of retail shopping. Over 70 percent of all retail shoppers said that finding a salesperson was easy. But once they got help, less than half the shoppers gave their salesperson a Very Good knowledge rating-compared to 69 percent of those who bought by telephone.

> As for selection, 54 percent of retail buyers said they were Very Satisfied with the store's range of PCs, compared to 69 percent of Web shoppers and 79 percent of phone customers. At most chains, the selection is remarkably similar: Preconfigured, home-oriented systems from Compaq, EMachines, and HP dominate the shelves. The exception is Gateway Country, which sells only custom-built Gateway PCs.

THE BIG SIX

ALTHOUGH you can buy a PC just about anywhere these days-from Wal-Mart to Costco, Sears to a local mom-and-pop shop-six national retailers dominated our survey results: Best Buy, Circuit City, CompUSA, Gateway Country, Office Depot, and Staples. Let's consider them in alphabetical order:

Best Buy: Between the competing sounds from the TV, audio, and video game departments, and the

Happiness Is...

Readers Rate Their Satisfaction With PC Sellers

WE ASKED PC WORLD SUBSCRIBERS who took our survey to answer the all-important question, "Considering your overall buying experience with this PC, how satisfied are you

ABOVE A	VERAGE		
Dell	Web and phone		
Gateway	Web and phone		
Gateway Country	Retail		
Micron	Web and phone		
Quantex	Web and phone		
AVER	AGE		
Circuit City	Retail		
Office Depot	Retail		
BELOW A	VERAGE		
Best Buy	Retail		
CompUSA	Retail		
Staples	Retail		

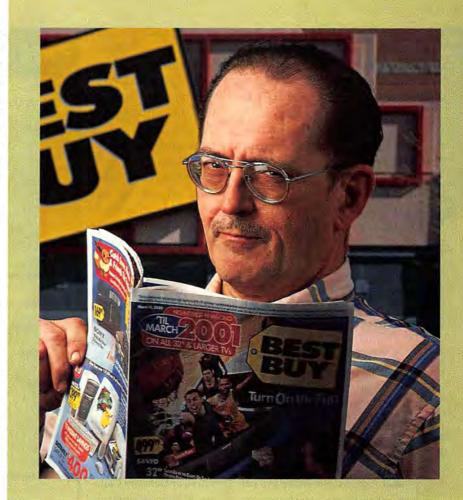
with the seller?" Judging from their responses (on a scale from Very Satisfied to Very Dissatisfied), the happiest computer shoppers purchase products without leaving their home or office. Four major mailorder companies-Dell, Gateway, Micron, and Quantex-and one retail store, Gateway Country, emerged with above-average scores on the survey. However, three of the biggest retailers-Best Buy, CompUSA, and Staples-earned below-average scores.

SOURCE: February 2000 survey of 3186 verified PC World subscribers who had purchased one or more PCs in the preceding 12 months. Only sellers for whom we received a significant number of responses are rated. Companies are listed alphabetically within each tier.

glare of the fluorescent lights, Best Buy isn't the best place to be if you feel a migraine coming on. And although more respondents bought from this retail chain than any other, they weren't enthusiastic about the service. Only 23 percent rated the knowledge of their salesperson as Very Good—the lowest (with CompUSA) for any store in this report. Courtesy marks were relatively low, too: Just 45 percent of respondents gave the sales staff a Very Good rating (compared with the 75 percent Very Good rating earned by Gateway Country sales staff).

BEST ORGANIZED

TO ITS CREDIT, Best Buy does offer a little something for everyone-from serious business-oriented workhorses built by Compaq and Hewlett-Packard to inexpensive Emachines systems. The store's computer section is better organized than those of most retail outlets we visited. Rather than having one endless row of PCs, or several smaller displays with computers crammed together, Best Buy places its systems along both sides of the aisles, making it relatively easy to compare system prices and features.



SHOPPER GARY NELSON CONCLUDES THAT "NOVICES WOULD BE IN A LITTLE BIT OF TROUBLE" AT BEST BUY.

Still, novice buyers would "be in a little bit of trouble" at Best Buy, concludes Gary Nelson (above), an operations officer with Arizona's Department of Transportation. Nelson purchased a Compaq Presario at Best Buy because its price was about \$100 less than what he found at other stores. But his salesperson "didn't know what came with the advertised special I was looking at, and had to keep going back to the department manager," he recalls. And even after all the back and forth, the Best Buy salesperson brought out the wrong monitor and forgot the printer altogether.

Circuit City: The computer departments in this electronics chain are packed with everything from entry-level machines to fairly high-end ones. And its staffers were rated second only to their counterparts at Gateway Country stores for knowledge and courtesy. That's the good news.

The bad news is that Circuit City's sales displays were among the most confusing and disorganized of any store we visited. Some of its demonstration PCs were accompanied by three different prices: One that included rebates, another that included a printer and a monitor, and a third that represented the base price for the computer-sans rebates or monitor. Small wonder that just 64 percent of our survey respondents thought that it was Very Easy to find the product they were looking for at Circuit City.

CompUSA: Overall, respondents to our survey gave low marks to the country's only computer superstore chain. Just 42 percent of respondents reported being Very Satisfied with the selection of PCs, even though the CompUSA stores we visited carried more brands and models than the other computer retailers. Why the discrepancy? For starters, the enormous computer displays are daunting-often spanning the entire back of the store. Even more problematic: Popular items were often out of stock when we visited.

Almost a third of CompUSA customers reported difficulty finding a salesperson, and staffers were rated among the least knowledgeable and courteous. Although our Boston-area shopper had a reasonably positive experience at his local CompUSA (see "Store Detective," page 165), salespeople at the San Francisco store we visited were scarce and-when we could track one down-unhelpful. When even a manager couldn't answer a question about the build-your-own-Compaq station, we were promised a phone call the next day. Two weeks later, we were still waiting. CompUSA, however, was

recently sold, and its new owners could make improvements to the chain.

Gateway Country: Low-key and quiet, with farm-themed decor, Gateway's stores take an unorthodox approach to PC retailing, and judging from our survey, its customers are grateful. Gateway Country earned the highest marks of any retailer for salesperson knowledge and courtesy, and boasts one of the highest percentages of customers willing to buy again-91 percent of respondents said they'd head back to the store to purchase their next who purchased a Gateway PC at a southern California store: "It was excellent-five-star all the way down the line." More than three-quarters of its customers were Very Satisfied with the chain's selection, a figure that may seem surprising given that it sells only Gateway PCs. But Gateway Country's range of configurations is extremely broadfrom the all-in-one Astro to a configured-to-order 1-GHz powerhouse. Each store typically features a weekly manager's special, as well as some standard configurations. And because Gateway builds all of its systems to order,

system. And as for ser-

vice, ask Robert Williams,

We had pleasing experiences at Gateway Country, with one slightly unnerving exception. Our salesperson's price quote included several add-ons that we neither requested nor wanted: a DVD software pack, an Office 2000 training program, and an extended, three-year onsite warranty. The added cost: \$359. When questioned, the rep removed the extras. Still, we were left wondering if less ob-

you can customize just

about everything.

servant purchasers might wind up with more than they originally bargained for. Before you buy, make sure you're getting the configuration you requested.

Office Depot, Staples: These similar office-supply chains don't stock many computers, and customers looking for more advanced systems are directed to instore kiosks where they can order a custom PC from Compaq (both chains) or HP (Staples only). Neither measured up to Gateway Country in selection, salesperson knowledge, or after-sale service.

20 30 40 50 60 70 80 90 Still, despite these stores' limited inventory, survey respondents gave them better marks than other retailers in some key categories-from the ease with which customers were able to find the product they were looking for, to staffers' knowledge and courtesy. And no chains rated higher when we asked readers whether they'd

buy again from the same seller. Part of the attraction might be the lowpressure sales environment. None of the staffers we encountered at these stores were the least bit pushy-they simply

Shop Talk Top 5 PC Shopping Tips

Do your homework. Rare indeed is the salesperson who offers expert, unbiased advice. So research your purchase by studying reviews (such as our Top 30 charts) and techni-

cal specs on manufacturer's Web sites.

Resist pushy salespeople. Retailers may strong-arm you to get costly extras such as an extended warranty, a surge protector, or a high-end mouse pad. Ignore high-pressure sales tactics-buy such items only if you really need them.

Don't forget mom and pop. The best locally owned computer stores offer solid systems at low prices and uncommonly personal service. If you go this route, buy from a store that's been in business for at least five years (a good sign it's not a fly-by-night outfit).

Ask about discounts. Certain sellers give their sales reps leeway to negotiate. If you're the haggling type, try requesting a price break. Odds are you'll get a polite refusal-but hey, it can't hurt to ask.

Pay with plastic. Pay for the PC with a credit card, even if a seller offers a discount for check or cash purchases-your credit card company may mediate postsales disputes.

Retail: Come to Gateway Country Lost in the Aisles? Percentage of respondents who said it was Very Easy to find what they were looking for. **Gateway Country** Staples 71% Office Depot 68% Circuit City 64% **Best Buy** 56% CompUSA 46% Dumb and Dumber: Percentage of respondents who rated their salesperson's knowledge as Very Good. **Gateway Country** 58% Circuit City 48% Office Depot 41% Staples 38% Best Buy CompUSA 23% Postsale Blues: Percentage of respondents who said they were Very Satisfied with the seller's service and support. **Gateway Country** Circuit City 51% Office Depot Staples 46% **Best Buy** CompUSA 34% Source: PC World online survey, conducted 2/3/00 to 2/9/00.

answered our questions and explained our options. One Office Depot salesperson took nonchalance to the extreme. After about 5 minutes of questions and answers, he looked at his watch and asked if we were almost through, and then he took a call on his cell phone. Clearly, he was not on commission.

NO DEPOSIT, NO RETURN

REGARDLESS OF WHERE survey respondents purchased their PC-at retail, on the Web, or by phone-roughly a quarter of them reported some problem with their system. However, only 6 percent of all retail shoppers wound up returning their computers. Draconian store policies may explain this low return rate: At most major chains, consumers have just 14 days in which to return a PC for a refund, and several levy a hefty 15 percent restocking fee if the returned PC isn't defective.

Strict return policies certainly thwarted Circuit City customer James Popko, whose computer started acting up almost from the start. Though his salesperson was helpful and well informed, Popko had nothing but trouble trying to get his PC serviced when it had problems after he brought it home. The problems started with frequent keyboard freeze-ups. Then he had trouble accessing the Internet. Finally, after he experienced several other problems, a technician told him that the hard drive

was bad. After two weeks of conflicting phone conversations with technicians, Popko was told he would have to send the entire CPU back to Compag for evaluation and repair. The estimated turnaround time: one long month.

CHECK THE FINE PRINT

DISCOURAGED that he couldn't use his brand-new computer, Popko contacted Circuit City to ask about exchanging it for another model. But he was too late-Circuit City's brief 14-day window for returns or exchanges had already elapsed. "I told them I wasn't asking for a refund," recalls a still-frustrated Popko. "All I want is a unit that works."

Store Detective

Notes From an Undercover Shopper

SOME COMPUTER STORES ARE LIKE CIRCUSES. Others, ghost towns. At least those are the metaphors that came to mind during my whirlwind tour of Boston-area retailers one recent Sunday afternoon. True, there were some pleasant surprises along the way. But I finished the day appreciating why our survey respondents who shopped at retail tended to be less satisfied than those who bought by phone and Web. Herewith, some of the, ahem, highlights:

12:15 p.m. My trek begins at Staples, where the sales help is plentiful-except in the computer department. In fact, I wonder if anyone's been there lately, given that it's festooned with ads for long-expired promotions. I try to serve myself at a bulld-your-own-PC klosk, but screens take ages to pop up, as if they were being downloaded via a 2400-bps modem.

12:56 p.m. CompUSA may tout itself as "the Computer Superstore," but I wade through aisles of game consoles, music CDs, and even walkie-talkies before reaching the PC department. On the plus side, the selection of systems is top-notch-everything from \$400 econoboxes to \$3000 luxury machines. And I'm quickly assisted by Dean, a ponytailed salesguy who knows his stuff. Reassuringly, he suggests that I opt for a 533-MHz PC rather than a pricier 550-MHz model, advising that the speed difference will be imperceptible.

1:42 p.m. The frenzied atmosphere at Best Buy begins outside the store, where LeAnn Rimes music is pumped at high volume. Inside, I keep having to leap out of the way of staffers wheeling the towering stepladders they use to pluck products from lofty shelves. Although

employees stress that they aren't on commission, their pitches smack of the used-car lot. One pressures shoppers to buy extended warranties within seconds of approaching them. Another extols the virtues of EMachines, stating that it was started by the founders of IBM and HP, and is Consumer Reports' favorite PC manufacturer-sheer fantasies, both.

> 2:25 p.m. At Gateway Country, there are no giant TVs or booming stereos to distract from the built-to-order PCs. With only four salespeople, however, the place seems understaffed. Eventually, I get solid advice from Gina. She even cheerfully admits that the store's selection of printers (a handful of HP and Epson models) is sparse.

3:02 p.m. Many of the desktop computers at Circuit City are shut off or sans mice, as if you aren't supposed to try them out; notebooks are padlocked into antitheft devices akin to the apparatus that was used

to restrain Hannibal Lecter in The Silence of the Lambs. At least Best Buy's high-pressure sales tactics are mercifully absent. Indeed, I practically have to tackle a clerk to get waited upon.

3:48 p.m. Office Depot has only a few PCs on display, plus a configureyour-own-Compaq kiosk. Within minutes, I'm greeted by Dave, who wears an "Employee of the Month" ribbon. He's genial and patient, though his assertions that Celeron chips are sluggish and that AMD's K6-2 is the equal of a Pentium III are questionable at best.

4:15 p.m. I've run out of stores, so I head home, relieved that I don't really have to buy a PC today. -Harry McCracken

Salesperson-Free Shopping



What's hot Around-the-clock shopping at an endless array of sellers; many brands and models, custom configurations.

What's not Some sites lack product detail; getting questions answered by a real person can be tough.

Best for Self-sufficient shoppers who want lots of choices and customization options.

IF THE RETAIL SHOPPING experience is so often uninspiring, should savvy PC buyers leave it all behind? Absolutely, says Michael Winckler, an Omaha software developer who recently purchased a notebook from Gateway's Web site. In fact, he says he wouldn't have bought it any other way. "Gateway's site was a breeze to move around in, and its custom configurator was easy to use," he reports. "I had plenty of options for building the laptop the way I wanted it, with a certain screen size and a special pointing device." And the best part: "I didn't have to talk to any salespeople."

For Web shoppers like Winckler, convenience is key. You can shop at any hour of the day or night, in clothes you would not dare wear in public. Long lines, pushy salespeople, and voice-menu black holes are unknown. If a site has the exact system you want, you can probably click and buy it in just a few minutes; if not, you can order one built to your specifications.

In general, survey respondents who bought on the Web rated the experience favorably: 68 percent said they came away Very Satisfied, compared to 55 percent of retail shoppers. Of course, no sales venue is perfect. Information on components can be skimpy at some sites, and many sites provide little in the way of buying advice. And your e-mail queries to the sales department (if such a department even exists) may go unanswered. All in all, Web shopping is better suited to self-sufficient PC veterans than first-time buyers.

SELECTION, SELECTION, SELECTION

IF SHOPPING for a PC on the Web has one decisive advantage over buying retail, it's the wealth of choices. If you buy

online from a direct manufacturer such as Dell, Gateway, or Micron, you can tailor a system to your preferences. Or if you visit an online reseller you'll find that the selection of brands is far broader than what's available at local stores. PC Connection, for instance, offers 13 brand names, CDW offers 10, and PC Mall 7. Egghead. com seems to have a gazillion brands up for grabs (though some, like ATO and Racer, aren't exactly household names).

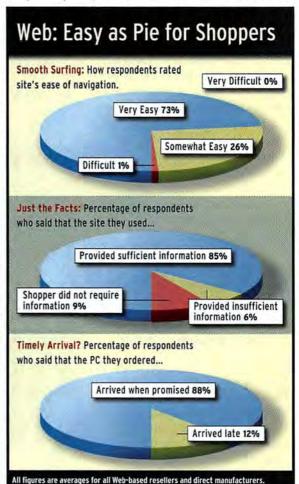
Just because a system is listed on a site doesn't mean it's ready for immediate shipment. Customconfigured PCs take time to build, and a reseller may or may not have the model you want in stock. Even if the site says it's available, be careful: A PC Mall phone rep told us that the company's site "can be slow" in updating

item status. She advised us to phone and confirm that our requested system was in stock after we ordered on the Web. (Seems to us it would be even smarter to make that call before buying.)

Still, most survey respondents who bought by mail order (either on the Web or by phone) got their systems relatively quickly. Just under half received their computers in a week or less; 75 percent received them within two weeks. And only one out of ten customers said their systems weren't delivered when promised. (One out of four Quantex buyers, however, reported late deliveries.)

ON A CLEAR SITE YOU CAN SHOP FOREVER

JUDGING FROM what survey respondents told us, the Web sites they're shopping at are reasonably well-designed and informative. (See "Web: Easy as Pie for Shoppers," below.) We, too, found lots to like online-Dell, Gateway, Micron, and Quantex all have solid sites-but we also



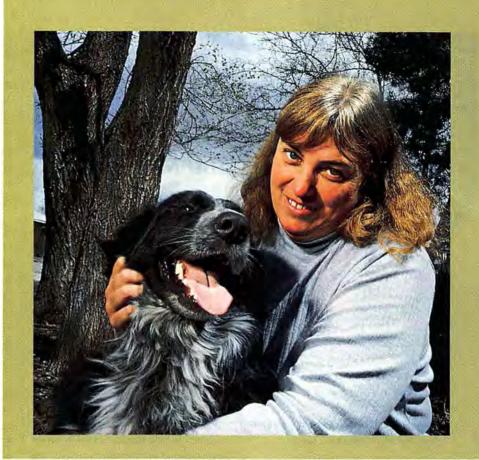
Source: PC World online survey, conducted 2/3/00 to 2/9/00.

found a few stumbling blocks.

Gateway's site is particularly impressive. It's as tidy as a manicured lawn. The lengthy configuration list is organized into neat groups such as Storage (which includes hard drives, DVD-ROM and CD-ROM drives), Multimedia (video, sound, speakers, and video capture), and so forth. That makes selecting options particularly easy.

Dell's Web store also has many useful features. Just ask Beth Cadenas, a consultant in Albuquerque, New Mexico. "It was so easy to select the base system from lots of options, then customize it with the online help," she reports. And the site helped her select components that were compatible with the graphics card she wanted.

Another feature we liked at Dell's site was its Learn More links, which led us to glossaries, technical specs, and comparison charts. But it couldn't tell us how much we'd pay for tax (if applicable) and shipping; instead, buyers get this information in an e-mail,



WEB SITE STORY: BETH CADENAS FOUND DELL'S WEB STORE USEFUL FOR CHECKING GRAPHICS CARD COMPATIBILITY.

after they've bought a system. By contrast, Quantex's site asks for your zip code early in the process, then uses it to tally shipping and tax costs before you buy.

Other glitches: On Micron's site, we couldn't figure out how to ask for beefier speakers-they didn't seem to be an option. (A phone call to Micron's sales line cleared things up: We needed to click on a not-very-prominent All Options icon first.) And on IBM's site, we had trouble finding practical information on available components. A series of footnotes littered our PC's list of specs, but they pointed to disclaimers, not helpful explanations.

ANYBODY OUT THERE?

EVEN AT THE BEST WEB STORES, the available information isn't always an adequate substitute for dialogue between you and a salesperson. And if our difficulty getting personal responses via the Web is any indication, you could be in trouble if you need answers from a real human being.

When we e-mailed queries to Webbased sellers, asking about adding RAM to a system and installing Dragon's NaturallySpeaking voice recognition software, Compaq, Dell, and Quantex never responded at all. And when a seller did reply, the helpfulness was a bit underwhelming. IBM, for instance, sent us an automated note that didn't exactly answer our question. And CDW's response was even worse. We received a copy of a message sent from one CDW sales rep to another: "...please assist customer, thanks." We never did receive that assistance.

GUARANTEE GOTCHAS

WHEN YOU HAVE the attention of a real person, you might want to ask about return policies and warranties-crucial information that's often buried deep within a site. Dell, Gateway, and Quantex allow returns and exchanges for 30 days after purchase, with no restocking fee. However, they won't refund your original shipping costs or pay for the PC's return trip, so you'll be stuck with a de facto restocking fee of up to \$100 or more.

The news is often bleaker at other Web stores. Hewlett-Packard assesses a \$150 restocking fee for systems returned to its HPShopping.com site. Micron's return policy allows a 15-day window to return the PC, but the grace period begins the moment the system leaves Micron's warehouse. Other resellers won't take systems back at all-even defective ones. After 30 days, if the Compaq, Hewlett-Packard, IBM, or Sony PC that you purchased from Zones.com is DOA, you're instructed to contact the manufacturer.

Despite such hitches and restrictions, 63 percent of Web buyers said that they were Very Satisfied with the seller's postsales service and support-compared to the 50 percent of retail buyers who said that they were Very Satisfied. But read on to get the scoop on a shopping alternative that respondents liked even better.

Phone By Market By Market



What's hot Same wealth of choices as the Web, but with assistance from a real person.
What's not Not every phone sales rep is an expert on every product.

Best for Shoppers with questions or special requests that the Web can't handle.

MAYBE THE WEB won't eliminate the need for salespeople after all. Although only one in five survey respondents bought their PC by phone, those who did were the happiest of the lot. (See "Phone: Beats Driving or Surfing," at right.)

Our hunch: Some of those buyers picked up the phone only after being frustrated by other shopping options. Although Beth Cadenas used Dell's site to resolve potential compatibility problems, Bob Baxter, a Memphis-based engineer, reported a different experience. When Baxter decided to buy a PC, he began by configuring a model at Dell's Web site. However, he recalls, "the flags about some components working or not working with others left me a bit uncomfortable." So he continued his shopping by phone, speaking to a Dell sales rep who answered his compatibility questions.

In the end, Baxter says, "I liked being able to talk to a live salesperson." And the benefits of speaking with a knowledgeable rep can be very tangible. If you need more facts about a PC than are readily available online, have an unusual configuration request, or would just rather talk than type, ordering by phone makes sense.

You Make the Call

Aside from the human touch, shopping by phone is a lot like buying on the Web. The range of sellers is practically identical—almost all vendors who sell on the Web also take phone orders (a handful discourage the practice by levying a fee—\$25 at NECX, and \$8 at Egghead.com after your first order). And you'll generally get the same products, prices, and shipping policies whether you click on a Web page or pick up the phone.

WE'LL BE RIGHT WITH YOU

BUYING BY PHONE may bring to mind visions of endless voice menus and unbearable hold music, but most survey respondents said they were connected to a salesperson in less than a minute. Our hold times were usually brief; however,

Enough Stuff: Percentage of respondents who were

we did endure a 13-minute wait for a Quantex salesperson to answer the line.

When it comes to talking shop, phone buyers rated sales reps noticeably higher than retail buyers did. Almost 70 percent of phone shoppers said their salesperson's level of knowledge was Very Good, compared to just 47 percent of retail shoppers. And almost eight in ten phone buyers said their salesperson was Very Courteous, versus six in ten retail buyers.

For the most part, our shopping experience mirrored those verdicts. Phone representatives at direct manufacturers such as Dell and Gateway seemed genuinely interested in helping us select the right system. And when we asked them if they could take care of oddball requests—for instance, configuring a PC with 96MB of RAM—they usually could, even when the option was unavailable on their Web site.

Another plus: The sales reps at some resellers, including CDW, PC Connection, and PC Mall, offered to customize an off-the-shelf system and ship it the same day—as long as our requests weren't too demanding. Among the upgrades that qualified for this same-day service were adding extra memory, a hard drive, or

software such as Quicken. (PC Connection and PC Mall charge a small fee—typically \$30—for such upgrades, while CDW will do them for free.) Again, these customization options were not available when we checked these vendors' sites—proof that sometimes a quick phone call is all you need to get the configuration that you desire for your PC.

Understandably, sales staffers at online resellers—which deal in tens of thousands of products—delivered less personal attention than those at direct manufacturers. And in some cases, they couldn't provide enough information for us to make an informed buying decision. For instance, a rep at Egghead.com

Phone: Beats Driving or Surfing

Phone buyers

Retail buyers

Smarter Staffers: Percentage who rated salesperson's knowledge as Very Good.

Phone buyers

69%

Retail buyers

69%

Retail buyers

47%



The Big Question: Percentage who were Very Satisfied

All figures are averages for all resellers and direct manufacturers in each category. Source: PC World online survey, conducted 2/3/00 to 2/9/00.



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admitted she didn't have any information beyond the (often scanty) specs that she could pull up on the company's Web site.

CALL ON ME

STILL, WHEN PHONE buying WORKS, it's hard to beat. It's certainly won a loyal fan in Aaron Hickmann, an information services manager at a fast-growing start-up company in Los Angeles. Hickmann recently bought ten PCs from reseller CDW, which assigned him a permanent account manager to call whenever he needs help (a useful service that not all phone-based sellers offer). "I value service more than anything," says Hickmann, "and I like being able to phone my rep and talk to him about new products that I haven't yet gotten my hands on. He'll go off, research the products' specs with the manufacturers, and come back to me with the one that will work for us."

Would you get that level of personal attention at a retail store? Probably not. Nor can the automated world of Web shopping match it-not yet, anyhow. Count Hickmann among those lucky shoppers who have found what is-for them-the best place to buy a PC.

Roberta Furger is a PC World contributing editor. Aoife McEvoy is a senior associate editor and Harry McCracken is a senior editor for PC World.



AARON HICKMANN SAYS "I LIKE BEING ABLE TO PHONE AND TALK TO MY REP."

Price Patrol

How PC Costs Compare

WE SHOPPED FOR a home PC and a business model, and found that prices were often similar from vendor to vendor-but not always. Compag's EZ2200 cost around \$1300 almost everywhere. IBM's corporate-oriented PC 300G varied more, however; Big Blue's own online store beat the prices we found at Web resellers. Prices don't include sales tax or shipping.

	Retailer	Model	Price				
610	Best Buy	Compaq EZ2200	\$1300				
	Circuit City	Compaq EZ2200	\$1275				
	CompUSA	Compaq EZ2200	\$1300				
	Web/phone reseller						
	Buy.com	Compag EZ2200	\$1395				
e PC	Outpost.com	Compaq EZ2200	\$1298				
Ноте	Web/phone direct vendor						
	Compaq	Compaq EZ2200	\$1298				
	Dell	Dell Dimension L550v '	\$1248				
	Gateway	Gateway Essential 433c ²	\$1233				
	Micron	Micron Millennia	\$1457				
	Quantex	Quantex M500c	\$1228				

Unless otherwise indicated, all systems include a Celeron-500 CPU, 64MB of RAM, 17GB hard drive, CD-ROM drive, CD-RW drive, 17-inch monitor, and Windows 98. Prices as of 2/00. 1 Celeron-533 CPU, 20GB hard drive, no CD-ROM. 2 Celeron-433, 20GB hard drive.

	Web/phone reseller	Model	Price			
	Buy.com	IBM PC 300GL	\$2259			
	Egghead.com	IBM PC 300GL	\$2358			
	Micro Warehouse	IBM PC 300GL	\$2433			
	PC Mall	IBM PC 300GL	\$2308			
S. P.	PC Zone	IBM PC 300GL	\$2508			
nes	Web/phone direct vendor					
Bus	Dell	Dell OptiPlex GX110'	\$2186			
	Gateway	Gateway E4200 ²	\$2050			
	IBM	IBM PC 300GL	\$2201			
	Micron	Micron ClientPro CS 3	\$2200			
	Quantex	Quantex SB700s	\$1674			

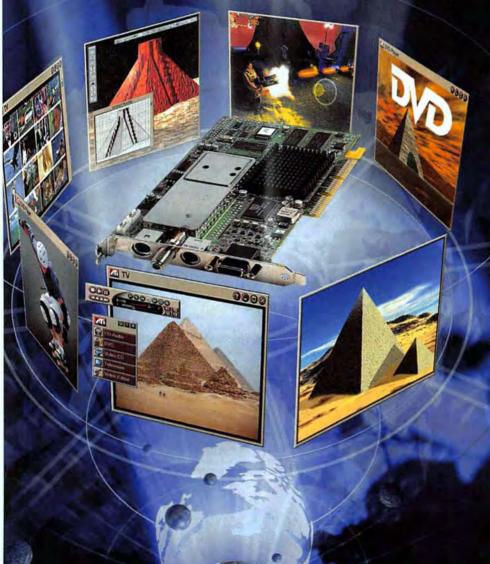
Inless otherwise indicated, all systems include a 733-MHz Pently 20GB hard drive, CD-ROM drive, graphics card with 16MB of RAM, 19-inch monitor, and dows NT 4.0. Prices as of 2/00.

Includes network adapter.

Pentium III-700.

Pentium III-700, network adapter.

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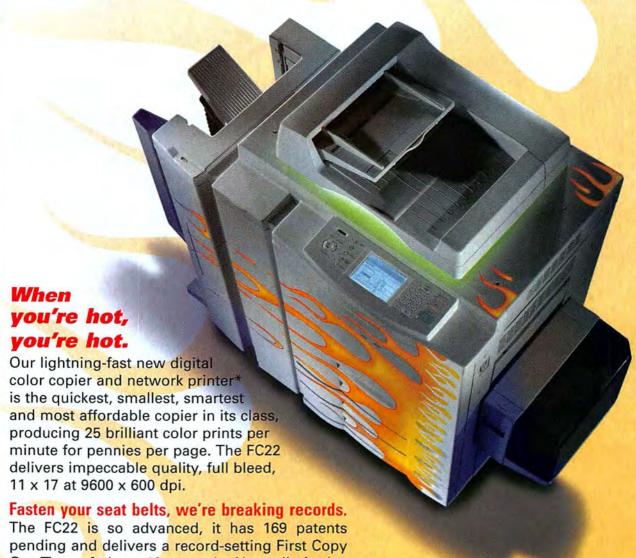


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orkflow "is the cerebral cortex of an organization," says Linda Myers-Tierney, chief marketing officer at Billerica, Mass.-based Eastman Software Inc. "The market is shifting from looking at workflow as just a way to automate a single process, to seeing it as an opportunity to unify a variety of

> as processes, lines, and repositories," she says.

> > Mark Tucker, senior consultant at Boston-based

Delphi Group, says, "Workflow as a technology has evolved far beyond its roots as a simple document routing capability to one that can control and manage both document and non-document work processes."

Workflow systems automate and speed

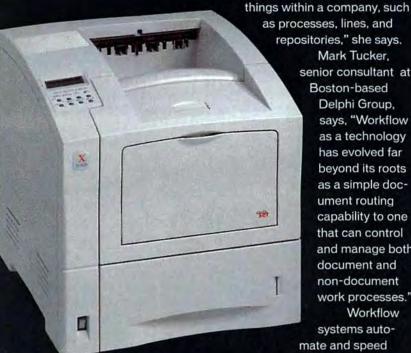
processes, with benefits such as improved customer service. Mark Scarbrough, manager of information systems at Charleston, S.C.-based Blackbaud, says automating just one workflow process has been "a huge time saver." Scarbrough uses the Work

Manager Suite from Eastman Software that allows employees to electronically manage documents. For example, he says, "Before we automated this process a person would have to walk to a file cabinet, find the appropriate manila folder. remove the invoice, photocopy it, and then fax it to the client," he says. Now all the person needs to do is call up the folder on his/her computer, find the appropriate document, and hit a button to fax the client a copy. "It is at least 15 times faster," Scarbrough states.

Assessing Workflow Needs

To effectively improve or implement workflow capabilities, it is important to evaluate the current workflow processes. "You are looking to improve the process rather than just automate it," says Connie Moore, vice president at the Waterford, Va., office of Giga Information Group, headquartered in Cambridge, Mass.

Moore recommends that companies also keep in mind how the business is going to change in the future and "how that will impact the document management workflow." She adds, "Many document management systems overlook content management, and focus more on documents created internally. "However, as companies move to doing e-business they are going to need to share complex documents such as technical manuals. contracts, and proposals over the Web. Because the complexity of unstructured information is going up, you need to think



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of document management as going beyond being a departmental requirement to something broader."

Using External Sources

Before deciding on a workflow solution, many companies turn to outside sources for their needs assessment. Tucker offers the following guidelines:

- Work with someone who understands how documents affect and are affected by the business process.
- Make sure whoever is helping you doesn't approach the problem with a preconceived notion of how to fix it.
- Make sure the company you work with has a broad awareness of the market and where it is going.

· Work with someone who is objective.

Tucker says some of the biggest mistakes he sees companies commit include making a selection on the basis of market share, and when "companies are not properly prepared to go through the commitment" of reviewing and implementing workflow processes.

Tucker adds that organizations vary in their willingness to make drastic changes to their processes.

What About Hardware?

Where does hardware – scanners, fax machines, laptop computers – fit into the workflow equation? Are there compatibility problems to be considered?

"It is not really a question of being able to plug a certain scanner into this system," Tucker says, since most workflow systems support hardware from major suppliers. Instead, the issue is more one of capacity, he says "What do I need from a scanner in terms of pages per minute, size of forms it will accept? Do the users have big enough monitors on their desktops? All of these issues should come out in the workflow requirements analysis."

Just as workflow has changed dramatically in the past decade, so is it expected to change in the future. "When this technology was new 10 years ago we talked about the role it could play in business-to-business transactions," Tucker says. "The concept was good but we were lacking the infrastructure. Now we have that infrastructure. It is called the Internet." This is opening avenues for small businesses to improve customer service by "hooking up" to bigger companies or business partners, and automating that process with workflow.

The bottom line is that by automating and improving business processes in organizations – both large and small – workflow allows companies to conduct business faster and more competitively. •

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- CyberMax 17"(.28dp-15.7"VA) Monitor
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Hammer Time!

How do you sell your products in cyberspace when every business has a Web site? Seize the gavel and use online auctions to your advantage.

By Gregg Keizer

Excess inventory, limited local markets,

modest advertising budgets... Small businesses face a tough challenge in any market—and in today's go-go economy, the competition is even rougher. Luckily, help awaits just around the corner, in the form of online auctions. Sure, hobbyists and junk addicts love them, but online auctions can also open doors for businesses of many sizes.

"I have customers from countries I can't even find on a map," admits Perry Calton, a collectibles seller from Lawton, Oklahoma, and one of Amazon's top-ranked online auctioneers. "I can be selling during prime time in England, or

prime time in California. Online auctions give me a 24-hour business that works even while I'm sleeping." And it does work. Calton estimates that his gross reached six figures over an eight-month period in 1999, and he says that he expects to double or triple that figure this year.

Online auctions are hotter than the plains of Oklahoma in July-and for good reason. By selling to consumers via online auctions, businesses can boost sales, liquidate excess inventory, gain new customers without investing a ton of advertising or marketing money, and raise their Web visibility.

For small businesses, online auctions have become another sales technique, albeit an offbeat one. But you

need a different set of tools for running a businessto-consumer auction than you need for handling a person-toperson auction. In particular, businesses require management software (to handle the deal's back end), low fees,

and convenient payment methods.

Major auction sites provide some of those tools, and most try to attract highvolume sellers. For instance, Amazon offers an innovative payment method that lets buyers use their credit cards to close auction deals, without requiring the seller to have a merchant account-an agreement between a business and a bank for processing and paying credit card transactions. Yahoo, meanwhile, has begun blending its you-build-it e-commerce stores with its auction areas, letting businesses stock both spaces with the same goods so they can pursue auction and fixed-price retail selling strategies.

SUCCESS STORIES

ACCORDING TO THE sellers we talked to. online auctions work wonders. Mike Baker, a full-time online auctioneer from Springdale, Arkansas, runs more than 2000 auctions a week on three major business table. With listing costs as low as 10 cents per item (and sometimes free), they're an inexpensive way to attract new customers. And if you already have an estore, setting up a link to your own Web site at the online auction venue is a cheap way to draw eyeballs to your URL. "I'm getting more than 200 hits a day on my pages from auctions," says Calton.

But how can your business take advantage of online auctions? Years of experience with traditional techniques of selling might not help you if the closest you've come to an auction is PBS's The Antiques Roadshow. To find the best road to selling online, we picked the brains of several auction experts and four experienced

> high-volume sellers. We also took an extended look at six top business auction sites identified by Gomez. com, an independent online company covering e-commerce sites.

At each site, we evaluated the tools avail-

able for high-volume sellers, compared pricing structures, and gauged buyer traffic. We found that, while auction sites overlap in some features, they have individual differences that might make particular ones work better for some businesses than for others. Using the experts' advice and our own experiences, we've put together a step-by-step guide for using online auctions in your business-from picking the right auction site to monitoring the dollars as they roll in.

With listing costs as low as 10 cents per item, online auctions are an inexpensive way to attract new customers.

sites, selling essentially one product: 8-by-10-inch (and larger) reprints of fine art. He wants to be a major player in his business, and with other online auctioneers now buying stock from him, he's well on his way. Antique dealer Lee Bernstein of Schererville, Indiana, uses Amazon's ZShops—a gallery of fixed-price online stores for new and used goods-to sell rare and out-of-print books.

Online auctions bring substantial benefits besides increased sales to the small-

FEATURES COMPARISON

AUCTION SITE	What we liked	Auction activity	Listing fee per item	Seller management tools
Amazon www.amazon.auctions.com	ZShops sell at fixed price; 1-Click payment program; Pro Merchant program saves listings and offers specialized inventory tools.	High	10 cents	My Account tracking page; inventory tools for merchants
Auctions.com www.auctions.com	Merchant Central, though pricey, offers small-business features, including on-your-own-site auctions.	Average	10 cents	Auction Management tracking page
EBay www.ebay.com	Huge collection of potential customers.	Very high	25 cents-\$2	My EBay tracking page
FairMarket Network www.fairmarket.com	List once and pay one listing fee, then see your item on multiple auction sites; great for those on a tight budget.	High	Varies by site	Varies by portal
Go Network Auction auction.go.com	Clearance feature gets rid of stuff by dropping the price every hour; Premier Seller program available only to high-volume sellers.	Low	Free	My Auctions tracking page
Yahoo auctions.yahoo.com	No transaction fee; integration with Yahoo Stores.	High.	Free	My Auction tracking page; Auction Manager tool set

• Yes O No

Limited to one photo (100KB maximum) per item.

* Limited to two photos per item.

1 Limited to three photos per item.

Step 1

Are Web Auctions Right for Your Business?

YOUR BUSINESS IS booming, but you want it to blow the doors off. Yet you've tapped out the local market, so there's not much left to squeeze from your current customer base without relocating. Online auctions sound enticing, but how do you know if they'll work for you? To find out, match your business against these profiles of a successful online auctioneer.

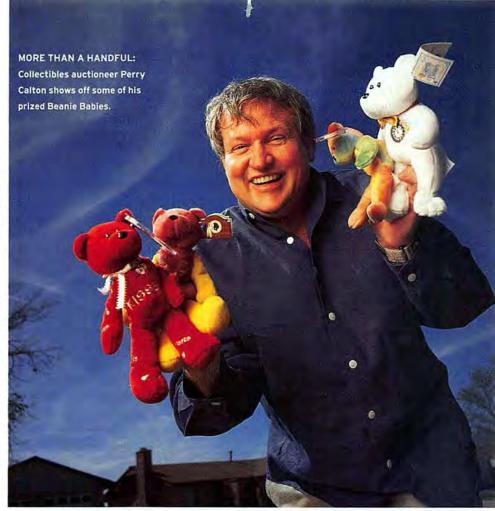
You sell to consumers, not to businesses: Though business-to-business auctions are taking off among companies that want to buy or sell raw materials, businesses that sell direct to the public should pay attention to the numbers that count: potential customers. These folks frequent consumer-oriented auction sites like EBay, Yahoo, and Amazon.

Your products have auction appeal: Auction experts like Dan Neary, vice president of marketing and sales at Auction-Watch.com, an independent Web-based company that provides auction services, say that certain goods do better than others. Prime candidates include collectibles. electronics, and items with narrow but intensive appeal like Bernstein's rare books. On the other hand, with millions of potential customers passing by, such commonplace goods as cookware and furniture may find an audience as well.

You already have an e-commerce storefront: No doubt about it: Online auctions

ree photo posting	Relist unsold items/cost	Customer service
•	One time only/free	Toll-free, 24 hours daily; e-mail
•	Up to three times/free	E-mail only
0	One time only/free	E-mail only
Varies by portal	Varies by portal	Varies by portal
•,	Unlimited/free	Toll-free, 15 hours daily; e-mail
• 1	Unlimited/free	E-mail only *

^{*} Tech support not auction-specific.



are a fairly painless and inexpensive way to get into e-sales if your current business is strictly a brick-and-mortar operation. To make the best use of auctions, though, you'll want an e-store of your own that can direct customers to your nonauction inventory and strengthen your credibility in buyers' minds.

You're comfortable with the Web: It may seem obvious, but you have to develop some familiarity with the Internet to launch, stock, and maintain your business's online auctions. Most tools you'll use for creating and managing auctions are Web-based, too. If you're more comfortable scribbling in a ledger than working with a Web browser, steer clear-or hire someone to do the work for you.

You have time: You may dream of gathering your overstock at 10 a.m. and selling it by noon, but the reality is considerably slower. Running online auctions can burn up hours of work, even if you use auction management software to ease the chore of large-volume selling. If you don't have spare time to invest in this selling tactic, stick to your retail store.

Step 2

Decide Where to Sell

FROM GREAT WHITE sharks like EBay and Yahoo to anchovies like Go Network Auction and Auctions.com, auction sites are proliferating. Hundreds of places let buyers bid at the blip of an electron. But if you're new to the game, you should settle on one auction site to start with.

Evaluating auction sites isn't simple, however, because of their sheer number and because uncovering differences between sites can be tricky. In appraising a site, consider the following traits.

Cost: You wouldn't sign a lease for a brick-and-mortar store without knowing the bottom line, right? Use the same approach with online auctions. Tally the listing fees-the nonrefundable charge for placing an item for sale (usually 10 cents to \$2)-and then factor in the commissions. The latter run between 1 and 5 percent of the item's selling price, depending on the size of the winning

bid. Compare costs by calculating the house's commission on an average-priced item. EBay's rate is among the highest, while Yahoo's is the lowest: zero.

Customer service: Responsive customer service is essential. To test a site you're considering, submit a query by e-mail or telephone and see how long the reps take to respond. Most of the sellers we interviewed praised Amazon's support, which includes a toll-free phone number and a live rep on duty around the clock. On the other hand, auctioneering message boards are rife with complaints about Yahoo's poor support (Yahoo doesn't provide an e-mail address specific to auction queries). Check a site's help files, too, since newbies won't bid if they can't figure out how the process works.

Feedback: With feedback ratings-report cards where buyers and sellers grade each other-you can find out whether buyers Two-way street: Most online auctions offer a feedback rating system so people can check the reputation of potential buyers and sellers.

bidding for your wares are deadbeats, and learn the procedure (if any) for challenging a buyer's unjustified criticism of your after-sale performance. EBay, which pioneered online auction feedback, has the most robust mechanisms in place, including a clear but narrowly defined policy for removing false or misleading feedback. Other auction sites copy EBay's feedback system, in spirit if not in specifics.

Form and function: Most big-time sites load quickly and are easy to use. EBay looks cluttered-perhaps that's part of its charm-whereas Amazon's auctions resemble the classy sections where the company sells its own wares, but both pass the form and function tests. The rest fall between those two extremes, though they lean toward Amazon's sleeker look. The search engine is another important factor: Buyers need to find the best deals easily.

Inventory: Since auction volume correlates to active buyers, you'll want to check the number of listings at a site. EBay takes the prize again, often holding more than 4 million auctions simultaneously. Go Network Auction, on the other hand, had a modest 1600 listings when we visited; that's fewer entries than in EBay's bicycle category alone. Use the site's search tool to find auctions featuring the kinds of products you plan to sell. If you fear getting lost in the shuffle at EBay's high-traf-

> fic auctions, visit less-active sites such as Auctions.com and Go Network Auction.

Price breaks: If you plan to use high-volume sellers, price breaks can be very helpful but tough to find. For instance, Amazon offers a Pro Merchant Subscription for \$10 a month

plus a \$10 setup fee, with no posting costs. Given that its usual fee is 10 cents per listing, if you put up more than 100 items in a month, you save money. Auctions.com also charges sellers 10 cents per listing, and it levies a flat 2.5 percent commission on all sales. At Yahoo, the whole process is free, but sellers are stuck with bare-bones customer service.

Sellers' tools: An array of sellers' tools can make one site stand out from another. If you want to list many items at one time, demand a bulk loader (for definitions of this and other specialized terms, see "Learn the Online Auction Lingo," page 184). Most sites have one, though Go Network Auction doesn't. EBay's Mister Lis-

B2B AUCTIONS

Sell Your Stuff to Other Businesses

BUSINESS-TO-BUSINESS (B2B) auctions have as much potential as businessto-consumer (B2C) auctions because they offer an outlet for companies that need to sell massive quantities of supplies and raw materials.

If you're looking to liquidate a large volume of inventory, check out sites like TradeOut.com (www.tradeout.com), DoveBid.com (www. dovebid.com), and EBay Business Exchange (www.ebay.com) that specialize in business-to-business auctions. Posting a product for auction on these sites entails the same process as auctioning goods at Amazon or Yahoo, so the tips and advice offered in the main story apply here as well. Fees are steeper at most B2B auctions. TradeOut taps you \$10 per listing and 5 percent of the final selling price; DoveBid charges only the latter. EBay, on the other hand, has the same fees for B2Bs and B2Cs. Still, you won't want to put small lots of goods or dirt-cheap stuff on the block at a B2B.

SPECIALTY SHOPS

IF YOUR BUSINESS SELLS RAW MATERIALS or specific products, try a niche-market auction. There are plenty of these. Some well-established sites-including FreeMarkets (www.freemarkets.com) and MaterialNet (www.materialnet.com)match raw-material buyers and sellers. Specialized, industry-centered auction sites run the gamut of goods from wood products (E-Wood, www.e-wood.com) to cargo containers (The Intermodal Exchange, www.intermodalex.com). Most of these, however, have different ground rules from straight auctions: First you must register with the online house; then you await requests for proposals (RFPs) that buyers submit to you via the site. B2B auctions aren't for every small business-in fact, currently they're better suited to large companies.

ter tool is only available to businesses that have been selling for at least two months. If your business sells lots of unique products, you must fill out each list form individually. Other tools, such as personal watch pages for monitoring ongoing auctions, are available at all six sites. At Amazon's ZShops, you can sell fixed-price items-in large quantities-to the same folks who buy at the site's auctions.

Traffic: You can estimate a site's traffic by looking at the number of auctions it conducts and how often buyers bid. The 800-pound gorilla here is EBay. According to data from Web measurement service Media Metrix, EBay attracts more visitors than any other auction-only site in the world. Other high-traffic sites include Amazon, Yahoo, and the FairMarket Network, a consortium of big Web portals such as Excite, Lycos, and MSN.com.

And try evaluating a site from the other side. As Perry Calton says, "Spend some time buying. Find out what it's like."



Pick a Type of Auction

JUST AS AUCTION SITES vary in quality from super to sloppy, auction types vary in small-business value from bonanza to bust. In choosing which auction style best suits your business, consider the way winners are determined.

Straight auctions (also called absolute or standard auctions) are the foot soldiers of a selling campaign. You list an item, specify an opening bid, and let the market decide what it's worth. Buyers understand the auction process because it resembles the one for most offline auctions. To manage multiple standard auctions, however, you'll need to use the site's bulk listing tools or third-party management software.

Dutch auctions, though uncommon, are the best way to unload a gaggle of identical goods. In a Dutch auction, all winning bidders pay the lowest successful winning bid price. Suppose that you list five identical chairs, and the top four bids are as follows: Buyer A bids \$275 each for two chairs, Buyer B bids \$225 for one, Buyer C bids \$200 each for two, and Buyer D bids \$190 each for three. Then buyers A, B,



and C qualify as the highest bidders for the merchandise, and they all pay the lowest successful bid (C's offer of \$200 per chair). Buyer D, who offered \$190 per chair, gets nothing. Total to seller: \$1000. Dutch auctions favor buyers, since higher bidders pay less than the price they bid.

Yankee auctions resemble Dutch auctions, but in Yankees the winning bidders pay the amount they offered. In the preceding example, Buyers A, B, and C again get the goods, but this time they each pay their highest actual bid (\$550 from A, \$225 from B, and \$400 from C), giving the seller a total of \$1175. Yankee auctions favor the seller, who moves more items out the door at higher prices. In both Dutch and Yankee auctions, sellers benefit from lower costs and reduced maintenance, mainly because of the volume of merchandise they can off-load quickly.

Localized auctions target local buyers rather than a global audience. EBay, for example, hosts local auctions in more than 50 cities, while Yahoo runs overseasspecific auctions in 17 countries. The advantage? You may be able to find local buyers for goods that would be hard to sell to long-distance customers, perhaps because of high shipping costs.

Featured auctions deliver a high-visibility position on the site's home page or at the top of a category. Stewart Mitchell, an insurance broker who moonlights as a CD and LP seller in Hamilton, Ontario, sometimes arranges to get featured positioning on EBay, but only when he's selling a bigticket item. "I featured a Beatles LP box set from Japan," he says, "because I knew it was worth at least \$500."

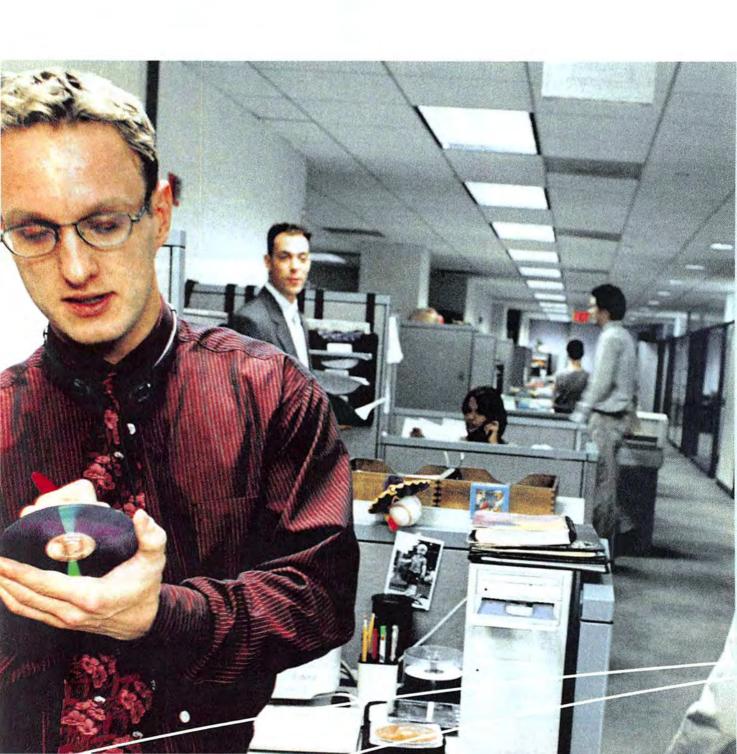
Fixed-price auctions allow buyers, who don't want to wait for the bidding to close, to purchase goods immediately. Some sites let sellers specify automatic winning bids; Amazon calls this the "take-it price," while Yahoo terms it the "buy price."

Private auctions hide bidders' identities (by concealing their e-mail addresses, usually). Private auctions are handy when buyers want privacy, such as for auctions of adult-themed items or high-priced art.

Reserve auctions ensure that sellers don't have to sell unless the bid reaches a preset threshold amount.



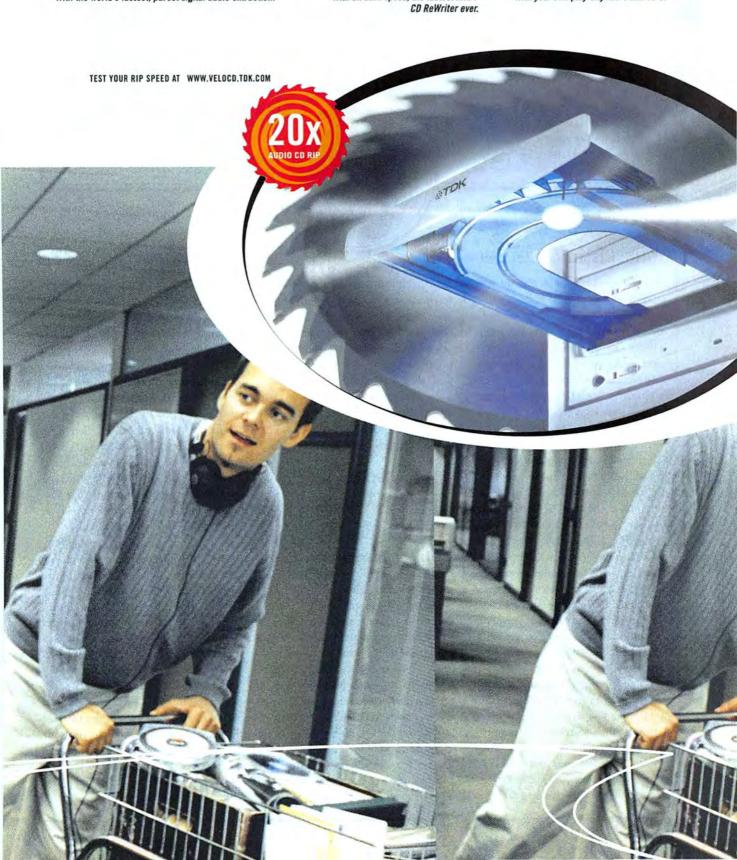
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GLOSSARY

Learn the Online Auction Lingo

Bulk loaders are programs or Web-based tools that make creating and uploading multiple listings simpler and quicker.

Commission is a percentage of the selling price that compensates the site for handling the auction. It is levied at the successful conclusion of an auction sale.

Escrow services take the buyer's payment for an auction item, hold it in a safe place, and release it to the seller only after the buyer has received and approved the goods.

Insertion fees (also known as listing fees) are paid by the seller to post (or insert) the

item in an auction. The cost for this service is generally low. Opening price is the minimum bid the seller is willing to accept from a prospective buyer in selling an item at auction. Relisting is reposting an item that didn't sell. Sometimes relisting must be done manually by the seller, but often it's handled automatically by the site.

> Shilling is an unscrupulous practice in which sellers bid on their own items (or have a partner-incrime do so) in hopes of boosting the bidding price or preventing sale to a third party for less than some predetermined amount.



Write Listings That Sell

SINCE YOU HAVE to work with the same set of tools as everyone else-a title, a description, and a photograph-you'll discover that preparing an eye-catching entry is tricky. The ideal listing would be a cross between a classified ad and a come-on.

All auction sites offer search engines for buyers to use in digging up items of interest, so composing a good title is the key to preparing a listing. "The right title is 99 percent of the battle," says Mike Baker. "The more words you can use that someone will search for, the more opportunities you have to sell." Avoid symbols, allcaps, and clichés like "fantastic," "best deal ever," and "must-have." "No one searches for 'fantastic' when they're looking for auctions," observes Baker. Instead, pack the title with nouns that describe the product. At a minimum include the brand name and the type of item.

At most sites, a product description can be open-ended, and you create the advertising-style copy. "Write in sound bites," recommends Lee Bernstein. "You don't want to bog people down with too much text. And try to fit key words into the description, too, so buyers find it when narrowing their searches." For example, she's noticed that buyers search for phrases like "no reserve" and "credit cards."

Photos can sometimes tell the story better than Pulitzer Prize-winning prose, es-

pecially when an item's condition affects its price. "[Photos] make an incredible difference," says Mitchell. "I didn't have a scanner the first couple of weeks I was in business, but after I started scanning, I saw marked improvement, not so much in [sales] volume, but in dollars." Keep your photos' composition simple. Use a plain backdrop and concentrate on closeups of the merchandise. Most auction sites host images at no cost, though EBay charges 25 cents per photo in its Gallery.



Set Your Price

SELLING AT AUCTION sites may mean rethinking your pricing philosophy. First, you have to draw customers in. "You can't afford to turn them off with too high an opening-bid price," cautions Bernstein.

One major factor in setting an opening price is the demand you expect your listing to generate. Baker says that he calculates his costs-from the item's price to the time it takes him to pack and ship itand then adds \$1. "Don't get greedy," he warns. "Remember, the buyers are going to determine what they're willing to pay."

Check the competition, too. Go to auction sites, search for similar products, and note the opening and winning bid prices.



Monitor Your Sale

RUNNING WEB-BASED auctions takes time and involves steps straight selling (offline or online) doesn't, including monitoring auctions, tracking when they close, and noting the highest bidder. Anything a site can do to lessen this load will help.

Bulk loaders can help if you post many identical items. Baker, who runs more than 2000 auctions each week on Amazon alone, loves bulk loaders, Bernstein, whose volume is 10 to 20 unique products a week, doesn't use a bulk loader.

Other tools include a seller-tracking page where you can monitor your auctions-far simpler than burning hours finding and viewing each auction.

Another option is to buy separate software for bulk loading or monitoring. Predictably, more packages work with EBay than with any other Web auction house. The \$199 AuctionAssistant Pro, for instance, integrates only with EBay's Mister Lister batch uploader to post scads of auctions with one click, and it includes tools for automating e-mails to buyers (at the conclusion of an auction, for example). Another program, AuctionTamer, is a \$20 customized version of the Internet Explorer browser that monitors your auctions on EBay, Amazon, Yahoo, FairMarket Network, and other sites. It provides instant bid-history reports and lets you watch auction action in real time.

Andalé (www.andale.com), a Web-based auction management service, offers a tool set that lists items for bidding (on EBay, Yahoo, and Amazon), creates listing ads, hosts images, and monitors ongoing auctions. Andalé also provides back-end reports detailing your sales and accounts receivable, sends personalized e-mails to customers, and lets you store ads for reuse. You don't pay until you close. And fees are low-from 10 cents to \$5, depending on the winning bid, plus a 2.95 percent commission on big-ticket items.



Inspire Buyers

WRITING A GREAT AD and using fancy tracking tools won't help if customers are afraid to buy from you. You must satisfy them that your business is legitimate.

The first line of security is to pick a site that accepts credit cards, since credit card companies secure online purchases. Many online auctioneers, particularly the small fry, don't take credit cards. And that makes buyers nervous, because it forces them to send a certified check or money order or to wait for you to ship the product after a personal check clears.

Fortunately, several online auction sites are taking steps to solve the problem. On Amazon, buyers can pay by credit card for any auction or ZShops item marked with the site's payments checkmark. Sellers need not obtain a full-fledged merchant account from Amazon to accept credit cards, and it costs just 25 cents per transaction plus 2.5 percent of the selling price.

EBay's Billpoint program has higher rates: 35 cents per transaction for items up to \$10, and 35 cents plus 3.5 to 5.5 percent of the total price for anything over \$10. In Auctions.com's BidSafe, the house acts as escrow intermediary, holding the buyer's payment for the seller until both parties approve the transaction.

Other online escrow services-ideal for reassuring skittish buyers of products costing more than \$400 or so-include IEscrow (www.iescrow.com), SecureTrades (www.securetrades.com), and TradeSafe (www.tradesafe.com). For transactions of \$101 to \$25,000, IEscrow takes a cut of 2 percent (for cash) or 4 percent (for credit).

Free Web services are another option. PayPal.com and X.com (set to merge soon) accept credit card payments from buyers and deposit the funds in a special account. Sellers can then transfer money from their account to a checking account.

Insurance and guarantees are helpful tools, too. Most big sites offer either or both. Amazon's A-to-Z Guarantee promises to reimburse buyers up to \$250 (or up

Gain the trust of your customers by offering first-rate service and secure shopping transactions. Stay abreast of the latest auctionrelated news and legal issues.

to \$1000 if they use the 1-Click purchase method) if the goods sold aren't up to snuff. And Auctions.com's BidSafe plan covers both buyers and sellers with a \$3000 insurance policy.

GIVE 'EM STELLAR SERVICE

PRACTICE SAFE SELLING by giving buyers great service. "Customer satisfaction comes first," says Calton. "We do whatever we can," including shipping replacements when appropriate. "I want my customers to know that I'm here to stay." Such an attitude earns high feedback ratings.

You must also follow the letter of the law. Don't neglect to collect sales tax from buyers who reside in your state. Investigate any local or regional selling requirements; visit your state government's Web site and search for "online auction." "auction regulation," or something similar. Some states, including New Hampshire, require resident auctioneers-online included-to be licensed, which means completing an auction course of at least 80 hours. Violating this law is a felony. Read about auction-related news (including legal issues) at the Online Auction Users Association site (www.oaua.org) or at AuctionWatch's daily news page (www. auctionwatch.com/awdaily/dailynews).



Build Your Own Auctions

IF YOU HOST an auction on your own site, you'll save money and encourage customers to gather at your online store.

Setting up an auction requires special tools. Bidland.com provides a point-andclick builder for customizing the auction to resemble your existing site. Bidland hosts the auction on its own servers and streams the data to your site. Setup costs \$295, plus a \$99 monthly service fee and a 5 percent commission per transaction.

If you don't have a site, consider combining a Yahoo Store (\$100 a

> month for the smallest shop) with that service's free Merchant Auctions, A pricey alternative is auctionbuilder software such as OpenSite's Auction 4.2 (at \$5000 minimum).

Whether you take this leap or stick with prime sites like

EBay and Amazon, online auctions can effectively and inexpensively push your business sales into new territory. "What a wonderful way to do business," says Calton. "Where I live, the [collectibles] market is saturated, but with auctions, I've opened the door to other parts of the country, other parts of the world."

Gregg Keizer is a freelance writer from Eugene, Oregon. He spends more time than he should haunting online auctions.

Auction 4.2

Street price: \$5000, OpenSite, 919/787-

0200, www.opensite.com

PRODUCT INFO NO. 610

AuctionAssistant Pro

Street price: \$199, Blackthorne Software,

www.blackthornesw.com/bthome

PRODUCT INFO NO. 611

AuctionTamer 4

List price: \$20, Envision Software, www. auctiontamer.com



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As low as \$67 per month! QuickAccess Code: 43X5X2-52064

Intel® Pentium® III Processor, 866 MHz.

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10X DVD-ROM Drive²

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Sound Blaster Live! Value Audio

56K ITU V.90 Modem³

JBL Pro Amplified Speakers

Dioital Creativity Imaging Center³

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Compag CV715 17" Monitor (16.0" VIA)

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JBL Pro Amplified Speakers 8X CD-RW Drive*
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Compag CV715 17* Monitor (16.0* VA)

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New Intel Pentium III Processor, 700 MHz, featuring Intel SpeedStep" Technology

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6X DVD-ROM Drivel
ATI Mobility Hardware Accelerated 3D Graphics with 8 MB Video Memory
56K ITU V.90 PCI Modem?
Ultra Hi-Capacity Lilon Battery
256 KB Integrated "On-chip" cache

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40X Max CD-ROM Drive

Diamond Stealth III 16 MB - S540 Graphics

Sound Blaster Live! Value Audio 56K ITU V.90 Modem

JBL Pro Amplified Speakers Digital Creativity Imaging Center

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\$1199

As low as \$34 per month¹

QuickAccess Code: 43X5X2-52057

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10.0 GB UltraDMA Hard Drive

10X DVD-ROM Drive: Diamond Stealth III 16 MB Graphics

Creative Labs 1373 Audio with 128 Voices

56K (TILLV 90 Modern

JBL Pro Amplified Speakers

Digital Creativity Imaging Center

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2X AGP w/64-bit Hardware Accelerated 3D Graphics

ESS Solo PCI Audio

56K ITU V.90 Modem³

JBL Pro Amplified Speakers

Creativity Action Center

Compaq CV515 15" Monitor (13.8" VIA)

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ATI Mobility Hardware Accelerated 3D Graphics

with 8 MB Video Memory 56K ITU V.90 PCI Modem*

Ultra Hi-Capacity Lilon Battery 128 KB Integrated "On-chip" cache

Personalize by choosing:

128 MB SyncDRAM: Add \$100 12.0 GB UltraDMA Hard Drive': Add \$150 6X DVD-ROM Drive': Add \$150

JET SETTER

PRESARIO 1600-600

\$1899

As low as \$53 per month¹ QuickAccess Code: 43X5X2-61643

Intel Pentium III Processor, 600 MHz
12.1" TFT Active Matrix Display
64 MB SyncDRAM
6.0 GB UltraDMA Hard Drive'
24X Max CD-ROM Drive'
Trident CyberBlade Hardware Accelerated 3D
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56K ITU Y90 PCI Modern'

Hi-Capacity Lilon Battery

256 KB Integrated "On-chip" cache Personalize by choosing:

14.1" TFT Active Matrix Display: Add \$250 96 MB SyncDRAM: Add \$100

12.0 GB UltraDMA Hard Drive : Add \$150

WEB SURFER

PRESARIO 1600-466

As low as \$42 per month

QuickAccess Code: 43X5X2-61626 Intel Celeron Processor, 466 MHz

12.1" TFT Active Matrix Display 64 MB SyncDRAM

6.0 GB UltraDMA Hard Drive 24X Max CD-ROM Drive

Trident CyberBlade Hardware Accelerated 3D

Graphics with 4 MB Video Memory 56K ITU V.90 PCI Modem²

Hi-Capacity Lilon Battery 128 KB Integrated "On-chip" cache

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> Top: OmniSky™ Minstrel V™ Modem Left: Expedite™ CDPD Modem Right: Merlin™ PC Card Modem

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Ahhh, New York City in June. For the people who create technology and IT for Business those who manage it, the

Big Apple's eighteenth PC Expo. June 26 to 29, is the perfect place to polish their skills, learn new coping strategies, and exchange war stories. One of the world's premiere IT events. this year's show at the Jacob K. Javits Conference Center will highlight the hardware and software ingredients that have fueled the revolution in digital wireless communications and pervasive networking. These technologies' critical ability to get information into the hands of the people when and where they need it has made them into a driving force in today's IT arena.

Advances in wireless products and services have significantly enhanced the quality and value of "anytime, anywhere" business communications. As recently as a decade ago, if you worked away from the office, you had to tote around stacks of paper to keep yourself informed and rolls of quarters for payphones to keep yourself in touch. Today, all the hardware needed for a mobile office fits neatly in your pocket or briefcase.

THE URGE TO CONVERGE

Examples of innovation will abound at the Mobile and Wireless Pavilion. Many of the hot new companies exhibiting are committed to erasing the distinctions among computers, cellular phones and handheld organizers by bundling wireless data devices and services.

Once again, Palm Computing's feature-laden line of handheld organizers leads the industry with new products. Palm Computing, a division of Santa Clara, Calif.-based 3Com. introduced the new Palm.Net wireless service, giving Palm VII owners easy access to the Internet to conduct e-commerce transactions, as well as to send and receive messages. In addition to keeping in touch with traveling and deskbound colleagues, mobile workers can stay abreast of fast-changing events using 3Com's pioneering webclipping technology. Designed to accelerate downloading of specific information from the Internet, web clipping compensates for the traditional

browsers' limitations in a handheld form factor. Web-clipping technology requires very low volumes of wireless data transmissions and provides

The Palm VII handheld organizer

PALM MOBILZE YOUR BUSINES?



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Send & Receive Faxes	Thesaurus	Address Book	Diet Log
Digital Camera	Black Jack	Snow & Ski Reports	Biorhythms Chart
Infrared Beaming	Area Codes	Door-to-Door Directions	Color Image Viewer
View Word & Excel	Golf Scoring	Security	Wine Guide
Sales Force Automation	Dictionary	Workout Log	E-mail
Flight Schedules	World Almanac	Pilot Training	Time Management
Shareware	Periodic Table	Receipt Printing	TV Remote
Inventory Management	Weather Report	Project Management	Country Codes
Stock Quotes & Trading	Unit Conversion	Package Tracking	Link to Oracle
Link to Outlook	Alarm Clock	Sports Report	Want to know
Paging	World Map	Link to Sybase	even more?
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quick response times, increased battery life, and affordable service costs.

Adding the convenience and productivity that full-time connectivity offers is another reason to make a stop at the Mobile and Wireless Pavilion part of your Expo itinerary. You can preview other examples of the latest and greatest in handhelds, notebooks, cellular phones, video conferencing and e-mail-enabled Internet appliances. And while you're there, be sure to find out more about the latest textto-text speech products designed to help your colleagues meet their sales and marketing objectives.

MOBILE, WIRELESS, AND IN YOUR POCKET

Cellular Internet is a wideopen frontier. With more than 70 million cell phones currently in use, and the market expected to double within three years according to the most conservative estimates. cellular Internet has certainly attracted the attention of many of the bigtime dot.com players. Consumers benefit as today's technology vendors scramble to get products and services on the market that will satisfy the skyrocketing demand for allin-one products. Consumer demand for data-enabled cell phones that can query and communicate with back-end databases will prompt vendors to respond with new services. For example, Yahoo has partnered with several cellular providers to provide information especially suitable for small-screen organizers and digital cell phones. Likewise, America Online is pressing into the wireless market with a plan it calls the "AOL Anywhere" initiative.

As testimony to the growing popularity and value of wireless connectivity, San Diego, Calif.-based Novatel Wireless will unveil the new pocket-sized Minstrel V wireless modem for the Palm V organizers. When teamed with the Minstrel V's 19.2 kbps Internet connectivity, dedicated IP address and e-mail access, your Palm V organizer is instantly

Novatel's Minstrel V wireless modem paired with a Palm V organizer



transformed into a virtual office that you can hold in the palm of your hand. As a result, improved productivity and full-time connectivity are only a tap away. Minstrel V supports popular enterprise productivity and synchroniza-

tion programs and comes bundled with POP3 e-mail and HTML web-browsing software.

TAKING IT WITH YOU

Ironically, this ease of access to data solves one set of problems and creates others; for example, what to do

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with all the data?

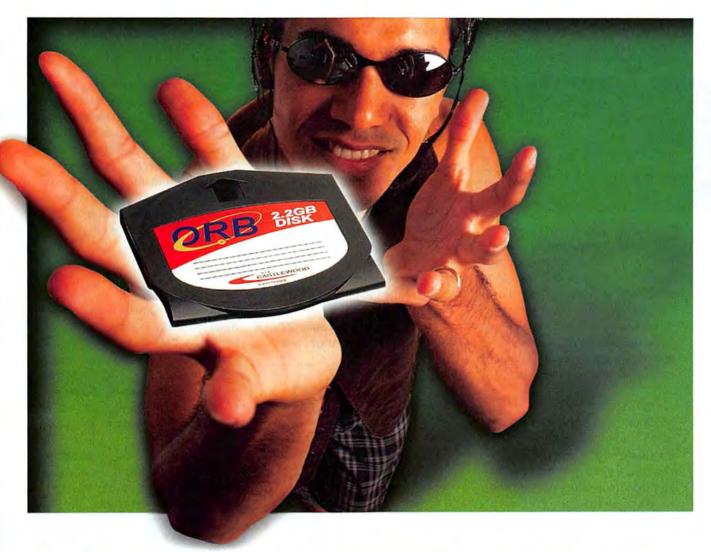
low and raises performance to a new high. Using a magneto-resistive, ultra-high-density recording technology, Orb drives outperform magneto optical removable drives, DVD and CD-ROM data-storage products. With an average seek time of 11 milliseconds and a maximum sustained datadelivery rate of 12.2 MB per second, Castlewood's 5.7 GB Orb can easily play back and record streaming video and audio. The Pleasanton, Calif.-based Castlewood also offers a 2.2 GB capacity model with a USB, EIDE or ultra-wide SCSI interface. All models provide convenient, safe and fast extended storage and simplify the process of storing data, images or Web pages. In addition to these generous storage capacities, Orb drives offer an added advantage when compared to other removable media drives: the cost per megabyte is a rock-bottom 1.4 cents.

FOR YOUR EYES ONLY

Just as wireless connectivity continues to grow, so does the need for security in a wireless environment. PC Expo's Biometrics Pavilion, Biometropolis, will feature innovative security solutions for electronic commerce and network management. Biological recognition devices are gaining well-deserved credit as a security solution that far surpasses the use of passwords. The problems with passwords are legion. First and foremost, they do not authenticate the person-they merely authenticate the password. Biometrics eliminates that weakness. For example, the odds are one in a billion that two people will have the same fingerprint. Using measurements of personal traits such as

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GROWING THE FUTURE

Many of today's brightest new ideas come from young energetic companies. PC Expo will feature two pavilions to help new-media and high-tech start-ups gain needed exposure to help solve one of their most daunting challenges: establishing a solid infrastructure and customer base.

The New Media Pavilion for start-ups and upstarts will host newbies, pre-IPO and new-media companies less than two years old. The visionary forum will provide this embryonic group with a venue to strut their stuff in front of potential financial backers and to help them obtain vital marketing, sales, and financial support. Expo's organizers, recognizing the limited capital resources, yet great potential, of this group, will offer participants a discounted price for exhibition space.

The AlleyCat Small Business Lounge will serve as an oasis for entrepreneurs to meet top professional services firms that can help their companies grow. It will provide show-goers and exhibitors with a place to meet representatives of some of the most prominent business-support firms in the business. Experts in law, accounting and

insurance will offer guidance on how to successfully traverse the pitfalls of entrepreneurial and start-up processes.

One of PC Expo's more novel conferences is *Touched by an Angel*. According to producer Alan Brody, principal of Scarsdale, N.Y.-based iBreakfast, *Angel* is a venue that "...allows start-ups a chance to pitch their ideas. It takes the often obscure venture capital acquisition process from the back rooms of the industry and puts it into the public eye."

Scheduled to run June 27 and 28, Touched by an Angel will



Five Minutes of Fame—and Maybe even Fortune

"WOULD-BE START-UPS
CAN SEE FIRSTHAND HOW
THE INTERNET CAN CHANGE
THEIR SMALL CORNER OF
THE WORLD. AND THEY
HAVE A CHANCE TO TAKE
PART IN IT. SOME OF THEM
WILL GET FUNDED, SOME
WILL GET ACQUIRED, OTHERS WILL BURN OUT, BUT
ON JUNE 27 AND 28, ALL
OF THEM WILL HAVE
THEIR CHANCE TO REALIZE
THEIR DREAM."

-Alan Brody, producer of iBreakfast's *Touched by an Angel* venture capital funding conference at PC Expo offer four sessions per day. Venture capitalists will be on the podium and in the audience seeking promising new companies, says Brody. "This is a lot like a lottery," he says. "Even if you don't 'win,' you gain valuable insight into the process of obtaining capital." Interested entrepreneurs are invited to submit their pitches at Brody's Web site, www.ibreakfast.com.

THE PERVASIVE NETWORK

Today, the functional overlap in electronic devices can already cause confusion. DVD and surround-sound PCs double as entertainment centers; cell phones and pagers receive stock quotes and send e-mail; browser-equipped televisions can surf the Web. Functional overlapping in devices will become more pronounced in the coming years as the Internet weaves devices and services into a seamless mesh. Before long, your refrigerator will reorder groceries, your boiler will send the oil company an e-mail when it needs maintenance, and your car will telephone the police when a thief steals it. Industry experts and analysts call this universal connectivity the "pervasive network." It is one of this year's hottest and most hotly contested technologies.

In this scenario, the once-venerable personal computer is but a bit player that has morphed into an information and entertainment appliance. The Internet takes center stage as it colonizes cell phone screens and extends its digital embrace to appliances in our homes, our automobiles, and most other electronic devices. The pervasive network will do more than control physical products. Futurists predict that conventional media such as film, radio, TV, and print will continue their inexorable transformation into digital formats. A pervasive network will learn how and when to entertain you, using whatever means necessary. +



In a developing story, IDG.net and CNN.com have been linked in a technology information coup.









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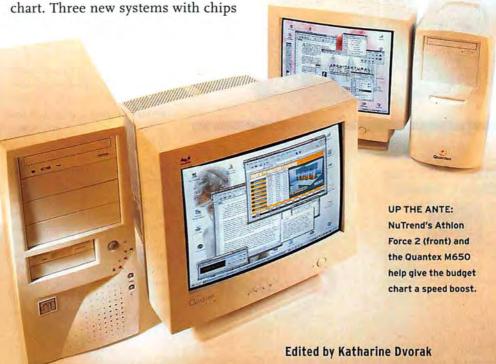
247 Modems



BUDGET SYSTEMS

HO thought that shelling

THOSE WHO thought that shelling out big bucks for a Pentium III-600 or Athlon-600 machine last November placed them securely at the front of the power-user pack might want to look twice at this month's *Top 10 Budget PCs* chart. Three new systems with chips





BIG VIEW, SMALL COST: Cornerstone's 21-inch C1025 nabs a Best Buy thanks to its bargain price.

that run at 600 MHz or faster (the MicroFlex-600A from Micro-Express, the NuTrend Athlon Force 2, and the Quantex M650) make the budget list.

Intel and AMD's struggle to dominate the chip world has changed the makeup of our Top 10 tables, as CPUs that once stood atop the power chart are now speedy newcomers to the budget category.

We first saw 600-MHz systems on our power chart in November 1999, when it was dominated by 500- and 550-MHz CPUs. Back then a budget system carried a 400- to 466-MHz processor-and we were lucky to see more than 64MB of RAM and a low-speed DVD-ROM drive.

These days, power chart systems arrive with 800 and 850-MHz processors (for example, this month's number nine Sys Performance 850A sports an astonishingly fast Athlon-850 chip). And the new one-gigahertz systems are not far off (look for them on next month's chart).

BUDGETS BURST WITH EXTRAS

THESE BLOCKBUSTER budget PCs also offer high-end features traditionally seen on midrange and power systems. Take one of this month's budget Best Buys, the Micro Express MicroFlex-600A. It sports an Athlon-600 CPU, 128MB of SDRAM, a whopping 18GB hard drive, an aging but still solid ATI Rage Fury graphics card, and a 6X DVD-ROM drive supported by a hardware MPEG video decoder-and it

sells for just \$1099. The MicroFlex's score of 134 on PC WorldBench 2000 isn't bad either; in fact, for an Athlon-600 system running Windows 98, it's the highest we've seen.

If space matters more than price, this month's power and midrange machines offer tons of it. Hard drives are monstrous: The smallest on this month's power chart is a hefty 20GB; the smallest on the midrange chart is 10GB. And the largest? The Quantex SM800 offers 40GB of disk space and HP's Vectra VL600 has 30GB. The Sys Performance 850A packs 41GB into two 20.5GB hard drives connected by a RAID card.

We're also seeing more of Iomega's latest removable storage drive, the Zip 250. Both of this month's higher-end Quantex machines—the SM800 and the SM700—offer this removable storage.

BIG VIEWS, PHOTO-FANTASTIC INK JETS

TWENTY-ONE-INCH displays are getting cheaper, if this month's Top 10 Monitors is any indication. We looked at these big screens (one model is 22 inches), and six of them are below \$1000. Cornerstone Technology sells its latest, the C1025, for a mere \$639—the cheapest on the chart-and another, the KDS VS-21e, is just \$10 more.

Photo devotees have a lot to celebrate as more and more photo-quality printers enter the ink jet market. Of four new ink jets vying for this month's Top 10, three qualify as photo-quality models-but they are also expensive.

Epson gives us the Stylus Photo 1270, a tabloid-size unit that handles edge-to-edge snapshot printing. HP has both the PhotoSmart P1100, which prints directly from a digital camera, and the wide-format



POINT YOUR browser to www. pcworld.com/top400 for lateonline breaking reviews on desktop com-

puters. In the Top 400 section, you'll find comprehensive reviews and ratings. You'll also find details on the PC WorldBench 2000 test suite at www.pcworld.com/benchmark.

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following information should answer 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 hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 70s is above average.

What does the PC WorldBench 2000 score mean? It's a measure of how fast a PC can run a mix of common business applications compared with our baseline machine, an HP Pavilion 8380 with a PII-400 CPU, 96MB of RAM, and an 8GB hard drive. For example, a PC that scores 200 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 on anonymous support calls made by PC World staff. The policies score is based on vendor support policies.

DeskJet 1220C. Despite their differing features, all three printers produce impressive prints using photo settings and glossy paper. But they all carry a \$499 price-the second-highest this month, enough to keep them off of the chart.

Freelance writer Joel Strauch and PC World editors Grace Aquino, Lisa Cekan, Eric Dahl, Katharine Dvorak, Mick Lockey, Kalai Murugesan, Kalpana Narayanamurthi, Karen Silver, and Alan Stafford contributed to the Top 100 this month. Testing was performed by Ulrike Diehlmann, Robert James, Elliot Kirschling, Jeff Kuta, Sean Tieu, and John Tjon of the PC World Test Center.

TOP 10 POWER PCs

_						
	SYSTEM: \$2000 AND OVER	Month tested	★ Overall rating	Street price (3/10/00)	PC WorldBench 2000 performance score	Base configuration
1	Quantex SM800 800/896-4898 www.quantex.com	NEW	96	Inexpensive: \$2179	Very good 163	Outstanding: Pentium III-800EB, 128MB of SDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 98 SE
2	Dell OptiPlex GX300 800/388-8542 www.dell.com	May 00	94	Very expensive: \$2974	Very good 165	Outstanding: Pentium III-733, 128MB of RDRAM, 256KB L2 cache, 20GB hard drive, 19-inch monitor, Windows 2000 Pro
3	Dell Dimension XPS B800r 800/388-8542 www.dell.com	May 00	94	Very expensive: \$3229	Outstanding 201	Outstanding: Pentium III-800EB, 128MB of RDRAM, 256KB L2 cache, 20.4GB hard drive, 19-inch monitor, Windows NT 4.0
4	Micron Millennia Max 800 800/642-7667 www.micronpc.com	May 00	93	Expensive: \$2599	Good 149	Outstanding: Pentium III-800, 128MB of SDRAM, 256KB L2 cache, 27GB hard drive, 19-inch monitor, Windows 98 SE
5	HP Vectra VL600 800/752-0900 www.hp.com/desktcps	May 00	92	Expensive: \$2598	Very good 190	Good: Pentium III-733, 128MB of RDRAM, 256KB L2 cache, 30GB hard drive, 17-inch monitor, Windows NT 4.0
6	Gateway GP7-800 800/846-2000 www.gateway.com	NEW	92	Average: \$2428	Very good 156	Outstanding: Pentium III-800, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 98 SE
7	ABS Performance 1 800/876-8088 www.buyabs.com	May 00	91	Inexpensive: \$2199	Good 151	Outstanding: Pentium III-700, 256MB of SDRAM, 256KB L2 cache, 27.368 hard drive, 19-inch monitor, Windows 98 SE
8	Axis Systems Orion CXV 800/378-9014 www.axissys.com	May 00	90	Very inexpensive: \$2027	Satisfactory 132	Outstanding: Pentium III-600EB, 128MB of SDRAM, 256KB L2 cache, 20.5GB hard drive, 19-inch monitor, Windows 98 SE
9	Sys Performance 850A 800/613-9963 www.sys.com	NEW	90	Expensive: \$2699	Outstanding 198	Outstanding: AMD Athlon-850, 128MB of SDRAM, 512KB L2 cache, two 20.5GB hard drives, 19-inch monitor, Windows NT 4.0
10	Polywell Poly 800K7 800/999-1278 www.polywell.com	May 00	89	Average: \$2275	Good 151	Outstanding: AMD Athlon-800, 128MB of SDRAM, 512KB L2 cache, two 13.6GB hard drives, 19-inch monitor, Windows 98 SE
	Best Buy	Percent 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 199.



THIS MONTH'S NEW number one hails from Quantex: The SM800 features top-of-the-line accessories, including an 800-MHz Pentium III CPU, an Iomega Zip 250

drive, and a 12X DVD-ROM drive-yet its \$2179 price won't bust your budget. Gateway also hits the chart with an 800-MHz version of its GP7, while Sys introduces the Performance 850A, with an Athlon-850 processor; both systems boast impressive speed and massive hard drives.

1 QUANTEX SM800



WHAT'S HOT: With a score of 163 on our PC WorldBench 2000 test suite, the SM800 earned top

NEW marks for a PIII-800EB running Windows 98 SE. If the monstrous 40GB hard drive proves insufficient for your storage needs, you can use the included Iomega Zip 250 removable media drive. The SM800 also uses a Guillemot Ge-Force 256 3D Prophet graphics card for outstanding graphics quality.

WHAT'S NOT: The somewhat flimsy case on this standard minitower took some work to reattach. At its bargain price, the system lacks a network interface card, which might limit connectivity options.

WHAT ELSE: The SM800 provides lots of room for expansion, with four open slots (three PCI and one ISA) and three open bays, but the system's somewhat cramped interior makes access difficult. The solid multimedia keyboard supports smooth typing, and its extra programmable buttons allow handy shortcuts. Corel Word-Perfect Office 2000-a strong suite of software tools for the small-office useralso comes with the system.

BEST USE: The business extras and topnotch performance make this PC at home in a nonnetworked small office.

2 DELL OPTIPLEX GX300



WHAT'S HOT: Running Windows 2000 Professional, this OptiPlex posted a PC WorldBench 2000

score of 165, trailing the Windows NT machines on the chart but outpacing all the Windows 98 ones. The price of the GX300 has plummeted by \$493 since last month. A tidy interior offers chassis intrusion detection, a case lock, a swing-out power supply, five open PCI slots, and three open (and toolless) drive bays. Dell's 19-inch Ultrascan P991 monitor delivers vibrant colors and crisp text at resolutions up to 1600 by 1200.

² 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).

³ For more information about all of the products listed in this table, select number 903 on the product information card or visit www.pcworld.com/productinfo.

Extra features	Design and expandability ²	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)	Product info number
Good: Guillemot GeForce 256 3D Prophet graphics card with 32MB of RAM, 12X DVD-ROM drive, V.90 modem, lomega Zip 250 drive, Corel WordPerfect Office 2000	Good: multimedia keyboard; minitower; 3 open drive bays, 4 open slots	Good 4	Good */ Good	24/7, toll-free	3/1	639
Very good: NYidia GeForce 256 graphics card with 32MB of RAM, 8X/4X/32X CD-RW drive, network card, chassis intrusion detection, case lock, Wake-on-LAN	Good: swing-out power supply; midsize tower; 3 open drive bays, 5 open slots	Outstanding	Good/ Outstanding	24/7, toll-free	3/3	-
Outstanding: NVidia GeForce 256 graphics card with 32MB of RAM, 8X/4X/32X CD-RW drive, V.90 modem, network card, Zip 100 drive, Microsoft Office 2000 SBE	Good: includes top-notch monitor; midsize tower; 3 open drive bays, 2 open slots	Outstanding	Good/ Good	24/7, toll-free	3/1	- 5
Good: VisionTek NY994 graphics card with 32MB of RAM, 8X DVD-ROM drive, V.90 modem, case lock, Microsoft Office 2000 Small Business Edition	Very good: roomy case; midsize tower; 5 open drive bays, 4 open slots	Good	Good/ Outstanding	24/7, toll-free	Varies 5/3	640
Good: Matrox Millennium G400 graphics card with 32MB of RAM, 4X/2X/24X CD- RW drive, network card, chassis intrusion detection, case lock	Good: toolless drive bay carriers; midsize tower; 3 open drive bays, 5 open slots	Good	Good/ Fair	24/7, toll call	3/3	641
Good: NVidia RIVA TNT2 graphics card with 32MB of RAM, 17X-40X CD-ROM drive, network card, Microsoft Office 2000 SBE, Microsoft IntelliPoint mouse	Good: easy access to memory sockets; tower; 6 open drive bays, 3 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3	642
Outstanding: ATI Rage Fury Max graphics card with 64MB of RAM, 8X DVD-ROM drive, 4X/4X/32X CD-RW drive, V.90 modem, Microsoft Office 2000 SBE	Good: front-mounted MIDI inputs; midsize tower; 2 open drive bays, 4 open slots	(me)	Fair */ Good	24/7, toll-free	3/Lifetime	643
Good: Creative Labs TNT2 Pro graphics card with 32MB of RAM, BX DVD-ROM drive, 4X/4X/24X CD-RW drive, V.90 modem	Very good: lots of storage room; midsize tower; 2 open drive bays, 4 open slots		Good */ Outstanding	24/7, toll-free	3/3	644
Good: Matrox G400 Max graphics card with 32MB of RAM, 17X-40X CD-ROM drive, network card, case lock, RAID card	Very good: room for expansion; midsize tower; 4 open drive bays, 3 open slots	•	Good '/ Good	24/7, toll-free	Varies */5	645
Very good: VisionTek NY994 graphics card with 32MB of RAM, 8X DVD-ROM drive, 7,90 modem, lomega Zip 100 drive, Lotus SmartSuite Millennium, RAID card	Good: roomy interior; minitower; 3 open drive bays, 3 open slots	4	Fair */ Good	24/7, toll-free	3/5	646
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent			percent	

^{&#}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.

WHAT'S NOT: Even with its price drop, this \$2974 model is hardly cheap. Dell posts most of its documentation online; the hard copy of the main system manual contains only the bare minimum, and you won't find any paper documentation for individual components (though you can order it for free).

WHAT ELSE: Despite the easy-service chassis, the memory slots are buried, and the interior feels cramped until you swing the power supply out of the way. But thanks to the 8X/4X/32X CD-Rewritable drive, making backups is fast and easy. BEST USE: For businesses that want to get started with Windows 2000 Pro as soon as possible, this OptiPlex offers a substantial bang, albeit for a lot of bucks.

3 DELL DIMENSION XPS B800R WHAT'S HOT: Throw a PIII-800EB CPU into a Windows NT 4.0 machine, and you've got rip-snorting speed: This Dell's score of 201 on our PC World-Bench 2000 tests is the highest attained by any NT system we've seen. Top-drawer extras include an 8X/4X/32X CD-RW drive, an Iomega Zip 100 drive, both a modem and a network card. and Microsoft Office 2000 Small Business Edition. WHAT'S NOT: Empty your wallet: The Dimension XPS B8oor costs \$3229, even after a \$240 price cut. And while Dell provides ample docu-

mentation for the standard equip-

ment, our unit lacked paperwork

for some extra components.

WHAT ELSE: The system uses expensive, high-speed Rambus DRAM (RDRAM), which is designed to rev up memory-intensive apps. Despite the addin goodies, this Dell provides two open PCI slots and three open bays in its neat

FOR COOL-LOOKING GRAPHICS: The

Quantex SM800 uses the Guillemot GeForce 256 3D Prophet graphics card, which helps generate clean, rich images and sharp, readable text on your PC's monitor.

> interior. You also get a quick-setup manual and a thick troubleshooting guide. BEST USE: For users who must have everything-regardless of sticker pricethis Dell looks like a million bucks.

⁵ Five years on CPU and main RAM, three years on other parts.

Six years on CPU and main RAM, three years on other parts.

4 MICRON MILLENNIA MAX 800

WHAT'S HOT: This 800-MHz Millennia Max's motherboard provides both Slot 1 and Socket 370 processor slots, so you can upgrade the system with either type of CPU. A well-designed interior offers four open slots and five open bays, and its power supply swings out to clear even more workspace. Text stayed sharp up to the unbelievably high resolution of 2048 by 1536 on the 19-inch Micron Trinitron CPD-4401 monitor. Colors appeared rich (albeit a tad dark) on test images.

WHAT'S NOT: There's neither a removable storage option nor a CD-RW drive. And this PIII-800 unit scored a 149 on our PC WorldBench 2000 tests, only six points better than its PIII-677 cousin, the Millennia Max 667.

WHAT ELSE: This Millennia earned a plus for documentation, thanks to its setup poster and thorough system manual, but it lacked some component manuals. At \$2599, the PC's price has fallen like a coyote holding an anvil (\$500 in one month). The large midsize tower features twin

fans, a case lock, and a side that pops off smoothly (it requires some fiddling to get back on, however).

BEST USE: With its excellent monitor, this PC makes a pretty-but pretty expensive-presentation system.

5 HP VECTRA VL600

WHAT'S HOT: Armed with Windows NT 4.0 and a Pentium III-733 processor, the VL600 ripped through our PC WorldBench 2000 tests with a score of 190. Pop off the solid side panel, using a pull-out handle at the top (similar to Apple's G4), and you'll discover a fairly neat interior with five

open PCI slots and three open drive bays with toolless quick-release tabs.

WHAT'S NOT: At a rather high \$2598, this Vectra doesn't come cheap and-like the Millennia Max 800-lacks a removable storage option. HP provides no documentation for components. The quickrelease drive carriers seem less sturdy than those we've seen in other systems. WHAT ELSE: The Vectra VL600 ships cor-



EXPAND AWAY: The Gateway GP7-800 offers plenty of room to grow—three open slots and six open bays.

porate-ready with a network card and a sturdy case lock (complete with its own keys). The keyboard features microphone and headphone jacks. HP's 17-inch HP71 monitor-the only 17-incher on the chart-provides sharp text up to its maximum resolution of 1280 by 1024, but the colors in our test images appeared a tad dark. Because the PC uses Rambus DRAM, it leaves just one memory slot open (systems with RDRAM can have only two slots on the motherboard).

BEST USE: The Vectra VL600 is a powerful PC aimed at corporate workgroups.

GATEWAY GP7-800

NEW WHAT'S HOT: A speedy score of 156 on PC WorldBench 2000 places the Gateway GP7-800 near the front of the pack among similarly configured PIII-800 systems (second only to the Best Buy Quantex SM800). The gargantuan tower offers lots of room for expansion, with three open PCI slots and six open bays. Bundled with a network interface card, a hefty 30GB hard drive, and Microsoft Office 2000 Small Business Edition, the GP7-800 is ready for business.

WHAT'S NOT: For \$2428, we'd expect a DVD-ROM or CD-RW drive, but the PC ships with a 17X-40X CD-ROM drive.

WHAT ELSE: Colors on the Gateway EV910 19-inch monitor looked rich but a tad dark, while text remained sharp up to the maximum resolution of 1600 by 1200. The system is simple to set up, with labeled, color-coded ports and a side panel that's easy to remove and reconnect.

How Big Can Hard Drives Get?

TECH TREND NOT TOO LONG AGO, vendors predicted that the hard drive size limit was near and warned that existing storage technologies had to change for drives to get much larger. Luckily, today's hard drives use more sophisticated magnetic storage technology, which involves increasing areal density (the number of bits that can be packed into each

square inch of each side of the magnetic disks, or "platters," inside the drive). Current hard drives hit 15GB per platter, permitting two-platter, 30GB drives.

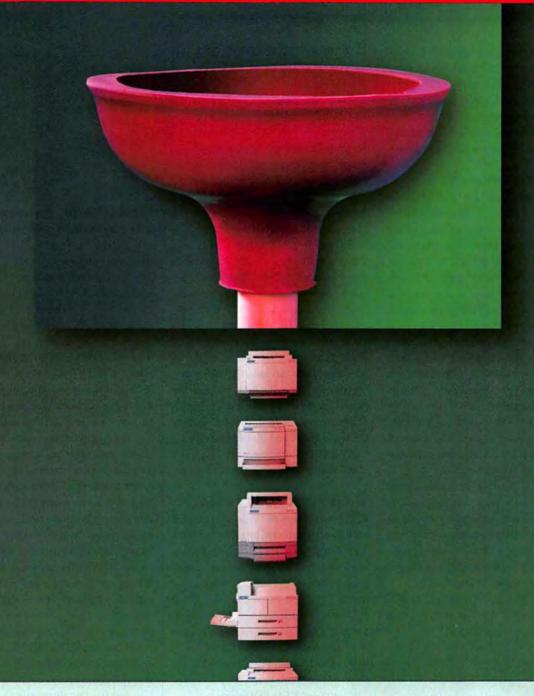
IBM's new Deskstar 40GV drive takes advantage of this greater areal density, with 14.3 billion bits of data per square inch on a 40GB drive. The company hasn't stopped there-it recently released a 75GB drive, the Deskstar 75GXP.

A size boundary still exists for hard drives, according to Steve Wilkins, the strategic marketing manager for drive-maker Quantum; it's just higher than previously expected. "Currently, it's thought to be between 70 and 100 gigabits per square inch. It's a ways off, but at the rate we're doubling [drive capacity], within five years' time, it's going to be a problem [again]," he says.

Once that size limit is reached, the billions of bits of information on your drive will be so tightly packed that they may not be able to hold their magnetic

charge. Then, Wilkins says, "Your drive, apart from being a very good random number generator, won't be much good as a storage device." But Wilkins feels that the drive size limit could

be raised again. "We try to bend the laws of physics wherever we can."



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Printers That Mean Business







Documentation for individual components isn't included, but the system manual is thick and features helpful color illustrations, useful upgrading tips, and troubleshooting information.

BEST USE: For performance and expandability, the GP7-800 shouldn't disappoint.

7 ABS PERFORMANCE 1

WHAT'S HOT: Packed with a PIII-700 CPU and a massive 256MB of RAM, the ABS Performance 1 earned a scorching PC WorldBench 2000 score of 151, the highest we've seen so far for a Windows 98 machine with a PIII-700 CPU. The Performance 1 is easy on the eyes, too: The ADI MicroScan 6P 19-inch monitor produced crisp text, even at 1600 by 1200 resolution, though colors looked slightly washed out. The Creative Labs Live Drive occupies one externally accessible drive bay and provides external ports for audio input and output.

WHAT'S NOT: During our tests, we noticed slight pauses in DVD video playback on the 8X DVD-ROM drive when we opened other applications.

WHAT ELSE: A cut of \$500 slashes the Performance 1's price to \$2199, making it one of the least-expensive systems on this month's chart, though it is still pricey for a PIII-700 system. A large binder holds the system documentation. Clearly labeled ports make for quick setup.

BEST USE: For a power user interested in gaming or audio manipulation, the ABS Performance 1 is a good deal.



WHAT'S HOT: The Orion CXV's PC WorldBench 2000 score of 132 makes it one of the fastest Pentium III-600EB units we've tested with Windows 98. The system sports an 8X DVD-ROM drive (which played test movies smoothly and clearly) and a 4X/4X/24X CD-RW drive. Besides quick speed and strong features, the Orion carries the lowest price on our chart-just \$2027-but this price is high for a PIII-600EB system.

WHAT'S NOT: You must remove four screws and take off the entire case to get inside: cables hinder access to the RAM slots and two open bays. The system lacks a printed manual, too, though an electronic one is loaded on the system.

WHAT ELSE: The electronic manual contains lots of information on troubleshooting and setup. Audiophiles will love the Altec Lansing ACS33 speaker set, which delivers crisp sound in concert with the Creative Labs Sound Blaster Live card.

BEST USE: This Orion works well as a stand-alone PC for general business use.

9 SYS PERFORMANCE 850A

NEW WHAT'S HOT: With twin 20.5GB hard drives (connected by a Promise Ultra ATA/66 RAID card), the Sys Performance 850A offers ample storage. One of the first Athlon-850 systems we've tested for the Top 100, it sprinted to a 198 on our PC WorldBench 2000 benchmark tests, a respectably high score even for a system

running Windows NT 4.0.

WHAT'S NOT: For \$2699, we'd like to see more than just a standard 17X-40X CD-ROM drive.

> WHAT ELSE: The 19-inch ViewSonic Professional Series PF790 monitor uses a "perfect flat" picture tube. It produces crisp text up to

the maximum resolution of 1280 by 1024, but colors looked washed

out. The Matrox G400 Max graphics card offers comprehensive output options: dual-head display, S-Video, and composite out



SAME POWER, LESS MONEY: Polywell lopped \$120 off the price of the Poly 800K7, lowering it to \$2275.

for connecting a second monitor or for television or DVD playback.

BEST USE: With an Athlon-850 CPU inside, this PC should keep corporate users ahead of the game for a while.

10 POLYWELL POLY 800K7

WHAT'S HOT: The 19-inch ViewSonic E790 monitor displayed great-looking colors and easily readable text up 1600 by 1200 resolution. And because the Vision-Tek NV994 graphics board includes a digital output port, you can use it to drive a digital flat-panel monitor.

WHAT'S NOT: The Poly's cramped interior doesn't give you much room to work in, and the rear ports are labeled with stickers that could easily come off.

WHAT ELSE: Though the 800K7's score of 151 on PC WorldBench 2000 was one of the highest by an Athlon-800 unit running Windows 98, it still just matches that of the PIII-700-equipped ABS Performance 1. The PC uses two 13.6GB hard drives connected to an IDE RAID card to speed disk-intensive tasks. The thick system manual contains detailed information but too few illustrations. A cut of \$120 brings the price down to \$2275.

BEST USE: This Poly makes a fast utility vehicle for a small office.

ALSO NEW THIS MONTH



WE EVALUATED the following systems along with the others, but they didn't score high enough to reach the Top 10 Power PCs

chart. For write-ups, visit PCWorld.com (www.pcworld. com/t10pcs).

- ♦ HP Vectra VL600
- ♦ NEC PowerMate 2000
- Premio Apollo 820



Performance 850A contains two 20.5GB hard drives connected by a Promise Ultra ATA/66 RAID card for a whopping 41GB of storage space.



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- 19" / 18" VIS
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- 0.25 dot pitch
- Flat Square
- 1600 X 1200 max, res.
- TC092

VL950ST

- •19" / 18" VIS
- · Short-length CRT
- 0.25 dot pitch
 - Flat Square • 1600 X 1200 max, res.
 - 4+1 USB power hub on swivel base
 - TC095

TC099

PR960F

- •19" / 18" VIS
- Sony FD Trinitron ® CRT
- 0.24 mm aperfure grille
- 1600 X 1200 max, res.
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• Full 18.1" TFT Active Matrix Flat Panel

True 1280 X 1024 SXGA resolution

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PR1400F EX1300

- •21" / 19.8" VIS • 21" / 20" VIS
- Sony FD Trinitron © CRT
- 0.24 mm aperture grille
- 2048 X 1536 max. res.
- 4+1 USB power hub
- · BNC connectors TCD99
- · BNC connectors
- High Contrast Flat Square
- 0.22mm horizontal dot pitch
- 1800 X 1440 max. res.
- 4+1 USB power hub
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PV880

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TOP 10 MIDRANGE PCs

	SYSTEM: \$1200 TO \$1999	Month tested	★ Overall rating	Street price (3/10/00)	PC WorldBench 2000 Faster performance score	Base configuration
1	Dell Dimension XPS T600r 800/388-8542 www.dell.com	May 00	91	Average: \$1589	Good 136	Very good: Pentium III-600E, 128MB of SDRAM, 256KB L2 cache, 20.4GB hard drive, 17-inch monitor, Windows 98 SE
2	Dell OptiPlex GX110 800/388-8542 www.deil.com	May 00	90	Average: \$1604	Very good 173	Good: Pentium III-600, 128MB of SDRAM, 512KB L2 cache, 13.6GB hard drive, 17-inch monitor, Windows NT 4.0
3	Micron Millennia Max 667 800/642-7667 www.micronpc.com	May 00	87	Average: \$1775	Very good 143	Very good: Pentium III-667, 128MB of SDRAM, 256KB L2 cache, 27GB hard drive, 17-inch monitor, Windows 98 SE
4	CyberMax Enthusiast K7-750 800/437-4596 www.cybermaxpc.com	NEW	87	Average: \$1649	Outstanding 154	Very good: AMD Athlon-750, 128MB of SDRAM, 512KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
5	Gateway GP7-700 800/846-2000 www.gateway.com	May 00	87	Average: \$1758	Very good 147	Good: Pentium III-700, 128MB of SDRAM, 256KB L2 cache, 10GB hard drive, 17-inch monitor, Windows 98 SE
6	Micro Express MicroFlex-700C 800/989-9900 www.microexpress.net	May 00	86	Very inexpensive: \$1249	Good 134	Good: AMD Athlon-700, 128MB of SDRAM, 512KB L2 cache, 18GB hard drive, 17-inch monitor, Windows 98 SE
7	Quantex SM700 800/896-4898 www.quantex.com	NEW	84	Average: \$1699	Very good 143	Very good: Pentium III-700, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
8	Systemax Ascent PVO-600A 800/875-8430 www.systemaxpc.com	May 00	83	Inexpensive: \$1449	Good 131	Very good: AMD Athlon-600, 128MB of SDRAM, 512KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
9	Sys Performance 750 800/613-9963 www.sys.com	NEW	82	Expensive: \$1899	Outstanding 151	Very good: Pentium III-750, 128MB of SDRAM, 256KB L2 cache, 20.5GB hard drive, 17-inch monitor, Windows 98 SE
10	NuTrend AMD K7-600 888/482-6678 www.nutrend.com	NEW	81	Inexpensive: \$1499	Good 127	Outstanding: AMD Athlon-600, 128MB of SDRAM, 512KB L2 cache, 20.5GB hard drive, 19-inch monitor, Windows 98 SE
	Best Buy	Percent of overa	II 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. See "Your Guide to the Top 100" on page 199.



A NEW CYBERMAX almost breaks into Best Buy territory, occupied this month by returning 600-MHz Dellsbut its Enthusiast K7-750 falls two notches short, coming in

at number four. The lower half of the chart experiences a major shakeup, however. Three systems—the Quantex SM700, the Sys Performance 750, and the NuTrend AMD K7-600-make their debuts on our leader board, claiming the seventh, ninth, and tenth spots, respectively.

1 DELL DIMENSION XPS T600R



WHAT'S HOT: With a Pentium III-600E CPU, this Dimension earns a respectable PC WorldBench

2000 score of 136-on a par with some PIII-700s we've tested. Four open slots (three PCI and one ISA) and four open bays offer room for expansion components in this midsize tower's smallish interior. Dell keeps the system's price moderate, despite including Microsoft Office 2000 Professional SBE.

WHAT'S NOT: You can type smoothly on the solid Dell QuietKey keyboard, but not as quietly as its name suggests. The Dimension's standard labor warranty lasts for only a year; however, Dell's systems earn Outstanding reliability scores.

WHAT ELSE: The system ships with thorough documentation, including a setup poster and guide, and a thick reference and troubleshooting manual. The side of the case comes off easily after you loosen a thumbscrew and lift two levers.

BEST USE: With its high-end office suite, this Dimension would excel as a robust starter system for a small business.

2 DELL OPTIPLEX GX110



WHAT'S HOT: The GX110's price dropped \$273 to a more affordable \$1604—an average price for our

midrange chart. With a Pentium III-600 CPU and Windows NT 4.0, the OptiPlex GX110 earned an impressive 173 score on PC WorldBench 2000. The system's expansion cards connect to a riser card that slides out for easy access. Upgrading will be a snap with four open slots and three open bays, and your IS department will appreciate the easy-service case on this midsize tower.

WHAT'S NOT: The integrated audio and low-end speakers produce weak, tinny sound. If you can talk your IS department into it, upgrade to external Harman/Kardon HK195 speakers for \$20 more.

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).

³ For more information about all the products listed in this table, select number 907 on the product informa-tion card or visit www.pcworld.com/productinfo.

Extra features	Design and expandability ²	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)	Product info number
Good: NVidia TNT2 M64 graphics card with 32MB of RAM, 17X-48X CD-ROM drive, V.90 modem, Microsoft Office 2000 SBE, Microsoft IntelliMouse	Good: solid, easy-to-remove side panel; mid- size tower; 4 open drive bays, 4 open slots	Outstanding	Good/ Good	24/7, toll-free	3/1	2
Good: integrated Intel 810 graphics with UMA and 4MB of 3D cache, 17X-40X CD-ROM drive, network card, chassis intrusion detection, case lock	Good: sturdy, lots of expansion room; midsize tower; 3 open drive bays, 4 open slots	Outstanding	Good/ Outstanding	24/7, toll-free	3/3	-
Good: Creative Labs TNT2 6870 graphics card with 32MB of RAM, 8X DVD- ROM drive, V,90 modem, Microsoft Office 2000	Good: ample expansion room; midsize tower; 5 open drive bays, 4 open slots	Good	Good/ Outstanding	24/7, toll-free	Varies 1/3	677
Good: NVIdia GeForce 256 graphics card with 32MB of RAM, 12X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	Very good: sleep and reset buttons on case; midsize tower; 4 open drive bays, 5 open slots	Fair ⁵	Good */ Good	24/7, toll-free	3/1	678
Outstanding: 3dfx Voodoo3 3000 graphics card with 16MB of RAM, 17X-40X CD-ROM drive, V.90 modem, network card, lomega Zip 100 drive	Good: great monitor; midsize tower; 5 open drive bays, 2 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3	679
Good: ATI Xpert 2000 graphics card with 32MB of RAM, 8X DVD-ROM drive, V.90 modem, Microsoft Natural keyboard	Very good: roomy, easy-access case; midsize tower; 4 open drive bays, 4 open slots	3	Fair 5/ Outstanding	24/7, toll-free	4/4	680
Good: NVidia RIVA TNT2 graphics card with 32MB of RAM, 12X DVD-ROM drive, V.90 modem, lomega Zip 250 drive, Corel WordPerfect Office 2000	Very good: multimedia keyboard; minitower; 3 open drive bays, 4 open slots	Good ⁵	Good '/ Good	24/7, toll-free	3/1	681
Good: NVidia Vanta graphics card with 16MB of RAM, 4X/4X/24X CD-RW drive, V.90 modem, Microsoft Office 2000 Small Business Edition	Very good: easy access via handy lever; mid- size tower; 4 open drive bays , 4 open slots		Fair 3/ Good	24/7, toll-free	5/3	682
Good: Hercules 3D Prophet DDR-DV1 graphics card with 32MB of RAM, 17X-40X CD-ROM drive, network card, case lock	Good: spacious, clutter-free interior; midsize tower; 5 open drive bays, 4 open slots		Good ³ / Good	24/7, toll-free	3/5	683
Good: ATI Rage 128 graphics card with 32MB of RAM, 8X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000, microphone	Good: multimedia buttons on keyboard; mid- size tower; 4 open drive bays, 4 open slots		Fair ^s / Good	24/7, toll-free	3/Lifetime	684
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support	and warranty: 15	percent	

Five years on CPU and main RAM. three years on other parts.

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.

WHAT ELSE: The system ships with a common two-button mouse (upgrading to an IntelliMouse costs \$29 extra). The GX110's distinctly corporate configuration includes full remote management, integrated video, chassis intrusion detection, and a case lock.

BEST USE: This powerful managed PC is sure to be a front-runner on any corporation's approved list.

3 MICRON MILLENNIA **MAX 667**

WHAT'S HOT: This Pentium III-

667 system earned a score of 143 on our PC WorldBench 2000 tests, outperforming some PIII-700s we've tested under Windows 98 SE. It ships with encyclopedic documentation and tutorials, including a quick-setup guide; a detailed system manual; and a year of free, unlimited access to Micron University, the compa-



JUST IN CASE: The CyberMax Enthusiast K7-750 provides handy sleep and reset buttons.

ny's online training classes. Even the bundled Microsoft Office 2000 Professional suite won't come close to filling the monstrous 27GB hard drive.

WHAT'S NOT: This large midsize tower lacks a reset button. Though you don't need tools to access the interior, reattaching the side panel can be tricky.

WHAT ELSE: There's plenty of expansion room in the neat interior-four open PCI slots and five open bays. You'll have to wriggle through some wires to install additional RAM, however. The 8X DVD-ROM drive played our test movie smoothly, but it bogged down a bit when we opened other applications. Although the system is designed to accommodate additional fans, it already comes with threeone for intake, one for exhaust, and another inside the power supply.

BEST USE: This affordable, well-rounded machine is best suited for a small business or home office that needs to run a powerful application suite.

4 CYBERMAX ENTHUSIAST

NEW WHAT'S HOT: Quicker than some Athlon-800 systems we've tested, this Enthusiast posted an impressive PC WorldBench 2000 score of 154, and



its \$1649 price tag won't break the bank. The system is easy to put together, with a handy quick-setup guide, color-coordinated ports, and a detailed system manual filled with helpful illustrations.

lomega Zip 250 drive, which is also handy for backups.

WHAT'S NOT: We weren't impressed with the system's display. Colors on the 17-inch CyberMax CX750N monitor appeared washed out in all our image tests, and text blurred when we cranked up the resolution to 1600 by 1200.

WHAT ELSE: Though the case comes off easily, accessing the five open slots (four PCI and one ISA) and four open bays is difficult in the slightly cluttered interior. But the generous software bundle offers Corel's WordPerfect Office 2000, Grolier's Multimedia Encyclopedia Deluxe Edition on DVD-ROM, and Sierra's Visual Home and Master Cook CD-ROMs.

BEST USE: For its moderate price, the Enthusiast K7-750 packs performance and features that any home-office or small-business user would appreciate.

5 GATEWAY GP7-700

WHAT'S HOT: With a Pentium III-700 processor, the GP7-700 earned a respectable score of 147 on our PC World-Bench 2000 tests—the highest among similarly configured systems on the midrange chart. For a moderate price, this exceptionally well-equipped PC includes an Iomega Zip 100 drive, a network card and a modem, and an APC surge suppressor that protects eight outlets and two

phone lines. Getting inside the case is simple, thanks to a side panel that slides off smoothly after you twist a couple of thumbscrews.

WHAT'S NOT: Expansion options are limited. You get just two open slots—one PCI, one ISA—and

> interior cabling obstructs access to memory upgrade slots. The system's 10GB hard drive is the smallest on the chart.

what else: Documentation includes a detailed setup guide and a system manual with many color illustrations. The twospeaker Cambridge SoundWorks SBS52 pumps out rich sound, and

the solid keyboard allows smooth typing. **BEST USE:** Targeted at small to medium-size businesses, the GP7-700 combines office-ready features with raw power.

6 MICRO EXPRESS MICROFLEX-700C

WHAT'S HOT: This MicroFlex makes upgrades a snap. Turn one large thumb-screw at the top of the case, and either side pops off (and reattaches) smoothly.

Though the interior is a bit cluttered, it has four open expansion slots and four open drive bays. The comfy Microsoft Natural ergonomic keyboard makes typing a pleasure. Micro Express offers a generous four-year parts and labor warranty.

WHAT'S NOT: Our test movie on the 8X DVD-ROM drive paused occasionally when we opened other applications. The thick system manual contains many photos, but the pictures are tough to make out. Micro Express's tech support quality rated only Fair in our anonymous calls.

WHAT ELSE: This model's WorldBench 2000 score of 134 falls near the average for Athlon-700 systems we've tested. The 17-inch Impression 7Plus DE-770 monitor displayed deep, rich colors; text remained sharp at 1024 by 768 but blurred a bit at 1280 by 1024.

BEST USE: This system would be at home in any small office that needs athletic performance at a bargain price.

7 QUANTEX SM700

NEW WHAT'S HOT: Setting up this Quantex proves simple, thanks to color-coordinated ports labeled with icons and to substantial documentation, includ-

When System Warranties Conflict

TECH TREND ALMOST ALL NEW PCs come with an overall system warranty, but some vendors offer conflicting and confusing coverage for individual components. For example, some machines have a standard three-year system warranty buttressed by a five-year warranty on the CPU and RAM. Who do you call in year four or five if you run into a problem—the system vendor or the component vendor? We checked around and discovered that on most occasions when something goes wrong, you should call the system vendor first.

"The customer goes through us for everything," says Matt Adams, who serves as manager of emerging technology for Systemax. "As a result, they never have to deal with another vendor."

Sys Technology spokesperson Bill Berry agrees. "Even if a warranty is expired, we'd still like them to contact us so we can try to help them out," he says.

Mona Pal, desktop product manager for Toshiba Computer Systems Group, says Toshiba handles the situation differently. "If a component warranty for a CPU were to outlive the overall system warranty, the customer should contact the hardware vendor, whether it be Intel or AMD," she says.

Generally, though, even if you must ultimately obtain coverage from an individual component vendor, it's a good idea to check with your system manufacturer first. The PC maker can help point you in the right direction.



Small Price Huge Value

If you're searching for a high-performance multimedia notebook that doesn't come with a highend price tag, take a closer look at this NEW WinBook Si.



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ing guides for components. Users with big storage needs will like the 20GB hard drive and Iomega Zip 250 drive. The SM700 also comes with useful smalloffice features such as a 12X DVD-ROM drive and Corel WordPerfect Office 2000. WHAT'S NOT: You'll have a tough time reattaching the case's flimsy side, and the cramped interior adds extra work to expansion efforts.

WHAT ELSE: With a score of 143 on our PC WorldBench 2000 tests, the SM700 keeps pace with comparable Pentium III-700 systems. Colors on the 17-inch Quantex XP175D monitor were deep and rich; text looked sharp at standard resolutions but blurred at higher ones. An S-Video output port on the NVidia RIVA TNT2 graphics card lets users switch between a TV and the monitor. Inside, four slots (including three PCI) and three bays provide adequate room to expand.

BEST USE: A small office looking for a lot of storage and midlevel performance would be pleased with this Quantex.

8 SYSTEMAX ASCENT PV0-600A

WHAT'S HOT: Solid multimedia hardware surrounds this reasonably priced (\$1449) machine. The 17-inch AOC Spectrum 7Glr monitor produced rich, saturated colors and crisp text, and the Cambridge SoundWorks SBS52 three-speaker set pumps out powerful sound. Unless you traffic in gargantuan files, the 20GB hard drive will take a while to fill up, and the 4X/4X/24X CD-RW drive lets you write and rewrite data to your heart's content. Interior access is outstanding: The mid-



MULTIMEDIA POWERHOUSE: The NuTrend AMD K7-600 also comes with a microphone.

size tower's case pops off when you depress a lever on the side.

WHAT'S NOT: Though it permits quiet typing, the keyboard feels cheap and flexes easily.

WHAT ELSE: The Ascent PVO-600A earned a 131 on our PC WorldBench 2000 test suite-that's about average for an Athlon-600 system running Windows 98 SE. Cables crisscross the interior, but you get unimpeded access to the four open slots (three PCI and one ISA) and four open drive bays. BEST USE: Thanks to its CD-RW drive, top-notch monitor, and good sound system, the Ascent PVO-600A makes a very attractive multimedia PC.

9 SYS PERFORMANCE 750

NEW WHAT'S HOT: Powerful and quick, this Sys Performance earned a 151 on our PC WorldBench 2000 tests, a strong score for a Pentium III-750 running Windows 98 SE. A neat and roomy interiorwith cabling bundled and pulled out of the way-offers access to four open PCI slots and five open bays. Corporate users will appreciate the case lock and network interface card-valuable extras for the midrange price of \$1899.

WHAT'S NOT: No overall system manual or setup poster ships with the system, so setup and maintenance could be confusing for nontechnical users.

WHAT ELSE: Colors appeared rich and text sharp at a resolution of 1024 by 768, but both looked fuzzy at 1600 by 1200 on the 17-inch Sys SPM-17-MS monitor. A Her-

cules 3D Prophet DDR-DV1 graphics card uses the faster double-data-rate memory and offers both digital and S-Video output-top-notch features for graphics-intensive work. Because the graphics card doubles as a DVD hardware accelerator, including a DVD-ROM drive with the system would have made sense, but instead you get a 17X-40X CD-ROM drive.

BEST USE: The workplace-ready Sys Performance 750 is a capable, reliable machine for running just about any business application.



tidy Interior of the Sys Performance 750 offers generous expansion room, including four RAM slots, one more than are typically found inside a PC.

10 NUTREND AMD K7-600

NEW WHAT'S HOT: Multimedia goodies abound in the NuTrend AMD K7-600's configuration. The 8X DVD-ROM drive offers smooth software-decoded video playback, and the solidly constructed keyboard provides additional programmable buttons. A large binder contains the comprehensive, well-illustrated system documentation, as well as the software bundle. which includes a copy of Corel WordPerfect Office 2000.

WHAT'S NOT: A below-average score of 127 on our PC WorldBench 2000 tests was all the PC's Athlon-600 CPU could manage. WHAT ELSE: Colors appeared washed out on the 19-inch ADI GD-166G monitor, but text remained sharp up to the maximum resolution of 1600 by 1200. The ATI Rage 128 graphics card offers S-Video and composite outputs for sending PC signals to a television. The roomy interior has four open slots (three PCI and one ISA) and four open bays for expansion.

BEST USE: Despite the monitor's rather lackluster color display, this NuTrend makes a choice presentation system.

LSO NEW THIS MONTH



We evaluated the following systems along with the others, but online they didn't score high enough to

reach the Top 10 Midrange PCs chart. For our capsule write-ups, visit PCWorld.com (www. pcworld.com/t10pcs).

- HP Brio BA600
- ◆ LEK SpeedPro III 4733

The Fastest Burn in the CD World



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Imagine burning CDs at 12X. Cool, huh? Just the spark. Rewrite at up 4X. And read CDs at up to 32X.

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It's the perfect solution for archiving images, mastering new software, creating multimedia and custom audio discs and many more applications that require a CD solution of exceptional quality and performance.

Choose the PlexWriter 12/4/32 external drive, the latest star from the award-winning developer Plextor[®].

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TOP 10 BUDGET PCs

_						
	SYSTEM: UNDER \$1200	Month tested	★ Overall rating	Street price (3/10/00)	PC WorldBench 2000 Fester performance score '	Base configuration
1	Micro Express MicroFlex-600A 800/989-9900 www.microexpress.net	NEW	91	Average: \$1099	Outstanding 134	Outstanding: AMD Athlon-600, 128MB of SDRAM, 512KB L2 cache, 18GB hard drive, 17-inch monitor, Windows 98 SE
2	NuTrend Sierra LE 888/482-6678 www.nutrend.com	May 00	85	Average: \$1139	Very good 120	Very good: Pentium III-500, 128MB of SDRAM, 512KB L2 cache, 13.5GB hard drive, 17-inch monitor, Windows 98 SE
3	Ouantex SB500c 800/896-4898 www.quantex.com	May 00	83	Inexpensive: \$949	Good 101	Good: Celeron-500, 64MB of SDRAM, 128KB L2 cache, 13.6GB hard drive, 17-inch monitor, Windows 98 SE
4	AcerPower 4400 800/733-2237 www.acer.com	May 00	83	Expensive: \$1199	Very good 118	Good: Pentium III-600, 64MB of SDRAM, 512KB L2 cache, 10.2GB hard drive, 17-inch monitor, Windows 98 SE
5	NuTrend Athlon Force 2 888/842-6678 www.nutrend.com	NEW	83	Expensive: \$1199	Outstanding 133	Very good: AMD Athlon-650, 128MB of SDRAM, 512KB L2 cache, 15.4GB hard drive, 17-Inch monitor, Windows 98 SE
6	Ouantex M650 800/896-4898 www.quantex.com	NEW	81	Average: \$1149	Very good 121	Good: Pentium III-650, 64MB of SDRAM, 256KB L2 cache, 15GB hard drive, 17-inch monitor, Windows 98 SE
7	HP Brio BA200 800/752-0900 www.hp.com/desktops/brio	May 00	80	Inexpensive: \$898	Satisfactory 99	Good: Celeron-500, 64MB of SDRAM, 128KB L2 cache, 4.3GB hard drive, 17-inch monitor, Windows 98 SE
8	Racer PC500c 800/454-9713 www.racerpc.com	May 00	78	Inexpensive: \$949	Good 102	Good: Celeron-500, 64MB of SDRAM, 128KB L2 cache, 8.4GB hard drive, 17-inch monitor, Windows 98 SE
9	AcerPower 8400 800/733-2237 www.acer.com	May 00	77	Expensive: \$1199	Good 104	Good: Pentium III-500, 64MB of SDRAM, 512KB L2 cache, 10.2GB hard drive, 17-inch monitor, Windows 98 SE
10	Amax MicroPlex 5000 800/800-6328 www.amax.com	May 00	77	Average: \$999	Satisfactory 96	Good: Celeron-533, 64MB of SDRAM, 128KB L2 cache, 10.2GB hard drive, 17-inch monitor, Windows 98 SE
	Best Buy	Percent of overa	II rating >	Price: 22 percent	Performance: 13 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 199.



BUDGET PROCESSING POWER shoots way up this month as two new 650-MHz PCs grace the chart: The NuTrend Athlon Force 2, based on an AMD Athlon CPU,

occupies the fifth spot, and the Quantex M650, based on an Intel Pentium III, takes number six. Another newcomer, Micro Express's MicroFlex-600A, tops the list thanks to great performance from a 600-MHz processor and an excellent all-around package.

1 MICRO EXPRESS MICROFLEX-600A



WHAT'S HOT: Its Athlon-600 processor propelled the MicroFlex-600A to an outstanding score of NEW 134 on our PC WorldBench 2000

tests, higher than any other machine on the budget chart. For users concerned with ergonomics, a Microsoft Natural keyboard permits comfortable, quiet typing. Inside the midsize tower, we found an uncluttered interior with three open PCI slots

and four open bays for lots of expansion. The MicroFlex-600A also has the largest hard drive on the chart: a generous 18GB. WHAT'S NOT: This well-rounded system is hard to knock, though business users might wish for a network card instead of a modem for connectivity.

WHAT ELSE: A well-organized system manual provides lots of information, including a detailed glossary, but the blurred images look like photocopies. Colors on the 17-inch Impression 7VX monitor appeared deep and rich, while text remained crisp except at the highest resolution of 1600 by 1200. The ATI Rage Fury graphics card offers S-Video and composite output, a boon for presenters. A 6X DVD-ROM drive is a pleasant surprise at this unit's bargain price of \$1000. BEST USE: This is an excellent generaluse system for a small office looking for performance on a budget.

2 NUTREND SIERRA LE



WHAT'S HOT: The Sierra LE costs \$1139 and boasts features and performance that put many midrange

systems to shame. It comes with an 8X DVD-ROM drive that maintained smooth playback even when we opened other applications. The keyboard offers convenient application-launching buttons. The ATI Rage Fury Pro 3D 2X graphics card provides a TV-out port for putting your PC display on a television monitor.

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 904 on the product information card or visit www.pcworld.com/productinfo.

Extra features	Design and expandability ^z	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)	Productinfo number
Good: ATI Rage Fury graphics card with 32MB of RAM, 6X DVD-ROM drive, V.90 modem, hardware MPEG	Very good: easy motherboard access; mid- size tower; 4 open drive bays, 3 open slots		Fair '/ Good	24/7, toll-free	4/4	647
Good: ATI Rage Fury Pro 3D 2X graphics card with 32MB of RAM, 8X DVD-ROM drive, V.90 modem	Good: interior messy but expandable; mid- size tower; 4 open drive bays, 4 open slots		Fair */ Good	24/7, toll-free	3/Lifetime	648
Good: Integrated Intel 810 graphics with UMA, 24X-48X CD-ROM drive, V.90 modem, network card, Corel WordPerfect Office 2000	Good: removing side panel takes work; mid- size tower; 4 open drive bays, 1 open slot	Good *	Good 1/ Good	24/7, toll-free	3/1	649
Good: Acer NVidia TNT2 graphics card with 16MB of RAM, 12X-40X CD-ROM drive, network card, chassis intrusion detection, case lock, LANDesk software	Good: RAM sockets hard to access; desktop; 3 open drive bays, 2 open slots	Fair	Poor '/ Good	24/7, toll-free	3/3	650
Good: ATI Rage 128 graphics card with 16MB of RAM, 8X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	Good: neat interior; midsize tower; 4 open drive bays, 4 open slots	1.4	Fair */ Good	24/7, toll-free	3/Lifetime	651
Good: integrated Intel 810 graphics with UMA, 12X DVD-ROM drive, V.90 modem, Corel WordPerfect Office 2000	Good: programmable keyboard buttons; mid- size tower; 4 open drive bays, 2 open slots	Good 4	Good '/ Good	24/7, toll-free	3/1	652
Satisfactory: integrated Intel 810 graphics with UMA, 17X-40X CD-ROM drive, V.90 modem	Satisfactory: small case cluttered inside; minitower; 1 open drive bay, 2 open slots	Good	Good/ Fair	24/7, toll call	1/1	653
Satisfactory: integrated Intel 810 graphics with UMA, 4.8X DVD-ROM drive, V.90 modem	Good: side handles on case; minitower; 1 open drive bay, 3 open slots	•	Fair '/ Good	24/7, toll-free	3/3	654
Good: ATI Xpert 98 AGP graphics card with 8MB of RAM, 24X-40X CD-ROM drive, network card, chassis intrusion detection, case lock, Wake-on-LAN	Good: slightly cramped interior; minitower; 3 open drive bays, 2 open slots	Fair	Poor */ Good	24/7, toll-free	3/3	655
Good: integrated Intel 810 graphics with UMA and 4MB of display cache, 8X DVD-ROM, network card	Good: well-kept interior; minitower; 2 open drive bays, no open slots	*	Poor */ Good	24/7, toll-free	3/1	656
Extra leatures: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support a	nd warranty: 15 p	percent	

^{&#}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.

WHAT'S NOT: Though you get a quicksetup guide, the skimpy manual provides little troubleshooting information. The interior wiring is messy, hampering access to components.

WHAT ELSE: The 17-inch Optiquest Q71 monitor produced bright, crisp colors and sharp text at resolutions up to 1280 by 1024. With four open slots (two PCI and two ISA) and four open bays, the Sierra LE offers lots of expansion room. This Pentium III-500 system earned a World-Bench 2000 score of 120, about average for systems we've tested in its class.

BEST USE: Frequent presenters can use the fast Sierra LE for day-to-day work.

3 QUANTEX SB500C

WHAT'S HOT: Packing both a modem and a network interface card, the SB500c is ready for any kind of connectivity. At \$949, this system delivers pretty good bang for your buck. Quantex's 17-inch MON-XP170DP monitor displayed our test images with deep, rich colors, and text stayed sharp up to the maximum resolution of 1280 by 1024. If that's not good enough, the SB500c-unlike most systems with integrated graphics-offers an AGP slot for upgrading.

WHAT'S NOT: To remove the flimsy side panel of the midsize tower, you must remove two screws and jimmy it back and forth. The cluttered interior offers limited expandability: four open bays but only one open PCI slot.

WHAT ELSE: This Quantex system's performance score of 101 on our PC

WorldBench 2000 tests is about average for the Celeron-500 systems we've tested. The keyboard is large and solid and has extra multimedia keys, but it clacks a bit as you type. Documentation includes a



back is processed by an MPEG PCI expansion card that attaches directly to the DVD-ROM drive.

> slim system manual filled with screen shots, and a Windows 98 setup guide. BEST USE: A strong performer for the price, this Quantex would suit almost any small business on a tight budget.

4 ACERPOWER 4400

WHAT'S HOT: Tons of illustrations and loads of excellent upgrading information fill this PC's system manual. The welldesigned desktop includes a case lock and a cover that slides off easily. The system also comes with Wake-on-LAN and chassis intrusion detection, as well as Intel's LANDesk Client Manager on disk.

WHAT'S NOT: The added features collide-literally. We had trouble reattaching the case cover because it didn't quite line up with the lock. Reaching an internal drive bay requires removing a metal panel secured by an easy-to-lose screw.

WHAT ELSE: The AcerPower 4400 earned a score of 118 on our PC WorldBench 2000 tests-a tad below average for PIII-600 systems we've tested (but still pretty darn fast for a budget system), due in part to its modest 64MB of RAM. Within its space-saving desktop case, the AcerPower provides two open slots and three open bays. Advent's AV120 two-speaker set attaches to the sides of the monitor; it's easy to set up but delivers mediocre sound.

BEST USE: With a slim desktop design and useful management features, the AcerPower 4400 would make a capable corporate PC for users trying to save both space and a few bucks.

5 NUTREND ATHLON FORCE 2

NEW WHAT'S HOT: The Athlon Force 2 is an upgrader's dream. To access its orderly interior, you simply remove one screw on the midsize tower's top and slide out the side panel. Inside, you'll find generous room for expansion (four open slots

ACCOMMODATING PC: The motherboard inside the Quantex M650 supports Slot 1 and Socket 370 CPUs.

and four open bays). A large, wellorganized, and colorful binder contains copious documentation and bundled software (including Corel's WordPerfect Office 2000 suite). Less-technical PC users will appreciate the system's well-labeled exterior.

WHAT'S NOT: You'll want to get another display if you buy the Force 2. Colors on the 17inch Optiquest Q71 monitor appeared diluted, and text was unreadable at the maximum resolution of 1280 by 1024. At \$1199, this system is at the upper end of our budget range.

WHAT ELSE: The Force 2's score of 133 on our PC WorldBench 2000 tests matched the average for similarly con-

figured Athlon-650's we've tested. Reset and sleep buttons are located conveniently on the front of the case, and ports are color-coded and labeled for easy setup.

BEST USE: The Athlon Force 2's handy midrange features and outstanding performance shouldn't disappoint small- and home-office users-although you will want to purchase a better monitor.

6 QUANTEX M650

NEW WHAT'S HOT: With its color-coordinated, icon-labeled rear ports and its helpful quick-setup guide, the Quantex M650 comes together easily. For future CPU upgraders, the system's motherboard accommodates both Slot 1 and Socket 370 processors, supporting a broader range of choices. Programmable buttons, including CD-ROM/DVD-ROM

> and volume controls, come in handy on the comfortable, solidly constructed keyboard. WHAT'S NOT: Though quick for a budget system, the M650's score of 121 on our PC World-Bench 2000 tests fell significantly short of marks posted by most other Pentium III-650 units we've tested. This lag is due in part to the integrated graphics, which draw from the system's 64MB of RAM.

WHAT ELSE: Colors on the Quantex DP1727 17-inch mon-



pull you out of a jam if your system hangs, appear on the front case of NuTrend's Athlon Force 2.

itor looked deep and rich, but text blurred at the standard resolution of 1024 by 768 and was almost unreadable at the maximum of 1280 by 1024. The two open PCI slots and four open bays provide adequate room for expansion.

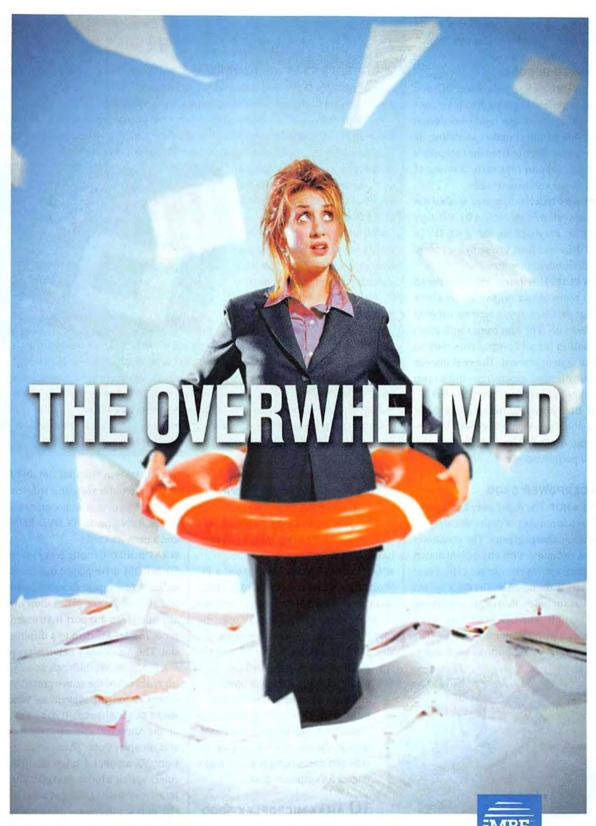
BEST USE: The M650 would make a capable addition to any small office.

7 HP BRIO BAZOO

WHAT'S HOT: At \$898, the Brio BA200 will leave a lot of change in your pocket. The system manual contains lots of troubleshooting information and many helpful illustrations, and the HP Brio Assist CD-ROM provides even more advice. If those don't suffice, try HP's tech support line-in our anonymous calls, we've found the reps helpful and easy to reach. WHAT'S NOT: The good tech support will cost you: HP doesn't offer toll-free lines; and after a year, you'll have to pull out a credit card to get them to talk to you.

WHAT ELSE: This Celeron-500 system managed a PC WorldBench 2000 score of 99-average for Celeron-500 units we've tested. Colors on the 17-inch HP 71 monitor appeared deep and rich, with sharp text at most resolutions, though it blurred somewhat at the maximum resolution of 1280 by 1024. If you want to go higher, you'll have to install a PCI graphics card, because you can't upgrade the Brio's integrated Intel 810 AGP graphics.

BEST USE: Any small or medium-size



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business with modest computing needs and budgets should consider this Brio.

8 RACER PC500C

WHAT'S HOT: At \$949, the Racer PC500c is one of the lowest-priced systems on our budget chart. A unique minitower design (with side handles) makes accessing its innards easy. Service from the company's technical support reps earns a rating of Good in our anonymous calls.

WHAT'S NOT: Colors appeared washed out on the system's 17-inch ADI VD-697 monitor. Playback on the 4.8X DVD-ROM drive was poor, primarily because of the substandard monitor.

WHAT ELSE: This Racer's PC WorldBench 2000 score of 102 ranks slightly above average for Celeron-500 systems running Windows 98. The unit comes with documentation for all components, but no overall system manual. The neat interior supports limited expansion-three open PCI slots but only one open drive bay.

BEST USE: Providing solid power at a low price, the Racer would work well for people who don't demand topflight multimedia performance.

9ACERPOWER 8400

WHAT'S HOT: The AcerPower 8400 packs a generous number of desirable corporate features at a bargain price. The minitower comes complete with chassis intrusion detection, a network interface card, a case lock, and Wake-on-LAN. The thick system manual includes thorough upgrading information. The CD-ROM drive even includes a dust cleaner for its lens. The drive also has extra buttons for fast-for-



MOVIE, ANYONE? The budget-priced MicroPlex 5000 from Amax comes with an 8X DVD-ROM drive.

Slot or Socket? Your CPU Knows for Sure

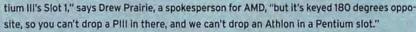
TECH TREND THE MOTHERBOARD ON YOUR PC has a suitable slot or socket to accommodate the CPU it uses. Knowing your sockets and slots may not sound important, but if you ever want to upgrade your CPU, it can spare you a headache.

Most Intel Pentium III processors-mounted on a circuit board and contained inside a cartridge-fit into a 242-pin slot dubbed Slot 1. Most Celerons are encased in plastic packaging and fit into a 370-pin socket dubbed Socket 370. Some motherboards made for Intel CPUs-such

as the one used in the Quantex M650 (number six on the Top 10 Budget PCs chart this month)-include both a Slot 1 and a Socket 370.

AMD processors require still other slots and sockets on the motherboard. Though the Athlon chip sits in a cartridge that physically resembles the Pentium III's Slot 1, it occupies a motherboard space called Slot A.

Slot A "looks identical to the Pen-



So if you are considering inserting a new processor into your motherboard, first consult your PC's manual, open the system case, and look carefully inside-or check the motherboard maker's Web site-to see what slot or socket you've got in your system.

And most important, don't even think about wedging an AMD processor into an Intel slot (or vice versa): You can't fool a motherboard, no matter how hard you try.

ward, play, and other audio CD options. WHAT'S NOT: Colors on the 17-inch Acer 77C monitor appeared washed out, while text blurred at 1024 by 768 and was almost unreadable at the maximum resolution of 1280 by 1024.

WHAT ELSE: This machine earned a PC WorldBench 2000 score of 104, about average for similarly configured Pentium III-500 systems we've tested. To open the case, you must remove two screws; the side panel then slides on and off smooth-

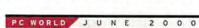
> ly. The small motherboard and small case make using the two open slots and three open bays a bit difficult. BEST USE: The AcerPower 8400 is

> suitable for any business with moderate computing needs; its anti-intrusion and networking features make it ideal for corporate desks.

10 AMAX MICROPLEX 5000

WHAT'S HOT: System documentation comes in a terrific box, with a holder that slides out and dividers that separate all the manuals-including an overall system manual notable for its detailed troubleshooting information. Even at \$999, this Amax carries several extras, including an 8X DVD-ROM drive and a network card.

WHAT'S NOT: On our test system, the DVD-ROM drive played our movie sporadically (the image flickered in and out, and sometimes the player didn't work at all) until tech support instructed us to move the MPEG card to a different PCI slot. The Amax has a Celeron-533 processor, but its PC WorldBench 2000 score of 96 ranks below the scores posted by most other Celeron-500 systems we've tested. WHAT ELSE: Although it has a tidy interior, the Amax includes only two open bays and no open slots. The 17-inch Impression 7VX monitor displays sharp text, but colors appear a bit washed out. The maximum resolution of 1600 by 1200 is attainable only at 256 colors-not a pretty sight. BEST USE: With its built-in network card and low price, this Amax represents an excellent cost-cutter for corporations that don't need extreme speed.



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TOP 15 NOTEBOOK PCs

	POWER NOTEBOOK: \$2700 AND OVER	Month tested	Overall rating	Street price (3/10/00)	PC WorldBench 2000 performance score	Base configuration
1	Gateway Solo 9300LS 800/846-2000 www.gateway.com	NEW	89	Expensive: \$3324	Very good 119	Very good: Pentium III-650/500, 15-inch active screen, touchpad, 64MB of RAM, 6GB hard drive
2	Acer TravelMate 732TLV 800/733-2237 www.acer.com/aac	May 00	87	Inexpensive: \$2799	Very good 120	Outstanding: Pentium III-500, 15-inch active screen, touchpad, 128MB of RAM, 9GB hard drive
3	Dell Latitude CPx H500GT 800/388-8542 www.dell.com	May 00	87	Average: \$3118	Good 114	Very good: Pentium III-500, 14.1-inch active screen, touch pad, eraserhead, 128MB of RAM, 6.4GB hard drive
4	HP OmniBook 900 800/322-4772 www.hp.com/omnibook	NEW	86	Expensive: \$3499	Outstanding 132	Very good: Pentium III-650/500, 13.3-inch active screen, touchpad, eraserhead, 64MB of RAM, 12GB hard drive
5	NEC Versa LXI 800/632-4565 www.nec-computers.com	NEW	85	Very expensive: \$3999	Outstanding 131	Very good: Pentium III-650/500, 15.1-inch active screen, touchpad, 128MB of RAM, 6GB hard drive
	MIDRANGE NOTEBOOK: \$2000 TO \$2699	Percent of over	all rating	Price: 14 percent	Performance: 20 percent	Base configuration: 5 percent
1	Micron TransPort LT C500 800/642-7667 www.micronpc.com	NEW	81	Inexpensive: \$2099	Satisfactory 99	Satisfactory: Celeron-500, 12.1-inch active screen, touch pad, 64MB of RAM, 4.8GB hard drive
2	Enpower ENP-314@P3 800/997-2258 www.enpower.com	NEW	77	Average: \$2299	Outstanding 121	Very good: Pentium III-550, 14.1-inch active screen, touck pad, 128MB of RAM, 6.4GB hard drive
3	Chem USA ChemBook 3015 800/866-2436 www.chemusa.com	May 00	77	Inexpensive: \$2199	Very good 114	Good: Pentium III-500, 14.1-inch active screen, touchpad, 128MB of RAM, 6.5GB hard drive
4	HP Pavilion N3290 800/322-4772 www.hp.com/notebooks	May 00	76	Average: \$2399	Good 109	Good: Pentium III-500, 14.1-inch active screen, touchpad, 64MB of RAM, 66B hard drive
5	Quantex W-1410 800/896-4898 www.quantex.com	May 00	75	Inexpensive: \$2199	Good 109	Good: Pentium III-500, 14.1-inch active screen, touchpad, 64MB of RAM, 6.4GB hard drive
	BUDGET NOTEBOOK: UNDER \$1999	Percent of over	rall rating	Price: 17 percent	Performance: 17 percent	Base configuration: 5 percent
1	Dell Inspiron 3800 800/388-8542 www.dell.com	NEW	89	Expensive: \$1928	Outstanding 101	Good: Celeron-500, 14.1-inch active screen, touchpad, eraserhead, 64MB of RAM, 6GB hard drive
2	Compaq Notebook 100 800/345-1518 www.compaq.com	NEW	84	Inexpensive: \$1449	Good 85	Satisfactory: AMD K6-2-475, 12.1-inch active screen, touchpad, 64MB of RAM, 5GB hard drive
3	Fujitsu LifeBook E-5140 877/372-3473 www.fujitsupc.com	NEW	83	Average: \$1699	Very good 91	Good: Celeron-433, 13.3-inch active screen, ErgoTrac, 64MB of RAM, 6.4GB hard drive
4	Chem USA ChemBook 2000 800/866-2436 www.chemusa.com	NEW	81	Very inexpensive: \$1149	Satisfactory 80	Satisfactory: AMD K6-2-450, 13-inch dual-scan screen, touchpad, 64MB of RAM, 4.3GB hard drive
5	Acer TravelMate 514TXV 800/733-2237 www.acer.com/aac	May 00	80	Expensive: \$1899	Good 83	Good: Celeron-466, 14.1-inch active screen, touchpad, 64MB of RAM, 6.4GB hard drive
	Best Buy	Percent of over	rall rating >	Price: 20 percent	Performance: 14 percent	Base configuration: 5 percent

Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.

For more information about all the products listed in this table, select number 902 on the product information card or visit www.pcworld.com/productinfo.

Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.



READY TO MAKE THE LEAP to Universal Serial Bus peripherals? Expect more laptop companies to attempt to wean you off parallel, serial, and other standard connections

this year in favor of the USB port. Our new midrange Best Buy, Micron's TransPort LT C500 subnotebook, can accommodate an optional USB floppy drive caddy (\$20 extra), and Compaq's new budget-priced Notebook 100 can dock to an optional USB legacy hub.

POWER NOTEBOOKS

GATEWAY SOLO 9300LS



WHAT'S HOT: This big, sophisticated desktop replacement offers a lot in return for a considerable

NEW outlay of cash. The 9300LS with Intel's SpeedStep processor has great battery life, although not quite as long as that of its predecessor, a PIII-450 version we

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
Excellent: 10X-24X CD-ROM drive, V.90 modern, LS-120 drive, fithium ion battery	Excellent: two modular bays offer configuration options	Outstanding: 4:46	Average: 8.6	Good	Good/ Good	24/7, toll-free	3/3	624
Excellent: 6X DVD-ROM drive, V.90 modern, multi- purpose bay takes second lithium ion battery	Average: comes network-ready	Very good: 4:31	Average: 7.9	Fair	Good 3/ Fair	24/7, toll-free	1/1	625
Satisfactory: 4X/4X/24X CD-RW drive, multi- purpose bay takes second lithium ion battery	Excellent: highly configurable but mouse buttons a tad uncomfortable.	Very good: 4:02	Average: 8.3	Good	Good/ Outstanding	24/7, toll-free	3/3	-
Satisfactory: 6X DVD-ROM drive, multipurpose bay, lithium ion battery	Very good: subnotebook stashes drives in external caddy	Satisfactory: 2:44	Light: 6.6	Good	Good ³ / Fair	24/7, toli call	1/1	626
Good: 6X DVD-ROM drive, V.90 modem, multipur- pose bay takes second lithium ion battery	Excellent: clunky but configurable, with external battery gauge	Good: 3:38	Heavy: 9.1	Fair	Fair/ Outstanding	24/7, toll-free	3/3	627
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	percent	
Very good: 10X-24X CD-ROM drive, V.90 modem, multipurpose bay takes second lithium ion battery	Average: lightweight travel laptop can use \$20 USB floppy drive caddy	Satisfactory: 2:32	Light: 6.7	Good	Good/ Fair	24/7, toll-free	Varies 1/1	628
Good: 6X DVD-ROM drive, V.90 modem, lithium ion battery	Average: convenient and comfy overall, but lacks audio niceties	Satisfactory: 2:57	Average: 8.2	1.	Good '/ Fair	Varies,* toll-free	1/1	629
Good: 12X-24X CD-ROM drive, V.90 modem, multi- purpose bay takes second lithium ion battery	Very good: lightweight all-black portable easy on the shoulder	Good: 3:20	Average: 7.6		Good ³ / Fair	24/7, toll call	1/3	630
Good: 6X DVD-ROM drive, V.90 modem, lithium ion battery	Average: listen to music CDs without booting this unit	Satisfactory: 2:52	Average: 7.8	Good	Good 3/ Poor	24/7, toli cali	1/1	631
Very good: 6X DVD-ROM drive, Y.90 modem, multi- purpose bay takes second lithium ion battery	Very good: plain-looking, has so-so sound, but holds two batteries	Good: 3:00	Average: 7.7		Fair '/ Fair	24/7, toll-free	Varies 7/1	632
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	percent	
Good: 10X-24X CD-ROM drive, V.90 modem, multi- purpose bay takes second lithium ion battery	Excellent: thinnish, flexible business laptop comes in different colors	Poor: 1:58	Average: 7.8	Good	Good/ Good	24/7, toll-free	1/1	-
Limited: 12X-24X CD-ROM drive, V.90 modem	Poor: no standard docking station port, but vendor sells USB legacy hub	Satisfactory: 2:36	Average: 7.4	Fair	Fair/ Fair	24/7, toll-free	1/1	633
Good: 12X-24X CD-ROM drive, V.90 modem, multi- purpose bay takes second lithium ion battery	Excellent: slew of extras includes exter- nal buttons for entering passwords	Satisfactory: 2:08	Average: 7.2	Good	Poor/ Fair	24/7, toll-free	1/1	634
Limited: 12X-24X CD-ROM drive, K56flex modem	Average: basic notebook has okay dual- scan screen	Satisfactory: 2:15	Average: 8.0		Good 3/ Fair	24/7, toll call	1/3	635
Good: 6X DVD-ROM drive, V.90 modem, lithium ion battery	Good: all-in-one portable can stand alone as a CD player	Good: 3:46	Average: 7.9	Fair	Good 3/ Fair	24/7, toll-free	1/1	636
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	percent	

* Five years on CPU and main memory, one year on other parts.

5 Insufficient data to give a rating.

* 10 hours of tech support on weekdays, 4 hours on weekends.

Three years on CPU and main memory, one year on other parts.

ranked a Best Buy last month. Two modular bays let you choose what to take along: Instead of the LS-120 drive that our test unit came with, you can swap in a second hard drive or a second battery, or you can swap out the CD-ROM drive for either a DVD-ROM drive or a CD-RW drive. WHAT'S NOT: At \$3324, the Solo 9300LS is not for bargain hunters. And the hard drive is a bit lean for a power portable.

WHAT ELSE: The 9300LS bristles with audio and video extras, including a TV-out port and a Dolby jack for connecting a Surround Sound stereo system. External buttons make playing music CDs more convenient, and four programmable buttons at the top of the keyboard can launch applications. A charge indicator light on the outside

IN CHARGE: An external indicator light on Gateway's Solo 9300LS keeps track of the laptop's battery life.



Micron sells a \$20 USB floppy

caddy that you can connect to the TransPort LT C500 laptop without having to reboot.

of the notebook lets you check on remaining juice without removing the battery. While speedy, the 9300LS performed a bit more slowly than the similarly configured HP OmniBook 900.

BEST USE: Presenters with deep pockets will appreciate this beautifully designed notebook most. With a second battery inserted, the 9300LS should let you work away from an outlet all day.

MIDRANGE NOTEBOOKS

MICRON TRANSPORT LT C500



WHAT'S HOT: The easy-to-tote TransPort LT weighs only 5 pounds, not including the AC

NEW adapter. Any of five devices can plug into its lone internal bay: the floppy drive, the CD-ROM drive, a \$190 6X DVD-ROM drive, a \$139 LS-120 drive, or a \$99 second battery. To make it easier to use the floppy drive externally alongside a device in the bay, Micron sells a \$20 USB floppy drive caddy, which you can plug in without rebooting the notebook.

WHAT'S NOT: For \$2000 these days, we would expect to see something bigger

BEYOND THE TOP 15



WE EVALUATED the following system along with the others, but it didn't reach the Top 15 Notebook

PCs chart. For a write-up, visit PC World.com (www.pcworld.com/top400).

Compag Armada M300

than a 12.1-inch screen. Also, if you need to run diagnostics or recover

> your system using a bootable floppy disk, you will have to use the internal bay, since you can't boot from floppies through the USB port.

WHAT ELSE: For its size and processor, the TransPort LT's 2.5hour battery life and speed generally fall in line. The keyboard has a somewhat shallow feel, but it lets you launch applications via the mouse buttons and one programmable key just right of the spacebar.

BEST USE: The Transport LT would make a fine business laptop for frequent travelers who are willing to sacrifice screen and hard drive size for the portability of a lightweight machine.

BUDGET NOTEBOOKS

1 DELL INSPIRON 3800



WHAT'S HOT: Dell's latest budget business laptop is a head-turner. Its upper casing and screen frame

NEW come in a choice of colors: forest green, sierra maroon, Tahoe blue, or a standard matte gray. The internal bay can hold any of eight different devices (the floppy drive, the CD-ROM drive, a second battery for \$99 extra, a Zip or an LS-120 drive for \$139, an 8X DVD-ROM drive for \$199, or an 18GB hard drive for \$598).

WHAT'S NOT: Though Dell notebooks usually offer good battery life, this Inspiron

3800 disappointingly lasted just under 2 hours in our testsabout 40 minutes less than the average laptop. WHAT ELSE: This Celeron-500 version of the Inspiron 3800 churned through business apps about 7 percent faster than

a Celeron-466. You can reduce its weight to 6 pounds by using an included plastic space holder in the modular bay, and the hard drive and memory are easily reachable for upgrading. Finally, among other perks, there is a video-out jack for sending images to a TV screen.

BEST USE: With refreshing good looks, the Inspiron 3800 is a fine value for companies that are ready to break out of the boxy black laptop mold.

What's New

THIS MONTH'S EASY TOTE award goes to HP's OmniBook 900 (4.6 pounds with no attachments), in a respectable fourth place on our power chart. The \$3499 OmniBook may be the second most expensive machine on the list, but it plows through business tasks the fastest. Its PC WorldBench score of 132 is especially impressive considering the OmniBook had only half as much RAM as other notebooks with similarly high scores.

Change swept through our budget chart this month, leaving only one notebook standing from last month (Acer's Travel-Mate 514TXV, in fifth place). Compaq's \$1449 Notebook 100, in second place, is the company's new low-end business portable, replacing the similarly priced Prosignia 150.

Tired of going through a password screen to log on to the company notebook? The \$1699 Fujitsu LifeBook E-5140, number three on the budget chart, offers four external buttons for punching in a password. Located on the front of the case, the buttons double as application shortcuts when the notebook is running.

Contributing Editor Carla Thornton regularly covers notebooks for PC World.



memory, RAM slots on the bottom of the Dell Inspiron 3800 can easily be reached for upgrading.

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TOP 15 HOME PCs

	POWER SYSTEM: \$2000 AND OVER	Month tested	Overall rating	Street price (3/10/00)	PC WorldBench 2000 performance score ' Faster	Base configuration ²
1	Dell Dimension XPS B733r 800/388-8542 www.dell.com	NEW	96	Very expensive: \$2999	Very good: 146	Very good: Pentium III-733, 128MB of RDRAM, 256KB L2 cache, 20GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
2	Quantex GX800 800/896-4898 www.quantex.com	NEW	92	Average: \$2299	Very good: 147	Very good: Pentium III-800EB, 128MB of SDRAM, 256KB L2 cache 30.7GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
3	Gateway Select 850 800/315-2536 www.gateway.com	NEW	91	Expensive: \$2699	Outstanding: 150	Very good: AMD Athlon-850, 128MB of SDRAM, 512KB L2 cache, 27.3GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
4	Sony VAIO PCV-R549DS 800/655-8246 www.sony.com/pc	May 00	90	Expensive: \$2599	Very good: 147	Good: Pentium III-750, 128MB of SDRAM, 256KB L2 cache, 41GB hard drive, minitower, 17-inch monitor, Windows 98 SE
5	Compaq Presario 5900Z-700 800/345-1518 www.compaq.com	May 00	89	Average: \$2433	Good: 135	Very good: AMD Athlon-700, 128MB of SDRAM, 512KB L2 cache, 34.26B hard drive, midsize tower, 19-inch monitor, Windows 98 St
	MIDRANGE SYSTEM: \$1200 TO \$1999	Percent of overa	II rating >	Price: 5 percent	Performance: 15 percent	Base configuration: 10 percent
1	Dell Dimension XPS T600r 800/388-8542 www.dell.com	NEW	95	Very expensive: \$1929	Very good: 136	Very good: Pentium III-600E, 128MB of SDRAM, 256KB L2 cache, 10.2GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
2	Micron Millennia Max 600 800/642-7667 www.micronpc.com	May 00	94	Expensive: \$1799	Good: 129	Good: Pentium III-600, 128MB of SDRAM, 512KB L2 cache, 20GB hard drive, midsize tower, 17-inch monitor, Windows 98 SE
3	Quantex M750 800/896-4898 www.quantex.com	NEW	93	Average: \$1699	Outstanding: 139	Outstanding: Pentium III-750, 128MB of SDRAM, 256KB L2 cache 20GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
4	HP Pavilion 8660c 800/752-0900 www.hp-at-home.com	May 00	87	Average: \$1598	Satisfactory: 117	Good: Pentium III-533, 128MB of SDRAM, 256KB L2 cache, 20.4Gb hard drive, minitower, 17-inch monitor, Windows 98 SE
5	ABS Multimedia System 1 800/876-8088 www.buyabs.com	May 00	86	Expensive: \$1899	Outstanding: 139	Outstanding: AMD Athlon-700, 256MB of SDRAM, 512KB L2 cache 27GB hard drive, midsize tower, 19-inch monitor, Windows 98 SE
	BUDGET SYSTEM: UNDER \$1200	Percent of overa	II rating >	Price: 15 percent	Performance: 10 percent	Base configuration: 10 percent
1	Dell WebPC 800/388-8542 www.dell.com	May 00	92	Inexpensive: \$848	Satisfactory: 86	Satisfactory: Celeron-466, 64MB of SDRAM, 128KB L2 cache, 6.4GB hard drive, minitower, 15-inch monitor, Windows 98 SE
2	Gateway Astro 800/315-2536 www.gateway.com	May 00	86	Very inexpensive: \$799	Good: 92	Satisfactory: Celeron-400, 64MB of SDRAM, 128KB L2 cache, 4.3GB hard drive, all-in-one, 15-inch monitor, Windows 98 SE
3	CyberMax Enthusiast 500 CBG 800/437-4596 www.cybermaxpc.com	May 00	85	Average: \$949	Good: 107	Very good: Celeron-500, 128MB of SDRAM, 128KB L2 cache, 13GE hard drive, midsize tower, 17-inch monitor, Windows 98 SE
4	Micron Millennia C466 800/642-7667 www.micronpc.com	May 00	83	Average: \$1050	Good: 105	Good: Celeron-466, 64MB of SDRAM, 128KB L2 cache, 13GB hard drive, minitower, 15-inch monitor, Windows 98 SE
5	Quantex M466c 800/896-4898 www.quantex.com	May 00	82	Average: \$949	Good: 98	Good: Celeron-466, 64MB of SDRAM, 128KB L2 cache, 13.6GB har drive, midsize tower, 17-inch monitor, Windows 98 SE
	Best Buy	Percent of overa	Il ration	Price: 20 percent	Performance: 10 percent	Base configuration: 5 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 199.



HALF OF THE PCs in our power and midrange ranks are new. Two debuting Dells-the Dimension XPS B733r and the Dimension XPS T6oor—take the Best Buy in each category.

Meanwhile, Gateway's Select 850 broke the home-PC speed record with a PC WorldBench 2000 score of 150, thanks to an Athlon-850 CPU. For less money, consider Quantex's speedy GX800 or its workhorse M750.

POWER HOME PCs

1 DELL DIMENSION XPS B733R



WHAT'S HOT: This system packs plenty of processing power and extra features. Its Pentium III-733

NEW CPU is complemented by 128MB of the new RDRAM, which is supposed to speed memory-intensive applications

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	Produc info numbe
fery good: Celestica graphics board with 64MB of RAM, 12X DVD- 20M drive, dual V.90/DSL modem, lomega Zip 100 drive	Outstanding/ Good	Very good	Outstanding/ Outstanding	PRO: Fast in games, digital video-out connection for flat-panel dis- plays, booming sound system. CON: Most expensive chart maker.	
outstanding: Guillemot 3D Prophet graphics board with 32MB of AM, 12X DVD-ROM drive, V.90 modem, 4X/2X/24X CD-RW drive	Very good/ Satisfactory	Good	Good/ Good	PRO: Great value, fast all-around performance. CON: Lackluster DVD movie playback, poorly illustrated setup poster.	612
ood: Creative Labs 3D Blaster Annihilator graphics board with 2MB of RAM, 10X DVD-ROM drive, V.90 modem	Outstanding/ Very good	Very good	Fair/ Good	PRO: Fastest PC on the chart, highly expandable. CON: A bit pricey, short on extra features.	613
ood: Asus AGP-V3800 graphics board with 16MB of RAM, 8X VD-ROM drive, V.90 modem, 8X/4X/32X CD-RW drive	Good/ Good	Good	Good/ Fair	PRO: \$201 price drop this month, colossal hard drive, easy to use. CON: Cluttered interior makes upgrades laborious.	614
Fery good: 3D Blaster RIVA TNT2 Ultra graphics board with 32MB of AM, 10X DVD-ROM drive, V.90 modem, 4X/2X/24X CD-RW drive	Very good/ Good	Very good	Fair/ Fair	PRO: \$322 price cut, lots of storage. CON: Middling reliability and support ratings, too few illustrations on its setup sheet.	615
Extra features: 15 percent	Setup/ease of use: 5 percent	Graphics: 15 percent	R & S: 35 percent		
iood: ATI Rage 128 Pro graphics board with 16MB of RAM, 12X DVD- OM drive, dual V.90/DSL modem	Satisfactory/ Good	Good	Outstanding/ Outstanding	PRO: Terrific performance, top-notch reliability rating, CON: Small hard disk, some blocky images in games.	No.
ood: Creative Labs 3D Blaster Annihilator graphics board with 2MB of RAM, 8X DVD-ROM drive, V.90 modem	Outstanding/ Good	Very good	Good/ Good	PRO: Speedy gaming performance, easy-open case. CON: Monitor displays fuzzy small text; documentation is too basic.	616
ood: integrated Intel 810 graphics with UMA and 4MB of 3D cache, 2X DVD-ROM drive, V.90 modem, lomega Zip 250 drive	Very good/ Satisfactory	Satisfactory	Good/ Good	PRO: Excellent speed, terrific value, great storage. CON: Mediocre image quality in games, setup documentation lacks detail.	617
ery good: integrated Intel 810 graphics with UMA and 4MB of 3D ache, 8X DVD-ROM drive, V.90 modem, network card, CD-RW drive	Outstanding/ Very good	Satisfactory	Fair/ Fair	PRO: Lowest-priced midrange PC here, rich in features, simple setup. CON: Cramped interior, sluggish, some game objects look pixelated.	618
ery good: Matrox Millennium G400 graphics board with 32MB of AM, 8X DVD-ROM drive, V.90 modem	Good/ Satisfactory	Good		PRO: Zippy performance, dual-display graphics support. CON: Pricey for its class, no setup poster, inadequate connector and cable labels.	619
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 35 percent		
ery good: integrated Intel 810 graphics with UMA and 4MB of 3D ache, 10X-24X CO-ROM drive, V.90 modem, LS-120 drive	Outstanding/ Very good	Good	Outstanding/ Outstanding	PRO: Reasonable price, small footprint, removable-media drive. CON: Slowest home PC, small hard drive.	1
atisfactory: integrated Intel 810 graphics with UMA and 4MB of 3D ache, 17X-40X CD-ROM drive, V.90 modem	Outstanding/ Very good	Satisfactory	Fair/ Good	PRO: Lowest-priced system on the chart, incredibly easy to set up. CON: A tad slow, tiny hard drive.	620
ood: integrated Intel 810 graphics with UMA and 4MB of 3D cache, X DVD-ROM drive, V.90 modem	Good/ Satisfactory	Satisfactory	Fair/ Good	PRO: Speediest budget PC, twice the memory of other budget systems here. CON: Slow in 3D games, middling sound system.	621
ood: integrated NVidia RIYA 128zx graphics with 8MB of RAM, YX-40X CD-ROM drive, V.90 modem	Satisfactory/ Good	Satisfactory	Good/ Good	PRO: Quick performance, multimedia keyboard, \$121 price drop. CON: Limited expandability, less-than-stellar documentation.	622
ery good: integrated Intel 810 graphics with UMA and 4MB of 3D ache, 6X DVD-ROM drive, V.90 modem	Good/ Satisfactory	Satisfactory	Good/ Good	PRO: Terrific value, roomy interior with easy access. CON: Small fonts are blurry, scant software bundle, rudimentary manual.	623
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 35 percent	The second secon	

³ For more information about the products listed in this table, select number 901 on the product information card or visit www.pcworld.com/productinfo.

(though we haven't detected any dramatic benefits from it at current CPU speeds). Together they pushed this Dimension to a PC WorldBench 2000 score of 146-the fastest we've seen for this processor class. The XPS B733r's bundled Celestica graphics board, which uses NVidia's GeForce 256 chip set and 64MB of DDR SDRAM (twice as much as on most other graphics boards), delivered excellent speed and stunning images in games. A digital video-out connector on the graphics board accommodates flat-panel displays. The included modem supports both V.90 and broadband DSL technologies for highspeed Web access. The Harman/Kardon HK595 sound system-with a subwoofer almost the size of an end table-pro-



FULL THROTTLE: The full-featured Dell Dimension XPS B733r runs fast in 3D games.

^{*} Insufficient data to give a rating.

duces strong sound and thumping bass. WHAT'S NOT: These days, \$2999 is a lot to pay for a home PC. Even taking the big 20GB hard drive and 100MB Iomega Zip drive into account, we would have liked to see a CD-RW drive included for that price. WHAT ELSE: Text and graphics looked crisp and clear at 1280 by 1024 resolution on the Dell Mogo 19-inch monitor. An excellent instruction sheet and thorough documentation make setup easy, and the PC's easy-off cover simplifies adding cards and drives. Inside the case, a spacious interior offers three open PCI slots and three open drive bays. Dell provides some basic software-Microsoft Works Suite 2000 and Norton AntiVirus 2000. BEST USE: This DSL-ready PC is ideal for graphics work and 3D games, thanks to its fast CPU and killer graphics card.

MIDRANGE HOME PCs

1 DELL DIMENSION XPS T600R



WHAT'S HOT: Dell's Dimension XPS T600r earns a PC World-Bench 2000 score of 136—very

NEW high for a Pentium III-600E unit. On the multimedia front, DVD movie playback looked sharp on the Dell M990 19-inch monitor, and small fonts were crisp at 1280 by 1024 resolution. If you plan to use this PC with a high-speed DSL connection, the bundled dual V.90/DSL modem delivers. The T600r's interior provides easy access to its three available PCI slots and four available drive bays.

WHAT'S NOT: The system's ATI Rage 128



NO MORE BEIGE: Dell's affordable WebPC sports a small, slender, hourglass-shaped black tower.

Pro graphics card produced middleof-the road performance in our 3Dgaming tests. Some images in Expendable looked blocky.

WHAT ELSE: An illustrated setup poster and clearly marked cables make setting up this PC a cinch. We also liked the Altec Lansing ACS340 speakers and subwoofer, which produced crisp sound. The no-frills keyboard feels solid and permits adequate key travel. Bundled software includes Microsoft Works Suite 2000 and Norton AntiVirus 2000. BEST USE: This strong, reasonably

affordable PC is suitable for day-to-day computing chores and multimedia tasks.

1 DELL WEBPC



WHAT'S HOT: This affordable PC's small footprint is approximately the size of a place mat. Its

slight, hourglass-shaped, black plastic case measures about 10 inches in both depth and height-ideal for anyone with limited desk space. Setup is simple, too: Just connect the mouse and the keyboard to separate USB ports, attach a phone line to the modem port, plug in the power cord, and you're in business.

WHAT'S NOT: The WebPC did poorly in our performance tests, earning a PC WorldBench 2000 score of 86-the slowest of all systems competing for a chart position. It also produced occasionally choppy 3D-gaming performance.

> Since the WebPC has no expansion slots or drive bays, the only part you can upgrade internally is its memory. And because it relies on USB ports for external expansion, you'll need an adapter if you want to connect such devices as parallel-port printers. The machine forgoes a floppy drive, but our test unit came with a 120MB external LS-120 drive, along with two SuperDisks. (Without the removable-storage drive, the PC would cost \$699.)

WHAT ELSE: Graphics and text looked good at 800 by 600 resolution on the 15-inch monitor. The



FAST WEB ACTION: The Dell Dimension XPS T600r includes a V.90/DSL modem for quick Web access.

keyboard has three handy programmable buttons and two USB ports. You also get a software bundle with Microsoft Works Suite 2000 and McAfee VirusScan.

BEST USE: The WebPC is great for budget-minded, space-inhibited shoppers but not for future upgraders.

What's New

TWO QUANTEX SYSTEMS parlay fast performance and great value into Top 15 rankings this month. The GX800 on our power chart is a high-powered machine with lots of extras, including a Sony 4X/2X/24X CD-RW drive, a gaming joystick and three games-Civilization Call to Power, Heretic 2, and Heavy Gear 2. These features make it an ideal choice for serious gaming, intense graphics, or formula-intensive spreadsheet work.

Although the midrange Quantex M750 doesn't perform as well as the GX800 in games, it's still a terrific buy. The M750 is a prime pick for home or office users with relatively modest computing needs.

Kirk Steers is a contributing editor for PC World.

ALSO NEW THIS MONTH



WE EVALUATED the following systems along with the others, but online they didn't score high enough to

reach the Top 15 Home PCs chart. For writeups, visit PCWorld.com (www.pcworld.com/ top400/newhomepcs).

- Compag Presario 5900Z-850
- Compaq Presario EZ2700

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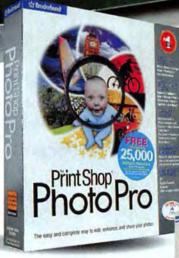
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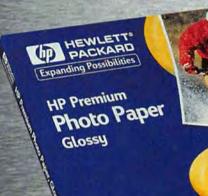
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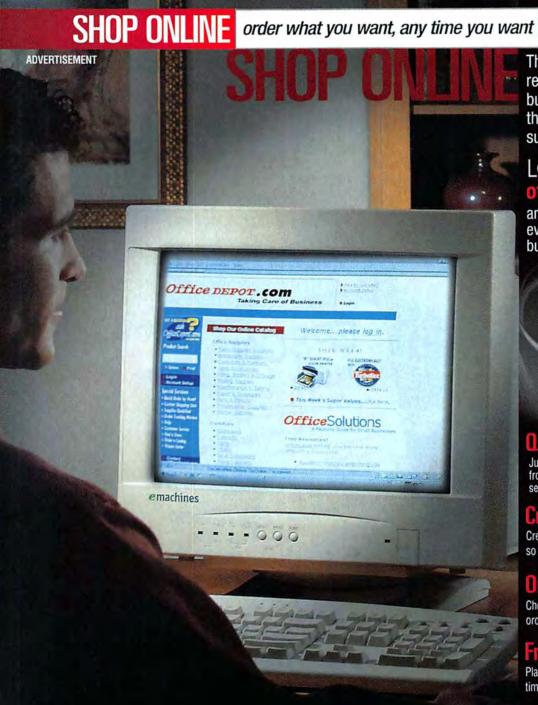


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1	Lexmark Z51 Color Jetprinter 800/539-6275 www.lexmark.com	\$149	91	3.9/0,5	Good/ Very good	FEATURES: Rated 10 ppm monochrome/5 ppm color. 1200-by-1200-dpi maximum resolution. 100 sheets input, 50 output. SUMMARY: A 550 price drop brings the Z51 back to the Best Buy slot with great extras, including a handy USB port and top-notch paper-handling. The Lexmark Z31 (at number four) offers a cheaper, albeit slower, alternative.	685
2	HP DeskJet 832C 800/752-0900 www.hp.com	\$199	87	3.8/0.5	Very good/ Good	FEATURES: Rated 4.6 ppm monochrome/3.1 ppm color. 600- by-600-dpi maximum resolution. 100 sheets input, 50 output. SUMMARY: The 832C offers impressive speed and good text quality, espe- cially for the price. People who print a lot of text will like that this unit can hold either a large black ink cartridge or a cheaper, smaller one.	686
3	HP DeskJet 932C 800/752-0900 www.hp.com	\$199	86	3.6/0.7	Good/ Good	by-1200-dpi maximum resolution. 100 sheets input, 50 out- put. SUMMARY: The 932C produces good text quality, sharp gray-scale images, and detailed, if light, color graphics. Text speed is slightly slower and text quality slightly worse than the similarly priced 832C's.	687
4	Lexmark Z31 Color Jetprinter 800/539-6275 www.lexmark.com	\$99	86	2.7/0.3	Good/ Good	FEATURES: Rated 8 ppm monochrome/3.5 ppm color. 1200-by- 1200-dpi maximum resolution. 100 sheets input, 50 output. SUM- MARY: Lexmark's Z31 is a bargain hunter's delight thanks to a \$50 price drop. Cheaper than the Z51 Color Jetprinter, it's also a lot slower. It has the same print-handling options as the Z51, but print quality is not as good.	688
5	Canon BJC-6000 800/652-2666 www.ccsi.canon.com	\$179	85	4.4/1.1	Very good/ Adequate	FEATURES: Rated 8 ppm monochrome/5 ppm color. 1440-by-720-dpi maximum resolution. 130 sheets input and output. SUMMARY: This reasonably priced ink jet has the second-fastest text speed on the chart. It offers quick graphics, strong text quality, and optional networking, though graphics could look better.	689
6	Compaq IJ750 800/345-1518 www.compaq.com	\$149	84	2.7/0.3	Good/ Good	FEATURES: Rated 7 ppm monochrome/3.5 ppm color. 1200-by- 1200-dpi maximum resolution. 100 sheets input, 25 output. SUM- MARY: The inexpensive IJ750 from Compaq delivers good all-around print quality, but text and graphics speeds are a bit sluggish. Images appear detailed, but colors can be somewhat off.	690
7	HP DeskJet 970Cse 800/752-0900 www.hp.com	\$399	80	4.3/0.7	Very good/ Good	FEATURES: Rated 6.5 ppm monochrome/5.3 ppm color. 2400-by- 1200-dpi maximum resolution. 150 sheets input, 50 output. SUM- MARY: Speedy small-office printer with built-in duplexer produces good- looking text and clean, straight lines. Colors on graphics look a bit faded, though output improves dramatically on ink-jet paper.	691
8	Lexmark 3200 Color Jetprinter 800/539-6275 www.lexmark.com	\$99	80	2.2/0.4	Good/ Good	FEATURES: Rated 6 ppm monochrome/2.5 ppm color. 1200-by- 1200-dpi maximum resolution. 100 sheets input, 25 output. SUM- MARY: Now priced \$30 lower, the venerable 3200 is dirt cheap. It offers solid print quality, but text and graphics speeds are comparatively slow. The 3200's design could be sturdier, and the unit tends to run noisily.	692
9	Epson Stylus Color 760 800/463-7766 www.epson.com	\$159	79	3.8/1.2	Good/ Adequate	FEATURES: Rated 7 ppm monochrome/6 ppm color: 1440-by-720-dpi maximum resolution. 100 sheets input, 30 output. SUMMARY: Epson dropped the price on this ink jet by a whopping \$70. It's speedy, especially on graphics; and though graphics printed on plain paper aren't great, photographs printed on glossy paper are fit for framing.	
10	Epson Stylus Color 900 800/463-7766 www.epson.com	\$299	76	6.8/2.2	Good/ Good	FEATURES: Rated 12 ppm monochrome/10 ppm color. 1440-by-720-dpi maximum resolution. 100 sheets input, 30 output. SUMMARY: The blazingly quick Stylus Color 900 is still relatively expensive for its features. Highlights include a USB port and an overnight exchange warranty, but graphics output appears a bit dull.	-
	Best Buy	Recom	mended for	home		Recommended for printing photos All products:	908



HOW WE TEST. The overall rating we assign to each ink jet printer is based on a combination of six measures, given the following weightings: print quality (25 percent), price (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



MAJOR PRICE-CUTTING at Epson and Lexmark makes major ink-jet news this month. Enormous price reductions move some recent favorites up several spots on the Top 10 chart. We also tested a handful of new printers this month, but none made the short list. Two models from Hewlett-Packard and one from Epson offer speed and true-to-life print quality, but high price tags keep them off the chart. Meanwhile, Canon aims for

the low end with its \$149 BJC-3000 and shoots itself in the foot; to our minds. lousy output at a low price is still lousy.

NEW NEWS IS NO NEWS

HP's \$499 PhotoSmart P1100 is a good printer with impressive print quality, but it will appeal primarily to digital photography enthusiasts. The printer's case includes slots for the two most common flash-media formats, SmartMedia and CompactFlash, so you can pop a card out of your digital camera and slip it directly into the printer. A control panel with an LCD and buttons for selecting photos allows you to print digital images without going through a PC. The P1100 is an inkjet workhorse, too, producing text documents at a speedy 4.7 pages per minute and graphics at 0.8 ppm. Text quality is clean, if light, and graphics are sharp and detailed on plain paper and beautiful on glossy paper. The P1100 also has a built-in duplexer for two-sided printing.

Does all this justify the \$499 price tag? Consider the competition: Lexmark sells its Photo Jetprinter 5770 for \$299, with the same features for PC-free printing. Admittedly, its print quality isn't as strong and it's also slower and lacks a duplexer. But a \$200 savings is significant. Ultimately, most people will find the P1100's price too steep for its niche features.

Another specialized HP printer we tested this month, the \$499 DeskJet 1220C, also fails to make the chart. Despite some handy features its price is too high for most users. The 1220C can handle paper up to 13 by 19 inches, and its enormous output tray folds up to reclaim desk space when not in use. The complicated paper feeder has a few esoteric features, such as a flap designed solely to hold postcards. The

DeskJet 1220C's print quality is generally good, with crisp but light text, slightly jagged lines, smooth grays, and detailed (though slightly grainy) color graphics. The 1220C is fast, too, printing text at a zippy 4.5 ppm and graphics at a respectable 0.7 ppm. But with 8MB of standard memory-more than most home users need-it's really intended as a network device for offices that don't want to pay \$3500 for a tabloid-size color laser. For those folks, it's a great deal. (The 1220C's network card costs \$109.)

A third large, expensive new printer that misses the chart is Epson's Stylus Photo 1270, which costs \$499 and can handle banner-size paper. On text, the 1270 runs quite slowly (2.3 ppm), but it handles graphics relatively quickly at 0.9 ppm. We liked its dark, solid text, but grays appear too grainy to preserve detail, and colors look faded. In contrast, Epson's Stylus Color 1160 (which we reviewed in April) produces better color images, prints text and graphics faster, and costs \$50 less.



A \$499 PRICE and niche features keep the HP PhotoSmart P1100 off the chart, but great print quality may persuade photo hobbyists to splurge.

We tested one more ink jet that missed the chart. Canon's BJC-3000 costs only \$149, which a year ago would have made us swoon. But today plenty of printers are priced in that vicinity, and most deliver text faster than the BJC-3000's sluggish 2.4 ppm (graphics speed is better, at 0.7 ppm). Even so, the BJC-3000's downfall is its print quality: Text is fuzzy, narrow lines look messy, and color and gray-scale graphics appear grainy and unrealistic.

SHAKEN, NOT STIRRED

THOUGH NO NEW printers make the grade, price changes shake up the chart this month. Lexmark slashed prices on its entire Z line, causing the major upheaval. First, it chopped \$50 off the Z51 Color Jetprinter, lowering its price to \$149. That's enough to move it to the top spot, ahead of the \$199 HP DeskJet 832C, which offers similar speed and print quality.

Next, Lexmark trimmed \$50 off the Z31 Color Jetprinter, which reenters the chart in fourth place at \$99. Lexmark also dropped its entry-level Z11 Color Jetprinter to \$89, but the Z31 is only \$10 more and includes a black ink tank (the Z11 doesn't). And since the tank costs \$40, a fully equipped Z11 actually costs more.

Epson's most notable price reduction involves the Stylus Color 760, which first appeared in our February issue. A price cut of \$70 moves the \$159 Stylus Color 760 up a notch to ninth place. Though it rivals this month's Best Buys in price and speed, it can't match their print quality.

—Dan Littman

PRINT QUALITY SAMPLES

HP Hits, Canon Misses







LEXMARK Z31 COLOR JETPRINTER

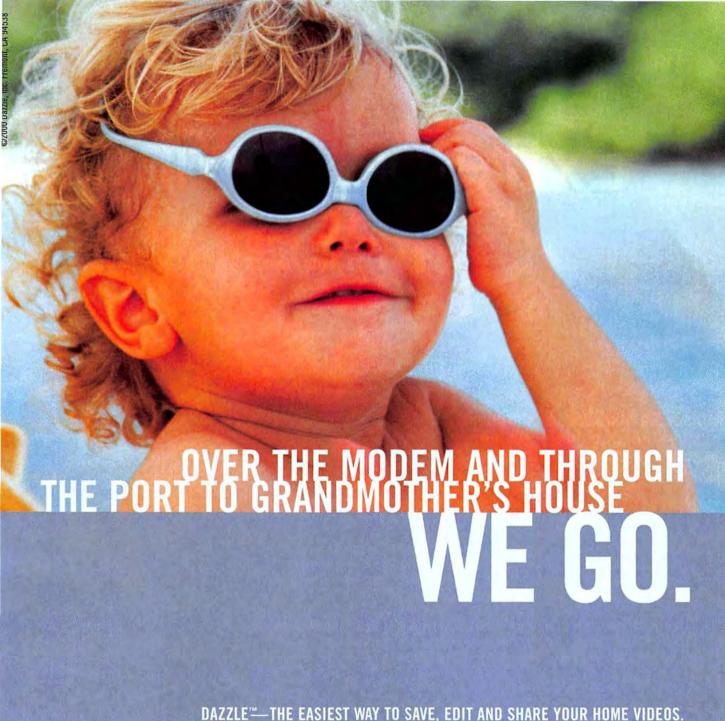
For its new \$99 price, the Z31 Color Jetprinter produces good detail and shading in color and grayscale graphics, but its jagged text could be better.

CANON BJC-3000

This new budget-level ink jet is a bad deal even at its low price. Text is rough and hard to read, while colors and grays are grainy and dotted with white bands.

HP PHOTOSMART P1100

This expensive ink jet produces dark, crisp text, and detailed, realistic graphics. Photographs print beautifully on special ink-jet paper (not shown).





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TOP 10 MONITORS

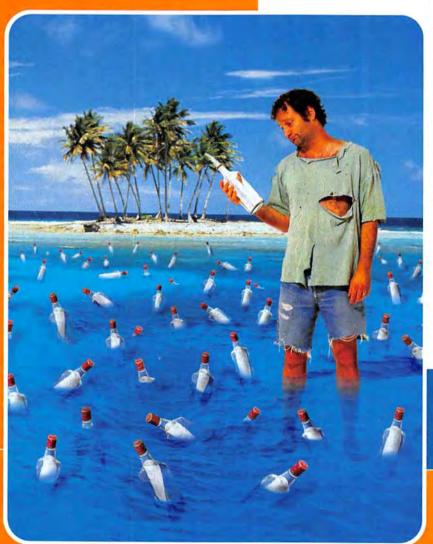
	21-INCH MONITOR	Month tested	Street price (3/31/00)	Overall rating	Quality of text/graphics	Comments	Productinfo number
1	Panasonic PanaSync/Pro PI10i 800/742-8086 www.panasonic.com/alive	Dec 99	\$999	90	Very good/ Very good	FEATURES: 19.6-inch viewable area, .25mm dot pitch tube, up to 106-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 10-hour weekday toll-free support. SUMMARY; \$50 price drop boosts model to the top. Text is crisp and colors are saturated, but tech support hours could be more generous.	667
2	Cornerstone Technology C1025 800/562-2552 www.monitorsdirect.com	NEW	\$639	87	Very good/ Good	FEATURES: 19.7-inch viewable area, .26mm dot pitch tube, up to 88-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour weekday toll-free support. SUMMARY: Bargain price and clear text on spreadsheets. Its higher-priced sibling, the Cl001, offers slightly better graphics quality.	668
3	ViewSonic P815 800/888-8583 www.viewsonic.com	Dec 99	\$889	83	Good/ Good	FEATURES: 19.7-inch viewable area, .25mm dot pitch tube, up to 105-Hz refresh rate, 'Plug and Play ready,' TCO'99 compliant, three-year warranty, 24-hour daily toil-free support. SUMMARY: \$10 price drop, comprehensive on-screen controls, and BNC connectors,' but unit's text and colors pale next to those of competitors.	669
4	Sony CPD-G500 800/352-7669 www.sony.com/displays	Dec 99	\$1200	82	Very good/ Good	FEATURES: 19.6-inch viewable area, .24mm FD Trinitron stripe pitch tube, up to 97-Hz refresh rate, Pluq and Play ready, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Crisp, dark text and well-organized on-screen controls compensate for high price and relatively weak graphics scores.	670
5	Samsung SyncMaster 1100p Plus 800/726-7864 www.samsungmonitor.com	NEW	\$824	81	Very good/ Good	FEATURES: 20-inch viewable area, .25mm dot pitch tube, up to 107-Hz refresh rate, 'Plug and Play ready,' TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Sharp text on word-processing documents, but colors could be livelier. BNC connectors' and intuitive on-screen controls are pluses.	671
5	Optiquest 0115 800/843-6784 www.optiquest.com	NEW	\$785	80	Good/ Good	FEATURES: 19.7-inch viewable area, .26mm dot pitch tube, up to 88-Hz refresh rate, Plug and Play ready, TCO'92 compliant, three-year warranty, .24-hour daily toll-free support. SUMMARY: Competitive price; not the best choice for professional applications, but suitable for word processing and home-office tasks.	672
7	KDS VS-21e 800/237-9988 www.kdsusa.com	Dec 99	\$649	76	Good/ Good	FEATURES: 19.9-inch viewable area, .26mm dot pitch tube, up to 111-Hz refresh rate, Plug and Play ready,*TC0'92 compliant, three-year warranty, 9-hour weekday toll-free support. SUMMARY: 5150 price drop helps model stay competitive. Adequate image quality, but tech support hours are limited.	673
3	IBM P260 800/426-7255 www.pc.lbm.com/options	NEW	\$1059	76	Good/ Good	FEATURES: 19.8-inch viewable area,24mm FD Trinitron stripe pitch tube, up to 85-Hz refresh rate, Plug and Play ready, three-year warranty, 24-hour daily toll-free support. SUMMARY: Text and graphics quality could be better for the price. Unusual eye-catching coal black case; also available in white.	-
,	Mitsubishi Diamond Pro 2040u 800/843-2515 www.mitsubishi-display.com	NEW	\$1199	73	Very good/ Satisfactory	FEATURES: 20.2-inch viewable area, .24mm Diamondtron NF stripe pitch tube, up to 112-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, I2-hour weekday toll-free support.* SUMMARY: 22-inch model renders crisp text. It's pricey, but has a large viewable area and a convenient USB hub.	674
0	HP P1110 800/752-0900 www.hp.com	NEW	\$1099	72	Good/ Satisfactory	FEATURES: 19.8-inch viewable area, .24mm FD Trinitron stripe pitch tube, up to 110-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 11-hour weekday toll-free support. SUMMARY: Squeaks onto the chart, but displays pallid colors on photos and Web pages. On-screen controls are easy to use.	675

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), price (25 percent), features and ease of use (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on texts designed and conducted by PC World Test Center. All rights reserved. Highest refresh rate at 1024 by 768 resolution. Plug and Play monitors and graphics cards cards cards with some high-end graphics cards. Uses an aperture grille whose parallel wires near the sides of the screen are strung farther apart than those near the middle. Monitor with black case does not meet TCO standards, but monitor with white case is TCO'99 compliant. 8-hour toll-free support on weekends.



PRICES OF BIG CRT monitors are plummeting-six units on this month's chart are under \$1000. Cornerstone Technology's C1025, a new Best Buy, costs just \$639—the lowest price yet, and about half as much as several other chart makers. The Panasonic PanaSync/Pro P110i nabs the top spot on the strength of sharp text, lively colors, and a \$50 price drop. A model from Sony missed the chart. Next month, we tackle 17-inchers.

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TOP 10 GRAPHICS BOARDS

	AGP BOARD	Month tested	Street price (4/5/00)	Overall rating	Mixed-media business rating	3D games rating	Features rating	Comments	Produc info number
1	Guillemot Maxi Gamer Xentor 32 877/484-5536 www.guillemot.com	Feb 00	\$149	92	Very good	Excellent	Good	FEATURES: 2X AGP, NYIdia RIVA TNT2 Ultra chip, 32MB of SDRAM, 300-MHz RAMDAC, video-out, bun- dled 3D games-Interplay's Kingpin: Life of Crime and UbiSoft's Speed Busters. SUMMARY: \$40 price drop on board with great 3D speed.	657
2	Matrox Millennium G400 Max 800/361-1408 www.matrox.com/mga	Apr 00	\$209	91	Excellent	Very good	Very good	FEATURES: 4X AGP, Matrox G400 Max chip, 32MB of SGRAM, 360-MHz RAMDAC, video-out, two VGA ports, bundled Micrografx Picture Publisher and Simply 3D, plus 3D game. SUMMARY: Solid speed and dual-display support keep it near the top.	658
3	Diamond Viper II 800/468-5846 www.s3.com	retested this month	\$179	90	Very good	Very good	Good	FEATURES: 4X AGP, S3 Savage 2000 chip, 32MB of SDRAM, 350-MHz RAMDAC, video-out, bundled 3D game-Acclaim's TrickStyle. SUMMARY: Affordably priced card renders excellent performance in Unreal Tournament with its latest drivers.	659
4	ELSA Erazor X2 800/272-3572 www.elsa.com/america	May 00	\$259	90	Excellent	Excellent	Good	FEATURES: 4X AGP, NVIdia GeForce 256 chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, video-out, bundled ELSA MainActor video-editing tool. SUMMARY: Still the fastest in Quake 3, churning out 91 frames per second in 16-bit mode.	660
5	Cardexpert GeForce 256 DDR 800/539-2273 www.galnward.com	NEW	\$250	87	Excellent	Excellent	Good	FEATURES: 4X AGP, NYIdia Geforce 256 chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, video-out, bundled 3D games. SUMMARY: Speedy gaming board looks good in Unreal Tournament and Quake 3 and is cheaper than most of its DDR competition.	661
6	Leadtek WinFast GeForce 256 DDR 888/532-3835 www.leadtek.com	May 00	\$249	87	Excellent	Excellent	Good	FEATURES: 4X AGP, NVidia Geforce 256 chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, video-out, bundled color-calibration tools. SUMMARY: Costs less than others with DDR memory, gives fine lighting effects in Quake 3, but has puny one-year warranty.	662
7	3dfx Voodoo3 3500 TV 800/234-4334 www,3dfx.com	Feb OO	\$200	87	Very good	Very good	Good	FEATURES: 4X AGP, 3dfx Voodoo3 chip, 16MB of SDRAM, 350-MHz RAMDAC, TV tuner, video-out, no bundled 3D games. SUMMARY: Fast, full-featured card has video editing software but lacks 32-bit 3D rendering. Tunerless 3000 model costs \$50 less.	663
8	Creative Labs 3D Blaster Annihilator Pro 800/998-1000 www.creative.com	Apr 00	\$300	86	Excellent	Excellent	Very good	FEATURES: 4X AGP, NVidia GeForce 256 chip, 32MB of DDR SGRAM, 350-MHz RAMDAC, bundled color-calibration tools and 3D games. SUMMARY: This pricey board is the second fastest in Quake 3, pumping out 89 frames per second in 16-bit mode.	664
9	Asus AGP-V6600 Deluxe 510/739-3777 www.asus.com	Apr 00	\$249	86	Excellent	Very good	Excellent	FEATURES: 4X AGP, NVIdia Geforce 256 chip, 32MB of SGRAM, 350-MHz RAMDAC, video capture, video-out, 3D glasses, bundled 3D games, Ulead Video Studio. SUMMARY: Strong card loaded with video extras generated dark scenes in some games.	665
0	Hercules 3D Prophet DDR-DVI 877/484-5536 www.hercules.com	May 00	\$319	84	Excellent	Excellent	Very good	FEATURES: 4X AGP, NVidia GeForce 256 chip, 32MB of DDR SGRAM, 350-MHZ RAMDAC, video-out, no bundled applications. SUMMARY: A swift performer, this expensive board renders lovely images but falls short on software extras.	666



HOW WE TEST We test boards under Windows 98. Business tests include PC WorldBench 98. Our 3D-gaming score is based on four games, each evaluated on frame rate and image quality. We test AGP boards in a Dell Dimension XPS T600 with a Pentium III-600 CPU and 128MB of RAM. Overall AGP rating is based on performance (42.5 percent), features (27.5 percent), price (20 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.



CARDEXPERT'S GEFORCE 256 DDR makes an impressive debut, joining a group of four other DDR-equipped GeForce boards on the chart this month. A fraternal twin of Leadtek's WinFast

GeForce 256 DDR (our sixth-place board this month), the Cardexpert is a superb value if you're willing to live with a bare-bones software bundle. In coming months, keep a lookout for graphics boards based on new chip sets from 3dfx, ATI, and NVidia.

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TOP 10 MODEMS

	INTERNAL V.90 MODEM	Month tested	Street price (3/29/00)	Overall rating	56-kbps downloads/ 33.6-kbps transfers (min:sec per MB)	Comments	Produ info numb
	Viking 56K Windows ISA Modem 800/338-2361 www.vikingcomponents.com	Feb 00	\$40	84	3:40/6:11	FEATURES: Supports K56flex, ISA card, Lucent chip set, V.80 video- conferencing, MNP-10 error control, MNP-10EC, distinctive ring, voice mail, QuickLink Message Center III software. SUMMARY: Good per- formance and a great price keep this controllerless modem at the top. Includes a five-year warranty and 24-hour toll-free support.	693
2	Creative Labs Modem Blaster Flash 56 PCI 408/719-5180 www.creative.com	Feb 00	\$40	84	3:39/5:41	FEATURES: Supports K56flex, PCI card, Rockwell chip set, MNP-10 error control, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, OuickLink Message Center III software. SUMMARY: Full-featured controllerless modem with stellar download rates. Backed by daily tech support and a three-year warranty.	694
3	Zoom FaxModem 56K PCI Dualmode 800/631-3116 www.zoom.com	Feb 00	\$60	83	3:45/6:07	FEATURES: Supports K56flex, PCI card, Lucent chip set, V.80 video- conferencing, distinctive ring, voice mail, Communicate Lite software. SUMMARY: Reasonable price and attractive voice features, but as with the PCI Dualmode's ISA sibling, 33.6-kbps transfers are a bit slow. Backed by long support hours and a seven-year warranty.	695
	Trendware Trendnet High Speed Internal Voice/Fax PCI Modem 888/326-6061 www.trendware.com	Apr 00	\$40	83	3:12/5:51	FEATURES: Supports K56flex, PCI card, Rockwell chip set, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, Cheyenne BitWare software. SUMMARY: True to its name, the Trendnet High Speed races on both clean and impaired lines. Five-year warranty and bargain price give this software modem a competitive edge.	696
5	Archtek SmartLink PCI Voice Faxmodem 888/912-9800 www.archtek.com	NEW	\$25	82	3:28/6:37	FEATURES: Supports K56flex, PCI card, ESS chip set, V.80 videocon- ferencing, voice mail, Caller ID, Communicate software. SUMMARY: A killer price puts this controllerless modem on the chart. Scant voice features; delivers quick 56-kbps downloads on clean lines, but slows considerably when transferring files over noisy lines.	697
5	3Com U.S. Robotics Winmodem PCI 800/638-3266 www.3com.com	Feb 00	\$60	82	3:41/5:49	FEATURES: Supports x2, PCI card, USR/TI chip set, V.80 videoconferencing, distinctive ring, Caller ID, RapidComm software. SUMMARY: Data transfer with the Ascend dial-up server could be better, but this model still turns in solid performance overall. 3Com offers a five-year warranty but no toll-free tech support.	698
	Diamond Multimedia SupraMax 56K PCI 800/468-5846 www.diamondmm.com	Apr 00	\$40	82	3:27/5:41	FEATURES: Supports K56flex, PCI card, Conexant chip set, MNP-10EC, V.80 videoconferencing, distinctive ring, voice mail, Caller ID, FaxTalk software. SUMMARY: Above-average performance overall and particularly fast on noisy lines. Five-year warranty and long support hours, but tech support requires a toll call.	699
	EXTERNAL V.90 MODEM						
	Diamond Multimedia SupraExpress 56e 800/468-5846 www.diamondmm.com	Feb 00	\$80	78	3:20/5:41	FEATURES: Supports K56flex, Rockwell chip set, V.80 videoconferencing, distinctive ring, voice mail, Caller ID, permanently attached serial cable, FaxTalk software. SUMMARY: Price drops \$20 this month. Fastest external modern here, small and portable, offers easy installation and a high connect rate. Backed by long support hours.	700
	Boca Research 56K Tidalwave Modem 561/997-6227 www.bocaresearch.com	Feb 00	\$100	75	3:35/5:41	FEATURES: Supports K56flex, Rockwell chip set, MNP-10 error control, serial cable, V.80 videoconferencing, distinctive ring, voice mail, ASVD, DSVD, Caller ID, OuickLink Message Center III software. SUMMARY: Solid performer with plenty of key features, a good software bundle, five-year warranty, and toll-free tech support.	701
	Viking 56K USB Modem 800/338-2361 www.vikingcomponents.com	Feb 00	\$100	75	3:32/5:44	FEATURES: Supports K56flex, Rockwell chip set, MNP-10EC, V.80 videoconferencing, USB cable, distinctive ring, Caller ID, OuickLink Message Center III software. SUMMARY: Stylish but bulky shark-fin shape. Above-average 56-kbps downloads, around-the-clock support, and simple USB setup make this a solid choice for home users.	702

HOW WE TEST We test V.90 (56-kbps) and V.34 (33.6-kbps) performance over a Telecomm Analysis Systems simulated phone network. We connect each modem to two common Internet service provider modems-Ascend's Max 6000 and 3Com's Total Control. Using each ISP modem, we perform two tests. In the Network Model Coverage test, we send a .zip file over several dif-Vice provider industrial scenarios and a Good and a Goo



ARCHTEK REDEFINES BARGAIN pricing this month. With competitive V.90 performance and a \$25 price, the no-frills SmartLink PCI modem is made for the ultimate bargain hunter. Viking's 56K ISA Modem retains its lead, however, with a winning combination of features and support. Meanwhile, \$20 price reductions on Viking's USB Modem and Diamond's SupraExpress make the external chart a \$100-and-under club.

Bookmark This!

Crucial.com: Hassle-Free Memory **Shopping Online**

buying RAM on the Web.

www.crucial.com

Joe Swern is always on the lookout for Web sites that deliver great customer service. As the vice president of service and support for an Indianapolis, Ind.-based management software firm, his job is to help small and midsize businesses move their support operations to the Web while maintaining high levels of customer satisfaction. Recently, Swern discovered Crucial.com, a leading site for



"A lot of thought has obviously gone into designing and delivering their Web store," Swern says, "And I know how hard that is to do well. Crucial delivers great e-service."

Crucial.com, a division of chip maker Micron Technology, Inc., is the only DRAM manufacturer that ships memory directly to its customers. The manufacturer tests all of its modules under extreme temperatures, voltages, and operating conditions before selling them through Crucial.com's Web site and telephone sales service. Through Crucial, users can purchase the same modules that PC makers Gateway, IBM, and HP build into their base systems.

Swern first bought RAM from Crucial to upgrade his home PC. "I had tried to buy it locally," he says, "but most vendors insisted that I tear open my computer just to tell them what I needed. Then a friend directed me to Crucial.com. The site told me what my system required right there on the spot."

Shoppers can learn everything they need to know about upgrading their systems at the Crucial.com Web site. The site's unique Memory Selector walks users through



the process of identifying the exact RAM their PCs require. Customers simply enter their computer's make and model information, and the Memory Selector returns a list of Crucial memory upgrades that are guaranteed to be compatible with that system.

Swern regularly refers to the performance benchmark results for Crucial.com's RAM in the site's Comprehensive Windows® 2000 Upgrade Guide, which recommends RAM for performance PCs, lists answers to frequently asked questions, and offers information on hardware and software requirements. "The key thing for me about Crucial is that all of the questions you would logically ask are answered on the Web site," Swern says.

Swern is also "especially impressed with Crucial's ordertracking link," which he uses to check on the shipping status of his orders. For his own PC, Swern was able to use Crucial.com's Web Order Tracking System to track an order from the Micron factory straight to his home. "I could find out at every instant where my order was," he says. "I could see that it left the FedEx office in Indianapolis at 7 AM, and that my wife signed for it at home later that morning."

Swern has been so impressed by the ease of ordering RAM from Crucial.com that his company now purchases memory upgrades there, too. "Crucial is right on target for delivering excellent sales and support on the Web," he says. "With its step-by-step RAM configuration process and streamlined ordering and tracking, I can get the right RAM for my PCs without ever having to pick up the phone." >

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"With ePilot, the user is king," says Heath Clarke, president of ePilot's parent corporation, eLiberation.com. ePilot pays its subscribers for each visit they make to participating Web sites, and for each new subscriber they introduce to the service. ePilot expects 1.5 million Net surfers to be using its software by 2001. "Simply put," Clarke says, "the more ePilot is accessed and referred, the more money users make."

Unlike many other Internet portals, there is no limit to the amount of money users can earn through ePilot. Thousands have already received checks of up to US\$100 since the service launched in December 1999. But ePilot does more than pay users cash for clicks-it can actually make their online information searches faster and more rewarding. "Some of my friends have told me that ePilot is their favorite money-making program," reads a five-star user review at Alexa.com, "But I'd use it even if I wasn't being paid."

Many users like the easy access ePilot provides to popular Web sites. It organizes tens of millions of information and product categories behind a single desktop icon located next to the Microsoft Windows Start button. "[ePilot includes] almost every category imaginable," reads another Alexa user review. "I don't have to go to any more search engines and look through hundreds of sites for the information I want."



Now ePilot fans can get even more out of the Net with its latest version, ePilot 2.o. Users can use the new software to tailor Internet content to match their favorite subjects and interests, and to change ePilot's look and feel. With Version 2.0. subscribers can create their own graphics, icons, color schemes, and sound effects, and choose between the subtle ePilot button or a fully customizable ePilot taskbar.



ePilot's home page is a full-service portal-it offers subscribers free email, a personal address and calendar, news, weather, and more. ePilot 2.0 accelerates the Web login process by remembering members' names and passwords. It also allows users to store multiple credit card

numbers in ePilot's "virtual wallet," which they can use to automatically complete online purchases.

ePilot users are some of the smartest people on the Net, and advertisers are eager for their attention. That is one reason why ePilot protects its members with an ironclad privacy policy. "Your personal information is safe with us," says eLiberation.com president Clarke in an online statement. "We promise not to sell, rent, loan, or give away anything that identifies you personally to anyone without your permission."

It is no wonder that ePilot is winning the trust of hundreds of thousands of savvy Web shoppers. "ePilot is a radically new concept in getting paid for [surfing the Web]," says ePilot subscriber William Otis. "Not only is this very handy-it's also profitable, and it takes virtually nothing away from your screen or online experience."



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he received his anthropology degree in 1972, his other passion-music-took center stage in his life. He opened an audio system repair shop, which later evolved into a successful short-run CD duplicating facility for up-andcoming musicians.

His shop, called Downtown Sound, also prints CD tray cards and booklets and offers clients on-the-disk printing. "We even design them if necessary," Kirssin adds. But while he has been able to parlay his music-industry expertise into a successful enterprise. Kirssin insists he could not have done it as quickly without help from CDW.com, a Web site run by Vernon Hills, Ill.-based CDW Computer Centers, Inc.

"I call my CDW account manager 'the problem solver," Kirssin says. "I sometimes have to count on her as if she were my IT person. Her knowledge base is immense." CDW assigns a designated account manager to each of its customers-someone who can direct them to the best deals on computer hardware and software for their business.

CDW.com provides customers with an updated list of manufacturer rebates and special offers. Shoppers only have to click on the list to receive detailed instructions and to print rebate coupons. CDW.com's Rebates & Coupons Resource lists dozens of excellent deals on popular items every day.

As an active user of his CDW@work extranet, a customized business-to-business Web site, Kirssin saves money on volume pricing often available only to larger organizations. His CDW@work extranet automatically gives Kirssin special discounts and lets him access and modify price quotes online.

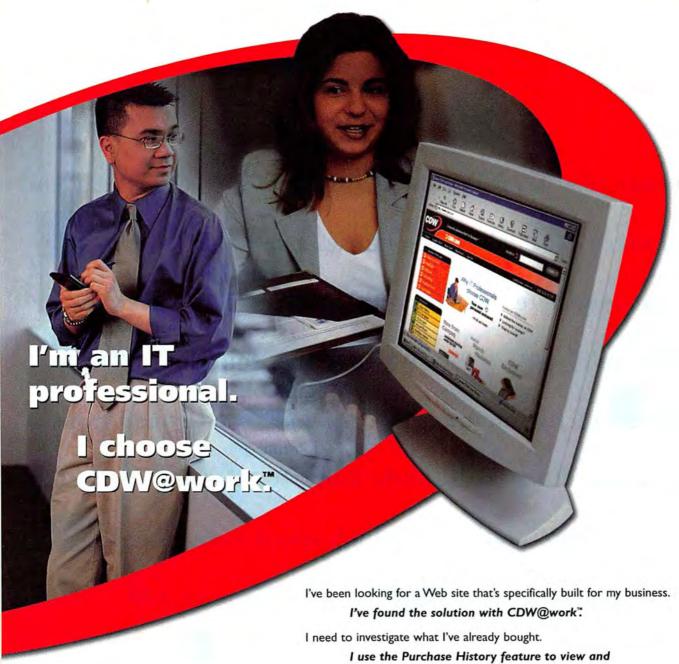


The CDW@work extranet also lets Kirssin review his five-year purchase history and check the status of his current orders.

CDW.com helps Kirssin make tough buying decisions with CDW Compare, a feature that allows him to sort products from competing manufacturers by any criteria-including price. "I use CDW Compare all the time," Kirssin says. "I often order such weird combinations of stuff-and CDW is the only vendor that has the depth of stock to support the work we're doing."

Kirssin relies on two other CDW.com features—Buyer's Alert and CDW Buyer's Edge-to ensure that he is paying a competitive price and getting more value for his computer purchases. Buyer's Alert notifies Kirssin when the products he selects become available or fall below certain price. And CDW Buyer's Edge e-mail newsletters give Kirssin the inside track on CDW news, and alert him to deals and unadvertised specials for leading products.

Even with all of the CDW.com features, Kirssin still values the service he gets from his CDW account manager, who recently helped him choose between two leading large-format printers he needed to produce CD tray covers for his growing business. "She saved me a week's worth of labor," Kirssin says, "by rounding up print samples and other information from these manufacturers. You just won't get that kind of service anywhere else." >



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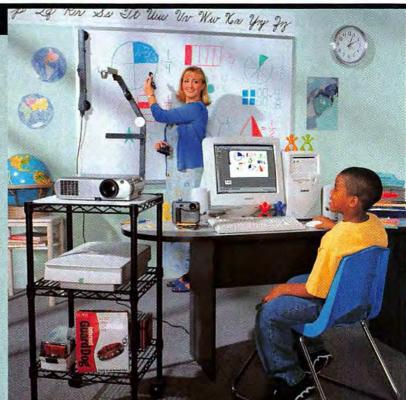
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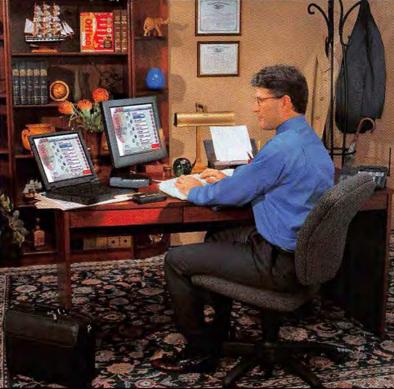
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WINDOWS TIPS

SCOTT DUNN

Customize Your Right-Click New Menu

WHEN select in options

WHEN I RIGHT-CLICK THE WINDOWS desktop and select *New* to create a shortcut or folder, I get not only the options for Shortcut and Folder but also a lengthy list of

documents representing every application that I have on my machine. Is there any way that I can change what appears on this list?

Larry Thompson, via the Internet

THOUGH MICROSOFT DOES not make it easy for users to customize the New submenu on the right-click menu, you can do the job if you're willing to roll up your sleeves and dig into the Registry. Because Registry changes can cause serious problems (like not being able to start Windows), proceed at your own risk.

Add a menu item: First, decide what file types you want added to the menu and what applications open these files. You need no special preparations for applications such as Notepad, WordPad, and Microsoft Paint that always start with a new document open and ready for you to begin working. But applications that start

with no documents open (like the \$25 shareware image editor Poly-View, available at www.polybytes. com and from FileWorld) require you to create and save a template file first. For these applications, you should set up a typical document the way you want it and then save it in the Windows folder's ShellNew folder. This folder is hidden on some systems, so you may first have to choose View. Options (Win 95) or View. Folder Options (Win 98 or later, or Win 95 with Internet Explorer 4's Desktop Update). Click View, select Show all files, and click OK.

Now start Windows Registry Editor: Choose Start-Run, type regedit, and click OK. Click the + (plus sign) next to HKEY_ CLASSES ROOT. You should see a series of folders in the left pane corresponding to the document extensions that Windows associates with particular applications (such as .doc, .xls, and .html). Find the extension of the file type you want to add to the New submenu, and right-click it. Choose New-Key. (In the Registry, each folder icon is referred to as a key.) Name the new key ShellNew, and press <Enter> to complete the naming process. With your new folder selected, right-click a blank area of the right pane and choose New-String Value. If you're using a file type whose program starts with a blank document by default, name the new icon Null-File and press (Enter). On the other hand, if you're using a file type whose program starts with no documents open, name the icon FileName. Double-click the FileName icon (or press (Enter)), and for 'Value data', type the full path and name of the template file you saved in Windows' ShellNew folder. Then click OK and exit the Registry Editor. Your changes should appear immediately on the New submenu.



FIGURE 1: YOU CAN ADD your own file types to the New submenu by editing the Registry.

Here's an example: To create a new Outlook Express mail message by rightclicking on the Desktop or in a folder (for example, to store copies of individual messages as separate files), launch Outlook Express and choose File New Mail Message. Add whatever boilerplate text you want to the message. Then choose File. Save As and save the file with a name like Blank in the ShellNew folder in your Windows folder. (Outlook Express will automatically add the .eml extension.) Next, start the Registry Editor as explained above, and locate the .eml folder in HKEY_CLASSES_ROOT. Create the ShellNew key; then in that key, create the StringValue icon and name it FileName. Double-click the FileName icon and type c:\windows\ShellNew\Blank.eml (your path and file name may differ) in the 'Value data' box. Click OK and exit the Registry.

To test the result, right-click on the Desktop, and choose New-Outlook Express



FIGURE 2: JUMP TO the end of the scrolling menu by pressing the <Ctrl> key as you click.

Mail Message (FIGURE 1). A new message icon will appear on the desktop. Name it and press (Enter). Double-click the icon and type your message. When you're done, click Send to place the message in the Outbox. Deleting the new message icon will not remove the message from the Outbox; this is just a technique for creating mail messages if you want copies stored as individual files outside Outlook Express (or any similar e-mail system).

Remove a menu item: There are various ways to remove items from the New submenu, depending on what you wish to accomplish. Here are three scenarios:

1. To remove a file type whose program you no longer use, it's best to uninstall the entire application: Double-click the Add/ Remove Programs icon in Control Panel, select the program name from the list on the Install/Uninstall tab, and click Add/ Remove. Follow the on-screen instructions to complete the removal of the software. This sequence should delete the item from the New submenu as well.

2. If the menu item remains after you manually remove the software, go to Explorer, choose View. Options or View. Folder Options, and click the File Types tab. Select the type of file you no longer use and click Remove. Click Yes to confirm the removal. This will expunge the file type from the list of associated files, from the Registry, and from the New submenu.

3. If you want to keep the application related to the file type but remove its icon from the New submenu, open the Registry editor as described earlier. Click the + next to HKEY_CLASSES_ROOT. Locate the folder containing the extension of the file type you want to remove, and click the + next to it. In the tree pane on the left, select the ShellNew folder under the proper extension. At this point, you can make a backup of just this branch if you think you'll ever change your mind. Choose Registry-Export Registry File. Designate a name and location, make sure Selected branch is selected, and click Save. Select NullFile or FileName in the right pane (whichever is present), and press <Delete> and then <Enter>. If you ever want to restore the item to the menu. find the .reg file you exported and doubleclick it to reinstate it in the Registry.

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SCROLLING, SCROLLING, SCROLLING ON THE MENU



WHEN THE Programs menu (or any of its submenus) on the Start menu gets too big in Windows

95, it breaks into multiple panels (see Answer Line, page 262, for more on this topic). If you've installed the Desktop Update portion of IE 4 or Win 98, the menu doesn't break into panels but becomes scrolled, and you navigate it via arrow buttons at the top or bottom of the menu (FIG-URE 2). To zoom quickly to the top or bottom of the menu, hold down (Ctrl) as you click the arrow end of the menu. This technique also works with any toolbars on the taskbar: If some of the icons don't fit on a given toolbar, you can press (Ctrl) as you hold your mouse over the arrow button to accelerate the intrabar scrolling. Unfortunately, this feature disappears if you install IE 5 or Win 98 SE.

You don't get speed-scrolling in Windows 2000 either, but at least Win 2000 gives you a choice between having the Programs menu break into panels and having it appear as a single scrolling menu. By default, oversize menus scroll, just as in Win 98. If you want to return to Win 95's menu-panel style, right-click an empty area of the taskbar and choose Properties. Click the Advanced tab, scroll to the bottom of the Start Menu Settings options, and uncheck Scroll the Programs menu. Then click OK.

POWER UP YOUR DOUBLE-CLICK TRICKS



ONE CLICK selects; a doubleclick opens or launches. That's probably the first thing that you

learned when you started using a mouse. But you can save a lot of pointing, clicking, and dragging time if you know all the other ways to use a double-click. Some of what follows may be old news to you, but chances are you'll find a new maneuver or two to add to your bag of tricks.

Maximize or restore: Double-click a window's title bar to toggle between maximized window size and the previous size. Expand or collapse: Double-click a folder in Explorer's folder tree to hide or display the subfolders nested in that folder. This works on RegEdit's folder tree, too.

Resize details: If you use Windows Explorer in Details view (choose View Details), you can instantly resize any file details column (Name, Size, Type, Modified, and so on) to fit its widest element by doubleclicking the column head's right vertical line—the line separating that head from the next column head. You can also resize all the columns at once to fit each one's widest element by pressing <Ctrl>-+ on the numeric keypad.

Adjust security settings: Insecure about your Web security settings? Double-click the Internet icon at the right end of any Internet Explorer window's status bar. Alternatively, in Windows 2000, you can double-click the My Computer icon at the right end of any Explorer or folder window. Select one of the four categories (Internet, Local intranet, Trusted sites, or Restricted sites) at the top, and than change the related setting as desired.

Tweak tray tools: Need to reset your system clock or calendar? Wondering how you can add or remove items from your Sched-

uled Task folder (Win 98 or 2000) or System Agent (Windows 95 with Microsoft Plus)? Want to check your CD player's volume level? You can do any of these by double-clicking the clock or the appropriate icon in the so-called tray area of the taskbar.

Resize toolbars: This

trick works only in versions of Windows that support two or more toolbars on the same line

(which rules out Win 95 with Internet Explorer 3 or earlier). When multiple toolbars share a horizontal or vertical space, an embossed bar separates them. You can drag the bar to move or resize the toolbar-or you can double-click this handlebar to get a variety of size options. To instantly resize a toolbar to see the greatest number of elements, double-click the divider bar (or the toolbar name, if visible).



FIGURE 3: DOUBLE-CLICK a divider once to see the toolbar at maximum size (top), twice to minimize (middle), and three times for optimum size.

Double-click a second time to shrink the toolbar to its smallest size. Double-click a third time to resize the toolbar to "perfect size"-the smallest size that still shows all elements on the bar (see FIGURE 3).

This last option is unavailable for the Address bar or for toolbars with too many elements to fit on one line at a time. Use this tip on the taskbar, on floating toolbars that share the same floating palette, and on toolbars in Explorer, Internet Explorer, and Microsoft Office applications. Naturally, the number of double-clicks re-

Save Your Screen and Blow Your Mind

A GOOD SCREEN SAVER can deter accidental intrusions into your private computing world and provide great entertainment as well. In fact, some screen savers-such



as Geiss, the brainchild of Ryan M. Geiss-even qualify as works of art. As if the engrossing, fluid graphics were not enough, Geiss can respond to music from audio CDs and other sound sources. The program comes both as a screen

saver and as a plug-in for the freeware MP3 player WinAmp. It's available free from FileWorld or from the creator's home page at www.geisswerks.com.

> quired depends on the state the toolbar is in when you enter the cycle. Since Microsoft Office applications don't have this cycle, the double-click's only effect is to enlarge the toolbar to reveal all elements (or at least as many as will fit).

> Bonus tip: If you want audible confirmation that you've double-clicked in the right place when resizing toolbars (or if you just like sound effects), choose Start-Settings-Control Panel and double-click the Sounds (Windows 9x) or Sounds and Multimedia (Windows 2000) icon. In the Events list, select Show Toolbar Band and pick a sound from the Name drop-down list; or click Browse in the Events list, select a .way file, and click OK. Then click OK to close the Sound Properties box. Your sound will play the next time you double-click a toolbar divider or name. Unfortunately, this sound effect doesn't work in Windows 9x with IE 5 or in Windows 98 SE.

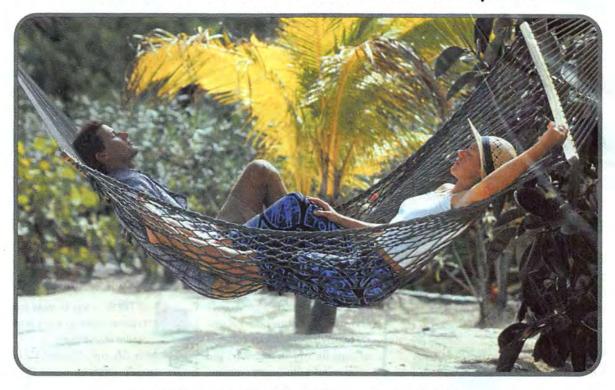


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pcworld.com/heres_how. Send your questions and tips to scott_dunn@pcworld. com. We pay \$50 for published items. Contributing Editor Scott Dunn is a principal author of The PC Bible, 2nd Edition (Peachpit Press, 1995).

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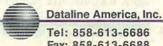
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YOUR QUESTIONS ON: The best Windows file system for you • Win 95 vs. 98 menus

Do You Really Need to Buy Utilities?

SOME SOURCES tell me that I need to buy third-party utilities, like those in Norton SystemWorks, to

replace the ones that come with Windows. But others say I don't. Any thoughts?

> James Sauvage Albuquerque, New Mexico

THERE ARE FOUR utilities you absolutely must have to practice safe computing: a

defragger, a disk scanner, and backup and antivirus software. Let's look at what Windows and other utility sources offer.

Defraggers: Windows' Disk Defragmenter is just fine for the job, especially in the Windows 98 version. It's not as

good as Symantec's Speed Disk, the most popular third-party defragger (Speed Disk, shown in FIGURE 1, comes with Norton Utilities and Norton SystemWorks), but the differences aren't compelling. Speed Disk's main advantage is, well, speed: During my informal tests, Speed Disk defragged a partition in less than a quarter of the time that Windows' own Disk Defragmenter took. But if you start your defrag at the end of the workday, so the operation has the whole night, speed is pretty much irrelevant.

Disk scanners: Symantec's Norton Disk Doctor (also available in Norton Utilities and Norton SystemWorks) has some real advantages over Windows' ScanDisk. The best of these is the Undo feature, which can save your hide if "fixing" a problem only makes things worse. And, once again, it's more than four times as fast.

But are the two tools sufficient reason to make you buy Norton Utilities? Not in my opinion.

Backup: Win-

dows Backup leaves a lot to be desired. For one thing, it doesn't support Zip, CD-

> RW, or many tape drives. However, these drives usually come with their own backup programs, so you probably already have a good one.

> Antivirus: This is the one vital utility that Windows doesn't offer at all, and for which, therefore, you need to buy a third-party program. The one I am partial to is Norton AntiVirus, which is also PC World's most recent Best Buy.

> You might want other tools, as well. For instance, if you're short on hard drive space or you share files

with others, a file compression tool (such as WinZip 7) is very useful. You might also want to consider a good file viewer, like Jasc's Quick View Plus (Windows' own QuickView hardly counts). And then



FIGURE 1: NORTON's Speed Disk is faster and looks better than Windows' Disk Defragmenter, but both are effective.

Quick E-Mail

KARLI WILLIAMS OF San Francisco suggested a simple way to create and address a new Microsoft Outlook or Outlook Express e-mail message, even when the program isn't running. Simply select Start Run and type mailto: plus the e-mail address of your recipient, and then press (Enter). You can do the same thing within your browser's URL field. For instance, to reach me, just type mailto:answer@pcworld.com. You can also enter mailto: by itself to bring up a new message box with a blank address field.

there's my favorite tool, Ontrack's PowerDesk-a strong file manager that also gives you file compression and viewing.

SETTING IE'S WINDOW SIZE



IS THERE A way to make Internet Explorer come up every time as a maximized window?

Mike Edwards, Newhall, California THE SHORT ANSWER is no. But with some understanding of how IE picks its window size, you can get some control.

There are three different ways to launch IE-a shortcut, the desktop icon, or launching to a specific URL. IE behaves differently in each situation when maximizing the window.

IE shortcuts, such as the ones on your Start menu and Quick Launch Toolbar, behave like other shortcuts. To adjust one of them, right-click the shortcut icon and

> select Properties. Go to the Shortcut tab. For the Run option, select Maximize, then click OK. Now whenever you load IE via that shortcut, the window will

> > be maximized.

The Internet Explorer icon on your desktop, however, isn't a stan-

dard shortcut; it has no maximize option. Luckily, this icon remembers the condition of the window



FIGURE 2: TO MAKE WINDOWS 98 display a long Start menu in multiple columns (as Win 95 does), you must edit the Registry.

from the last time you used the browser. So if you exit IE after maximizing its window during a session, it'll open in the same mode next time you launch it.

The real problem comes from launching via a URL. This includes selecting an option from the Start. Favorites menu, typing a URL at the Start-Run prompt, rightclicking a link and selecting Open in a New Window, or even clicking a URL in an e-mail message. Unfortunately, IE never comes up maximized in this situation. But IE remembers the size of the window the last time you exited the browser (as long as it wasn't maximized). So if you resize that standard window to be as big as possible, and then exit and relaunch Internet Explorer, the size will hold.

THOSE OLD-FASHIONED MENUS



IN WINDOWS 95, the items in the Start menu and its submenus were always alphabetized, and Win 95

could expand a long menu into multiple columns. But Windows 98 forces you to scroll. Is there a way to make the Win 98 Start menu behave like the one in Win 95?

Lowell Shearer Alexandria, Virginia THERE ARE FIXES, but they require Internet Explorer 5 (go to Start. Windows Update). Once you have IE 5 installed, to alphabetize any Start submenu right-click the submenu and select Sort by Name.

Making long menus display in multiple columns is tougher (see FIGURE 2). In fact, it requires editing the Registry. Before you do this, see "Protect Yourself Against Catastrophic Installs" (p. 248, May Answer Line, www.pcworld.com/mayoo/al) for instructions on backing up the Registry.

Once your Registry is safely backed up, select Start. Run, type Regedit, and press <Enter>. In the Registry Editor, navigate the left pane, as you would in Windows Explorer, to HKEY_LOCAL_MACHINE\ SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\Advanced. Once there, right-click a blank spot in the righthand pane and select New-String Value. Name your new value StartMenuScrollPrograms. Press **<Enter>** once to save the name and again to bring up the Edit String dialog box. In that box's 'Value data' field, type false. Press (Enter), then close the Registry Editor and reboot.

For more on Win 95's multiple-column menus, see this month's Windows Tips.

THE BEST FILE SYSTEM



I'M RUNNING Windows 2000. Should I set up my hard drive for NTFS or FAT32?

Jim Dixon, Little Rock, Arkansas WINDOWS 2000 gives you a choice between the NT File System and FAT32two file systems that can handle multigigabyte drives efficiently. It also offers the old FAT16 system, which doesn't do well on drives bigger than a gigabyte.

The major issue is backward compatibility. NTFS is fine if you want to dualboot between Win 2000 and an earlier version of NT, while FAT32 will work if you boot from Windows 98 or Windows

Norton AntiVirus

List price: \$39

Norton SystemWorks

List price: \$59

Norton Utilities

List price: \$50; Symantec; 800/441-7234;

www.symantec.com

PRODUCT INFO NO. 606

PowerDesk 4 Pro

List price: \$20; Ontrack; 800/752-1333;

www.mijenix.com

PRODUCT INFO NO. 607

Quick View Plus

List price: \$59; Jasc Software; 800/622-2793;

www.jasc.com

PRODUCT INFO NO. 608

WinZip

List price: \$29; Nico Mak Computing;

www.winzip.com

PRODUCT INFO NO. 609

95B (but not the original Win 95). FAT16 will work with just about any operating system you can run on your hardware.

If you want to take advantage of Win 2000 features like file encryption and compression, you'll have to use NTFS. But an NTFS-formatted drive will probably be a bit slower than a FAT32 unit, because it must track disk usage in order to provide those extra features. For more information, see FIGURE 3 below.



For more tips, see www.pcworld. com/juneoo/al. Send your questions to answer@pcworld.com.

We pay \$50 for published items. Contributing Editor Lincoln Spector writes and performs computer humor. His column Gigglebytes appears in 13 publications.

FOR WINDOWS 2000 IF YOU WEEK		Choose		The state of the s
FOR WINDOWS 2000, IF YOU NEED	NTFS	FAT32	FAT16	Because
Multigigabyte hard drive	•	•		FAT16 has big clusters (smaller is better), 2GB partition limit.
Security	•			Encrypting file system requires NTFS.
More room on drive	•			Windows 2000 file compression requires NTFS.
Dual-boot with Windows NT	•		•	Windows NT doesn't support FAT32.
Dual-boot with Windows 98		•	•	Windows 98 can't read NTFS partitions.
Other dual-boot			•	Most operating systems support FAT16.
Performance	100	•	•	FAT systems use less overhead.

FIGURE 3: WHAT'S THE BEST FILE SYSTEM for Windows 2000? Each alternative has its advantages.

Banish banner ads • Ping redux • Find Net bottlenecks with Tracert

Create Your Own Ad-Free World

TIRED OF BLINKING, flashing come-ons cluttering your screen? Even if you've developed the ability to ignore banner ads, they still waste screen real estate and slow browsing speed. Guess what: You can avoid downloading them if you want to. Many people argue that Web ads are a blessing, providing an income source to sites and services you'd have to pay for otherwise. True, but nobody says you have to watch them, any more than you're obliged to watch television commercials. Why else were the remote control and the refrigerator invented? So let other users support the advertisers. Here's how to enjoy an almost ad-free environment.

BUST THE BANNERS

FILTERING OUT Web ads isn't as easy as switching channels on the television, but you can do it. At least a dozen utilitiessome free-banish banner ads from your browser (see FIGURE 1). And such products aren't just hackerware-even big-time software vendors sell them. Symantec recently licensed WRQ's AtGuard ad blocker and incorporated it into its Internet Security 2000 package. And Siemens, Europe's gray eminence of Net security, promotes its Web-Washer to companies that want to reduce their

network bandwidth consumption.

w.com

Most of these applications are specialpurpose proxy servers. Strategically situated between your browser or other Internet software and your connection to the Internet, they examine the link addresses that your browser requests when it loads a Web page, comparing them to a frequently updated list of known ad server addresses. When the proxy server finds a match, it discards the browser's request to retrieve the ad. This may alter the Web page layout slightly in some cases, but the benefits-fast loading and fewer irritating product pitches-usually outweigh this minor inconvenience. And because many banner ads use cookies to track your surfing habits, banishing the banner ads reinforces your online anonymity as well.

If ad-blocking software sounds like overkill for your needs, or if you just want

Set Default Web Editor

YOU CAN SPECIFY an HTML editor by choosing Start+Settings+Control Panel, double-clicking Internet Options, and clicking the Programs tab. But, you may not find any editors available in the drop-down list-even if likely candidates are installed on your system. Choose View*Folder Options*File Types in Windows Explorer (Tools*Folder Options* File Types in Windows 2000), select the HTML document entry in the list of file types, and then click the Edit button and assign a new program to the edit action.

to disable ads temporarily to speed page downloads, an easier alternative is to turn off all graphics. All you'll see is a page's text (and background color, if any), which could be a problem at sites that rely on image maps and buttons for navigation. To turn off graphics in Internet Explorer 5, choose Tools. Internet Options, click the Advanced tab, scroll to the Show pictures setting, uncheck it, and then click OK. To allow ads to download but prevent them from animating, uncheck Play animations instead. In Netscape Navigator, choose Edit · Preferences, select Advanced, and uncheck Automatically load images.

MORE CONNECTION TROUBLESHOOTING

IN FEBRUARY'S column (www.pcworld. com/feboo/hh_internet), I talked about how to use the Ping command and a

> Microsoft Web site to troubleshoot sluggish Net connections. I received a lot of mail about the item -mostly requests for additional help-so let's take a closer look.

But first, here's a follow-up on another February tip. The URL we printed for Microsoft's Bandwidth Speed Test works, but if you don't have a cable or DSL connection, you'll get better results with www. computingcentral.com/topics/ bandwidth/speedtest.asp.

Now some more about Ping: It's a great tool when it makes contact with the server on the other end.



FIGURE 1: IF ALL THOSE BANNER ADS on Web sites bother you, these shareware and freeware utilities will clear them from your screen. You can download them from the URLs listed above.

But when Ping returns a 'request timed out' message, it could mean any number of things. The most likely of these is that the request simply timed out-the connection was so slow that Ping gave up waiting for a response from the remote server. On the other hand, the time-out message could mean that the destination site is simply ignoring you. If you tried pinging www.pcworld.com-the example that I used in February's column-you experienced the latter. For whatever reason (probably because thousands of readers started pinging our server), PC World's Webmaster decided to turn off the software that replies to Ping requests. The same goes for America Online and many other large sites. So don't be surprised if certain addresses never seem to respond to your request.

Ping can also be misleading in other ways. A Web server bogged down with users may nevertheless respond promptly to Ping requests, for example. Despite these quirks, this utility's forte is testing whether your connection is working at all—if the connection seems dead, and half a dozen or more sites time out when you ping them, you probably have a basic failure to communicate. Start over, this time checking your modem settings, dialin number, and IP and DNS addresses.

Take the trace route: If Ping reveals that your Internet connection is functional but frustratingly slow, you need to know where the problem lies. Perhaps things have bogged down somewhere beyond your ISP's control (and yours). Or the problem could be closer to home—in

your home, even. To pinpoint the bottleneck's location, use the Tracert command. Like Ping, the command—short for trace route—is part of Windows 95, 98, NT, and 2000. As its name implies, Tracert follows the path that data takes between your computer and any remote address you communicate with. To trace the route between your system and

Microsoft's Web site, for example, open a command prompt window (select *Start-Run*, then type **command**), type **tracert microsoft.com**, and then press **<Enter>**.

Tracert's text output (see FIGURE 2) shows you how quickly data travels between your location and each network router along the way. As with Ping, time displayed is in milliseconds, and larger numbers mean slower performance. Tracert tests each new net-

work segment (these are known as hops) three times and posts all three numbers. A star in place of a number signifies a time out. If Tracert reports times in single or double digits for the first five or six hops but then suddenly encounters a segment in the high triple digits, you have found your slowdown—or at least part of it. The bad news: The Internet is slow. The good news: It's probably not your fault or your ISP's.

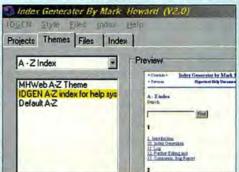
If slow Ping times consistently commence on the second or third hop, your ISP will probably want to know about it the backbone service it connects to, the high-speed lines it uses to connect to the backbone, or the ISP's own internal net-

> work or servers may be faulty. If the problem shows up on the first hop, however, it most likely involves either your equipment or the phone company's. Review your basic modem and network settings, as well as the physical phone wiring both inside and outside your home or office. Disconnect

DOWNLOAD OF THE MONTH

Index Your Web Site

AS YOUR SITE GROWS horribly out of control, you can easily misplace important data and links in its forgotten backwaters. Like any publication, your site needs an index. But indexing is a task from hell—and even if you do it at the outset, revising the index as your site evolves is something you'll probably keep moving to



the end of your to-do list. Mark Howard's free Index Generator 2.1 (available on FileWorld or at www.mh.ic24.net/idgen) makes that daunting task automatic. Once you get Index Generator's settings tweaked to your satisfaction, you can generate a new list with a few clicks.

all other phones and telephone devices that you use, including your answering and fax machines, to determine if they might be responsible for the problem.

If you become a habitual pinger and trace-router, you may want to pick up some extra-strength tools. Webmaster of the 82nd Airborne Division Kip Keziah wrote in to recommend NeoTrace, a graphical trace-route utility that charts route performance and plots the path on a map of the world. Download an evaluation copy from FileWorld or from www. neotrace.com. The registration fee is \$30. Reader Jim Bartek prefers PingPlotter, which combines ping and trace-route tools in a graphical interface. The program (only \$15) is available on FileWorld or at www.nessoft.com/pingplotter.



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nettips@spanbauer.com. We pay \$50 for published items. Scott Spanbauer is a contributing editor for PC World.

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FIGURE 2: WINDOWS' TRACERT route-tracing utility lets you pinpoint bandwidth slowdowns and Internet connection problems.

Create instant lines • Open multiple documents • Protect files from changes

Speed Your Formatting by Painting It

ONE OVERLOOKED feature in Word and WordPerfect lets you copy the formatting (fonts, colors, boldface, and so on) of a selected area of text and apply it to other parts of the document. Word calls this feature Format Painter, while WordPerfect calls it QuickFormat. Whatever the name. it's a great way to save time when formatting a document. Here's how to use it:

Word 97 and 2000: Select a block of text formatted with the attributes you want to copy elsewhere. If you have no suitably formatted text, select and format some. Click the Format Painter icon on the toolbar-it looks like a paintbrush. (To apply the copied format to more than one block of text, doubleclick the icon.) Then drag the paintbrush over the text you want

to format. Format Painter will also copy Paragraph formatting (such as indentation and line spacing). Alternatively, you can use any keyboard or other text-selection technique. If you double-clicked the Format Painter icon initially, click it again or press (Esc) to turn the feature off.

WordPerfect 8 and 9: To copy text formatting but not paragraph formatting, select a block of preformatted text. To copy the paragraph formatting, click anywhere in the paragraph. Click the QuickFormat icon on the toolbar-it looks like a paint roller. Then select a format option in the Quick-Format dialog box (see FIGURE 1). Word-Perfect will automatically choose the correct format option for the kind of text that you selected, but you can change it to another text format if you want to. Click OK.

QuickFormat can also copy the formatting used in tables. If you

are working in a table, the options will appear in a dialog box. Drag the paint

> roller over the text you want to format if you're copying text attributes, or click in a new paragraph to copy paragraph formatting. Again, you can use any keyboard or other selection method to apply the formatting. When you finish, click the QuickFormat icon to turn the feature off.



CREATE INSTANT HORIZONTALS

MANY WEB SITES use horizontal lines in doc-

uments. These lines quickly and effectively separate sections and highlight important points. You might expect creating horizontal lines in a Word or Word-Perfect document to be a daunting task,

but it's not. Both programs offer quick shortcuts for creating various horizontal lines in your documents. Here's a short and simple guide: Word 98 and 2000: Word's AutoFormat As You Type feature lets you create either plain or fancy horizontal lines particular character on a

Unformat All in Word

SOMETIMES A DOCUMENT gets overformatted. Whether you did it yourself or you're working with someone else's doc, getting rid of all formatting and starting fresh may be the best course. In Word 98 and 2000, this takes only four steps, which you can record as a macro for future use: Press (Ctrl>-A to select the entire document. Press (Ctrl>-<Shift>-N to apply the Normal style to the document. Press (Ctrl>-(Space) to remove all manual character formatting, Press (Ctrl>-Q to remove all paragraph formatting.

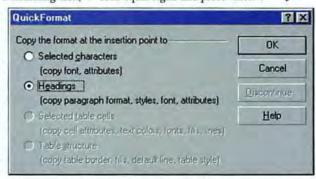
blank line three times and press (Enter). FIGURE 2 shows how to create several types of lines in Word and in WordPerfect.

To adjust the width of any line created in this way, position the cursor just above the line, and drag the margin markers on the ruler to new positions.

If this technique doesn't work when you try it, you need to turn the feature on. Select Tools. AutoCorrect and then click the AutoFormat As You Type tab in the Auto-Correct dialog box. Click Borders to mark the check box and then click OK. Note that these instant lines can only serve as fullwidth horizontal lines; you can't incorporate text or other characters into the line.

To delete the lines, select Format-Borders and Shading and click the None box.

WordPerfect 8 and 9: WordPerfect's Format-As-You-Go feature offers a more limited set of instant horizontal lines than Word's AutoFormat As You Type. In WordPerfect 8 or 9, type four hyphens or four equal signs and press (Enter).



in seconds. First type a FIGURE 1: WORDPERFECT'S QUICKFORMAT LETS you format selected sections of text, paragraphs, and tables.



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- Find up to minute news not available anywhere else!



FIGURE 2: GET HORIZONTAL in Word 98 or 2000 or in WordPerfect by using strings of keyboard characters.

If you try this technique and it doesn't work, you need to activate the feature. To do this, select Tools · Quick Correct and click the Format-As-You-Go tab in the Quick-Correct dialog box. Click the QuickLines check box in the Format-As-You-Go list to enable the feature; then click OK.

You can create a thicker line in the same location simply by repeating the process that you used to create the original thin single line; do this immediately after you press (Enter) to generate the first line. Repeating the process after creating a double line produces a triple line with a heavier centerline.

JUSTIFY THE LAST LINE OF A PARAGRAPH

WHEN YOU'RE WORKING with justified text (lines of text that are stretched until they're flush with both margins), you'll sometimes need to justify an entire paragraph, including its last, short line. In Word 98 and 2000, you can achieve this

effect by pressing <Shift>-<Enter> at the end of an already justified paragraph (which creates a new line), rather than (Enter) (which begins a new paragraph). In WordPerfect 8 and 9, clicking the Justify All icon on the Formatting toolbar has the same effect. Use this technique sparingly, however, and only when the line almost reaches the right-hand margin on its own. Otherwise, you'll create huge gaps between words on the last line.

OPEN MULTIPLE DOCUMENTS

TO OPEN more than one document in Word 97 or 2000 or WordPerfect 8 or 9, you don't need to select File Open

for each file you want, Instead, select File.

Open, and hold down <Ctrl> while clicking each document you want to open (see Figure 3). After you select the documents for your work session, click Open to open them simultaneously.

INDENT BOTH SIDES

THE GENERALLY accepted standard for formatting blocks of quoted text in a document is to leftused in academic docu-

ments and general publishing. Versions 8 and 9 of WordPerfect make this formatting easy to apply. Place the cursor at the beginning of a paragraph or select one or more paragraphs, and press <Ctrl>-

> <Shift>-<F7>. Your quotation will be perfectly indented.

> Word 97 and 2000, on the other hand, require you to take a trip either to the Paragraph dialog box to increase left and right indentation or to the ruler to drag the indentation marks. There's no keyboard shortcut. Buried deep within the styles included in the normal.dot

template, however, is the hidden paragraph style you needed. Here's how to find and apply the style:

Click inside the paragraph you want leftand right-indented, or select multiple paragraphs. Hold down <Shift> and click the arrow next to the 'Style name' field on the formatting toolbar (see Figure 4). You'll get a list of all available styles, not just the most common ones. Scroll down the style list and select Block Text. This will format your extract properly, in the same font as your Normal style. Once you've used a new style in a document, it will appear in the regular style list and will be available for use elsewhere in the document.

If you use this formatting often, record the steps as a macro and assign the macro

> a toolbar icon for easier access. See Word's help system for instructions.



and right-indent each FIGURE 4: HOLD (Shift) and click a block. This format is style to indent left and right.

PROTECT DOCS FROM CHANGES

BOTH WORD 97 and Word 2000 offer a way to prevent others from changing the contents of your documents, while letting them open the document freely without a password. Alas, Microsoft's description is so obscure that you might never find this method. Follow these steps after

your document is in its final form:

- 1. Select Tools. Protect Document.
- 2. Select Forms in the Protect Document dialog box.
- 3. Type a password of your choice in the Password field and click OK.
- 4. Type the password again in the Confirm Password dialog box and click OK.

If you need to remove the protection for editing, open the document, select Tools. Unprotect Document, enter the password when prompted, and then click OK.

Send your questions and tips to george_ campbell@pcworld.com. We pay \$50 for published items. George Campbell is a PC World contributing editor. Reach him on his Web page at www.osomin.com.

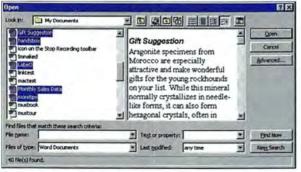
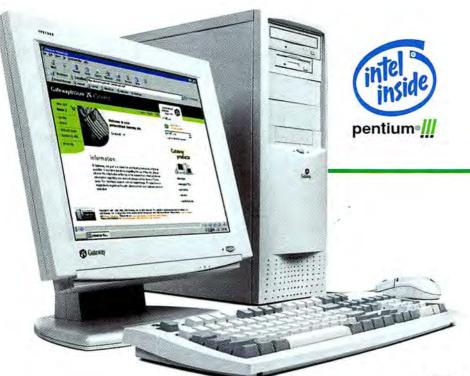


FIGURE 3: OPEN MULTIPLE DOCUMENTS by holding down <Ctrl> and selecting as many files as you want before clicking Open.

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Display Multiple Charts on a Single Chart Sheet

AN EXCEL CHART can appear embedded in a worksheet or reside in a separate Chart sheet. Here's a trick for storing multiple charts on a single Chart sheet.

Create charts as usual, placing them in a worksheet. Select any blank cell in the worksheet and press <F11>; this creates an empty Chart sheet to hold the embedded charts. Reactivate your worksheet, click an embedded chart, and select Chart. Location to display the Chart Location dialog box. Choose As object in, and specify the empty Chart sheet. Excel will transfer the embedded chart to your Chart sheet.

Select your remaining charts, and use Chart-Location to move them to the Chart sheet. Now you can arrange and size the charts any way you like. Putting multiple charts on a single Chart sheet lets you use the View. Sized with Window command (available when the Chart sheet is active) to scale the charts to the window size and dimensions. FIGURE 1 shows an example of a Chart sheet that contains three charts. When the window is resized, the charts adjust to fill the window automatically.

DISPLAY A WORKSHEET NAME



CAN I CREATE a formula to display the name of the worksheet? I'm familiar with Excel's CELL() func-

tion, but it shows the workbook's full path.

Ken Fernandez, Fremont, California WHEN YOU PRINT a worksheet, you might want the sheet's name displayed in a cell in case you need to refer to the original sheet. Oddly, Excel does not offer a function that displays the sheet's name. As you noted, the CELL() function comes close. The formula =CELL("filename") displays the workbook's full path, along with the worksheet name.

The actual string "filename" is the required parameter.

For example, this formula might return FIGURE 1: USE THE Chart • Location command

top\[Budget.xls] Sheetz. Getting Excel to return only the sheet name requires a more complex formula that



strips off everything except the name of the sheet:

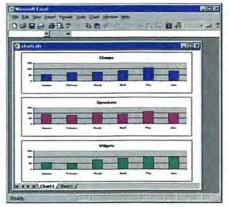
=MID(CELL("filename"),FIND("]",CELL(" filename"))+1,LEN(CELL("filename"))-FIND ("]",CELL("filename")))

COLOR MARKS THE SPOT

EXCEL'S CONDITIONAL formatting feature (available in Excel 97 or later) offers an easy way to apply special formatting to cells if a particular condition is met. This feature is even more useful when you understand how to use a formula in your conditional formatting specification.

FIGURE 2 shows a worksheet with student grades on two tests. Conditional formatting highlights students who scored higher on the second test. This formatting is dynamic; if you change the test scores, the formatting adjusts automatically.

To apply conditional formatting, select range A2:C15 and choose Format-Conditional Formatting. The Conditional Formatting dialog box will appear with two



something like C:\WINDOWS\Desk- to display three charts in a single Chart sheet.

Too Many Sheets?

BY DEFAULT, each new Excel workbook begins life with three worksheets. You can, of course, add more sheets to the workbook or delete sheets you don't need. The unused sheets don't occupy additional memory or increase file size, but I generally don't like them in my workbooks. A better approach is to change the default. Select Tools Options and click General in the Options dialog box. Then change the setting for 'Sheets in new workbook'. Now all new workbooks will have the number of sheets you specified.

input boxes. In the first box, choose Formula Is, press <Tab>, and enter =\$C2>\$B2 (meaning, if C2 is greater than B2). Click Format and choose a format to distinguish

	A	В	C	D
1	Student	Pre-Test	Post Test	
2	Adam	89	93	
3	Beth	91	90	
4	Charles	75	81	
5	David	65	65	
6	Elisa	90	81	
7	Fanny	B3	88	
8	George	74	71	
9	Howard	59	74	
10	Isaac	79	81 82	
11	Jim	80	62	
12	Keith	96	92	
13	Larry	87	63	
14	Marisa	92	95	
15	Nancy	89	88	
16			lel I	

FIGURE 2: USE CONDITIONAL formatting to spot trends, like these improved test scores.

the cells (I used yellow shading). Click OK, and the formatting will be applied.

The conditional formatting formula is evaluated for each cell in the range. The trick here is to use mixed cell references (the column references are absolute, but the row references are relative). To see how this works, activate any cell within the range and choose Format-Conditional Formatting so you can examine the conditional formatting formula for that cell. You'll find that cell A7, for example, uses this formula: =\$C7>\$B7.

Send questions and tips to john@j-walk. com. We pay \$50 for published items. Contributing Editor John Walkenbach is the author of Excel 2000 Formulas (IDG Books, 2000) and maintains The Spreadsheet Page (www.j-walk.com).

Get faster printouts • Fix paper jams in a jiffy • Increase output quality

Troubleshoot Your Laser Printer Quickly

LASER PRINTERS are as temperamental as 2-year-olds. Sheets of paper can jam, complex graphics can cause your printer to sleepwalk, and stray particles can smear and smudge your precious output. Here's how to diagnose your laser's malaise and return it to good health.

Start with Windows 98 Troubleshooter. This wizard-based utility can't solve every difficulty, but it's good at tracking down some basic printer problems. Select Start. Help. In the Help window, select the Contents tab and then Troubleshooting. Choose Print from the resulting list.

If your laser printer is crawling instead of cranking, try the following suggestions. Enable your ECP setting: Most recent laser printers support the faster transfer speeds of an Extended Capabilities Port. An ECPcapable printer prints substantially faster when connected to a parallel port set to ECP mode. And to a lesser degree, so will printers that don't support ECP.

But not all PCs arrive with their parallel ports set to ECP mode. To see if yours is adjusted properly, look at the parallel port



FIGURE 1: A YELLOW CIRCLE next to ECP Printer Port indicates a DMA conflict that needs attention.

settings in your system's CMOS Setup program. Select the ECP setting. You may be prompted for a Direct Memory

Access (DMA) channel for the port. Note the number of the channel you select.

Next set up the ECP port in Windows. Go to the Device Manager (select Start. Settings-Control Panel-System and click the Device Manager tab), and open the Ports (COM & LPT) entry. If you see an ECP Printer Port listed, you're set, If not, you need to run the Add New Hardware wizard from the Control Panel: Choose Ports from the hardware list. Under Ports, pick the ECP Printer Port installation option.

After rebooting, confirm that the ECP is installed by checking the Device Manager. If Device Manager alerts you to a resource conflict (see FIGURE 1), the DMA channel you selected in the CMOS Setup program is probably already in use. Go back into Setup and select a new channel.

Retool your spool: Make sure your hard drive isn't fragmented or full; Windows needs room for the spool file. Select the Details tab in the printer's Properties dialog box, and click the Spooling Settings button. If spooling is enabled, check that the data format is set to EMF, not RAW. You can also disable spooling by selecting the Print directly to printer option. This may speed up printing, but you'll have to wait longer to resume other computing tasks. Add memory: Large files with complex graphics can take forever to print from PCs with insufficient on-board memory. In fact, you may not be able to print some graphics at all. Many laser printers store an entire page before printing. At the very

least you need 512KB for printing 300

Solve Call Waiting Disconnects

DON'T YOU HATE missing important phone calls because you're surfing the Web on your only phone line? The Call-Waiting Modem from Actiontec recognizes incoming calls that ordinarily would disconnect the modem. Instead, it lets you pick up the phone and have a brief conversation without losing your online connection. It also works when an extension phone on the same line as the modem is picked up, preventing modem hangups. The internal version goes for \$80, and the external USB version lists for \$100.

dots per inch and 1MB for 600 dpi. For complex graphics or network use, you'll want at least 2MB and preferably 4MB to handle these resolutions.

Confirm that the Device Options tab in the Properties dialog box lists the correct

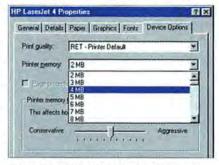


FIGURE 2: MAKE SURE YOUR printer setting shows the true amount of RAM in your printer.

memory settings. If Windows doesn't know about your extra memory, it can't use it (see FIGURE 2).

Check the obvious: If your printer won't work at all, check to see that cables, power cords, paper trays, and switches are in their proper positions. Also check for the proper paper size in the printer's Properties box (select the Properties button from any app's Print dialog box or select Start. Settings. Printers and right-click on the printer icon in the Printers window).

Next, see if your printer is communicating with your computer. Many printers have a switch for toggling between online and offline states. If the trouble persists, turn the printer off and on. It's amazing how often that fixes a problem.

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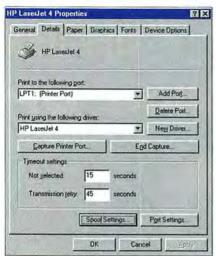


FIGURE 3: GET TO KNOW your printer settings (Properties) by right-clicking the printer icon.

Print a test page from the printer's control panel, not from Windows. If it prints, the problem involves your cable, your PC, or your software—but not your printer.

Look for a bad driver: Out-of-date or corrupted Windows drivers are a common source of printer problems. Reinstalling a driver is easy: First, go to the Printers folder (Start-Settings-Printers), and delete the printer icon. Next, double-click the Add New Printer icon. The Add New Printer wizard will ask you to select your printer from a list of possible choices. You may need to insert the Windows CD-ROM at this point to load a driver.

Before installing a new printer driver, check your printer manufacturer's Web site to ensure that you have the latest version. To install a downloaded printer driver, hit the Have disk button (instead of selecting a driver from the list) in the New Printer installation wizard.

Once you have a good driver installed, check your printer's settings. Right-click the printer icon and select Properties. The type, number, and location of the settings vary from printer to printer, but many are common to most printers. FIGURE 3 shows the settings for an HP LaserJet 4.

Actiontec 56K USB Call-Waiting Modem

List price: \$100 external, \$80 internal; Actiontec Electronics; 800/797-7001; www.actiontec.com PRODUCT INFO NO. 601

Check your parallel port mode: Try switching the parallel port settings in the PC's CMOS Setup program (as described earlier) to Standard or Bi-directional. These settings have slower data transfer rates but offer greater compatibility.

Getting out of a jam: Laser printers use high-voltage power and generate high temperatures. So before you reach inside, unplug the printer and wait a few minutes for its innards to cool down.

Pull jammed sheets of paper out of the printer in the direction opposite the way they normally move through it.

Check for bits of paper that may remain lodged in the printer. Habitual jamming can be caused by out-of-alignment rollers. See if you can gently realign them.

IMAGE IS EVERYTHING

HERE ARE A FEW common graphicsrelated problems together with some sug-

COMPONENT

gestions for fixing them. Partially printed page: You probably need to add memory.

Offset margins or odd alignment: On your printer's Paper tab, check the Unprintable Area settings. Printing too large an image for the printer's parameters can alter margins and spacing.

Uneven print density across the page: Your toner level may be low. Take the toner cartridge out and tilt it gently back the remaining toner.

Dark background/echoed depositing excess toner.

Lower the print density setting on the external control panel or inside the unit. Light or gray print overall: Your printer's photoreceptor may be wearing out. To correct this temporarily, increase the print density setting. Eventually, you'll have to replace the photoreceptor-which on many budget and midrange laser printers means replacing the toner cartridge.

All-white pages: The printer's transfer

corona wire may be broken. This problem requires professional service.

All-black pages: The charger corona wire (usually located in the toner cartridge) isn't working correctly.

Remove the toner cartridge to clear the electrical contacts, then reinsert it. If that doesn't work, install a new cartridge.

WATT'S UP?

I LIKED YOUR February column on power supply issues. But I want to add a CD-RW drive and can't tell whether my 200-watt power supply can handle the extra load. I have a generic Pentium II system with a 2GB hard drive, CD-ROM drive, and a new 3D graphics card with 16MB of RAM, Any ideas?

John Galvin, Lafayette, Louisiana FIGURE 4 SHOWS a table of components found in PCs and the typical wattage requirements for each. Add the wattage values for all of your system's components.

> Then, to be safe, add 30 percent more (that is, multiply the total by 1.3) to calculate the minimum wattage rating for your power supply.

> For example, if your system has a sound card and a floppy drive, you need a 178-watt power supply even before connecting a CD-RW drive. When you add the CD-RW drive, you'll need 39 watts more (30 X 1.3). but you'll lose the CD-ROM drive's 28 watts (25 X 1.3)-unless you plan to keep it installed. So your 200-watt power supply should suffice.

Or try the Power Supply Selector at www.pcpowerandcooling. com. If possible, use a power supply with a higher rating than you need: A power supply with a high wattage rating minimizes heat production. And that's cool.

Pentium CPU 20 Pentium II, III CPU 30 Motherboard 20 64MB of RAM 5 Hard drive 25 Floppy drive 5 Zip drive 10 CD-ROM drive 25 5 2D graphics card 3D graphics card with 8MB 20 or more of RAM 7 Sound card Each additional card 5 (such as SCSI or modem)

Watts used

and forth to redistribute FIGURE 4: TO COMPUTE YOUR PC's energy needs, add the wattage for each component; then multiply that images: The printer is sum by 1.3 to build in a safety factor.

Send tips and questions to kirk_steers@ peworld.com. We pay \$50 for published items. Kirk Steers is a PC World contributing editor.



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Shift Your Graphics Into Overdrive

TODAY'S GRAPHICS-INTENSIVE business applications and mind-boggling 3D computer games push graphics cards to the edge. Swapping out your tired old graphics card for a hot new model can give even an older, slower PC a dramatic performance boost. The technology underlying the dedicated graphics processors used in today's graphics cards is every bit as advanced as the fastest Intel Pentium III and AMD Athlon CPUs.

AGP bus cards offer the most power and choice, and 32MB of on-board RAM has become standard, permitting more colors and higher resolutions. But don't despair if your PC doesn't have an AGP slot. PCI graphics cards are still available. though the selection and performance capabilities are relatively lean (16MB of on-board RAM is standard for PCI cards). Either kind of card should still make a big difference in performance.

Figure on spending \$150 to \$300 for an AGP card, \$100 to \$200 for a PCI card. The best card for you depends on whether you're a spreadsheet jockey, a game freak, or a user who falls somewhere between the two. (Check out the Top 10 Graphics Boards, page 245, for buying tips.)

Swapping graphics cards is a popular, and usually easy, upgrade. But a few pitfalls lie hidden along the way. Here's how to perform the upgrade painlessly.

Stan Miastkowski is a PC World contributing editor.

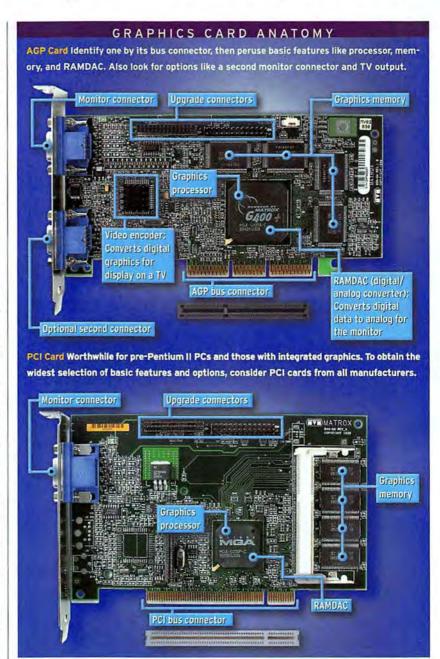
THE TOP

Benefits: Faster, higherresolution graphics Cost: AGP card, \$150 to \$300; PCI card, \$100 to \$200 Time required: 30 to 45 minutes



Tools required: Phillips screwdriver, antistatic wrist strap

Expertise level: Beginner to intermediate Vendors: 3dfx (www.3dfx.com), ATI (www.ati.com), Creative Labs (www.creative.com), Diamond (www.s3.com), ELSA (www.elsa.com), Guillemot (www.guillemot.com), Matrox (www.matrox.com)



 Get the latest drivers. Even if you have purchased the latest, greatest graphics board, it may have been sitting on your dealer's shelf for weeks. And graphics card makers are constantly updating the all-important driver software. Before you begin, go to the Web site of your new card's manufacturer and download the latest driver update.



2 Uninstall the old software. While most graphics card makers say you can simply swap a new board for the old, we've found that uninstalling the old card's driver can help prevent problems. You can skip this step and take your chances, but it's particularly dangerous to do so if your new board is the same brand as the old one. Some vendors make uninstalling easy.



For example, Matrox (whose Millennium G400 Max is shown at left) provides an uninstall option for all its util-Itles and complete uninstall directions on its Web site. To clear out the drivers for your old card, go to Start Settings Control Panel, double-click the Add/Remove Programs icon, and remove any software that's specific to your old graphics card. (If you're not sure about an item, don't remove it!)

Check your manual or the support section of your old board maker's Web site for additional instructions. If you don't find anything, and nothing is evident in Add/Remove Programs, just forge onward.

Out with the old. Turn off your PC and unplug it. Consider using an antistatic wrist strap (available at your local electronics store) to minimize the risk of causing static damage. First, unhook the monitor cable. Then open the case, remove the screw that holds down your existing graphics card, and carefully withdraw the card.



In with the new. Remove your new graphics card from its packaging and carefully insert it into your PC. Press it firmly into the proper slot, and use the screw that you removed in step 3 to secure it. Reconnect the monitor cable, but leave the case off for now.

Important: If you have a dual-head card (like the Matrox G400 Max shown on the facing page), make sure you connect your main monitor to the correct connector (usually the upper one). If you have other components-such as a second monitor, a digital display, or a television-to connect to the card, plug them in as needed to the second connector.

f) Install the software. Read through the manual that came with your new graphics card to familiarize yourself with the recommended driver installation procedure, which can vary slightly from one manufacturer to another.

Reconnect your PC's power cord and turn the system on. As Windows starts, it should automatically detect the new card and start the Add Hardware Wizard. Insert the CD-ROM that came with your graphics card, and follow the directions for loading the driver (if you downloaded a new driver, point Windows to the right location on your hard drive). You may or may not be able to install additional utilities at the same time as the driver, depending on the card. If you do need to install additional utilities after the drivers have been installed, do so now.

6 Adjust the settings. Go to Start Settings. Control Panel, choose the Display icon, and click the Settings tab. Next, choose the resolution and color depth that you want to use. (Windows will test those settings for you to make sure that your monitor can handle them.) In addition, most new graphics cards have a multitude of advanced features and options. Simply click the Advanced button to gain access to them. (You might have an icon for this in the System Tray.)

If all's well, put the case back on. If you experience any problems, turn off your computer, check all your connections, and make sure the





Matrox Millennium G400 Dual Head Max - English Properties 12 X

Matrox GurckDesk autostant

graphics card is firmly seated in its slot. You may also want to try reinstalling the drivers. If the display is garbled or completely blank, check the troubleshooting section of your graphics card manual. Still dead in the water? Then it's time to reach for the phone and call tech support.

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F 6





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\$1,201 - \$2,000 \$2,001 - \$3,000	\$189.99 \$219.99	MW3004 MW3005
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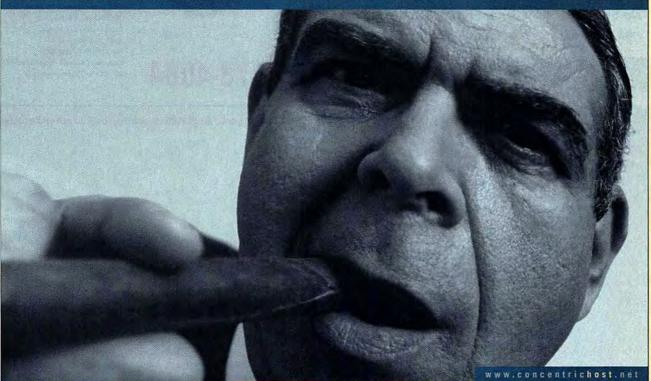
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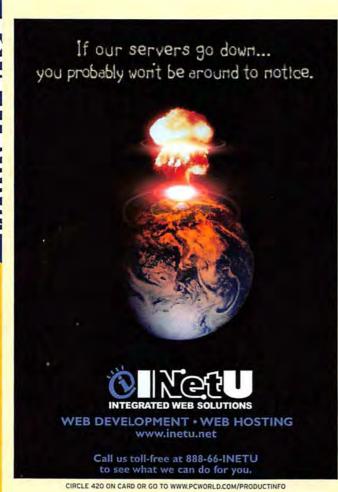
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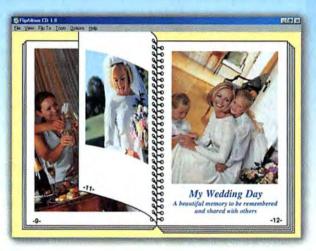
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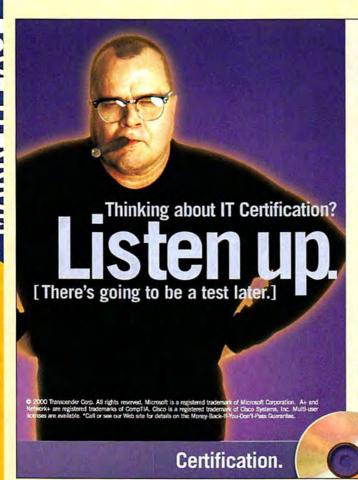


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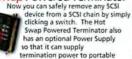
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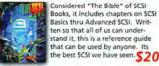
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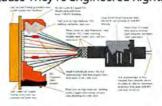
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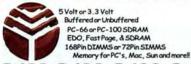
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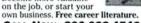


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Private Lives? Not Ours!

"YOU HAVE ZERO PRIVACY ANYWAY," Sun Microsystems' CEO Scott McNealy said last year. "Get over it."

He's right on the facts, wrong on the attitude. It's undeniable that the existence of enormous databases on everything from our medical histories to whether we like beef jerky may make our lives an open book, thanks to the ability of computers to manipulate that

information in every conceivable way. But I suspect even McNealy might have problems with somebody publishing his family's medical records on the Web, announcing his whereabouts to the world, or disseminating misinformation about his credit history. Instead of "getting over it," citizens need to demand clear rules on privacy, security, and confidentiality.

The sooner this happens, the better. Check out Simson Garfinkel's trenchant and scary new book Database Nation: The Death of Privacy in the 21st Century (O'Reilly, \$25). When it comes to privacy in a world where databases increasingly dominate our lives, there definitely ought to be a law-but privacy statutes are the exception rather than the rule.

YOUR INFO BELONGS TO US

THANKS TO POLITICAL outrage after Judge Robert Bork's video rental habits were un-

earthed during his Supreme Court nomination hearings in the late 1980s, it's now illegal for video stores to reveal your rental records. But Garfinkel points out that there are few similar confidentiality laws on the books. For instance, all sorts of highly sensitive medical information about you can travel back and forth throughout the health care and insurance industries, and sometimes beyond, with virtually no legal restraint.

Marketers think they deserve your information at least as much as you do. The creepy idea that somebody can follow you around the Net without your express permission is already commonplace. Web add-ons like Third Voice (which lets you post and read



I've always been aghast that some fingerprint-ID schemes might let a severed digit unlock your ATM account.

comments about specific Web sites) need to follow where you go in order to work and can collect your entire "clickstream" should they so choose. Ad companies like DoubleClick do their best to track your moves online, rendering individual sites' privacy policies meaningless-not that they're reassuring in the first place.

Garfinkel also demolishes the myth of infallibility among up-and-coming technologies like biometric identification. I've always been aghast that some fingerprint-ID schemes might allow a severed digit to unlock your ATM account. But ultimately it may be unnecessary for the bad guys to spoof the identification end of the chain; it's easier just to manipulate the underlying database to link someone else's fingerprint to you and your credit rating.

BEYOND THE USUAL SUSPECTS

HOW HARD IS IT to compromise a database? Just ask the tens of thousands whose credit card numbers have been filched from sites that did not take privacy and security seriously. My own credit files are still riddled with errors, thanks to someone who used my Social Security number to impersonate me. Microsoft's many security gaffes prove privacy is not considered a top product feature-probably because only those who have already been victimized seem to care.

Privacy violations by electronic means aren't limited to the obvious sources. Garfinkel discusses cameras mounted in public places that can pick up the images of every person or vehicle that passes, microphones that can capture conversations from afar, and cell phones that can report their users' peregrinations. If databases store this information in digital form, misuse is almost guaranteed.

We won't get real privacy or security until we demand it as a matter of law. Enough bad things have happened that the outcry should be deafening. But companies eager to improve their marketing efficiency or make billions selling personal data of questionable accuracy continue to wield immense influence. We probably won't see much change in electronic privacy law until some poor Supreme Court nominee gets caught downloading files from psychic-friends.net.

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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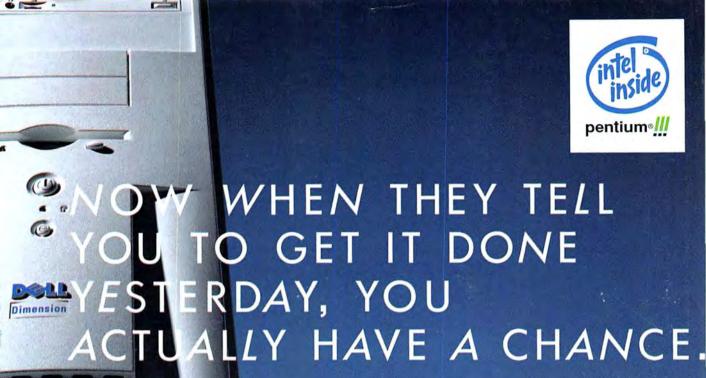
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