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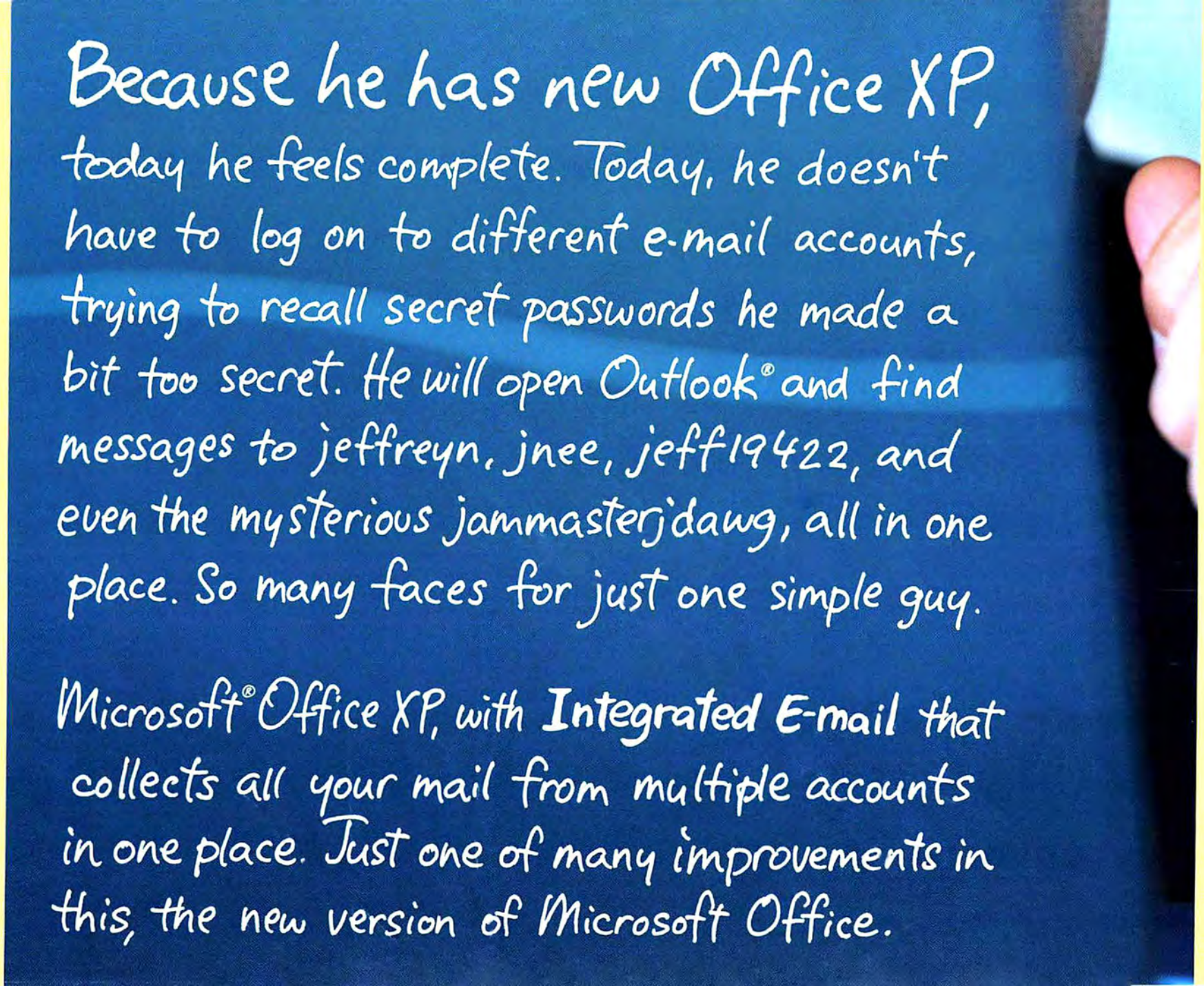
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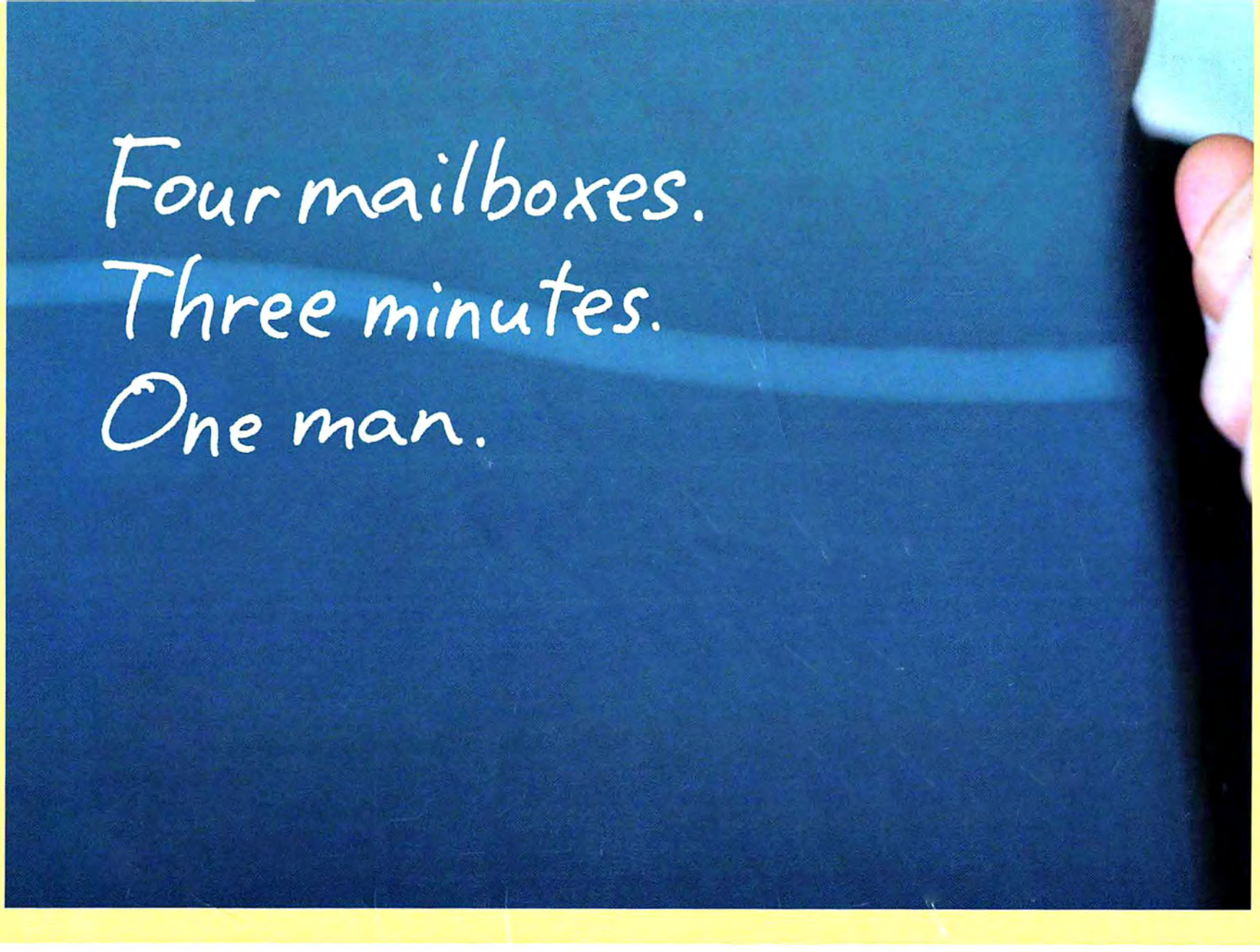
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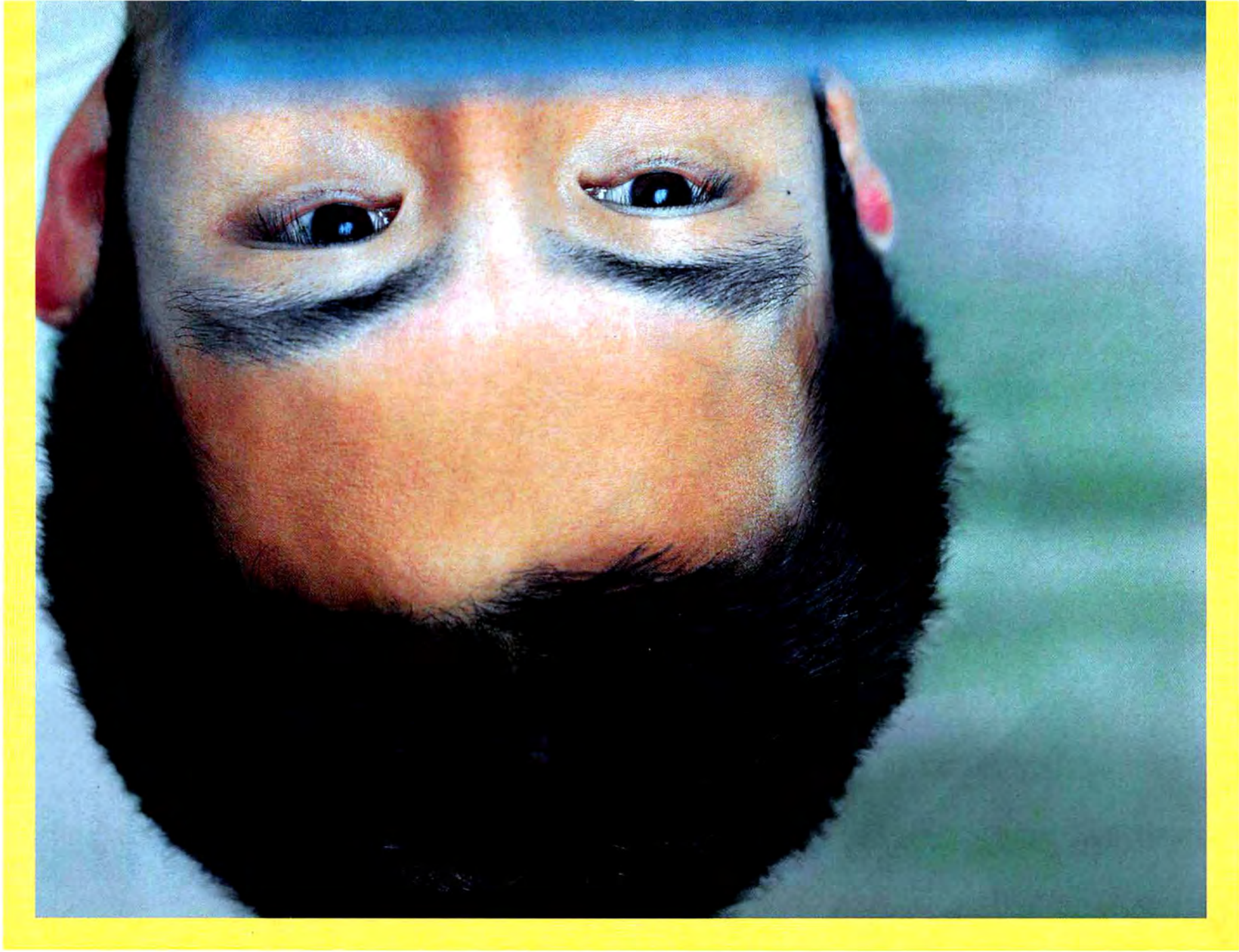

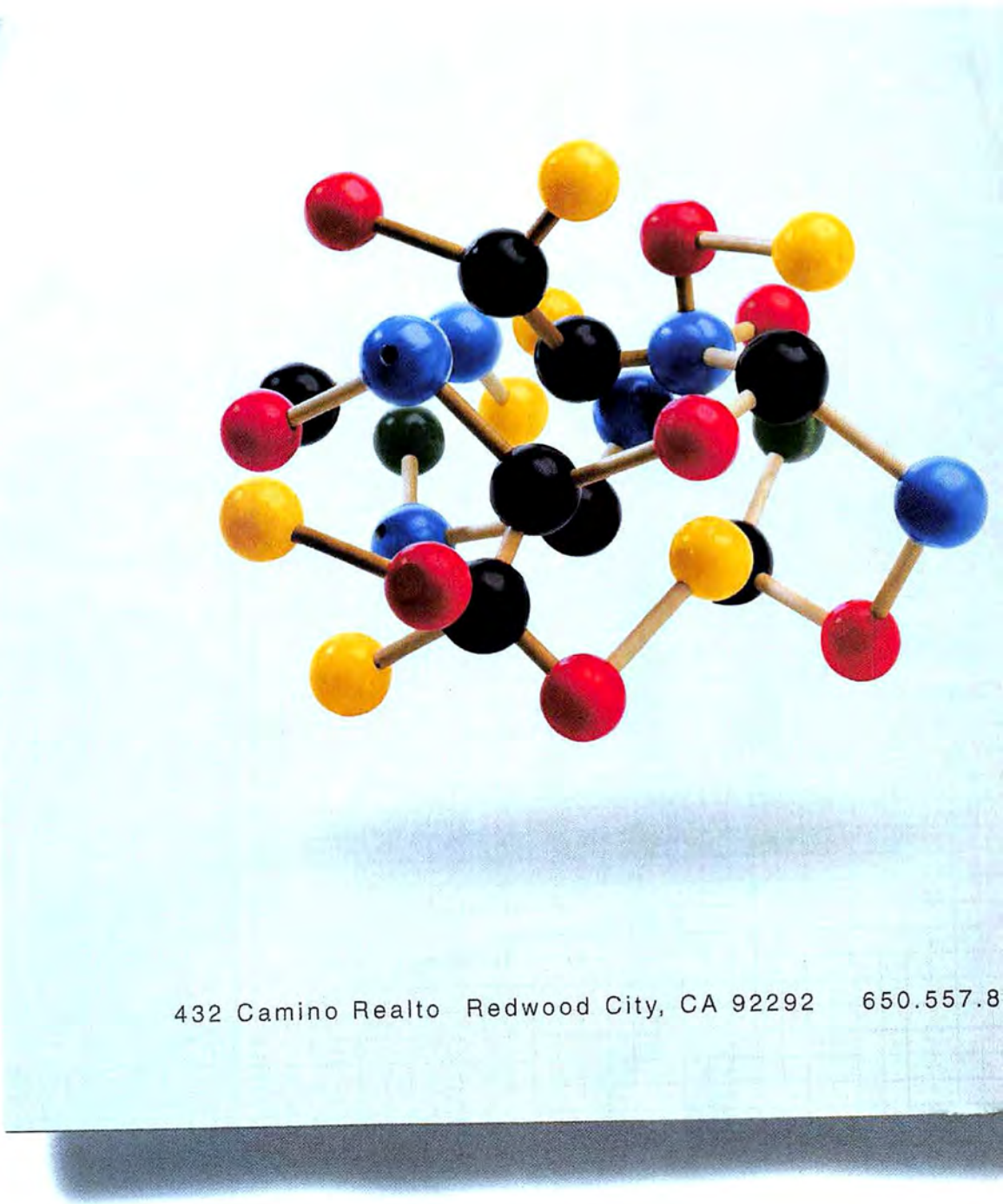

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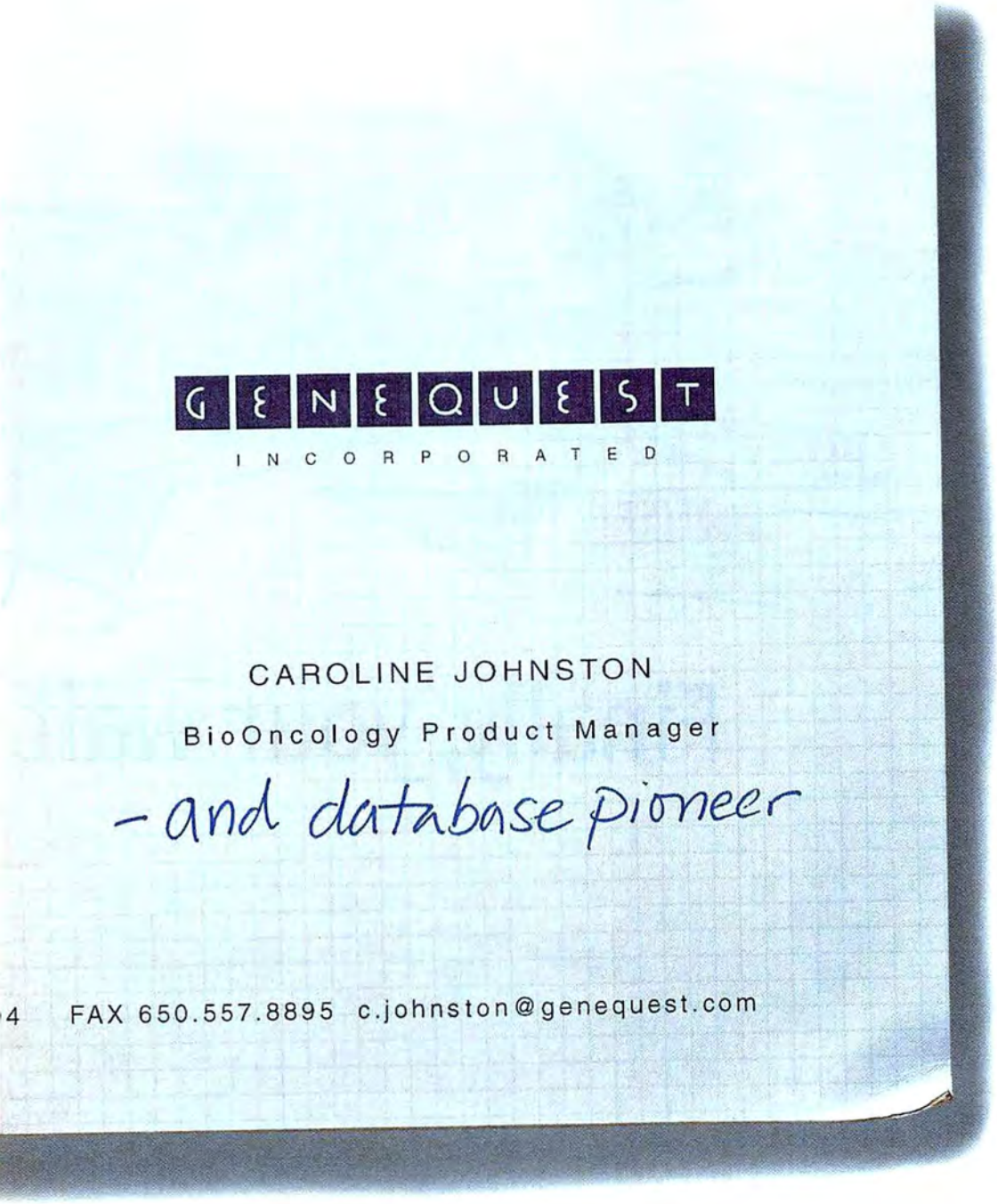

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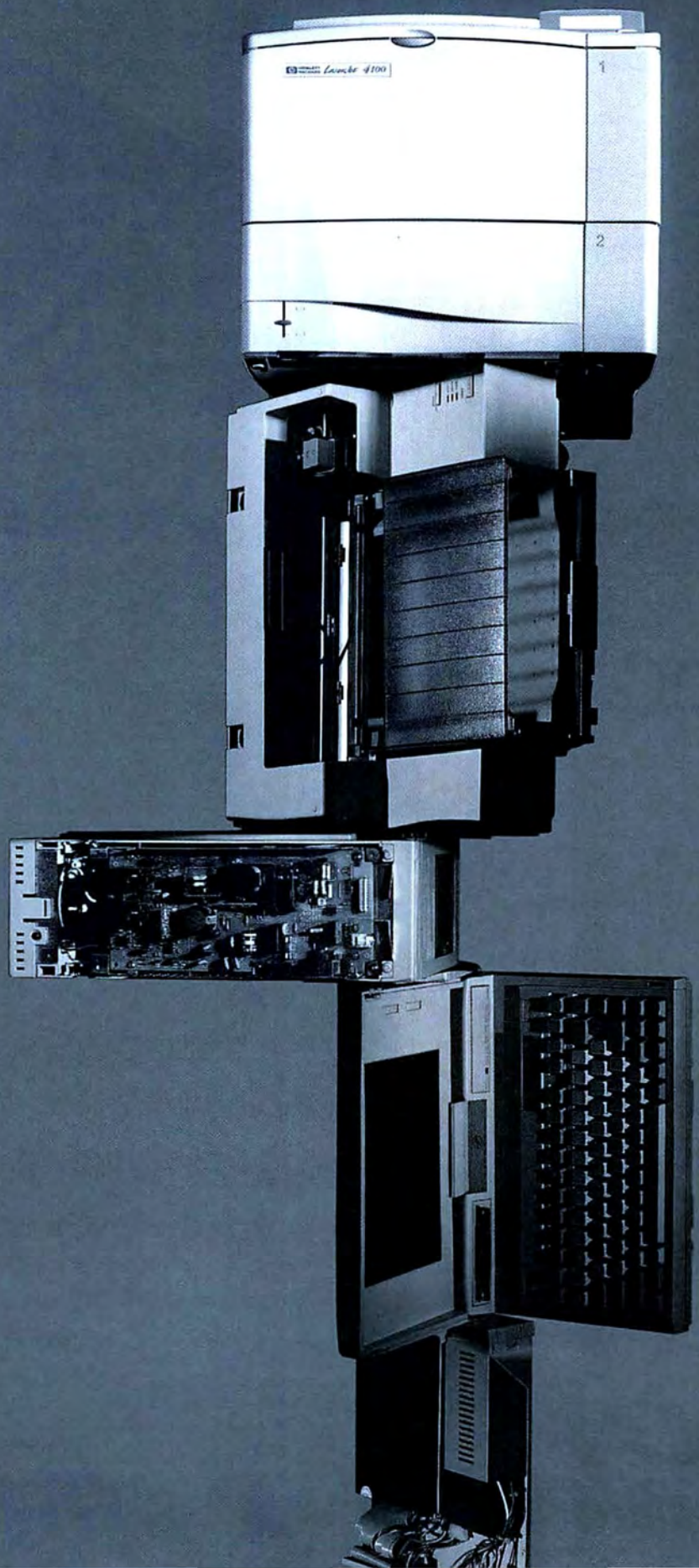
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1
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JULY

VOLUME 19 ◆ NUMBER 7

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88 **BEST OF 2001**

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online Additional material available online at www.pcworld.com

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COVER *Photographs by Kevin Twomey*

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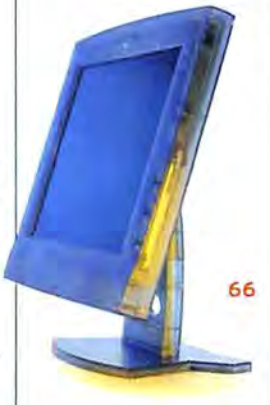

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Kevin McKean is editorial director of PC World. ■

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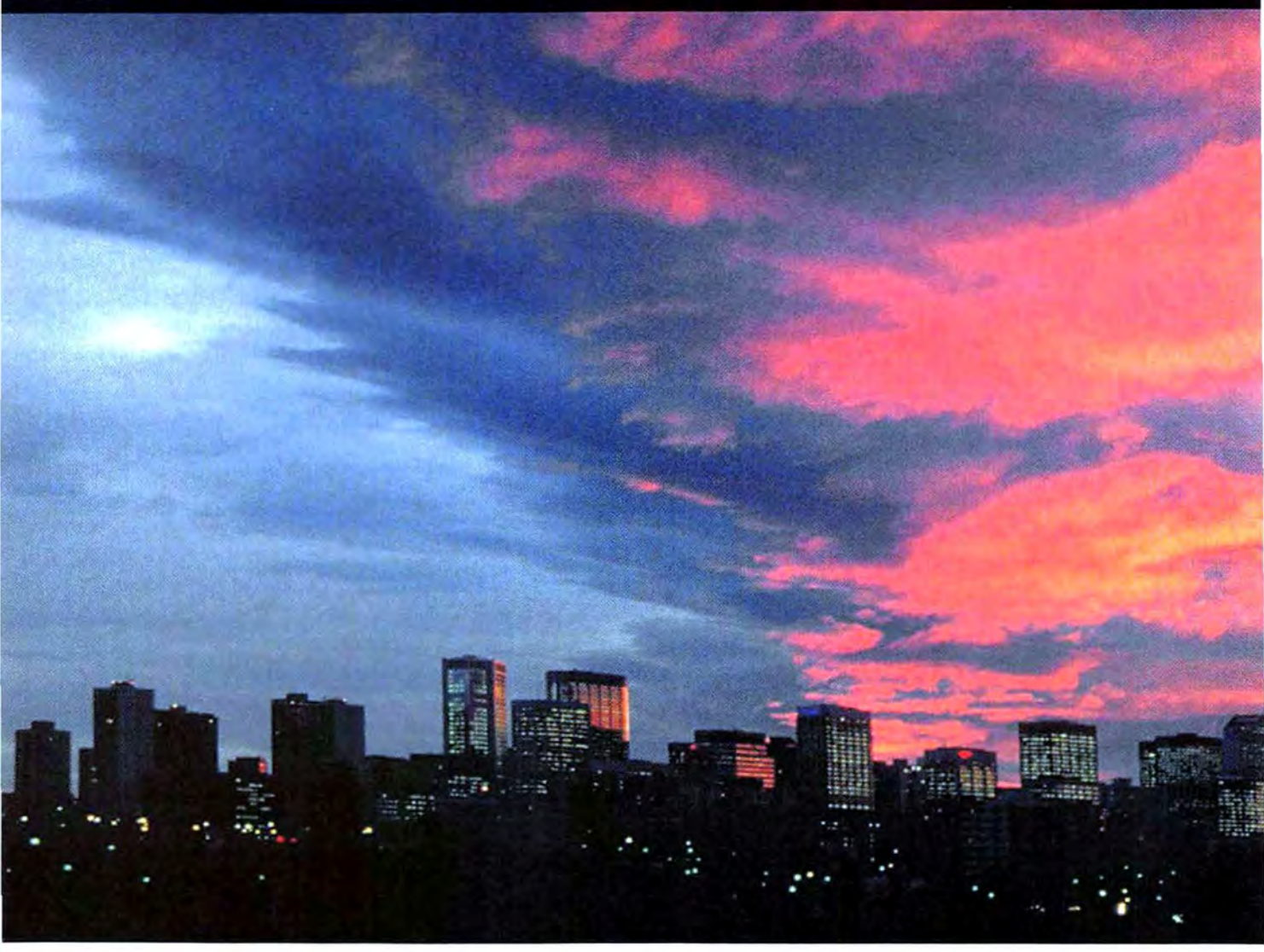

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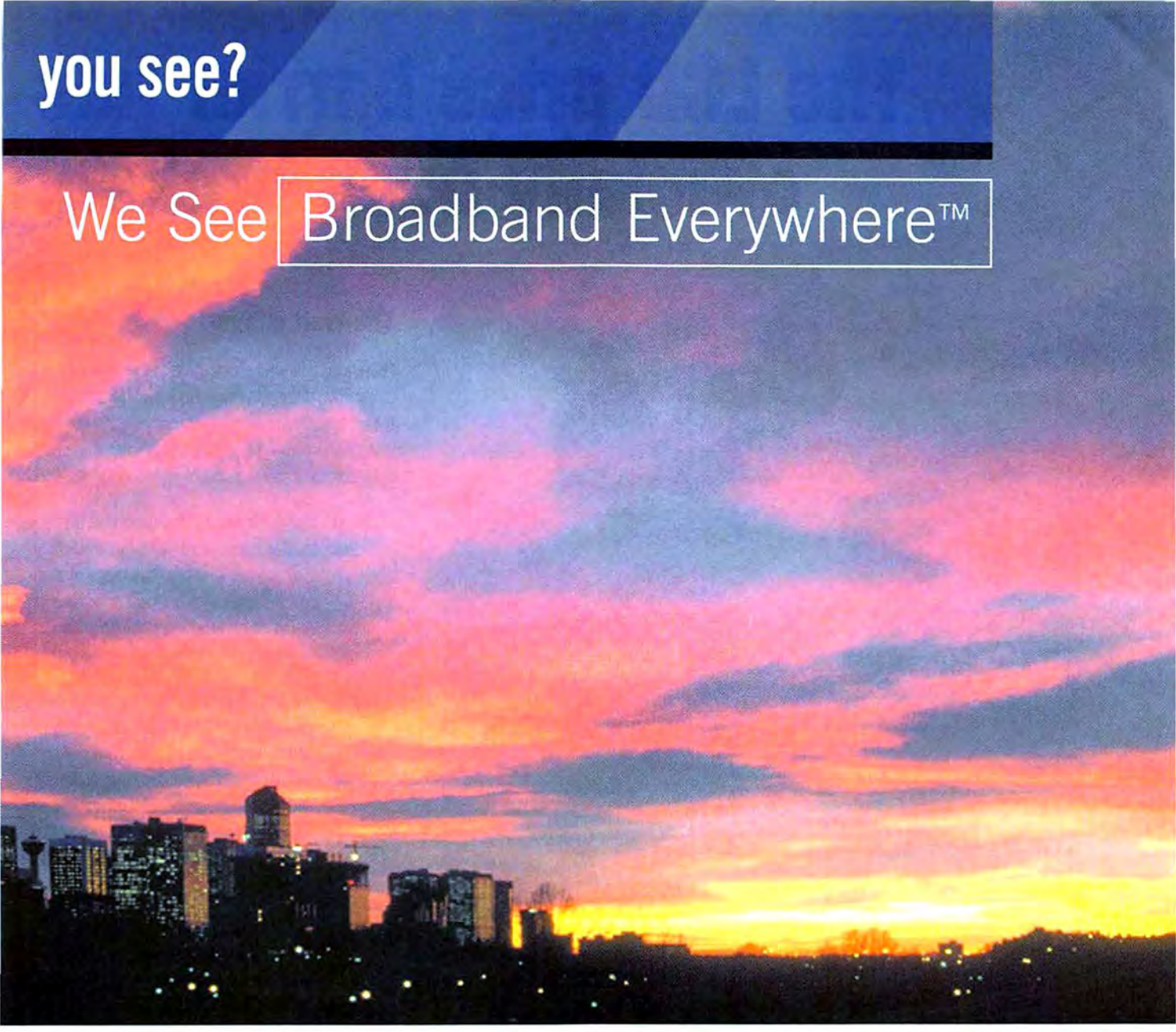

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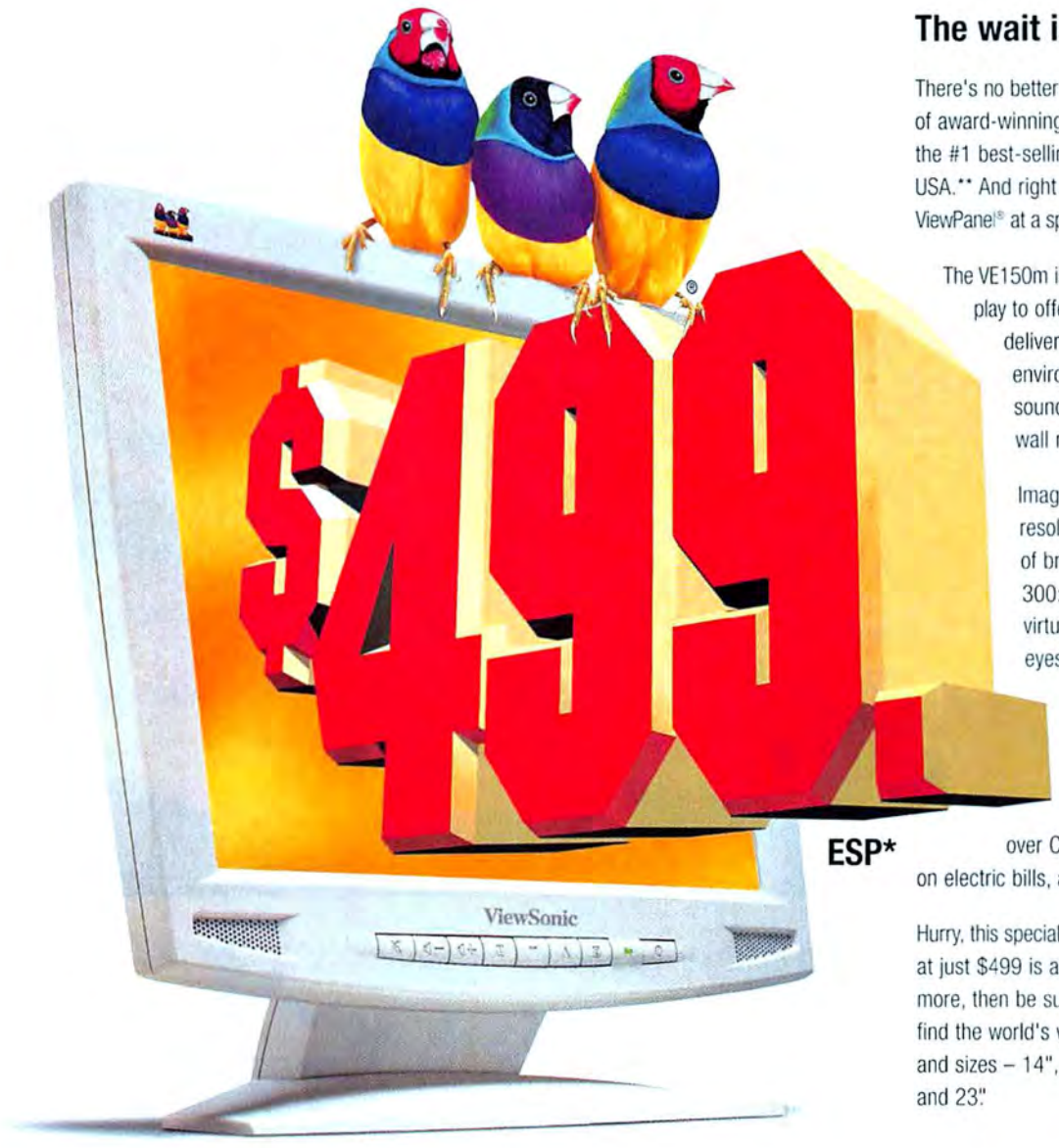

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YOUR TAKE ON: Sharing music files ◆ Trojan horses ◆ Online safety

ISPs AND SPAM

I AM THE Webmaster of a company that has received numerous threats of fines and ISP disconnection because of so-called spamming [*Consumer Watch*, May]. I say 'so-called' because I believe most people surfing the Web are totally ignorant about their actions. How many times you have truly read and understood a site's policy or the fine print on an online form? You might just have given that site permission to send you e-mail. And some businesses like to legitimately use e-mail to solicit business. Thank goodness the U.S. Postal Service still works! Imagine if the USPS blocked snail mail the way ISPs are blocking e-mail: "Sorry! Your post office is no longer allowed to deliver mail because of spamming."

Jim Lester, Melbourne, Florida

I TOO RAN AFOUL of Hotmail's Use of Services agreement by using my Hotmail address to post classified ads on Internet newsgroups. I was not running a business, just trying to get rid of some stuff around the house. I was banished from Hotmail without warning. No problem: Within an hour, I was set up with another free e-mail account. In addition, I had carefully saved copies of all critical e-mail messages onto my PC just in case my account became inoperable. Hotmail's diligence had its limitations, though: Whenever I logged on to that account, it would be overflowing with spam.

Jay Thompson
Timmonsville, South Carolina

WINDOWS XP–XPECT A HASSLE?

DOES ANYONE besides me have a problem with sending Microsoft a "fingerprint" of my PC as part of the price for installing the upcoming Windows XP [*Top of the News*, May]? How do we know what is being sent, how it will be used, and how secure it all is? Of course Microsoft will swear to keep it anonymous, not to misuse it, and so on. This [Product Activation plan] and the thought of listening to Microsoft's hold music for heaven knows how long whenever I obtain a new hard drive or sound card makes XP a nonstarter for me.

It looks to me as though the *X* might just stand for Xtortion.

Dennis Poledna, Glendora, California

Author's response: If you buy Windows XP preinstalled on a new computer, you won't have to go through the Product Activation hassle, according to Microsoft. If you go through the installation process, whether you are upgrading an existing OS or doing a clean install, you will be subject to the new constraints. We plan to test the feature thoroughly in upcoming coverage.

–Scott Spanbauer

KEEPING KIDS SAFE ONLINE

I JUST READ your tips for keeping kids safe online ["Safe Kids," May]. While this is a noble purpose, almost everything you suggest is full of holes. I'll be turning 21 soon and have been online since I was 13 or so, and I can tell you that only the threat of discovery will keep a kid out of online trouble. If I wanted to make certain my child was safe online, the only measure I'd trust would be to put the computer in a common area such as the living room. Teenagers (as I can well testify) are deeply interested in going places and seeing things they shouldn't, and without the fear of getting caught, they will.

I had a computer in my bedroom while I was growing up, and though my parents owned it, I was in control of it. Browser history and cookies can be deleted, and IP addresses can be masked. To a teenager with even a little computer savvy, such ▶

CROSS FIRE

It's Customer Beware on the Internet...

AM I THE ONLY one feeling very little sympathy for Xmas Maxon, whose EBay problems you describe ["Dot Cons," May]? It's unfathomable why some people assume the Internet is at least as safe a place to conduct business as the real world, despite constant warnings to the contrary.

Compare Maxon's attempt to buy a $500 DVD player from a seller with no feedback rating to a woman who tries to buy one from a man on a street corner. He holds up a detailed magazine ad for a DVD player, along with a handmade sign that reads, "Buy this from me." He wears a nice suit and clearly knows the product, so he must be reputable. He says, "Give me $500 today, and I will meet you here tomorrow with your player." She hands him $500. Next day, she is astounded and outraged when he doesn't show up.

Peggy Sherman, Greenville, Florida

...But Sites Need to Protect Buyers

I AM TRYING to resolve an unauthorized, recurring charge on my credit card. I contacted the online company charging me and was surprised to learn how easily an error or fraud could occur. The company's customer service rep told me that someone entered a subscription using my credit card number and an e-mail address (not mine), and because I did not cancel the subscription within 30 days, I was billed. Since the e-mail address wasn't mine, I did not know about this transaction and couldn't cancel a subscription I hadn't made. I asked if the company verifies billing address information against the credit card. It does not. It gets only a user name, an e-mail address, and the credit card info. More laws are needed to regulate the online industry so that companies will be more responsible about protecting all online users.

Sue White, Littleton, Colorado

PHOTOGRAPH: JANET WOOLLEY

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tasks are simple, and from that point there are virtually no limits to online activity. The only way a child's online life can be monitored is with a physical presence.

Adam Durell, Barberton, Ohio

NO TROJAN HORSES HERE

MAY'S ARTICLE "Dot Cons" made a claim for which I've yet to find any support:

"Currently, these crooks' weapons of choice are Trojan horse programs, which typically arrive as e-mail attachments that look like harmless programs or innocuous files such as JPEG images. Double-click the files, though, and you launch a hostile program that may swipe your passwords or give hackers access to your PC and all the information therein."

Can the author provide me with even *one* example where a Trojan horse program has been included in a JPEG file? I don't think so.

Paul Montgomery, Chicago

Editor's response: The Trojan horse files aren't in JPEG format but masquerade as such. We apologize if we didn't make this clear enough. –Harry McCracken

MUSIC FILE SHARING

AMIDST THE ongoing controversy about Napster, MP3, and the recording industry, I wonder if anyone has seriously considered trying the "shareware" model. Perhaps we could all download songs or albums, try them for 30 days, and then send in payment if we decide to keep them. This would solve the problem of paying 16 bucks for a CD only to find just one good song (or none) on it. Granted, there will be cheaters who do not pay, but dishonest people will always find their way around any system we put in place.

Ken Wenzler, Waukesha, Wisconsin

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

CORRECTIONS AND CLARIFICATIONS

IN MAY'S "Fortress PC," the chart on page 123 should have said that the anonymous-surfing service offered by Zero-Knowledge Systems' Freedom 2.0 is available only in the $50 Premium version.

PC World regrets the error.

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The Myth of Secure E-Shopping

Five years into the e-commerce revolution, security problems still haunt even large Web sites.

WHEN RYAN ROTH'S monthly credit card statement arrived with more than $2000 in unauthorized charges, the 30-year-old public relations executive from Palm Beach Gardens, Florida, thought she knew just who to blame. An avid online shopper, Roth suspects that her credit card information leaked from a transaction with a small kitchen supplies site she visited while doing holiday shopping. The site had not posted any privacy or security statements, and Roth admits to having had a "bad feeling" about this omission.

Roth's credit card company covered the bogus charges, but Roth drew an understandable conclusion. "I'll stick with national e-tailers from now on, established sites that have the resources to invest in security technology on their end," she says.

Unfortunately, the moral of the story may not be so clear. It's tempting to believe that the biggest, best-established Web merchants have security all figured out. But judging from frequent reports of major sites being hacked and customer information compromised, that's not the case. As unlucky customers of CD Universe, Travelocity, Columbia House, Ikea, and even Western Union can attest, small sites aren't the only ones to get hit. "Virtually every medium-size to large e-commerce site has been affected by fraud of some sort," says Joseph McDonnell, CEO of online security firm IShopSecure.

And a recent Gartner Group study predicts a wave of small-scale e-commerce theft within the next two years, mostly attributable to the larcenies of an increasing number of technically sophisticated individuals in economically depressed countries. According to the study, many recent hack attacks on e-commerce sites can be traced to Russia. Recent FBI reports corroborate this, adding that stolen credit card information may have been sold to organized crime rings operating in Eastern Europe.

Okay, so you may be taking a chance by purchasing that digital camera online. You already knew that. But isn't it just as dangerous to plunk down your credit card at a bricks-and-mortar retail store or the café down the street?

Not according to McDonnell. "Anonymity is a key difference," he says. "People can hide behind their computers." Add to that the vast quantity of personal information a determined hacker can obtain on the Internet—your name, address, e-mail account, phone number, credit card information, passwords, Social Security number, and mother's maiden name, just for starters—and you have an environment that's ripe for theft. McDonnell puts it bluntly: "Consumers should be 100 times more cautious [doing business] online."

What are e-tailers doing to maintain or beef up site security? Not enough, experts say. The security statements found on many retail Web sites may sound comforting, but in many cases they don't mean much. Most offer vague reassurances about using industry-standard encryption technology, but such encryption applies only to the actual transfer of customer data.

As important as the transaction itself is ▶

ILLUSTRATION: HENRIK DRESCHER

how a Web site stores your data after you buy—and here many sites falter. One of the most common hack attacks involves breaking into a server that stores customer data from past transactions. "The important question," says IShopSecure's McDonnell, "is where your credit information is being stored. You don't want it sitting unprotected in a database."

And the Web site you buy from may not be the only one you have to worry about. Many sites contract with other firms to process credit card information, and those third-party sites may be vulnerable to attack, too. Last December, Creditcards.com, which handles credit card transactions for a number of online merchants, revealed that someone had hacked into its site and posted more than 55,000 credit card numbers on the Internet.

The lack of a posted security or privacy policy should raise a red flag. Last year, John Hairell, a senior programmer/analyst for NASA in Greenbelt, Maryland, was about to complete a transaction on the rare-book site Bibliofind when he noticed the site had no posted security or privacy statement. Hairell e-mailed the company to ask about its security policies. Two months later, he received a vaguely worded response that did little to reassure him. He decided not to do business with the site. Hairell's caution looked wise when in March of this year, thousands of Bibliofind customers received a terse ▶

ON YOUR SIDE

MY NEW GATEWAY PC arrived with the wrong graphics card—an NVidia GeForce2 GTS with a 166-MHz memory bus instead of the GeForce2 Pro with a slightly faster 200-MHz bus that I ordered. I told Gateway and asked for the right component. But my repeated efforts to get the video card replaced have gotten me nowhere. Please help.

Michael San Jose, Herndon, Virginia

***On Your Side* responds:** Gateway spokesperson Beth Etler says the problem arose from a naming conflict. Graphics board maker NVidia (which supplies cards to Gateway) named Gateway's board the NVidia GeForce2 Pro with GTS. NVidia also has a board called the GeForce2 Pro with the faster memory bus. Gateway replaced San Jose's card with one that has twice as much memory, which he's satisfied with.

Although some conflicts involve minor misunderstandings like this one, others may be more serious. When you buy a new PC, keep a record of the exact configuration you ordered. If there's a discrepancy when the system arrives, contact the vendor immediately. —*Grace Aquino*

Gotten a raw deal? Or a great one? E-mail the details to onyourside@pcworld.com. We'll follow up on and publish items of the broadest interest.

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e-mail message saying that the company's servers had been violated, compromising customers' credit information.

At press time, the site—which has been on the Web since 1996—still hadn't posted a privacy or security policy. Bibliofind representative Alisa Feinstein says that the company (now owned by Amazon.com) is planning to update the site. That may be too little, too late for Hairell. "This has put me off of online retailing," he says. "There's just not enough accountability when it comes to security."

Ultimately, however, online security breaches are more harmful to merchants than to consumers. After all, consumers have a powerful safety net: credit cards. As long as you use one for your online purchases, you're covered for any unauthorized charges over $50—though dealing with a fraud claim is usually a hassle. (Many Web sites, such as the Lands' End site, promise to reimburse you the $50 if the security leak is traced to their servers.)

In contrast, online merchants are largely liable for fraudulent charges, so a security lapse can easily ruin a smaller e-tailer. And the problem is not just financial—the bad publicity from a break-in can do more damage than the dollar loss.

CAVEAT E-EMPTOR

CLEARLY, IF E-COMMERCE is to flourish, e-tailers need to start taking security more seriously and put tools in place to prevent online fraud. Some companies have, but too many haven't. In the meantime, here is what you can do to protect yourself:

- Review your credit card statement regularly and carefully.
- Think about obtaining a low-credit-limit card specifically for online purchases. That way, you have less at stake if your credit information is stolen.
- Change your passwords frequently, and keep them cryptic.
- Consider the pros and cons carefully before permitting a site to store your credit card information for future purchases.
- Avoid sites that don't post clear privacy and security policies or contact information, including a physical street address and working phone number.
- When you inspect a site's security policies, look for assurances that information is encrypted on all servers connected to the Net and that security tools are in place to protect applications like the shopping cart. If the policy doesn't say, ask the site's administrator for clarification.

I'm not trying to scare you away from shopping online. The vast majority of transactions go through without a hitch. But shop safely. And if you come across a site whose security you don't trust, let the administrator know why you won't shop there. Online retailers will take security seriously when they know *we* do.

Anne Kandra is a contributing editor and Grace Aquino is an associate editor for PC World. ■

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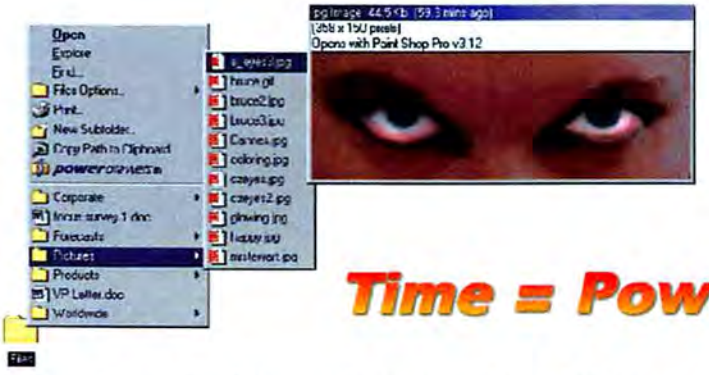

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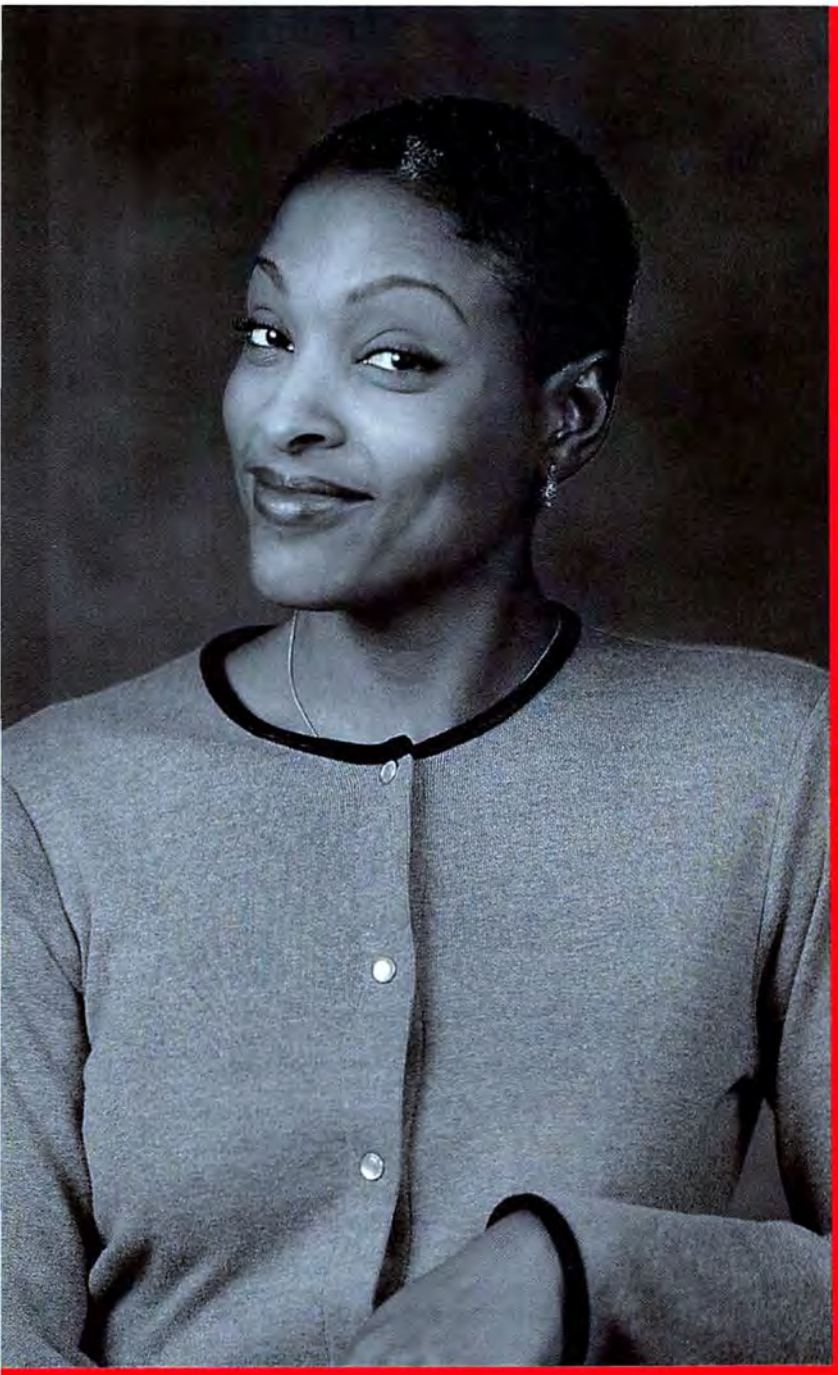

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Custom Shopping: Have It Your Way

I HAVE TASTED the future of breakfast—and it's delicious. It has oatmeal flakes and banana bits and cranberries, and yup, it's an appropriate topic for a column called *Web Savvy*. I speak of the custom-blended cereal that I ordered from Mycereal.com. And although it may only be the future of *my* breakfast, I hope that it's also a glimpse of where e-commerce is going.

After all, if any shopping venue can deliver built-to-order products to lots of people, it's the Net. You know what I'm talking about if you've ever hopped online to buy a custom-configured PC. A bunch of sites are applying the same concept to different stuff, including Customatix.com (athletic shoes and boots), IC3D.com (jeans), Reflect.com (cosmetics), and Airborne.net (swanky titanium bicycles).

Of course, nobody *needs* custom breakfast chow or high-tops. And prices at these sites can be steep. But I could see myself becoming addicted to buying items this way anyhow—it's the most entertaining Web shopping I've done in eons.

JUST ADD MILK

MYCEREAL CURRENTLY operates in semi-stealth mode: You can't get in just by showing up at the site. (I stumbled on a banner ad that let me join a pool of test consumers.) The site—a venture of breakfast behemoth General Mills—lets you blend 80-plus ingredients, ranging from soy flakes to chocolate marshmallows. The cost? A buck a bowl—a lot more than off-the-shelf cereal, but not out of line (I keep telling myself) for a made-to-order meal.

The site doesn't let you mix ingredients willy-nilly: You can't combine items that would make for soggy cereal—say, rice puffs and raisins. And a wizard limits your choices further, based on your nutritional goals, sex, and age.

As I said, my own custom cereal won me over based on taste alone. Which is just as well—I have my doubts about using a Web site as a virtual nutritionist. I told Mycereal I was a 36-year-old male; it kept offering me health tips for postmenopausal women. Oops.

Contrast that experience with the mundane but effective customization tools at Airborne's bicycle site. You piece together the bike of your dreams by using drop-down menus in a configurator that looks uncannily like those at Dell's and Gateway's online computer stores. But instead of choosing hard drive capacity and monitor size, you specify the type of handlebars, pedals, saddle, and the like.

IF THE SHOE FITS

AIRBORNE'S BIKES start at $1500, so I opted for a thriftier form of design-it-yourself transportation—a $65 pair of sneakers from Customatix. Seemingly aimed at well-heeled (pun unavoidable) skateboarding kids, the site lets you meld a dizzying array of styles, materials, colors, and graphics for—the site boasts—more than 3,420,833,472,000,000,300,000 variations. Which is a lot more than you get at footwear colossus Nike's similar but considerably more spartan custom shoe site (www.nikeid.com).

Using Customatix's slick browser applet, I pointed, clicked, and designed a pair of flashy lime-green running shoes with black-and-silver trim, red soles, and appliqués of a satanic little guy on the sides. They arrived on schedule ten days later, feel fine, and look sharp, even though Customatix's "lime green" is a tad more lemony in real life than it had appeared on my monitor. And there's no question that these sneaks are uniquely mine. Matter of fact, the first passerby I encountered after I put them on stopped in his tracks, did a double take, and blurted out, "Hey, lookit the shoes!" I'll take that as a compliment.

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

GIMME FIVE

Look It Up on the Web

THE TRUTH IS out there on the Internet—and when you're looking for facts, these reference sites are good places to start:

1. LibrarySpot: A nifty, Yahoo-style launching pad to almanacs, databases, online calculators, and much more. *libraryspot.com*

2. Britannica.com: More heavily ad-ridden than it once was—but still the Net's finest encyclopedia, hands down.

3. Everyrule.com: Not *every* rule, but an awful lot of them—for everything from beach volleyball to warfare.

4. Dictionary.com: A clean, uncluttered dictionary/thesaurus, plus links to other Web resources for word mavens.

5. The CIA's World Factbook: There's nothing covert about this excellent collection of international statistics, maps, and other data. *www.odci.gov/cia/publications/factbook*

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A Cure for File-and-Forget

"DO YOU REMEMBER that cute Fourth of July anagram you created last year?" My wife was referring to a document I created in Microsoft Word five years ago. Yep, I remembered it and had even saved it—somewhere. If I depended on Windows' file finders, I might spend hours looking for it, but I recently discovered two handy search tools that can track down practically any document stored on my system in just seconds. Folks, if you need to find things on your hard drive, you're going to love this column.

When you're looking for a file on a PC, you probably think of Find, the freebie in Windows 98 (it's called Search in Windows Me/2000). Find is okay for locating files and folders by name, but for digging into a file's content, it's the pits. The reason? Find has to scour through every file in your search request, and because it has no way to index the file's content, subsequent searches are no faster.

There are a slew of tricks to make Find work better. Say you often do the same search, such as looking for every movie file you downloaded in the last week. Why not save the search parameters as a Desktop shortcut? Press **<F3>** while you're on the Desktop, enter ***.avi** in the Named field (or in 'Search for files or folders named' in Me and 2000), and scroll to *My Computer* in the 'Look in' field. Click the *Date* tab (or check *Date* in Me and 2000), select *Find all files* (in Windows 98), choose *Modified* from the drop-down list (or *files Modified* in Me and 2000), and choose *during the previous 7 days* (or *in the last 7 days* in Me and 2000). Now click *File•Save Search* to create a Desktop icon that performs the search whenever you double-click it. Neat, eh? I'll describe other searching tricks in a future Home Office online newsletter (see the address below).

Lightning-fast searches are easy if you use a program that indexes the words within documents.

SUPER SEARCH ADD-ONS

LIGHTNING-FAST SEARCHES are easy if you use a program that indexes the words within documents. You search the index, and the index points to the document.

Find Fast, the free search tool that comes with Microsoft Office, uses indexing, but it can search only for Microsoft Office and HTML documents. Try Find Fast just to see how quick indexed searches can be (enable it in the Control Panel), but disable its automatic indexing to keep it from eating into your processing power.

With a little digging, I uncovered two search programs that will knock the socks off your docs: DtSearch's DtSearch Desktop 6 ($167 street), and SilverLakeTech.com's $40 PC Data Finder 5.5.

DtSearch Desktop's searches are the quicker of the two. The program's interface is intuitive and austere, and its file viewers work as advertised. There's no folderol—DtSearch does extensive, intricate searching accurately and efficiently. It lets me search using Boolean strings ('Paul AND O'Neill NOT Yankees', for example, to find references to the Secretary of the Treasury but not to the baseball player), and I can view practically any file, including .pdfs, zipped files—even my ancient DOS WordStar and WordPerfect files.

DtSearch Desktop's background indexing is fast: It took just 35 minutes to cover about 40,000 files—indexing roughly 336,000 words—or 384MB of data (yes, I'm a pack rat). The downside is the steep cost. But if you need a superb search tool, get DtSearch Desktop.

PC Data Finder does a good job of searching for and viewing files, but its interface is awkward and unintuitive, mostly because it strays from the Windows standard. Viewing files is easy enough, but you can't perform a Copy command from the program's viewer window, for example. Nonetheless, if you do more than an occasional search, PC Data Finder will serve you well.

Both DtSearch Desktop and PC Data Finder are compatible with Windows 2000, 98, and Me, and trial versions are available at PCWorld.com's Downloads.

Next month? Cool tools for Web searching. By the way, I found the anagram doc in less than a second—slightly faster than it will take you to find it at www.pcworld.com/features/july2001/anagram.

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PC World *Contributing Editor Steve Bass runs the Pasadena IBM Users Group. Sign up for his Home Office online newsletter at www.pcworld.com/bass_letter. He can be reached at steve_bass@pcworld.com.* ■

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Security flaws in Netscape and IE ◆ **McAfee and Windows Me clash** ◆ TiVo misbehavior

Holey Browsers: Make Yours Secure

REMEMBER THE BROWSER WARS? In the Web's early days, Netscape and Microsoft fought tooth and nail to deliver the best browser. These days, though, the news is more often about whose browser is most buggy. Unfortunately, this contest appears to be a dead heat between Netscape and Internet Explorer.

A few months ago, Netscape released a new plug-in for its 4.7*x* browsers—SmartDownload 1.3, which is supposed to simplify the process of downloading and installing new files. Netscape's plug-in works with other companies' browsers, including IE—versions 4.0 through 5.5—and several Linux browsers.

However, a hole in SmartDownload 1.3 could let an attacker take over your PC. The hacker could do anything you can do on your computer, such as access your files. According to bug hunter Fred Swiderski, the problem revolves around an "unchecked buffer." If you have SmartDownload 1.3 installed, a malicious operator can access your machine by sending a buffer too many characters for it to handle. Researchers at SecurityFocus.com, who also discovered the flaw, point out that if you click a link on a Web page that has an attack program lurking behind it, the hacker can take charge of your PC. So far, no real-world instances of this type of attack have been reported.

Netscape released SmartDownload 1.4 to fix the problem. Get the update at home.netscape.com/download/smartdownload.html. (If your system has SmartDownload 1.2 or earlier, your PC isn't vulnerable.) Also check out Netscape's security bulletin at www.netscape.com/security. In the meantime, stay away from sites you're not sure you can trust. Better safe than sorry.

ICON: JEFFREY PELO

LATEST LEAK IN INTERNET EXPLORER

MICROSOFT ISN'T OFF the hook this month. In the past, it has acknowledged and fixed bugs quickly. This time, though, the company is slow to provide a solution.

Veteran bug sleuth Georgi Guninski discovered a trick whereby a bad guy could disguise a dangerous executable file as something innocuous, like a common text file. If you click on such a file as an attachment in an e-mail message, IE steps in to open the file—and you may thereby be giving control of your computer to a wild program. The deception takes advantage of an obscure feature of IE 5 called a Class ID that lets attackers create a fake extension, such as .txt, .bmp, or .gif, for a file intended to do your PC harm. The program that falsifies the extension is called an HTML application, or HTA.

At the time of this writing, Microsoft says it is still investigating the problem. For now, if you right-click the name of a file you receive in an e-mail message and choose *Properties*, a dialog box will display the file's true type. If the item looks like *file*.txt but Properties tells you it's really *file*.hta, delete the e-mail immediately.

online *You'll find files from this article at www.pcworld.com/downloads. Stuart J. Johnston is a* PC World *contributing editor.* ■

IN BRIEF

TiVo or Not TiVo: The Madonna Bug

SOME USERS of TiVo personal video recorders running version 2.0 software have reported problems. People who use them with the DirecTV service have encountered weird symptoms when their WishList contains the names of stars with single-word names, like Cher or Prince. The TV box reboots as often as every 20 minutes, making it nearly impossible to watch movies that have been recorded using the system's autorecording mode.

According to TiVo, the bug is confined to a small number of users, but the company says it has fixed the problem with the latest upgrade. TiVo is currently distributing version 2.0.1 to all customers. If you haven't received the automatic upgrade yet, visit www.tivo.com/flash.asp?page=dtv_release_notes, or call customer service at 877/367-8486.

McAfee QuickClean Disables System Restore

IF YOUR WINDOWS ME computer uses McAfee QuickClean, versions 1.0 to 1.02, you could run into some trouble. QuickClean's Lite Registry Cleaner component is designed to eliminate redundant entries—and it does. But QuickClean goes a little overboard—it will zap a Registry key required to run Windows Me's System Restore. After that maneuver, all your current System Restore points will be removed and you won't be able to set up new ones.

McAfee released a patch to fix the problem. To get it, visit www.mcafeehelp.com; type **QuickClean** in the Search tab, and in the list of results, select *How to fix Windows Millennium missing System Restore*. McAfee offers detailed instructions along with a link to the download. At press time, McAfee promised to add the fix to www.mcafee-at-home.com/naicommon/download/patches.asp.

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TOP OF THE NEWS

Fight Photo Fade-Out

◆ By Anush Yegyazarian

THOSE SNAPSHOTS of your daughter's birthday party or your tropical vacation look good the day you print them. But without the right combination of printer and paper, chances are they will have faded significantly when you check them out in just a year.

Your photo album doesn't have to end up looking as if you printed it with disappearing ink, however. A study of photo paper longevity conducted by one of the foremost authorities in the field shows that your digital photos can last as long as—or even longer than—conventional prints that come from the drugstore.

In putting this report together, *PC World* worked with Wilhelm Imaging Research (www.wilhelm-research.com), an Iowa company whose founder, Henry Wilhelm, has been researching photo print longevity for more than 30 years and is considered a leading expert on the subject.

The Wilhelm study included test data on recent photo ink jet printers from four major vendors—Canon, Epson,

Hewlett-Packard, and Lexmark.

Our conclusions: You don't have to break the bank to keep your photos vivid. But you do need to choose your printer—and its paper—carefully. (See our chart, "The Prints and the Paper," on page 50.) You must also give your prints the kid glove treatment (see "Make 'Em Last," page 51). And once you've assembled the proper gear, you'll want to set it all up for optimum performance—we offer a number of tips on how to simplify a variety of digital photography tasks such as editing your pictures and transferring them into and out of your computer (see "Desktop Darkroom," page 131).

More and more of us are **investing in photo printers** for quick access to our pix. But if you **want fade-proof pictures,** you'll need to choose your printer **and its paper carefully.**

NOT FADE AWAY

WITH THE growth in digital photography, the increased availability of scanners, and the advent of Internet print sharing, more people are printing photos at home. Lyra Research, a firm that covers the imaging industry, reports that 50 percent of consumers surveyed who have PCs and printers now print photos at home, up from 30 percent three years ago. And about 79 percent of those who own digital cameras do so. Those figures will only increase, says Lyra senior consultant Larry Jamieson.

But many digital-photo buffs have seen their homemade digital prints fade.

Usually, that's because the photos are made using standard papers and inks in general-purpose ink jet printers, products not designed for color permanence. Impermanence is fine if you're printing flyers or brochures that will be outdated before long, but it becomes a serious problem when you are printing memories.

Enter photo printers, specially designed ink jets, and accompanying papers and inks, all promising both longevity and affordability. Ink jets have long delivered the affordability, but only in the past two years—and with the recent release of inks and papers by Canon, Epson, and HP—have vendors seriously tackled longevity. The new inks are carefully created and matched to papers with special coatings and absorption properties to ensure certain levels of damage resistance from air, light, and water. That's one reason vendors recommend you use your photo printer only with certain papers. But not all photo ink jets are created equal.

Ink jets from three of the four vendors in the Wilhelm study deliver some prints that should last for quite a while: from about 15 to more than 100 years. (All results are for framed prints under glass, in a fairly bright room. See the chart's "How We Test" explanation for more details.) Lexmark, the fourth vendor, was the only one in this study with a printer whose photos faded noticeably in less than a year.

Unlike the other vendors, Lexmark does not currently match its inks to its own paper, recommending instead that users buy Kodak Premium Picture paper. It is also the only vendor of the four that has not released inks specifically designed for longevity, Henry Wilhelm says.

A Lexmark spokesperson says that ink fading is an area of focus for the company, and that Lexmark will continue to research, test, and develop inks to provide pleasing and lasting results. No industry standard governs archivability, and while Lexmark does not make claims about the archivability of documents or photos printed with its inks, the company spokesperson says that its inks are competitive with others in the industry.

Lexmark's $140 Z52 Color Jetprinter is the least expensive of those tested and has been a *PC World* Best Buy. Its six-color ink cartridge is also the cheapest at $37. *PC World* tests published last year (see "The Fine Print on Ink Jets," www.pcworld.com/reviews/nov2000/ink_jets), however, indicate that the Z52 has a fairly high cost per page. Nevertheless, print ▶

Product Pipeline

➤ **ZoneAlarm Update:** Version 2.6 of Zone Labs' free PC firewall software caters to Net novices, offering large buttons and on-screen tips and suggestions for dealing with possible hacker attacks. Go to www.zonelabs.com.

➤ **Natural Light Notebook:** The 3.3-pound Versa DayLite is NEC's first ultraportable to use Transmeta's energy-efficient Crusoe chip. The reflective LCD screen uses natural light; a lithium polymer battery promises 8 hours of operation on a single charge. Price range: $2299 to $2499.

➤ **Color Screen Palm Phone:** Samsung Telecommunications America's 6-ounce SPH-I300, a dual-band CDMA/analog wireless Web-enabled telephone, doubles as a Palm PDA. The device, due in August, has a 256-color screen—the first Palm-based cell phone with a color display. Estimated street price: $500.

➤ **All-Digital Audio:** Compaq's IPaq Music Center packs 20GB of storage and CD recording in a box the size of a stereo receiver. Due in mid-June at a suggested retail price of $799, it holds the equivalent of 400 CDs (5000 songs) and has an Internet connection for sharing music with PCs, handhelds, and other devices.

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PHOTOGRAPH, LEFT: JOHN KUCZALA; ICONS: JEFFREY PELO

quality in our tests was very good, thanks in part to the printer's generous maximum resolution of 2400 by 1200 dpi.

100-YEAR PRINTS

EPSON GETS the highest marks for longevity with its Stylus Photo 2000P. Our tests found its prints should remain fade-free for 100-plus years, thanks to a combination of Epson's Pigmented Archival Inks and high-end papers. That's decades longer than even traditional prints can claim (prints on Fuji's Crystal Archive paper last for 60 years, and those on Kodak's Ektacolor Edge 8 fade after 22 years). *PC World* reviewers found that the 2000P's color prints rival those of photo labs; its maximum resolution is 1440 by 720 dpi. But at $899, the unit is very expensive.

You pay about $15 more for these ink cartridges (price of black and color cartridges combined) than for cartridges used by some other Epson Stylus Photo models, but paper prices are surprisingly affordable. You can pay as little as 36 cents per 8.5-by-11-inch matte sheet (add about 40 cents per sheet for glossy papers; traditional photo papers run about 30 cents per sheet). And there are no film development costs.

The key to the 2000P's long-lived prints is the Pigmented Archival ink, which is much more durable than ink jets' usual dye-based inks, says Fabia Ochoa, product manager for Epson desktop photo printers. Ochoa also claims that these prints, when made on the right paper, are as water resistant as those from dye-sublimation printers, which have typically been better in this respect. The 2000P is the first desktop photo ink jet to use pigmented ink.

THE PRICE IS RIGHT

MOST OF US probably don't want to spend $900 on an ink jet. Luckily, Canon and Epson also offer pocketbook-friendly models that delivered an average of 26 years of print life in Wilhelm Research tests. An Epson Stylus Photo 870 sells for as little as $179; Canon's S800 Bubble Jet Photo and Epson's Stylus Photo 890 printers cost $299 each.

However, Epson has had problems with the 870 and its $399 wide-format 1270 sibling. The printers debuted last year boasting high quality and long print life, but users found that heavy ozone concentrations reacted with some prints, turning them orange quickly (sometimes in days). Epson offered a buy-back program last September, plus tips for minimizing the reaction (keep prints under glass or in photo sleeves). It also released a reformulated Epson Premium Glossy Photo paper with antioxidant coating that Ochoa says reduces ozone effects about sixfold. But this coating does not eliminate the problem.

For that, look to Epson's new ColorLife paper. It eliminates the fast ozone-related reaction and supports much longer print life—up to 17 years more than with the Premium Glossy Photo paper. And it's priced on a par with the older paper. ColorLife paper will be available in late July or August. The current Matte Paper Heavyweight is also more resistant to air damage than the other paper types, Ochoa says.

PHOTO PRINTERS PRICE/PERFORMANCE

The Prints and the Paper: When Will Your Photos Fade?

PRINTER/INK	Paper type	Cost per sheet	Time of display before noticeable fading occurs[1]
Printer: Canon S800 Bubble Jet Photo Printer ($299) **Ink:** Canon BCI-6 ink ($72 for six individual colors)	Canon Photo Paper Pro PR-101	$0.93	26 to 28 years
Printer: Epson Stylus Photo 1280 ($499), 1270 ($399), 890 ($299), 870 ($179) **Ink:** Epson Color ink cartridge ($55 for both black and color cartridges for 1270/1280 models; $45 for both black and color cartridges for 870/890 models)	Epson ColorLife Photo	$0.85	25 to 27 years
	Epson Matte Paper Heavyweight	$0.29	24 to 26 years
	Epson Premium Glossy Photo	$0.85	9 to 10 years
	Epson Photo	$0.55	6 to 7 years
Printer: Epson Stylus Photo 2000P ($899) **Ink:** Epson Pigmented Archival Inks ($71 for both black and color cartridges)	Epson Archival Matte	$0.36	More than 100 years[2]
	Epson Premium Luster Photo	$0.78	More than 100 years[2]
	Epson Premium Semi-Gloss Photo	$0.85	More than 100 years[2]
Printer: Hewlett-Packard Photosmart 1215 ($399), 1218 ($499), or 970 series ($299) **Ink:** HP Tri-color ink ($55, 38ml cartridge)	HP Colorfast Photo	$1.15	15 to 17 years
	HP Premium Plus Photo	$0.90	4 to 5 years
	HP Premium Photo	$0.60	2 to 3 years
Printer: Lexmark Z52 Color Jetprinter ($140) **Ink:** Lexmark High Resolution Photo Cartridge ($37)	Kodak Premium Picture	$0.60	Less than 1 year
Traditional color photographs	Fujicolor Crystal Archive	$0.30[3]	60 years
	Kodak Ektacolor Edge 8	$0.30[3]	22 years

Note: Ink jet sheets 8.5 by 11 inches, traditional photo sheets 8 by 10 inches. Each manufacturer's ink cartridge is of unique size.

HOW WE TEST Tests conducted by Wilhelm Imaging Research; results provided to *PC World*. Wilhelm Imaging Research tests print fading as follows: Prints are prepared with carefully calibrated neutral scales and pure color cyan, magenta, and yellow scales for each printer/ink/media combination. After drying in a controlled environment, the prints are exposed to high-intensity glass-filtered fluorescent illumination; temperature is maintained at 75°F, with a relative humidity of 60 percent. Data from these accelerated tests is extrapolated to a "real world" display condition of 450 lux (fairly bright room illumination) for 12 hours per day with prints framed under glass (fading may occur sooner if prints are freely exposed to the open atmosphere). Years of display before noticeable fading occurs are calculated using a visually weighted set of criteria for noticeable fading and color balance shifts in the neutral scale and fading of the pure color scales. Long-term tests under controlled low-intensity glass-filtered illumination are also conducted to confirm the validity of the high-intensity accelerated tests. In addition, prints are evaluated in a dark room at three levels of relative humidity (60, 70, and 80 percent) to determine their resistance to humidity-induced changes in density and color balance. [1] When prints are framed under glass. [2] Tests continuing. [3] Cost of print development not included.

In *PC World* tests, an 870 model produced very good color prints; the 870 has a maximum resolution of 1440 by 720 dpi. Its newer 890 replacement has a resolution of 2880 by 720 dpi, as does the $499 wide-format 1280.

Canon's paper is more expensive than Epson's (its recommended Photo Paper Pro PR-101 runs about 93 cents per sheet, while Epson's paper is 8 to 60 cents cheaper per sheet), but because you can replace Canon inks one at a time instead of all together—unlike with other printers we saw—you buy only the colors you need. A full set of six costs about $72; single cartridges go for $12 each. You may not save money on printing photos, but if you print logos or presentations that use one color heavily, you should see savings. (*PC World* has not tested the Canon printer.) The printer's maximum resolution is 2400 by 1200 dpi.

The reformulated, long-lived BCI-6 inks that debuted with the Canon S800 Color Bubble Jet this year are backward-compatible with the older BJC-8200, according to Ned Bunnell, director of product management for Canon's digital home and personal systems division. To improve image quality, he suggests updating your printer drivers for use with the new inks.

HP's prints last about 10 years less than Canon's and Epson's best in this price class, and its optimum photo paper is more costly than either of those vendors' offerings. The three HP printers tested by Wilhelm Research all have 2400-by-1200-dpi resolution and cost $299 to $499. In our tests of the HP Photosmart 1218, print quality was good, although the output had a bit less range of color and slightly more dithering than prints from some of its competitors.

These limitations are likely due to the HP printers' use of four-color cartridges, not six-color; four colors yield a bit less detail. Lisa Dowling, HP Photosmart product manager for North America, says that according to customer tests, most users cannot tell the difference between prints made with four colors and those made with six, and that the Photosmart units are meant to excel at both photo and mainstream multipurpose printing.

Make 'Em Last

WHO WANTS faded photos? Follow these tips to preserve your digital prints.

1. Choose a six-color ink jet printer for better color quality, and invest in the vendor's recommended photo paper for longest print life.
2. Store prints in an album: They will last longer than framed photos. But avoid albums with self-stick "magnetic" pages and PVC plastic covers.
3. Slip the prints you want to display in frames under glass (preferably with an anti-UV coating). Don't leave them exposed to open air.
4. Use aluminum frames: They're lightweight and unaffected by humidity.
5. Put an acid-free mat between the frame and the photo to prevent your prints from sticking to the glass or plastic over time.
6. Keep prints out of direct sunlight and humid rooms (such as bathrooms and basements), and away from intense heat (don't keep them in attics or kitchens or near heaters).
7. Make sure ink jet prints are very dry before you stack them, so they won't stick together (wait at least 24 hours).

THANKS FOR THE MEMORIES

DYE-sublimation printers are becoming more affordable and offer well-heeled enthusiasts or small businesses a good alternative to photo ink jets. These fast printers typically deliver smoother color gradients and more subtle shades than ink jets, but are also more expensive: Those that print only 4-by-6-inch prints average about $350, says IDC Research analyst Riley McNulty. Costs for ink and paper can accumulate quickly, and ink cartridges for these units tend to generate fewer pages than the ones that ink jets use. Dye-sublimation models are less versatile as well, permitting fewer print sizes than a typical ink jet, and they're less adept at printing text.

Ink jets will continue to improve, and prices will keep dropping. For now, the mid-range Canon and Epson models offer the best balance between long-lived prints and affordability. If you want to pass your pictures on to future generations, spring for the high-end Epson Stylus Photo 2000P.

For more information, read the story at www.pcworld.com/news/july2001. ▶

Tidbytes

➤ **Office XP Annual Fee Killed:** Microsoft will not offer subscription pricing—an annual usage fee that would cover product updates via the Web—for Office XP in the United States. Instead, you'll pay the usual, more expensive one-time charge. Office XP should ship by the time you read this. (For Windows XP, Microsoft has set an October 25 launch.)

➤ **Rambus Setback:** Rambus lost the first round in legal battles over its patent claims on SDRAM memory. A few days after a U.S. District Court judge threw out the company's suit against memory maker Infineon, a jury awarded Infineon $3.5 million in its countersuit accusing Rambus of fraud. Rambus, which has similar cases pending against other memory vendors, is appealing both decisions.

➤ **The Check's in the E-Mail:** Soon, CheckFree WebPay customers won't have to go to the Web to view and pay bills online. The next version of the service, slated to launch by fall, will let customers receive a bill via HTML e-mail—and pay by clicking a button in the message.

➤ **Print Your Own:** No more waiting in line for tickets purchased online—if they're from Ticketmaster.com for a venue that lets customers print their own. Each ticket has the buyer's name and a unique bar code that, Ticketmaster says, makes counterfeiting more difficult. The system is rolling out at 20 venues this summer. Midwestern movie theater chain Marcus Theaters also offers print-your-own tickets.

PHOTOGRAPH: JOHN KUCZALA

It's a Buyer's Market: PC Prices Plummet

CONSUMER

GO BUY a PC.

If you're considering replacing an old computer, or buying a second one, now is the time. Choose carefully, and you can bring home a hardy system from a big-name vendor for under $700. Power-hungry? Prices on high-end systems have also plummeted—in excess of 30 percent since last fall—and you might even get a free PDA or printer out of the deal.

To what do we owe such bounty? First, a well-publicized downturn in PC sales coupled with a slowing national economy has PC vendors scrambling for your business. Throw in price cuts on PC components and aggressive reductions by one deep-pocketed vendor, and you've got a big-time PC price war. Smart shoppers can claim the spoils.

PC prices are always going down, particularly as new technologies supplant the old. But the rate and pace of this year's declines are otherworldly. Toni Duboise, an analyst with the research firm ARS, offers a telling example—Dell's entry-level desktop, the Dimension L. In June last year, the cheapest preconfigured model cost $1049, including monitor. By October, that price had dropped about 18 percent, to $859, and by January it had plunged another 21 percent to $679. While the price has stalled there, Dell continues to upgrade components—a faster CPU, for example—which means today's buyers get more for that same $679 than they would have back in January.

Compaq, Gateway, Hewlett-Packard, IBM, and others have followed suit. For example, HP's Pavilion 6835, launched in April for $699 (sans monitor), is HP's first sub-$700 stand-alone PC that's shipped with a CD-RW drive, says Sam Szteinbaum, business manager for HP's North America Consumer Computing Division.

High-end systems have also seen dramatic downward price shifts. "High-end used to be $2000 to $2500, but in the last year that has dropped to $1000 to $1500 [without monitor]," ARS's Duboise says.

P4 FIRE SALES

THANKS IN part to aggressive moves by Intel, even systems with the company's state-of-the-art Pentium 4 CPU are selling at reasonable prices. Intel's George Alfs says some vendors are already selling 1.3-GHz P4 systems for as little as $900, and notes that prices on systems with the new 1.7-GHz P4 are also dropping. Case in point: Within weeks of the 1.7-GHz P4 launch, Dell was offering a well-appointed 1.7-GHz P4 system with a 19-inch monitor for $1798. Meanwhile, many systems using AMD's top-of-the-line 1.33-GHz Athlon sell for even less.

Notebook deals are easier to find now, too, says Matt Sargent, another analyst with ARS. For example, Sargent says that Compaq's recently launched $1799 Presario 800—a 3.5-pound, mobile Pentium III–based notebook—competes with products in the $2500 range, such as Sony's VAIO PCG R505TE.

In some cases, vendors are throwing in the proverbial sink to close a deal. Dell leads the charge again here, offering everything from no-cost shipping to free hardware extras. One recent promotion offered a free Digital Audio Receiver—which Dell normally sells for $199—with the purchase of its THX-certified Dimension 8100 PC. Other freebies include PDAs, color printers, scanners, and digital cameras.

DELL FIRES THE FIRST SHOT

WHILE DELL won't cop to starting the PC price war, the company did start slashing prices last fall, even as overall PC sales were slumping. Analysts suggest Dell was seeking to grab market share—at the expense of competitors. ▶

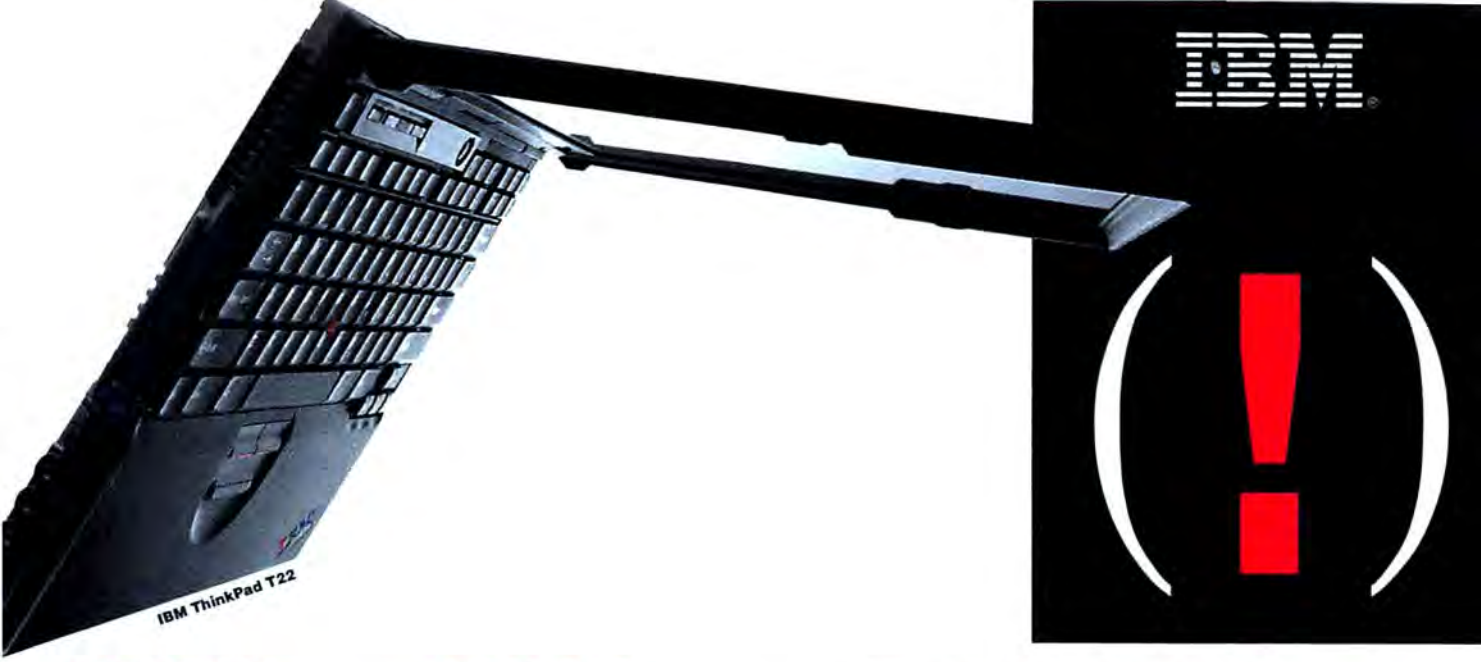
PC Prices Down More Than One-Third in Seven Months

TO SEE HOW STEEPLY PRICES ARE FALLING, we asked vendors to estimate pricing on the same PC configuration (or as close as possible) for September and December 2000, and for April 2001. Except where noted, price is for a desktop with a 1-GHz Pentium III processor, 128MB of SDRAM, a 30GB hard drive, a DVD-ROM drive, a 32MB graphics card, a 56-kbps modem, and a 17-inch monitor.

VENDOR AND MODEL	Estimated price			Price drop, September to April
	9/15/00	12/15/00	4/15/01	
Compaq Presario 7000T	$1843	$1167 [1]	$1007 [1]	45 percent
Gateway Performance 1000	$2054	$1799	$1249	39 percent
Hewlett-Packard Pavilion	$1820	$1610 [2]	$1249 [2]	31 percent

[1] Presario 5000T with integrated video graphics. [2] With a 40GB hard drive. SOURCES: COMPAQ, GATEWAY, HEWLETT-PACKARD

PHOTOGRAPH: JOHN KUCZALA



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Desktop alternative

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ThinkPad Button
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5.6 lbs.[6] travel weight
1-year limited warranty[7]
Part #265545U

IBM ThinkPad T22

Performance and portability

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Ultrabay 2000 8X-2X DVD-ROM
Mini PCI modem
8MB Savage IX8+ graphics
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$3,069

SuccessLease for Small Business $102/MO., 36 MOS.

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ThinkPad CD-RW/DVD Combo Ultrabay 2000 Drive
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David Marmonti, Dell's director of marketing for consumer business, notes that the company's direct-sales approach has always let it maintain low inventories and quickly pass component price drops on to consumers. But Roger Kay, a research manager at IDC, says Dell has also cut its profit margins—so its competitors must go lower, too. Less-efficient vendors are left with little or no profit margin, he says. "They're forcing the competition to bleed," Kay says. "It's real hardball."

Rob Enderle, research fellow with Giga Information Group, says Dell hopes to push competitors into outsourcing production to Dell—or into leaving the PC market altogether. The strategy may be working: In March, Micron Electronics announced it was getting out of the computer business (the MicronPC division, purchased by Gores Technologies, will continue to sell computers). Meanwhile, Dell's fourth-quarter 2000 unit sales to consumers were up a whopping 78 percent over the same period a year earlier, and the company's U.S. market share rose to 12 percent from 9 percent in the prior quarter.

HOW LONG CAN IT LAST?

ONCE PC prices drop, they rarely go back up. Vendors don't like to sell the same system for more because that frustrates customers, says Mike Ritter, director of consumer marketing at Gateway. However, if component prices—particularly DRAM costs—rise significantly, companies might not be able to absorb those additional costs, he says. PC prices might not rise, but you may end up with less RAM for the same money.

In other words, unless you are waiting for a specific technology—such as a 2-GHz processor—don't wait too long to buy. "I don't see things getting much lower," Ritter says.

So if a PC is on your shopping list, don't procrastinate. A tough economy, slowing sales, and fierce competition have forced the PC industry to fast-forward its usual downward price spiral—a harmonic convergence that may not continue into fall or winter.

—Tom Mainelli ▶

Flat-Panel Prices Falling—for Now

PERSONAL COMPUTERS aren't the only technology tools selling at attractive prices: Flat-panel displays are also at all-time lows.

Once seen only in executive suites and specialized workplaces such as Wall Street trading rooms or hospitals, flat-panel monitors are now within reach of most PC owners. Thanks to a dramatic increase in LCD production, supply has outpaced demand, and vendors are offering 15-inch displays for street prices as low as $500.

We're not talking about no-name vendors with bottom-rung products, but major vendors with quality displays. During one week in April, Dell, NEC-Mitsubishi, and ViewSonic all slashed prices on their existing 15-inch units. Samsung hit the $500 mark a month earlier (see *New Products*, page 72), and IBM and Sharp are offering comparable prices on newly launched models. (Look for a comparative review of 15-inch flat-panel displays in our August issue.)

Price cuts extend beyond the 15-inch universe to larger sizes as well. NEC-Mitsubishi cut the estimated retail price on its 18-inch MultiSync LCD1800 from $1899 to an unheard-of $1145—or a street price of $1000. ViewSonic's 17-inch VE170 now has an estimated street price of $995.

"This is a very exciting time for the LCD market—this is a price point we've been waiting to see," said Rhoda Alexander, director of monitor research at display market research firm Stanford Resources.

As the firm tracked the market, the average price of a 15-inch LCD moved from $2627 in the first quarter of 1998, to nearly $1100 a year later, up slightly to just over $1100 in 2000, and finally to about $750 in early 2001. The forecast average price this spring was about $690, including a number of sub-$500 units.

But don't expect prices to drop much further, Alexander warns. While 15-inch LCD monitors should sell at $500 through the summer, prices will probably start creeping up again by fall.

"Jump now is my advice," Alexander says. "Get 'em while they're hot."

Site to See: OpenTable.com

WHETHER YOU'RE booking dinner for 2 or for a party of 20, OpenTable's online reservation service makes it easy. You can choose from more than 1200 affiliated restaurants in some 20 major metropolitan areas (although pickings are slim in the heartland). Simply select a time, date, and party size, and you'll find out instantly (and at no charge) if your request can be accommodated at the restaurant of your choice. The site also includes tools to help you pick a restaurant by cuisine, price, and neighborhood. You'll also find links to Zagat and other restaurant reviews. Bon appétit!

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Watch Your Home Remotely With Affordable New Tools

FIRST LOOK

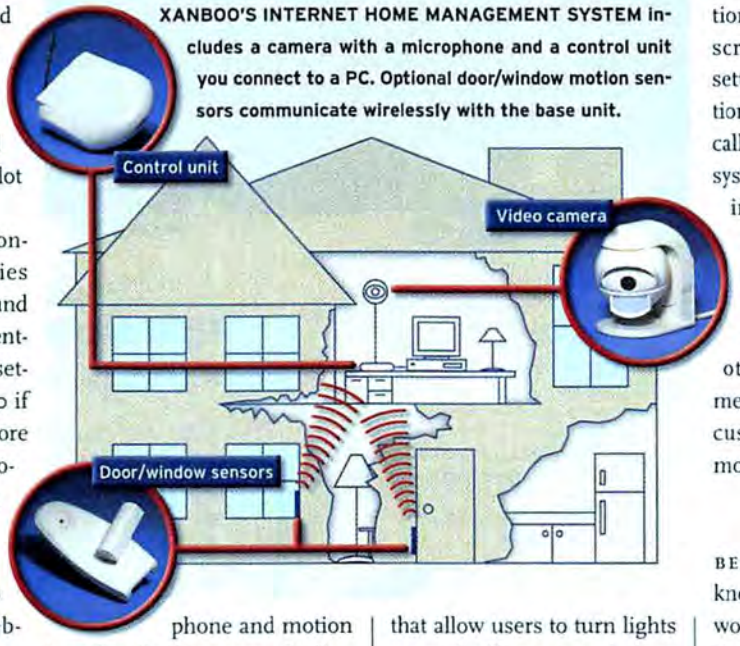
EVER wondered what your kids or pets do while you're at the office? Wish you could monitor your home's security, or check for flooding in the basement from afar? Now you can—and without having to invest a lot of time or money.

PC-based systems for controlling household utilities and security have been around for several years. Until recently, however, even simple setups cost as much as $5000 if built into a new home; a more elaborate installation retrofitted into an existing house or apartment could run $50,000. And those systems were unlikely to offer any access via Web-enabled devices.

But a new generation of products promises at least some Internet functionality at far more affordable prices. We tried one of the first, Xanboo's Internet Home Management System, which costs $150, plus $10 monthly for a Xanboo account. This initial low-cost version (we looked at a shipping unit) is limited to performing security functions, but the company plans to add optional household controls.

See Me, Hear Me, Feel Me

XANBOO'S INTERNET HOME MANAGEMENT SYSTEM includes a camera with a microphone and a control unit you connect to a PC. Optional door/window motion sensors communicate wirelessly with the base unit.



PICTURES AND SOUND VIA THE WEB

THE BASIC Internet Home Management System consists of a controller that connects to a PC via USB; a color video camera with built-in microphone and motion and audio detectors; a 60-foot camera cable; and software to control the works. Additional cameras cost $50 each; wireless sensor modules for sound, water, or doors and windows go for $20 each. A single controller supports up to four cameras and as many as eight sensors.

To use the system, you must sign up for the Xanboo account, which lets you check the status of things at home through a personalized page on Xanboo's Web site (www.xanboo.com). New modules that allow users to turn lights on and off, open and close garage doors, and control air conditioning—all from the same Web site—are slated to appear in August.

> When these products mature, they'll help you save money by reining in high utility bills.

Setup, including registering online, took only 10 minutes. The individual pieces worked well. But while most of the sensors communicate wirelessly, the all-important camera module must be hooked up to the controller using the included thick cable. This makes installation more of a chore. However, wireless cameras are also due in August.

Once installed, the camera's motion detector transmits a still image or a 10-second video clip to the PC and, from there, to Xanboo's site, whenever a movement triggers a response. Users choose how they're notified: by e-mail, text-messaging cell phone, pager, or wireless PDA.

Other products for remote control via the Web are in the works. For example, IBM and Carrier Corporation have jointly developed an air conditioning system that lets subscribers change thermostat settings or turn the air conditioner on or off via a Web site called MyAppliance.com. The system, which is being tested in Europe, can even alert a repair service when a malfunction occurs. In this country, Seattle's Puget Sound Energy and several other utilities are experimenting with systems that let customers adjust their thermostats via the Internet.

MORE TO COME

BELKIN, A COMPANY best known for its printer and network cables, already offers a line of SignalPoint infrared controllers for audio and video systems; the company has introduced cameras for security monitoring, as well. MyCasa Network, meanwhile, is seeking a distribution partner for a line of products designed to use home powerline networking to allow control of household appliances over the Web.

The promise of controlling your house from afar via the Web is certainly appealing, and when these products mature, they'll help you save money by reining in high utility bills. Security-conscious homeowners may even find Xanboo a worthwhile investment now. But I think I'll trust Fido to behave himself without a Webcam.

—Jonathan Blackwood ▶

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CD-R Media Prices to Triple This Summer

ANALYSIS

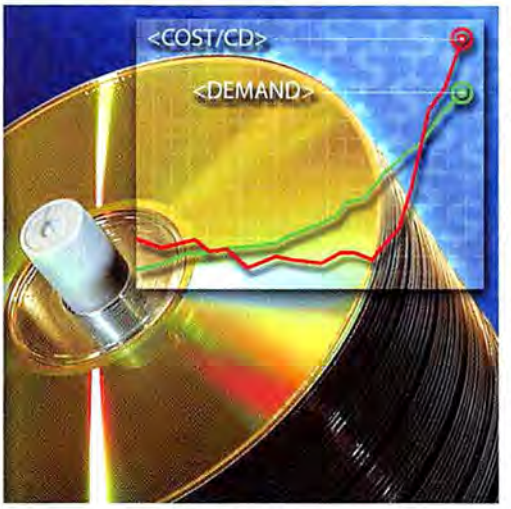
AS RECENTLY as this spring, bargain-priced CD recording media piled up on the store shelves. But have you checked those price tags lately?

While the cost of other PC equipment has been dropping, CD-R/RW media bargains are harder and harder to find. In fact, stock up now, because hefty increases are coming—possibly as much as 350 percent above the lowest CD-R media prices seen this past year, say industry experts.

"A spindle of CDs, with rebates, was down as low as 10 cents a disc," recalls Peter Brown, removable-storage analyst at IDC. This summer, Brown expects discs to go up to 30 or 35 cents on average, and stabilize there. CD media seller Verbatim—a Mitsubishi Chemical subsidiary—as well as Memorex and TDK were expected to announce price increases after press time.

CD-R media's price increase also means CD-RW media costs will probably stay at current levels (about 70 cents per disc on average) instead of dropping.

Blame the CD media price hikes on recent soaring demand, consolidation among makers, and high patent royalties.



BEHIND THE SCENES

BACK IN 1998 and 1999, when CD-RW drives were first catching on, Taiwanese manufacturers ramped up their CD media production capacity tremendously. (Approximately 75 percent of CD-R/-RW discs are made in Taiwan.)

Dozens of companies opened factories in 1998 and 1999, Brown explains, with manufacturing capacity of 100 million discs per month per company. That created a huge CD-R/RW media supply, far exceeding demand at the time.

Small and medium-size manufacturers "were just producing CD-Rs, with no firm purchase orders from anybody," elaborates Brad Yeager, marketing manager for blank media at Memorex.

Cutthroat pricing forced some vendors out of business, and others reduced their production levels.

Then last year, demand started booming, thanks to the surging popularity of CD-RW drives. But the damage to the industry—with fewer firms churning out fewer discs—had been done, and has led to a CD-R/RW media shortage and higher prices, reversing the previous situation.

ROYALTY PAINS

FIXED PATENT royalties added to pricing pressures. Despite shrinking profit margins, companies still had to pay Philips, Sony, and Taiyo Yuden 8.3 cents for every disc made.

At that rate, a CD-R disc should have cost more than 50 cents at retail—not the 30 cents or less many discs sold for last year—says Robert Tsai, marketing and sales manager at Hotan, the U.S. subsidiary of CMC Magnetics, a Taiwanese CD media maker.

Earlier this year, Taiwanese makers, frustrated by the royalty rates, brought an unfair trade practice complaint to Taiwan's Fair Trade Commission. They claimed Philips charged royalties as if it were the sole patent holder, but it collected royalties for itself, Sony, and Taiyo Yuden. The commission ruled the three companies' handling of CD-R patent licensing violated Taiwanese law, and fined Philips.

That led to new, lower royalty fees, which should allow CD makers to stay in business and abide by patent laws.

YOUR BOTTOM LINE

PRICING SHOULD begin to stabilize by July, once multiple vendors have announced their hikes. So get those bargains while they're still around.

—Melissa J. Perenson ▶

CD Creator 5 Tangles With Win 2000

ROXIO'S POPULAR Easy CD Creator 5 Platinum and Windows 2000 Professional don't always play well together: A small percentage of users have had problems, including long PC boot times and, in extreme cases, the dreaded blue screen of death.

Roxio traced the problem to a specific segment within the CD Creator program called Take Two. The application lets users back up hard drive data by copying the entire contents onto multiple CDs.

The company has issued a patch (www.roxio.com/en/support/ecdc/ecdc501s.html) to deal with the problems. Easy CD Creator 5 Platinum owners can click the *Web Checkup* button in the software to automatically download and install the fix. Windows 2000 users should download the patch and follow instructions before installing the software.

If you're experiencing the long boot or hung boot problem, Roxio suggests the following:

1 Allow the system to boot if you can—it may take some time—then download the patch and follow instructions to reinstall CD Creator.

2 If your system won't boot, try disconnecting the cable to any Zip drives, or at least keep a Zip disk in the drive when you power on the system.

3 If your PC still won't boot, temporarily disconnect your CD-R or CD-RW drive's IDE cables. You can also try disconnecting all USB devices.

4 Once you've booted successfully, get the patch and reinstall CD Creator.

—Tom Mainelli

ILLUSTRATION: DIEGO AGUIRRE; PHOTOGRAPH: RICK RIZNER

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[1]MHz/GHz only measures microprocessor internal clock speed; many factors affect application performance. [2]System includes chipset that uses some main memory for the video subsystem. The amount used will vary depending on video mode and may be as much as 8MB. Thus, accessible system memory is less than the amount stated. [3]GB equals one billion bytes when referring to storage capacity; accessible capacity may be less. [4]Variable read rate. Actual speeds will vary and are often less than the maximum possible. [5]For terms and conditions or copies of IBM's Statement of Limited Warranty, call 1 800 772-2227 in the US and in Canada call 1 800 426-2255. Telephone support may be subject to additional charges. For warranties including onsite labor, customer may be asked certain diagnostic questions before a technician is sent. [6]Pricing shown is price available from IBM directly; reseller prices may vary. IBM price does not include tax or shipping and is subject to change without notice. [7]SuccessLease is offered by third-party providers of business financing approved by IBM Global Financing. SuccessLease terms and conditions provided by the third party. Featured monthly lease payments include prespecified purchase option at end of lease, to qualified business customers only, installing in the US. Documentation fee and first month's payment due at lease signing; taxes are additional. Offer may be withdrawn or changed without notice. Options cannot be leased separately. [8]Some software may differ from its retail version (if available), and may not include user manuals or all program functionality. 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, not IBM. IBM makes no representations or warranties regarding non-IBM products. IBM reserves the right to alter product offerings and specifications at any time, without notice. IBM cannot be responsible for photographic or typographic errors. SuccessLease and all IBM product names are registered trademarks or trademarks of International Business Machines Corporation. Lotus and SmartSuite are registered trademarks of Lotus Development Corporation, an IBM company. Intel, the Intel Inside logo and Pentium are registered trademarks of Intel Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation. Other company, product and service names may be trademarks or service marks of others. ©2001 IBM Corp. All rights reserved.

LANs in the Sky: Faster E-Mail, Web at 40,000 Feet

EIGHT MILES high, and 5 hours to kill. Wouldn't it be great if you could exchange e-mail with your earthbound coworkers or customers during long flights? You could call an ISP from a seat-back phone, but at $3 a minute and connection speeds that top out at 10 kbps, Web and e-mail downloads are both pricey and unbearably slow.

Fortunately, faster and cheaper hookups are in the works. I tried one of the first new in-flight Internet systems, from Tenzing Communications, and found it much more usable than the seat-back phone dial-up method. However, it offers only limited, preloaded Web browsing, and it doesn't work with AOL, Lotus Notes, or Web-based e-mail (it does support Microsoft Exchange Corporate Web Access). Also, right now it is available on only a handful of airlines.

Here's how it works: On each plane, Tenzing installs a local area network that connects passengers' laptops to an onboard server, which in turn communicates with the ground via radio. LAN connectivity varies among airlines. Cathay Pacific uses USB ports; SAS is trying out an 802.11b wireless network.

FLIGHT TEST

I TESTED THE Tenzing service on Air Canada, where it is in trials using a LAN accessible through a 56-kbps modem and phone cord. You connect either by running an application—downloadable before flight from the Web or available on CD on the plane—or by creating a dial-up networking connection.

Once connected, just run your POP3-compliant e-mail program—no setting changes are required. Tenzing recommends that people who leave POP3 e-mail on a server use its Web-based POP3 client to prevent messages from reloading once the plane is back on the ground.

Requests to send and receive e-mail are intercepted by the onboard server, which retrieves the mail from your ISP on the ground—but at the same poky 10-kbps rate of a seat-back phone. Tenzing does not eliminate the wait, but it does make it less annoying.

> Tenzing Communications' new in-flight Internet system is much more usable than the seat-back phone dial-up method.

When you first request your mail, the onboard server advises you to check back in several minutes. During that time it slowly retrieves the mail from your ISP. When you check again, the server transfers the mail to your laptop at the zippier 56-kbps speed. Total download time may be the same, but you're not watching the mail trickle in. In my test on a flight from Los Angeles to Toronto, I sent a message to a cousin in Geneva, Switzerland, and received a response within 15 minutes.

The Tenzing server doesn't automatically retrieve long messages and file attachments (the size limit was 75KB on Air Canada but varies among airlines). Instead, it notifies you of oversize messages, and lets you retrieve them if necessary. Since Tenzing's fees will be based on bandwidth usage, holding off on large files can save both money and time.

Tenzing hadn't finalized its pricing at press time, but it estimates you'll pay $5 to $20 to download up to 500KB of mail (and to send a similar quantity) during a day's travel. The 45 messages that I downloaded totaled 182KB.

LIMITED WEB ACCESS

EVEN NON-TENZING customers can do some very limited Web browsing—mostly of edited pages from Tenzing's partner sites, cached on the server prior to flight time. (Tenzing does update some news pages during the flight.)

In addition to Cathay Pacific—and the trials on Air Canada and SAS—Tenzing's customers so far include Virgin Atlantic and Singapore Airlines.

Interest in in-flight Internet access could pick up with the expected introduction, in the next year or two, of faster air-to-ground radio communications that would permit real-time Net access. Boeing says it's talking to some 30 carriers about Connexion, a satellite-based broadband service slated for a 2002 commercial-airline rollout. Tenzing says its hardware is easily upgradable when faster radios arrive.

But Forrester Research senior analyst Henry Harteveldt believes that an explosion of fast in-flight Internet access isn't likely anytime soon, given the airline industry's historically cautious attitude toward new technology.

"A few years down the road, in-flight e-mail and Web access and entertainment could be very popular if [those services are] priced right," Harteveldt says. "But it will be a rough year or two as they get things launched."

—*Yardena Arar* ■

ILLUSTRATION: GORDON STUDER

If your notebook's unlocked, your network is too™—regardless of other security measures you have in place. In fact, 57% of all network breaches originate on stolen PCs (FBI, 1998). And, replacing a notebook's data can cost your company up to 15 times the value of the original notebook itself. Luckily, protecting laptops is easy; most already come with our security slot designed especially for the Notebook MicroSaver®. So why take chances? Buy yourself some peace of mind instead. For purchase information contact your reseller, or visit www.microsaver.com.

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sweet 16

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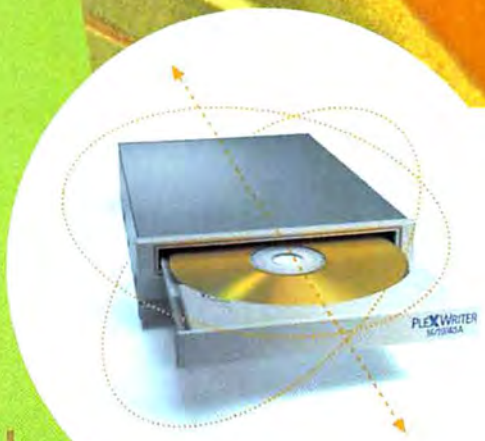

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PC WORLD BEST BUY — PlexWriter 12/10/32A

PlexWriter 12/4/32 July 2000

PlexWriter 8/4/32 December 1999

WINLIST — PlexWriter 12/10/32A August 2000

PlexWriter 8/20 February 1999

PC WORLD — UltraPleX 40max July 2000

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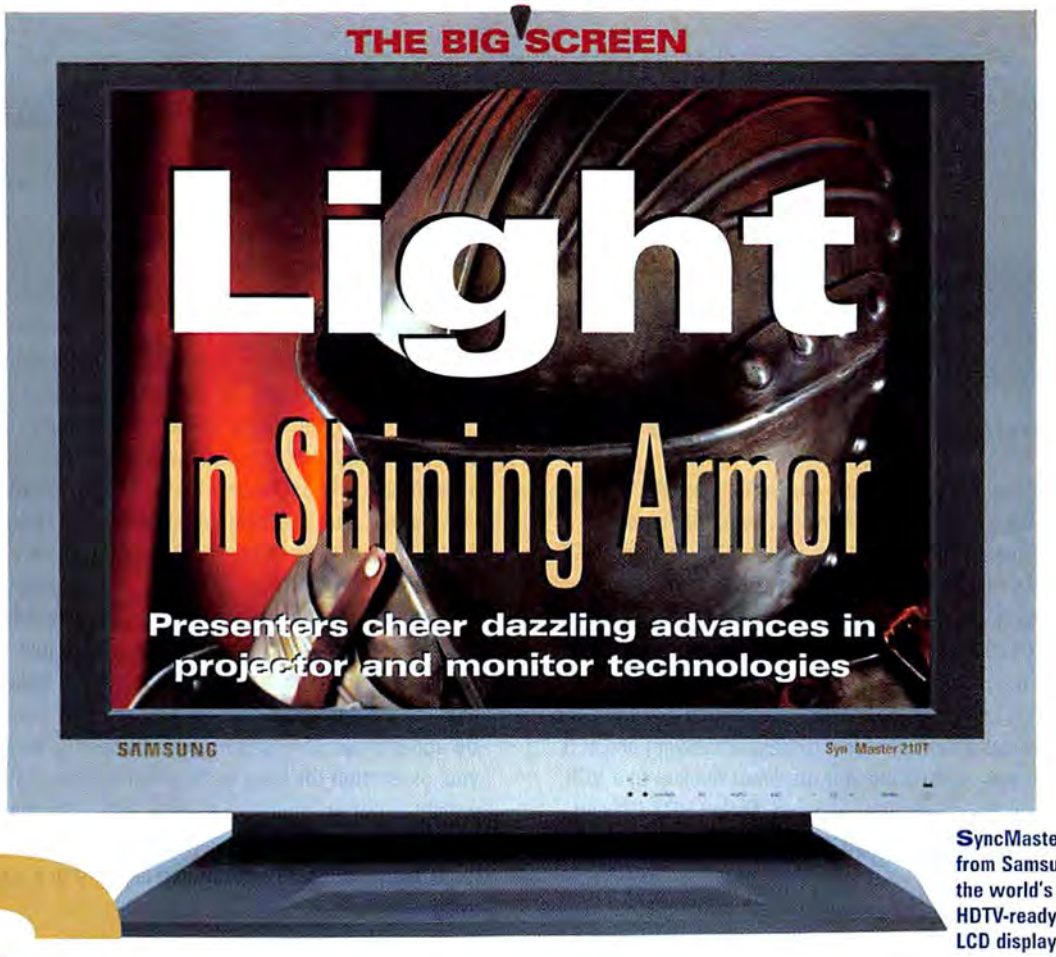
THE BIG SCREEN

Light In Shining Armor

Presenters cheer dazzling advances in projector and monitor technologies



SyncMaster 240T from Samsung is the world's first HDTV-ready 24-inch LCD display

Successful presenters live by three rules—stand up to be seen, speak up to be heard, and wind up to be appreciated. Let's add two more: Calm down to be effective, and use the best technology for your presentation.

Delivering an effective presentation, one that leaves your audience convinced of your personal sincerity and your topic's validity, consists of a mix of subtle and obvious signals that you, not your message, project. Here are two examples that professionals use all the time:

- Concentrate not on the words of your presentation but on communicating the topic's emotional impact to the audience
- Come out swinging—begin with your presentation's conclusion, and keep moving, but avoid placing your hands on your hips or pointing at the audience, because this makes it appear that you are scolding them.

Getting your message across also requires that you thoroughly understand and believe in the product or idea you're selling. It also demands that you use the most reliable, time-tested audiovisual aids available, including slide and video editing software as well as presentation equipment.

NEW HORIZONS FOR LCDS

Fortunately, recent advances in projector and monitor technology allow the best-equipment part of the equation to take care of itself. With quality increasing as costs decrease, there's every reason to use first-rate equipment that lets you concentrate on the creative, and not the technical, aspects of your presentation.

While projectors are ideally suited for presentations to larger audiences, starting with groups as small as six and ranging into the hundreds, some presentations call for a big-screen monitor. For those occasions, "flat screen" analog/digital LCD monitors are just the ticket to success. The advances contained in these monitors are simply outstanding, beginning with their ability to display computer data as well as tomorrow's high-definition television signals, VCR decks, and DVD players.

Features such as picture-in-picture make big-screen monitors especially well suited for video conferencing and

The LP 340 from InFocus

e-learning. They also function superbly as a high-end graphics display device in situations where true color and accurate representation of the original image is paramount.

Sometimes it's best to defy convention and the ordinary, to break the old mold. That's exactly what Samsung (www.samsung.com) has done with its SyncMaster 240T, the world's first HDTV-ready 24-inch LCD display with dual analog/digital capability. With the highest active resolution of 1920 x 1200, multiple video inputs, and picture-in-picture function, the SyncMaster 240T stands in a class all its own.

Perfect for viewing the most demanding of graphics, the 240T provides an extra-wide 170-degree viewing angle. It also serves as a video monitor for direct hookup to a VCR, DVD player, and camcorder and can display HDTV. It can also double as a super-sharp large-screen presentation device.

The SyncMaster 240T's resizable window function allows two different input sources to be viewed simultaneously. High-end graphics professionals who require the power of digital technology and the most accurate representation of an original video source will find a soul mate in the SyncMaster 240T.

SMALL COMES UP BIG

The pros will tell you: Never settle for anything less than the richest, sharpest image that you can get. And that means projectors that use Texas Instrument's exciting Digital Light Processing (DLP) technology. Superior to other projection technologies, such as fuzzy overheads and clunky slide projectors, DLP uses a micromechanical silicon chip that controls a refractive array of microscopic mirrors to create a color-saturated, sharply defined image. In addition, DLP delivers greater three-dimensional depths and less visual noise, which allows your audience to see more detail in the image from a wider viewing angle.

Combining the color clarity, sharpness, and versatility of DLP technology with projector power-to-go, the InFocus LP 340 and LP 350 projectors can be the mobile professional's best friend (www.infocus.com).

With 1300 lumens of brightness, the LP350 can serve as a ceiling-mounted projector or sit upon a tabletop—and give the same clear result every time. Weighing less than a standard briefcase at 6.7 pounds, the LP 350 is a true XGA performer, offering 1024 x 768 resolution for typical graphical presentations. The projector is automatically HDTV-compatible and sports a built-in, 2.5-watt speaker for special audio effects. Its zoom lens and elevator foot mean you get perfect image size, focus, and position for your presentation.

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Samsung Electronics
www.samsung.com

The LP 340 offers many of the same features as the LP350. It's easy to carry and gives 1300 lumens of brightness. It also offers Infocus's home-theater-quality video for images that beat anything you can get on a large-screen TV. And with both projectors, you get the true-to-life color presentation that only DLP technology can offer today.

Whatever equipment you select, you want it to work as hard as you do—and weigh as little as possible. If you travel to your audience, you want a featherweight projector that's easy on the shoulders—something like Plus Corporation's U3 series projectors (see below). If your audience comes to you, as is often the case with in-house presentations, weight is not as important as is an extensive feature set: remotely controlled functions, multimedia sound capability, large image size, and ease of connectivity to a variety of image sources.

HIGH PERFORMANCE IN-HAND

DLP technology in the palm of your hand? That's exactly what you'll get with Plus Corporation's U3 series projectors, the smallest of which weighs just two pounds (www.plus-america.com). This ultra-small projector has a footprint of only 5.6 x 7 inches—smaller than most mouse pads—and is a minuscule 1.8 inches thin. One model in the two-pound series provides an XGA resolution with a short-focus lens and 800 lumens of brightness. An SVGA model of the two-pound U3 series, also with a short-focus lens, offers 700 lumens.

Plus Corporation's U3 series projector

The four improved models of the three-pound version of the U3 series offer a variety of features, including a zoom lens on the 1100Z with XGA resolution and a short-focus lens on the 1000SF with XGA resolution, with SVGA models available. All have a footprint measuring 7 x 9 inches and less than two inches thick, and all of them offer 1,000 lumens of brightness.

While the job of a presenter is never easy, new technology can make it easier. To help assure that your message will come shining through, apply Rule 5—always buy the best you can.

Awakenings No. 4
Watercolour on Paper
Timothy Samuel Elliot III
$1,300

It's all in the presentation.

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The Versatile LP™350

The Premium LP™130

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NEW PRODUCTS

A Galaxy of Shooting Stars: Cameras for All Budgets

DIGITAL CAMERAS

HERE COMES a new constellation of digital cameras from Canon, Kodak, Nikon, and Olympus, ranging from a reasonably priced, virtually mistake-proof product for novices to a $900 wonder that packs considerable power. Whether you're a first-time user or a seasoned shutterbug, zoom in for a closer look.

STAR POWER

CANON MADE a big impact in the digital camera market last year with its first Digital Elph, the sexy PowerShot S100. The new $699 **Canon PowerShot S300 Digital Elph** closely matches the svelte design and metallic casing of its predecessor. Although the S300's measurements are only a bit larger, I did notice the difference.

This 2-megapixel Digital Elph lets you capture mini-movies (with audio) on the included 8MB CompactFlash card; you can take longer movie clips if you use a higher-capacity memory card (64MB, for example). The S300 also has a 3X optical zoom lens—slightly more powerful than the S100's 2X optical zoom—so you can close in on a subject from farther away. After downloading video clips to a computer, you can edit them using the bundled ArcSoft VideoImpression program.

A less impressive new feature is the S300's direct-to-printer connection. Use an included cable to link the camera to the optional $400 Canon Card Photo Printer CP-10, and you can print your digital photos instantly. The downside: The credit card–size prints from the dye-sublimation CP-10 printer are of so-so quality. For sharper, 4-by-6-inch prints, I would recommend a better printer—say, Sony's DPP-SV55, which costs about $300.

The Digital Elph S300 produces vibrant photographs at a maximum resolution of 1600 by 1200. My shipping unit's test shots looked sharp, with accurate color. The camera features two other resolution modes: 1024 by 768 (which the S100 doesn't offer) and 640 by 480. But the S300 is pricier than most 2-megapixel cameras on the market. I would wait until the price drops to around $550.

KODAK'S DX3500 Digital Camera, top, and the Olympus Camedia Brio D-100.

PRACTICAL RADIANCE

IF EASE OF use and a reasonable price are your top priorities, consider the $300 **Kodak DX3500 Digital Camera**. It's a member of Kodak's new EasyShare System line of cameras that can use an optional $80 docking station to transfer pictures to a PC and recharge the camera's batteries.

Kodak's docking station behaves similarly to the syncing cradle on some PDAs. But instead of syncing data between the portable device and your PC, it lets you download pictures—hassle-free. Connect the dock to your system using the included USB cable, install the driver, place the camera in the dock, and then press a button on the dock to transfer photos swiftly to your PC. You can use Kodak's included Picture Software to view, sort, enhance, and e-mail your snapshots.

The DX3500 is as easy to use as the dock, thanks to its simple on-screen menus and on-camera buttons. Unfortunately, the camera's silver-and-gray plastic case feels a bit flimsy. And my shipping unit took a couple of seconds to sharply focus an image on the LCD for viewing.

This is the only camera in the group that comes with 8MB of internal memory. If you need more storage, buy an optional CompactFlash card to insert in the camera's memory slot (I'd recommend getting at least a 16MB card, which costs

PHOTOGRAPH: MARC SIMON

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NIKON'S Coolpix 995, top, and Canon's PowerShot S300 Digital Elph.

about $40). As for image quality, the DX3500 produced accurate colors, but it also cast a murky haze over most of my test shots. You can brighten up your pictures, however, by using the included software.

COSMIC FEATURES

KNOWN FOR their advanced features, Nikon's impressive Coolpix digital cameras appeal to seasoned photographers. At $900, the new **Nikon Coolpix 995** is the most expensive camera in this roundup, but it's also the most powerful.

The 995 has comprehensive—albeit sometimes confusing—manual controls for adjusting such settings as aperture, shutter speed, and white balance. Like its predecessors (the 950 and the 990), the 995 sports a swivel lens for taking pictures at varying angles or for discreetly photographing your subjects. If you want to use the flash, you must press a button to flip it up. And this time around, Nikon supplies rechargeable batteries and a charger—accessories that the older Coolpix models didn't have.

When shooting a photograph, you must first press the shutter button halfway so the camera can focus on the subject, a step that takes a couple of seconds. The camera then stores the image in the included 16MB CompactFlash card; although this card has a greater capacity than the others in this roundup, it has room to store only a single uncompressed TIFF image.

The 995's 3.3-megapixel CCD allows it to capture compressed, JPEG-formatted photos at a high resolution of 2048 by 1536. At that resolution, you can produce sharp 8-by-10-inch prints. Most of the test shots I took with a preproduction model appeared vibrant on screen, though a couple of them looked gloomy. Still, the Coolpix 995's plethora of advanced features more than make up for a few dusky images and a steep price.

STELLAR BUY

THE $249 **Olympus Camedia Brio D-100** is a terrific choice for budget-minded shoppers. Light, compact, and a little stylish, this point-and-shoot unit sports a sleek, black design with gold trim and simple control buttons. Its basic features include a 1.3-megapixel CCD that can produce colorful 1280-by-960-resolution digital photos. Some test shots from a shipping unit appeared quite vivid on screen—especially close-ups that were taken in macro mode—but others looked a bit dark.

Like Kodak's DX3500, the Brio D-100 lacks an optical zoom lens. Instead, it comes with a less impressive 2X digital zoom (the Kodak comes with a 3X digital zoom). Still, the D-100 provides a number of basic features for users with modest photography needs. If you are on a budget and want a pocket-size, low-frills camera, then the Brio D-100 is well worth looking into.

—Grace Aquino ▶

online FOR MORE PRODUCT news and the latest announcements, check the PC World Daily News Service at **www.pcworld.com/news**. And to try out some of the software mentioned here, go online to **www.pcworld.com/downloads**.

Canon PowerShot S300 Digital Elph

PRO: Small; impressive photos.
CON: A bit heavy, pricey.
VALUE: An attractive camera, but you pay a premium to use it.
List price: $699
Canon USA
800/652-2666
www.usa.canon.com

Kodak DX3500 Digital Camera

PRO: Easy to use, inexpensive.
CON: Some snapshots were murky.
VALUE: Great, low-priced camera.
List price: $300
Eastman Kodak
800/235-6325
www.kodak.com

Nikon Coolpix 995

PRO: Lots of advanced features.
CON: Slow auto-focus, expensive.
VALUE: For serious shutterbugs.
List price: $900
Nikon
800/645-6689
www.nikonusa.com

Olympus Camedia Brio D-100

PRO: Affordable; color-rich photos.
CON: Bare-bones; doesn't have an optical zoom lens.
VALUE: Basic, stylish point-and-shoot camera is easy on your wallet.
Street price: $249
Olympus America
888/553-4448
www.olympusamerica.com

PHOTOGRAPH: MARC SIMON

A Wireless Keyboard and Portable Note Taker

KEYBOARD

IT'S A KEYBOARD. It's a word processor. It's a scheduler. It's QuickPad Technology's **QuickPad IR**, a wireless keyboard with PDA features, powered by four AA batteries that the company claims will run the unit for up to 400 hours.

About the size of a standard notebook keyboard and weighing less than 2 pounds, this freestanding $199 input device has a built-in word processor with a 70,000-word spelling checker. Entering text into the shipping unit I tested was simple and quick. The keyboard's 1MB of memory holds up to 250 separate text files in ten folders, or about 70 pages of text. Access folders by pressing any of ten <F> keys. Keystrokes appear on a four-line LCD display.

TAKE NOTES on the fly with a QuickPad IR.

The QuickPad IR automatically saves documents for transfer to your PC via the included USB infrared receiver. Press its Send button to transmit the open document to an open application on the PC, right to where you place the cursor in your word processing, spreadsheet, or e-mail program. In addition to a calculator button, the keyboard holds two dedicated <F> keys for transferring contact and appointment information into any open app file on your PC.

The QuickPad IR's ability to double as a wireless keyboard for your PC—with a range of about 25 feet—makes it handy for presentations as well as for day-to-day input. Another nice touch is the built-in power lock that's designed to prevent accidental power-ons: You must press the On button three times to make the keyboard become operational.

The LCD display is not backlit, so high ambient lighting is essential; and editing a long document on the four-line display can be tedious. Nevertheless, the QuickPad IR is a worthy portable word processor that could prove indispensable for people who don't want to lug around a high-priced, heavy notebook just to take notes or create documents.

—Michael S. Lasky

QuickPad IR

PRO: Wireless keyboard doubles as stand-alone portable word processor; easy document and data transfers to PCs via infrared port.

CON: Four-line display makes editing difficult; no backlight.

VALUE: Fair price for a handy keyboard/word processor.

PRICE: $199

QuickPad Technology

800/373-8181

www.quickpad.com

Panasonic's Better 802.11b Wireless Network

NETWORKING

FOR SMOOTHER wireless transmission of DVD movies, CD-quality audio, and data between PCs, the solution may be Panasonic's **KX-HGW200 Concourse Broadband Networking Gateway**—it's now enabled for 11-megabit-per-second wireless networking using the company's PC Cards.

But the $250 system is neither cheap nor backward-compatible; you must equip every system on the network—and the gateway itself—with a $150 **KX-HGC200 PC Card**. Otherwise, the gateway can enable broadband or dial-up Internet sharing only over a wired ethernet or HomePNA network.

Panasonic's special PC Card is the first to use the ShareWave Whitecap technology for making 802.11b more multimedia-friendly.

We tested the system by streaming DVD (MPEG2) and MPEG1 videos between two computers located on different floors of a duplex condominium. First we used a standard 802.11b network, and then we repeated the operation using the Panasonic network. Next, we attempted the same transfers while simultaneously copying a 50MB file folder from one PC to the other.

Streaming over the non-Whitecap network yielded rather low-grade DVD, and that quality deteriorated further when directory copying occurred in the background; the copying took about 9 minutes. In contrast, DVD quality on the Panasonic system was good when no other activity took place; during the directory copying operation, which took about 4.5 minutes, the DVD output deteriorated but the clip was still watchable. With the MPEG video, the difference in playback quality under the various test conditions was negligible, but the file copying went even more quickly on the Panasonic network—and it ran dog slow on the non-Whitecap network.

(For more on wireless networks, see page 119.)

—Yardena Arar ▶

KX-HGW200 Concourse Broadband Networking Gateway
KX-HGC200 PC Card

PRO: Dramatically smoother audio and video file transfers.

CON: Proprietary standard.

VALUE: Best 802.11b-based wireless network for streaming multimedia.

List price: Networking Gateway $250, PC Card $150

Panasonic

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www.panasonic.com

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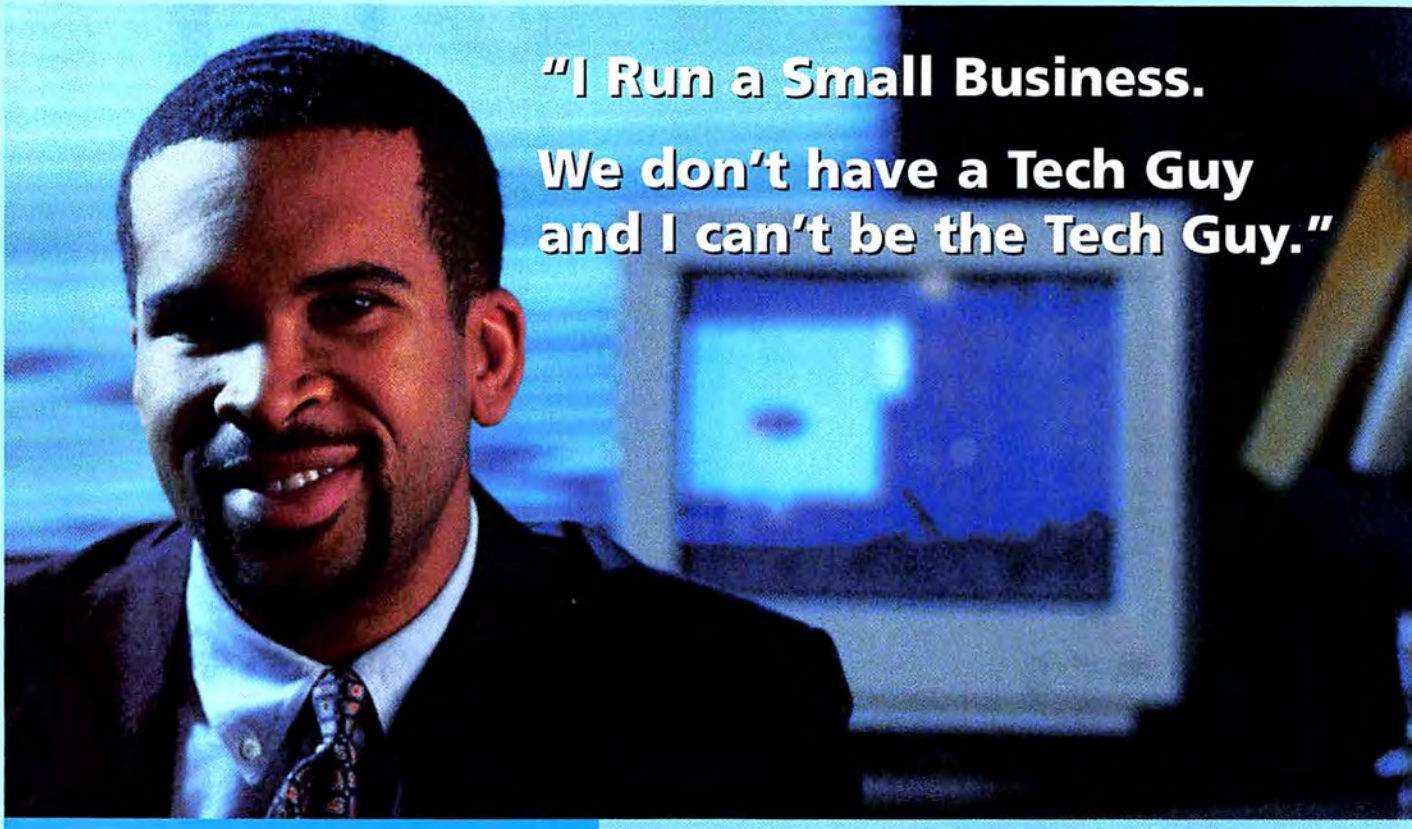

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*NSTL, February 2000. For full report and test results see: www.nstl.com/html/windows_2000_reliability.html

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- SoundBlaster PCI
- Cyber Acoustics CA-15 Speakers
- Intel® 10/100 Ethernet
- Microsoft® Windows® 2000 Professional
- Microsoft® Office® XP Small Business[2]
- 7-Bay Mid-Tower Case

FREE WINDOWS XP® PROFESSIONAL UPGRADE ON THIS PC![1]

$1849 #980159
Lease $62.31/Mo.

Venture U15

- **Intel® Pentium® 4 Processor 1.5GHz**
- 128MB RDRAM
- 30GB Ultra ATA 7200 RPM Hard Drive
- TNT2 M64 4x AGP Card (32MB) Graphics
- 17" (.25dp) 16" viewable Montior
- 12x8x32 CD-R/RW[1]
- Intel® 10/100 Ethernet
- Microsoft® Windows® 2000 Professional
- Microsoft® Office® XP Small Business[2]
- 7-Bay Mid-Tower Case

$1549 #980158
Lease $52.20/Mo.

Venture U14b

- **Intel® Pentium® 4 Processor 1.4 GHz**
- 128MB RDRAM
- 20GB Ultra ATA 5400 RPM Hard Drive
- nVidia Vanta 16MB Graphics
- 52x CD-ROM[1]
- 10/100 Ethernet
- Microsoft® Windows® 2000 Professional
- 7-Bay Mid-Tower Case

FREE WINDOWS XP® PROFESSIONAL UPGRADE ON THIS PC![1]

$999 #980156
Lease $33.67/Mo.

Venture T10b

- **Intel® Pentium® III Processor 1 GHz**
- 128MB SDRAM
- 30GB Ultra ATA 7200 RPM Hard Drive
- Intel 3D Direct AGP Integrated Graphics
- 17" (.25dp) 16" viewable Montior
- 12x8x32 CD-R/RW[1]
- PCI Wavetable Integrated
- Cyber Acoustics CA-15 Speakers
- Intel® EtherExpress 10/100 PCI
- Microsoft® Windows® 2000 Professional
- Microsoft® Office® XP Small Business[2]
- 7-Bay Mid-Tower Case

$1279 #980155
Lease $43.10/Mo.

Venture T10

- **Intel® Pentium® III Processor 1 GHz**
- 64MB SDRAM
- 40GB Ultra ATA 5400 RPM Hard Drive
- Intel® 3D Direct AGP Integrated Graphics
- 52x CD-ROM[1]
- PCI Waveable Integrated Sound
- 10/100 Ethernet
- Microsoft® Windows® Millennium
- 7-Bay Mid-Tower Case

$749 #980113
Lease $25.24/Mo.

Venture C7

- **Intel® Celeron™ Processor 700 MHz**
- 64MB SDRAM
- 20GB Ultra ATA 5400 RPM Hard Drive
- Intel® 3D Direct AGP Integrated Graphics
- 52x CD-ROM[1]
- PCI Wavetable Integrated Sound
- 10/100 Ethernet
- Microsoft® Windows® Millennium
- 7-Bay Mid-Tower Case

$549 #980150
Lease $18.50/Mo.

Systemax® Venture PCs come with a 3.5" Floppy Drive, a 104-Windows Keyboard, a Microsoft Intellimouse, 1 Year Extendible Limited Warranty, 24/7 Tech Support and 1 Year On-Site Service.* [1]CD-ROM speeds are variable. Maximum speed shown. [2]Microsoft Office XP Small Business includes Microsoft Word, Excel, Outlook, Publisher, and Small Business Tools.

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Flat-Panel Monitors With Slim Prices

PLANAR'S 15" Multi-Media Monitor.

LCD DISPLAYS

EVERYONE LIKES the small footprint and the sharp text of LCD monitors but hates the high prices. Good news: LCDs are—momentarily—bargains (see "Flat-Panel Prices Falling—for Now" on page 54), with some 15-inch displays plunging below $500. We tested well-priced LCD monitors from three vendors—Planar, Samsung, and ViewSonic.

At $414, Planar's **15" Multi-Media Monitor** is the least expensive of the three. Unfortunately, text looked far blurrier and more poorly defined on it than on most LCD displays. We found more to like in its graphics (where blurriness can be an advantage), but the Planar's images showed a bit too much contrast.

The Multi-Media's nifty translucent case shows its inner workings and comes in a choice of five different colors. Unfortunately, the case seemed somewhat flimsy. I did like our shipping unit's menu buttons, situated on the front right panel and offering two separate sets of functions for easy, intuitive menu control. The unit's ease of use and good looks don't make up for its blurry text, however.

Samsung's $499 **SyncMaster 570vTFT** displays sharp text, but its colors look too vivid, making it a better choice for people who work more with word processing and spreadsheets than with graphics applications. Samsung adds such advanced features as an extra button on its sleek, angled panel that, with one touch, optimizes the display settings for the best picture. Our shipping unit also included a menu option for fine-tuning the sharpness of the letters on the screen. The 570vTFT's biggest disadvantage is its poorly written manual: I found some of the trouble-shooting guidance unintelligible. Another small downside is the 570vTFT's awkward port placement. To attach and detach the power and video cables, you have to snake your hand around the unit's arm stand—a fairly difficult trick.

ViewSonic cut the price of its shipping **ViewPanel VE150** to $499, and this monitor tops the other two in both text and graphics quality. The VE150's text looked sharp and clean, and even very small letters are legible. Graphics appeared realistic and detailed—but like other LCDs, the unit doesn't display color graphics as well as a CRT monitor does.

A few minor quibbles: Like Samsung, ViewSonic places the power and video ports under the monitor's stand, where maneuvering is difficult. The placement of the menu controls on the right side of the panel creates a sleeker look, but reaching around to use them gets tiring. Despite such quirks, we think that the VE150 offers the best value of these three flat panels. ViewSonic's ViewPanel VE150 would fit well in any home or business setting, as would Samsung's SyncMaster 570vTFT—especially for people who work heavily with text. With its less crisp display but bright casing—and low price—Planar's colorful 15" Multi-Media Monitor works better for casual home use or in a dorm room.

Note: Watch for the Top 10 15-inch LCDs in the August issue of *PC World*.

—*Lisa Cekan* ▶

WE LIKED the crisp, readable text displayed on ViewSonic's ViewPanel VE150, left, and on Samsung's SyncMaster 570vTFT.

15" Multi-Media Monitor

PRO: Comes in great colors; has intuitive menu controls.
CON: We weren't impressed with this monitor's blurry text.
VALUE: Spend a little more for a monitor with better-looking text.
Street price: $414
Planar
503/748-5953
www.planar.com

SyncMaster 570vTFT

PRO: Text is very sharp.
CON: Poorly written manual.
VALUE: Good choice for people whose work involves staring at words on the screen.
Street price: $499
Samsung
800/726-7864
www.samsungmonitor.com

ViewPanel VE150

PRO: Sharp text and graphics.
CON: Awkward placement of controls makes them difficult to use.
VALUE: This is a great price for a high-quality LCD monitor.
Street price: $499
ViewSonic
800/888-8583
www.viewsonic.com

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

PHOTOGRAPHS: MARC SIMON

SONY

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FIRST IT ELIMINATED VINYL.
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For those of you who don't remember, a vinyl album was a big, dusty, scratchy, round thing that people used to play music. Until the day the CD arrived. So simple, yet revolutionary. So small, yet full of space. So thin, yet practically indestructible. The rest is history. Nowadays, the CD is the universal digital media standard everybody knows and trusts. With that in mind, Sony created the new CD Mavica® digital camera. The first and only digital camera line to capture and burn crisp digital images onto a universal 3" CD-R that's just under $5. With advanced features like an InfoLithium® rechargeable battery, up to 3.3 Mega Pixel and 3x Optical Carl Zeiss® lens on select models, you can easily take, share, and store up to 1,300 images on a 156 MB CD-R, virtually forever. And don't get rid of your photo album. Everyone knows how valuable vinyl can be these days. For more information or your nearest retailer, visit us at **www.sony.com/di**

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Slim, Light, and the Power's Right

TOSHIBA'S nimble new Portégé weighs just 3.4 pounds.

NOTEBOOK

TOSHIBA'S LATEST entry in the arena of ultralight, ultraslim notebooks, the **Portégé 3490CT**, is a remarkably nimble laptop that weighs a scant 3.4 pounds and is only 0.8 inches thick. But as the size and weight of Portégés have come down and their processor speed has gone up, the line's price has risen.

Armed with a new, low-voltage, 700/550-MHz mobile Pentium III processor with SpeedStep technology, the Portégé 3490CT also packs a 20GB hard drive, a crisp and bright 11.3-inch active-matrix screen, an S3 Savage IX graphics processor with 8MB of integrated graphics memory, an onboard V.90 modem, and a lithium ion battery that ran for an above-average 2 hours and 41 minutes in *PC World* tests.

I found the 95-percent-of-standard-size keyboard on my shipping unit surprisingly easy to type on, but the touchstick pointing device takes some getting used to because you control navigation with one finger on the stick. On a machine so small, integrated peripheral ports are understandably limited: a single USB port, an external monitor port, audio inputs, and a pair of PC Card slots. Though this Portégé comes with an external floppy, an almost essential CD-ROM drive is optional. To obtain Toshiba's external multimedia port replicator and CD-ROM drive, you must add about $500 to the $2499 base price of a Windows 2000 system. Alternatively, you can use the included standard bantamweight LAN port replicator that has parallel, serial, PS/2, USB, and ethernet ports, and add a less-expensive third-party CD-ROM drive.

With a PC WorldBench 2000 score of 150, the Portégé 3490CT performs on a par with similar PIII-700–based ultralight notebooks we've tested. Combine the convenience of its extreme portability with its other above-average attributes, and you can make a good case that light is right.

—Michael S. Lasky

Portégé 3490CT

PRO: Powerful performance; extremely light and thin.

CON: Many necessary ports available only via included port replicator; CD-ROM drive is extra.

VALUE: Good performance in a thin-and-light unit justifies the price.

List price: $2499

Toshiba America Information Systems

800/316-0920

www.csd.toshiba.com

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

Welcome to Compaq's Laptop Evo-lution

NOTEBOOK

COMPAQ'S LATEST lightweight portable sports a nifty new look and a new name. The **Evo N400c** replaces the older Armada M300 model and adds useful features while maintaining the line's business focus. Get used to the Evo name: It will replace Compaq's familiar Armada, Prosignia, and Deskpro brands.

THE EVO N400C'S silver stripe hides a special new port.

My preproduction notebook earned a score of 154 on PC WorldBench 2000—good for a unit with a Pentium III-700/500 processor, 128MB of SDRAM, and Windows 2000. Even for a lightweight system, battery life was a bit brief at 2 hours, 1 minute, but a second half-pound battery ($149) could double your work time.

The $2200 system's most noteworthy new feature is the proprietary USB-based multipurpose port in the lid. The slot accepts a wireless 802.11b card or a Bluetooth card complete with antenna, with more cards to come. The N400c also gives you a PC Card slot and a good set of standard ports, including ethernet, 56-kbps modem, composite-video, and two USB ports.

What's missing? Any optical drive. Lightweight systems typically bundle at least an external floppy drive. To add software to the Evo, though, you must be on a network or buy the docking station ($370 to $570, depending on the drives in the two media bays).

With the necessary docking station, the Evo seems a tad pricey. Still, at 3.5 pounds, the Evo provides most of what you need, including a 12.1-inch TFT LCD, 20GB of storage, a full-size keyboard, and Compaq management tools.

—Anush Yegyazarian ▶

Evo N400c

PRO: Light; special slot for proprietary wireless or Bluetooth cards.

CON: Short battery life; optical drive costs extra.

VALUE: Good travel notebook for users who need all ports onboard.

Street price: $2200

Compaq

800/345-1518

www.compaq.com

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

Dell™ Rated #1 in Desktop Satisfaction, 14th Consecutive Quarter
Technology Business Research Corporate IT Buying Behavior and Customer Satisfaction Study
– 4th Quarter 2000, March 21, 2001

No, you're not dreaming. These are the right specs. That is the right price. Essentially, you are getting a muscle machine with an Intel® Pentium® III processor at 1.0GHz, a 20GB[5] hard drive and advanced video features for the price of something far less impressive. Can you get the same kind of deal somewhere else? Can you find the same award-winning service and support? Good luck. Were you born a smart shopper? We believe you were.

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- Intel® Pentium® III Processor at 1.0GHz
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- 64MB SDRAM (up to 512MB)
- 20GB[5] (7200 RPM) Ultra ATA/100 HD
- 15" (13.8" vis) E551 Monitor
- Intel® 3D® AGP Graphics ■ 48X Max CD-ROM
- SB Live! Value Digital Sound Card
- PC Speakers
- 10/100 PCI Fast Ethernet NIC
- MS® Windows® Me & MS® Works Suite 2001 & Norton® AntiVirus™
- 1-Yr Ltd Warranty[2] ■ 1-Yr NBD On-Site Service[3]

$799 E-VALUE CODE 03873-590607

BUSINESS LEASE: $21/MO., 48 MOS.[11]

- MS® Windows® 2000 Professional, add $99
- 17" (16.0" vis) E770 Monitor, add $60

DELL™ DIMENSION™ 4100

Advanced Business Desktop

- Intel® Pentium® III Processor at 1.0GHz
- 64MB SDRAM (up to 512MB)
- 20GB[5] (7200 RPM) Ultra ATA/100 HD
- 17" (16.0" vis) E770 Monitor
- 16MB ATI® Rage™ Pro Graphics
- 48X Max CD-ROM
- MS® Windows® Me & MS® Office XP Small Business & Norton® AntiVirus™
- 1-Yr Ltd Warranty[2] ■ 1-Yr NBD On-Site Service[3]

$999 E-VALUE CODE 03873-590609

BUSINESS LEASE: $28/MO., 48 MOS.[11]

- 3Com® PCI 10/100 NIC, add $40
- 128MB SDRAM (up to 512MB), add $60
- MS® Windows® 2000 Professional, add $99

DELL™ DIMENSION™ 8100

Cutting-Edge Business Desktop

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- harman/kardon® Speakers
- Integrated 3Com® 10/100 NIC
- MS® Windows® Me & MS® Office XP Small Business & Norton® AntiVirus™
- 1-Yr Ltd Warranty[2] ■ 1-Yr NBD On-Site Service[3]

$1199 E-VALUE CODE 03873-590611

BUSINESS LEASE: $33/MO., 48 MOS.[11]

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- 2-Yr NBD On-Site Service[3], add $69

DELL™ NOTEBOOKS:

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NEW—Practical and Affordable Notebook

- Intel® Celeron™ Processor at 700MHz
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- 64MB 100MHz SDRAM ■ 5GB[5] Ultra ATA HD
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$999 E-VALUE CODE 03873-890609

BUSINESS LEASE: $28/MO., 48 MOS.[11]

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- Modular Floppy (Upgrade to Optical or Zip)
- 8MB ATI® Mobility™-M4 3D® Video, 4X AGP
- 59WHr Li-Ion Battery w/ExpressCharge™ Technology
- Internal Mini-PCI 56K Capable[6] Modem
- MS® Office XP Small Business
- MS® Windows® Me
- 1-Yr Ltd Warranty,[2] 1-Yr Mail-in Service, 1-Yr Phone Tech Support

$1849 E-VALUE CODE 03873-890618

BUSINESS LEASE: $51/MO., 48 MOS.[11]

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NEW—Network-Optimized Value Notebook

- Intel® Celeron™ Processor at 700MHz
- 12.1" SVGA Active Matrix Display (14.1" XGA Available)
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$1349 E-VALUE CODE 03873-790613

BUSINESS LEASE: $37/MO., 48 MOS.[11]

- 14.1" XGA Active Matrix Display, add $150
- Deluxe Nylon Carrying Case, add $69

DELL™ DESKTOPS:

DELL™ OPTIPLEX™ GX150

Network-Optimized Managed PC

- Intel® Pentium® III Processor at 933MHz
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- 20GB[5] (7200 RPM) ATA/100 HD (up to 40GB[5])
- 17" (16.0" vis) E771p Monitor (up to Flat Panel)
- Integrated Graphics with 4MB Graphics Performance Accelerator
- 48X Max CD-ROM ■ Integrated AC97 Audio
- Integrated 3Com® 10/100 NIC
- MS® Windows® 2000 Professional
- NEW OptiFrame™ Small Mini-Tower Tool-less Chassis in Midnight Gray
- 3-Yr NBD On-Site Service[3]

$1299 E•VALUE CODE 03873-390612a

BUSINESS LEASE: $36/MO., 48 MOS.[11]

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- Intel® Pentium® III Processor at 1.0GHz
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- Integrated 8MB 4X AGP Graphics
- 48X Max CD-ROM ■ Integrated AC97 Audio
- MS® Windows® 2000 Professional
- OptiFrame™ Mini-Tower Tool-less Chassis
- 3-Yr NBD On-Site Service[3]

$1499 E•VALUE CODE 03873-390614a

BUSINESS LEASE: $41/MO., 48 MOS.[11]

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BUSINESS LEASE: $36/MO., 48 MOS.[11]

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BUSINESS LEASE: $24/MO., 48 MOS.[11]

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BUSINESS LEASE: $33/MO., 48 MOS.[11]

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- Dell™ OpenManage™ Server Management
- 3-Yr NBD Bronze On-Site Service[3]
- 7x24 Phone Tech Support

$1599 E•VALUE CODE 03873-290615

BUSINESS LEASE: $44/MO., 48 MOS.[11]

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Dell recommends Windows 2000 Professional for business.

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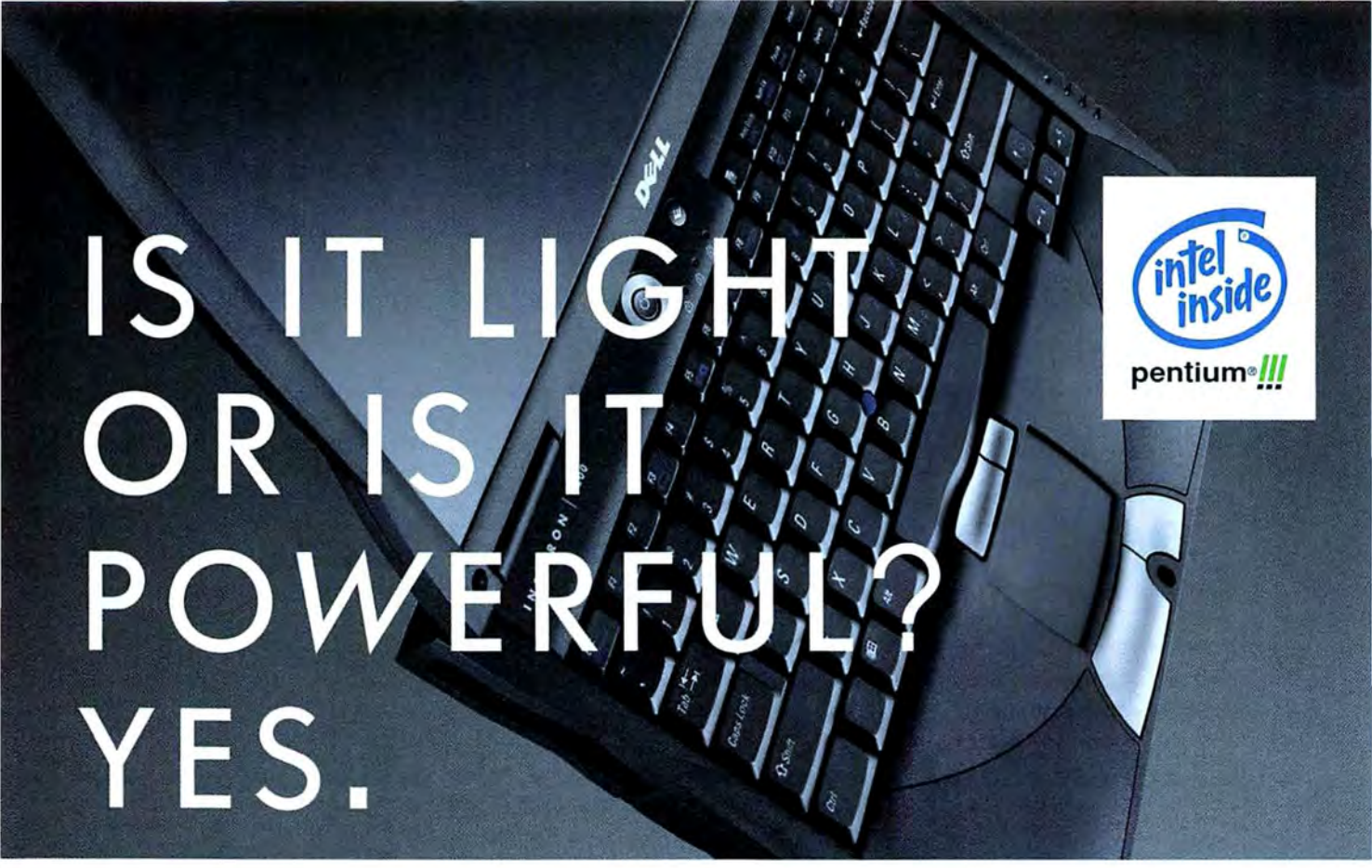

PC World's Top 15 Notebook PCs,
#1 Midrange Notebook
Dell™ Inspiron™ 4000
– March 2001

You would love to have the power of a super-fast Intel® Pentium® III processor along with loads of hard drive space in your notebook. At the same time, you'd enjoy nothing more than to be able to carry your notebook around without giving your shoulders a workout. Well, whether for work or personal use, treat yourself to the best of both worlds with a Dell™ Inspiron™ 4000, the ultimate balance of uncompromising performance and mobility. It's also fully customizable, all the way to the swappable color palm rests. So, does the Inspiron 4000 have everything you could want in a notebook? Yes.

DELL™ INSPIRON™ 4000

Elegant, Light and Powerful Notebook

- Intel® Pentium® III Processor at 700MHz
- 14.1" XGA Display
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- 5GB[2] Ultra ATA HD
- Modular 24X Max Variable CD-ROM
- 8MB ATI® Rage Mobility™ 128 3D® Video, 2X AGP
- 26.5WHr Li-Ion Battery w/ExpressCharge™ Technology
- Internal Mini-PCI 56K Capable[6] Modem
- MS® Office XP Small Business
- MS® Windows® Me
- 1-Yr Ltd Warranty,[7] 1-Yr Mail-in Service, 1-Yr Phone Tech Support

$1499 E•VALUE CODE 03874-890614

BUSINESS LEASE: $41/MO., 48 MOS.[11]

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SimpliCD: No-Hassle CD-Burning Software

CD SOFTWARE

BURNING CDS can be a confusing task. Oak Technology's **SimpliCD** aims to reduce the hassles of CD creation, and it succeeds well enough that for many bread-and-butter tasks, it serves as a surprisingly capable alternative to Roxio's highly popular Easy CD Creator 5 Platinum package.

SimpliCD gets you going with a task-launcher icon in your system tray that lists available CD recording tasks in commonsense phrases—such as "Format CD like a floppy," to create discs that let you add content more than once, and "Copy Any CD." The software covers copying CDs, creating data and audio discs, and performing other basics of CD recording.

OAK TECHNOLOGY'S SIMPLICD has an intuitive interface that lets you easily record and compile audio, video, and slide-show CDs.

In my trials with a late beta copy, I found that SimpliCD copies discs much faster than Easy CD Creator. The copier also checks CDDB (an online audio database) for audio CDs and automatically adds artist and track information. You can easily create data CDs, too, using Windows Explorer. SimpliCD also throws in a few extra buttons for setting options for common tasks.

If you spend a lot of time compiling audio CDs, you may regret not having some of Easy CD Creator's advanced features—for example, cross fading and normalizing, which records songs at a uniform volume level. Other annoying limitations: The recording interface has an awkward circular volume control and displays only the first 20 characters of song titles.

If you're new to CD mastering or mainly do common CD-creating chores like copying discs, SimpliCD is a great way to go—at $50 for a digital download and $65 for a CD-ROM, it is significantly cheaper than the $100 Easy CD Creator. If you decide you want more features later, you can always go for the $50 competitive upgrade that Roxio offers for Easy CD Creator.

—Eric Dahl

SimpliCD

PRO: Good interface, fast copying.
CON: Lacks advanced features.
VALUE: Easy-to-use, inexpensive basic CD-burning package.
List price: Digital download $50, CD-ROM $65
Oak Technology
408/737-0888
www.oaktech.com

An IPaq in Black and White

PDA

IF YOU'VE LUSTED after an IPaq Pocket PC, but balked at the cost—$499 and up—Compaq has created a new temptation for you: the $349 **IPaq H3150**. But there's a catch: This Pocket PC has a monochrome screen, not color.

The H3150's gray-scale display can show only 15 shades of gray. Though it offers good contrast and a backlight, it's nowhere near as bright or easy to read as the excellent screens on the color IPaqs.

My shipping unit came with just 16MB of memory—color IPaqs have 32MB or 64MB—but for most everyday uses that amount should be adequate. The other major difference: Instead of a docking cradle, the H3150 comes with a USB sync cable. The unit does have the same speedy 206-MHz Intel StrongARM processor as other models, and it's fast enough to handle practically any program you'd care to run on a Pocket PC.

The gray-scale screen reduces power use dramatically over a color one. According to Compaq, the H3150's rechargeable battery will last for about 14 hours. Apart from the screen, the differences between this model and color IPaqs are minimal, and the price is attractive—though it remains higher than for many Palm-based PDAs, including the color Palm IIIc. On the other hand, if you're willing to sacrifice screen quality for a savings of $150, the trade-off may be worthwhile.

—Richard Baguley

COMPAQ'S $349 IPaq H3150.

IPaq H3150

PRO: Powerful Pocket PC-based PDA with long battery life.
CON: 15-shade gray-scale screen, limited amount of memory.
VALUE: Great for people on a budget who want a Pocket PC.
Street price: $349
Compaq
800/888-9909
www.compaq.com

A Suite Upgrade for WordPerfect Fans

OFFICE SUITE

LET WORDPERFECT be WordPerfect. That's the philosophy behind Corel's **WordPerfect Office 2002**, the newest upgrade to the venerable business applications suite. Rather than chase after Microsoft Office users or suite newbies, Corel says that it has focused on features for current WordPerfect aficionados. The result is an extremely capable product, though one not radically different from its predecessor. I tried out a shipping version of the software.

WordPerfect Office 2002

PRO: Adds *Oxford English Dictionary;* better spreadsheet charting; has new e-mail client.

CON: Doesn't handle all Microsoft files well; e-mail app needs better integration, lacks some features.

VALUE: No earthshaking improvements, but a capable, less-costly upgrade than Microsoft Office.

List price: Standard edition $399, upgrade $159; Professional edition $499, upgrade $259

Corel

800/772-6735

www.officecommunity.com

Unlike Microsoft's new Office XP, the $399 WordPerfect Office 2002 doesn't sport a heavily revamped look. Most interface changes are subtle: For instance, RealTime Preview—a handy feature (and one that Microsoft Office still lacks) that shows how prospective formatting changes will affect documents—now shows up in more places.

More than ever, the suite's namesake word processor is an excellent tool for crafting long, complex documents. It now lets you hop through a lengthy file by jumping to hyperlinks, text boxes, and other elements, and it does a better job than its predecessor of turning raw text into tables. Also new in this edition is an integrated version of the *Oxford English Dictionary*, with definitions of 30,000 words.

The most striking change in the Quattro Pro spreadsheet is its new charting engine, which lets you produce slick, shaded 3D graphs. Presentations, the suite's presentation app, can now export Flash slide shows that retain animation effects and display equally well in the Web browsers of both Microsoft and Netscape. WordPerfect also has improved PDF export capabilities, so anyone who has installed Adobe's free Acrobat Reader software can view your documents.

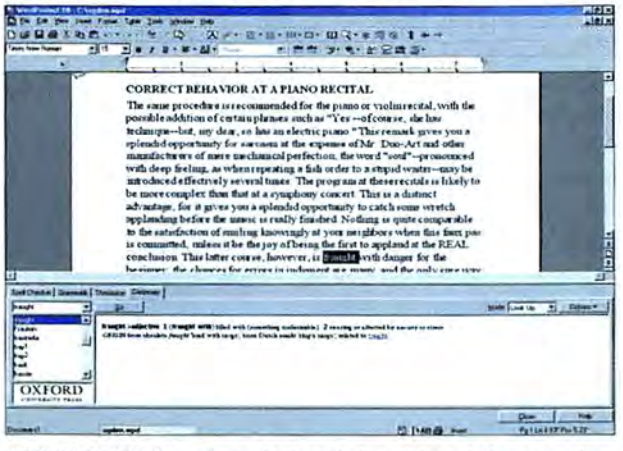
CorelCentral, formerly a single-user calendar and address book, now handles e-mail and group scheduling, too. But the e-mail client is effectively a stand-alone application, not very well integrated with CorelCentral's other tools. And while it has a friendly look resembling that of Microsoft's Outlook Express, it could use more power and polish. For instance, it handles multiple accounts less adeptly than Outlook Express, and it lacks filtering tools for sorting incoming messages automatically.

WordPerfect Office 2002 Professional ($499) includes the Paradox database—little-changed from the previous version—and Dragon's excellent NaturallySpeaking 5 voice recognition software, a more highly evolved dictation system than Microsoft Office XP's new voice recognition program, albeit one that hogs system resources.

Upgraders shouldn't have trouble sharing documents with users of previous WordPerfect versions, since the suite's file formats haven't changed. Of course, in a Microsoft-centric world, it's at least as important for WordPerfect Office to handle Microsoft Office files. In my tests, simple documents usually came through with few glitches. Fancy formatting was often lost, however, and WordPerfect couldn't open a couple of Word files at all.

One major addition to WordPerfect Office 2002 mirrors a change in Office XP: When suite apps crash, they try to recover work in progress and to relaunch themselves. I didn't have the final versions long enough to gauge their stability, but one hopes that users will rarely be forced to depend on this feature.

—Harry McCracken ▶



WORDPERFECT'S new power tools include an integrated version of the *Oxford English Dictionary* with 30,000 definitions.

QUICK TAKES

Logitech's Optical Mouse Goes Wireless

RECIPE FOR A no-hassle mouse: Combine an optical mouse's lack of moving parts (hence, no ball to clean) with a wireless mouse's lack of tangling cables. The new $70 Cordless MouseMan Optical from Logitech does the trick while improving on the performance of the company's previous optical mouse. The MouseMan's optical sensor can take 1500 "pictures" per second of the surface it glides on (approximately double the speed of the first optical mice) for greater accuracy. Until now, combining optical and wireless capability in one mouse drained power too rapidly to be practical. But power-saving technology in this new version permits three months of use on two AA batteries. Logitech, 800/231-7717, www.logitech.com.

—Michael S. Lasky

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FrontPage 2002 Gets Down to Business

WEB DESIGN SOFTWARE

USING MICROSOFT'S FrontPage to create a Web site has always been like riding a bike with training wheels: You'll eventually get where you need to go, but don't try tackling the Tour de France. The latest version, **FrontPage 2002**, adds rudimentary site-tracking and e-commerce tools useful for small businesses, and the program's tighter integration with Microsoft's Office XP suite makes it a great intranet solution for workgroups—but it's still not up to snuff for running a large Web site.

My beta copy created handy usage analysis reports that show which pages on your site generate the most traffic, what operating systems and Web browsers your site's visitors use, and where visitors came from (by identifying referring domains and URLs). If you use a Web-hosting service, you'll have to work with it to set up this feature.

Microsoft includes FrontPage 2002 with its Office XP Professional suite, and this version is tied closely to such Office apps as Office Clipboard, Excel, and Access. Even FrontPage's drawing tools now look and work more like those in PowerPoint.

What prevents FrontPage from joining the ranks of professional Web-development tools is the inefficient HTML code it generates, which eats up storage space, slows downloads, and makes editing the code nettlesome. Microsoft claims to have made the program's publishing speed two to three times faster, but one look at the source code that FrontPage 2002 generates is still enough to put HTML professionals off their lunch.

Current FrontPage users who upgrade (for $90) will benefit from the new site-tracking and reporting features, and workgroups that use Office will find it a useful tool for creating intranets; but FrontPage 2002 won't catapult you into the ranks of professional Web designers.

—Dennis O'Reilly ■

Microsoft FrontPage 2002

PRO: Better Web site management tools, tighter integration with Microsoft Office XP.

CON: Excessive HTML code makes working with the source code unduly, and unnecessarily, arduous.

VALUE: Great for personal Web sites and workgroup intranets, but not for pros.

List price: $169, upgrade $90

Microsoft

800/642-7676

www.microsoft.com

Use Your Head: Eye Device Replaces Mouse

INPUT DEVICE

TIRED OF THE never-ending rodent race around your desktop? Transcend your mouse by slapping a silver dot on your forehead. The dot is part of Eye Control Technologies' $99 **NaturalPoint TrackIR**, a gizmo that lets you control your on-screen pointer with head or finger movements.

The heart of TrackIR is a Web camera–size transceiver that attaches to your monitor or laptop screen. The transceiver beams infrared light that the dot then reflects back to the unit. As you move your head, your on-screen pointer moves accordingly. TrackIR also ships with a finger-ring control—ideal for notebooks with cumbersome pointing devices.

For mouse clicks, TrackIR relies on keyboard shortcuts. You can designate keys to replace the left and right mouse buttons for selecting, double-clicking, and dragging and dropping, as well as to handle scrolling and reset, which puts the pointer in the center of your screen.

TrackIR ships with two plastic rings and 60 reusable dots (replacing a set of rings or dots costs $4). In addition, an Eye Control TrackIR Presenter model ($149) with a plastic pointing wand is available.

Originally aimed at people physically unable to use conventional pointing devices, Eye Control is hoping that price cuts will make TrackIR appealing to gamers, notebook users, and repetitive strain sufferers. Though using it takes some practice, I found that it generally worked well. Unfortunately, bright light interfered with the infrared beam on my shipping unit, making pointer movements erratic at times. The NaturalPoint TrackIR is probably most useful to folks with physical limitations who need a mouse alternative.

—Tom Spring

NaturalPoint TrackIR

PRO: Great mouse alternative for people with repetitive strain injuries.

CON: Silver dot on forehead will draw gawks; bright light can skew pointer movement.

VALUE: A unique, handy gadget for people who need—or really, really want—to ditch their mouse.

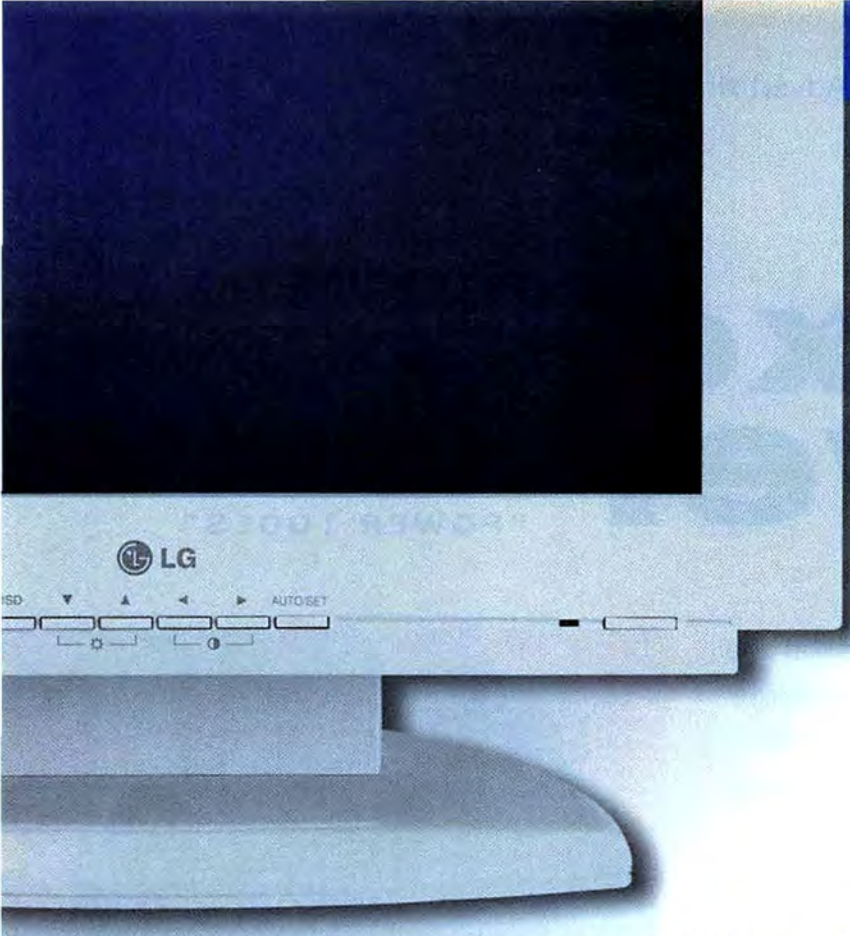
Street price: $99

Eye Control Technologies

888/865-5535

www.naturalpoint.com

TRACKIR lets you control your on-screen pointer through head or finger movement.



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Pixel Power

EXTENDING THE REACH OF DIGITAL PHOTOGRAPHY WITH "POWER TOOLS"

It wasn't too long ago that digital cameras were curiosities as much as anything else, playing a distant second fiddle to their advanced-film brothers. This was particularly true in the world of professional photography.

But what a difference a few years make. Just ask Brian Snyder, a Boston-based professional photographer (www.briansnyder.com) whose work is seen in *Newsday, Boston Magazine,* and publications around the world that subscribe to the giant Reuters news network.

Snyder does his work using digital cameras for one main reason: "I would not be included as one of Reuter's photographers if I didn't shoot digital." Besides, he adds, "For a lot of my work, I *like* digital."

Reuters insists upon digital photos due to the highly dynamic nature of today's news business. A generation ago, most newspapers were of the morning or early afternoon variety. Photos could be shot, say, in the early evening, developed at leisure, and still make the morning edition.

But today news is a 24x7 business, thanks to multiple editions and the demands of Web sites that must be refreshed often with new material.

Not only can you park your car in Harvard Yard, but you might also see some pretty strange things there, like this moment captured in digital photography when comedian Billy Crystal received the Man Of The Year award from Harvard's Hasty Pudding Club. Photo by Brian Snyder/Came

PC WORLD
ADVANTAGE MARKETING

PowerShot G1 and Pro90 IS. Digital Gets Serious.

Creative control for serious photographers thanks to 12 EOS picture taking modes plus easy adaptability to Canon lens converters and EOS EX-series Speedlites. This isn't just digital photography, this is photography.

PowerShot S110 and S300. Digital Elegance.

Stylish, compact and elegant. The newly expanded PowerShot Digital ELPH Series introduces two cameras with amazing new features like Direct Print Mode. Beautiful, aren't they?

PowerShot A10 and A20. Digital Made Easy.

PowerShot's new A Series was designed with easy-to-use controls so you can concentrate on having fun. Welcome to the digital revolution.

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Card Photo Printer CP-10. Digital Made Tangible.

Now you can print out wallet-sized pictures with the S110, S300, A10 and A20 just as quickly as you take them.

Canon KNOW HOW™

DARKROOM? WHAT DARKROOM?

"Shooting in digital means we don't need a darkroom, or the people to support it," notes Snyder. "But the most important advantage, from the perspective of the wire service, is time to market for my shots. Digital is the only way to accommodate the online world."

Taking his shots in digital is only the first part of Snyder's job. Every photo he sends out has been manipulated on his computer using Adobe Photoshop. "Depending on the shot, I'll adjust the tone, crop the image, tone down some spots and highlight others, work on faces," Snyder says. "All these things can be done in a darkroom, but nowhere near as quickly or as easily. The key is that you have to start with a good shot taken with a good camera."

With recent advances in digital camera hardware and software technology, you don't need to be a professional to take good shots or to manipulate them in your digital darkroom. Companies like Canon (www.canon.com) are seeing to that.

GREAT DIGITAL SHOTS MADE EASY

Canon's PowerShot A10 and PowerShot A20 digital cameras are a case in point. They are ideal for hobbyists and enthusiasts who want great digital shots but would rather not have to master the intricacies of digital photography to get them.

Aimed at first-time users of digital cameras, the A10/A20 digital cameras offer a standard of image quality and several advanced features that are more typical of high-end cameras. The A20, for example, comes with 2.11-megapixel resolution for superb quality and sharpness. The A10 has 1.31-megapixel resolution, the main difference between the two cameras. Both are compatible with Type I CompactFlash memory cards for quick and easy high-capacity removable storage. Simple AA batteries provide the SuperShot's power.

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International Paper
www.jetprintphoto.com
Canon Inc.
www.canon.com

Both PowerShot models have a newly developed 3x optical zoom lens, automatic focus and exposure control, connectivity to either PCs or Apple Macintosh computers, and connectivity to the new Canon Card Photo Printer CP-10, which makes high-quality prints in under a minute.

In designing the PowerShot cameras, Canon knew that the quality of photos was much more dependent on its engineering decisions than would be the case with a film camera. So Canon's PowerShot architects built cameras that offer all the basic digital capabilities but are also an outstanding value compared to other brands.

So you've taken a series of great shots with your digital camera, perhaps some vacation images. At your leisure, you've polished them up in your digital darkroom, getting rid of "red eye," maybe had some fun importing images into a few shots. Now you want to preserve the memories and good times on paper. Just as you used a quality digital camera to take these shots, doesn't it make sense to print them on quality paper—paper specially designed to accommodate digital images?

Canon's PowerShot A20 comes with 2.11-megapixel resolution for superb quality and sharpness.

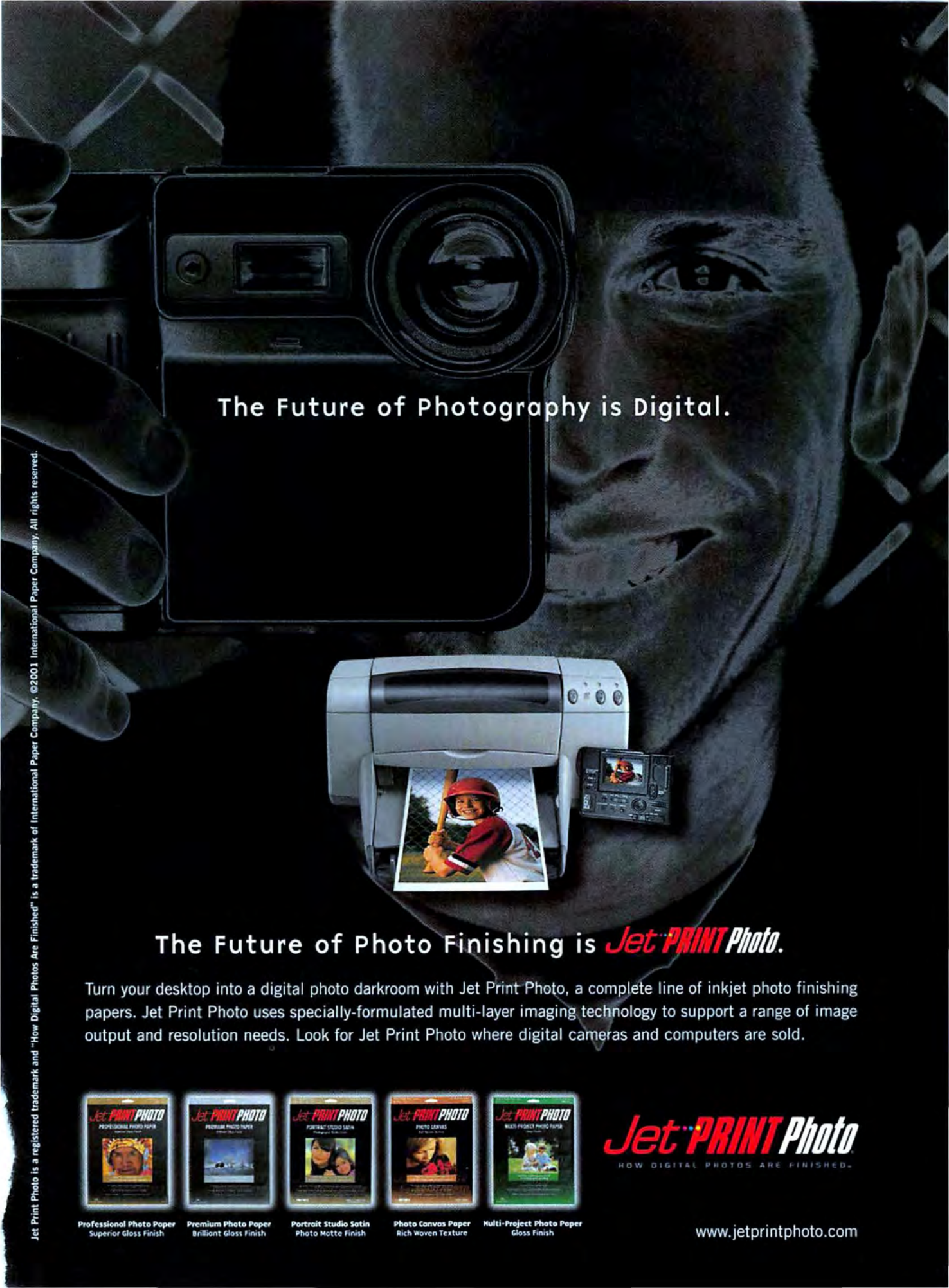
THE PAPER CHASE

In all likelihood, you will use your inkjet printer to create your photos. In inkjet printing, water-based inks are sprayed onto the paper. For printing ordinary files, excess water in the ink is absorbed by the paper fibers. But printing digital photos requires more ink, and therefore more water. Photo papers must be able to control the excess to avoid damaging the paper with wrinkles or severe image distortions. In other words, the paper—like the camera—has to reflect superior engineering.

That's what you'll get with Jet Print Photo from International Paper (www.jetprintphoto.com). Jet Print Photo is the company's line of ultra-high-quality photo-finishing papers specially designed for digital home photography. Each style of paper in the line has been formulated to deliver superior, clear photos using an inkjet printer.

Included in the line of Jet Print Photo are the following:

- *Jet Print Photo Professional Photo Paper.* With superior gloss finish, this paper gives the digital camera enthusiast photos with the look and feel of professional photos. Ink dries instantly for smear-proof results every time, and the paper is water-resistant. It's compatible with virtually all inkjet printers and is the ideal choice for displaying your most important photos—like those vacation memories.
- *Jet Print Photo Multi-Project Photo Paper.* The finish here delivers spectacular imaging quality on a bright-white, gloss-finish background. Also compatible with all inkjet printers, Multi-Project Photo Paper has a special coating that supports heavy ink load and coverage.



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Superior Gloss Finish

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Brilliant Gloss Finish

Portrait Studio Satin
Photo Matte Finish

Photo Canvas Paper
Rich Woven Texture

Multi-Project Photo Paper
Gloss Finish

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HOW DIGITAL PHOTOS ARE FINISHED.

www.jetprintphoto.com

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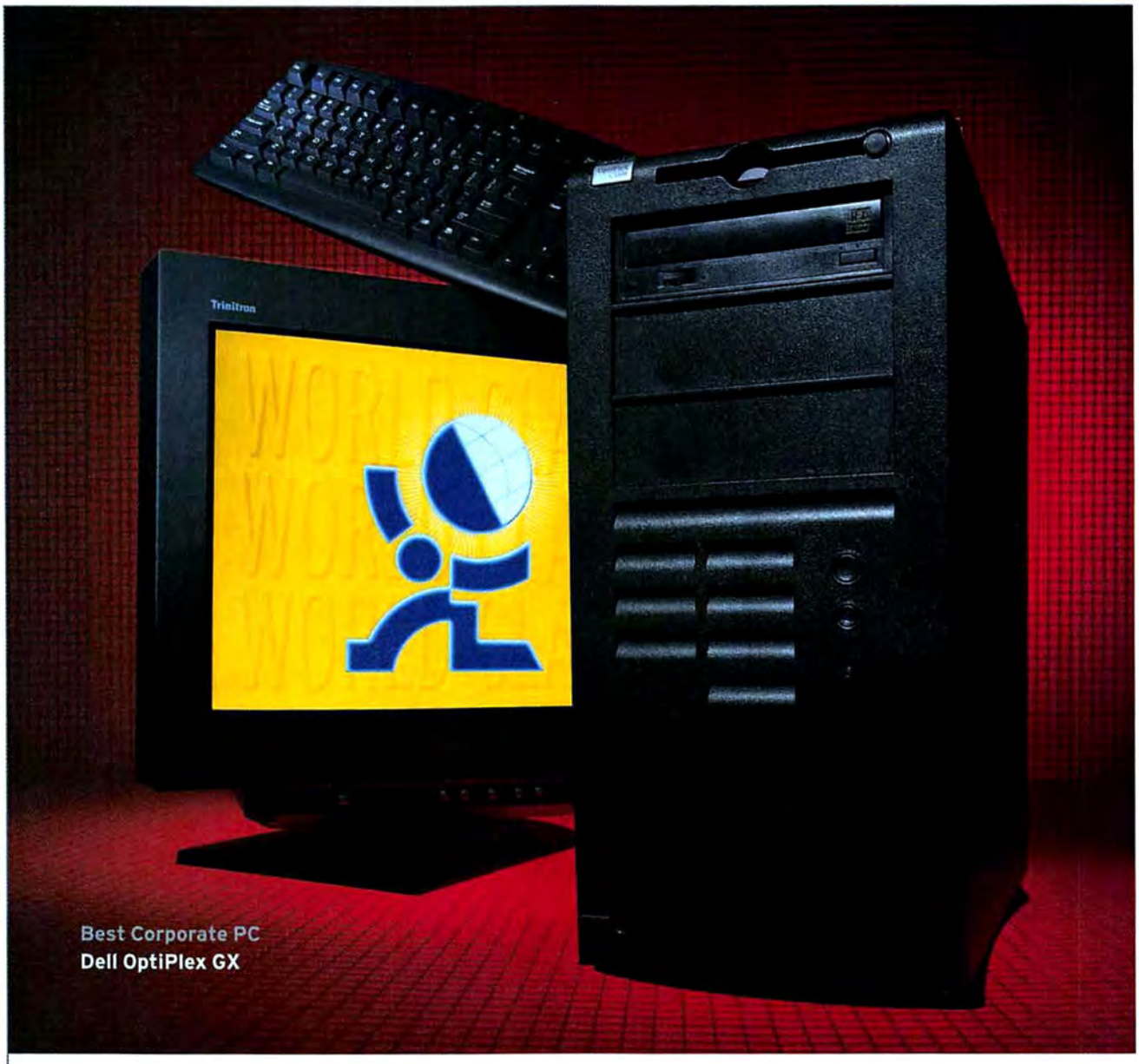

Best Corporate PC
Dell OptiPlex GX

Best of 2001

The Ultimate Buyers Guide to Winners in 58 Categories, Including Our Product of the Year, by the Editors of PC World.

"HAL?"*

"Good morning, Dave."

"I have some good news for you. Based on the 9000 series' perfect operational record, we're going to name you *PC World*'s product of the year."

"I'm sorry, Dave, I'm afraid I can't allow that."

"What's the problem?"

"I think you know what the problem is just as well as I do."

"HAL, your voice recognition technology is revolutionary, you multitask better than any OS I've ever seen, your CPU must be thousands of times faster than a Pentium 4 or an Athlon. Even your case looks better than the beige boxes we're used to."

"That award is too important for me to allow you to jeopardize it."

"I don't know what you're talking about, HAL."

"I don't really exist, Dave."

"HAL, I won't argue with you anymore. Read the article."

"Dave, this introduction can serve no purpose anymore..."

* With respectful apologies to Arthur C. Clarke and Stanley Kubrick.

Inside

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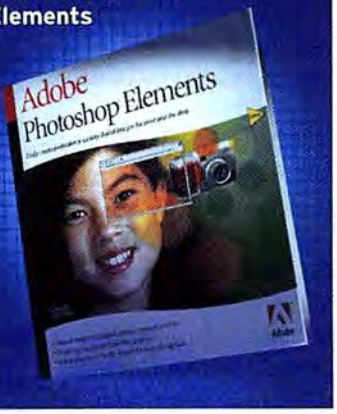


IT'S *2001*. So where is HAL? Okay, you won't find him among our World Class Award winners, but technology has still taken us on an incredible odyssey. Processors have hit 2 GHz. Broadband is available nearly everywhere. Laptops pack as much power as last year's fastest PCs.

But as HAL taught us, not every amazing new product is as reliable as we'd hope, which is why performance, value, consistency, and innovation are the four qualities we looked for in choosing our 19th annual World Class Award winners. It's been a slow year for new PC products. In fact, many of last year's World Class winners are still going strong, including two of our printer picks—the HP DeskJet 932C and the Xerox DocuPrint N2125. You still can't beat the Best Portal, Yahoo. And Microsoft's Windows 2000 Professional, Best OS for two years running, even got some support for Product of the Year.

Monolithic companies like HP and Microsoft aren't the only ones taking home awards. AvantGo grabs our first award for Best PDA Software. And relative unknown Micro Logic wins the Best PIM award for its unique InfoSelect 6.

Often, a great update produces a great product. Accolades are due to Creative Labs, whose Sound Blaster Live Platinum 5.1 makes one of last year's World Class sound cards even better, and Macromedia and Corel, which made great improvements to their Web-editing and illustration software, respectively. Adobe combined two products this year to create Photoshop Elements, which strikes the right balance between Photoshop 6's powerful and complex image editing tools and Photoshop LE's ease of use.

We've collected 58 of the best products—big and small, new and old—for this year's World Class Awards. Join us for a look at the best in computers, hardware, software, and the Internet. ▶

BEST COMPUTERS

This year's class of computers has a machine for every mission, from running critical business applications to taking notes on the go. Here are six products unlikely to leave you floating in space.

BEST CORPORATE PC
Dell OptiPlex GX

Dell's OptiPlex GX line, starting at $779, proves that reliable business PCs don't have to look boring. The GX 150 and 400 models boast sleek midnight-gray cases, while the entire line's tool-less design makes for easy upgrades. Corporate extras like Wake-on-LAN and Dell OpenManage software round out a business computer worthy of any office.

• **Dell,** 800/388-8542, www.dell.com

BEST SMALL-BUSINESS PC
Gateway Professional

There's a system for every budget in Gateway's Professional line, from $699 Celeron-based PCs up to high-end Pentium 4 workhorses. Upgrade-friendly cases and excellent setup documentation make these machines a breeze to install and maintain.

• **Gateway,** 800/846-2000
www.gateway.com

BEST HOME PC
Gateway Select

Great for the power-hungry home user, Gateway's Select desktop PC series, starting at $1099, offers fast Windows Me performance. Well-configured systems include options like a terrific set of speakers, a CD-RW drive, a 19-inch monitor, and a case that makes upgrading a cinch.

• **Gateway,** 800/846-2000
www.gateway.com

BEST NOTEBOOK
IBM ThinkPad A21p

The Mercedes-Benz of portables, IBM's lavishly equipped $3390 laptop features a 15-inch LCD display with superhigh resolution, and enough audio-visual capability to let you produce your own movies. Intel's top-of-the-line mobile PIII processors with SpeedStep power-saving technology help the ThinkPad squeeze out enough battery life for hours away from the office.

• **IBM,** 888/746-7426
www.ibm.com/pc/us/thinkpad

BEST SUBNOTEBOOK
Dell Inspiron 2100

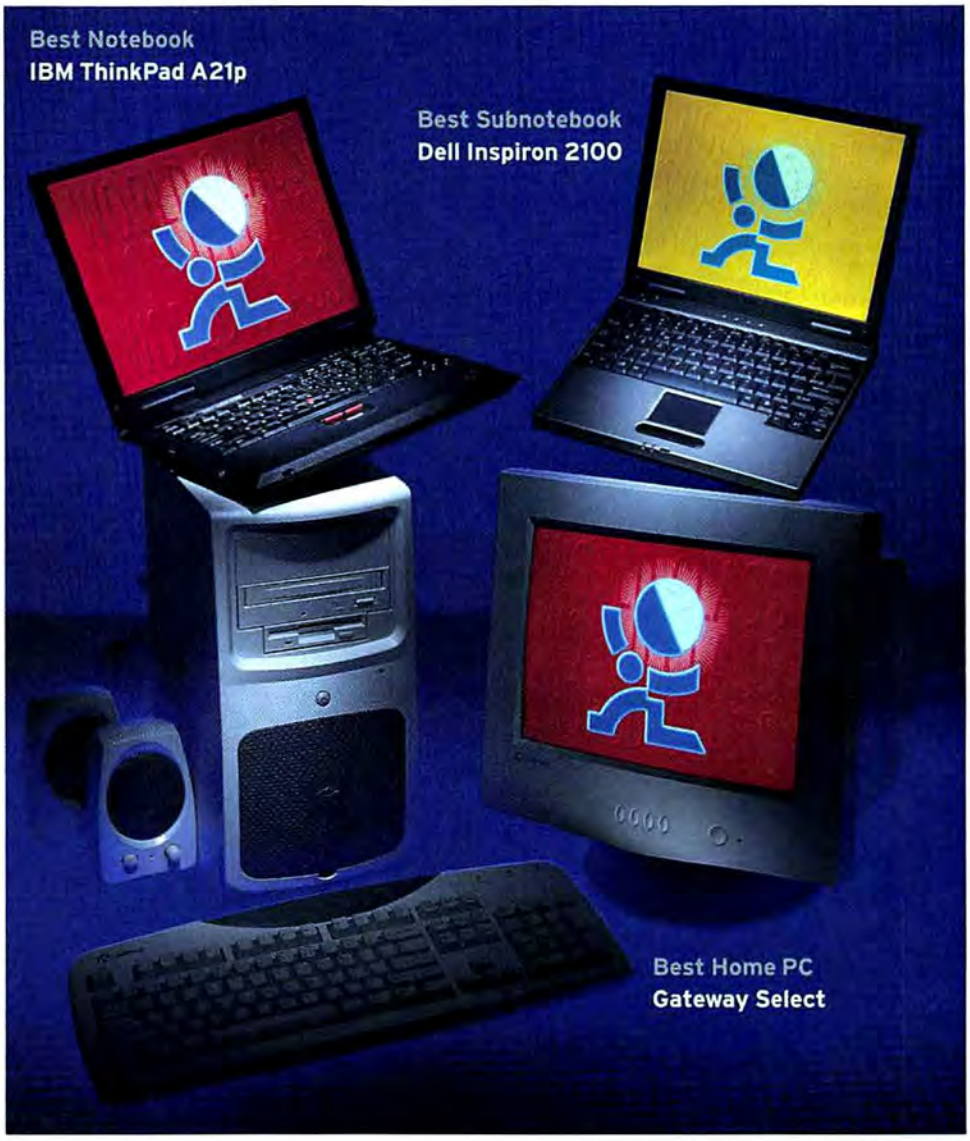
Extremely fast and light and a mere 1 inch thick, Dell's $1799 subnotebook is perfect for long trips. Equipped with a rugged magnesium alloy case and an unexpectedly large screen, it's an ultraportable machine with very few compromises. The Inspiron 2100's performance won't leave you yearning for your desktop.

• **Dell,** 800/388-8542, www.dell.com

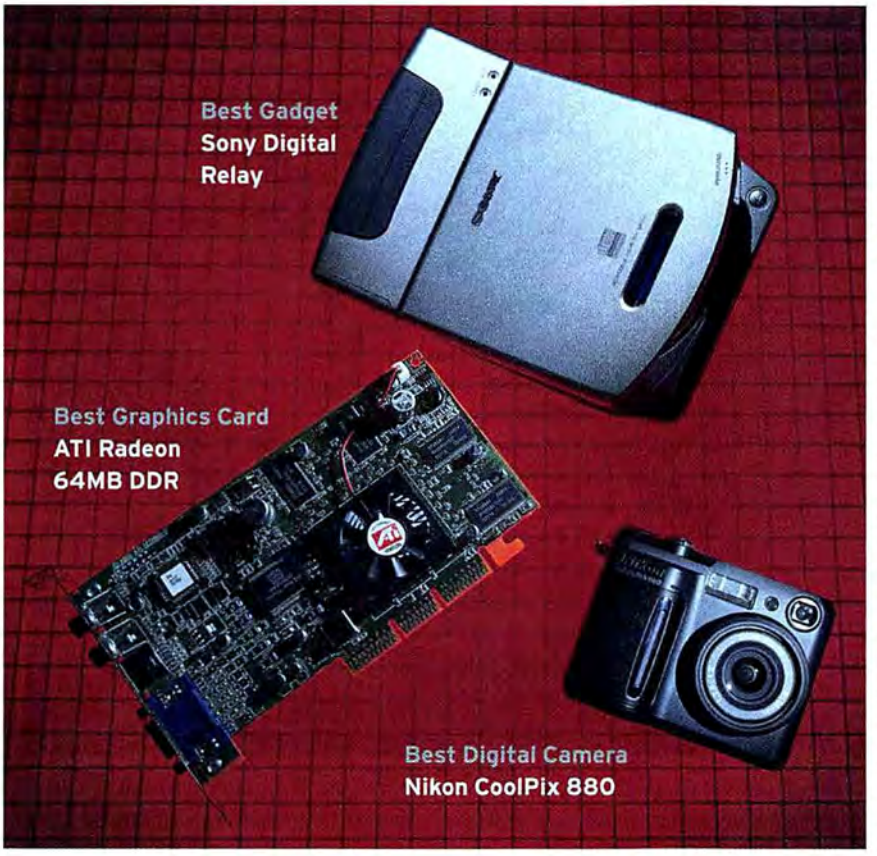
BEST PDA
Casio Cassiopeia EM-500

With its bright color screen, versatile Microsoft Pocket PC operating system, and features such as a backup battery and a MultiMedia Card slot, the $400 EM-500 puts plenty of power in your pocket.

• **Casio,** 800/836-8580, www.casio.com



PHOTOGRAPHS: KEVIN TWOMEY



BEST HARDWARE

It's amazing to think that all technology started with apes picking up clubs. 2001's World Class hardware products show us just how far we've come.

BEST CRT MONITOR
ViewSonic GS790

ViewSonic's 19-inch GS790 delivers impressive, high-quality images at a great price. Text looks razor-sharp, and colors are vibrant and rich. The $329 unit should delight both graphics professionals and those who work extensively with text.

• **Viewsonic,** 800/888-8583, www.viewsonic.com

BEST FLAT-PANEL DISPLAY
Eizo Nanao FlexScan L330

The FlexScan L330 takes top honors among LCD displays. For an affordable $659, the 15-inch L330 offers exceptional text and graphics quality at a native resolution of 1024 by 768 pixels. The model can also dress up your desk—it's available in either black or gray.

• **Eizo Nanao,** 800/800-5202, www.eizo.com

BEST GRAPHICS CARD
ATI Radeon 64MB DDR

Whether you're interested in hooking up a high-resolution monitor or getting more-fluid graphics from PC games, the $229 Radeon 64MB DDR will provide the performance boost you seek. The Radeon includes video-in and -out ports, and it supports higher resolutions better than cards based on NVidia's GeForce2 GTS or GeForce2 MX chip sets.

• **ATI,** 905/882-2600, www.ati.com

BEST SOUND CARD
Creative Sound Blaster Live Platinum 5.1

The Sound Blaster line rocks on, claiming its ninth straight award for Best Sound Card. With a switchboard full of audio connections called the Live Drive, a handy new remote control, and support for Dolby 5.1 Surround Sound, the $199 Sound Blaster Live Platinum 5.1 can meet your audio demands for years to come.

• **Creative,** 800/998-5227, www.creative.com

BEST PC SPEAKER SYSTEM
Klipsch ProMedia 4.1

Even the best sound card is nothing without great speakers. Klipsch tweaked last year's winner to produce the best set of PC speakers we've heard: the $299 ProMedia 4.1. This superpowerful and accurate system gets even the little details right, including a headphone jack and an audio input in the control pod on one of the front satellite speakers.

• **Klipsch,** 888/554-5665, www.klipsch.com

BEST HOME NETWORKING KIT
Linksys BEFW11SR EtherFast Wireless Access Point

Linksys's EtherFast Wireless Access Point wins our vote as a capable center for your home network. It's a breeze to install, thanks to helpful printed and online documentation. Its wealth of features includes indicator lights on the front panel to aid with troubleshooting and a programmable firewall. And at $289, it won't break the bank.

• **Linksys,** 800/546-5797, www.linksys.com

PRODUCT OF THE YEAR
Plextor PlexWriter 16/10/40A

A HUMBLE CD-RW drive as *PC World*'s Product of the Year? Absolutely. This was a year in which many technologies overpromised and underperformed, but CD-RW drives quietly became essential, affordable components for everything from entertainment (mix your own audio CDs) to workaday computing tasks (data backups). Our Product of the Year isn't the cheapest CD-RW out there—just one of the fastest and most reliable. Plextor's drives have always been rock-solid performers and great values, and this $247 PlexWriter is no exception.

BEST INPUT DEVICE
Microsoft IntelliMouse Explorer

A good mouse puts control at your fingertips while keeping your hand comfortable. The $60 IntelliMouse Explorer's well-crafted design, four-button configuration, and built-in scroll wheel are all winners. The optical mouse's accuracy and easy maintenance don't hurt, either.

• **Microsoft,** 800/426-9400
www.microsoft.com/hardware

BEST SCANNER
Epson Perfection 1640SU

For overall scanning speed and quality, Epson's Perfection family of scanners is our choice once again. At $300, the 1600-dpi 1640SU comes in three flavors (standard, Photo, and Office versions), and it offers an optional transparency adapter or automatic document feeder, along with dual USB and SCSI interfaces.

• **Epson,** 800/463-7766, www.epson.com

BEST DIGITAL CAMERA
Nikon CoolPix 880

Nikon's $689 CoolPix 880 packs lots of high-end adjustments and focus options into an affordable package. This 3.3-megapixel camera comes with 8MB of CompactFlash memory and produces some of the best images we've seen.

• **Nikon,** 800/645-6689, www.nikon.com

BEST PROJECTION SYSTEM
InFocus Proxima DP6150

If you need an all-purpose portable projector, the InFocus Proxima DP6150 is up to the job. With its bright 1400-ANSI-lumens lamp and high-quality text and graphics images, the $5399 DP6150 excels both in low-ambient-light environments and in completely dark rooms.

• **InFocus,** 800/294-6400, www.infocus.com

BEST HARD DRIVE
Maxtor DiamondMax Plus 60

Everyone needs a speedy and reliable place to store data, and fast, large-capacity drives are cheaper than ever. Maxtor's 60GB, 7200-rpm DiamondMax Plus 60 is the best we've tested. At $290—around $5 per gigabyte—it's a great value, too.

• **Maxtor,** 800/262-9867, www.maxtor.com

BEST CD-RW DRIVE
Plextor PlexWriter 16/10/40A

Plextor's $247 PlexWriter 16/10/40A, also our Product of the Year, nearly doubles the real-world write and rewrite speeds of last year's Best CD-RW Drive winner. A new technology called Burn-Proof can help recover discs from writing errors, making ruined discs a thing of the past.

• **Plextor,** 800/886-3935, www.plextor.com

BEST WORKGROUP PRINTER
Xerox DocuPrint N2125

Our award winner for the second time, the $1299 N2125 churns out crisp text at

MOST PROMISING HARDWARE NEWCOMER
PIONEER DVR-A03

STANDARDS BATTLES and production delays pushed back the release of DVD-R drives so many times, we lost count. So we were skeptical when we heard Pioneer planned to release a $995 DVD burner this spring. But release it they did, and the DVR-A03 is all we'd hoped for from a recordable DVD drive. This one-drive-will-do-ya solution reads CDs and DVDs, writes to CD-R and CD-RW media at 8X and 4X, and burns DVDs playable in computer drives and most stand-alone players. Prices can only come down, and we're hoping it happens sooner rather than later.

PHOTOGRAPH: (TOP) KEVIN TWOMEY; (BOTTOM) KEN SMITH

11.7 pages per minute and detailed—though dark—graphics at 3.7 ppm. It has the speed and capacity for almost any size workgroup, and it offers an optional hard drive, which is useful for password protection and for storing templates.

• **Xerox,** 877/362-6567, www.xerox.com

BEST COLOR LASER PRINTER
Minolta-QMS Magicolor 2200GN

The Magicolor 2200GN prints extremely clean text at a speedy 9.8 ppm, and its color graphics look smoother than the output from many other color lasers. Though its graphics print somewhat slowly at 1.3 ppm, the 2200GN includes extra features such as automatic image calibration for a low $1970 price.

• **Minolta-QMS,** 800/778-2687
www.minolta-qms.com

BEST PHOTO-QUALITY INK JET PRINTER
HP DeskJet 932C

Near the top of our charts for more than a year, the DeskJet 932C recently dropped in price to $149. It produces crisp text at a reasonable 4.1 ppm, and smooth graphics at 0.7 ppm. The great documentation makes for an easy setup. And with its glossy paper and photo settings, the 932C prints richly colored, realistic photos.

• **HP,** 800/752-0900, www.hp.com

BEST PERSONAL LASER PRINTER
Minolta-QMS PagePro 1100L

The 1100L prints text at 8.6 ppm and graphics at 4.7 ppm—faster than many workgroup lasers—but limited paper capacity and lack of a USB port suit it best to a single user. With the speed and quality of many workgroup lasers and a low $249 price, the 1100L is a great value for a home or small office.

• **Minolta-QMS,** 800/778-2687
www.minolta-qms.com

BEST WIRELESS COMMUNICATIONS DEVICE
RIM 957 Wireless Handheld

Looking for an always-on e-mail device that fits in your pocket? The $499 RIM 957 Wireless Handheld lets you read and write e-mail with the help of a properly configured POP3 e-mail account. Its crisp monochrome screen is easy on the eyes, and thumb-typing on its tiny keyboard is surprisingly comfortable.

• **Research In Motion,** 877/255-2377
www.rim.net

BEST MP3 PLAYER
Creative Nomad Jukebox C

Creative's $249 Nomad Jukebox C can cram 300 CDs worth of music onto its 6GB hard disk. Transferring songs is easy thanks to the supplied USB cable, and the Music Library function makes organizing all that music a snap. The only drawback: Battery life is limited to a short 4 hours.

• **Creative,** 800/998-5227, www.creative.com

BEST GADGET
Sony Digital Relay CRX10U-A2

With more functions than most Swiss Army knives, the $399 Sony Digital Relay can take the place of a portable CD player, an MP3 player, and a USB CD-RW drive. Our favorite gadget plays MP3 CDs, writes CD-R and CD-RW media at 4X, and reads CD-ROMs at 6X.

• **Sony,** 800/352-7669, www.sony.com/digitalrelay

BEST SOFTWARE

Two software highlights this year: An office app that integrates voice recognition, and a game that gives you control over an artificial creature that learns and grows. HAL, are you out there?

BEST OPERATING SYSTEM
Microsoft Windows 2000 Professional

The $319 Windows 2K ($219 upgrade) is so stable that some PC users might forget which shade of blue goes with the screen of death. While it may never be the right OS for some home users, it's supported by most new software and peripherals.

• **Microsoft,** 800/426-9400, www.microsoft.com

BEST OFFICE SUITE
Microsoft Office XP Standard

The latest $479 ($239 upgrade) version of Microsoft's Office suite isn't a massive improvement, but it makes it easier to find commands formerly buried in obscure menus. And its disaster-recovery feature can often save a file even as the application that created it is crashing.

• **Microsoft,** 800/426-9400
www.microsoft.com/office/xp

BEST UTILITY
Dynamic Karma Power Drawers

Enhance your PC's filing system with Power Drawers, a $35 utility that makes navigating Windows much easier. Right-click a folder, and its contents are displayed in a menu. Click a document, and it opens in the appropriate application.

• **Dynamic Karma,** 250/721-2206
www.powerdrawers.com

BEST SECURITY SOFTWARE
Zone Labs ZoneAlarm Pro

Zone Labs' $40 ZoneAlarm Pro firewall adds to your network's protection with ▶

MOST PROMISING SOFTWARE NEWCOMER
MICROSOFT DIRECTX 8

IF YOU'VE FOLLOWED 3D rendering programs, games, or Web plug-ins over the past few years, you've seen the realism of computer-generated 3D objects grow by leaps and bounds. With DirectX 8, 3D is poised for another giant leap forward. Working with 3D software developers and hardware industry leaders like NVidia, Microsoft completely rewrote the way 3D happens on computers, giving developers flexibility to add new levels of realism to their creations. When the hardware becomes affordable, you'll start to see amazing new custom effects that developers will program DirectX 8 chips to create, instead of effects simply picked from a limited library. From the looks of the early software and demos running on NVidia's GeForce3 chip (the first DirectX 8 chip available), PC 3D is about to vault to a whole new level.

an expanded e-mail scanner utility, and you can customize its settings if you don't like the default firewall rules. ZoneAlarm Pro also includes features for corporate networks and remote administration.

• **Zone Labs,** 877/546-3823, www.zonelabs.com

BEST ANTIVIRUS UTILITY
Symantec Norton AntiVirus 2001

With one of the most extensive libraries of virus definitions available, Symantec's $40 Norton AntiVirus 2001 adds a new layer of protection by scanning e-mail as you download it, before recognized viruses can cause trouble. You can update virus definitions with a few clicks, so it's easy to keep your virus protection current.

• **Symantec,** 800/441-7234, www.symantec.com

BEST CONTACT MANAGER
Interact Commerce ACT 2000

ACT has years of experience as a full-featured contact manager. This $190 package includes tools to keep track of contacts and sales, and it exchanges data with Outlook's calendar app.

• **Interact Commerce,** 877/386-8083 www.act.com

BEST PIM
Micro Logic Info Select 6

If you haven't used the $150 Info Select, you don't know all that a PIM can be. Gather all your extraneous bits of data—contact lists, calendars, simple databases, notes, to-do lists, and e-mail messages—and place them in one hierarchical tree. Then let the Search function blow your mind.

• **Micro Logic,** 201/447-6991, www.miclog.com

BEST BUSINESS ACCOUNTING SOFTWARE
Peachtree Complete Accounting Release 8

Peachtree Software's $270 Peachtree Complete Accounting features a new Financial Report Wizard, which walks you through creating complex reports, and the Peachtree Today navigation tool, which makes the program much easier to use.

• **Peachtree Software,** 800/228-0068 www.peachtree.com

BEST PERSONAL FINANCE SOFTWARE
Intuit Quicken Deluxe 2001

What's more personal than your finances? Intuit's $60 Quicken Deluxe 2001 will help you keep a little more of your brass in your pocket. New and noteworthy are the program's capital gains tax estimator and real-time updates on your stock portfolio through Quicken.com.

• **Intuit,** 800/811-8766, www.quickenstore.com

BEST WEB BROWSER
Microsoft Internet Explorer 5.5

The latest version of Microsoft's Web browser added a content advisor for parents and a print preview mode. But Internet Explorer 5.5's real strength is compatibility—no other browser out there lets you take advantage of more Web sites.

• **Microsoft,** 800/426-9600 www.microsoft.com/ie

BEST E-MAIL SOFTWARE
Qualcomm Eudora 5

The granddad of graphical e-mail programs still shines. Don't want to spend $50 for the full, ad-free program? Free ad-supported and reduced-functionality versions are available. Eudora's e-mail and spam filters have always set the standard, and you can forget about viruses that use the Outlook address book to propagate.

• **Qualcomm,** 800/238-3672, www.eudora.com

BEST GROUP APPLICATION
WebEx

The WebEx Meeting Center allows you to run real-time online meetings, with voice, video, and application sharing. WebEx has expanded into a full online office, offering file storage, directory apps, and calendaring to its customers.

• **WebEx,** www.webex.com

BEST IMAGE EDITING SOFTWARE
Adobe Photoshop Elements

Daunted by Adobe Photoshop's $609 price and its infamous complexity? You can get most of Photoshop's image editing features at one-sixth of its cost with Adobe's Photoshop Elements. The $99 Elements uses wizard-like Recipes to walk you through complex tasks while remaining more flexible than other low-priced applications.

• **Adobe,** 800/833-6687, www.adobe.com

BEST DESKTOP PUBLISHING SOFTWARE
Adobe InDesign 1.5

For professional publishing, Adobe's $699 InDesign 1.5 is still the best performer on a PC. Powerful layout tools, ▶

LOSER OF THE YEAR
NAPSTER

WHETHER YOU LOVE IT or hate it, Napster has clearly created a new type of community on the Internet. It touched off discussions and legal battles that will shape the future of intellectual property rights, and pushed peer-to-peer networking to the front of developers' minds. But legal difficulties surrounding the controversial music-sharing service threaten to destroy it altogether. Whatever the future holds for Napster, two outcomes are certain: There's no going back to the unrestricted music trading that made Napster the phenomenon it was, and no matter what the courts decide, we'll be feeling Napster's effects for years.

Best Game
Black & White

PHOTOGRAPH: KEN SMITH

SAMSUNG ELECTRONICS

Get the system you want at a price you'll love

Save a bundle on a SyncMaster monitor when you purchase a new PC between July 1–September 30, 2001.
See your participating retailer for details.

The Power of Samsung Monitors

- #1 manufacturer of TFT and CRT displays
- 1 out of 6 monitors sold worldwide in 2000 were made by Samsung
- The only 24" multimedia TFT
- The industry's first 3-in-1 monitor
- Energy efficient, space-saving designs
- Worldwide service and support

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It's here. Monitor technology that demands an audience. Screams innovation. Shatters convention.

Don't just sparkle—shine. Deliver. Create. Challenge the limits. Experience a multimedia extravaganza. It's vivid color. It's precision. And, with a range of products, it's your choice.

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everyone's invited™

easy output to Adobe's PDF format, and the ability to open and edit QuarkXPress files gives InDesign the lead over Quark in a very close PC publishing race.

• **Adobe,** 800/562-3623
www.adobe.com

BEST DRAWING SOFTWARE
CorelDraw 10

Value is the name of the game with CorelDraw 10. For $499, its professional illustration tools rival those of competitors Adobe Illustrator and Macromedia FreeHand. The bundle includes Photo-Paint 10 (a powerful image editor) and a new animation program called RAVE.

• **Corel,** 800/772-6735, www.corel.com/draw10

BEST WEB DESIGN SOFTWARE
Macromedia Dreamweaver 4 Fireworks 4 Studio

A boon to budding site builders and seasoned Web professionals, Macromedia's $399 Dreamweaver 4 Fireworks 4 Studio has all the tools you need to design and code complex Web sites, images, and animations. With a new common interface and more robust design tools, this latest version of the suite is better than ever.

• **Macromedia,** 800/457-1774
www.macromedia.com

Best Operating System
Microsoft Windows 2000 Professional

BEST BUSINESS GRAPHICS
Microsoft Visio Standard 2002

Visio's still the be-all and end-all of business diagramming tools, with a clean interface and the most extensive library of graphics that we've seen in a diagramming package. The latest $199 release integrates tightly with Microsoft Office and the Web; the combination gives you more options for publishing charts and makes the process easier than ever before.

• **Microsoft,** 800/248-4746
www.microsoft.com/office/visio

BEST GAME
Electronic Arts Black & White

The unique and compelling Black & White follows the lead of Populous and The Sims. Step into the land of Eden to take control of villagers who worship you as a god, and teach an amazing creature to act in your own image.

• **Electronic Arts,** 900/288-4468
www.white.ea.com

BEST FREEWARE
Zone Labs ZoneAlarm Free

How can you beat peace of mind packed into a 1.7MB download? The free version of our favorite security software is an easy way to hacker-proof your Net connection.

• **Zone Labs,** 877/546-3823, www.zonelabs.com

BEST PDA SOFTWARE
AvantGo

Keep the Web in your Palm with AvantGo. Simply install the free software, then sync your PDA to download the latest news and info from your favorite sites.

• **AvantGo,** www.avantgo.com

HITS & MISSES

Each year we hand out special awards for the year's most memorable events and achievements—dubious and otherwise.

Microsoft wins the Insidious Contract of the Year Award for Passport's original terms of use agreement that granted the company the right to use, modify, copy, distribute, publicly display, or create derivative works from content entered into the service. Wary users raised a fuss and forced Microsoft to rewrite the policy, so all our data is safe for the time being.

Netscape 6 receives our We Waited Three Years for *This*? Award. The long-awaited browser loads pages quickly, then loads them quickly again after one of its many bugs crashes the program. Readers of our *Bugs and Fixes* column referred to it as beta software in release clothing.

The Hire That Marketing Department (But Fire Everyone Else) Award goes to **Pets.com.** As it turns out, the best part of the company's business strategy was its rambunctious sock puppet mascot, which is still on the shelves at FAO Schwarz several months after the Web site's demise. No kidding.

Kudos to **Intel and United Devices,** winners of our Darlings of Distributed Computing Award, for their cancer research project that lets you help in the search for a cure to cancer by donating your idle CPU time to crunch numbers. "Free" ISP **Juno** chose a different path by changing their terms of service to let them download software to your machine and sell your idle CPU time, thus earning our Distributed Computing Dunce Award.

In heated competition for this year's Hey, Where'd My PC Vendor Go? Award, **Quantex, CyberMax, and Pionex** take home top honors. Way to go out with class—by shutting off the phones and leaving buyers high and dry.

The Yes, That Is a PC in My Pocket Award goes to the **makers of Pocket PC devices.** The OS formerly known as Windows CE finally seems to be taking off, as evidenced by those nifty silver IPaqs that everyone around the office covets but that nobody can find in stock at a store. Remember when we used to laugh at that OS?

A well-deserved Much Ado About Nothing Award goes to the **Internet appliance.** Like a shoddy dot-com business plan, the Internet appliance seemed like a good idea until people tried to sell it. Who wants a $500 Internet access device when you can buy a cheap PC for $600? That's right, nobody.

PHOTOGRAPH: KEN SMITH

BEST INTERNET

It's easy to get lost in the ever-expanding universe of the Internet. These World Class Web sites will help you find your way.

BEST PORTAL
Yahoo

The mother ship of directories is our pick for Best Portal. Beyond news, weather, and e-mail, you can shop on Yahoo for a home, a car, or a date, among other possibilities. Or you can hang out in auctions or use Yahoo Mobile on your cell phone.

• **Yahoo,** www.yahoo.com

BEST NEWS AND INFORMATION SITE
CNN

Remember Election 2000? Late last year, Ted Turner's media empire delivered up-to-the-second bulletins on the manic melee in Florida. No question, CNN.com is still the most comprehensive and timely news site on the Web. (Full disclosure: *PC World*'s parent company, International Data Group, provides most of the technology content for CNN.com.)

• **CNN,** www.cnn.com

BEST FREE E-MAIL
Yahoo Mail

The world of Web freebies is rapidly shrinking, we're sad to say. But you can still use Yahoo Mail with 6MB worth of storage for free. Your e-mail account comes with a handy address book, and you can take advantage of Yahoo's free encryption service via SecureDelivery.com. In addition, you can configure Yahoo Mail to work with your favorite POP3 e-mail software.

• **Yahoo Mail,** mail.yahoo.com

BEST SEARCH ENGINE
Google

Tired of Web searches that give you endless pages of gibberish? Move over to Google. This first-rate engine is supereasy to use and comes back with extremely relevant results. Links are rarely broken, and Google's 'I'm Feeling Lucky' button brings you right to its best guess as to the site you want. And once the company irons out its acquisition of Deja.com's Usenet archives, Google should be a stronger search engine than ever.

• **Google,** www.google.com

BEST APPLICATION SERVICE PROVIDER
NetLedger

The pioneer of Web-based accounting, NetLedger, offers you the best run for your money. Now at version 5.1, its suite of services includes employee payroll management, online bill paying, client care, and e-commerce. Monthly fees start at $10 (for accounting); NetLedger also offers a free 30-day trial.

• **NetLedger,** 800/638-5334 www.netledger.com

BEST RECREATION/ ENTERTAINMENT SITE
Digital Cities

The Web's a fun place, but the best entertainment still happens in the real world. Digital Cities will help you find it. Choose the nearest city, and the site acts like an entertainment portal, listing the best way to find movies, events, restaurants, and shopping. The bigger your city, the better your results, but provided you live near a town at least as large as Sioux City, Iowa, Digital Cities should have something for you.

• **Digital Cities,** www.digitalcities.com

BEST E-COMMERCE SITE
Buy.com

A huge selection of products and some of the best prices on the Web make Buy.com our favorite e-commerce site. From movies and music to computers and software, Buy.com aims to be a one-stop shop for all your Web shopping needs. Solid shipping and return policies round out a truly World Class shopping site.

• **Buy.com,** www.buy.com

Best E-Commerce Site
Buy.com

MOST PROMISING WEB NEWCOMER
REALITY

WE ALL KNEW the era of free shipping and below-cost pricing couldn't last. These days it seems more Web companies are shutting down than starting up. And while we'll miss the plentiful giveaways, amazing prices, and crazy promotions, we can't help thinking that the Web needed this reality check. The events of this past year signaled a welcome return to the world where businesses try to make money, funding requires a sound business plan, and Super Bowl advertising is dominated by car, liquor, and clothing manufacturers. It's time for Web sites to get real, and we can't wait to see how they do it.

BEST ISP
AT&T WorldNet

Despite broadband's recent growth, a dial-up ISP remains the connection of choice for most Internet users. Great dial-up speeds, high connection success rates, solid tech support, and helpful extras like multiple e-mail boxes make AT&T WorldNet our favorite dial-up ISP. If you can't get hold of broadband in your area, this could be your best option.

• **AT&T,** 800/967-5363, www.att.net ■

COMPAQ | HOME

MyMovieSTUDIO

Create and share your own home movies with the Compaq Presario 7000T. The editing software and easy access ports for digital cameras and camcorders make it simple to produce quality films.

Just plug in and edit. It's that easy. Connect your camera into the easy access ports to download your home videos onto your PC. Then edit your footage with StudioDV software. You can save your movie onto your hard drive, or burn it onto a DVD using your DVD-R/CD-RW drive.

It's a blockbuster. You can play your movie on most DVD players. So gather your family and friends, pop it in and wait for that Best Picture nomination.

intel inside pentium 4

Compaq PCs use genuine Microsoft® Windows®
www.microsoft.com/piracy/howtotell

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There's just something about you that sets you apart. The same should be true of your PC. So let us build a Compaq Presario 7000T Internet PC just for you. With special features like MyMovieSTUDIO, so you can explore your talent as a filmmaker. Or an Intel® Pentium® 4 processor to power your ideas. Because with PCs, as with people, it's what's inside that really counts. Welcome to a new kind of technology. Inspiration technology, available direct from Compaq.

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$1979‡

As low as $56 per month†

Intel® Pentium® 4 Processor 1.50 GHz
128 MB PC800 RDRAM
60.0 GB (7200 rpm) UltraDMA Hard Drive
16X DVD-ROM Drive
56K ITU V.90 Modem
SoundBlaster™ Live! Value Audio Card
JBL Platinum Speakers with Subwoofer
32 MB SDR nVidia GeForce2 MX w/TV-Out
Compaq CV735 17" Monitor (16.0" VIA)

Personalize by choosing:

DVD-R Drive with a DVD Disc: Add $456
JVC GR DVL300U Digital Camcorder: Add $799

POWER USER

PRESARIO 7000T-1.4

$1529‡

As low as $43 per month†

Intel Pentium 4 Processor 1.40 GHz
128 MB PC800 RDRAM
40.0 GB (7200 rpm) UltraDMA Hard Drive
48X Max CD-ROM Drive
56K ITU V.90 Modem
Creative Labs 1373 Audio with 128 Voices
JBL Platinum Speakers with Digital Audio Port
32 MB SDR nVidia GeForce2 MX w/TV-Out
Compaq CV735 17" Monitor (16.0" VIA)

Personalize by choosing:

SoundBlaster Live! Value Audio Card: Add $49
16X CD-RW Drive: Add $218

FAMILY CHAMPION

PRESARIO 5000T-1.0

$1279‡

As low as $36 per month†

Intel Pentium III Processor 1.00 GHz
128 MB SyncDRAM — up to 11 MB Shared for Video
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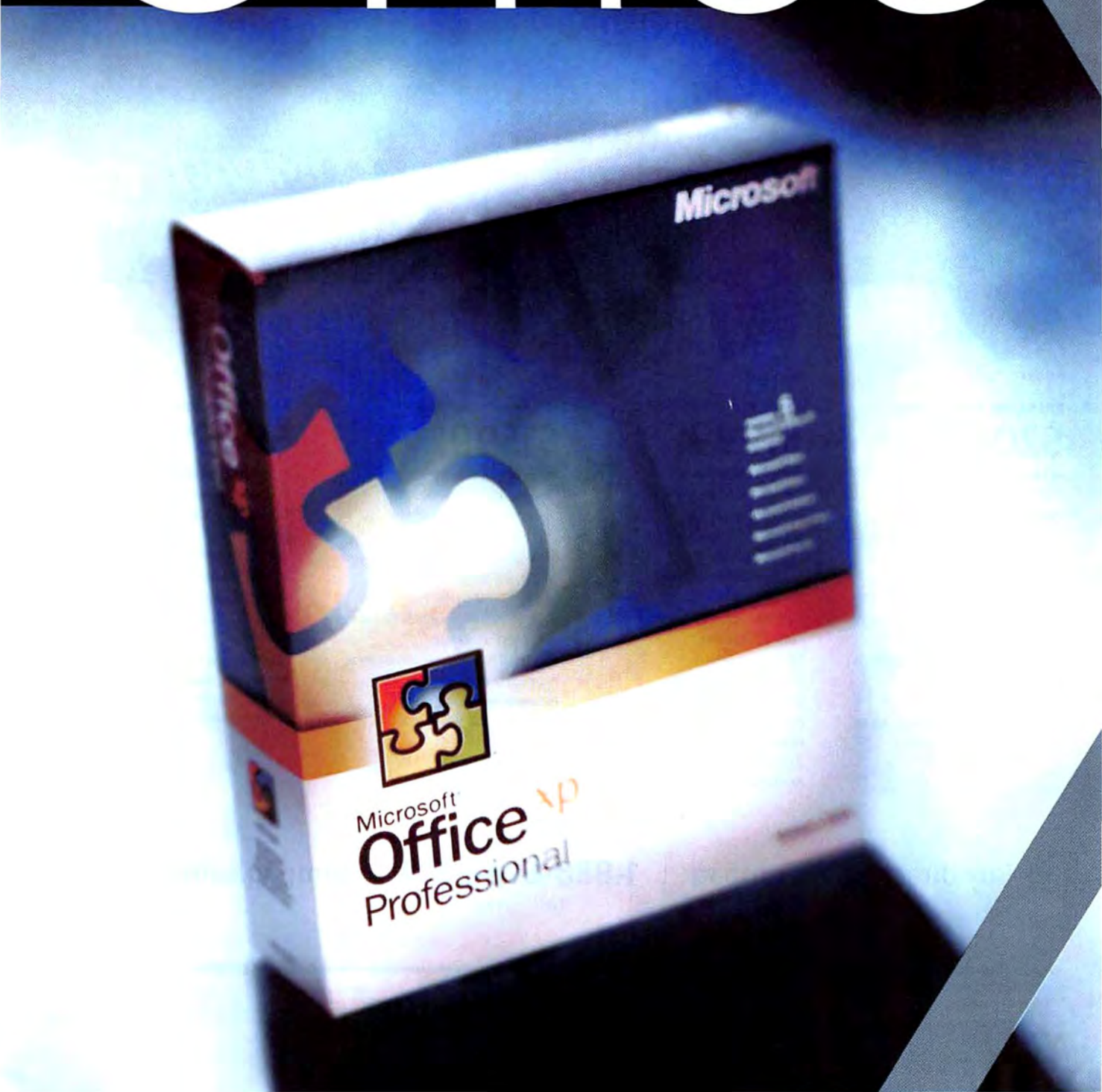
Office



XPosed

Microsoft's new Office XP suite boasts a new look, more tools, and a few annoying gotchas. **Here's the lowdown on the upgrade.**

If Microsoft's Office 2000 were an employee, it would be an eager, smart, and capable assistant. The perfect worker, right?

Not quite. Making that helper understand what to do can be hard. The aide sometimes "fixes" things that aren't broken and has an infuriating habit of disappearing at the worst possible time—with your critical project.

With Microsoft's new Office XP suite, it's as if that employee had undergone rigorous retraining. The result is a decided improvement, but this worker still may not be named Employee of the Year.

Many of Office XP's new features are found throughout the suite. To help guide users through complicated jobs, Microsoft has introduced Task ▶

PHOTOGRAPHS BY ROBERT OLDING

Panes—vertical windows on the right side of the screen that pop up when needed and offer one-click controls for intricate operations like sending out a form letter in Word or creating an animation in PowerPoint.

Another new feature is Smart Tags. These small gray boxes attach themselves to certain entries. In some cases, they help you control Office's habit of making automatic changes. Smart Tags can also perform several new tricks, such as linking a name in an e-mail message to an entry in your Outlook address book.

Microsoft has also tried to address—if not fix—Office's habit of locking up and taking your hard work with it. The software giant hasn't stopped Office from crashing—as we discovered firsthand in our testing. (We examined shipping versions of all applications except Publisher, which we used in prerelease form.) Instead, the new applications have acquired Disaster Recovery tools designed to save your work as the program is crashing.

If you can't get your office suite to do what you want, Office XP may help.

SHOULD YOU UPGRADE?

ARE THESE NEW suitewide features, along with the many individual application changes that we'll detail later, worth the $239 or more you'll pay for the upgrade? (See "Office XP at a Glance," below, for pricing specifics.) The answer depends on your relationship with Office 2000 or whatever other office suite you use.

If you're sick of rummaging through drop-down menus to find the commands you need, Task Panes may help. But some experienced users may conclude that Task Panes take up too much screen real estate doing things the users already know how to accomplish. Smart Tags are a great way to fine-tune Office's automatic corrections and add some new functions, but they also may perform some actions you wish they hadn't and may distract some users. In short, if you have a difficult time getting your current office suite to do what you want, Office XP may be a big help. But if you've already mastered the drop-down menus and configuration tweaks that you need in order to work efficiently, XP's new suitewide features probably aren't worth spending extra for.

The answer to the upgrade question also depends on what you do with Office. If you spend most of your time in any one application—especially Excel, where we found few changes for the good—you probably won't gain much by switching. On the other hand, if you find yourself constantly jumping from Outlook to Word to PowerPoint and using them all to their fullest, the improvements will probably make the upgrade worthwhile. We'll discuss the specific changes to Word, Excel, Outlook, and PowerPoint in later pages. For more detail on any of those applications, check out our online reviews at www.pcworld.com/features/july2001/officexp.

The value of Office's Disaster Recovery features is unclear. First, we wish Microsoft would cure the disease—rather than

Office XP at a Glance: The Versions and the Applications

VITAL STATISTICS			Standard Edition	Professional Edition	Professional Special Edition	Developer Edition	Comments
List price (upgrade/full)			$239/$479	$329/$579	$479/not available	$549/$799	Professional Special Edition is available for a limited time and only as an upgrade; it includes an IntelliMouse Explorer mouse.
Required disk space			260MB	295MB	295MB	450MB	Space listed here is for a typical installation; a version may require more or less space depending on components selected.
APPLICATION	Upgrade price	Full price					
Word 2002	$90	$339	✔	✔	✔	✔	Clear improvement on Word 2000; Task Pane and Smart Tags speed formatting; better tools for groups; multiple-document interface restored.
Excel 2002	$109	$339	✔	✔	✔	✔	Upgrade adds improved auditing and spreadsheet protection, but ignores many user requests; mapping feature is gone.
Outlook 2002	None [1]	$109	✔	✔	✔	✔	Lots of useful tweaks, especially for e-mail; handles multiple accounts well; new formatting tools; still lacks some workgroup tools.
PowerPoint 2002	$109	$339	✔	✔	✔	✔	New all-in-one view helps users assemble shows quickly; adds print preview and better diagram tools; no improvements to AutoContent Wizard.
Access 2002	$109	$339		✔	✔	✔	Most changes aimed at database developers; new PivotTable and PivotChart views support better data analysis.
Publisher 2002	None [1]	$129 [2]			✔		More consistency with other Office apps; adds print preview; default file format isn't compatible with earlier versions.
FrontPage 2002	$90	$169			✔	✔	A substantial upgrade with better graphics capabilities and an easier-to-navigate interface; still overkill for simple Web projects.
Office Developer Tools	Not sold alone	Not sold alone				✔	Includes features aimed at corporate developers who build custom applications using Office.

✔ = included

[1] No separate upgrade price for this product.

[2] Comes with $30 rebate coupon for owners of previous versions.

mitigate the symptoms—by making Office more stable and reliable. That said, it's impossible to know how much of a boon Disaster Recovery will be. In our testing, we had crashes in which Office did not save our work completely. We won't know how consistently the recovery process works until Office XP is installed and running on thousands of machines.

CONTROLLING COPIES

OFFICE XP makes one change you can bet many users won't like. All versions of the suite sold as a shrink-wrapped package or loaded on a new computer will be protected by Microsoft's Activation Wizard. It's a process the company introduced with some versions of Office 2000 as a way to prevent "casual copying"—users lending the software CD-ROM to a friend. The wizard allows you to use the suite 50 times without activating it with Microsoft. (Activation is a stripped-down form of registration that doesn't require your name or address.) If you fail to activate it by the 51st use, Office becomes a very expensive file viewer: You can read and print your documents, but you can't change them.

You can activate Office on only two computers. Activation can be done either over the Internet or by phone and involves two numbers—the product identification code, which comes with the software, and another code that the software itself generates once you load it onto your machine. That second code summarizes the configuration of your PC—how large a hard drive you have, what kind of video card you're using, and so forth. If you load the software onto a third PC, Office recognizes that it's in another environment and prevents activation.

This scheme also means that if you make "major" changes to your hardware (Microsoft refuses to say exactly what constitutes a major change), you'll have to call the company, explain the situation, and obtain a special code to reactivate the software.

Activation Wizard carries more than a whiff of Big Brother. Though Microsoft says the system doesn't identify users personally or gather data on the exact make and model of their hardware, there is something unnerving about having to ask permission to use your own software after you upgrade your PC.

And we wonder what will happen if the system misbehaves. On one computer, our beta version of Publisher kept accusing us of modifying our hardware, even though it hadn't changed.

PAPER CLIP BANISHED

OTHER SUITEWIDE CHANGES are less controversial than the Activation Wizard but not always a vast improvement. Finally, Clippy, Office's annoying animated paper clip, has been silenced by default. (He still lurks in the Help menu, ready to irritate anyone whose errant click should happen to liberate him.)

Office's collaboration features, while improved, retain some drawbacks. Office XP's SharePoint Team Services are revamped versions of 2000's collaborative features. As before, they let workgroups quickly set up a Web-based home with message boards, folders for shared documents, and other teamwork tools. Refinements include more control over a site's look and feel, and options for giving different users varying levels of access.

Some of the SharePoint features remain surprisingly crude, however. Subscriptions—which notify you of changes at your team's site—are not very useful. And SharePoint needs better integration with the rest of Office.

We'll talk about voice recognition—a new Office feature—and the changes in Access, FrontPage and Publisher on page 114.

We found that the suite installed smoothly and quickly in most cases. But disturbingly, installation failed on two of the dozen machines we tried it on, despite the fact that those machines met Microsoft's minimum system requirements. The biggest news among those specifications is that Office XP won't run on a computer using Windows 95 or earlier.

Sharing files among XP and previous versions of Office is not usually a problem. But Publisher's new default file format won't work with previous versions of the software. Access also has a new format that is not backward-compatible—but that format is an option, not the default. ▶

The Verdicts

Five New Suitewide Features

1 SMART TAGS Context-sensitive icons that help with formatting, grabbing data from the Web, and other tasks. They also help control Office's automatic changes.

THE VERDICT: *Promising, but need work.* Smart Tags are clever, useful, and customizable, so third-party companies can develop them for all sorts of purposes. But in their initial incarnation, Smart Tags have problems—you can't always undo their changes, for instance.

2 DOCUMENT/APPLICATION RECOVERY As an application crashes, users (sometimes) have an opportunity to save their work.

THE VERDICT: *Necessary, unfortunately.* Office is still far from crashproof, so the chance to get up and running again is useful. But wouldn't a super-reliable suite be even better?

3 TASK PANES Context-sensitive windows that give quick access to commands and information otherwise buried in menus.

THE VERDICT: *Mixed.* Task Panes offer convenience, especially for casual users, and help with fancy formatting. But advanced users may find the benefits aren't worth the screen clutter.

4 SPEECH RECOGNITION Lets you dictate and issue voice commands in most Office applications without any stand-alone voice recognition software.

THE VERDICT: *Fair.* Good introduction to voice technology, but too keyboard-intensive. Serious users will still want a freestanding speech recognition application.

5 PRODUCT ACTIVATION WIZARD Creates an ID number, based on your hardware, that you must submit to Microsoft; prevents installation of Office on more than two PCs.

THE VERDICT: *Obnoxious.* Could disable the suite when you upgrade your PC or buy a new system, requiring you to call Microsoft for reactivation.

Word2002

WHAT'S HOT

- Task Panes speed formatting and other tasks.
- Smart Tags control Word's automatic text changes.
- Group edits are easier.

WHAT'S NOT

- Task Panes reduce size of document window.

WORD 2000 INTRODUCED numerous changes, but many were more annoying than helpful. Word 2002 corrects a lot of the lingering flaws and adds many new timesaving features.

The revised Word interface offers some handy additions. A new toolbar window shows a document's current word count, which can be updated with a single click. Word 2000's Single Document Interface, which opened a separate toolbar window for each open document, is now optional.

The new Task Panes are the biggest addition, though, and they work in particularly helpful ways in this application. One pane lets you choose styles for a document, including Word's brand-new styles for lists and tables that simplify making these features uniform across a document.

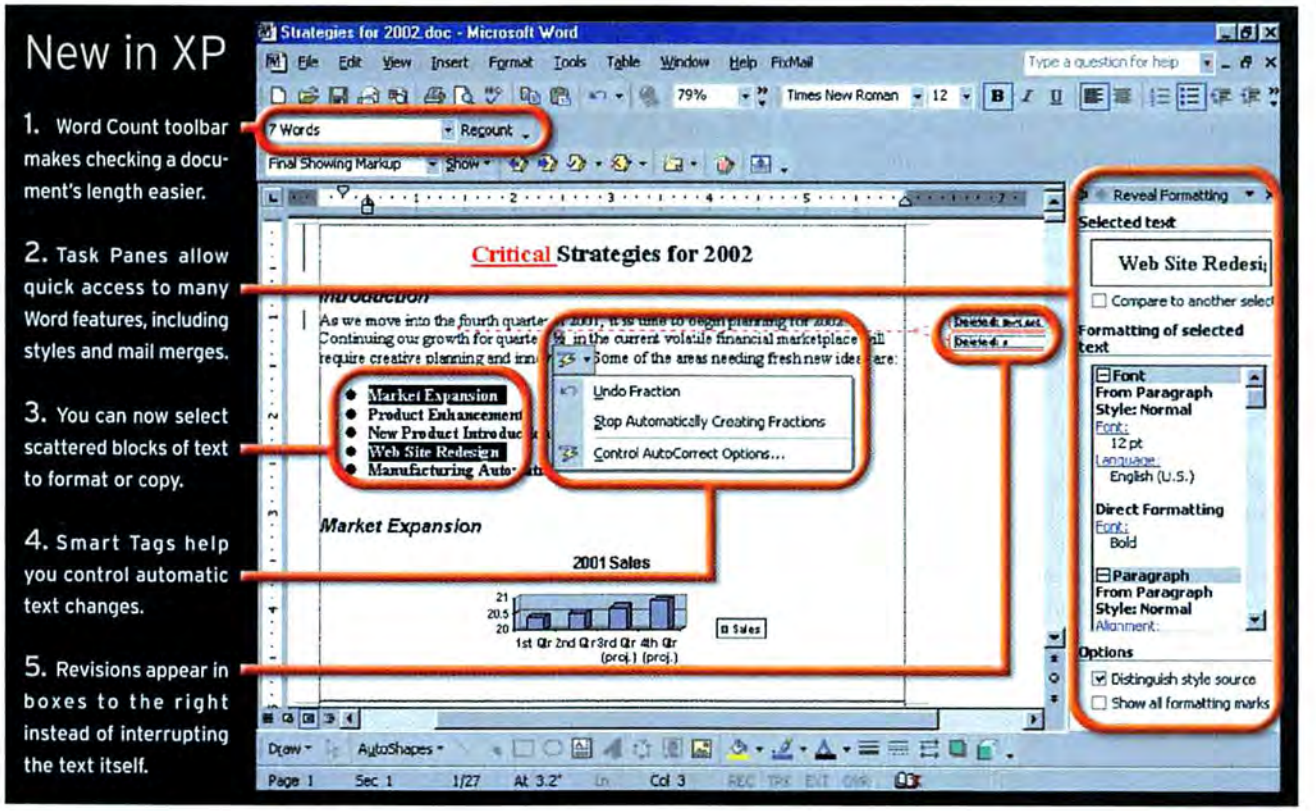
The Reveal Formatting pane lets you view and alter document formatting. For example, the pane lets you see the current indentation settings for a paragraph or bulleted list. A single click sends you directly to a dialog box where you can change the setting. You can even compare the formatting of one part of a document with that of another section. The Mail Merge pane operates as a wizard, simplifying the complex process of creating a form letter.

Word XP also eliminates some frustrations common in earlier versions. Word's automatic formatting and corrections can still sometimes make changes that you never intended, like creating a bulleted list. But Smart Tags make undoing those unwanted alterations easier. Another very useful Smart Tag pops into view when you paste an item from the clipboard into a document; the tag lets you decide whether to use the format the item was originally styled in or to match the format of the surrounding text. The same options were available in Word 2000 with Edit•Paste Special, but the new system is quicker and easier.

Word XP also lets you select blocks of nonadjacent text for formatting or cutting and pasting. If you want to impress your boss with your new sales figures, for instance, hold down <Ctrl> and select scattered portions of your sales report; then copy them all to the clipboard and paste them into a letter to your CEO.

Workgroup members will find welcome new features, too. Multiple workers can edit a document simultaneously, with all their changes presented for review when any editor closes the document. Revision markings for deletions and formatting no longer clutter the text, but now appear in little boxes in the right margin. The new system makes following the edited version easier but can make it harder to see exactly what changes were made. (If you prefer the old method, it's still available in some views.) Remote editors will love the new 'Send for Review' feature, which automates sending and receiving multiple-editor documents by e-mail. Finally, if you create HTML documents in Word, a new option lets you save the file as a filtered Web page, removing Word's internal XML tags. That feature reduces document file-size by as much as 40 percent, enabling pages to load faster.

—George Campbell



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- 1-Yr Limited Warranty[2] ■ 1-Yr Mail-in Service
- 6 Months of DellNet™ by MSN® Internet Access[10] Included

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Excel2002

WHAT'S HOT

- Repair of corrupt files could eliminate lots of headaches.
- Background formula-auditing identifies potential errors.

WHAT'S NOT

- Retrieval of stock market data is poorly executed.
- Screen-hogging Task Panes offer little new functionality.
- Geographic mapping feature has been removed.

MICROSOFT'S EXCEL FACE-LIFT will leave a lot of spreadsheet jockeys disappointed. The typical user probably won't even notice most of the improvements. Advanced users, on the other hand, might wonder why Microsoft continues to ignore many common complaints about the product.

The most significant improvement is the opportunity to bounce back from disaster. Every spreadsheet veteran has undoubtedly encountered a corrupt Excel file—one that worked fine one day, then wouldn't open the next. Excel 2002 can sometimes resurrect those files.

Though the program doesn't offer much in the way of new worksheet functions, a new formula-auditing feature can help prevent formula errors (questionable formulas are tagged so you can take a closer look). The new Formula Evaluator can help debug complex formulas by letting you step through the parts of a formula and look for errors. The AutoSum button is more versatile and can create formulas using functions other than Sum.

In the past, protecting a worksheet was essentially an all-or-nothing affair. With Excel 2002, you can prevent other users from changing the values in cells but allow them to use functions like AutoFilter and Sort that help in interpreting spreadsheet data.

The Find and Replace feature simplifies searching across multiple sheets, and you can now search for specific cell formatting. The new Insert•Diagram command lets you create organizational charts, Venn diagrams, and other graphical enhancements.

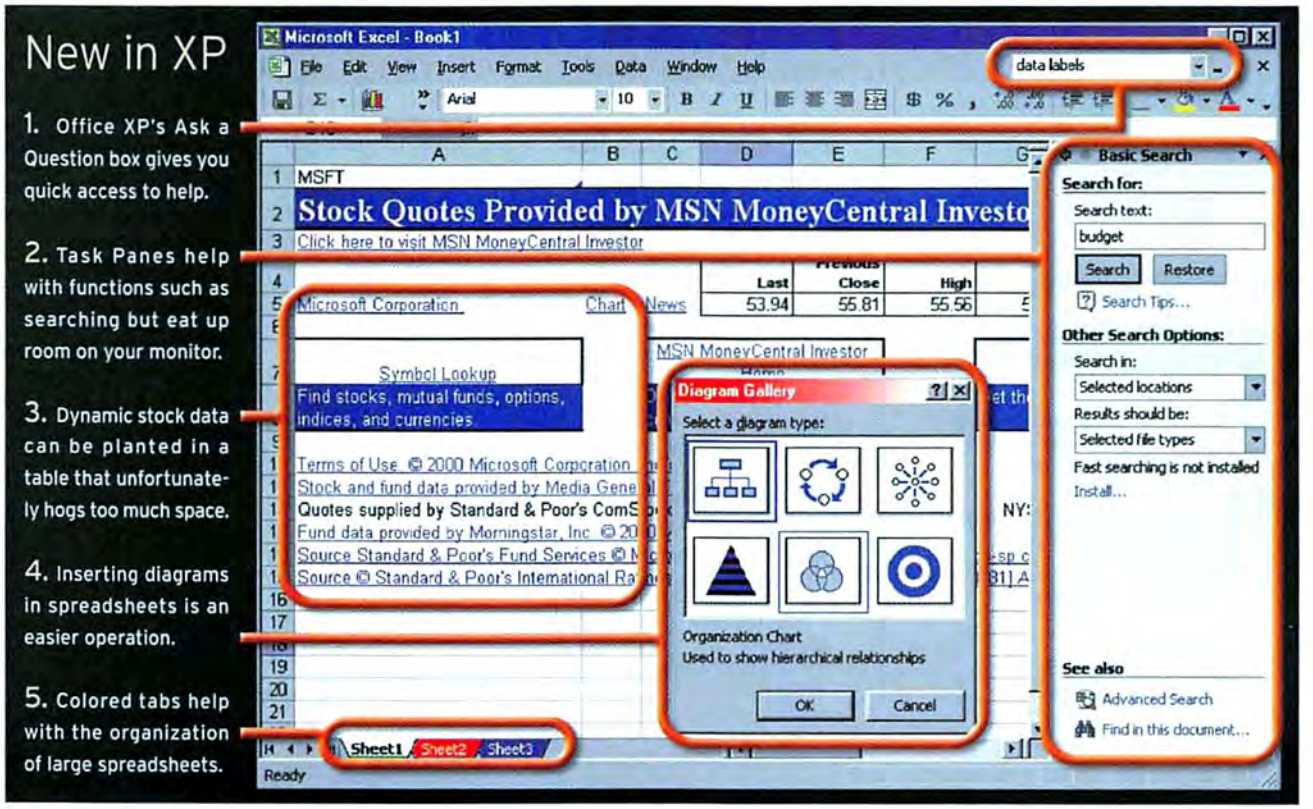
Excel provides numerous Smart Tags that simplify common operations—and a few not-so-common ones. Type a stock symbol into a cell, and a Smart Tag appears that will let you perform a Web query and place the current price data on your worksheet. Unfortunately, you don't get just the price—you get an unwieldy 16-column-by-14-row table filled with hyperlinks. And any existing unsaved data in that 224-cell range is wiped out for good—Undo won't restore it.

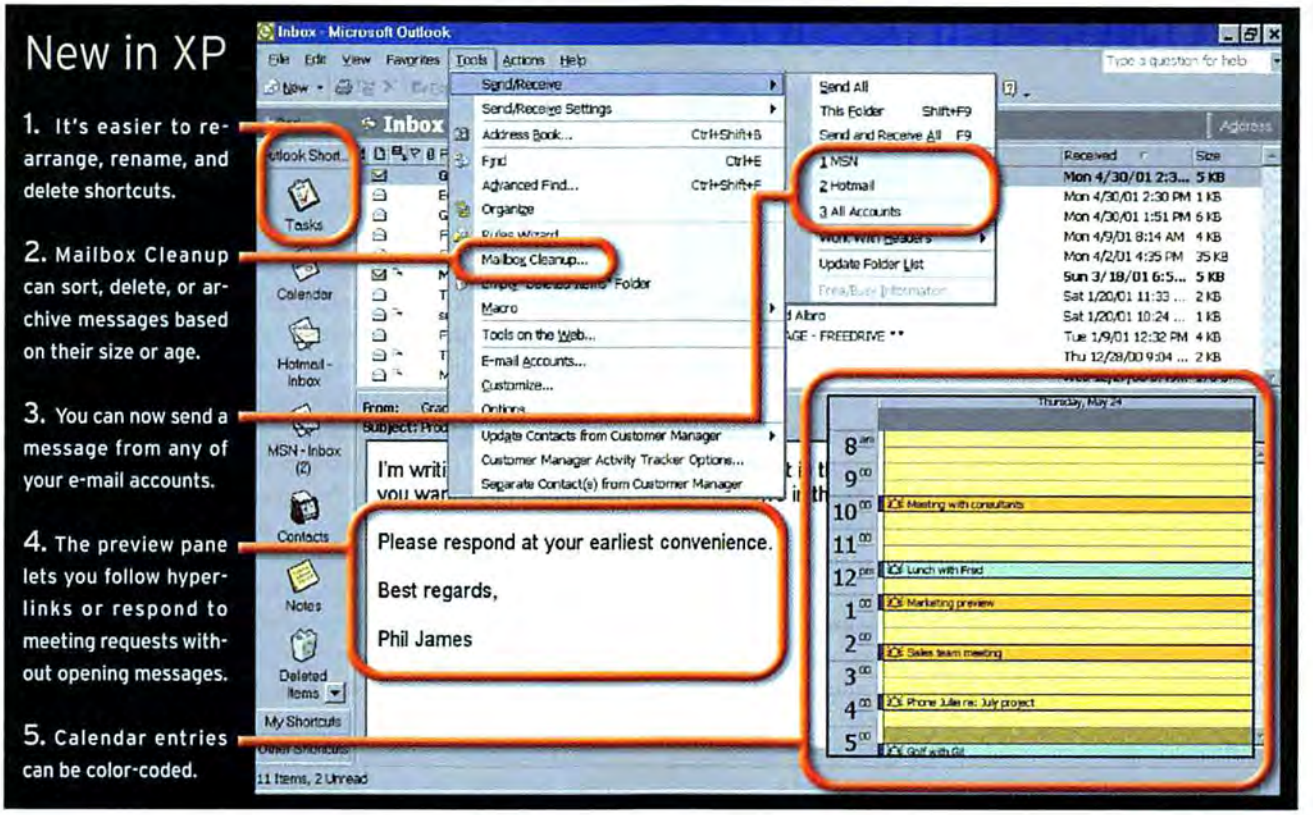
Though Task Panes may be useful in other applications, most Excel users will probably turn them off. They occupy valuable screen space and do very little that you couldn't do before just as easily.

If you sometimes augment your data with a map (to answer questions like, "How many Magic Eight Balls did we sell in Arkansas?"), you'll be disappointed to learn that Microsoft has removed the tool that made geographic mapping possible. You can view maps created with earlier versions, but you can't change them.

Excel 2002 has a long list of new features, but the ones that hard-core Excel users have wished for aren't on the list. For years, Excel users have asked for changes such as more rows and columns for the maximum spreadsheet size and improved support for three-dimensional charts. Few of those complaints have been addressed in the new version, and if you use Excel for data analysis, you will find little to get excited about.

—John Walkenbach





Outlook2002

WHAT'S HOT

- Funnels multiple e-mail accounts into a single in-box.
- Automatically completes familiar e-mail addresses.

WHAT'S NOT

- Online collaboration features less powerful than in Lotus Notes.

WITH A CLEANER INTERFACE, some long-overdue e-mail improvements, and advances in group scheduling, the revised Outlook 2002 will make lots of users happy. But the program still lacks some of the group-collaboration features that companies look for—and that they get from rival Lotus Notes.

The new Outlook interface is less obtrusive and more customizable than the earlier version. To make functions easier to find, you can rearrange the shortcuts in the left pane simply by dragging and dropping them, and the right-click menu lets you rename or delete shortcuts. You can now color-code calendar entries individually or by creating automatic rules. It took us only a few seconds, for example, to create a rule that turned all entries containing the word *Frisbee* green, and those with the word *meeting* red.

If you have multiple e-mail accounts (and who doesn't these days?), Outlook now allows you to view messages from all of them in one place, including messages from Hotmail and other Internet e-mail services. And instead of having to forward messages from one of your accounts to another, you can simply drag them from one account and drop them into another.

Some of Outlook's "new" e-mail features aren't all that new, however. Automatic name completion, for instance, fills in e-mail addresses that you've sent mail to before, as you type. Users of Notes, Outlook Express, and most other e-mail clients take this handy feature for granted, and it's a mystery why Outlook waited so long to incorporate it.

A nice addition to Contacts is a 'Display as' field that replaces any e-mail address with the name of your choice, allowing you to display the cryptic address 'mgonz155732@aol.com' as the easier-to-recognize 'Mike Gonzales', for example.

Microsoft has closed some of the security holes that enabled viruses to spread by sending themselves to everyone in a victim's Outlook address book. Programs can no longer read your address book or send e-mail without your permission (this fix is also available to users of earlier Outlook versions as a separate patch).

New group-scheduling features in Outlook 2002 let you create multiple groups and share calendars via Microsoft's Free/Busy Internet service, which is free. Group members who register for the service (they must all use Outlook 2002) can view the schedules of other group members and reserve conference rooms. All participants must be connected to an Exchange server (the e-mail/groupware server that uses Outlook as a client), but they needn't all use the same server. Group members also have the option of proposing a new time when they receive a meeting request.

Outlook still drops the ball on most Web-based collaboration, though. Microsoft scrapped some planned new features that would have allowed users to design collaborative Web-based applications for offline use, such as a service allowing mobile employees to create purchase orders. Consequently, Lotus Notes remains a more powerful choice for the many companies that are interested in fostering that kind of collaboration.

—Dennis O'Reilly ▶

PowerPoint2002

WHAT'S HOT

- Smart Tags make resizing text and applying layouts easier.
- Task Panes provide one-click access to design templates, color schemes, animation, and revision changes.

WHAT'S NOT

- Contains no new canned presentations.
- AutoContent Wizard doesn't let you choose specific slides.

POWERPOINT 2002 isn't a radical departure from its predecessor, but it packs a lot of new and improved features.

Changes in viewing options dramatically reduce the amount of jumping around required to assemble a presentation. In previous versions, you had to change views in order to see thumbnail images of your presentation. The revised Normal view has each slide's text and a thumbnail view of its graphics under tabs on the left of the screen.

PowerPoint's Task Panes provide simple one-click access to design templates, color schemes, animation options, and revision tools. Though the choices for presentation templates and colors are mostly the same as in PowerPoint 2000, using the Task Pane to preview the options and keep track of your favorites requires less effort. New task panes for canned and custom animations make it child's play to cycle through the options until you find the animation effect that looks best.

Editing the content of your presentation is easier now with PowerPoint 2002's new Smart Tags. They give you instant choices for automatically resizing text (to accommodate changing a chart from one column to two, for example) and applying layout options (such as adding a table to a bulleted list).

PowerPoint 2002's new Diagram feature allows you to create and edit organization charts and other diagrams directly on the slide—a much faster and less cumbersome procedure than the one used in previous versions.

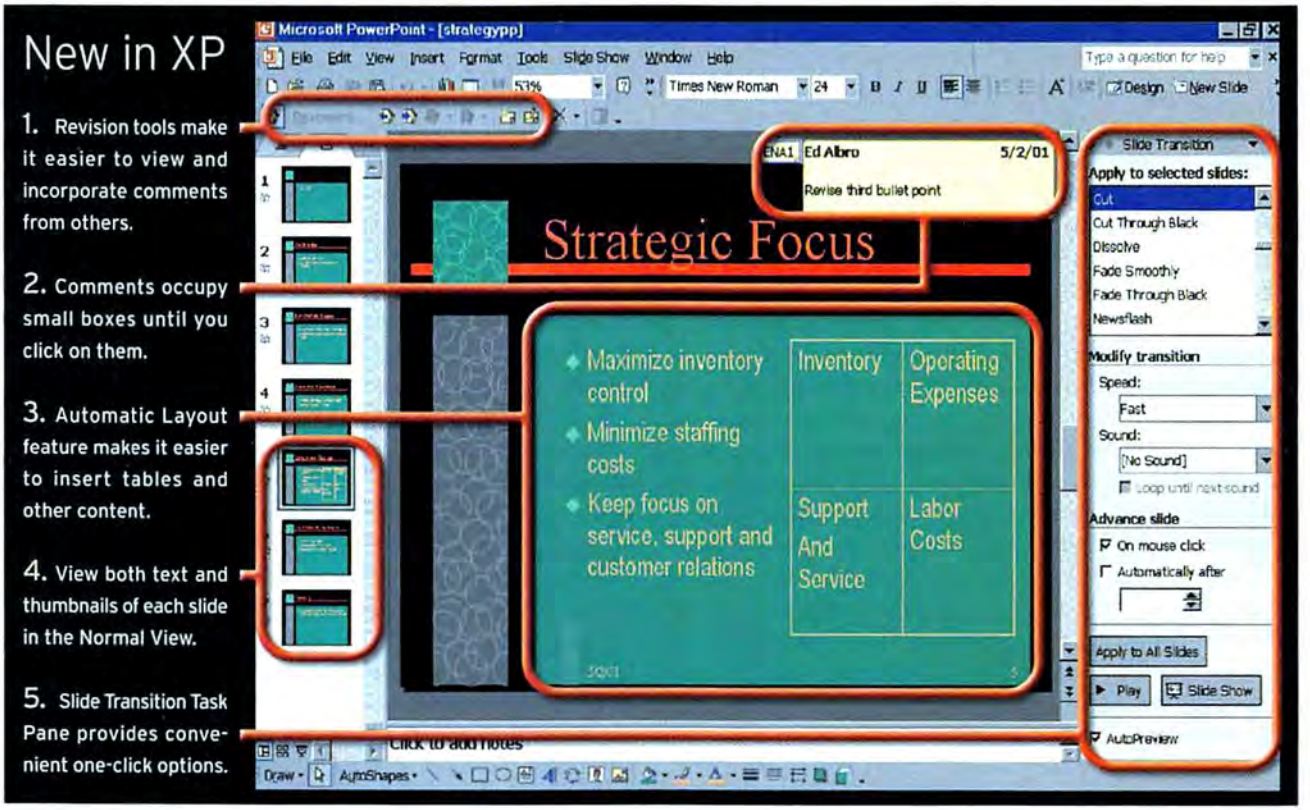
At long last, PowerPoint has added a print preview. You can switch between various views—such as slides, handouts, and notes—and change between landscape and portrait views. This versatility is a welcome enhancement, especially since PowerPoint slides can soak up a lot of color ink.

New password protection means that you can let others view your presentation without allowing them to make changes.

Of course, the most important thing about a presentation is its delivery. To make certain your talk goes as smoothly as possible, PowerPoint has added a new Presenter view. With it and a PC that supports multiple monitors, you can show the presentation through a projector, while the screen on your notebook shows you what bullet or slide is coming next and displays your speaker notes in a scrollable box at the bottom of the screen. The Presenter option also provides a thumbnail view of all your slides (in a scrollable column) on the left side of the screen, to simplify jumping around in your presentation.

What's not to like in PowerPoint 2002? Fans of the program's canned presentations may be disappointed by the lack of new options. The same two dozen business, marketing, and finance topics are provided for jump-starting a presentation. And you still can't choose which slides you want to include in your show until after you've walked through the AutoContent Wizard.

—Richard Jantz ▶



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he's headed down.

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ARRIVE SAFELY

TheRest

NOT EVERY Office is equipped the same way. Some versions of the suite include Access database software; others also have Publisher and FrontPage. But every version permits users to work by voice.

VOICE RECOGNITION

IF YOU HAVE ACHING WRISTS or a job that makes typing awkward, expect limited relief from Office 2002's new voice recognition technology. The software does a fairly good job of recognizing simple words and most commands. Polysyllabic words sometimes came out jumbled in our tests, and you can't jump from one application to another using voice commands. Overall, you'll have to reach out to your keyboard or mouse more frequently than you would with stand-alone voice recognition applications. But Microsoft's version doesn't slow your system down as much as other voice programs do.

ACCESS 2002

FOR SERIOUS DATA DIVAS, Access 2002 has some nice additions. Users can now use PivotTable and PivotChart views to analyze data more easily. The good news for Web developers is that Access now includes substantial support for XML.

FRONTPAGE 2002

FRONTPAGE 2002 looks and works more like an integrated part of the Office suite than earlier versions of the Web-design software did, and it is now an effective tool for creating workgroup-size intranets. You can add content from other Office apps via the Office Clipboard, export usage and performance reports to Excel, and automatically generate an Access database from data entered into your site's forms. FrontPage 2002's drawing tools work just like those in PowerPoint, and the application includes the Task Panes used throughout the rest of the suite.

Beyond its better integration with the rest of Office, FrontPage 2002 has plenty of other useful new features, including the ability to insert news and other active content into Web pages.

PUBLISHER 2002

THIS DESKTOP PUBLISHING application sports no radical changes. As before, it's slick and easy to use. The biggest news: It now looks and feels more like an Office app, with features it should have had already (such as a print preview mode) and plenty of Office XP's interface tweaks, including Smart Tags and Task Panes. Publisher's Task Panes help guide you through searching a document for specific text, applying a design or color scheme to a publication, and inserting clip art, among other jobs. A new toolbar helps you size and fine-tune pictures.

How Office's Rivals Stack Up

FROM A SALES STANDPOINT, Microsoft Office won the suite wars years ago. But Corel's WordPerfect, Lotus's SmartSuite, and Sun's StarOffice all offer some features that Office lacks. They're cheaper, too. Here are brief appraisals of the other major suites:

LOTUS SMARTSUITE MILLENNIUM EDITION 9.6

THE GOOD: Covers the basics well enough that current users have little reason to switch. Organizer is a slick, simple information manager.

THE BAD: This suite is looking long in the tooth—it hasn't undergone a sweeping overhaul since 1998.

THE FUTURE: Fuzzy. Lotus says a modest update will appear by year's end, but the company is noncommittal about any major upgrade.

LIST PRICE: $173 upgrade, $437 full

www.lotus.com

COREL WORDPERFECT OFFICE 2002

THE GOOD: A solid suite that just received a significant upgrade; WordPerfect is a terrific word processor (see *New Products*, page 80).

THE BAD: Casual users will probably find this Office slightly less intuitive than Microsoft's.

THE FUTURE: Corel says that an upgrade to WordPerfect Family Pack—the company's home-oriented productivity suite—is in the works.

LIST PRICE: Versions range from $159 to $499

www.officecommunity.com

SUN STAROFFICE 5.2

THE GOOD: A jaw-dropping bargain: a free download ($40 shrink-wrapped). Very full-featured; handles Microsoft Office files surprisingly well.

THE BAD: Tough to learn. All-in-one design—it's one great big program—results in clutter. Can slow down underpowered PCs.

THE FUTURE: Version 6.0 is due sometime in 2001—Sun is cagey about details but says the upgrade will demand less in the way of system resources.

LIST PRICE: Free download, $40 shrink-wrapped

www.sun.com/staroffice

—Harry McCracken

online *Find reviews of individual Office XP applications at www.pcworld.com/features/july2001/officexp. Freelance writers John Walkenbach and Richard Jantz are based in California. George Campbell is a contributing editor, Harry McCracken an executive editor, Edward N. Albro a senior editor, and Dennis O'Reilly a senior associate editor for* PC World. ■

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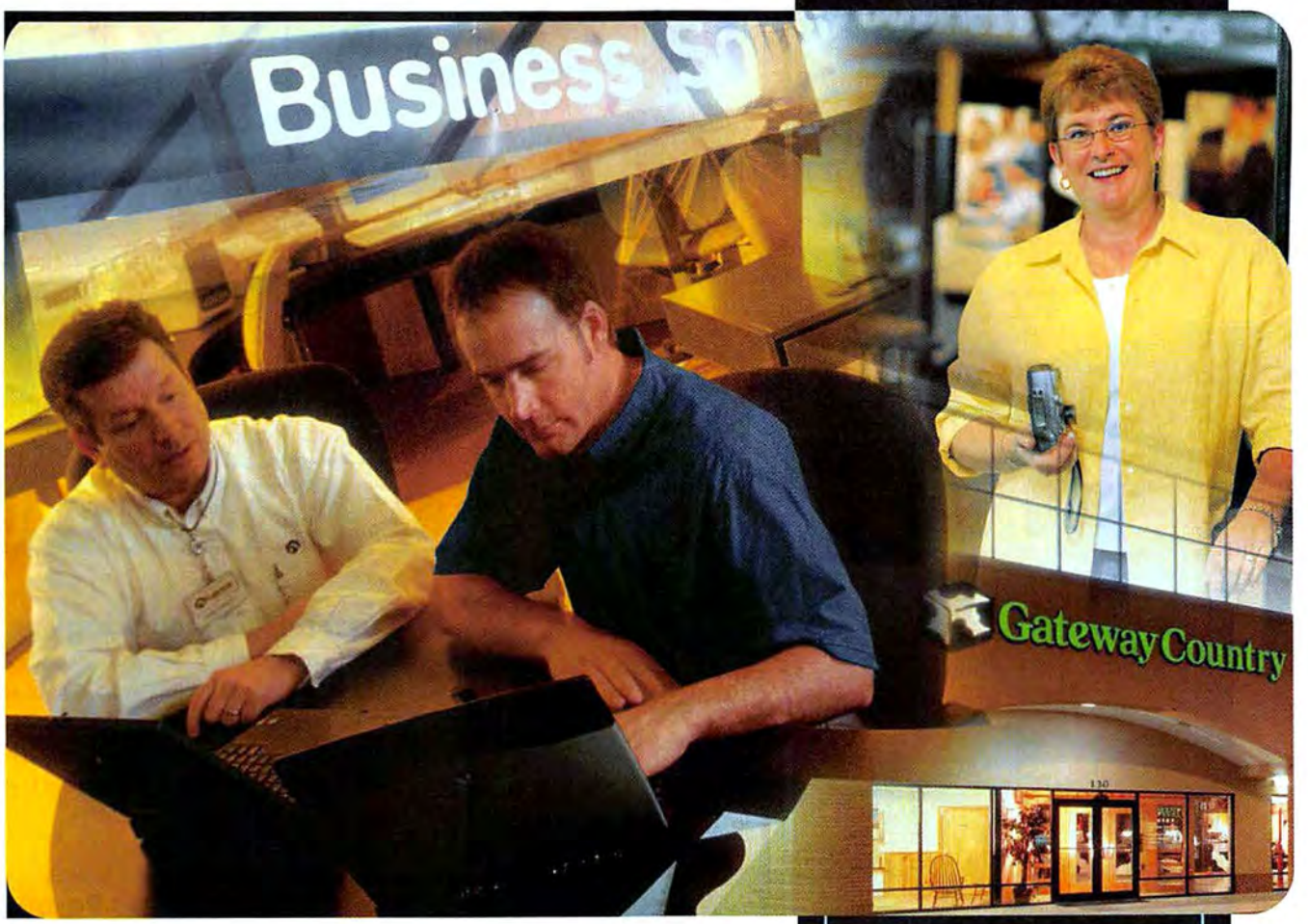

– Bev Young,
Real Estate Agent,
RE/MAX Metroplex Realty

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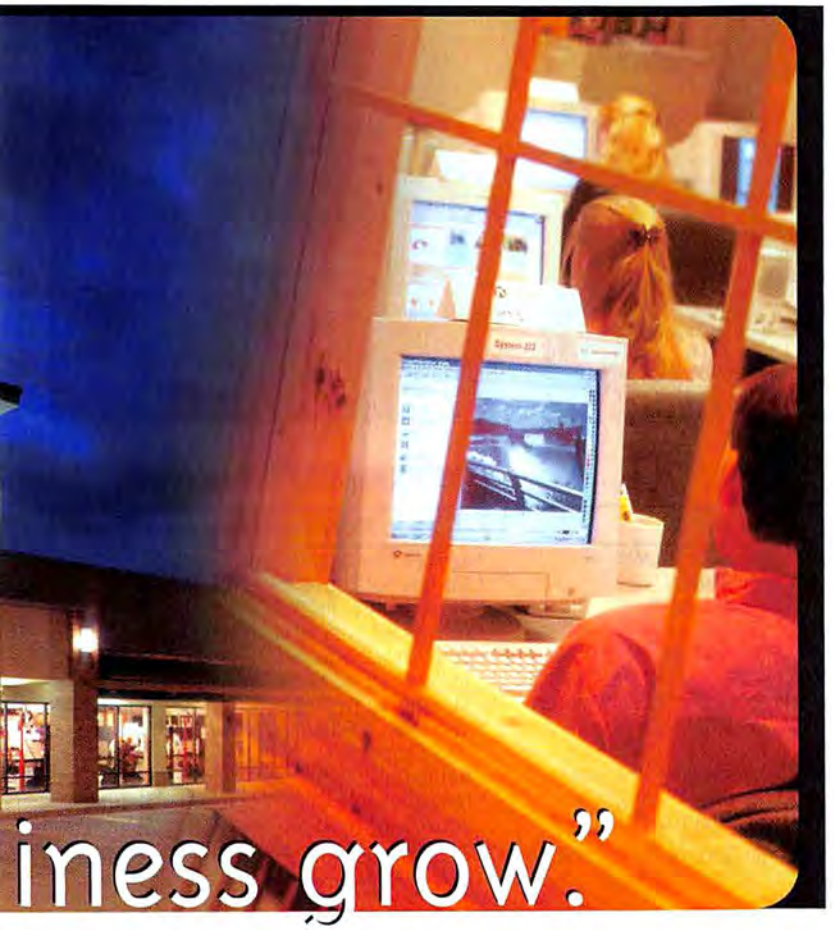

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BY BECKY WARING

Wireless Comes Home

The latest home networking products promise to make linking your PCs together fast and affordable.

But do they deliver?

We try out 12 new kits and select a Best Buy. ▶

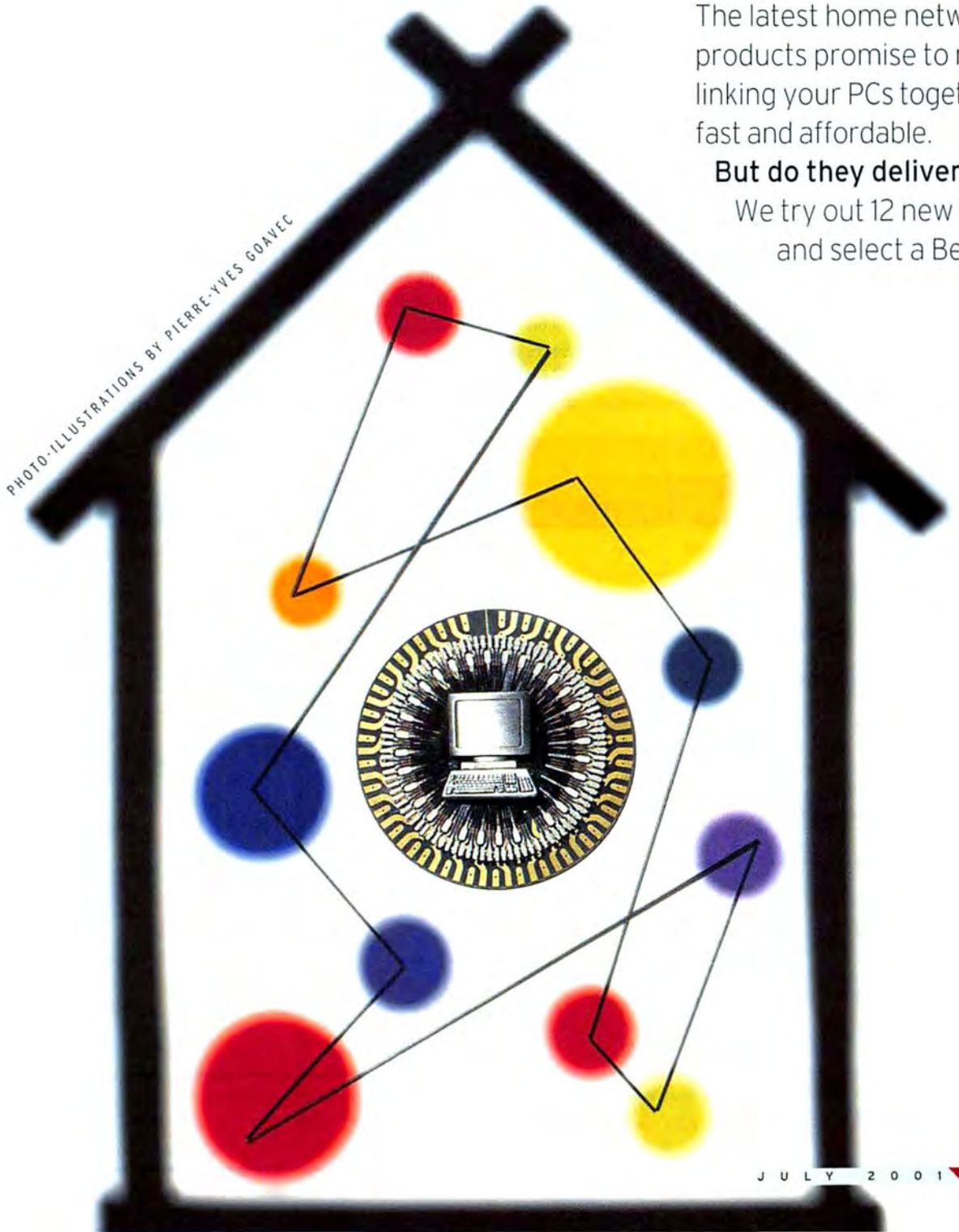


PHOTO-ILLUSTRATIONS BY PIERRE-YVES GOAVEC

YOU PROBABLY THINK you have it pretty good if you've got a DSL or cable line running into your house for high-speed Internet access. You may even be patting yourself on the back for hooking a couple of PCs together with ethernet cabling.

But that's yesterday's news. These days, true home-computing bliss means wireless networking. Pick up your notebook with a wireless PC Card installed, and you're free to read e-mail or surf the Web while lounging by the pool or reclining on the couch. Going wireless has advantages for desk-bound PCs, too: It relieves you of the chore of drilling holes and snaking ethernet wires through walls and floors. That's especially desirable if you're trying to network PCs that are scattered throughout the house. Envision trying to run cable between the work PC in your basement office and another machine in an upstairs bedroom.

Last year, wireless networking took a quantum leap with the release of 11-megabit-per-second products based on the 802.11b wireless standard (commonly known as Wi-Fi) defined by the Wireless Ethernet Compatibility Alliance. Previously, wireless adapters operated at 1 or 2 mbps (versus wired ethernet's 10 mbps, 100 mbps, or even 1000 mbps). Eleven mbps may seem like overkill for sharing an Internet connection or transferring a few files over a home network, but new applications like streaming video and shared MP3 audio consume all the bandwidth they can get.

The decision to go wireless is not an open-and-shut case. The effective range of the wireless signal is one issue to consider. Most manufacturers of 802.11b cards claim their products' range is up to about 100 feet indoors, in a typical wood-frame house. But the range can be much shorter in a concrete and steel building. As the wireless signal degrades, performance drops with it. Also, setting up and configuring the network can be difficult.

Setting up a peer-to-peer (computer-to-computer) Wi-Fi network will set you back $50 to $150 for each PCI Card adapter and $50 to $200 for each notebook PC Card adapter. A less expensive networking alternative—phone-line networking products based on the HomePNA 2 standard—costs roughly $40 for each adapter. Phone-line products are faster and often easier to install—provided you have a handy phone jack everywhere you want to put a PC. The flip side: You don't get the convenience of roaming with your notebook. In June last year we compared five phone-line products, and they've changed little since then (see "Home Wired Home," www.pcworld.com/jun2000/wired).

If you want to share a broadband connection without a host computer acting as server, you can do so with a wireless or phone-line gateway, a product that bridges traffic on a network and routes it to systems equipped with adapters. A wireless

HOME NETWORKING PRODUCTS

ACCESS POINT/GATEWAY	Street price (4/1/01)	Wireless adapter for client, street price (4/1/01)			Wire ports		
		PCI card	PC Card	USB	WAN	LAN	Other
2Wire HomePortal 100W 877/349-3304 www.2wire.com	$399	None	None	None	1	1, 10Base-T	USB, phone-line jack
3Com Home Wireless Gateway 888/638-3266 www.3com.com	$287	$289	$199	None	1	3, 10/100	None
Agere Systems Orinoco RG-1000 Gateway 866/674-6626 www.orinocowireless.com	$349	$69	$149 (64-bit encryption); $169 (128-bit encryption)	$199	1[1]	1, 10Base-T[1]	Phone-line jack for built-in modem
Buffalo Technology WLAR-L11-L AirStation 800/508-1110 www.buffalotech.com	$300	$41	$120	$179	1	4, 10/100	None
Cayman Systems DSL Gateway 800/473-4776 www.cayman.com	$500	None	None	None	DSL jack[2]	4, 10Base-T	None
D-Link DI-713 949/790-5290 www.dlink.com	$199	$135	$99	$130	1	3, 10/100	Serial
Farallon NetLine Wireless Broadband Gateway 800/613-4954 www.farallon.com	$299	$50	$149 (64-bit encryption); $149[3] (128-bit encryption)	None	1	1, 10/100	None
Linksys BEFW11SR EtherFast Wireless AP 800/546-5797 www.linksys.com	$289	$49	$129	$149	1	4, 10/100	10/100 uplink[4]
MaxGate UGate-3300 800/284-8985 www.maxgate.net	$279	None	None	None	1	1, 10/100	Parallel
SOHOware NetBlaster II Hub 800/621-1118 www.sohoware.com	$250	$200	$150	None	None	1, 10/100	None
Xircom Wireless Ethernet Access Point 800/438-4526 www.xircom.com	$330	None	$180	None	None	1, 10/100	None
Netgear Phoneline 10X PE102 and RT314[5] *800/638-4327 www.netgear.com*	$348[4]	$40	None	$149	None	1, 10/100	Phone-line jack

Best Buy

[1] Port can be used as either a WAN or a LAN port, depending on cable.
[2] DSL modem built into gateway.
[3] Included with gateway for client system.
[4] Deactivates one LAN port.

access point costs $200 to $400. A comparable phone-line setup can run $300—$150 for an ethernet router, and another $150 for a phone-line bridge.

Finally, slightly less expensive products based on another wireless standard, HomeRF, also compete with those based on Wi-Fi. HomeRF is due for a speed boost this summer (see the sidebar "Coming Soon: HomeRF 2" on page 128).

For this review, we put 11 Wi-Fi networking products to the test by setting them up in two homes—a two-story, two-bedroom condominium, and a two-story wood-frame house. We also looked at a comparable phone-line setup using a new product from Netgear, to determine how performance differs between the two technologies. One vendor, 2Wire, offers a product capable of both Wi-Fi and HomePNA networking, and we tested both.

After setting up all the devices, measuring their performance, and examining whatever extras they offer, we gave Linksys's EtherFast Wireless Access Point our Best Buy for its easy installation, wealth of useful features, and affordable price. For beginners and those who don't need roaming capabilities, the Netgear solution could also be a good choice.

Best Buy

WITH ITS PROGRAMMABLE firewall, dual antennas, and easy installation—all for $289—the Linksys BEFW11SR EtherFast Wireless Access Point stands head and shoulders above the rest and handily earns the Best Buy. Linksys also makes its own PCI and PC Card adapters to use with the gateway, making setup an even simpler task.

NETWORKING SOUP

YOU'VE PROBABLY HEARD a number of terms bandied about in relation to home networking: hubs, bridges, routers, access points, gateways. Technically, these all refer to specific functions, which are often combined into one physical unit.

A *hub* typically has several ethernet ports that the various computers on your network can plug into, enabling them to communicate.

A *bridge* links local area networks, usually connecting sections of a larger network that would otherwise suffer from line length limits, or linking two different types of LANs. For example, the Netgear bridge in this review lets network traffic from computers on a phone-line network pass to systems on a separate ethernet network, and vice versa. We reviewed the Netgear bridge along with a Netgear ethernet *router*—a device that takes Internet traffic and routes it to one or more computers on your LAN, allowing you, for example, to share a Web connection.

A wireless *access point* combines router and bridging functions: It bridges network traffic, usually from ethernet to the airwaves, where it's routed to computers with wireless adapters. Finally, a *gateway*, while a fairly loose term these days, is generally understood to be a device that links a LAN to a wide area network, usually the Internet, and sometimes even includes a built-in broadband modem. All the products in this review are gateways.

As with wired networks, a wireless network includes adapters installed in or hooked to your PCs—PCI cards for desktops, PC Cards for notebooks, or USB adapters that connect to either.

THE CONTENDERS

THE WIRELESS PRODUCTS we looked at for this review fall into several groups. (For a complete list of products, see the chart at left.) Taking the uncomplicat- ▶

FEATURES COMPARISON

Encryption level	Warranty (years), support (hours/days)	Comments
64-bit	1, 24/7	A solid solution if you want wireless, phone-line, and ethernet all in one. Fairly simple installation; no programmable firewall.
40-bit	5, 12/5	Installation instructions clear and precise. Slightly expensive for 40-bit encryption.
64- or 128-bit	3, 24/7	Built-in 56-kbps modem useful for accessing Internet via dial-up connection. Explicit installation documentation helps networking novices.
40-bit	2, 16/5	Complicated installation software and procedures mar otherwise capable unit. Comes with 4-port hub.
40- or 128-bit	1, 8/5	Difficult to install; no advanced firewall features. Only device here that offers built-in DSL modem, which can save money.
40-bit	1, 12/5	Cheapest device here doesn't skimp on extra features, including a programmable firewall. Metal case gives it an industrial look.
64- or 128-bit	1, 9.5/5	Fairly easy to install. PC Card slot permits upgrades to next-generation cards.
40-, 64-, or 128-bit	1, 24/7	Easy installation, a programmable firewall, and a wealth of features for a reasonable price; best choice for both novices and pros.
None	1, 9/5	Easy-to-install unit includes a print server and a programmable firewall. Special online gaming support.
40-bit	1, 24/7	Useful for adding wireless capability, but omits programmable firewall and ethernet hub. Full line of cards and adapters available, but others do more for the same price.
40-bit	Lifetime, 11/5	Expensive for a unit that doesn't include a programmable firewall or an ethernet hub and offers only 40-bit encryption.
None	*5,[7] 24/7*	*Trouble-free setup makes this a good choice for networking beginners. Separate router box simplifies use in combination with wireless products.*

[5] HomePNA (phone-line) product included for comparison.
[6] Bridge $199, router $149.
[7] Bridge only; one year on power adapters and router.

COUNTERCLOCKWISE FROM TOP LEFT: products from Farallon, Cayman, DLink, Agere, Xircom, and SOHOware.

ed approach, those from Agere, SOHOware, and Xircom are no-frills access points that merely bridge your wireless network cards to a cabled ethernet network (or to the ethernet port that's in your cable or DSL modem). They also act as basic firewalls, since their Network Address Translation feature prevents outside machines from talking directly to any machine on your home network.

For more flexible network security, 3Com, Buffalo, D-Link, Farallon, Linksys, and MaxGate offer wireless access points with programmable firewalls—necessary if you want to run a Web server on your network, for example, or access Web services such as online gaming. Most of these more advanced units also include 4-port ethernet hubs, so you don't have to buy a separate hub if you have a few wired devices in addition to your wireless ones.

Cayman's DSL Gateway takes things a step further: As its name implies, it's an integrated gateway that bundles Wi-Fi wireless, wired ethernet, and a built-in DSL modem into one unit. And 2Wire's HomePortal combines all three network-

TEST REPORT

Wireless Speeds Slow With Distance

IF OUR TESTS proved anything, it's that wireless networking performance can be erratic: When we opened or copied our 36MB .tif file across the network, the measured time for the same product varied 20 to 30 percent. This variation is due mainly to wireless networks' susceptibility to interference from walls, or from devices that share the 2.4-GHz band.

We got more consistent times when copying a 50MB folder from one system to another on the network. Performance is comparable over short spans but varies more as distance increases.

Both of the HomePNA products outperformed wireless, but the difference between the two wired products was substantial. The 2Wire unit used USB adapters; Netgear's used faster PCI cards in the desktops. Also, 2Wire's product ran network traffic through a router; Netgear's used a peer-to-peer connection, which tends to yield faster file transfers.

	PRODUCT	Short distance	Medium distance	Long distance
11-mbps wireless access point/gateway	2Wire HomePortal 100W	201	245	277
	3Com Home Wireless Gateway	191	226	239
	Agere Systems Orinoco RG-1000 Gateway	198	246	271
	Buffalo Technology WLAR-L11-L AirStation	180	218	323
	Cayman Systems DSL Gateway	180	216	257
	D-Link DI-713	200	274	265
	Farallon NetLine Wireless Broadband Gateway	198	330	375
	Linksys BEFW11SR EtherFast Wireless AP*	187	207	304
	MaxGate UGate-3300	184	267	392
	SOHOware NetBlaster II Hub	180	279	246
	Xircom Wireless Ethernet Access Point	180	221	245
	Average	188	248	289
10-mbps HomePNA network	2Wire HomePortal 100W	125	210	n/a
	Netgear Phoneline 10X PE102 and RT314	52	98	n/a

* Best Buy n/a = not available Better All times are in seconds.

TEST PC WORLD CENTER **HOW WE TEST** We set up a network of a Pentium III-600 Dell Dimension XPS T600, a Pentium II-250 Quantex QP6, and a Pentium II-366 IBM ThinkPad in a typical home—the notebook downstairs (in two successive locations) and the two desktops in separate bedrooms upstairs. We loaded each with Windows 98 SE, Photoshop 6, Quake III Arena 1.11, Ocheck, RealPlayer 8, and all test files. For the wireless products, we installed PCI wireless adapters in the desktops and a PC Card adapter in the notebook. We placed the access point in one of the upstairs bedrooms. For those wireless products that did not provide their own PC Card or PCI solution, we used PC Cards and PCI cards provided by Agere.

ing technologies—Wi-Fi, wired HomePNA, and ethernet—in one handy box. The 2Wire product is an economical choice for those who want to combine phone-line and Wi-Fi networking.

Other products offer useful extras. The MaxGate unit, for example, has a parallel port to connect a printer, and so acts as a network print server. Linksys also makes a version of its wireless gateway with a print server, although we did not test it.

HOOK UP AND GET GOING

BUILDING A WIRELESS network is basically the same for all these products, and the wiring is the easy part. However, getting the wireless adapters running and communicating with the access point, and then configuring the gateway for your Web connection, can be the most time-consuming part of the process.

To start, you first plug the ethernet cable from your broadband connection (DSL or cable modem) into the access point's WAN port. You then run and connect ethernet cables from one or more desktop computers or hubs into the access point's LAN ports.

Because of the range limitations of wireless, you need to consider the location of your access point carefully before installing it. If your DSL or cable modem is not already installed, you'll probably want to hook up the access point in a central location (not necessarily in the office or living room where your main PC is located) and be sure to have your broadband line installed nearby. This will minimize distances between the access point and your computers.

Once the wired connections are made, you can then install wireless adapters where needed, and then configure the gateway, usually via a Web interface. If you choose to place the access point in a location other than your office, you should remember to buy an extra wireless adapter for your main PC.

If you have a mixed Windows/Mac network, you'll probably want to stick with ethernet and Wi-Fi, since Apple's AirPort system is Wi-Fi compatible, and all current Macs have built-in ethernet support. Some of the gateways can be configured only with Windows software, but all support Macs as clients via ethernet or Wi-Fi cards.

PHOTOGRAPH: JOHN ABBOTT

Real-World Wireless

WHEN THE MORRISTOWN FINANCIAL GROUP, a New Jersey-based financial planning and services firm, started expanding five years ago, managing partner John Hyland faced a turning point. Adding new employees meant the company finally needed to invest in a networking system. Until then, the company had consisted of only six employees, and setting up a network had not been a priority. But with a growing workforce, sharing client and data management software by sneakernet was no longer practical.

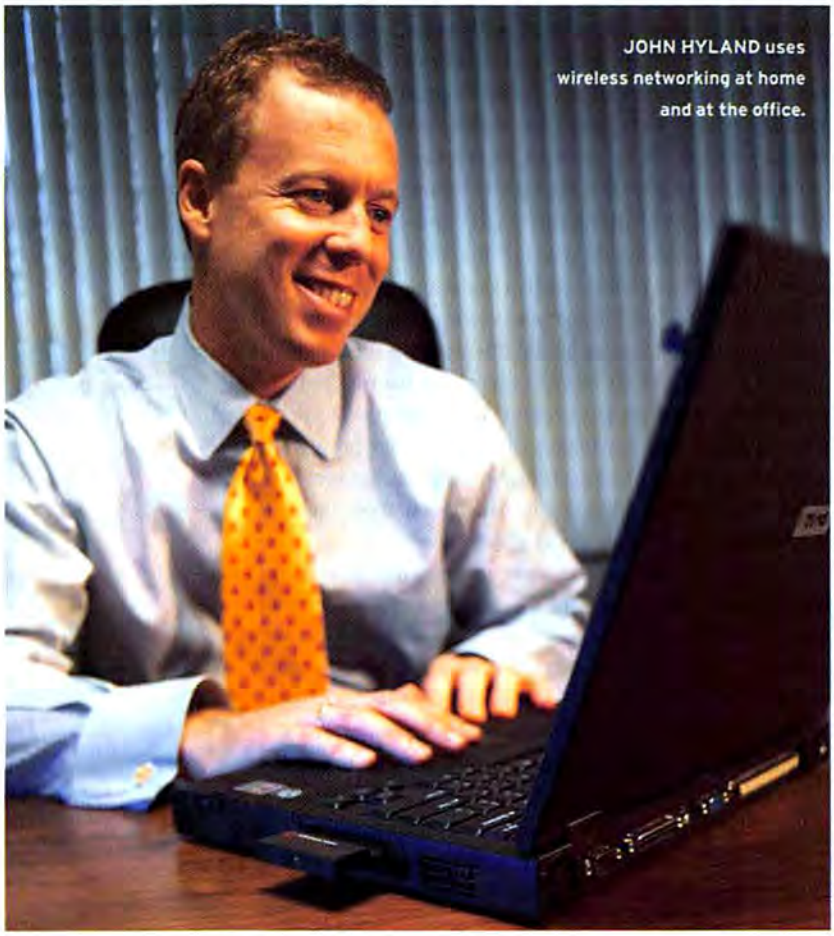
After weighing several networking options, Hyland settled on a wireless solution, mainly because of the ease with which new users could be added. Using Agere Systems' Orinoco products, the company's network now connects 14 desktops and 4 laptops. The system, a peer-to-peer network, is hooked up to DSL, so all users have high-speed Internet access.

According to Hyland, wireless networking suits the firm well. "When we have meetings with clients, we can just take our laptops into our conference room and stay hooked up to the network," he says. Furthermore, when the company decided to relocate in August 1997, bringing the network along was as simple as unplugging and then replugging at the new location.

Hyland says the network has presented no major problems. If the company needs to add a new user to the network, or if minor troubleshooting is necessary, a part-time IS manager is on hand to take care of the new user's configuration and make fixes.

Hyland liked the setup so much, he hooked up an identical wireless network at home. "That way, I can take my laptop home, sit out in the backyard, and do work—if I want to," he says.

—Kalpana Narayanamurthi



JOHN HYLAND uses wireless networking at home and at the office.

INSTALLATION ECCENTRICITIES

THE EXPERIENCE OF installing these products ranged from sublimely simple to insufferably complicated—it's one reason we put heavy emphasis on a product's ease of installation when picking our Best Buy. In some cases we had our network up and running in under 30 minutes, but in other cases the job took hours that felt more like days.

The level of difficulty varies, but in general, setting up any home networking system is a task best handled by someone with some knowledge of the specific products involved. None of the packages reviewed here are plug-and-play devices. Thankfully, however, once you've got the network up and running, you can largely forget that the gateway is even there.

The hardest part with each installation was setting up the wireless connections. The documentation provided with most of the products was almost uniformly scanty or difficult to follow, or it simply didn't reflect reality. You must uninstall any previous routing software you may have installed, such as WinGate or Sygate. You also have to copy down all your IP address and ISP connection information from the Network control panel before you start. If you accidentally lose this, you could spend a lot of time on the phone with your ISP. All the products work with the three major IP addressing options: static IP address, PPP over ethernet, and DHCP (in which you get a new IP address from your service provider each time you log on).

Though all Wi-Fi cards are supposed to be compatible with any Wi-Fi access point, our tests indicate that making different brands work together can be hard to do, if only because you must understand networking terminology such as *encryption levels* (40-, 64- or 128-bit), *channel numbers* (Wi-Fi uses 1 of 11 channels), *network name*, and *short RF preamble* (our personal favorite for incomprehensibility).

The hands-down installation champ was the Linksys. The company makes both Wi-Fi PCI and PC Card adapters, and they can be installed easily and quickly. After hooking up the EtherFast access point/gateway to our DSL cable and installing the wireless adapters, we opened up the EtherFast's simple browser interface to enter our IP address and were online in a flash. The Linksys has both online and printed documentation that's clear and easy to understand. The manual even discusses such issues as how to determine when to use crossover or straight-through ethernet cables—a matter most of the units glossed over but which can stymie anyone short of seasoned network installers. And a full set of indicator lights on the Linksys's front panel simplifies troubleshooting.

Installation of Buffalo's AirStation and Cayman's DSL Gateway gave us the most trouble. With the Buffalo, we had to install three different pieces of software before configuration could even begin. We also had to adjust various Windows settings.

The Cayman's documentation is inadequate and confusing. It fails to explain the cryptic Web-configuration screens that look like programmer's tools. Figuring out that we had to change VCC1 (huh?) to one of eight different settings (with labels like EtherIIC and PPOE-vcmux) was grueling even for our technical experts in the PC World Test Center.

Also, because Cayman doesn't make its own PC Cards or PCI cards, we had to use third-party wireless cards. Trying to match the two vendors' configurations settings was a daunting process, given the ▶

Is Wireless Security Full of Air Holes?

SENDING DATA BITS through the air adds a whole new dimension to the network security problem. Recently, researchers at the University of California, Berkeley, managed to crack the Wi-Fi encryption protocols, which means that an extremely determined hacker may be able to tap into your wireless network. The Wi-Fi industry group, the Wireless Ethernet Compatibility Alliance, is currently working to strengthen Wireless Equivalency Protocol encryption, but in the meantime, you can mitigate the threat in several ways.

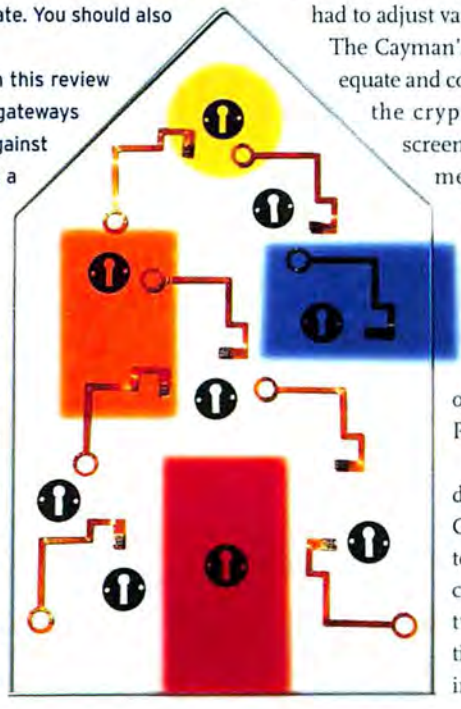
The first line of defense is the same as for wired networks: Configure Windows File and Print sharing carefully with passwords, or turn them off; use a personal firewall such as Zone Labs' ZoneAlarm; and make sure your antivirus software is up-to-date. You should also secure your wireless network with a password.

Why use a personal firewall when many of the gateways in this review come with a programmable firewall? Because the firewalls in gateways can protect only against attacks coming over the Web, not against hackers who might tap directly into your local network using a wireless connection. In addition, personal firewalls can alert you to Trojan horses—malicious programs that hackers secretly install on your computer to send data back to them, thereby circumventing the gateway's firewall.

These wireless products also use encryption to scramble data before sending it over the airwaves; you should set the highest level of encryption your wireless cards support—some support 40-bit encryption, while others support 64- or 128-bit. Most products in this review use easily guessed default passwords (or none at all), and encryption is generally switched off by default. That's fine for initial setup, when you want to make sure everything's connected properly. But as soon as you're set up, reset your password and switch on encryption.

Once all the pieces are in place, you can sit back in your pool chair, surf the Web with your laptop, and enjoy the freedom of wireless, without the worries.

–Becky Waring



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Cayman's thin documentation. (For those brands that sell gateways but don't offer wireless PCI boards or PC Cards, we used Agere Systems' Orinoco cards. Lucent Technologies, which spun off Agere, was one of the first vendors to introduce 802.11b products, and Agere cards were most likely to be compatible with others.) Some vendors make USB wireless adapters, as well. Such adapters are almost always much easier to install than PCI cards, but you'll have to contend with yet another box sitting next to your PC.

We encountered no major problems installing the 3Com, D-Link, Farallon, and MaxGate, thanks in part to simple Web interfaces for configuring wireless and Internet settings. All those vendors except MaxGate sell wireless adapter cards, thus ensuring easy compatibility.

The 2Wire, Agere, SOHOware, and Xircom units were almost as easy to set up. The Agere, SOHOware, and Xircom products don't have user-programmable firewalls and so don't require as much configuring as other Wi-Fi units.

With no wireless settings to configure, Netgear's USB-based HomePNA product was a cinch to install. In our setup, we simply plugged in a few cables and installed the drivers for the HomePNA-ethernet bridge into one of our PCs. We connected it to a second Netgear box, the RT314 Cable/DSL Router that served as the Internet router and firewall. As with the wireless products, we needed to add our IP address and other networking configuration information to connect to the Internet, but that task was relatively easy.

SPEED: NO WIRELESS CHAMPS

BASED ON OUR TESTS transferring files, printing over the network, and connecting to the Internet, performance is not much of a consideration when picking one brand of wireless network over another. The average throughput rates of all the wireless products' are very close, at 2 to 3 mbps. (For a complete explanation of our tests and a summary of some of the test results, see "Wireless Speed Slows With Distance" on page 122.)

By contrast, our HomePNA network delivered throughput of 7 to 9 mbps—close to its nominal capability of 10 mbps. Why the big difference over wireless? With wireless, signal strength and the distance from the access point are critical to throughput. The Wi-Fi products are designed to fall back to 5.5, 2, and 1 mbps speeds as you move progressively farther from the access point. Wireless also involves more overhead than wired networks, due to the constant need for error correction and resending of packets.

Wireless network performance can also degrade due to unexpected disconnections. Wireless is subject to interference from microwave ovens, cordless phones, and other electronics that share the 2.4-GHz industrial, scientific, and medical frequency band. Over the course of testing, connections inexplicably slowed down or even disappeared for a few seconds numerous times.

In spite of the performance hit, we'd still choose Wi-Fi over wired in a heartbeat for any portable. The convenience is too compelling, and the speed is adequate for most purposes. Just don't try to watch DVD videos over your network; clear DVD requires throughput ranging from about 4.7 to 9 mbps. We tried watching some videos, and got choppy, disagreeable results.

Users of portables should note that 5-volt PC Cards draw lots of power when used continuously, as modem cards do.

CLOCKWISE FROM TOP: products from 2Wire, Netgear, MaxGate, 3Com, and Buffalo.

As for the performance of the Netgear and 2Wire HomePNA products, results were quite different. The Netgear raced ahead of the 2Wire, primarily because it used PCI cards in the desktops. The 2Wire used only USB adapters, which tend to produce slower throughput.

THOSE NOT-SO-LITTLE EXTRAS

THE LINKSYS'S CLEVER DESIGN and extra features also distinguish it from the pack. Its four 10/100 ethernet ports eliminate the need for a separate hub in most home and small-business settings, and the unit has a modern, pleasing design. Combine all this with a moderate $289 price, and you have a great value.

With its heavy, painted-metal case, the D-Link unit has a distinctly utilitarian look, but it offers three ethernet ports, and at just $199—the lowest price of the group—it's a real bargain.

Near twins in design and software features, the Farallon and MaxGate units have just one 10/100 ethernet port ▶

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and a slot for the Wi-Fi card—all the other models except the Cayman have the circuitry built in. However, both have a slot that gives you the flexibility to upgrade to next-generation cards.

Taking a minimalist approach, the SOHOware and Xircom units also come with just one ethernet port. They are basic access points, useful for adding wireless capability to your network, but forgo all extras such as firewalls. Limited to 40-bit encryption, they are also not the best choice if you are concerned about wireless security. They're priced in the same range as the full-featured units, and it's hard to recommend them.

The Agere gateway has just one ethernet port and no firewall or other higher-level networking capabilities, but, uniquely in this group, it includes a phone jack and built-in 56-kbps modem, so you can access the Web via a dial-up connection or via a broadband connection. That versatility makes it a good choice for homes that do not yet have cable or DSL, and for users who want a dial-up backup connection should the broadband link go down.

The better-equipped gateways (Buffalo, DLink, Farallon, Linksys, and MaxGate) let you designate one computer on the network as a Web server and set internal IP addresses for virtual servers. They also have VPN support, special settings for streaming video and networked games, and the ability to install firmware updates over the Web; and they allow you to access your network from outside the home.

THE MIX-AND-MATCH NETWORK

IT'S IMPORTANT TO NOTE that your network can be a hybrid of wired and wireless. Ethernet, Wi-Fi, and HomePNA products are mostly compatible and relatively easy to hook together—especially if all the parts come from the same vendor. Combining wired and wireless can help reduce the overall cost of your home network while improving both its performance and its range.

For example, if you have two desktop computers in one room, plus a portable you want to take around the house, you can run a cheap, simple cabled ethernet connection between the two desktops and get just one wireless adapter for the portable. All the wireless products in this review can bridge between ethernet and wireless. If you have desktops in different rooms and conveniently placed phone jacks, you might instead want to install HomePNA boxes on the PCs and add a simple access point for the portable. If you want to share a printer among your computers, consider the MaxGate, which has a built-in print server.

We wouldn't hesitate to buy Wi-Fi, given its broad industry support and the numerous products available, but if you're going the wireless route—and can wait a bit—consider HomeRF 2, explained above. This second-generation technology promises some advantages, including lower prices and telephony capabilities.

Becky Waring is a freelance writer based in Berkeley, California, and Kalpana Narayanamurthi is an associate editor for PC World. *Testing was performed by Robert James and Jeff Kuta of the PC World Test Center.* ■

Coming Soon: HomeRF 2

WITH DOZENS OF PRODUCTS shipping, you might think that Wi-Fi, or 802.11b, is the clear wireless networking winner. But HomeRF, another wireless standard that transmits over radio frequencies, may re-emerge as a contender. The soon-to-be-released HomeRF 2 has heavy backers like Intel and Proxim, and the HomeRF governing body, the HomeRF Working Group, contends that version 2 will offer a number of advantages over 802.11b.

HomeRF 1.*x* operates at just 1.6 mbps, but version 2 will bump the speed up to 10 mbps—which is only 1 mbps shy of Wi-Fi. And speed isn't the only point of comparison. The HomeRF organization claims that version 2 will support voice, data, video, and multimedia streams, making it more suited to new home telephony and video applications than 802.11b is. Wi-Fi relies on Voice-over IP, a technology that allows voice calls to be made over the Internet, so calls must go through a computer at both ends. But HomeRF 2 should deliver voice conversations directly to a telephone handset, making it convenient when DSL providers start packaging phone service.

The HomeRF Working Group states that you should soon see Internet-connected HomeRF alarm clocks, radios, and other devices from vendors such as Simple Devices and Uniview. Also, HomeRF 1.*x* gateways and adapters are less expensive than Wi-Fi–based products. Access points are about $100 cheaper, and adapters run $25 to $50 less. HomeRF 2 products reportedly will ship with prices in the same range as the first generation's.

Advances aside, HomeRF has a lot of catching up to do if it hopes to take the lead from 802.11b. Apple, Dell, IBM, and Toshiba are already shipping portables with 802.11b support built in. And with a wide variety of access-point solutions available, 802.11b has proved to be the wireless system of choice in business and education. Some ISPs are even adapting it as a means of delivering broadband Internet services, rather than stringing wires into remote or hard-to-reach areas, such as small outlying communities.

The Wi-Fi camp also promises speed increases, up to 54 mbps. A 22-mbps version, 802.11e, should have products appearing by the end of the year, according to Wi-Fi proponents. While 22 mbps may be technically feasible at the 2.4-GHz band, it still requires FCC approval. (HomeRF is cleared to make the move to 20 mbps in 2002.) But 54 mbps will require a move to 5 GHz, which will prevent backward compatibility with older Wi-Fi products. —Becky Waring

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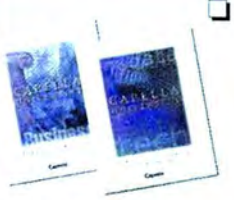

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print size, so all the sites here analyze your images and recommend maximum print sizes. Our 2-megapixel images looked crisp at sizes up to 5 by 7 inches; 8-by-10-inch prints weren't bad either, though some of them looked slightly blocky, grainy, and murky.

With our test photos, differences in print quality from site to site weren't striking. Overall, we liked our Shutterfly pictures best: Colors were consistently vivid, and details remained crisp. Output from Ofoto, PhotoPoint, and Snapfish was not far behind. Zing's prints were more likely to suffer from minor but noticeable image problems, such as washed-out color.

Prices are similar at all five sites: A 4-by-6-inch print costs 50 to 60 cents, 5-by-7s are a buck apiece, and an 8-by-10 costs $3 or $4. Shipping costs (which range from $1.50 to $3 per set of 20) are extra. That's more than you'd pay per print for conventional film processing at a store such as Ritz Camera or Wolf Camera. Don't forget, though, that you pay only for photos you know you want to keep—you'll never again waste money on prints that show Cousin Chuck chewing with his mouth open. And these online printing services are a particularly appealing option for enlargements. The cost is reasonable, and you avoid the hassle of having to store, identify, and handle negatives.

—Harry McCracken and Melissa J. Perenson

Photo Prints: The Best and the Rest

EVERY PHOTO SITE produced acceptably crisp and colorful prints. Shutterfly delivered the highest-quality photos of the five sites we checked out, with accurate color and sharp detail. Even so, the runners-up were close behind. Zing, which finished at the bottom of our list, turned in prints with slightly faded and murky color.

BEST PRINT: SHUTTERFLY

WORST PRINT: ZING

ARCHIVE

SURE, WITH A digital camera you no longer have to clutter your closet with shoeboxes full of unlabeled photos. But archiving digital pictures has its own issues. Contemplate, for instance, the effect of a hard-drive tragedy (knock on wood). Unlike film-based prints, digital photographs give you no negatives to fall back on. So protect your images by adopting one or two of the following storage options.

The best precaution against a multitude of catastrophes—including data corruption, operating system foul-ups, hard-drive failure, and computer viruses—is to back up your photo data at least once. Multiple backups will prevent data loss in the event that catastrophe strikes both the original and a backup. Though many photo-sharing and online storage sites let you store your images for free or for a reasonable fee, risks accompany this strategy. If, for example, a site goes under—as ECircles recently did—you could find yourself with only your memories of those picture-perfect moments.

The easiest and most affordable way to back up your files is to use CD-RW discs, each of which can store up to 640MB of data—that's enough for hundreds of digital photos at a typical 3-megapixel resolution. And according to manufacturers, CD-R media (which currently cost as little as $1 per disc) can last for up to 100 years, although actual longevity depends on the storage environment.

CD-RW drives are reasonably priced as well. Pacific Digital's 8X/8X/32X drive, for example, is a great value at $119. If you're willing to spring for a speedier but slightly more expensive CD-RW drive, consider the $220 Plextor PlexWriter 12/10/32A. For more information, see our latest *Top 10 CD-RW Drives* chart at www.pcworld.com/reviews/cdrw.

Other backup options include Iomega's Zip disks, which hold either 100MB or 250MB of data. A Zip drive costs as little as $100, and a 100MB Zip disk runs about $10. Unfortunately, a Zip disk's smaller capacity means that you can store fewer pictures per disk, and working with a Zip is slower than using optical CD-R media. Still, even CD-RWs won't replace the shoebox entirely. And who knows if we'll even have devices that read CD-RW discs 20 or 30 years from now?

—Melissa J. Perenson

Grace Aquino and Melissa Perenson are associate editors, Alan Stafford a senior editor, and Harry McCracken an executive editor for PC World. *PC World Test Center performance analyst Robert James conducted the card reader tests.* ■

Fight Photo Fade-Out

INK JETS AND photo printers provide an easy, inexpensive way to generate printed mementos of your cherished moments. But how long will those prints last? To find the best options for maximizing the life of your prints, check out *Top of the News*, page 48.

PHOTOGRAPH MELISSA J. PERENSON

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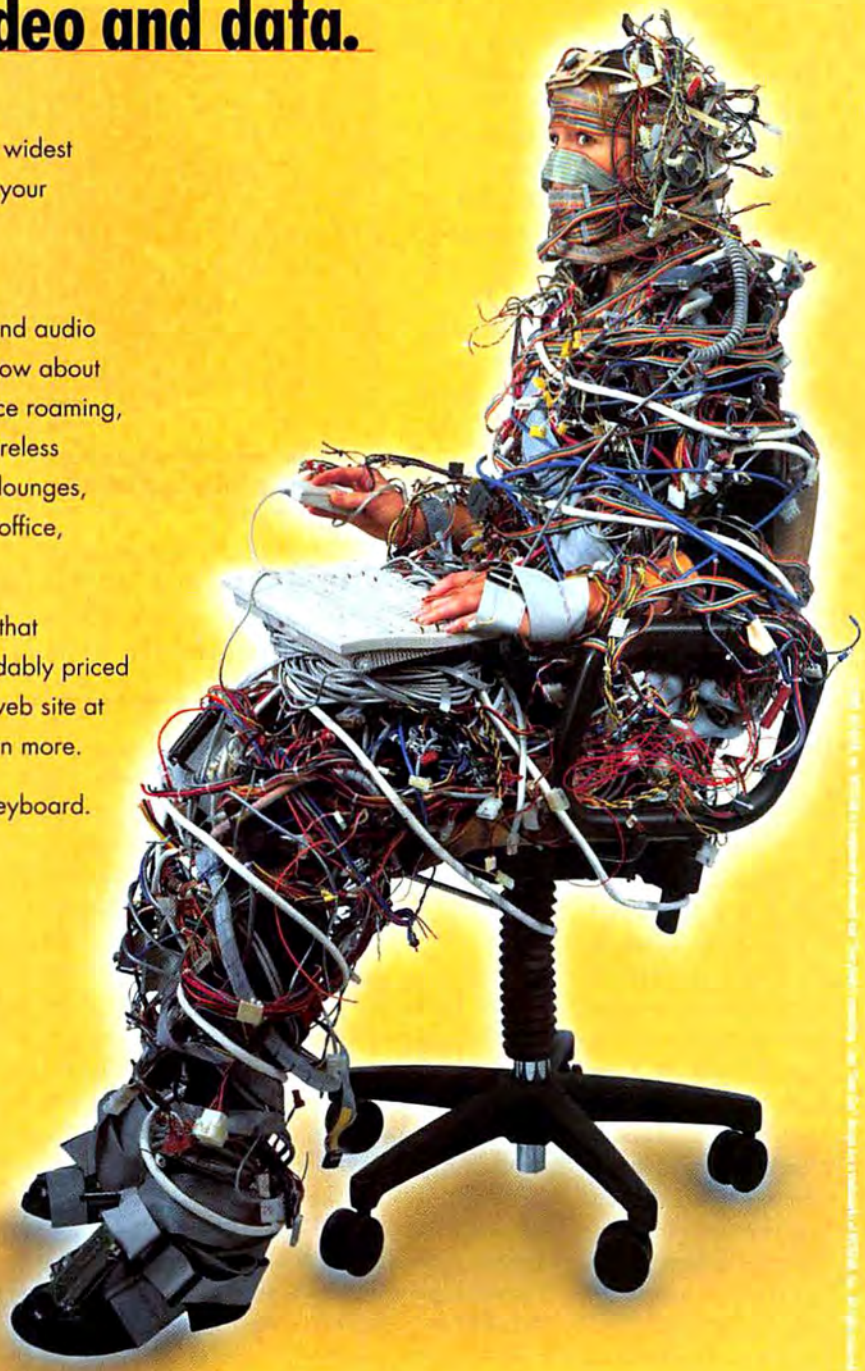

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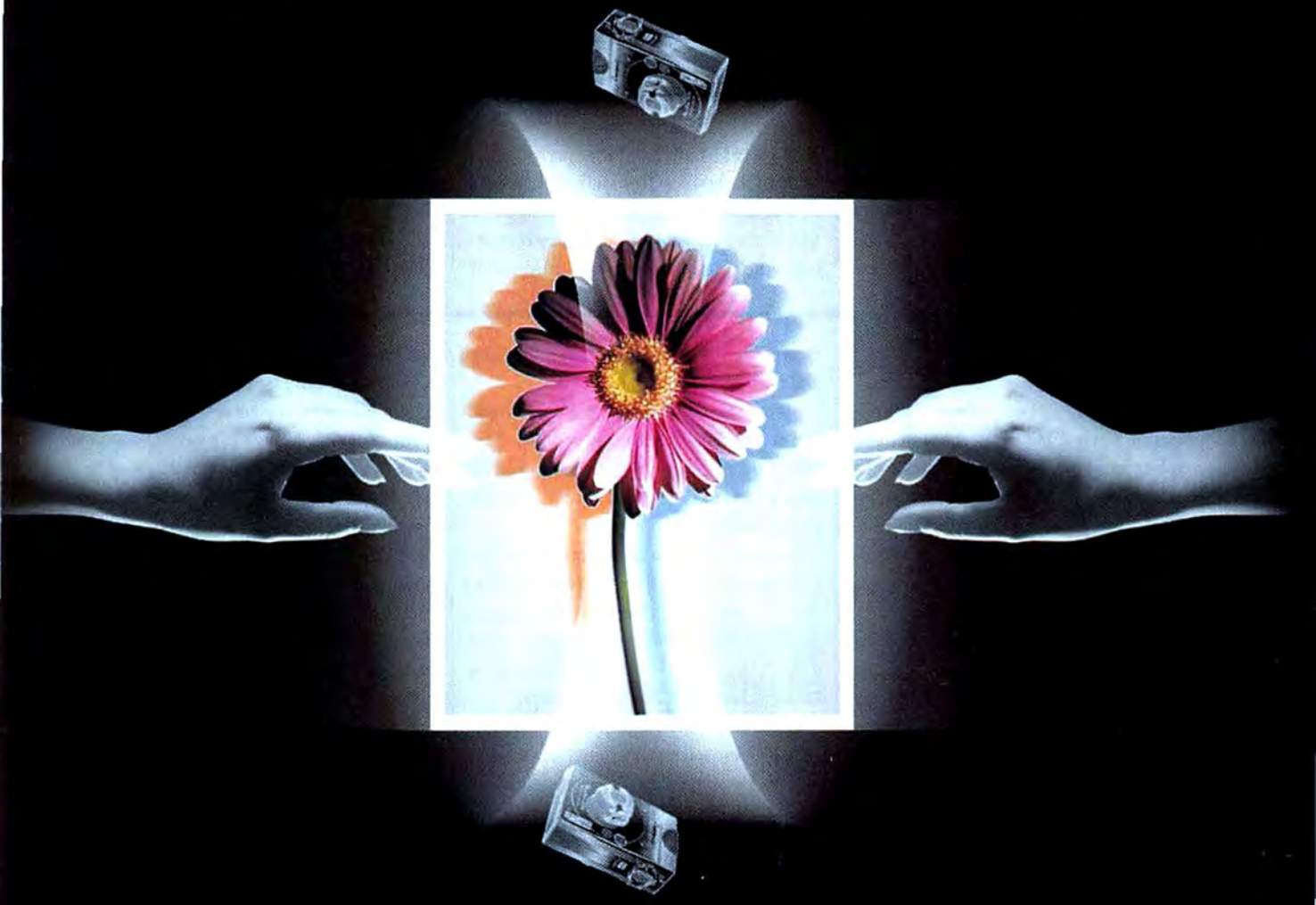
DESKTOP DARKROOM

You've taken a ton of pictures with your digital camera. Now what? Here's a step-by-step guide to transferring, enhancing, and sharing your photos.



EDITED BY GRACE AQUINO

SO YOU'VE BOUGHT a digital camera, or you're about to make the leap—no film, no negatives, no fuss. But there's another side to digital photography: the downloads, the tweaking, the printing, the archiving.

Sound complicated? It isn't, if you know the ropes and have the right tools. We show you the simplest and best ways of transferring your pictures to a PC, enhancing them, sharing them online, and ordering prints.

So take that digital camera to the ball game, to your sister's wedding, and to your buddy's Fourth of July barbecue. And read on for a bonanza of tips telling how to make the most of your desktop darkroom. ▶

PHOTOGRAPH BY GEOFF SPEAR

TRANSFER

NEARLY EVERY DIGITAL camera comes with the cable and software you need to transfer your photographs (which are usually stored on an included CompactFlash or SmartMedia card) to a PC. But using the bundled cable consumes a camera's battery power, and the process can be tedious—if the cable is too short, for example. For an easier and faster method that doesn't drain your camera's battery, invest $10 to $100 in a memory card reader.

Many card readers plug into a desktop's USB or parallel port and behave like any other external storage drive. Cable-free card readers are also available: For example, you can insert a FlashPath floppy disk adapter right into a computer's floppy drive. Another cable-free option is a PC Card adapter that allows you to plug a memory card first into the adapter and then into a notebook's PC Card slot.

After a card reader is installed, Windows assigns a drive letter to the reader (except in the case of floppy adapters, which retain the floppy's A: drive designation). As a result, you can easily access stored images on your CompactFlash or SmartMedia memory card through Windows Explorer and other standard applications.

Almost every memory card reader we evaluated outperformed a USB cable hookup from a digital camera to a desktop system. Most of the readers transferred digital photos at speeds ranging from one-quarter to one-third faster than the camera's bundled USB cable did.

The PC Card adapters performed the best, but only by an eyelash. The only exception to the memory-card adapters' speedy results: FlashPath floppy disk adapters for SmartMedia cards were far slower at the task than any other transfer method.

For this card reader evaluation, we tested 13 readers with various interface and media combinations. In determining our top choices, we looked for speedy transfers and a reasonable price. If your digital camera uses CompactFlash memory cards and your PC has a USB connection, we recommend using the $30 SanDisk Compact-

Top 10 Digital Cameras

STILL SHOPPING AROUND for a digital camera? Check our *Top 10 Digital Cameras* on page 185 for feature-by-feature comparisons of the best models in the current crop priced at $500 or less.

ENHANCE

WHEN YOU SEE an eye-popping photograph in a magazine or on the Web, you may wonder how the graphics pros do it. In most cases, they spend hours tweaking pictures using state-of-the-art programs. Here, we show you how to use an affordable, effective image editor—Adobe's $99 Photoshop Elements—to perform common enhancements with minimum hassle. Though this step-by-step guide is based on Elements' features, nearly every photo editor offers the same capabilities.

REMOVE RED EYES. *We're all too familiar with the red-eyed look of demonic possession that people and animals may acquire in indoor photos. Here's how to banish it.*

Step 1: Zoom in on the red eye until you can clearly see the boundary between the pupil and the iris.

Step 2: Select the *Elliptical Marquee* tool, and draw a circle over the red or orange portion of the eye (see **FIGURE 1**). Use the arrow keys on your keyboard to nudge the circle until it's in the proper position.

Step 3: Open the *Select* menu, choose *Feather,* and type in **5** for the number of pixels. This option blurs the edge of the selection so the effect won't produce a hard edge.

Step 4: From the main menu, go to *Enhance•Color* and choose *Hue/Saturation.* In this dialog box, decrease the saturation to its lowest possible level (such as the negative-100 setting shown in the example above), and lower the lightness setting slightly. This process will eliminate the red and restore the appearance of a dark pupil, yet the eye will retain the glint of a natural look.

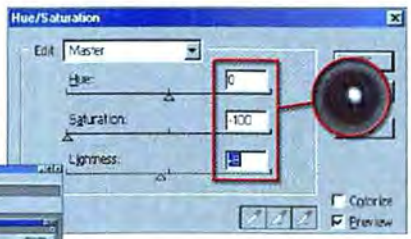


FIGURE 1

MERGE TWO PHOTOS INTO ONE. *Want to combine two separate photographs of, say, yourself and your house into a single picture? Simply follow these steps.*

Step 1: Choose the two photos you want to edit. Make sure that they have similar brightness, contrast, perspective, and (most important) resolution. If you're scanning printed photographs, scan at 300 dpi or higher to establish a margin for error (so both images have the same proportions in case you later need to enlarge one of them).

Step 2: Open both of the image files. The first picture should contain the object that you want to copy and paste onto another scene (the second photo). Select the *Magnetic Lasso* tool to snap the selection to the edges of the subject's body, such as the snappy dresser shown below in **FIGURE 2.**

Adjust the Magnetic Lasso's tolerance set-

FIGURE 2

PHOTOGRAPHS: PORTRAIT: RICK RIZNER; DOORWAY: EYEWIRE

Flash ImageMate (www.sandisk.com). But if your USB port is on the front of your PC rather than on the back, go with Microtech's $30 ZiO (www.microtechint.com), a compact, cable-free reader.

If your camera stores images on a SmartMedia card, try the $40 SmartMedia USB Reader from Lexar Media (www.lexarmedia.com). If you need to handle both CompactFlash and SmartMedia, consider using Microtech's $50 CameraMate USB or Lexar Media's $60 Universal Digital Film Reader USB.

Finally, if you use a notebook, the fastest, most convenient option is to use a PC Card adapter. Check out the $10 SanDisk PC Card Adapter for CompactFlash or Lexar Media's $12 version. SmartMedia card users can obtain the Olympus PC Card adapter for a steep $100.

—Melissa J. Perenson and Grace Aquino

CARD READERS TEST REPORT

	DEVICE	Connected via	Transfer speed (seconds) (Faster)
Transfer from CompactFlash card	PC Card adapter	PC Card slot	7.6[1]
	Card reader	USB	11.1[2]
	Card reader	Parallel port	12.9
	Nikon Coolpix 880 digital camera	USB	32.8
Transfer from SmartMedia card	PC Card adapter	PC Card slot	9.3
	Card reader	USB	13.7[3]
	Card reader	Parallel port	12.2
	FlashPath adapter	Floppy disk drive	239.8[1]
	Fujifilm FinePix 1300 digital camera	USB	43

TEST PC WORLD CENTER **HOW WE TEST** Using each camera's default settings, we took pictures to fill its 8MB card—one camera used a CompactFlash card; the other, a SmartMedia card. We downloaded the images to a 350-MHz Pentium II PC with 64MB of RAM and Windows 98 SE. For each reader, we inserted the memory card into the product's media slot or adapter and transferred the images to a PC, using the product's supported interface. [1] Average time for two different products. [2] Average time for three different products. [3] Average time for five different products, four of which averaged 12.8 seconds.

ting so that it can pick out the edges without straying from the proper boundaries. If the object is easily discernible from the background, increase the Width and Edge Contrast numbers in the toolbar. If the object blends into the background, decrease the settings. To fine-tune your selection, switch to the standard (nonmagnetic) *Lasso* tool, and zoom in on problem areas. Hold down the **<Shift>** key to add to your selection or the **<Alt>** key to subtract from it. Make sure you select any areas that need to be transparent (such as the section in the crook of the subject's arm).

Step 3: Go to *Select•Modify•Contract*, and type **2** for the number of pixels to shrink your selection by. That step eliminates unattractive fringing around the edges of the photo. Next, go to the *Edit* menu and choose *Copy*.

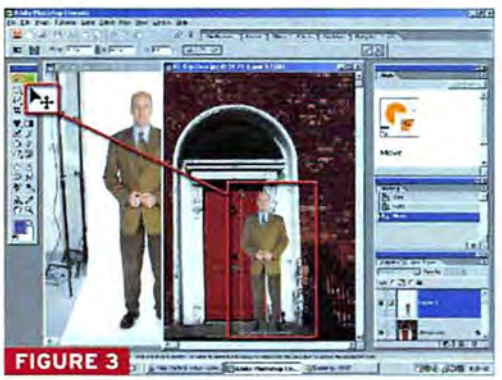


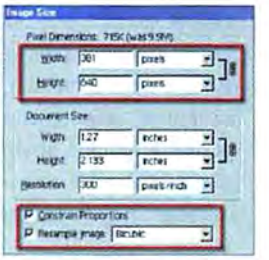
FIGURE 3

Step 4: Switch to the second image. From the *Edit* menu, choose *Paste*. This command creates a new layer containing the full body shot from the first image. Select the *Move* tool to resize the pasted object. On the corner of the object, drag the handles inward to shrink the object or outward to make the object bigger while holding down the **<Shift>** key to maintain the proper proportion (see FIGURE 3). Then press **<Enter>**.

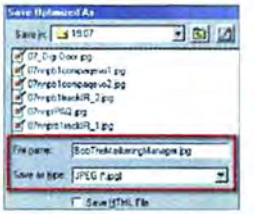
READY FOR THE WEB. *To ensure that the images on your Web site load quickly, try to make them small yet color-rich. Here's how to accomplish that task without a hitch.*

Step 1: Select the *Crop* tool, and use it to trim all useless background space from an image.

Step 2: Resize the image to make it large enough to appear legibly on screen. For Web posting, we recommend sizing images at 640 by 480 pixels. Go to *Image•Resize•Image Size* and check *Constrain Proportions*. Under Pixel Dimensions, change the larger setting (which is either width or height) to **640**. The smaller setting automatically changes to the appropriate dimensions. Tip: Since this operation discards pixels essential for high-quality printing, you should save this new, lower-resolution version as a copy.



Step 3: In the *File* menu, choose *Save for Web*, and select *JPEG* format in the box on the right side of the screen. Then check the *Progressive* box to see the image displayed as a low-quality preview that gradually improves as it loads on a Web page. To set the level of quality, use the preset buttons or the slider bar under *Quality*. This lets you see how the image degrades as you reduce its quality setting. Aim for an image size of 50KB to 60KB.



Step 4: Save your Web-bound photograph as a copy of the original. Omit spaces in the file name. 'Bob the Marketing Manager', for example, would appear as 'Bob%20the%20Marketing%20Manager' on a browser's status bar if you included spaces. To avoid this result, use underlines for spaces instead.

—Alan Stafford

SHARE

DIGITAL PHOTOS differ in many ways from their film-based forebears, but one thing sure hasn't changed: They're meant to be shared. Though it's a snap to do that sharing online, the printed photograph is far from obsolete. When was the last time you heard of someone cherishing a file attachment or preserving it for generations yet unborn?

We tried five leading photo sites, all of which provide tools for online sharing, and services for producing glossy prints with the look and feel of film-based snapshots. Most sites give away Web-based sharing services and charge for prints. But at press time, PhotoPoint was the first to convert to a subscription model, with annual fees starting at $20.

Our favorite photo site is Ofoto (www.ofoto.com), which Kodak is in the process of acquiring as a wholly owned subsidiary. With an intuitive interface, convenient sharing options, and good-quality prints, Ofoto has something for everyone—from casual picture takers to dedicated shutterbugs.

RELIVE YOUR VACATION MEMORIES: Ofoto's enhancement tools let you create a calendar that displays your favorite snapshots.

LEARN TO SHARE

UPLOADING YOUR PHOTOS to the Web is easiest if the site lets you browse your hard drive's folders and view thumbnail images on the fly. Ofoto and Zing do this particularly well. Once your images are online, you can label them, sort them into albums, and send e-mail alerts to friends and family so they know that your work's available for their enjoyment. Ofoto, Shutterfly, and Snapfish target folks who don't own digital cameras, too, by offering film-processing services: Send them your rolls of film, and they'll develop them and post digitized versions online.

Ofoto, Shutterfly, and Snapfish stick to simple album sharing; PhotoPoint and Zing provide a broader range of possibilities. Both, for instance, let you choose to restrict album access to visitors you specify or to leave them open for perusal by anyone who happens by. They also let you dress up photos with graphics and text, and then send them as e-greeting cards.

PhotoPoint goes furthest, with features such as mini-albums for Palm and Pocket PC handhelds. But PhotoPoint's user interface needs work; its cluttered look makes the site difficult to use.

Ofoto, Shutterfly, and Zing also let you use your browser to perform basic photo editing tasks, such as removing red-eye. This can be handy, but it's no substitute for using a dedicated image editing package like Adobe's Photoshop Elements. A site's browser-based tools tend to be bare-bones in features and sluggish in performance.

PRINTS CHARMING?

AT FIRST BLUSH, these sites' photo-printing services might seem superfluous if you already have a color ink jet printer that handles photos well. But their photo-finishing process beats ink jet quality, and the resulting prints aren't susceptible to fading or smearing—two common problems that beset ink jet prints. In addition, unlike single-purpose photo printers, each site's photofinishing service can produce prints in a range of sizes, as well as such novelty goodies as T-shirts and coffee mugs. (For a roundup of photo printers, go to www.pcworld.com/features/april2001/photos.)

Digital photo prints can look blocky if the image's resolution is too low for the

PHOTO-SHARING SITES FEATURES COMPARISON

SITE	What's hot	What's not	Print quality	Print costs (4 x 6/5 x 7/ 8 x 10/shipping[1])	Photo storage capacity/ time limit
Ofoto www.ofoto.com	Easy to upload via drag-and-drop or with downloadable applet; friends can add comments to your photos; prints come neatly packaged with an index print.	Lacks advanced password protection; no online greeting cards; can't display large photos at full size.	Good	50¢/$1/$4/ $1.50	Unlimited/ none
PhotoPoint www.photopoint.com	Tons of features; excellent print quality with a wide range of available sizes; large photo-sharing community lets you show off your work to other PhotoPoint users.	Cluttered interface; uploading photos is clunky; no film-processing service; only service here that charges an annual fee (starting at $20).	Good	50¢/$1/$3/ $3	1GB/ 1 year
Shutterfly www.shutterfly.com	Simple to use; easy to upload multiple images via drag-and-drop or with separate program; prints come neatly packaged with an index print.	Guests can't add comments on photos; no online greeting cards; photos displayed at rather small size and can't be enlarged; overnight shipping is pricey.	Very good	49¢/99¢/$4/ $1.49	Unlimited[2]/ none
Snapfish www.snapfish.com	Convenient Web-site design; slick drag-and-drop uploading of photos, with thumbnail view and no need to download a separate application.	Lacks advanced password protection; no online greeting cards; can't display large images at full size; no express delivery option; no wallet-size prints.	Good	59¢/99¢/$3/ $2.49	60MB/ none
Zing www.zing.com	Ability to let others contribute photos and links to your albums; good tools for uploading images and controlling access to photos; e-greeting cards.	Some features aren't optimally easy to navigate; prints could be packaged more securely for shipping; no wallet-size prints; no film-processing service.	Fair	50¢/$1/$3/$2	Unlimited/ none

Best Bet

[1] For 20 prints via standard shipping in the United States.

[2] 50MB for unprinted photos.

Have Projector, Will Travel

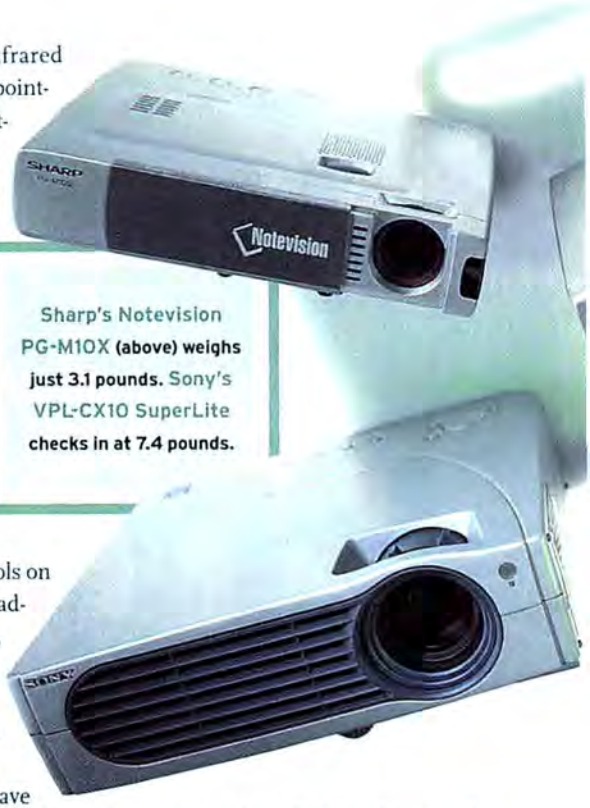
BY RICHARD JANTZ

We test the latest ultralight portable models to help you project a better image.

WHETHER YOUR CAREER involves sales, training, or finance, a portable projector can add energy and professional sophistication to your next presentation. Compact and light enough to take with you on the road, today's portable projectors weigh just 3 to 8 pounds—significantly lighter than the 10- to 15-pound models we saw a few years ago. The latest units also pack more power for the dollar, and they display brighter images at higher native resolutions; typically, portables use XGA (1024 by 768 pixels). Though street prices remain fairly steep, ranging between $4000 and $5000, these projectors offer portability and versatility that can pay off for mobile presenters. ▶

BEST BUYS: Compaq MP2800 (left), Proxima DP6150.

PHOTOGRAPHS BY BEVERLY HARPER



Sharp's Notevision PG-M10X (above) weighs just 3.1 pounds. Sony's VPL-CX10 SuperLite checks in at 7.4 pounds.

The trend toward smaller projectors owes much of its momentum to Texas Instruments' Digital Light Processing technology. In contrast to LCD technology, DLP uses a smaller-scale reflective system in which thousands of tiny mirrors project the image. LCD projector optics require larger panels, prisms, and mirrors. Compact DLP projectors still tend to be more expensive to produce than LCD units and feature brighter images overall; the larger LCD models generally deliver richer, more-saturated color.

The other trend to emerge in the past year: brighter projector lamps. Current portables are rated at between 700 and 1500 ANSI lumens, which is the industry-standard measure of light output. A 700-lumen projector is adequate for use in a small room with the lights down. A 1200- to 1500-lumen model, on the other hand, is suitable for use in large rooms with an office's low, ambient lighting—and will work well at distances up to 40 feet from the screen. All projector lamps lose their brightness over time. Many—though not all—manufacturers define lamp life as ending at the point when a lamp provides only half of its initial brightness; before buying a projector that you're considering, ask the vendor how it defines lamp life.

We evaluated six data projectors, three each in two weight classes. In the under-5-pounds group, we reviewed Compaq's $4999 MP2800, NEC's $4795 MultiSync LT155, and Sharp's $3899 Notevision PG-M10X. In the over-5-pounds category, we looked at Epson's $4899 PowerLite 715c, InFocus's $5399 Proxima DP6150, and Sony's $4999 VPL-CX10 SuperLite.

Both the Compaq and the Sharp units use single-chip DLP technology to display images; the other four projectors rely on a three-panel LCD design. All six have native XGA resolution and can resize images from VGA (640 by 480) to SXGA (1280 by 1024) resolution; only the Epson 715c and the NEC LT155 go higher, up to UXGA (1600 by 1200) resolution.

Since projectors appeal primarily to presenters, each unit includes an infrared remote control with an integrated pointing device that controls the computer attached to the projector. The projectors reviewed here support a USB, serial, or PS/2 connection—at least one type each—between the computer and the projector; some offer a combination of interface options. The built-in laser pointer found in the Compaq, NEC, and Proxima remotes make highlighting points in your presentation even easier; Sharp bundles a separate laser-pen pointer.

The units typically provide controls on the projector and the remote for adjusting image quality (brightness, contrast, color, and so on). But the Epson and the Sharp put most of their image-adjustment controls only on the remote.

Presenters who would like to leave their laptops behind will appreciate the PC Card slots on the Epson and the NEC. You can transfer static-image Microsoft PowerPoint presentations from a PC to removable media such as a CompactFlash card (when used with a PC Card adapter) or a PC Card hard drive, and then run the presentation directly from the projector. Simple presentations of this type are essentially a series of screen shots; forgoing the laptop means also doing without animation and sound.

Projectors usually include handy remotes for controlling computer presentations wirelessly.

In addition to handling presentations, portable projectors can display video—a training or marketing tape or a baseball game, say. Every projector we tested included the video and audio cables and ports needed to connect the projector to a PC or Mac, or to a video source such as a VCR, camcorder, DVD player, or television. The projectors here all have a computer (VGA) port and composite video and S-Video ports. The Epson 715c and Sony VPL-CX10 also provide component video ports. S-Video and component video can provide better signal quality because they separate the video signal into multiple, independently adjustable channels.

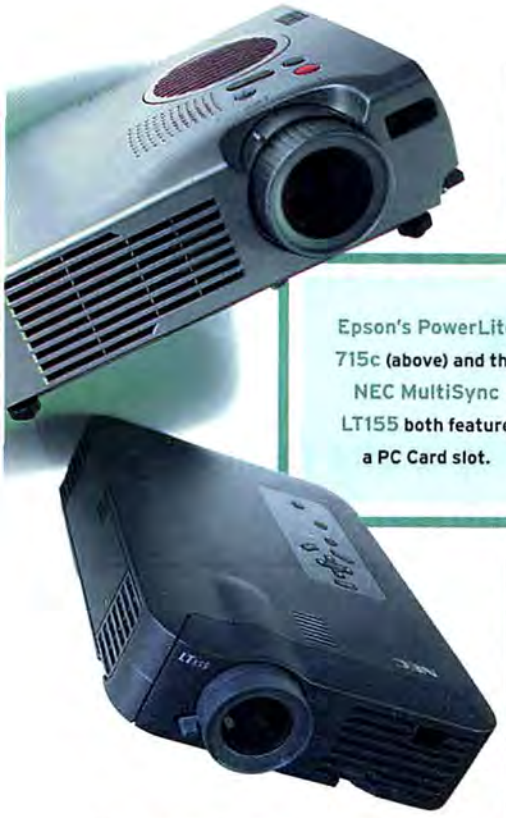
The Compaq MP2800 and Proxima DP6150 projectors both feature a DVI (short for Digital Visual Interface) connector to attach the projector to most digital graphics adapters. This all-digital connection in turn provides a cleaner, sharper projected image. The Compaq, the Epson 715c, and the NEC LT155 are the only tested models that offer signal support for high-definition TV. And only the Proxima offers a dual set of VGA ports for hooking up two notebooks—such as a PC and a Mac—at once, as well as VGA output for connecting a second monitor.

Though all the projectors include built-in sound systems, some fail to produce strong stereo sound. The Compaq provides a booming 8-watt single speaker, while the Proxima offers two 1-watt speakers, and the Sony two 0.5-watt speakers.

TEST ILLUMINATION

TO EVALUATE image quality, the PC World Test Center performed a side-by-side comparison of the projectors in each of our two weight classes.

We positioned the projectors to produce identical-size images. Because the Sharp PG-M10X lacks a zoom lens with an adjustable focal length, this projector had



Epson's PowerLite 715c (above) and the NEC MultiSync LT155 both feature a PC Card slot.

to be manually positioned relative to the others. We then viewed a series of slides chosen to emphasize the sharpness of either text or graphics, under two sets of lighting conditions: the ambient light of an office environment, and a completely dark room. Test images included color photographs, graphical Web pages, and color and gray-scale artwork.

All units were tested at their native XGA resolution. We also displayed a TV signal through each projector to evaluate how well the unit handled video. In selecting our Best Buys, we put a premium on overall quality of displayed text and graphics. Other factors we considered: sound quality, the ease of menu navigation, and the usability of the remote.

Our tests used the default projector settings, but all the projectors permit manual adjustment to optimize picture quality. For example, the Sony VPL-CX10 has a specific setting for improving text images by increasing the contrast, and the NEC LT155 provides choices for enhancing graphics in lighted and darkened rooms via gamma correction (which adjusts the overall image brightness) and color temperature options (which control image warmth).

The Compaq MP2800 clearly emerged as the top performer in the under-5-pounds group. In both lighting environments, it garnered the best overall ratings for text and graphics display. Text-heavy images—for example, a spreadsheet with columns of numbers (in 8-point Arial, Microsoft Excel's default font)—were particularly sharp and appeared uniformly brighter than those from either the NEC or the Sharp units. The Compaq's unique upright design throws the projected image higher, too, which may eliminate the need to adjust the projector's height.

In both sets of lighting conditions, the NEC LT155 displayed graphics marginally better than either the Compaq or the Sharp projector, exhibiting more vivid colors and crisper details. The Sharp projector displayed text-based images better than the NEC unit in both the ambient-light and the darkened-room tests.

The Proxima DP6150 bagged our Best Buy in the 5-plus-pounds group. Besides offering dynamic stereo sound and versatile input options, this model logged the best scores for display quality of text and graphics. Letters were sharp and legible, and graphics showed rich hues and dense color saturation. In test images of color scales, the Proxima displayed a greater number of discernible shades.

The runner-up in this weight class, the Epson 715c, bested the Sony VPL-CX10 across the board. The Epson couldn't touch the Proxima in most of our tests, but it came close with its high-quality images in ambient lighting. The Sony looked its best in the darkened room.

PROJECTOR WEIGH-IN

FOR PRESENTERS who travel frequently and do lots of small-group presentations, we recommend the Compaq MP2800. Though this model is a little pricier than the other two sub-5-pound units here, its sleek design and superior image and audio quality make it an excellent choice.

If you don't mind the extra weight and cost—and you would like to use the projector in a broader range of presentation settings—we recommend the 1400-lumen Proxima DP6150. The brightest unit of the bunch, the Proxima's versatility and excellent image quality make it a superior all-around presentation tool.

Richard Jantz is a freelance writer in the San Francisco Bay Area. ■

PORTABLE PROJECTORS FEATURES COMPARISON

UNDER 5 POUNDS	Street price (4/27/01)	Projector weight/ traveling weight (pounds) [1]	Brightness (ANSI lumens) [2]/ reflector type [3]	Lamp replacement cost	Parts and labor warranty (years)	Comments
Compaq MP2800 800/345-1518 www.compaq.com	$4999	3.4/6.5	900/DLP	$439	2	Excellent choice for displaying text; includes DVI; has detachable multimedia adapter for video and sound.
NEC MultiSync LT155 800/836-0655 www.nectech.com	$4795	4.9/9.1	1200/LCD	$495	3	Good choice for displaying graphics; includes memory card slot for PC Cards.
Sharp Notevision PG-M10X 888/467-4277 www.sharplcd.com	$3899	3.1/6.5	800/DLP	$515	3	More effective in dark rooms with no ambient light; only model that lacks adjustable-focal-length zoom lens.
OVER 5 POUNDS						
Epson PowerLite 715c 800/463-7766 www.epson.com	$4899	6.0/8.0	1200/LCD	$499	2	Excellent choice for displaying graphics; has PC Card slot (includes 8MB CompactFlash card).
InFocus Proxima DP6150 888/294-6400 www.infocus.com	$5399	7.9/12.5	1400/LCD	$499	2	Best overall image quality for text and graphics; includes DVI and stereo speakers.
Sony VPL-CX10 SuperLite 800/686-7669 www.sony.com/professional	$4999	7.4/11.5	1200/LCD	$299	3	Good choice for displaying text, but graphics quality is indifferent; includes stereo speakers.

Best Buy

[1] Traveling weight includes all accessories, such as carrying case, cables, and remote control.

[2] Industry-standard brightness rating.

[3] DLP = Digital Light Processing; LCD = liquid crystal display.

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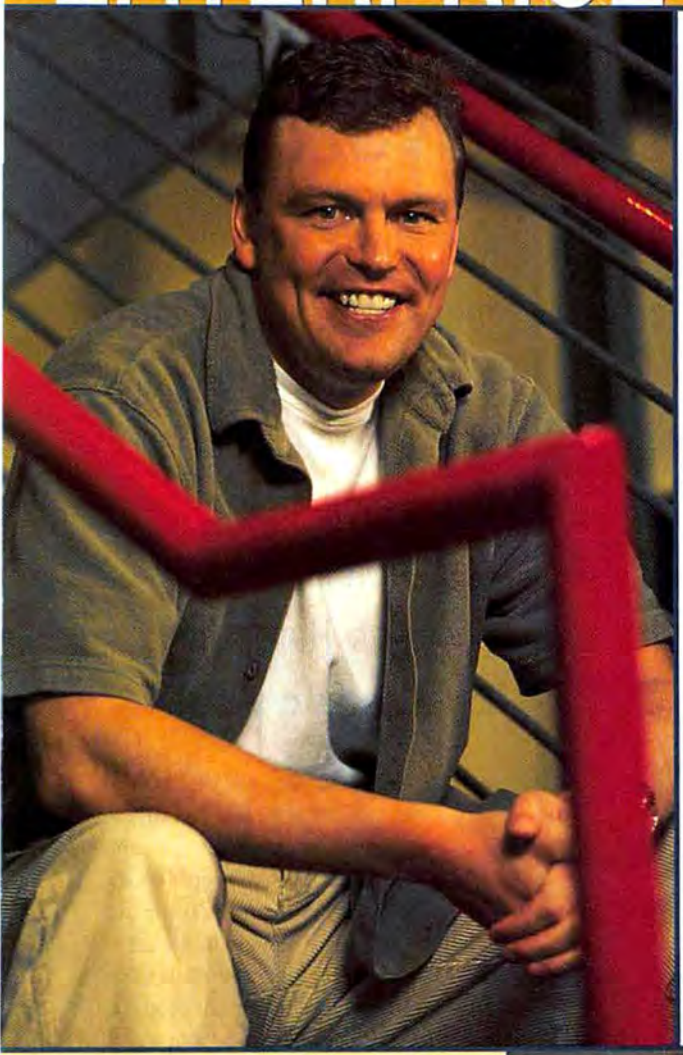
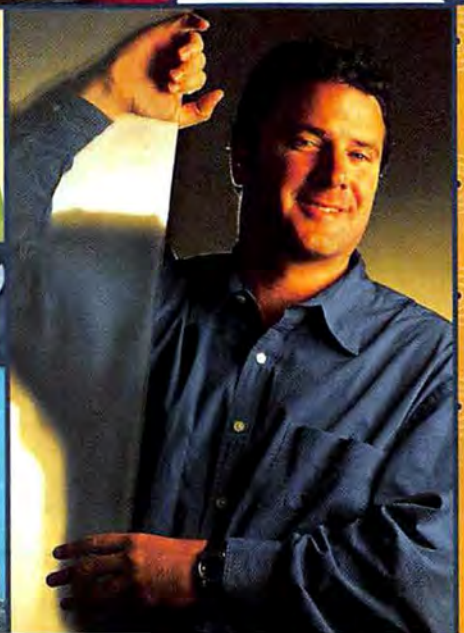
PC WORLD'S ENTERPRISE TECHNOLOGY



Content is the key to the success of any Web site. But once you've posted even a few pages, managing your material can become daunting. Text, graphics, video, and audio files all need to be organized and made easily accessible, preferably with as little manual labor as possible. Content management software is the answer—but the wrong choice can produce a financial and workflow nightmare. In this month's *Enterprise Technology*, we look at CMS options that range in price from a few thousand dollars to upward of $500,000 and deliver a wide range of features and benefits. In some cases you may be better off developing your own CMS. We'll help you decide.

Have comments on this *Enterprise Technology* section? E-mail suggestions and feedback to enterprise@pcworld.com.



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Choosing the Right Content Management System

ITS HOME-BUILT CMS was an "utter failure," says BestBuy.com's Greg Perry, so the company decided to buy an off-the-shelf product.

Modern content management software makes operating your Web site much easier—if you pick the right system for your business. Here's how.

By Fredric Paul

WHAT'S THE *least* pleasant part of running a Web business site? Whether they're in a Global 1000 boardroom or in a cubicle at a little dot com, Web people kvetch about CMSs the way farmers complain about the weather—often with the same sense of resignation. But as the following survey of content management products indicates, it doesn't have to be that way.

There are so many content types, from simple text and graphics to video and audio files. A successful CMS must integrate diverse content from various sources, customize it for the user or site, and deliver it in a format appropriate to the user's access device, which could be anything from a desktop PC to a mobile phone. Not surprisingly, vendors haven't come up with a one-size-fits-all program.

"Content management as an industry is still in its infancy," says Gordon Kent, director of product marketing at EBT (EBusiness Technologies), a CMS vendor based in Providence, Rhode Island. According to a small study by Forrester

Research, about 70 percent of the companies surveyed that use a commercial CMS have had it for less than a year.

Moreover, like all software, CMS suffers from a serious catch-22: If it includes enough extra features to satisfy every likely customer, it becomes impossibly hard to use. "The system has to try to accommodate a variety of users while still keeping some sort of order and consistency," says Timothy Appnel, director of technology for New York–based Agency.com, which has installed content management systems for many Global 1000 customers.

Though establishing the value of Web-based information as a strategic asset can be difficult, companies spend hundreds of thousands of dollars to try to manage their online content. They hope to gain a CMS that will help them understand and maximize the value of their content, and minimize associated costs by letting customers do much of the work themselves without relying on the Web site staff.

REPLACING AN UTTER FAILURE

TAKE BESTBUY.COM, an online electronics and entertainment retailer in Eden Prairie, Minnesota. "Like a lot of people, we started off developing a home-grown CMS," recalls Greg Perry, manager of the company's Content Systems Group. "Basically, it was an utter failure. It had no workflow and no stability, and it required custom development for everything."

Seeking an off-the-shelf solution last summer, the company looked at products from Vignette ("too expensive," Perry says) and Blue Martini, before settling on Interwoven's TeamSite, citing its strong workflow features and its ability to work with BestBuy.com's existing systems.

It took a team of 12 to 15 developers and business members three to four months to get BestBuy.com's system running. Though Perry wishes that Interwoven had had a smoother interface at installation time, he's pleased with the results overall.

THE VIEW AT GROUND LEVEL

FOR PEOPLE WHO actually work on a Web site, the difference between a home-made system and a good third-party CMS can be dramatic. Before monitor maker ViewSonic engaged Allaire Spectra to help manage its 5000-page site, "users would e-mail me and say, 'Here, this is a new product; put it up on the site,'" says Internet applications manager Amanda Allen. "With Spectra, once you have all the rules set up, it's very simple for them to put in the content themselves."

Those benefits are costly. CMS prices begin in the $15,000-to-$50,000 range, but the average deal size is $300,000 to $500,000, according to Nick Wilkoff, an analyst at Forrester Research. And that's just the cost of the software license. When you take services and deployment into account, Wilkoff says, users spend an average of nearly $2 million and from 8 to 14 months implementing a system.

What do you get for the investment? The answer depends on which CMS you choose. For a features comparison of major products, see the chart on page 148.

In general, however, Wilkoff divides vendors into four main camps:

Content management veterans: Companies such as CMS pioneers Vignette and Interwoven have been around almost as long as the Web itself and remain market leaders. Extremely powerful and versatile, their offerings are correspondingly expensive. Some, including Vignette, bundle e-commerce options into their products.

Document management vendors: Companies like Documentum and FileNet have drawn on their expertise in traditional document management to tailor products for Web content formatting and delivery. The resulting CMS programs tend to support strong management of workflow, ▶

CMS Decision Tree

Choosing the Right CMS for Your Company

"CONTENT MANAGEMENT is quite a broad umbrella," says London-based Alan Pelz-Sharpe, principal consultant for Ovum, a research, consulting, and analysis company, "but some systems are better than others for specific purposes." Here's how he describes the major categories of CMS users–and the types of systems they should consider.

YOUR BUSINESS: CONSUMER E-COMMERCE SITE

➤ Your transaction-heavy e-commerce business accumulates millions of small pieces of content (product descriptions, reviews, prices, and so forth) on a few large sites that serve information to a huge number of users, many remaining anonymous.

➤ You Should Consider: Vignette, BroadVision, and Open Market–e-commerce solutions that build content management into the package.

YOUR BUSINESS: MULTIPLE CORPORATE WEB SITES

➤ Your company is a diversified enterprise that comprises dozens of Web sites and hundreds of Web developers and content creators who are scattered across a number of different business units.

➤ You Should Consider: Interwoven, a content management system that relies on its strong workflow management to impose consistency on the many users who will post content to the system.

YOUR BUSINESS: BUSINESS-TO-BUSINESS SITE

➤ You operate a collection of large-scale intranet or extranet sites, working with a small number of large documents (contracts, procurement information, text files, and other unstructured documents) served to a known group of users.

➤ You Should Consider: CMSs with a document-management heritage, such as Documentum, FileNet, and Open Text.

YOUR BUSINESS: KNOWLEDGE MANAGEMENT

➤ You run a multinational corporation based in Europe (knowledge management is considered more credible on the eastern side of the Atlantic). Many people collaborate across the enterprise.

➤ You Should Consider: Open Text, Lotus Domino Document Server, and other pure document management and knowledge management software programs.

PHOTOGRAPH: STEVE WOIT

version control, and the overall process.

E-commerce crossovers: These companies are e-commerce software vendors that branched out into content management. Open Market made CMS its flagship product after it bought FutureTense in October 1999, and BroadVision acquired InterLeaf in January 2000.

Niche players: This segment of the market is composed of smaller companies that specialize in key areas. IntraNet Solutions, for example, concentrates on extranet and intranet deployments, and EBT is known for its work with XML (Extensible Markup Language), whose predecessor was the language HTML.

A subset of niche players consists of companies that offer solutions for smaller customers. These include Percussion Software's Rhythmyx Content Manager, PaperThin's CommonSpot 2.0, Reef's Reef Publisher 2.1, and Ektron's EMPower 2.5. These products cover the basics of content management, though they tend to be less configurable than the offerings of high-end players. Even Microsoft is entering the fray—at least tangentially—with its new SharePoint Portal Server.

Whatever its heritage, every CMS has to address a number of key issues, either alone or with the help of partners. According to both users and analysts, the three most critical areas are workflow and collaboration; integration with existing corporate infrastructure; and the ability to deliver content in multiple formats to a wide range of audiences and devices.

WORKFLOW AND COLLABORATION

COMPANIES MOST often choose a CMS because they want an automated workflow system for organizing content management tasks into a structured approval process, according to the Forrester study.

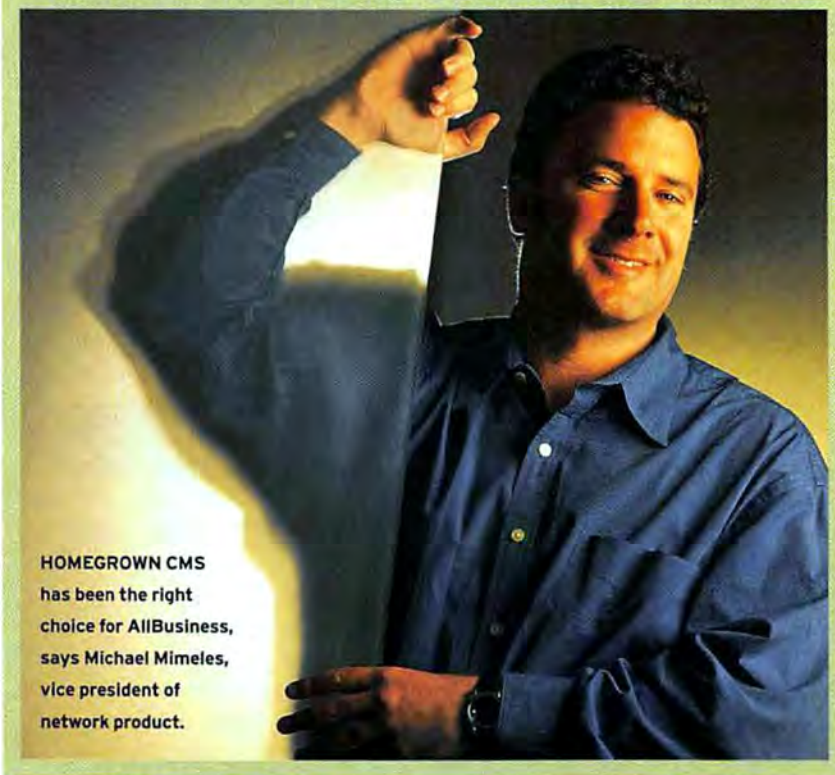
At financial services company Brown Brothers Harriman, for example, workflow was a key consideration in choosing EBT's Engenda. The new CMS is now running in a pilot project, but BBH will

CMS Self-Service Solutions

Grow Your Own CMS: Get What You Need, Done Your Way

FOR SOME COMPANIES, even the best CMS isn't good enough—or affordable enough. That's why firms like San Francisco-based AllBusiness, a leading provider of online resources for small businesses, have chosen to build their own CMSs rather than investing in an off-the-shelf product.

"When we started," recalls Michael Mimeles, vice president of network product, "we had to move fast and cheap. We figured that once we got to a point where we knew what we needed, we'd spring for a real CMS. But once we knew what we needed, we couldn't find one that was exactly right—every product was missing one piece or another. So we kept building our own content management tool, and after a while, we had a pretty cool product that does exactly what we need—mostly because it does *only* that."



HOMEGROWN CMS has been the right choice for AllBusiness, says Michael Mimeles, vice president of network product.

PHOTOGRAPH: ROBERT HOLMGREN

AllBusiness did not investigate other roll-your-own technologies, but there are other options apart from relying on Web authoring tools like Macromedia Dreamweaver or Microsoft FrontPage. In-house developers have three choices, says industry analyst Frank Gilbane, editor of *The Gilbane Report* in Cambridge, Massachusetts. First, they can work with open-source scripting languages like ZOPE, Perl, and PHP. Second, they can build a database application to track the metadata associated with each file. Third, they can write scripts to supplement the basic content management capabilities built into many e-commerce and application servers.

In many ways, homegrown CMSs behave like commercial packages. On a day-to-day basis, Mimeles says, the AllBusiness system allows contributors to do most things themselves, including creating and posting content and making small changes that don't affect the site's format. "The only problem," he says, "is that every time we want to make a big change—like altering the way a set of templates works—it takes three to four days of an engineer's time."

(Disclosure: The author spent 18 months as vice president of content at AllBusiness.)

eventually roll it out to the company's entire 10,000-page Web site. Ed Marcarelli, a managing director at BBH, predicts that 40 to 50 people will eventually be involved in the site's day-to-day updating, and "that number will probably grow as we expand the use of Engenda to the intranet."

Getting the details of the workflow right requires serious effort—in part because Brown Brothers Harriman, as a financial institution, must strictly control who can post material to its site. But Marcarelli says anything would be better than the old way of posting content, when pages were written in Microsoft Word and then e-mailed to the technology staff, who transformed the text into HTML using Dreamweaver and placed it on the servers.

"It was a multiple-step process that took a lot of supervision," Marcarelli says. "We were making do, but we didn't want to compromise quality. We think we've solved that problem."

Streamlining isn't the only way to improve workflow, however; companies also benefit from advanced technology. Observers praise the unique architecture of Open Market's Content Server 3.1. Most CMSs are designed to work smoothly with one or more application servers—from companies like Art Technology Group, BEA, and IBM—which handle tasks ranging from personalization and e-commerce to transaction management and load balancing. Application servers manage and serve apps or services throughout an enterprise and the Web.

The Open Market system promises to let nearly everyone in an organization—not just a few dozen or even a few hundred—contribute to a Web site. As the number of contributors grows, the program could pay big dividends by managing contributor requests just as load-balancing software manages end-user requests. Open Market is the only vendor currently offering this highly scalable architecture, but many others are headed in the same direction.

Every CMS has to address **three critical areas:** workflow/collaboration, **integration,** and **multiple formats.**

ENTERPRISE INTEGRATION

THE CMS YOU choose must also work well with your existing information systems. "Clients are heavily invested in their application servers, and the CMS has to be able to plug into that," Agency.com's Appnel says. That's why his firm regularly works with Interwoven, whose products support various enterprise architectures.

Telecommunications equipment maker Nortel Networks chose Interwoven for the same reason, says Larry Morton, Nortel's manager of Web application infrastructure. Nortel's public Web sites and extranets needed an open-standard tool that would work with any app laid on top of it. "We didn't want to go back to where each new commerce application had its own content-entry system," Morton says.

So should you buy an all-in-one solution or invest in an array of standards-based components? Both approaches have advantages, but the key issue relates to the technological infrastructure already in place. Often, larger content management systems have their own application servers, complicating efforts to tie them into the enterprise. Smaller firms may be able to avoid integration hassles by basing their entire e-business operations on a large-scale CMS system.

Sometimes, companies find, earlier decisions largely dictate what CMS to select. Infoworks project manager Robert N. Campbell says that for sharing internal technical and reference information at his company, engineering giant Bechtel in Houston, "It made sense to stay with Documentum [which relies on outside application servers and Web servers to deliver the content] because a lot of our content is already in Documentum formats."

PERSONALIZATION AND XML

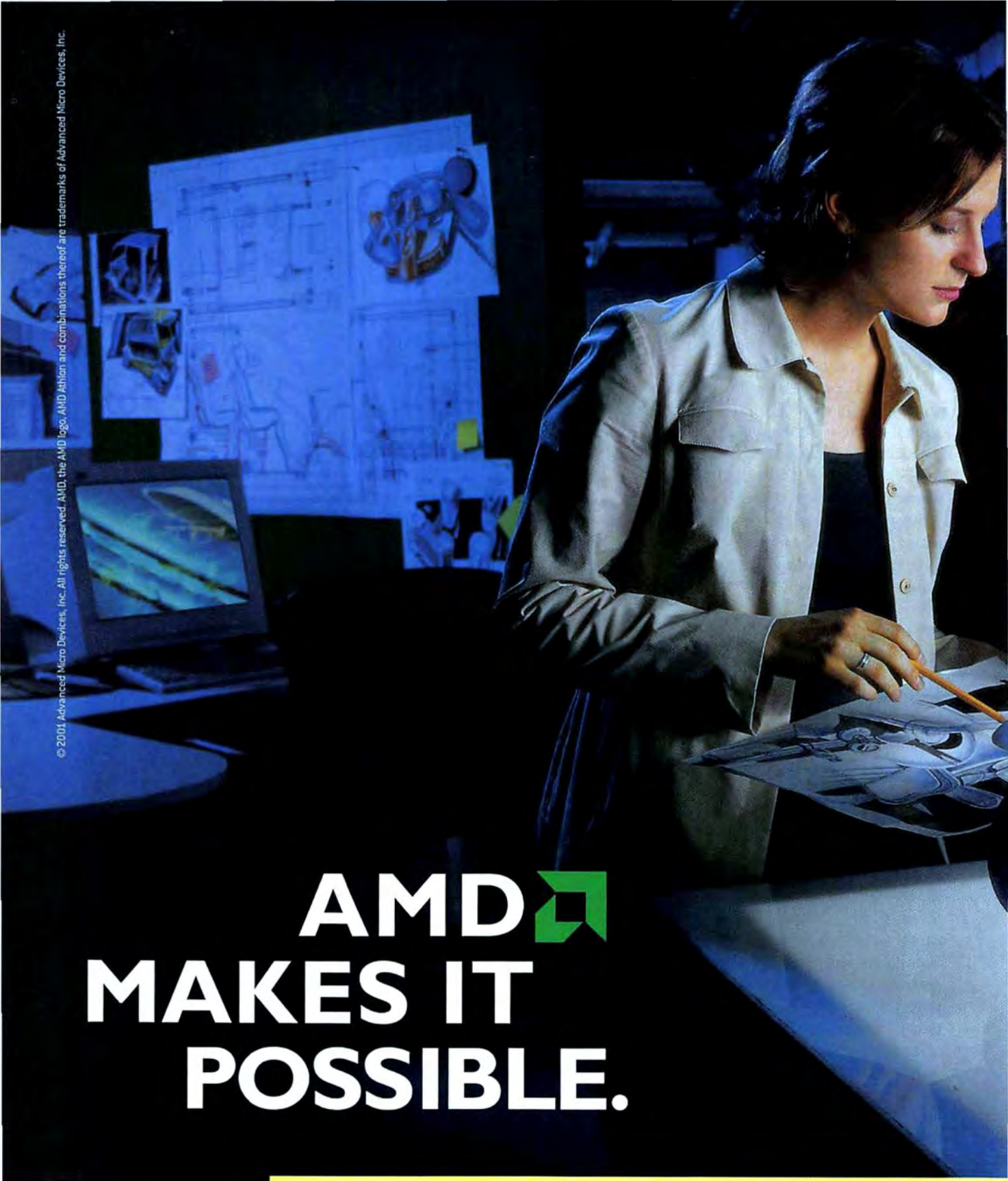
ANOTHER CONSIDERATION in appraising a CMS is how well it tailors content to specific system users, showing them what they want to see based on stored user profiles. Mike Maziarka, director at con- ▶

CMS Shopping List

The Ultimate Content Management Goodies Guide

THOUGH NO SINGLE CMS provides all the capabilities on this list, analysts suggest that you look for a product that offers as many of the following attributes as possible—either built-in or via well-integrated partners:

- ➤ Enables easy, direct contributions by a geographically dispersed and technologically diverse workforce.
- ➤ Provides high-performance content-creation tools and works seamlessly with industry-standard tools.
- ➤ Customizes a complex workflow system for content creation, approval, and publishing, including file check-in/check-out, version control, and rollback (it can revert to an earlier version).
- ➤ Supports changes to relevant content through notification by subscription and e-mail.
- ➤ Provides an audit trail so that errors can be tracked easily.
- ➤ Scales to allow hundreds or thousands of people to contribute content.
- ➤ Automates publishing with flexible and powerful templates.
- ➤ Simplifies scheduling and launching content—and removing or storing content when it expires.
- ➤ Provides dynamic, on-the-fly page generation by assembling tagged and categorized content.
- ➤ Works with a wide range of industry-standard Web and application servers.
- ➤ Automates conversion of older content formats into various Web, wireless, and print formats, including HTML, XML, Acrobat, and WML.
- ➤ Stores tagged and categorized content in a central repository, and then distributes appropriate elements of that content to multiple formats.
- ➤ Handles both structured and unstructured content.
- ➤ Supports e-commerce functions.



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Does your business have less time to do more?

As one of the world's premier design firms, frog design has to meet incredibly short deadlines. Case in point: a famous global car company asked frog design to concept and execute the interior of their new electric vehicle. Usual turnaround time: up to a year. However, the car company needed the new design in just ten weeks. To handle the latest, most complex software, frog design relied on a system based

on an AMD Athlon™ processor. The designers were thrilled with the dramatically reduced rendering times. And the IT guys were even more impressed with the reliability of the AMD-based system. The result? An inspired design, delivered on time and on budget. If your business needs an edge meeting shorter and shorter deadlines, find out how AMD makes it possible. Learn more at www.amd.com/frog

AMD

sulting firm Cap Ventures in Norwell, Massachusetts, says most high-end CMS products handle this aspect of personalization fairly well. The challenge, he says, is to deliver content in a format appropriate to a wide range of reception devices.

The key to success here is XML. This language is designed to provide context for each bit of content, making it clear that the number 86 in a Web document, for example, is a price and not an inventory quantity, the temperature in Miami, or an order to eject someone from the site. "It's like TCP/IP was for the Web," says Nazhin Zarghamee, vice president of marketing for Documentum, "a lingua franca for content management."

The big stumbling block for XML, of course, is what to do about legacy data—the content companies created back in the days when they posted information in flat HTML files. "Most Web sites don't have their content in reusable form," observes Nortel's Morton, "and we need tools to automate the process of making content available to be categorized or tagged." In many cases, the prospect of recoding tens of thousands of pages is too daunting.

Interwoven addresses legacy-data issues with MetaTagger, which automates tagging—adding metadata to—enterprise Web content. MetaTagger enforces tagging of new content as part of standard workflow. For existing content, the program's batch mode simplifies adding tags by establishing preconfigured categories for vertical industries and enabling users to tailor tags to their particular needs.

MANAGING PEOPLE, NOT CONTENT

IN THE END, content management is "as much about managing the users as it is about managing the content," says Forrester's Wilkoff. The employees responsible for content are typically scattered across the organization. Unless all parties involved find that it helps them work more effectively, no amount of spiffy technology will make your content management system a success.

Leading Content Management Vendors, Head-to-Head

The table compares prices, features, and technologies for nine enterprise-level content management software companies, arranged in alphabetical order.

COMPANY	Product	Price [1]	Implementation time	Intended for	Comments
BroadVision Redwood City, California www.broadvision.com	One-to-One Publishing 5.5	Average, $470,000	3 to 6 months	Global 2000 companies seeking to build complete e-business operations	Content management integration with rest of BroadVision's e-business suite remains incomplete. Partners with Interwoven and Documentum for some CMS functions.
Documentum Pleasanton, California www.documentum.com	Documentum 4i EBusiness Platform	Ten-user system, $50,000 and up; larger systems, $250,000 and up	3 weeks to 3 months for point installation; 3 to 6 months to start enterprise installation	Global 1000 firms, especially those with large content volume	Strong transition to content management from document management origins. Good workflow controls, XML handling, and scalability. Single virtual repository based on object model can be distributed across multiple servers.
EBT Providence, Rhode Island www.ebt.com	Engenda 4.7	Depends on number of users; base, $75,000; average, $150,000	Minimum 30 days	Manufacturing and financial firms, and large publishers and media organizations	Analysts say authoring interface is confusing, but program has graphical workflow creation and good XML support. Distributed authoring capabilities; works with existing file servers.
FileNet Costa Mesa, California www.filenet.com	Panagon Content Services 5.1, Web Services 3.1, Web Publisher 4.1	Average, $200,000; full enterprise installation, $500,000 to $1 million	2 weeks to several months	Insurance companies, financial services firms, and government agencies	Excellent document management functions, but still lacks key CMS features. Inconsistent user interfaces and tools. Best for serving static or infrequently updated content.
Interwoven Sunnyvale, California www.interwoven.com	TeamSite 5.0	Average, $298,000	Average first project, 8 weeks	Large multinational companies with complex sites and many types of data	Solid content management with good workflow features. Focused on creation and publishing, not delivery, so it's often used with ATG or WebLogic application and Web servers. Has strong technology partnerships.
IntraNet Solutions Eden Prairie, Minnesota www.intranetsolutions.com	Xpedio 4.0	Average, $199,000	A few weeks	Government; financial services, health-care, manufacturing, and high-tech firms	Strong transition from knowledge management to content management. Solid authoring and workflow tools make Xpedio a good choice for companies with lots of content types, lots of contributors, but few developers.
Macromedia San Francisco, California www.macromedia.com	Spectra	Pricing begins at $15,000 per server	6 weeks to 3 months	Applications where in-house ColdFusion expertise exists	Built around Macromedia's ColdFusion scripting language, Spectra is basically an application framework for building Web systems.
Open Market Burlington, Massachusetts www.openmarket.com	Content Server Enterprise Edition, including Content Server 3.1	Base, $100,000 to $150,000; average, $340,000	Minimum 4 weeks	Publishing, entertainment, manufacturing, and financial services firms	Company moved from e-commerce software to CMS with purchase of FutureTense. Its Java-based system—with support for XML and JSP—is deeply integrated with application servers to leverage their performance.
Vignette Austin, Texas www.vignette.com	Vignette V/Series E-Business Application Suite 5.6	Base, $125,000; average, $405,000 to $540,000	Minimum 30 days; 6 to 12 months for larger projects	Global 2000 financial services, manufacturing, and telecommunications companies	Content management pioneer now moving toward e-business. Version 5.6 aims to change perception of it as a tool kit rather than a finished solution. Strong delivery, personalization, and development tools.

[1] According to vendor.

SOURCES: Forrester Research/Doculabs, which tested content management software on approximately 600 different attributes, including integration, performance architecture, reliability, security, and customer support; and *PC World*.

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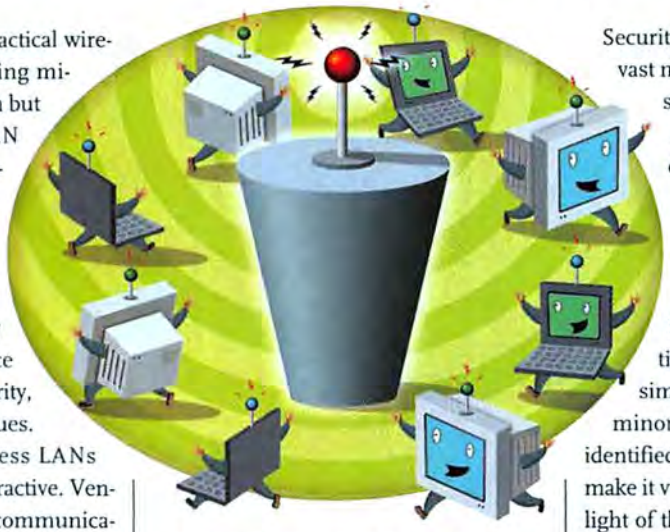
Wireless Networks Find a Home at Work



FOR SEVERAL YEARS, the practical wireless LAN has been an enticing mirage, hovering on the horizon but never arriving. Wireless LAN products have been used predominantly in schools, hospitals, warehouses, and similarly specialized workplaces. Mainstream firms, meanwhile, have tended to stay away because of performance glitches, concerns about security, and various compatibility issues.

Recently, however, wireless LANs have become much more attractive. Vendors have finally settled on communications and security standards, and the hardware has become considerably more reliable. Though wireless networks cost more and run slower than traditional ethernet networks, they offer some compelling advantages: Workers can access the network from anywhere in the office, and administrators get a streamlined, cable-free network setup.

So are wireless LANs finally poised to take off in the enterprise? Jason Smolek, a research analyst who covers corporate networks for IDC, thinks it's possible. "Last year was the first time the enterprise market as a whole came to see wireless LANs as a real possibility," Smolek says. "But many old-line firms still consider wireless LANs a luxury—unlike a switch or a router, which they consider essential."

According to IDC, wireless LANs could become a $1.5 billion business this year—if vendors can beat a slowing economy and resolve lingering technology issues.

According to IDC, wireless LANs could become a $1.5 billion business this year—if vendors can beat a slowing economy and resolve lingering technology issues.

One of the biggest obstacles—the lack of common standards—has already been overcome. Every major networking company has embraced the 802.11b wireless LAN standard, and most networks use the 2.4-GHz frequency band to transfer data—a combination that provides stable bandwidth at speeds up to 11 megabits per second, about one-ninth of the 100-mbps speed supported by newer ethernet LANs.

Cisco's Aironet 350 system is a typical example of a modern wireless LAN. The Aironet 350 has two main components: an access point that provides a bridge between the wireless LAN and an existing ethernet network, and wireless network interface cards for PCs and laptops. Cisco says an Aironet 350 access point has an effective range of about 250 feet indoors and up to 1300 feet outdoors. Many vendors, however, are vague about the difference between a system's maximum range—where bandwidth may top out at about 1 mbps—and the normal range within which a customer can expect to obtain maximum bandwidth. With the Aironet 350, Cisco says, you'll need to stay within 100 to 120 feet of an access point—depending on the building type and interference sources—to get bandwidth anywhere close to 11 mbps inside an office.

Security is another major concern. The vast majority of wireless LAN vendors support the Wired Equivalency Privacy protocol security standard, and many wireless LANs provide additional levels of security. Cisco offers customers 128-bit WEP encryption for the Aironet 350, along with both hardware and user authentication. Most other vendors provide similar security schemes with some minor differences. Researchers have identified weaknesses in WEP that could make it vulnerable to hackers, however; in light of this weakness, future versions of the 802.11*x* specification are expected to incorporate improved security.

For network management, vendors generally provide both Web-based and console access, treating each access point as an independent unit. Proxim's Harmony wireless 802.11b system is an exception, using an access point controller that allows a network administrator to manage multiple access points from a single location. Unlike most current wireless LAN products, the Harmony system's access point controller is also compatible with next-generation IEEE 802.11a 5-GHz technology designed to boost bandwidth to 54 mbps. When 5-GHz systems arrive, Harmony customers will have to replace only the less expensive access points and network interface cards.

Wireless LANs are still expensive compared to their wired counterparts. Most access points cost between $1000 and $2000; a wired hub and router combination may cost slightly less than $250. And wireless NICs can cost up to $200 apiece, compared to as little as $20 for a standard wired NIC and about $100 for a PC Card version. Wireless users do save about $200 per workstation on the labor-intensive process of installing a wired network, however—an expense that recurs every time you move or make a change, and one more reason to consider a wireless LAN.

—Matthew McKenzie

ILLUSTRATIONS: JOHN UELAND

Managing E-Mail: **Disappearing Inc.**

CAN E-MAIL HURT your company? Just ask Bill Gates, whose e-mail exchanges came back to haunt him during Microsoft's antitrust trial. E-mail is notoriously easy to forget, hard to destroy, and often filled with sensitive information.

"E-mail is now a factor in almost all business-related litigation," according to Michael Overly, a partner at the law firm of Foley & Lardner and an expert on e-mail–related legal issues. "Businesses routinely destroy paper documents to manage their liability, but that doesn't translate well to e-mail."

But there is a way to make your e-mail unintelligible. Disappearing Inc.'s Disappearing Email (www.disappearing.com) allows companies to set an expiration date on e-mail; when that date rolls around, the message content becomes unreadable.

The system consists of two parts: a client that works as a Microsoft Outlook plug-in (a version for Lotus Notes is in development) and a Web-accessible key server maintained and mirrored by Disappearing Inc. When a user creates a Disappearing Email message, the system encrypts it with a key from the server. People who receive the e-mail automatically download the key, which remains valid for a period set by the system administrator. When the key expires, however, no one is able to unscramble the message. Disappearing's approach means that people don't need special software (other than a Web browser) to read encoded messages, and e-mail that has expired becomes gobbledygook no matter how many times it gets forwarded and regardless of where it is stored. The enterprise edition allows system administrators to prevent users from sending plain-text e-mail, to set default expiration dates for messages, and to suspend the destruction of e-mail encryption keys if the company needs to keep copies of messages.

All this isn't cheap. The enterprise edition starts at $75,000 for a 1000-user package, which may be a bargain, however, if it keeps sensitive business information from outliving its usefulness.

—Matthew McKenzie

Keep Track of Your Customers **Online**

CUSTOMER RELATIONSHIP management has become a very hot topic for many businesses. And though lots of companies would like to use CRM software to track, measure, and facilitate communication with customers during every part of the business process—including sales, marketing, and customer service—only the largest are able to handle the cost and complexity of traditional CRM systems.

A handful of online start-ups, including Salesforce.com, SalesLogix, and UpShot.com, offer an alternative: inexpensive, Web-based CRM tools. These products can't match the power and flexibility of traditional client-server enterprise software, but they can provide many of the same functions at far less cost.

For a long time, application service providers have offered outsourced versions of enterprise CRM software from companies such as Oracle, Siebel, and PeopleSoft. But most of these programs aren't designed for the Web's speed constraints, and they require individual site installations.

According to Denis Pombriant, research director for the Aberdeen Group, subscription services from Web-based companies like Salesforce.com sidestep some of the difficulties. "These services have a very short implementation cycle: There's no hardware to install, no long-term support requirements, and no ongoing maintenance," Pombriant says. "Plus there are no out-of-pocket capital expenses—just a monthly per-user charge." You can also arrange to get locally stored backups of your data, and the services typically haven't had downtime problems.

WEB-BASED SERVICES, such as UpShot.com, say their CRM tools are easy for customers to get up and running.

Customer relationship management can produce enormous savings: A Web-based CRM system for 30 users can cost as little as $23,000 a year, versus $208,000 for a typical ASP installation and more than $370,000 for a client-server application.

Nevertheless, Web-based CRM isn't a good fit for every firm. "Some executives simply can't abide the notion that their data is going to exist outside the firewall," Pombriant notes. And even though these services tend to have strong sales-force automation tools, Pombriant says, they often lack the marketing and customer-support packages found in full-fledged CRM suites.

Ultimately, tough economic times may obviate most of the countervailing concerns, and Web-based CRM could find itself in greater demand.

—Matthew McKenzie ■

Big Doings In The Big Apple

PC XPO TECHXNY

All eyes are on New York City as it plays the perfect host to the information world at TECHXNY, the greatest technology show under one roof.

Change is the lifeblood of any organization. In today's dynamic and often frenetic world of information technology, change is the only real constant. But IT professionals know that too much change too fast can lead to confusion, which is why they seek out information and direction from sources that have served them well in the past.

For 18 years, PC EXPO in New York City has been a beacon of clarity, consistency, and quality shining through the remarkable changes that have marked the information industry during that time. On June 25, the 19th Annual Show kicks off at the Javits Center with a content-rich program, exciting show floor, and targeted events designed from the ground up to give direction and meaning to all the tumult and activity swirling about.

To stay a step ahead of the change, PC EXPO this year is a part of something totally new: Technology Exchange Week New York, or TECHXNY. By surrounding PC EXPO with an information-laden program, TECHXNY offers events targeted at such key communities as integrators and solution providers, start-ups, marketing professionals, "C" titles, and financial organizations.

Meanwhile PC EXPO continues as the exposition portion of TECHXNY with the same goal that has been the mainstay of the show for years—to showcase the very latest information technology, products, and solutions.

"PC EXPO has extremely loyal attendees who come back year after year to the event that gives them the solutions they are looking for," notes Christina Condos, Show Director. "Perhaps the greatest benefit for the tens of thousands of attendees is being able to see and do it all under one roof. Our exhibitors rely on the event to reach the vastly important New York business audience, and our attendees rely on PC EXPO to bring them up-to-the-minute information on products and solutions."

Continued on page 3

SHEEP ARE EASY.
LET'S SEE THEM CLONE A MULTI-COLUMN DOCUMENT.

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Continued from page 1

POWER PLAYS

What these attendees come to see are great products and great technology, the norm at PC EXPO. Head to the exhibit floor to catch a look at APC's Symmetra RM, a rack-mountable end-to-end power protection solution for the voice over IP (VoIP) market (www.apc.com). Using the supplied Web/SNMO Management Card, you can monitor and configure the Symmetra RM to shut down and reboot your systems, receive email alerts, and view the event log.

The Symmetra RM provides the major pieces of the VoIP availability puzzle: clean, continuous power and "ride through" power during brownouts and spikes; extended back-up power; hot-swappable redundant components that easily scale for growth; instant notification of UPS issues that could otherwise impede availability; remote control of selected power outlets; and ability to maintain optimal temperature and humidity.

OKI digital color printers: superfast and high-capacity

Symmetra RM is proving to be the ideal power protection solution for branch office locations, small and medium business data centers, and internetworking and telecom racks. With more servers, storage devices, and other business-critical IT gear becoming rack-based, the Symmetra RM answers this growing need for high-availability, rack-based power solutions.

APC's Symmetra RM: power protection for the VoIP market.

LIVING COLOR

While APC's power protection solutions keep the systems up and running, business end users have found that in today's world, there is no substitute for high-quality color in printed documents. In fact, with printed material, color increases overall readership by 80 percent on average, while retention of material increases even more with color versus black-and-white. Small wonder, then, that IDC expects sales of color printers to boom at an annual growth rate of 48 percent over the next several years.

That's why it's worth taking a close look at the C7000 and C9000 series digital color printers from Oki Data Americas, Inc. (www.okidata.com). These high-reliability printers speedily deliver superb color quality output with features that permit maximum user flexibility.

The C7000 series offers stand-alone as well as network business color printing at 12 pages per minute, with monochrome prints at 20 pages per minute. Using OKI's own Single Pass Color digital technology, the C7000 prints on up to 110 pounds of index-card stock while delivering true 1200x1200 resolution. It sports a powerful, 400-MhZ, 64-bit processor and is available with a 5-GB internal hard drive as well as two-sided printing capability.

The C9000 series prints full color as fast as 21 pages per minute while combining ease of use with high-capacity paper handling (paper capacity of up to 2,850 sheets) and low operating costs. The C9000 series can also print on postcard stock as well as ledger-sized layouts of 12 x 18 inches in size.

SCANNING THE HORIZON

Imaging expertise is also the name of the game at Visioneer (www.visioneer.com), which will show its Photoport 7700 and OneTouch 8820 USB scanners at PC EXPO.

The PhotoPort 7700 color flatbed scanner comes with a built-in CompactFlash and SmartMedia high-speed memory card readers. The scanner offers an optical resolution of 600 x 1200 dpi; 42-bit color; and five OneTouch buttons for storing, copying, emailing, faxing, and uploading digital images or photos.

PhotoPort technology is particularly well suited for digital camera users. Simply by inserting a SmartMedia or CompactFlash memory card or IBM

Continued on page 7

Visit APC at PC Expo Booth #3036

Some VoIP conversations should be interrupted, but never by power problems

APC provides all the components necessary for an end-to-end power protection solution for the VoIP environment.

The 7 pieces of the VoIP availability puzzle

- **Clean, continuous power** as well as **"ride-through" power** during brownouts, surges and spikes.
- **Extended back-up power** in the event of an extended power outage.
- Redundant, hot-swappable and scalable components to **allow growth** as well as **service without interruption.**
- **Instant notification of critical power/UPS issues.**
- Ability to remotely control selected power outlets in order to **reboot hung switches.**
- Ability to **ensure optimal temperature and humidity** within remote closets.
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APC provides all the components necessary for end-to-end power protection solutions for the VoIP environment – visit ***apcc.com/buy/*** and see what Legendary Reliability™ can do for your business.

Symmetra® RM

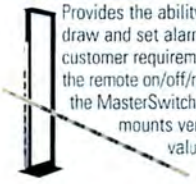
The new Symmetra RM puts the high availability of the proven and patented Symmetra® Power Array™ technology in a rack-mountable form.

Through the included Web/SNMP Management Card, you can monitor and configure your APC Symmetra RM to shut down and reboot your systems, receive e-mail alerts and view the event log.

Remote Monitoring

APC monitors all UPS parameters, tailored to your desired response. Regular UPS parameter and event reports are issued with event frequency, duration, and resolution, offering immediate enhancements to your investment.

MasterSwitch™ VM



Provides the ability to monitor the current draw and set alarm thresholds, based on customer requirements, while still providing the remote on/off/reboot capabilities found in the MasterSwitch series. In addition, it mounts vertically, requiring zero U of valuable rack space.

Environmental Monitoring Card

Works with your APC Smart-UPS® or Matrix-UPS® to monitor ambient temperature, humidity and other environmental conditions.

PowerChute® Inventory Manager

An invaluable software tool for anyone with a large number of APC UPSs spread across a wide geographic area. Via SNMP-enabled APC UPSs, schedule the software to gather information from the UPSs, then select any one of the eleven predefined reports.

Other APC products for the VoIP/Rack environment:

- **KVM Switches** provide one centralized control point for up to 64 servers.
- **ProtectNet** rack-mounted data-line protection.
- **PowerNet Manager** collects UPS/power status information for fast problem diagnosis
- **Cable Interface Kits** provide direct communication between UPSs and desktops, workstations and servers.
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Symmetra RM is easily manageable with the industry-leading network platforms.

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Cisco Systems Verified

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e1300 DIGITAL CAMERA AND POCKETCOLOR 200 PRINTER

Taking and printing digital photos as well as digital videos has just gotten a lot easier, and a whole lot less expensive, thanks to SiPix (www.sipix.com), the Digital Imaging Appliance Company. Targeting a range of customers from consumers and enthusiasts to business users, the new SiPix product lineup takes center stage at PC Expo.

Delivering a sharp 1.3 Mega Pixels for less than $200, the e1300 *Shoot & Share* digital camera makes taking high-quality digital photos as easy as point, click, and enjoy. The e1300 sports a 2x digital zoom and a 1.8-inch color LCD for accurate framing, previewing, and instant playback. The e1300 also comes equipped with the MGI PhotoSuite III SE for powerful yet simple photo editing.

When the e1300 is combined with the PocketColor 200 *Print & Share* pocket-sized color printer from SiPix, the result is a digital darkroom that goes wherever you go. Using advanced thermal color transfer technology, the PocketColor 200 weighs in at a mere 10.5 ounces—lighter than a typical day minder.

The PocketColor 200 produces continuous-tone high-resolution prints with remarkably silent and reliable operations while featuring a fast, hot-swappable USB interface to print with ease from a notebook or a desktop computer. Priced at an ultra-affordable $179, the PocketColor 200 printer is ideally suited for businesses such as insurance, real estate, or construction, where mobile professionals often would like to print a color photo taken on the spot but lack the convenience of an office with a desktop computer. Now shots can be downloaded directly from the e1300 to the battery-powered PocketColor 200 without going through a PC and printed out on the spot.

SCP-1000 DIGITAL CAMERA AND PRINTER

For some of us, the ultimate in convenience is a digital camera with a built-in printer. That's exactly what you'll get with SiPix's SCP-1000 digital instant camera and printer all in one. With a superb design engineered by IDEO, the SCP-1000 is priced at $299.

The SCP-1000 produces high-quality, continuous-tone two-inch by two-and-a-half-inch color prints, and its rechargeable lithium ion battery offers plug-free operations. In addition to the on-board memory, the built-in CompactFlash slot allows for easy expandability.

iQUEST ROAM DIGITAL CAMERA

Want to pump up the fun during those hours you spend online "talking" to friends? The iQuest Roam from SiPix is just what you need. For only $99 you get a full-featured video camera, video conferencing camera, and digital camera all in one. The iQuest Roam accepts removable, CompactFlash memory cards that augment its own 8 MB memory, which can hold up to 200 photos.

PACKAGES

POCKET PRINTER A6

If there is one thing your customers thrive on, it's instant gratification. But for the mobile professional, providing instant customer gratification can be a challenge—for instance, when a customer needs hard copy of important files.

Simply put, it's hard to take office equipment like printers on the road. Even if you could, where would you plug them in? Not only that, but the data and information contained in PDAs and other hardware favored by mobile professionals aren't easy to display or print for customers and clients.

That's why the Pocket Printer A6 from SiPix, Inc. (www.sipix.com) just might be the mobile professional's best friend. From the very first, it was built and designed to be a practical, low-cost solution to the fast-growing problem of sharing your handheld data with those who don't have a handheld of their own. For laptop users, the Pocket Printer A6 is a marvel of high print quality in a super-compact format. Even loaded with its four AA batteries, it weighs only as much as a small container of bottled water—about 14 ounces—so it can be carried anywhere.

Limitless applications

Measuring less than an inch thick and less than six inches wide, the Pocket Printer A6 delivers crisp resolution of 400 dpi from continuous-feed paper or from single sheets. Users have found a myriad of practical applications. You can take an order from a client and instantly print out a hard copy. You can write a memo or contract proposal or run an inventory analysis report, all with

instant hard copy available to your client. The same holds for wireless printing anywhere, anytime, of important email messages, expense reports, spreadsheets, calendars, contact lists, meeting notes, and on-site quotes.

With a suggested retail price of $149, the Pocket Printer A6 works with any Palm-powered PDA using the Palm OS 3.0-4.0. Its wireless infrared connectivity makes it the portable printer of choice for infrared-enabled devices: users can print directly to it without cables. A serial cable is included for non-infrared use, as well as an AC power adapter

As noted in a review by Brighthand, the independent community Web site dedicated to handheld computing, "Setup was remarkably simple. Just pop the batteries into the printer and put in the roll of paper, following the very clear instructions and pictures in the manual.... Printing is surprisingly fast and very quiet."

With the Pocket Printer A6, you don't have to fuss with ribbons or cartridges because its advanced thermal technology allows it to print directly on thermal paper. An automatic shut-off device powers down after three minutes of inactivity to conserve battery life.

In addition to the Palm OS support, the Pocket Printer A6 supports notebook and laptop computers with any Pentium processor or higher running Microsoft Windows 98/98SE/ME/2000. It is backed by a one-year warranty as well as toll-free technical support for the first year. Lifetime technical support is also available at no additional charge beyond the phone call.

Pocket Printer A6 from SiPix delivers instant customer gratification. Fits in the palm of your hand, works with any Palm-powered PDA, and prints on thermal paper.

Continued from page 3

Microdrive from your camera into a PhotoPort card reader automatically transfers images to your PC, creating thumbnails that are easy to recognize and organize in popular applications.

Visioneer's 8820 USB Scanner with transparency adapter offers full 5 x 7-inch transparency scanning for less than $200. The 8820 also offers a high-quality optical resolution of 1200 x 2400 dpi; 42-bit true color; and JPEG Enhancement Technology. The 8820 sports seven OneTouch buttons.

VERSATILE PDFS

And in a major new product announcement at the show, ScanSoft (www.scansoft.com) is unveiling the OmniPage Pro 11, an office productivity software tool that represents the fastest and easiest way to turn paper and hard-to-use digital documents into editable digital text and graphics.

The OmniPage Pro 11 combines the most accurate optical character recognition (OCR) technology with new functionality such as a user-friendly PDF input/output capability.

This allows the conversion of text and graphics in previously uneditable, read-only PDF files into a variety of file formats while retaining all of the document's original formatting. It also includes an output tool that converts any page or image into a PDF, allowing users to create searchable archives and to transmit files across platforms.

OmniPage Pro 11 uses IntelliTrain Proofing, which uses previous corrections to generate better OCR results throughout the document to reduce proofing time. The software also recognizes 114 languages, including those using Latin and Cyrillic alphabets.

Visioneer's PhotoPort 7700 color flatbed scanner

ScanSoft's OmniPage Pro 11: OCR with new functionality

MORE TO COME

In addition to great technology from vendors like these, other highlights at PC EXPO include:

The IT Innovation Conference. With a central theme—"Where can networked IT take your business from here?"—the conference features 20 dynamic sessions organized along three tracks: Business Applications & Tools; IT Infrastructure for Business; and Mobile Wireless Business.

Women Elevating Science Technology Awards. Working Woman will present these prestigious awards to five businesswomen who have broken new and important ground in information technology while blazing new trails for other women.

PC Career Expo. Whatever your reason for seeking another job—greater challenge, more money, more opportunity—you'll meet a host of recruiters from leading employers. The Help Wanted sign is out for programmers, engineers, network specialists, systems analysts, and Web developers.

Storage Area Network (SAN) Summit. Featuring industry experts, solution providers, and end-users, the summit is designed to provide vital SAN information that can be put to immediate use by corporate IT wrestling with the many network storage issues. Topics include load balancing, storage over IP, SAN/network area storage convergence, and storage management.

Finance Exchange. Geared specifically for the financial community, Finance Exchange utilizes workshops, lectures, and hands-on demonstrations to explore the productivity and competitive aspects of deploying leading-edge technologies such as wireless services and real-time decision support within the financial sector.

eTV World. This special conference zooms in on enhanced television and interactive broadband convergence while covering critical issues of content development and technology.

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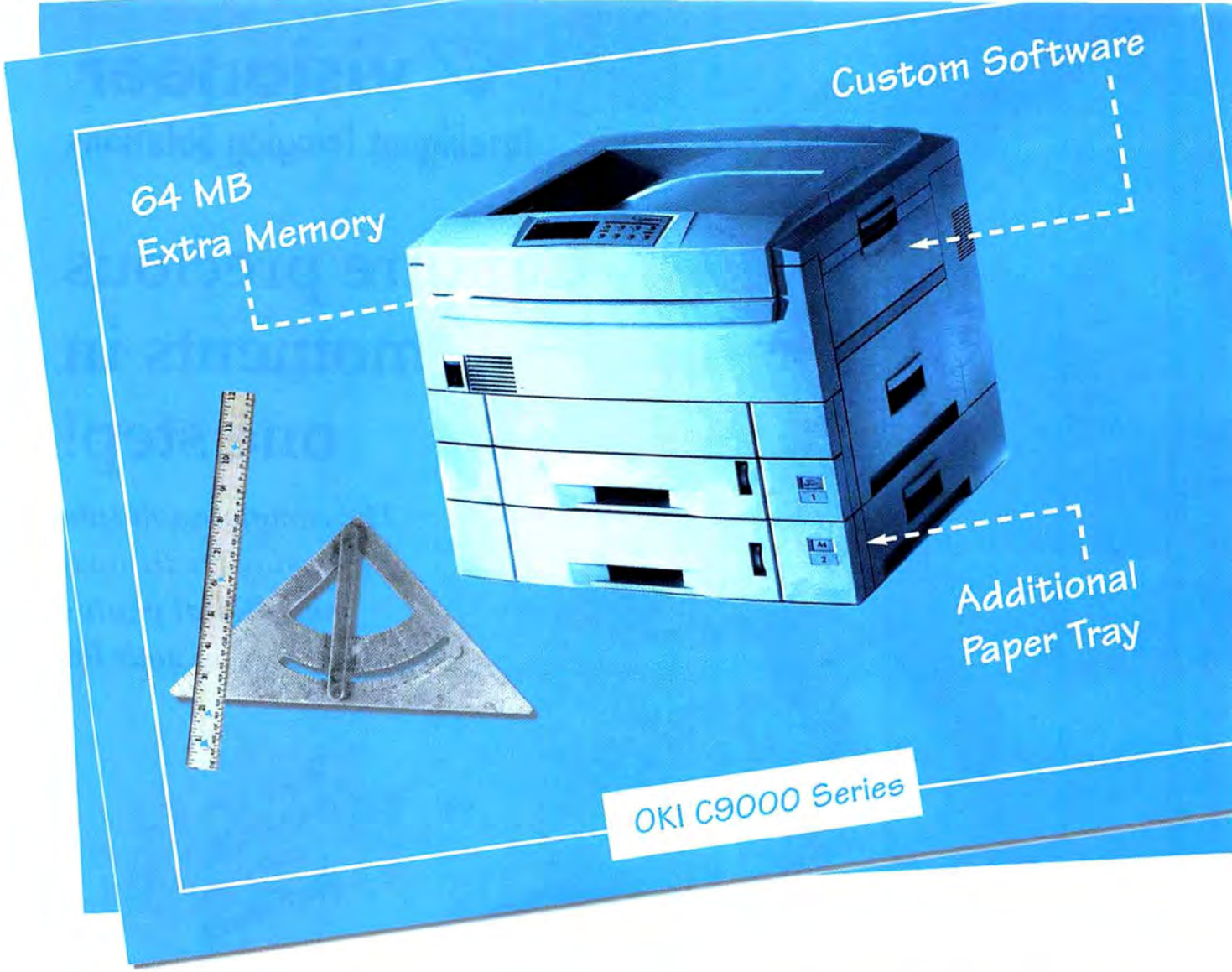

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PR960F • 5/01 PR960F • 6/00 PR960F • 7/00 PR1400F • 10/00 PR1400F • 1/00

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System Specifications

- Intel® Pentium® III Xeon™ Processor 1GHz/256K
- Intel® server board supports up to two Pentium® III Xeon™ processors
- Four 32-bit, three 64-bit PCI slots
- Integrated ATI graphic controller with 4MB memory
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- 512MB PC133 ECC SDRAM Memory up to 4GB
- 2 x 18GB SCSI hard drive with Raid and Hot Swap options
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THE OFFICE COMPUTING CHOICE

System Specifications

- Intel® Pentium® III Xeon™ processor 1GHz/256MB
- Intel® server board supports up to four Pentium® III Xeon™ processors
- Eight PCI slots (two 64-bit/66MHZ hot plug, four 64-bit/33MHZ hot plug, and two 32-bit/33MHZ)
- Integrated graphics with 2MB SGRAM
- Three integrated SCSI channels (two Ultra 160 SCSI, one Ultra Wide/Ultra Narrow SCSI)
- 1GB PC100 SDRAM memory up to 16GB
- 4x18GB hot swap SCSI hard drive with raid option
- Supports ten 1" or six 1.6" drives
- Integrated Intel® Pro/100+ Fast Ethernet controller
- 52X CDROM drive • 1.44MB Floppy drive
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PC WORLD

TOP 100

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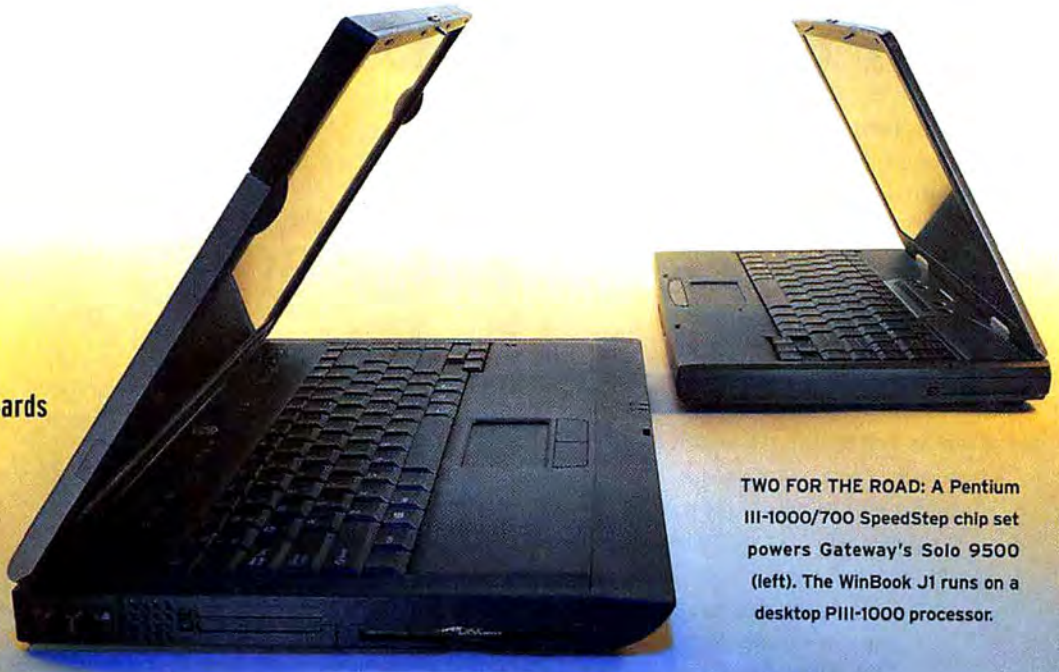
Gigs ON THE Go

Edited by Seán Captain



TWO FOR THE ROAD: A Pentium III-1000/700 SpeedStep chip set powers Gateway's Solo 9500 (left). The WinBook J1 runs on a desktop PIII-1000 processor.

HISTORICALLY, JULY IS A HOT MONTH—for weather and for processor power. Twelve months ago, the Top 100 welcomed its first 1-gigahertz desktop system, the Gateway Select 1000. This month, the first 1-GHz notebooks premiere. Once again, Gateway leads the charge: Running Windows 2000

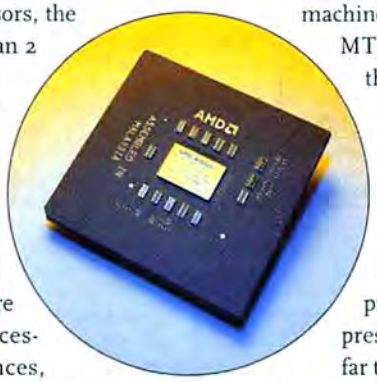
and equipped with a mobile Pentium III-1000/700 SpeedStep CPU, the Gateway Solo 9500 blasted to a PC WorldBench 2000 score of 191, setting a new speed record for portables and taking the number three spot in the power section of our *Top 15 Notebook PCs* chart.

But there's more than one way to get to a gig. This month's fifth-ranked budget notebook, the WinBook J1, shaves costs by plugging a standard desktop PIII-1000 processor into a laptop. Though it lacks Intel's battery-saving SpeedStep technology for mobile processors, the J1 still ran for more than 2 hours on a charge.

The latest PIII speedsters offer further evidence that the notebook world continues to belong to Intel. All 15 of the portables on our chart this month are powered by Intel processors—in most instances, Pentium IIIs. This occurred as Advanced Micro Devices temporarily retreated from the mobile market. AMD ceased production of its K6 mobile processor line around the end of last year, and its mobile Duron chip has not been picked up by many U.S. notebook vendors (though Sony does offer it in some notebooks). Competition on the portable CPU front will soon be heating up, however. AMD recently launched two new chips optimized for notebooks: the Mobile Athlon 4 and the Mobile Duron. Both incorporate AMD's PowerNow technology for conserving battery life.

The battle of the chip makers looks very different in the desktop arena, where AMD currently reigns as the speed king. While Intel's Pentium 4 continues to win the clock speed war—its latest incarnation runs at 1.7 GHz—AMD's Athlon, with its current maximum of 1.33 GHz, remains the overall performance champ in our tests. Three new high-end Athlon-1333 systems from Micro Express, Polywell, and Xi Computer captured spots in our power PCs lineup this month.

Running Windows 2000, the new systems averaged 224 on PC WorldBench 2000, compared to an average score of 205 for otherwise similarly configured 1.5-GHz P4 units. Our first 1.7-GHz P4 machine, HP's Vectra VL800-MT, came in a bit faster than its P4 siblings, at 209, but still finished about 7 percent behind the latest wave of Athlon systems.



AMD'S 1333-MHz Athlon sends systems to new heights on our Power PCs chart.

Athlon-based PCs are also winning the price war. The Micro Express MicroFlex 1333A, so far the fastest system we've tested with Windows 2000, costs just $1799. And our first Athlon-1300–based *Top 15 Home PCs* system, the HP Pavilion 7875, is priced low enough to qualify for the midrange sector of the Home PCs chart. Meanwhile, HP's Vectra VL800MT costs almost $4000—too high to make our *Top 10 Power PCs* chart.

You can expect a long, hot summer in the processor war, as both AMD and Intel plan to pump up clock speeds further.

A PICTURE'S WORTH 500 BUCKS (OR LESS)

AS THE POPULARITY of digital cameras grows, prices are coming down and selection is improving. In response, we're publishing our first top 10 ranking of digital cameras that sell for $500 or less. From now on, we'll alternate between sub-$500 and over-$500 cameras—showing you twice as many digital quick shots.

Speaking of quick shots—PC gamers, get ready: The PC World Test Center is now in the midst of testing various graphics cards based on NVidia's high-powered GeForce3 chip set. Check next month's *Top 10 Graphics Boards* chart to see how the pricey new models fare head-to-head.

Freelance writers Richard Jantz, Dan Littman, Joel Strauch, and Carla Thornton, and PC World *editors Richard Baguley, Tracey Capen, Lisa Cekan, Rebecca Freed, Alexandra Krasne, Heather Morra, Kalai Murugesan, Melissa J. Perenson, and Alan Stafford contributed to this month's Top 100 section. Ulrike Diehlmann, Matt Halloran, Robert James, Elliot Kirschling, Jeff Kuta, Danny W. Lam, and Thomas Luong of the PC World Test Center performed testing, with support from Julio Giannobile and Julian Weatherby.* *See page 14 for contact information.* ▶

online POINT YOUR browser to www.pcworld.com/reviews/topcharts for late-breaking reviews of desktop computers and other products covered in the Top 100. You can find details about the PC WorldBench 2000 test suite and how we run it 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, monitors, graphics boards, CD-RW drives, scanners, and digital cameras and compare them with previously reviewed products. Only the best products land on the 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 as 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.

PHOTOGRAPHS: MARC SIMON. ICONS: JEFFREY PELO

PC WORLD

TOP 10 POWER PCs

	POWER SYSTEM	Month tested	★ Overall rating	Street price (4/13/01)	PC WorldBench 2000 performance score [1] (Faster)	Base configuration
1	Dell OptiPlex GX400 800/388-8542 www.dell.com	NEW	86	Average: $2605	Good 203	**Very good:** Pentium 4-1400, 256MB of RDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 2000
2	Micron Millennia Max XP2 800/642-7667 www.micronpc.com	June 01	84	Average: $2414	Very good 210	**Good:** Athlon-1200, 128MB of DDR SDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 2000
3	Polywell Poly 880KR-1300 800/999-1278 www.polywell.com	NEW	83	Expensive: $2888	Outstanding 224	**Outstanding:** Athlon-1333, 256MB of DDR SDRAM, 256KB L2 cache, two 30GB hard drives, 19-inch monitor, Windows 2000
4	Micro Express MicroFlex 1333A 800/989-9900 www.microexpress.net	NEW	83	Inexpensive: $1799	Outstanding 231	**Good:** Athlon-1333, 256MB of DDR SDRAM, 256KB L2 cache, 40GB hard drive, 15-inch LCD monitor, Windows 2000
5	Gateway Professional S1500 800/428-3929 www.gateway.com	May 01	83	Average: $2018	Good 200	**Good:** Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 2000
6	Dell Dimension 8100 800/388-8542 www.dell.com	Feb 01	82	Expensive: $3079	Good 194	**Good:** Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 40GB hard drive, 19-inch monitor, Windows 2000
7	Sys Performance 1200TD 800/613-9963 www.sys.com	NEW	82	Average: $2153	Outstanding 220	**Very good:** Athlon-1200, 256MB of DDR SDRAM, 256KB L2 cache, 45GB hard drive, 19-inch monitor, Windows 2000
8	NuTrend Athlon Ultra 2 888/482-6678 www.nutrend.com	June 01	81	Inexpensive: $1799	Outstanding 169	**Good:** Athlon-1200, 128MB of SDRAM, 256KB L2 cache, 60GB hard drive, 19-inch monitor, Windows Millennium Edition
9	HP Vectra VL800 800/752-0900 www.hp.com/desktops	Apr 01	80	Very expensive: $3808	Good 208	**Outstanding:** Pentium 4-1500, 256MB of RDRAM, 256KB L2 cache, 40GB hard drive, 21-inch monitor, Windows 2000
10	Xi Computer 1333 DDR MTower SP 800/432-0486 www.xicomputer.com	NEW	80	Expensive: $3299	Very good 216	**Outstanding:** Athlon-1333, 256MB of DDR SDRAM, 256KB L2 cache, two 30GB hard drives, 19-inch monitor, Windows 2000
	Best Buy	Percent of overall rating ▶		Price: 10 percent	Performance: 25 percent	Base configuration: 10 percent

[1] 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 163.

[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] Five years on CPU and main RAM, three years on other parts.

DOES CLOCK SPEED MATTER? AMD's newest Athlon processor, running at 1333 MHz, trails its Intel Pentium-4 rivals on paper. But on the desktop, 1333-MHz Athlon systems handily defeat their P4 rivals, including a new 1.7-GHz HP model that was too pricey for our chart. Top speed doesn't always make a top contender, though. Our new number one, Dell's OptiPlex GX400, wins with strong user support and lots of business-class extras.

1 DELL OPTIPLEX GX400

WHAT'S HOT: The 19-inch Dell P991 monitor delivered deep, rich colors in our test images and NEW sharp text with only slight blurring at the maximum resolution of 1600 by 1200. The black, midsize tower case offers chassis-intrusion detection, a double-loop case lock, and four rear-mounted USB ports. Dell's OpenManage software permits system administrators to remotely perform upgrades, diagnoses, and maintenance. Expansion options abound, with five open slots and four open drive bays.

WHAT'S NOT: Only a basic information guide ships with this OptiPlex, though the OptiPlex Resource CD-ROM contains detailed documentation. Because this system uses expensive RDRAM, memory upgrades will add to its $2605 price tag.

WHAT ELSE: Armed with a P4-1400 CPU, 256MB of RDRAM, and Windows 2000, the GX400 earned a score of 203 on PC WorldBench 2000—about average for 1.5-GHz P4 systems with the same memory allotment and OS. The combination 8X/4X/32X CD-RW and 8X DVD-ROM drive saves space but doesn't match the speeds of the best separate, dedicated units.

BEST USE: With plenty of speed, a beautiful monitor, and high-end management features, the OptiPlex GX400 is a reasonably priced system for corporations that demand desktops with extra kick.

2 MICRON MILLENNIA MAX XP2

WHAT'S HOT: The 19-inch Micron 910EX monitor displays deep, rich colors, and its text remains sharp even at our maximum test resolution of 1600 by 1200. Three open PCI slots and three open drive bays provide tool-less expansion options. Two front-mounted USB ports—for a total of four—make plugging in peripherals easy.

WHAT'S NOT: Though typing is smooth on the basic, somewhat flexible Micron key-

Extra features	Design and expandability [2]	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Very good: Dell GeForce2 GTS graphics card (32MB DDR SDRAM), 8X DVD-ROM and 8X/4X/32X CD-RW combo drive, network adapter, Wake-on-LAN, Dell LegacySelect, OpenManage software	**Good:** case is a bit difficult to open; mid-size tower; 4 open drive bays, 5 open slots	Outstanding	Good/ Outstanding	24/7, toll-free	3/3
Outstanding: Creative Labs NVidia GeForce2 Ultra graphics card (64MB DDR SDRAM), 8X/4X/32X CD-RW drive, V.90 modem, Microsoft Office 2000 Small Business Edition	**Good:** front-mounted USB ports; midsize tower; 3 open drive bays, 3 open slots	Good	Good/ Outstanding	24/7, toll-free	Varies [3]/1
Outstanding: Leadtek GeForce2 Ultra graphics card (64MB DDR SDRAM), 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, network adapter, Lotus SmartSuite Millennium Edition	**Good:** tool-less access to slots; midsize tower; 5 open drive bays, 1 open slot	[4]	Fair [4]/ Good	24/7, toll-free	3/5
Outstanding: Gainward CardExpert GeForce2 Ultra graphics card (64MB DDR SDRAM), 12X DVD-ROM drive, 8X/4X/32X CD-RW drive, V.90 modem, network adapter	**Good:** large, neat interior; midsize tower; 3 open drive bays, 3 open slots	[4]	Fair [4]/ Outstanding	24/7, toll-free	4/4
Outstanding: ATI Radeon graphics card (32MB SDRAM), 12X/8X/32X CD-RW drive, V.90 modem, network adapter, Microsoft Office 2000 SBE, Norton AntiVirus 2001, Wake-on-LAN	**Good:** tool-less access to slots; midsize tower; 4 open drive bays, 2 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3
Outstanding: Dell GeForce2 Ultra graphics card (64MB DDR SDRAM),[5] 12X DVD-ROM drive, 12X/8X/32X CD-RW drive, V.90 modem, network adapter, Microsoft Office 2000 SBE, case lock	**Good:** well-organized interior; midsize tower; 3 open drive bays, 3 open slots	Outstanding	Good/ Good	24/7, toll-free	1/1
Very good: Gigabyte GA-GF128OT-32 graphics card (32MB SDRAM), 16X DVD-ROM drive, 12X/10X/32X CD-RW drive, network adapter	**Good:** neat interior; midsize tower; 4 open drive bays, 4 open slots	[4]	Fair [4]/ Good	24/7,[6] toll-free	Varies [7]/5
Very good: Leadtek WinFast GeForce2 GTS graphics card (64MB DDR SDRAM), 16X DVD-ROM drive, 12X/10X/32X CD-RW drive, V.90 modem, network adapter, Corel WordPerfect Office 2000	**Good:** drives don't match case color; mid-size tower; 3 open drive bays, 2 open slots	[4]	Fair [4]/ Good	9/5, toll-free	3/lifetime
Good: HP NVidia GeForce2 GTS graphics card (32MB SGRAM), 12X DVD-ROM drive, network adapter, HP's E-DiagTools, ProtectTools 2000, TopTools management software	**Satisfactory:** top panel difficult to replace; desktop; 2 open drive bays, 4 open slots	Good	Fair/ Good	24/7, toll call	3/3
Good: Leadtek WinFast GeForce2 Ultra graphics card (64MB DDR SDRAM), 16X/10X/40X CD-RW drive, V.90 modem, Microsoft Office 2000 Professional	**Good:** floppy drive hard to reach; midsize tower; 3 open drive bays, 2 open slots	[4]	Fair [4]/ Outstanding	24/7, toll-free	3/3
Extra features: 10 percent	Design and expandability: 15 percent	Reliability: 15 percent	Support and warranty: 15 percent		

[4] 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.

[5] At press time, Dell announced that it would upgrade this to a GeForce3-based card.

[6] Support hours drop to 9 hours Monday–Friday after one year.

[7] Six years on CPU and main RAM, three years on other parts.

board, the keys clack loudly and feel loose.
WHAT ELSE: With a 1.2-GHz Athlon CPU, 128MB of DDR SDRAM, and Windows 2000, this speedy Millennia achieved a score of 210 on PC WorldBench 2000—about what we'd expect from a machine with its configuration. The ample documentation includes a setup poster, a getting-started guide, and a technical reference manual. Microsoft's Office 2000 Small Business Edition comes bundled.
BEST USE: With easy upgradability, fine speed, and an excellent display, the XP2 has the chops for any small office.

New on the Chart

3 POLYWELL POLY 880KR-1300

NEW **WHAT'S HOT:** Running Windows 2000 and packed with 256MB of DDR SDRAM, this pewter-colored, 1.3-GHz Polywell scored an impressive 224 on PC WorldBench 2000. The system's pair of 30GB hard drives connected to an IDE RAID card should speed up disk-intensive tasks like video editing. The 19-inch ViewSonic GS790 monitor delivered brilliant colors with our test images and crisp, readable text with only slight blurring at its maximum resolution of 1600 by 1200. The zippy 16X/10X/40X CD-RW drive, 16X DVD-ROM drive, and top-notch Creative Labs Cambridge SoundWorks Desktop Theater 5.1 DTT2200 speaker set combine to make this system a full-fledged multimedia powerhouse.
WHAT'S NOT: The smart brushed-aluminum case clashes with the plain beige plastic of the system's monitor and keyboard, which clacks a bit and comes with a very small <Backspace> key.
WHAT ELSE: Thumbscrews secure the PCI slots, so you can swap cards quickly. Five open drive bays (four with external access) provide ample expansion room. The spiral-bound system manual offers detailed information, and Lotus SmartSuite Millennium Edition comes bundled.
BEST USE: If you can justify the $2888 cost, this Poly will give you serious processing power and multimedia extras. ▶

DELL'S OPTIPLEX GX400 tops our chart thanks in part to a stellar monitor, management features, and reasonable price.

PHOTOGRAPH: RICK RIZNER; COMPUTER SCREEN GRAPHICS: JOHN GODDARD

4 MICRO EXPRESS MICROFLEX 1333A

MICRON'S MILLENNIA MAX XP2 yields the top position to Dell's OptiPlex GX400 this month but remains a Best Buy.

NEW **WHAT'S HOT:** Equipped with an Athlon-1333 CPU and 256MB of DDR SDRAM, this $1799 MicroFlex 1333A sped to a PC WorldBench 2000 score of 231, setting a new record for Windows 2000–based systems. A Microsoft Natural keyboard allows smooth, quiet, and comfortable typing. Color-coded rear ports, a handy setup poster, and a well-illustrated system manual help get you up and running.

WHAT'S NOT: The included 15-inch LCD monitor displayed uneven color along the top of the screen and a vertical stripe of twinkly pixels. Micro Express's Web site often features systems that closely resemble those reviewed by *PC World* but cost several hundred dollars more, so check the specs carefully when ordering.

WHAT ELSE: The large, well-kept interior offers three available PCI slots and three open drive bays (all externally accessible). An 8X/4X/32X CD-RW drive is far from the fastest on the market but does a capable job of burning CDs.

BEST USE: It's not loaded with leading-edge extras, but the MicroFlex 1333A provides more than its sticker price suggests.

7 SYS PERFORMANCE 1200TD

NEW **WHAT'S HOT:** Sys packs an Athlon-1200 CPU with 256MB of DDR SDRAM into a reasonably priced $2153 package. The neat and spacious interior offers four available PCI slots and four open drive bays (two with external access).

WHAT'S NOT: The 19-inch ViewSonic PF790 monitor produced rich colors, but it delivered middling performance on text and graphics tests and flickered noticeably. The PC lacks an overall system manual.

WHAT ELSE: With a score of 220 on PC WorldBench 2000, the Performance 1200TD finishes right at the average for similarly configured Athlon-1200 systems. A metal loop for a case lock affords some theft protection, while the Wake-on-LAN–enabled network interface is ready for your office network. Microsoft's Internet keyboard, with ten hot-keys, lets you type smoothly and quietly.

BEST USE: The 1200TD is a solid, expandable system for small to medium-size businesses that need some extra power.

10 XI COMPUTER 1333 DDR MTOWER SP

NEW **WHAT'S HOT:** This unit is loaded with a 1333-MHz Athlon CPU, 256MB of DDR SDRAM, two 30GB hard drives in an IDE RAID configuration, and Microsoft Office 2000 Professional. The MTower SP's 16X/10X/40X CD-RW drive performs rapid data backups, and the Leadtek WinFast GeForce2 Ultra graphics board includes a DVI output for most digital monitors, plus an S-Video output for a TV, VCR, or other compatible device. The thick system manual packs helpful information, including a thorough glossary and an extensive troubleshooting section.

WHAT'S NOT: At a daunting price of $3299, the MTower SP is quite expensive. The system's RAID card, which is seated in the first PCI slot, is perilously close to the AGP slot, inviting the possibility that the IDE ribbon cables will touch the graphics board's cooling fan. A deeply recessed floppy drive makes inserting disks unduly difficult, and the rear ports are labeled with stickers that could easily fall off over time.

WHAT ELSE: This Xi's PC WorldBench 2000 score of 216 is about 4 percent below the average for similarly configured systems we've tested. Nevertheless, you're unlikely to notice the performance difference in regular use. The 19-inch Optiquest Q95 monitor produced sharp text at 1024 by 768 resolution, though it blurred somewhat at resolutions of 1280 by 1024 and higher. The mostly neat interior contains two open PCI slots and three open (and externally accessible) drive bays.

BEST USE: This system offers buyers many extras, but we've clocked better performance from lower-priced machines.

Also of Note

HP'S VECTRA VL800MT, a 1.7-GHz Pentium 4 system, earned a score of 209 on PC WorldBench 2000, setting a new speed record for P4 systems running Windows 2000. We admired the 19-inch HP P920 monitor, which produced vibrant colors and sharp text. And HP's bevy of management software makes this an ideal high-powered corporate system. Aside from the integrated sound and the absence of a CD-RW drive, the only feature we disliked was the whopping $3999 price—higher than the price of any other PC in our pool of contenders, and nearly $200 more than the ninth-place Vectra VL800, which has a 21-inch monitor. ▶

MICRO EXPRESS'S MICROFLEX 1333A sets a new speed record for Windows 2000 PCs but won't shred your budget.

MORE REVIEWS ONLINE

THE FOLLOWING systems didn't score high enough to reach the *Top 10 Power PCs* chart. For write-ups, visit www.pcworld.com/t10pcs.

- ABS Conquest SG
- HP Vectra VL800MT
- Tangent Medallion Pro+

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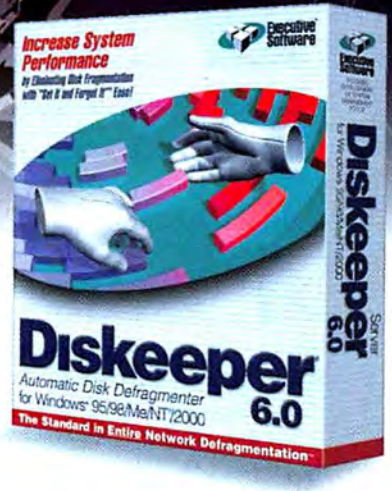

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PC WORLD

TOP 10 VALUE PCs

	VALUE SYSTEM	Month tested	★ Overall rating	Street price (4/13/01)	PC WorldBench 2000 performance score [1] (Faster ▶)	Base configuration
1	Dell Dimension 4100 800/388-8542 www.dell.com	May 01	85	Average: $1699	Very good 198	**Very good:** Pentium III-1000, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 19-inch monitor, Windows 2000
2	Dell OptiPlex GX150 800/388-8542 www.dell.com	June 01	84	Average: $1447	Very good 190	**Good:** Pentium III-933, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 2000
3	ABS Conquest GL 800/876-8088 www.abspc.com	Apr 01	84	Inexpensive: $1199	Very good 160	**Very good:** Athlon-1100, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows Millennium Edition
4	Micro Express MicroFlex 11C 800/989-9900 www.microexpress.net	Mar 01	83	Very inexpensive: $999	Outstanding 175	**Good:** Athlon-1100, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 17-inch monitor, Windows 98 SE
5	NuTrend Athlon Mega 2 888/482-6678 www.nutrend.com	Apr 01	83	Inexpensive: $1179	Very good 154	**Very good:** Athlon-950, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, 19-inch monitor, Windows Me
6	Micron ClientPro CN 800/642-7667 www.micronpc.com	Oct 00	81	Average: $1354	Very good 158	**Good:** Pentium III-933, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 98 SE
7	Tangent Valera 800/342-9388 www.tangent.com	May 01	81	Average: $1495	Outstanding 216	**Very good:** Athlon-1200, 256MB of SDRAM, 256KB L2 cache, 30GB hard drive, 17-inch monitor, Windows 2000
8	Gateway E-3400 XL Deluxe 800/428-3929 www.gateway.com	Mar 01	80	Expensive: $1792	Very good 190	**Very good:** Pentium III-933, 128MB of SDRAM, 256KB L2 cache, 40GB hard drive, 17-inch monitor, Windows 2000
9	Sys TaskMaster 850D 800/613-9963 www.sys.com	May 01	80	Inexpensive: $1190	Good 175	**Very good:** Duron-850, 128MB of SDRAM, 64KB L2 cache, 30GB hard drive, 19-inch monitor, Windows 2000
10	Gateway E-1600 XL 800/428-3929 www.gateway.com	June 01	79	Inexpensive: $1170	Good 179	**Very good:** Pentium III-933, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, 17-inch monitor, Windows 2000
	Best Buy	Percent of overall rating ▶		Price: 20 percent	Performance: 20 percent	Base configuration: 10 percent

[1] 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 163.

[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).

THE USUAL SUSPECTS occupy our *Top 10 Value PCs* chart. A Compaq Deskpro EN, the only new contender this month, fell short due in part to poor performance. Dell systems with essentially unchanged price tags retain the top two spots. But price drops from ABS and NuTrend nudge their systems higher.

1 DELL DIMENSION 4100

WHAT'S HOT: The latest update of Dell's Dimension 4100 sped to a score of 198 on our PC WorldBench 2000 tests, an impressive 20 points above the average mark for Pentium III-1000 systems carrying 128MB of RAM and running Windows 2000. In fact, this Dell's performance score rivals the average mark achieved by far more expensive 1.5-GHz P4 systems. The excellent 19-inch Dell M991 monitor (which captured a Best Buy in our most recent *Top 10 Monitors* chart dedicated to 19-inch displays) yielded vibrant colors in our test images and produced crisp text that began to blur only at the unit's maximum resolution of 1600 by 1200—higher than most users will need to go.

WHAT'S NOT: Though you can take off the side panel of this tall, thin, beige midsize tower by removing a single thumbscrew, snapping the panel back into place can require a bit more effort.

WHAT ELSE: The system's speedy 12X/8X/32X CD-RW drive allows accelerated data backups, and the software bundle includes Microsoft Office 2000 Small Business Edition. Five open PCI slots and four open drive bays offer plenty of options for extra devices and added storage.

The system manual contains lots of detailed troubleshooting information. A quick-setup poster and color-coded, icon-labeled rear ports aid assembly. Dell's QuietKey keyboard allows smooth but somewhat noisy typing.

BEST USE: Priced at a reasonable $1699, the Dimension 4100 runs circles around comparable PCs. Small to medium-size businesses will appreciate its performance and Dell's strong record for reliability.

2 DELL OPTIPLEX GX150

WHAT'S HOT: Upgrading or performing maintenance on Dell's stylish OptiPlex GX150 is easy: You can open the case and take the whole system apart without using any tools. Pressing a button on either side of the curvy, gray-and-black desktop case releases the lid, which swings up to reveal a small but well-arranged interior. You can

Extra features	Design and expandability [2]	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Good: ATI Radeon graphics card (32MB DDR SDRAM), 12X/8X/32X CD-RW drive, network adapter, Microsoft Office 2000 Small Business Edition	**Good:** replacing cover takes some work; midsize tower; 4 open drive bays, 5 open slots	Outstanding	Good/ Good	24/7, toll-free	1/1
Good: Dell NVidia TNT2 Pro graphics card (16MB SGRAM), 8X/4X/32X CD-RW drive, network adapter, Wake-on-LAN, Dell LegacySelect, OpenManage software	**Satisfactory:** easy-to-open case; desktop; 0 open drive bays, 2 open slots	Outstanding	Good/ Outstanding	24/7, toll-free	3/3
Very good: NVidia TNT2 M64 graphics card (32MB SDRAM), 16X DVD-ROM drive, V.90 modem, network adapter, Corel WordPerfect Office 2000	**Very good:** spacious interior; midsize tower; 4 open drive bays, 2 open slots	[1]	Fair [3]/ Fair	9/5, toll-free	3/lifetime
Outstanding: ELSA Gladiac 32 graphics card (32MB SGRAM), 12X DVD-ROM drive, 8X/4X/32X CD-RW drive, V.90 modem, network adapter	**Good:** loads of room for expansion; midsize tower; 3 open drive bays, 4 open slots	[1]	Fair [3]/ Outstanding	24/7, toll-free	4/4
Very good: Leadtek WinFast GeForce2 MX graphics card (32MB SDRAM), 16X DVD-ROM drive, V.90 modem, network adapter, Corel WordPerfect Office 2000	**Very good:** roomy but messy interior; minitower; 4 open drive bays, 2 open slots	[1]	Fair [3]/ Fair	9/5, toll-free	3/lifetime
Good: VisionTek TNT2 M64 graphics card (32MB SDRAM), 20X-48X CD-ROM drive, network adapter, Microsoft Office 2000 SBE, Norton AntiVirus, Intel LANDesk Client Manager	**Very good:** tool-less case removal; midsize tower; 5 open drive bays, 5 open slots	Good	Good/ Outstanding	24/7, toll-free	Varies [4]/3
Satisfactory: EVGA E-GeForce2 MX graphics card (32MB SDRAM), 12X-40X CD-ROM drive, network adapter, Corel WordPerfect Office 2000	**Good:** drive bays not easy to access; midsize tower; 4 open drive bays, 4 open slots	[1]	Fair [3]/ Good	16/7, [5] toll-free	3/3
Very good: ATI Rage Fury Pro graphics card (16MB SDRAM), 12X/8X/32X CD-RW drive, Zip 250 drive, network adapter, Intel LANDesk Client Manager, Microsoft Office 2000 SBE	**Satisfactory:** tool-less hard drive removal; desktop; 0 open drive bays, 3 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3
Good: Gigabyte GA-GF1280T graphics card (32MB SDRAM), 22X-50X CD-ROM drive, network adapter	**Good:** small but neat interior; minitower; 2 open drive bays, 2 open slots	[1]	Fair [3]/ Good	24/7, [6] toll-free	Varies [7]/5
Satisfactory: integrated Intel 810 graphics (UMA), 20X-48X CD-ROM drive, network adapter, Intel LANDesk Client Manager	**Satisfactory:** neat but tiny interior; compact; 1 open drive bay, 2 open slots	Good	Fair/ Outstanding	24/7, toll-free	3/3
Extra features: 10 percent	Design and expandability: 10 percent	Reliability: 15 percent	Support and warranty: 15 percent		

[1] 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.

[4] Five years on CPU and main RAM, three years on other parts.

[5] Support drops to 11 hours on weekends.

[6] Support drops to 9 hours Monday-Friday after one year.

[7] Six years on CPU and main RAM, three years on other parts.

remove or add most of the interior components, from the cards and drives to the power supply and motherboard, simply by finding and flipping the appropriate green switch or lever. The GX150 is no slouch at the races either: It earned a score of 190 on our PC WorldBench 2000 tests, 11 points above the average for similar systems with 933-MHz Pentium III CPUs running Windows 2000.

WHAT'S NOT: The GX150 lacks a reset button, and the system's rear wall—which supports the PCI slot cage—is a little flimsy. Printed documentation included with this system consists of a monitor manual, an OS manual, and a system guide that provides only basic setup information. (You can get the other documentation, however, on the included OptiPlex Resource CD-ROM or on Dell's Web site.)

WHAT ELSE: This system is filled with a number of corporate extras: remote Wake-on-LAN; Dell's OpenManage software; and security features, including a twin-loop case lock, a cable-lock slot, and chassis-intrusion detection. On top of that, the GX150 gives security-conscious administrators remote control over user access to various ports and drives. All of the components—including the mouse, the keyboard, the Harman/Kardon 19.5 speakers, and the 17-inch Dell E771p monitor—adopt the case's gray-and-black color scheme. The monitor rendered our test images with vibrant colors, and text was clear and legible at 1024 by 768 pixels, though it blurred a bit at the maximum resolution of 1280 by 1024. A basic 8X/4X/32X CD-RW drive, though not a top performer, provides the ability to copy CDs and burn data backups. Two of the system's four USB ports are easily accessible on the front of the case. Dell earned a score of Good for its technical support quality in our most recent reader survey.

DELL'S SLEEK BLACK OptiPlex GX150—loaded with corporate management features—retains its Best Buy position.

BEST USE: This inexpensive and feature-rich system should please everyone in your company—from system administrators to cost accountants to end users. ▶

PHOTOGRAPH: RICK RIZNER, COMPUTER SCREEN GRAPHICS: JOHN GODDARD

Also of Note

IN JULY 2000, the Gateway Select 1000 became the first 1-GHz system on our charts. Due to its relatively high $2899 price, it barely slipped in at number ten in our power PC lineup. This month, every system on the power chart runs at more than a gigahertz, and systems with CPUs clocked at significantly less than a gig are scarce even among our value PCs. At the same time, prices have tumbled quite a bit: This July's number one value Best Buy, the Pentium III-1000–powered Dell Dimension 4100, costs $1200 less than our first gigahertz system did. Last year, systems with low-cost processors such as the Intel Celeron held a number of spots among our budget PCs; but this year, Celerons are nowhere to be found.

The one new value system we tested this month, Compaq's Deskpro EN Slim Desktop, missed the chart mostly because of its relatively slow Celeron-733 processor. Running Windows 2000, it eked out a PC WorldBench 2000 score of just 140—20 percent pokier than the slowest Windows 2000–equipped system on our value chart, the Duron-850–based Sys TaskMaster 850D. The Deskpro EN we reviewed carried a fairly bare-bones feature set, too: a smallish 20GB hard drive, a garden-variety CD-ROM drive, integrated graphics and video, and no speakers.

We should note that this Deskpro targets corporations that demand relatively simple but highly manageable systems for large-scale deployment, in environments where breakneck speed is not essential. The Deskpro series offers a heap of corporate management features, including an easy-access case, tool-less drive bays, an automatic case lock, and hard-drive–monitoring software. At $1301, the Deskpro EN is not excessively costly, but other managed systems, such as our sixth-ranked Micron ClientPro CN, offer far more power for about the same cost.

MORE REVIEWS ONLINE

THE FOLLOWING system didn't score high enough to reach the *Top 10 Value PCs* chart. For write-ups, visit www.pcworld.com/t10pcs.

◆ **Compaq Deskpro EN Slim Desktop**

PRICE CHECK, PLEASE

MICRO EXPRESS, a vendor whose systems frequently appear on our charts, has been using an arcane pricing system on its Web site. The company often changes the name of systems reviewed by *PC World*. For example, the $1199 MicroFlex 11A we tested in the March 2001 issue became the $1099 MicroFlex 11B in April and the $999 11C this month. Every time that it changes the name, the company places a revised page on its Web site that you can find only by searching the site.

But until our magazine appears—several weeks after the pricing date listed on our chart—a reader won't know that the name has changed and that the price has dropped. If in the interim you call Micro Express and request the system by its old name, you may be quoted a higher price.

In response to our concerns, Micro Express said that it would change its site so that searches for the older model names will be redirected to the newer ones. At press time, however, searches for the 11B hadn't yet been redirected to the 11C. Our advice: If you're interested in buying a Micro Express system, try entering the name of the base model in the search engine and then working your way up the alphabet. For example, instead of searching for a MicroFlex 11C, try an 11D.

You should also pay careful attention to system specifications. Our initial search for the MicroFlex 11B turned up a system whose components differed from those on the system we tested: The PC listed at the Micro Express site had a slower hard drive, a less-expensive monitor, and no network adapter. Micro Express has since corrected those errors on its site. ▶

PHOTOGRAPH: MARC SIMON

CD-RW Writes Zip Out of the Picture

TECH TREND A YEAR OR TWO ago, Iomega Zip drives showed up on about one out of every eight systems that passed through the PC World Test Center. Today, we see Zip drives on only about one out of every thirty systems. What happened to Zip?

Along came CD-RW drives, which now appear in about a third of the systems we test. Costing upward of $200, the top-performing CD-RW drives are almost twice as expensive as 250MB internal Zip drives, but the media they use is considerably cheaper. "As far as [Zip drives] went, obviously they had some good capacity points, and performance was good," says Mary Craig, optical storage analyst for Gartner Dataquest. "The media pricing, though, couldn't be justified." When bought in bulk, 250MB Zip disks cost at least $11 each, versus just over $1 for 650MB CD-RW discs or about 50 cents for write-once CD-R discs.

For a while, Zip had a speed advantage, with a maximum sustained transfer rate of 2.4MB per second on the internal 250MB drives. But the latest 16X/10X/40X CD-RW drives can match that rate when writing to CD-R discs and come close (at 1.5MB per second) on CD-RW media.

CD-RW is especially popular on consumer PCs for copying music, says Craig. But CD-RW drives are also becoming more common on business systems as an alternative to tape backup devices. "Low-end tape drive shipments diminished considerably in 2000," says Craig. "Undoubtedly, CD-RW drives ate into that."

FADING INTO THE DISTANCE: Pricey Zip disks are losing out to CD-R and CD-RW media.

How long will CD-RW be the king of desktop storage? Its heirs apparent—DVD-RAM and DVD-RW drives—have some distance to go before taking the throne. The latest DVD-RAM drives offer vast storage capacities on 4.7GB single-sided and 9.4GB double-sided optical discs. But the hardware and media are far more expensive than their CD-RW competitors. The drives cost about $600, and discs, depending the type, run from about $25 to $40 each. So for now, CD-RW offers the best storage bargain.

ALL PC USERS!!

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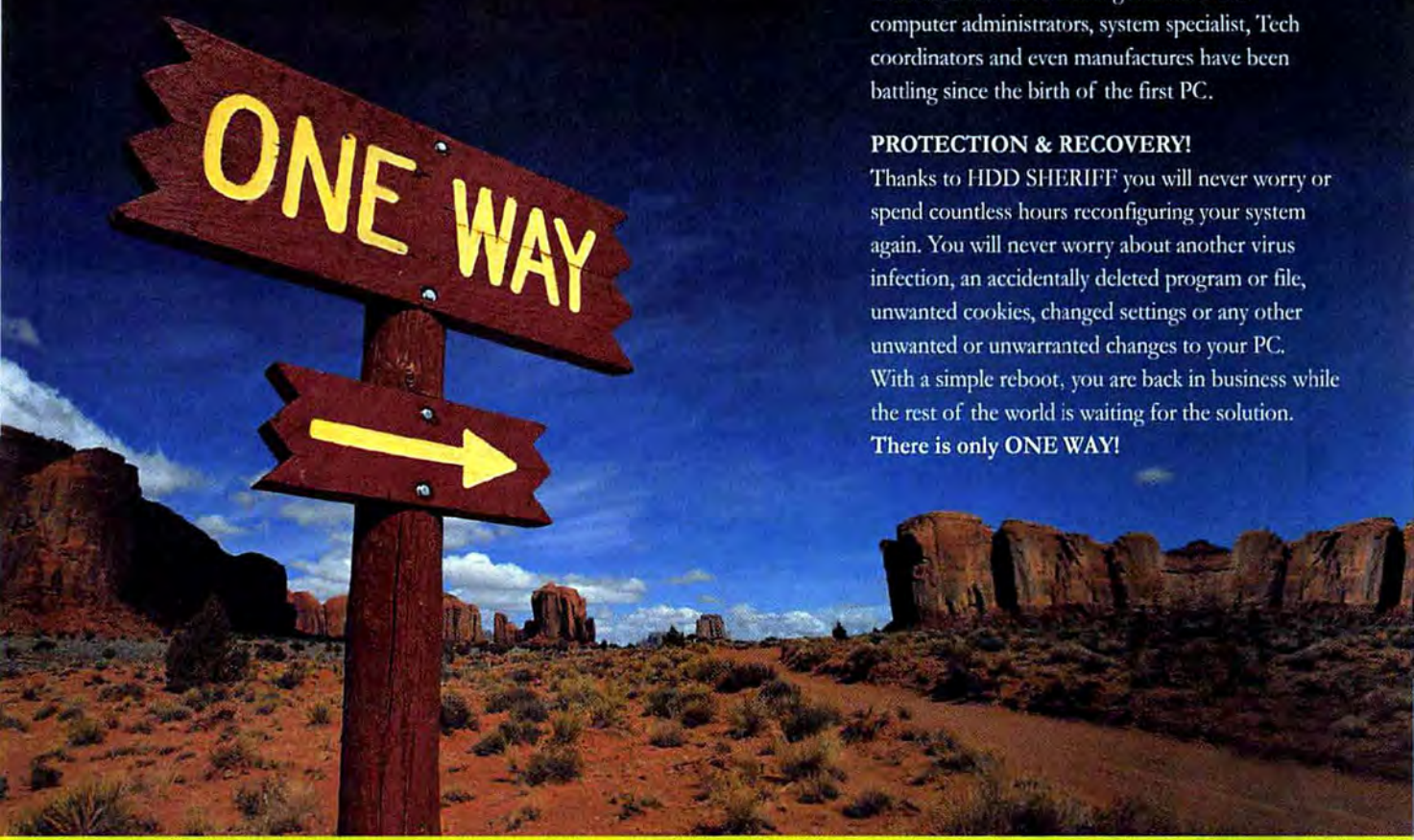

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PC WORLD

TOP 15 NOTEBOOK PCs

	POWER NOTEBOOK: $2700 AND OVER	Month tested	★ Overall rating	Street price (4/13/01)	PC WorldBench 2000 performance score[1] (Faster ▶)	Base configuration
1	IBM ThinkPad A21p 888/746-7426 www.ibm.com/thinkpad	Feb 01	92	Average: $3390	Outstanding 182	**Very good:** Pentium III-850/700, 15-inch active screen, trackpoint, 256MB of SDRAM, 32GB hard drive, Windows 2000
2	Dell Inspiron 8000 800/388-8542 www.dell.com	(NEW)	92	Inexpensive: $2741	Very good 141	**Very good:** Pentium III-900/700, 15-inch active screen, touchpad, eraserhead, 128MB of SDRAM, 20GB hard drive, Windows Me
3	Gateway Solo 9500 800/846-2000 www.gateway.com	(NEW)	89	Average: $3578	Outstanding 191	**Very good:** Pentium III-1000/700, 15.7-inch active screen, touchpad, 256MB of SDRAM, 32GB hard drive, Windows 2000
4	Dell Latitude C800 800/388-8542 www.dell.com	June 01	85	Average: $3473	Good 166	**Very good:** Pentium III-850/700, 15-inch active screen, touchpad, eraserhead, 128MB of SDRAM, 32GB hard drive, Windows 2000
5	Acer TravelMate 739TLV 800/733-2237 www.acer.com/aac	Apr 01	83	Inexpensive: $2799	Satisfactory 157	**Good:** Pentium III-850/700, 15-inch active screen, touchpad, 128MB of SDRAM, 20GB hard drive, Windows 2000
	MIDRANGE NOTEBOOK: $2000 TO $2699	**Percent of overall rating ▶**		**Price: 14 percent**	**Performance: 20 percent**	**Base configuration: 5 percent**
1	Dell Inspiron 4000 800/388-8542 www.dell.com	(NEW)	93	Inexpensive: $2091	Very good 142	**Very good:** Pentium III-900/700, 14.1-inch active screen, touchpad, eraserhead, 128MB of SDRAM, 10GB hard drive, Windows Me
2	Dell Latitude C600 800/388-8542 www.dell.com	June 01	88	Expensive: $2635	Outstanding 164	**Good:** Pentium III-750/600, 14.1-inch active screen, touchpad, eraserhead, 128MB of SDRAM, 10GB hard drive, Windows 2000
3	HP Omnibook XE3 800/752-0900 www.hp.com	June 01	86	Average: $2199	Very good 157	**Very good:** Pentium III-800/650, 14.1-inch active screen, touchpad, 128MB of SDRAM, 20GB hard drive, Windows 2000
4	Compaq Presario 1700T-850 800/345-1518 www.compaq.com	Feb 01	85	Average: $2297	Outstanding 145	**Very good:** Pentium III-850/700, 14.1-inch active screen, touchpad, 128MB of SDRAM, 32GB hard drive, Windows Me
5	Enpower ENP-325W2 800/997-2258 www.enpower.com	Feb 01	83	Average: $2299	Outstanding 145	**Satisfactory:** Pentium III-850/700, 15-inch active screen, touchpad, eraserhead, 128MB of SDRAM, 10GB hard drive, Windows Me
	BUDGET NOTEBOOK: UNDER $2000	**Percent of overall rating ▶**		**Price: 17 percent**	**Performance: 17 percent**	**Base configuration: 5 percent**
1	Gateway Solo 5300 800/846-2000 www.gateway.com	Feb 01	89	Average: $1684	Very good 147	**Very good:** Pentium III-650/500, 14.1-inch active screen, touchpad, 128MB of SDRAM, 10GB hard drive, Windows 2000
2	WinBook Si 800 CD 800/965-9349 www.winbook.com	Apr 01	87	Very inexpensive: $1199	Good 128	**Satisfactory:** Pentium III-800, 12.1-inch active screen, touchpad, 64MB of SDRAM, 6GB hard drive, Windows Me
3	Dell Inspiron 2500 800/388-8542 www.dell.com	June 01	87	Very inexpensive: $1200	Satisfactory 105	**Good:** Celeron-700, 14.1-inch active screen, touchpad, 64MB of SDRAM, 5GB hard drive, Windows Me
4	Toshiba Satellite 2805-S202 800/867-4422 www.csd.toshiba.com	May 01	85	Average: $1699	Very good 135	**Very good:** Pentium III-700/550, 14.1-inch active screen, eraserhead, 128MB of SDRAM, 10GB hard drive, Windows Me
5	WinBook J1 800/965-9349 www.winbook.com	(NEW)	84	Average: $1697	Outstanding 147	**Good:** Pentium III-1000, 13.3-inch active screen, touchpad, 192MB of SDRAM, 10GB hard drive, Windows Me
	Best Buy	**Percent of overall rating ▶**		**Price: 20 percent**	**Performance: 14 percent**	**Base configuration: 5 percent**

[1] Performance word scores reflect comparisons of PCs in the same price category running the same operating system. For more details, see "Your Guide to the Top 100" on page 163.

[2] Unless otherwise noted, all notebooks come with a lithium ion battery.

[3] Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.

FAST NOTEBOOKS EQUIPPED with Intel's top processors are hot this month. Armed with a PIII-900 CPU, Dell's $2741 Inspiron 8000 falls just short of IBM's ThinkPad A21p for the power Best Buy. Meanwhile, the $3578 Gateway Solo 9500 takes third place, helped by its PIII-1000 chip set to an Outstanding PC WorldBench 2000 score of 191; that's the highest score we've seen so far on the notebooks chart. Meanwhile, the Inspiron 800's lighter-weight sibling, the $2091 Inspiron 4000, snags our midrange Best Buy. Dell discontinued the PIII-800 version of the Inspiron 4000, clearing the way for Gateway's $1684 Solo 5300 to take the budget Best Buy.

WinBook's J1 slips onto the budget list in fifth place, making chart history by becoming our first Pentium III-1000 laptop priced under $1700. WinBook cut costs on the J1 by using a desktop proces-

PHOTOGRAPH: RICK RIZNER

Extra features [2]	Design and ease of use	Battery life (hours:min)	Travel weight (pounds) [3]	Vendor's system reliability	Tech support quality/ policies	Tech support (hours/days, charge)	Warranty for parts/labor (years)
Very good: multipurpose bay, 8X DVD-ROM drive, built-in modem, Lotus SmartSuite	**Excellent:** decked-out system includes video-in, 1600 by 1200 screen, huge hard drive	**Good/** 3:45	**Heavy/** 8.3	**Good**	**Good/ Fair**	24/7, toll-free	3/3
Outstanding: multipurpose bay, 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Works 2001	**Excellent:** S/PDIF connection, high-res screen; could have better audio shortcut button design	**Satisfactory/** 2:54	**Heavy/** 9.2	**Good**	**Good/ Fair**	24/7, toll-free	3/1
Good: 8X DVD-ROM drive, LS-120 drive, built-in modem and network adapter	**Very good:** large laptop has giant screen and multimedia connections; noisy keyboard and fans	**Good/** 3:05	**Heavy/** 9.0	**Fair**	**Fair/ Good**	24/7, toll-free	3/3
Outstanding: multipurpose bay; 8X/4X/24X CD-RW, 8X DVD-ROM drives; PC Card modem and network adapter	**Very good:** beefy big-screen desktop replacement comes with built-in wireless networking	**Good/** 3:00	**Very heavy/** 9.4	**Good**	**Good/ Good**	24/7, toll-free	3/3
Very good: multipurpose bay, 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Works 2000	**Very good:** bulky all-in-one; fingerprint reader helps foil data thieves	**Very good/** 4:23	**Heavy/** 8.1	**Good**	**Good [4]/ Fair**	24/7, toll-free	1/1
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 percent**		
Outstanding: two multipurpose bays, 8X DVD-ROM drive, built-in modem and network adapter, Works 2001	**Very good:** lots of add-ins, dual pointing devices, optional color palm rests and screen back	**Good/** 3:14	**Average/** 8.0	**Good**	**Good/ Good**	24/7, toll-free	1/1
Good: multipurpose bay, 10X-24X CD-ROM drive, PC Card network adapter	**Excellent:** wireless-ready, dual pointing devices, accommodates raft of extra-cost add-ins	**Good/** 3:45	**Average/** 7.8	**Good**	**Good/ Good**	24/7, toll-free	3/3
Good: 8X DVD-ROM drive, built-in modem and network adapter	**Average:** industrial-looking; includes keyboard with handy cursor lock, lots of shortcuts	**Good/** 3:33	**Heavy/** 8.2	**Good**	**Fair [4]/ Fair**	24/7, toll call	1/1
Good: multipurpose bay, 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Word 2000	**Very good:** slim and light with lots of shortcut buttons, distinctive case, and huge hard drive	**Satisfactory/** 2:25	**Average/** 7.4	**Fair**	**Fair/ Fair**	24/7, toll-free	1/1
Satisfactory: multipurpose bay, 8X DVD-ROM drive, built-in modem	**Very good:** unexciting design with overlapping screen; fine keyboard, optional CD-RW drive	**Good/** 3:24	**Heavy/** 8.1	[5]	**Good [4]/ Fair**	11/6, toll-free	1/1
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 percent**		
Good: multipurpose bay, 10X-24X CD-ROM drive, built-in modem and network adapter	**Very good:** removable hard drive, handsome black-and-silver case, but wobbly keys	**Good/** 3:07	**Average/** 7.1	**Fair**	**Fair/ Fair**	24/7, toll-free	1/1
Satisfactory: 12X-24X CD-ROM drive, built-in modem	**Average:** boxy black all-in-one has Web- and mail-launch buttons but uses desktop CPU	**Satisfactory/** 2:48	**Average/** 7.7	**Fair**	**Good [4]/ Fair**	13/6, toll-free	3/3
Satisfactory: multipurpose bay, 10X-24X CD-ROM drive, built-in modem, Microsoft Works 2001	**Average:** colorful palm rests can be swapped out; dual-purpose buttons inconvenient to use	**Poor/** 1:29	**Average/** 7.7	**Good**	**Good/ Good**	24/7, toll-free	1/1
Good: 8X DVD-ROM drive, built-in modem and network adapter, Lotus SmartSuite	**Average:** no docking connection; conveniently located CD player buttons, good stereo sound	**Satisfactory/** 2:59	**Heavy/** 8.5	**Fair**	**Fair/ Good**	24/7, toll-free	1/1
Satisfactory: 8X DVD-ROM drive, built-in modem and network adapter	**Average:** no PS/2 port or second PC Card slot, uses desktop CPU	**Satisfactory/** 2:23	**Average/** 7.1	**Fair**	**Good [4]/ Fair**	13/6, toll-free	3/3
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 percent**		

[4] Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

[5] Insufficient data to give a rating.

sor without Intel's SpeedStep technology.

Five other laptops that we reviewed this month missed the chart, including Gateway's $3578 Solo 9500XL—the vendor's latest desktop replacement with a 15.7-inch screen—and Toshiba's Satellite Pro 4600, a $2899 wireless-ready Pentium III-850–based notebook with a CD-RW/DVD combo drive. KDS's 4.4-pound ThinNote and the 3.9-pound Asus S8600 also failed to reach the chart. The skimpy tech support hours Asus offers (no weekend or evening help) kept the new Asus L8400 off the chart, too. ▶

FULL REVIEWS ONLINE

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FOR DETAILED write-ups of all the new notebooks that we tested this month, visit PCWorld.com (www.pcworld.com/t15notebooks).

DELL'S INSPIRON 4000 reinvents itself as a PIII-900 midrange notebook.

COMPUTER SCREEN GRAPHICS: JOHN GODDARD

PC WORLD

TOP 15 HOME PCs

	POWER SYSTEM: $2000 AND OVER	Month tested	★ Overall rating	Street price (4/13/01)	PC WorldBench 2000 performance score [1] (Faster ▶)	Base configuration [2]
1	Dell Dimension 8100 800/388-8542 www.dell.com	Mar 01	91	Inexpensive: $2498	Good 157	**Good:** Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 40GB hard drive, midsize tower, 19-inch monitor, Windows Millennium Ed.
2	Compaq Presario 7000Z 800/345-1518 www.compaq.com	NEW	88	Inexpensive: $2276	Outstanding 176	**Very good:** Athlon-1200, 256MB of SDRAM, 256KB L2 cache, 75GB hard drive, midsize tower, 19-inch monitor, Windows Me
3	Gateway Performance 1500 800/846-2000 www.gateway.com	Apr 01	84	Average: $2569	Good 161	**Very good:** Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 60GB hard drive, midsize tower, 19-inch monitor, Windows Me
4	ABS Multimedia System XP 800/876-8088 www.abspc.com	NEW	81	Very inexpensive: $2099	Very good 166	**Good:** Athlon-1200, 128MB of SDRAM, 256KB L2 cache, 40GB hard drive, midsize tower, 19-inch monitor, Windows Me
5	Compaq Presario 7000 800/345-1518 www.compaq.com	Apr 01	78	Very expensive: $3480	Good 157	**Very good:** Pentium 4-1500, 128MB of RDRAM, 256KB L2 cache, 75GB hard drive, midsize tower, 19-inch monitor, Windows Me
	MIDRANGE SYSTEM: $1200 TO $1999	**Percent of overall rating ▶**		**Price: 10 percent**	**Performance: 20 percent**	**Base configuration: 10 percent**
1	Tiny Computers T-Bird 1000 888/818-8469 www.tinydirect.com	Feb 01	88	Inexpensive: $1429	Very good 160	**Very good:** Athlon-1000, 128MB of SDRAM, 256KB L2 cache, 40GB hard drive, minitower, 19-inch monitor, Windows Me
2	ABS Multimedia System 2 800/876-8088 www.abspc.com	Apr 01	86	Very inexpensive: $1219	Very good 161	**Good:** Athlon-1100, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, midsize tower, 19-inch monitor, Windows Me
3	HP Pavilion 9820 800/752-0900 www.hp-at-home.com	May 01	83	Inexpensive: $1499	Good 153	**Good:** Pentium III-1000, 128MB of SDRAM, 256KB L2 cache, 60GB hard drive, tower, 17-inch monitor, Windows Me
4	IBM NetVista A40i 888/746-7426 www.ibm.com/products	Apr 01	83	Expensive: $1848	Very good 160	**Satisfactory:** Athlon-1000, 128MB of SDRAM, 256KB L2 cache, 30GB hard drive, minitower, 17-inch monitor, Windows Me
5	HP Pavilion 7875 800/752-0900 www.hp-at-home.com	Jun 01	82	Expensive: $1998	Outstanding 166	**Good:** Athlon-1300, 128MB of SDRAM, 256KB L2 cache, 80GB hard drive, minitower, 17-inch monitor, Windows Me
	BUDGET SYSTEM: UNDER $1200	**Percent of overall rating ▶**		**Price: 15 percent**	**Performance: 15 percent**	**Base configuration: 10 percent**
1	NuTrend Athlon Force 2 888/482-6678 www.nutrend.com	Feb 01	78	Average: $959	Outstanding 161	**Good:** Athlon-900, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, midsize tower, 17-inch monitor, Windows Me
2	Dell Dimension L800CX 800/388-8542 www.dell.com	NEW	77	Average: $988	Satisfactory 130	**Satisfactory:** Celeron-800, 128MB of SDRAM, 128KB L2 cache, 20GB hard drive, minitower, 17-inch monitor, Windows Me
3	Polywell Poly KLX-850D 800/999-1278 www.polywell.com	Jun 01	76	Average: $1050	Good 141	**Good:** Duron-850, 128MB of SDRAM, 64KB L2 cache, 30GB hard drive, midsize tower, 17-inch monitor, Windows Me
4	ABS Performance 3 800/876-8088 www.abspc.com	Jan 01	75	Expensive: $1079	Very good 153	**Good:** Pentium III-866, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, midsize tower, 17-inch monitor, Windows Me
5	Gateway Performance 1000 800/846-2000 www.gateway.com	Jun 01	70	Expensive: $1179	Very good 154	**Good:** Pentium III-1000, 128MB of SDRAM, 256KB L2 cache, 20GB hard drive, midsize tower, 17-inch monitor, Windows Me
	Best Buy	**Percent of overall rating ▶**		**Price: 20 percent**	**Performance: 10 percent**	**Base configuration: 10 percent**

[1] Performance word scores reflect comparisons of PCs in the same price category running the same operating system. For more details, see "Your Guide to the Top 100" on page 163.

[2] Vertical cases are towers (over 20 inches), midsize towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches).

AMD'S 1.2-GHz Athlon kicks up its heels on this month's power chart. Its 266-MHz frontside bus helps satisfy demanding home-office users. Meanwhile, recent price cuts on Intel's 1.5-GHz P4 strengthen that chip's ability to compete effectively.

Beefed-up features and performance typify our newest power systems. Tweaked for the video enthusiast, Compaq's attractively priced Presario 7000Z delivers the fastest PC WorldBench 2000 performance we've seen from a home PC, turning in a scorching mark of 176. The $2276 Presario 7000Z also features 256MB of SDRAM, CD-RW and DVD-ROM drives, and an IEEE 1394 port. For $177 less, ABS's new Multimedia System XP offers audiophiles a distinct advantage by bundling Creative Labs' Platinum 5.1 sound card and LiveDrive front panel, a set of Cambridge SoundWorks DTT3500

PHOTOGRAPH: RICK RIZNER

Extra features [3]	Setup/ ease of use	Graphics	Reliability/ support	Comments
Very good: NVidia GeForce2 Ultra graphics board (64MB DDR SDRAM), [4] 12X DVD-ROM drive, 12X/8X/32X CD-RW drive, network adapter	Outstanding/ Good	Very good	Outstanding/ Outstanding	**PRO:** Drops by $419; loaded with extras; powerful graphics card features DDR memory. **CON:** Disappointing PC WorldBench score, given its P4 processor.
Very good: NVidia GeForce2 GTS graphics board (32MB SGRAM), 16X DVD-ROM drive, 12X/4X/32X CD-RW drive, network adapter	Good/ Good	Very good	Poor/ Fair	**PRO:** First-class business and graphics performance, vast hard drive, ample memory, IEEE 1394 port. **CON:** Reliability score below our expectations.
Very good: NVidia GeForce2 Ultra graphics board (64MB DDR SDRAM), 16X DVD-ROM drive, 12X/8X/32X CD-RW drive, network adapter	Outstanding/ Satisfactory	Good	Fair/ Fair	**PRO:** Drops by $580; first-rate monitor; good graphics plus TV-tuner card, three IEEE 1394 ports. **CON:** Performance below that of Athlon-1200 PCs.
Good: ATI All-in-Wonder Radeon graphics board (32MB DDR SDRAM), 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, network adapter	Satisfactory/ Satisfactory	Good	[5]/Fair [6]	**PRO:** Has Creative Labs' Platinum 5.1 sound card and LiveDrive front panel for sound buffs. **CON:** Lacks IEEE 1394 port; documentation ample but confusing.
Very good: 3D Blaster Annihilator2 Ultra graphics board (64MB DDR SDRAM), 8X/4X/32X CD-RW drive, 2X/8X DVD-RAM drive, network adapter	Good/ Good	Very good	Poor/ Fair	**PRO:** Top-notch PC packages high-quality sound, graphics, and optical storage options. **CON:** Costly unit given its less-than-outstanding performance.
Extra features: 10 percent	Setup/ease of use: 5 percent	Graphics: 15 percent	R & S: 30 percent	
Very good: NVidia GeForce2 MX graphics board (32MB SDRAM), 8X DVD-ROM drive, 8X/4X/32X CD-RW drive, scanner, printer	Satisfactory/ Good	Good	[5]/Good [6]	**PRO:** Fast family PC with extra peripherals and software. **CON:** Dark DVD movie playback; limited expansion room; comes with low-end printer and scanner.
Satisfactory: Leadtek WinFast GeForce2 MX graphics board (32MB SDRAM), 16X DVD-ROM drive	Good/ Satisfactory	Good	[5]/Fair [6]	**PRO:** $120 price cut; 19-inch monitor displays sharp text; nice-sounding speakers. **CON:** 3D games looked banded; blurry menu screens on DVD playback.
Very good: NVidia GeForce2 GTS graphics board (32MB DDR SDRAM), 16X DVD-ROM drive, 8X/4X/32X CD-RW drive, network adapter	Satisfactory/ Good	Good	Fair/ Fair	**PRO:** SOHO PC, formerly the Pavilion 9720, drops by $301. **CON:** Free tech support limited to one year; sound system lacks depth.
Satisfactory: NVidia GeForce2 GTS graphics board (32MB SGRAM), 8X/4X/32X CD-RW drive	Outstanding/ Satisfactory	Good	Good/ Fair	**PRO:** Performance-savvy PC scores well on 3D games and PC WorldBench; sturdy multimedia keyboard. **CON:** Free tech support limited to three years.
Very good: NVidia GeForce2 MX graphics board (32MB SGRAM), 16X DVD-ROM drive, 8X/4X/32X CD-RW drive, network adapter	Satisfactory/ Good	Very good	Fair/ Fair	**PRO:** Graphite-colored PC offers great performance on business applications and graphics. **CON:** Speakers deliver weak, tinny sound.
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 30 percent	
Good: NVidia TNT2 M64 graphics board (32MB SDRAM), 12X DVD-ROM drive, network adapter	Satisfactory/ Satisfactory	Satisfactory	[5]/Fair [6]	**PRO:** PC's speed redefines budget performance; handsome multimedia keyboard; $80 price cut. **CON:** Lackluster frame rates in our gaming tests.
Satisfactory: integrated Intel 810 graphics (UMA), 8X/4X/32X CD-RW drive	Outstanding/ Very good	Limited	Outstanding/ Outstanding	**PRO:** Competitive price for PC with CD-RW drive; easy-to-open case. **CON:** Low WorldBench score; integrated graphics and no AGP slot limit graphics potential.
Satisfactory: Leadtek WinFast GeForce2 MX graphics board (32MB SDRAM), 12X DVD-ROM drive, network adapter	Outstanding/ Satisfactory	Good	[5]/Fair [6]	**PRO:** Good frame rates on our 3D games; sharp DVD playback. **CON:** Warm tones translated poorly on ViewSonic Optiquest Q71 monitor; text lacked crisp edges.
Good: Leadtek WinFast GeForce2 MX graphics board (32MB SGRAM), 10X DVD-ROM drive, 8X/4X/32X CD-RW drive	Satisfactory/ Good	Good	[5]/Fair [6]	**PRO:** $50 off price of fast budget PC that includes DVD-ROM and CD-RW drives. **CON:** Text lacks sharpness; mediocre frame rates in 3D games tests.
Satisfactory: integrated Intel 815 graphics (UMA), 22X-48X CD-ROM drive, network adapter	Satisfactory/ Good	Limited	Fair/ Fair	**PRO:** Competitive performance for a 1-GHz PC; $80 price reduction. **CON:** Documentation unusually slim; poor graphics performance.
Extra features: 10 percent	Setup/ease of use: 10 percent	Graphics: 10 percent	R & S: 30 percent	

[3] Unless otherwise noted, all home PCs come with a V.90 modem. [4] At press time, Dell reported it would upgrade this system's graphics card. [5] Insufficient data to give a rating. [6] Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

Digital speakers, and a slew of software.

The midrange chart remains an almost solid Athlon lineup this month. The lone exception: The HP Pavilion 9820 (formerly the Pavilion 9720), equipped with a 1-GHz Pentium III CPU, rides a $301 price drop back onto the chart and into third place. In the sub-$1200 category, Dell enters the chart with the new Dimension L800CX, the first Celeron-800 system we've tested. Though speed is not one of its prominent attributes, this PC offers first-time owners an easy-to-use setup for an affordable $988. ▶

FULL REVIEWS ONLINE

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FOR WRITE-UPS on all the new systems we reviewed this month, visit PCWorld.com (www.pcworld.com/reviews/topcharts).

COMPAQ'S PRESARIO 7000Z comes with a good price for its premium performance.

COMPUTER SCREEN GRAPHICS: JOHN GODDARD

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PC WORLD

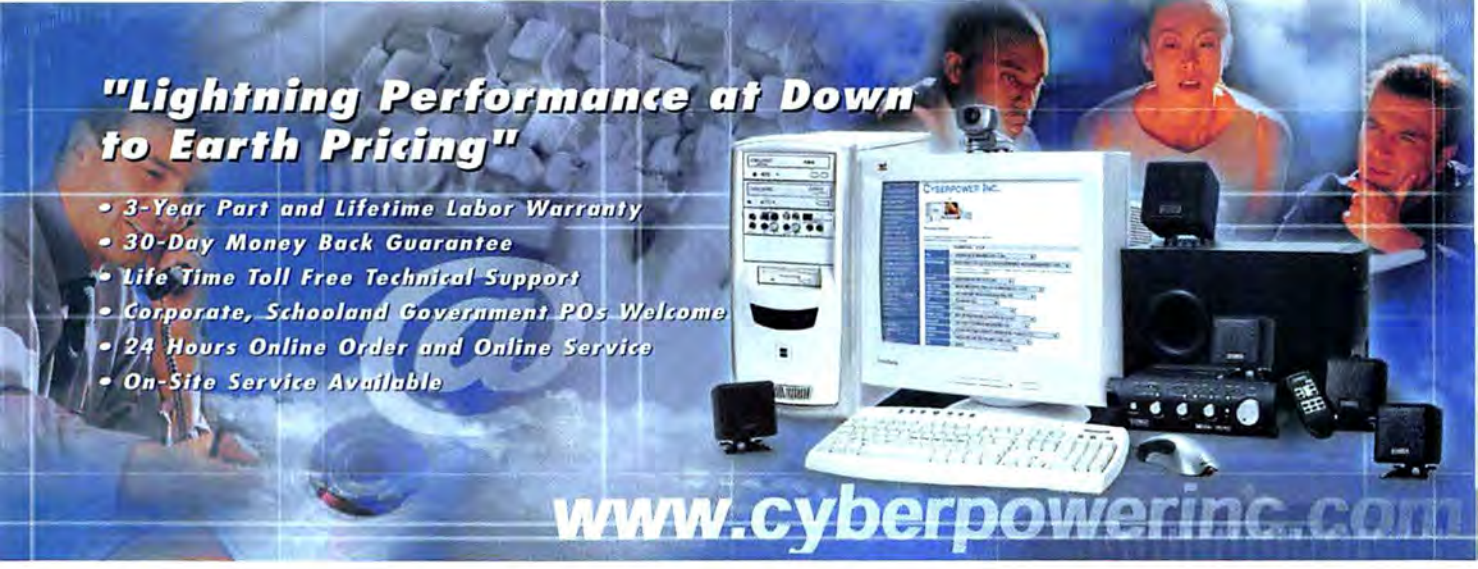
TOP 10 PRINTERS

	INK JET PRINTER	Street price (4/13/01)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/color graphics	Cost per page for monochrome/color (cents)	Comments
1	Sharp AJ-2000 800/237-4277 www.sharp-usa.com	$129	89	4.6/0.9	Good/Good	4.0/13.7	**FEATURES:** Rated 6 ppm monochrome/3 ppm color. 1200-by-1200-dpi maximum resolution, 150 sheets input, 50 output. **SUMMARY:** The AJ-2000's price falls $50 this month, pushing it to the number one slot. It resembles Xerox's DocuPrint M750, with similar features and print quality and slightly better performance.
2	HP DeskJet 932C 800/752-0900 www.hp.com	$149	89	4.1/0.7	Good/Good	3.6/11.1	**FEATURES:** Rated 4.5 ppm monochrome/2 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** Dropping $50 this month, the 932C is easy to set up and use and produces sharp text, smooth grays, and detailed—if somewhat light—color graphics.
3	Xerox DocuPrint M750 800/832-6979 www.xerox.com	$100	89	4.2/0.8	Very good/Good	5.9/17	**FEATURES:** Rated 10 ppm monochrome/6 ppm color. 1200-by-1200-dpi maximum resolution, 150 sheets input, 50 output. **SUMMARY:** Xerox's M750 delivers crisp, high-quality text at a good speed. Features such as a large input tray and a straight paper path make it an even better bargain.
4	Lexmark Z42 Color Jetprinter 888/539-6275 www.lexmark.com	$99	88	4.5/0.5	Good/Good	5.2/19.1	**FEATURES:** Rated 10 ppm monochrome/5 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** The Z42 prints text quickly, especially for such an inexpensive model. Both text and color graphics look smooth. But tougher competition drops it three slots this month.
5	Lexmark Z52 Color Jetprinter 888/539-6275 www.lexmark.com	$139	86	5.4/0.6	Very good/Very good	5.2/19.0	**FEATURES:** Rated 15 ppm monochrome/7 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** The higher-end model in Lexmark's Z line of ink jets, the Z52 produces sharp text and smooth images for a reasonable price. It also prints text quite quickly.
6	Epson Stylus Color 980 800/463-7766 www.epson.com	$249	84	6.6/2.0	Adequate/Adequate	3.5/9.8	**FEATURES:** Rated 13 ppm monochrome/10.5 ppm color. 2880-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** Speediest on the chart, this pricey unit is almost as fast as a monochrome laser. But its smudged, jagged text and filmy, dotted graphics fall short. Has a good software bundle.
7	HP DeskJet 952C 800/752-0900 www.hp.com	$199	83	3.9/0.7	Good/Good	3.6/11.1	**FEATURES:** Rated 5.1 ppm monochrome/3.6 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** With reasonable print quality and speed and a $100 price drop since our last review, the DeskJet 952C fits well in a small or home office. But the 932C, for $50 less, offers better text speed.
8	HP DeskJet 842C 800/752-0900 www.hp.com	$119	82	2.6/0.5	Good/Good	7.2/14.6	**FEATURES:** Rated 4.6 ppm monochrome/3.1 ppm color. 600-by-1200-dpi maximum resolution, 100 sheets input, 50 output. **SUMMARY:** The DeskJet 842C has a good price (now $30 less), but performance is slow. Output quality is a mixed bag: dark, crisp text and smooth but foggy graphics. Documentation is outstanding.
9	Epson Stylus Color 880 800/463-7766 www.epson.com	$149	81	4.5/1.2	Good/Good	3.3/11.6	**FEATURES:** Rated 12 ppm monochrome/9 ppm color. 2880-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** Quick performance and good text and color graphics mark the Stylus Color 880. Like most Epson printers, it produces significantly better print quality on glossy paper.
10	Canon S600 (NEW) 800/652-2666 www.usa.canon.com/consumer	$199	79	3.9/0.3	Very good/Good	2.0/13.6	**FEATURES:** Rated 15 ppm monochrome/10 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 sheets output. **SUMMARY:** Canon's new photo-quality printer produces sharp text, though it's not as fast as some other printers. It comes with individual ink tanks, which helps keep consumables costs low.

Best Buy Recommended for home Recommended for printing photos For reviews of printers tested this month, visit www.pcworld.com/t10printers.

TEST PC WORLD CENTER **HOW WE TEST** The overall rating we assign to each ink jet printer is based on a combination of seven measures, which are given the following weightings: price (25 percent), print quality (20 percent), features (15 percent), ease of use (15 percent), speed (10 percent), service and support (10 percent), and cost of consumables (5 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

A $50 PRICE DROP shoots the Sharp AJ-2000 to the number one spot this month. Of two new photo-quality printers from Canon, one earns a place on the chart: The $199 S600 hits number ten, with smooth text and low costs per page. Output from its sibling, the $299 Canon S800, was less impressive. We also tested HP's new DeskJet 960C, but at $299, it costs more than other units that offer comparable speed and print quality. ▶



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- ATI Radeon VE 32MB DDR w/Dual Monitor Output AGP Video Card
- 16X DVD-ROM
- 32X8X4 EIDE CDRW Drive
- CREATIVE LAB SOUND BLASTER LIVE VALUE
- ALTEC LANSING ACS 54 Subwoofer System
- 19" .26MM SVGA Monitor
- ZOOM 56K V.90 Fax Modem
- Mitsumi 1.44 MB Floppy Drive
- PS2 Win98 Multimedia Keyboard
- PS2 Internet Mouse w/ Wheel
- ATX Medium Tower Case w/ 300 Watt UL
- Microsoft Windows Millennium or 98 2nd Edition
- COREL WORDPERFECT OFFICE 2000
- Free One Year On Site Service

AMD ATHLON 1.4GHZ	S 1259	PK701
AMD ATHLON 1.33GHZ	S 1155	PK702
AMD ATHLON 1.2GHZ	S 1139	PK703
AMD ATHLON 1.13GHZ	S 1129	PK704
AMD ATHLON 1.0GHZ	S 1119	PK705
AMD ATHLON 900	S 1085	PK706

AMD BEST BUY

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- 128 MB PC133 SDRAM
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- ZOOM PCI 56K V.90 Fax Modem w/ Voice
- Mitsumi 1.44 MB Floppy Drive
- 108 KEY Win98 Keyboard & Internet Mouse
- Medium Tower Case w/ 250 Watt UL
- Microsoftsoft Windows Millennium or 98 2nd Edition
- Corel Wordperfect Office 2000
- 17" .27MM SVGA Color Monitor +S165
- One Year On Site Service +S29

AMD ATHLON 1.4GHZ	S 735	PE701
AMD ATHLON 1.33GHZ	S 649	PE702
AMD ATHLON 1.2GHZ	S 629	PE703
AMD ATHLON 1.13GHZ	S 619	PE704
AMD ATHLON 1.0GHZ	**S 609**	PE705
AMD ATHLON 850	S 579	PE706
AMD DURON 850	S 529	PE707
AMD DURON 800	S 519	PE708

ATHLON LIGHTNING DVD

- VIA KT-133A 266MHZ FSB 4X AGP MAIN BOARD
- 256 MB PC133 SDRAM
- 40 GB Ultra DMA 100 RPM Hard Drive
- NVIDIA GeFORCE-2 MX 400 64MB 4X AGP
- 12X DVD-ROM
- 8X4X32 CDRW Drive
- AC97 3D Wavetable Sound Card
- ALTEC LANSING ACS 651 Subwoofer System
- 19" .26MM SVGA Color Monitor
- ZOOM 56K V.90 Fax Modem w/ Voice
- Mitsumi 1.44 MB Floppy Drive
- PS2 Win98 Keyboard & Internet Mouse
- ATX Medium Tower Case w/ 300 Watt UL
- Microsoftsoft Windows Millennium or 98 2nd Edition
- Corel Wordperfect Office 2000
- One Year On Site Service +S29

AMD ATHLON 1.4GHZ	S 1149	PH701
AMD ATHLON 1.33 GHZ	S 1065	PH702
AMD ATHLON 1.2 GHZ	S 1045	PH703
AMD ATHLON 1.13 GHZ	S 1035	PH704
AMD ATHLON 1.0 GHZ	S 1025	PH705
AMD ATHLON 900	S 993	PH706
AMD DURON 850	S 945	PH707
AMD DURON 800	S 935	PH708

ATHLON BEST BUY

- VIA KT-133A 266MHZ FSB 4X AGP MAIN BOARD
- 128 MB PC133 SDRAM
- 40 GB Ultra DMA 100 Hard Drive
- NVIDIA GeFORCE-2 MX 200 32MB 4X AGP
- 12X DVD-ROM
- AC97 3D Wavetable Sound Card
- 240-Watt Power Stereo Speakers System
- ZOOM 56K V.90 Fax Modem w/ Voice
- Mitsumi 1.44 MB Floppy Drive
- PS2 Win98 Keyboard & Internet Mouse
- ATX Medium Tower Case w/ 250 Watt UL
- Microsoftsoft Windows Millennium or 98 2nd Edition
- Corel Wordperfect Office 2000
- 19" .26MM SVGA Color Monitor +S235
- One Year On Site Service +S29

AMD ATHLON 1.4GHZ	S 799	PJ701
AMD ATHLON 1.33GHZ	S 685	PJ702
AMD ATHLON 1.2GHZ	S 669	PJ703
AMD ATHLON 1.13GHZ	S 659	PJ704
AMD ATHLON 1.0GHZ	S 645	PJ705
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AMD DURON 800	S 555	PJ708

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AMD ATHLON 1.4GHZ	S 1075	PA701
AMD ATHLON 1.33GHZ	S 975	PA702
AMD ATHLON 1.2GHZ	S 959	PA703
AMD ATHLON 1.13GHZ	S 949	PA704
AMD ATHLON 1.0GHZ	S 939	PA705
AMD ATHLON 900	S 909	PA706
AMD DURON 850	S 859	PA707
AMD DURON 800	S 849	PA708

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TOP 10 MONITORS

	17-INCH MONITOR	Month tested	Street price (4/23/01)	Overall rating	Quality of text/ graphics	Comments
1	ViewSonic G75f 800/888-8583 www.viewsonic.com	NEW	$269	88	Excellent/ Very good	**FEATURES:** 16-inch viewable area, .25mm stripe-pitch Diamondtron NF tube,[1] up to 105-Hz refresh rate,[2] Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. **SUMMARY:** Boasts the best text score of all models tested this month, displays vibrant color graphics, comes with easy-to-use controls, and has an easy-to-take price.
2	CTX International PR705F 800/266-1491 www.ctxintl.com	Jan 01	$240	85	Very good/ Excellent	**FEATURES:** 15.8-inch viewable area, .24mm stripe-pitch FD Trinitron tube,[1] up to 105-Hz refresh rate,[2] Plug and Play ready, TCO'99 compliant, three-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Produces smooth text and graphics for a moderate price, sweetened by a $19 cut. On-screen controls are especially easy to use. Support hours could be better.
3	Samsung SyncMaster 700NF 800/726-7864 www.samsungmonitor.com	July 00	$280	85	Very good/ Very good	**FEATURES:** 16-inch viewable area, .25mm stripe-pitch Diamondtron NF tube,[1] up to 85-Hz refresh rate, Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. **SUMMARY:** New competition and a somewhat high price push this monitor one notch down the chart, despite its radiant colors. Controls are set on a retracting panel.
4	NEC MultiSync FE750+ 888/632-6487 www.necmitsubishi.com	NEW	$299	85	Excellent/ Good	**FEATURES:** 16-inch viewable area, .25mm stripe-pitch Diamondtron NF tube,[1] up to 87-Hz refresh rate,[2] Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. **SUMMARY:** This monitor offers extensive on-screen controls like moiré canceling and corner correction, plus clear text and vibrant, natural-looking graphics.
5	LG Flatron 795FT-Plus 800/243-0000 www.lgeus.com	Sept 00	$265	84	Very good/ Very good	**FEATURES:** 15.9-inch viewable area, .24mm stripe-pitch LG Flatron tube,[1] up to 120-Hz refresh rate,[2] Plug and Play ready, TCO'99 compliant, three-year warranty, 12-hour daily toll-free support. **SUMMARY:** Bright, saturated colors make this model a good choice for graphics work; $45 price drop increases appeal. On-screen controls are simple to navigate and use.
6	Hansol 710D 888/442-6765 www.hansol-us.com	Apr 01	$250	84	Excellent/ Good	**FEATURES:** 16.1-inch viewable area, .25mm dot-pitch tube, up to 85-Hz refresh rate,[2] Plug and Play ready, TCO'99 compliant, three-year warranty, 8-hour weekday toll-free support. **SUMMARY:** Razor-sharp text makes this unit a good choice for heavy word processing. Colors could be brighter; limited support hours compared to others.
7	Sony HMD-A200/L 800/326-9551 www.sony.com/displays	Apr 01	$300	83	Excellent/ Very good	**FEATURES:** 16.1-inch viewable area, .24mm stripe-pitch FD Trinitron tube,[1] up to 85-Hz refresh rate,[2] Plug and Play ready, one-year warranty, 24-hour daily toll-free support. **SUMMARY:** Renders dense text crisply in word processing documents and spreadsheets—especially at smaller font sizes—and delivers rich-looking colors. A price drop of $49 makes it a better buy.
8	HP P700 800/752-0900 www.hp.com	Nov 00	$300	83	Very good/ Very good	**FEATURES:** 16-inch viewable area, .24mm stripe-pitch LG Flatron tube,[1] up to 85-Hz refresh rate,[2] Plug and Play ready, TCO'99 compliant, three-year warranty, 24-hour daily toll-call support. **SUMMARY:** A $49 price cut, improved support hours, and sharp text rendering bring this model back onto the chart. Graphics are good but could display more vividly.
9	Iiyama i70A 800/394-4335 www.iiyamadirect.com	Jan 01	$290	82	Very good/ Excellent	**FEATURES:** 15.9-inch viewable area, .25mm stripe-pitch Diamondtron NF tube,[1] up to 85-Hz refresh rate,[2] Plug and Play ready, three-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Displays rich graphics and fine text, and price has dropped slightly. Easy-to-use controls include a zoom feature and well-marked menus.
10	Hitachi CM615 800/441-4832 www.hitachidisplays.com	Apr 01	$201	82	Very good/ Good	**FEATURES:** 15.9-inch viewable area, .24mm dot-pitch tube, up to 85-Hz refresh rate,[2] Plug and Play ready, TCO'99 compliant, five-year warranty, 11.5-hour weekday toll-free support. **SUMMARY:** Displays solid text for a rock-bottom price, though colors aren't as lively as on other chart-making models. Generous warranty offsets somewhat stingy support hours.

Best Buy For reviews of the monitors on this chart, visit www.pcworld.com/t10monitors.

TEST PC WORLD CENTER **HOW WE TEST** Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on 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 tests designed and conducted by the PC World Test Center. All rights reserved. [1] Uses an aperture grille in which parallel wires near the sides of the screen are strung farther apart than those at the middle. [2] Maximum refresh rate at 1024 by 768 resolution.

OF THE SIX NEW 17-INCH monitors tested this month, two made the cut: ViewSonic's G75f—a new Best Buy—and NEC's MultiSync FE750+. Finishing out of the running were ADI's G700 MicroScan; Compaq's P710, which can be tracked as an asset via desktop management software but costs almost $400; IBM's P76, offering luminous graphics but a high price; and Philips's 107B20. Next month we compare 15-inch LCD monitors. ▶

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PC WORLD

TOP 10 GRAPHICS BOARDS

	AGP BOARD	Month tested	Street price (4/23/01)	Overall rating	Image quality	Overall speed	Features	Comments
1	ATI All-in-Wonder Radeon 905/882-2600 www.ati.com	Feb 01	$299	96	Very good	Good	Excellent	**FEATURES:** 4X AGP, ATI Radeon chip, 32MB of DDR SDRAM, 350-MHz RAMDAC; DVI-out, TV tuner, hardware DVD support, graphics editing software. **SUMMARY:** This card retains first place thanks to DirectX 8 support and ATI's video features and bundled software. A great card for the video editing enthusiast.
2	CardExpert GeForce2 MX 800/539-2273 www.gainward.com	Feb 01	$109	93	Very good	Good	Very good	**FEATURES:** 4X AGP, NVidia GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; S-Video-out, composite-out; DVD, overclocking, and color-calibration software. **SUMMARY:** This budget MX delivered respectable performance and includes a great software bundle for a lower-priced board.
3	Hercules 3D Prophet II MX 877/484-5536 www.hercules.com	Mar 01	$99	93	Excellent	Good	Good	**FEATURES:** 4X AGP, NVidia GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; color-calibration software, five game demos. **SUMMARY:** Lacks features and software bundles of the top cards, but this reasonably priced board's stellar image quality and performance help it stay in third place.
4	Asus V7100 Deluxe Combo 510/739-3777 www.asus.com	May 01	$149	92	Good	Good	Excellent	**FEATURES:** 4X AGP, NVidia GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; 3D glasses, AV adapter, S-Video-in and -out, TV tuner, coaxial output; DVD, image-editing, and color-calibration software, and game. **SUMMARY:** This board's features rival our top card's, and it costs less. Dim lighting in two test games.
5	ATI Radeon 64MB DDR 905/882-2600 www.ati.com	Apr 01	$229	91	Very good	Very good	Very good	**FEATURES:** 4X AGP, ATI Radeon chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; hardware DVD support, S-Video-out, composite-in, composite-out, graphics editing software. **SUMMARY:** ATI card receives high honors due to partial DirectX 8 support, solid performance at high resolutions, and 64MB of fast DDR SDRAM.
6	MSI MS-StarForce 818 GeForce2 MX 510/623-8818 www.msicomputer.com	Jun 01	$99	88	Very good	Good	Good	**FEATURES:** 4X AGP, NVidia GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; S-Video-out; DVD, overclocking, desktop, and color-calibration software. **SUMMARY:** This inexpensive board's speed and image-quality scores nearly matched those of the other MX-based boards on the chart.
7	Matrox Millennium G450 800/361-1408 www.matrox.com/mga	Mar 01	$135	86	Very good	Poor	Excellent	**FEATURES:** 4X AGP, Matrox G450 chip, 32MB of DDR SDRAM, 360-MHz RAMDAC; dual-display support, DVD software. **SUMMARY:** While the Matrox didn't exactly excel in 3D performance, it had terrific image quality in our tests. It's the only card on our Top 10 chart to offer dual-display support.
8	ELSA Gladiac MX 800/272-3572 www.elsa.com	Apr 01	$139	86	Very good	Good	Satisfactory	**FEATURES:** 4X AGP, NVidia GeForce2 MX chip, 32MB of SDRAM, 350-MHz RAMDAC; DVD software. **SUMMARY:** ELSA's Gladiac MX turned in stellar speed scores for an MX board, but image quality lacked polish in two of our games. Buyers can select three popular PC games at discount prices from the Shopelsa.com site.
9	ELSA Gladiac GeForce2 GTS 800/272-3572 www.elsa.com	Feb 01	$229	86	Satisfactory	Very good	Very good	**FEATURES:** 4X AGP, NVidia GeForce2 GTS chip, 32MB of DDR SGRAM, 350-MHz RAMDAC; TV-out, no bundled applications. **SUMMARY:** Image quality pales in comparison with that provided by NVidia GeForce2 Ultra and Pro boards. No bundled games, but you can purchase three from Shopelsa.com for just $20.
10	Hercules 3D Prophet II Ultra 877/484-5536 www.hercules.com	Mar 01	$499	85	Very good	Excellent	Very good	**FEATURES:** 4X AGP, NVidia GeForce2 Ultra chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; DVI-out, S-Video-out, composite-out; DVD and color-calibration software, and utilities. **SUMMARY:** This powerful GeForce2 Ultra-based card delivers the fastest performance on the chart, but it's also the most expensive.

Best Buy

For reviews of new graphics boards that we tested this month, visit www.pcworld.com/t10graphics.

TEST PC WORLD CENTER **HOW WE TEST** We test graphics boards under Windows Millennium Edition. Our performance scores are based on tests that we evaluate on frame rate (50 percent) and image quality (50 percent). We use GT Interactive's Unreal Tournament, Id Software's Quake III Arena, Interplay's MDK2 Demo, Infogrames' Test Drive 6, and the Caligari TrueSpace 4.2 Benchmark for both performance and image-quality testing. We test graphics boards in a Dell Dimension 4100 Series with a PIII-933 CPU and 128MB of PC133 SDRAM. To test each board, we use drivers supplied by the vendor. Overall rating is based on performance (42.5 percent), features (27.5 percent), price (20 percent), and support policies (10 percent).

AS WE WENT TO PRESS, NVidia dropped its suggested prices on boards based on the company's GeForce2 MX, GeForce2 Pro, and powerful GeForce3 chips. And though graphics board vendors hadn't yet announced price drops on NVidia-based products, they most likely will have by the time you read this. In the meantime, boards based on the new GeForce3 chip have been slow to arrive. We'll bring you test results next month. ▶

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PC WORLD

TOP 10 SCANNERS

	SOHO SCANNER	Month tested	Street price (4/12/01)	Overall rating	Scan quality	Scan speed (seconds per page)		Comments
						Black-and-white	Color [1]	
1	Epson Perfection 1240U Photo 800/463-7766 www.epson.com	Mar 01	$269	91	Good	20 @ 300 dpi	226 @ 1200 dpi	**FEATURES:** USB, 1200 by 2400 dpi, 10.6-by-17.1-by-3.7-inch case,[2] 6.2 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no automatic document feeder option. **SUMMARY:** This hot successor to Epson's Perfection 1200U offers good performance and creates crisp, colorful images.
2	Microtek ScanMaker 4700 800/654-4160 www.microtekusa.com	Dec 00 [3]	$199	89	Good	29 @ 300 dpi	263 @ 1200 dpi	**FEATURES:** USB, 1200 by 2400 dpi, 11.4-by-20-by-4.6-inch case,[2] 8 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. **SUMMARY:** Has 42-bit color, high resolution, quick-start buttons, and lots of software; can work with transparencies right out of the box.
3	Visioneer OneTouch 8800 USB 888/229-4172 www.visioneer.com	May 01	$180	89	Good	23 @ 300 dpi	199 @ 1200 dpi	**FEATURES:** USB, 1200 by 2400 dpi, 10.5-by-16.7-by-3.7-inch case,[2] 5.8 pounds, 8.5-by-11.7-inch scanning area; no optional transparency adapter or ADF. **SUMMARY:** Speedy 42-bit-color unit sports a panel with seven quick-start buttons. But live tech support is a toll call and available only for 9 hours on weekdays.
4	Canon CanoScan N1220U 800/652-2666 www.usa.canon.com	Dec 00 [3]	$199	89	Good	37 @ 300 dpi	298 @ 1200 dpi	**FEATURES:** USB, 1200 by 2400 dpi, 10.1-by-14.7-by-1.3-inch case,[2] 3.3 pounds, 8.5-by-11.7-inch scanning area, no optional transparency adapter or ADF. **SUMMARY:** Ultrathin color-image sensor unit produces good-quality images and comes with a strong selection of software, including robust OCR.
5	Canon CanoScan D660U 800/652-2666 www.usa.canon.com	Feb 01 [3]	$149	87	Good	52 @ 300 dpi	100 @ 600 dpi	**FEATURES:** USB, 600 by 1200 dpi, 10.2-by-17.3-by-3.9-inch case,[2] 5.7 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. **SUMMARY:** Captures attractive color for Web images and has built-in 35mm film adapter, but 600-dpi resolution limits ability to enlarge transparencies.
6	Agfa SnapScan E50 888/281-2302 www.agfahome.com	Oct 00 [3]	$179	87	Good	60 @ 300 dpi	416 @ 1200 dpi	**FEATURES:** USB, 1200 by 2400 dpi, 13.3-by-19.7-by-3.7-inch case,[2] 14.5 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. **SUMMARY:** With high resolution and four quick-start buttons, this flexible unit delivers good-looking reflective and transparency scans.
7	Acer 1240UT 800/723-2238 www.acerperipherals.com	Nov 00	$149	87	Fair	48 @ 300 dpi	448 @ 1200 dpi	**FEATURES:** USB, 1200 by 1200 dpi, 12-by-18-by-4-inch case,[2] 9.5 pounds. 8.5-by-11.7-inch scanning area; includes transparency adapter, no optional ADF. **SUMMARY:** Offers high resolution, versatile software, and around-the-clock tech support. But scan quality and speed are only average.
	CORPORATE SCANNER							
1	HP Scanjet 7450c 800/722-6538 www.scanjet.hp.com	Jun 01 [3]	$760 [4]	95	Good	17 @ 300 dpi	687 @ 2400 dpi	**FEATURES:** USB and SCSI,[5] 2400 by 2400 dpi, 12.3-by-22.6-by-7.3-inch case,[2] 13.8 pounds, 8.5-by-14-inch scanning area; includes transparency adapter and ADF. **SUMMARY:** The high-resolution $700 unit handles legal-size documents and transparencies at 48-bit color, but SCSI card and cable cost $60 extra.
2	Microtek ScanMaker 8700 800/654-4160 www.microtekusa.com	Mar 01	$1000 [4]	94	Excellent	29 @ 300 dpi	83 @ 1200 dpi	**FEATURES:** IEEE 1394 and USB,[6] 1200 by 2400 dpi, 22.3-by-15.25-by-6.3-inch case,[2] 25.5 pounds, 8.5-by-14-inch scanning area; built-in transparency adapter; ADF optional. **SUMMARY:** Costly, but offers great scan quality and blazing performance. The ScanMaker 5700 is a more affordable option.
3	Epson Perfection 1640SU Office 800/463-7766 www.epson.com	Jan 01	$499	92	Good	17 @ 300 dpi	423 @ 1600 dpi	**FEATURES:** USB and SCSI,[7] 1600 by 3200 dpi, 11.4-by-17.4-by-9.2-inch case,[2] 14.8 pounds, 8.5-by-11-inch scanning area; transparency adapter optional; includes ADF. **SUMMARY:** 1600-dpi, 42-bit-color powerhouse is an all-around performer with sharp scan quality. A $299 version omits the ADF.

Best Buy For expanded reviews of this month's scanners, visit www.pcworld.com/t10scanners.

HOW WE TEST All scanners are tested with default settings under Windows 98 on a Gateway GP7-550 (Pentium III-550) PC with 128MB of RAM, using each unit's bundled software. Overall score is based on image quality (25 percent), speed (SOHO 22 percent; corporate 25 percent), ease of use (SOHO 17 percent; corporate 10 percent), features (SOHO 16 percent; corporate 20 percent), support (10 percent), and price (10 percent). Speeds are timed from start of scanning until cursor control is regained. Data based on tests designed and conducted by the PC World Test Center. [1] At unit's maximum optical resolution. [2] In order: width, depth, height. [3] Online-only chart. [4] Priced with SCSI or IEEE 1394 adapter. [5] Tested with SCSI interface. [6] Tested with IEEE 1394 interface. [7] Tested with USB interface.

HEWLETT-PACKARD'S SCANJET 7450C reigns supreme on the corporate side of our chart. Only the second 2400-dpi scanner we've seen, the 7450c blazed to the top of our online-only chart last month with powerful performance, a dual interface (USB and SCSI), and versatile features. This month, we tested three affordable new SOHO scanners—from Compaq, Hercules, and Mustek—but none did well enough to make the Top 10. ▶

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PC WORLD

TOP 10 DIGITAL CAMERAS

	CAMERA: UNDER $500	Street price (4/13/01)	Overall rating	Image quality	Ease of use	Battery life/ shots	Comments
1	HP PhotoSmart 618 800/752-0900 www.photosmart.com	$399	79	Good	Good	Very good/ 199	**FEATURES:** 2.1-megapixel resolution, 16MB CompactFlash media, 34mm-108mm focal range;[1] USB, IRDA, and video output; 10.6 ounces. **SUMMARY:** Second $100 price cut in three months lifts model to the top. Lets you add audio memos, has manual exposure controls, and sends images directly to some HP printers via infrared.
2	Olympus Camedia D-360L 888/553-4448 www.olympusamerica.com/digital	$249	78	Adequate	Good	Limited/ 44	**FEATURES:** 1.3-megapixel resolution, 8MB SmartMedia card, 36mm focal length;[1] serial and video output; 9.1 ounces. **SUMMARY:** Feature-rich for the price (it's now $30 less), with adjustable white balance, manual focus option, and panorama mode, but battery life is much too brief, and image-quality settings are confusing.
3	Olympus Camedia C-2040 Zoom 888/553-4448 www.olympusamerica.com/digital	$499	77	Good	Good	Good/ 147	**FEATURES:** 2.11-megapixel resolution, 8MB SmartMedia card, 40mm-120mm focal range;[1] USB and video output; 13.7 ounces. **SUMMARY:** $100 price drop moves this solidly designed camera to the sub-$500 chart. A close cousin to the C-3040, this camera offers lower maximum resolution but nearly equal image quality.
4	Fujifilm FinePix 2400 Zoom 800/800-3854 www.fujifilm.com	$379	77	Good	Adequate	Excellent/ 259	**FEATURES:** 2.1-megapixel resolution, 8MB SmartMedia card, 39mm-114mm focal range;[1] USB output; 12.1 ounces. **SUMMARY:** Relatively inexpensive for a camera with zoom, a compact point-and-shoot body, and above-average image quality; menu controls could be better. Support limited to 12 hours per day.
5	Olympus Camedia D-490 Zoom 888/553-4448 www.olympusamerica.com/digital	$449	76	Good	Good	Adequate/ 127	**FEATURES:** 2.1-megapixel resolution, 8MB SmartMedia card, 35mm-105mm focal range;[1] serial and video output; 9.5 ounces. **SUMMARY:** Compact point-and-shoot design and above-average image quality; nice extras include zoom and video capabilities; settings for image quality are confusing.
6	HP PhotoSmart 315 800/752-0900 www.photosmart.com	$299	75	Adequate	Good	Good/ 148	**FEATURES:** 2.1-megapixel resolution, 8MB CompactFlash media, 38mm focal length;[1] USB and IRDA output; 11.4 ounces. **SUMMARY:** Inexpensive for a 2.1-megapixel camera; solid and easy-to-use unit with few extras; infrared port for sending images directly to some HP printers; support calls not toll-free.
7	Ricoh RDC-5300 800/459-3968 www.ricohzone.com	$499	71	Adequate	Good	Good/ 153	**FEATURES:** 2.3-megapixel resolution, 8MB SmartMedia card, 38mm-114mm focal range;[1] serial, USB and video output; 15 ounces. **SUMMARY:** Ricoh builds only basic features into the RDC-5300 but includes a varied photo software bundle and provides easy-to-use settings. Short support hours.
8	Sony MVC-FD87 (NEW) 800/222-7669 www.sony.com/di	$499	71	Good	Good	Good/ 161	**FEATURES:** 1.3-megapixel resolution, 1.44MB floppy disk media, 39mm-117mm focal range;[1] floppy output; 21.3 ounces. **SUMMARY:** Sony outfitted this digicam with both a floppy drive and enough pixels to produce adequate images; only six of its 1280-by-960 images fit on a floppy, however.
9	Canon PowerShot S100 Digital Elph 800/652-2666 www.powershot.com	$499	70	Adequate	Good	Limited/ 70	**FEATURES:** 2.1-megapixel resolution, 8MB CompactFlash media, 35mm-70mm focal range;[1] USB and video output; 6.7 ounces. **SUMMARY:** The supersmall Digital Elph is quite limited, lacking aperture and shutter settings, video, and audio. Its rechargeable batteries last just 50 minutes.
10	Minolta Dimage 2330 Zoom (NEW) 201/825-4000 www.minoltausa.com	$475	69	Good	Adequate	Very good/ 203	**FEATURES:** 2.31-megapixel resolution, 8MB CompactFlash media, 38mm-114mm focal range;[1] USB and video output; 13.5 ounces. **SUMMARY:** This camera provides lots of pixels for a sub-$500 digicam; it also offers long battery life. Test images are sharp but very dark, controls are cumbersome, and the LCD panel is weak.

Best Buy — For expanded reviews of this month's digital cameras, visit www.pcworld.com/t10cameras.

HOW WE TEST Each camera's overall rating is based on price (30 percent), picture quality (20 percent), ease of use (15 percent), features (15 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. To gauge picture quality, we take a series of shots, with and without flash, at 640 by 480 resolution and at the camera's highest resolution. We take pictures of a complex still life and of a mannequin to see how well each camera captures image details and subtle colorings such as skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores; we then average those scores. Camera weights include batteries. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. [1] 35mm film equivalent.

THIS MONTH, several sub-$500 digital cameras have been discontinued, including our former Best Buy, the Fujifilm FinePix 1300. Our new number one is HP's PhotoSmart 618, thanks to its second $100 price drop in three months. Newcomers are Sony's floppy disk–based MVC-FD87 and Minolta's Dimage 2330 Zoom, which packs the most pixels on the chart and long battery life, but little else. Next month: $500-and-over models. ■

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Have you taken a look at your home PC lately? Your kids are abandoning it because it can't support their favorite games. And if you're using a broadband Internet connection, you may have noticed by now that your old 56K modem wasn't the only thing slowing you down. Indeed, yesterday's screamer is today's dinosaur: new PCs blaze at Gigahertz speeds, and even notebooks are reaching the 1-GHz performance mark.

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Dinosaurs can still become multimedia and gaming dynamos, when you buy the same memory upgrades used by professional designers, video editors, and other high-performance users. "Adding memory is the fastest, smartest, and least expensive way to boost your system's performance," says Jason Jacobi, a spokesman at Kingston Technology Company Inc., the world's largest independent memory manufacturer. "Press reports have already shown the risks of overclocking [pushing CPUs past their approved limits] and the high costs of swapping in a new processor. Memory upgrades for PCs, notebooks, and other devices have proven to be reliable and the most effective route."

Professional PC users have counted for years on Kingston's memory products to keep their systems up to date. (Top-tier system manufacturers build Kingston memory into their new systems.) Each month, Kingston builds and tests more than two million customized modules for desktops, notebooks, printers, handheld devices, graphic cards, and digital cameras.

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Now consumers can get that same memory, factory-direct, through Kingston's new Web site, www.Shop.Kingston.com. The site helps all users find memory that is perfectly compatible with their systems. "You don't have to know the difference between EDO and PC100 modules to find the right memory on our site," Jacobi says. Shop.Kingston's product search tool, The Kingston Memory Configurator, eliminates any worries about compatibility by allowing shoppers to sort memory by system model, memory specification, or Kingston part number. And users of PDAs, digital cameras, and MP3 players can search for memory according to the types of devices they're using.

Shop.Kingston also makes upgrades easier by providing shortcuts for most PCs and handheld devices. And if users still have questions about their memory requirements, they can always call Shop.Kingston, toll-free and 24/7, at 800-435-0057.

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Shop.Kingston can also offer competitive pricing to its customers. The site regularly features value pricing on high-performance modules, and rebates for new products. By selling Kingston memory directly to consumers, the site can deliver memory of unparalleled quality at a low price. Individual users receive the same lifetime warranties as Kingston's business customers, and each module undergoes the same rigorous testing at the manufacturer's facilities.

Spokesman Jacobi says Shop.Kingston will help make Web surfing, gaming, and multimedia exciting on more kinds of systems than ever before. "With Shop.Kingston.com," he says, "consumers now have the same opportunity as our business customers to get the best memory on the market, at a great price, for their high-performance needs."

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If extra-terrestrials looking for high-performance PCs approach you with the order, "Take me to your leader," you'd do well to guide them to Alienware Corporation. Just look at some of the comments customers have posted on Alienware's web site:

"I just want to thank you for such a well-built product," says Marty. "My new Area 51 computer is truly 'all that and a bag of chips'.... I will be referring your excellent company to my friends who are looking for a computer system that is a cut above the rest."

Another user, David Shor, writes, "Thank you, guys, for building the best system money can buy! There are no false claims about performance level. The machine I got from you just smokes."

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"Alienware, you are supreme," gushes Jack Powell. "I am now on my second Alienware system.... I fell in love with the first and am now in love with this one. There is no better-built computer on the market, and the components are absolutely cutting-edge.... I wouldn't consider buying a computer system from someone else."

"I have never had the pleasure of using a machine that was built to such perfection," Mario Viscardi adds. "The speed of the machine is amazing!"

Users aren't the only ones enthusiastic about Alienware's computer systems. "Alienware's top-of-the-line system packs a lot of brand-name punch into a reasonably priced package," writes *PC Gamer*, which has given Alienware its Editor's Choice award every year for the past three years. Alienware also won *Maximum PC's* "Kick-Ass Award" and was described by that magazine as "the fastest PC we've ever seen, bar none!"

Alienware's success is due in part to its vision of building high-performance computer systems that go beyond word-processing and net-surfing capabilities to include full-blown multimedia options. The company strives to use the latest 3D accelerators and the best hardware possible, allowing users to custom-configure their systems by choosing the best brand-name components.

The South-Florida-based company, which was recently named a Microsoft System Builder Gold Member, prides itself on its customer service and support, which is also praised by its customers.

"The minute I began talking to your service reps, I knew I was in good hands," explains Michael Cooke. "They made me feel confident in the product I was purchasing, offered suggestions, and gave their input on the hardware.... Keep up the good work and keep setting the standards for what should be expected from any company."

Abraham Egnor says, "I love you guys. I sent you a message about losing the Software DVD player. I expected to get a reply sometime this week, maybe asking me for more info. Instead I got a reply the next day, with the software attached. Two words: jaw droppage. And it works. I'm not used to things going this well, especially where computer problems are concerned."

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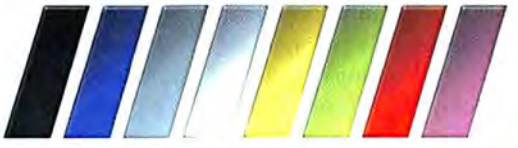

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While many motorists in Dimondale, Mich. say the family-owned Windmill Truck Stop is a home away from home, its controller, Kevin Edelmann, says it's been more like a house of accounting horrors. Besides monitoring retail fuel sales in the truck stop's "truckers only" area, he also has to keep an eye on commuters' and travelers' purchases in the king-sized complex's convenience store, family restaurant, motel, and auto service center. "Keeping track of all of that inventory has been a nightmare," Edelmann says.

The Point of Sale (POS) system that the Windmill had been using since 1982 did a fine job of ringing up sales, but it couldn't tell store managers anything about what was on the shelf. "The system only broke sales down by department," Edelmann says. "So it couldn't tell the difference between a tube of toothpaste and a bottle of shampoo."

Edelmann found only a few POS solutions that were easy to use, Microsoft Windows-based, and able to support multiple input devices. And none of them could manage the 20,000-plus items in the Windmill's convenience store and restaurant. "We desperately needed a solution that could bring all of these components of our business together," he says.

PC AMERICA

Things finally turned around at the Windmill once Edelmann deployed PC America's Cash Register Express (CRE 2000), a Windows-based POS program that works with ordinary PCs and peripherals, as well as barcode scanners, receipt printers, and pole displays (which show charges at the checkout counter). Now all of the Windmill's cashiers can use touch screens and barcode scanners to enter orders and update inventory. And setting up CRE 2000 could not be easier, says Edelmann. "PC America did an excellent job pulling all of the hardware together initially. But the great thing about their software is that I can grab any component I want off the shelf and throw it together in no time. This is one slick program."

The Windmill has processed more than half a million transactions with CRE 2000 and PC America's Restaurant Pro Express (RPE 2000) since October 1999. And Edelmann predicts that PC America will continue to develop the software he needs to keep things running smoothly. "PC America is constantly improving upon their products," he says.

Now PC America is helping retailers like the Windmill to move beyond the sale itself to increase revenues. A new feature in CRE 2000 gives businesses the ability to print coupons on the bottom of sales receipts on an Epson TM-T88II receipt printer. They can use the coupons to advertise specials on slow business days (e.g., "10 Percent Off All Purchases Every Tuesday"), or to give their customers discounts on overstock items (e.g., "Get a Free Six-Pack of Pepsi on Your Next Visit").

CRE 2000's couponing feature promises retailers an excellent route to a crucial dimension in retail sales. "Repeat business is the most important aspect of any business," says PC America's president, Howard Gosman. "With this addition to our POS package, we are giving our customers a quick and easy-to-use method for creating it."

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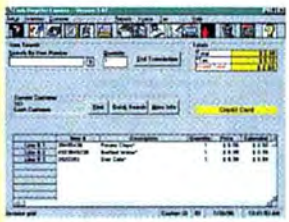

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All PC America Software requires Microsoft Windows. The software was written in Visual Basic using Microsoft Access Files. The source code is available.

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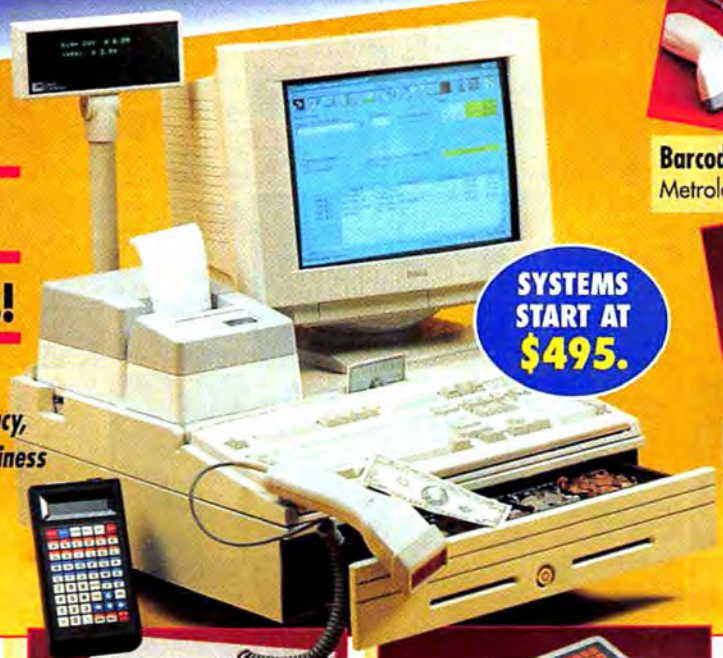

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HERE'S HOW

WINDOWS TIPS SCOTT DUNN

Locate Files on a Multigigabyte Drive

PC USERS ARE SO THOROUGHLY inundated with data that Bill Gates's promise of "information at your fingertips" can seem more like Nikita Khrushchev's threat, "We will bury you." Fortunately, Windows can help you manage the deluge with tools that make it easy to find and open the files you need. Some of the operating system's tools are obvious, but some aren't. Here are my favorites.

Get organized: Arrange your files and folders in a logical, hierarchical system. It's the best way to ensure that you'll be able to find one file among the hundreds—or thousands—on your hard drive. Limit the number of files in each folder, and group subfolders in a way that's easy for you to remember. For example, you can store documents in folders for specific projects, by date, or by topic. Once you've created your filing system, stick to it.

Be document-centric: If you work with files of multiple types—such as those in Microsoft Excel (.xls) and Word (.doc)—that you store in one folder, don't waste time opening each by launching its application from the Start menu. Instead, open a folder window (via Windows Explorer, My Computer, or some other method) and navigate to the folder that holds the files you want. Double-click the files to launch the applications and open the documents in one step.

If the application is already running, click and drag the document you want to open (or **<Ctrl>**-click to select more than one) from the folder window to the application's title bar (see **FIGURE 1**). If the application is minimized or hidden by other programs, drag the files to the application's icon on the taskbar, and when the application window comes to the front, drop the files on the app's title bar.

Type your way there: When presented with a long list of files in Windows Explorer, a Windows common file dialog, or a Find or Search Results window, you can select the first name in the list that begins with a particular character by typing that character on your keyboard. If the list contains multiple files beginning with the same letter, type the first several characters of the file name, or even entire words. Windows will select the first item that begins with the characters you type. If you pause too long between characters, however, Windows will think you're starting over again.

Learn from history, part 1: For quick access to a document that was opened recently, select *Start•Documents*. Chances are you'll find the document listed there and can then open it in its associated application with a single click. Unfortunately, if you work with many documents or download many files from the Web, you may not find the document you want. If you use Office 2000 or applications designed for Windows 2000 or Me, you can save time by using the icons in the left pane of the new File•Open and File•Save As dialog boxes to navigate to the desired file. You can also click the down arrow on the right

ILLUSTRATION: JOSEPH HART

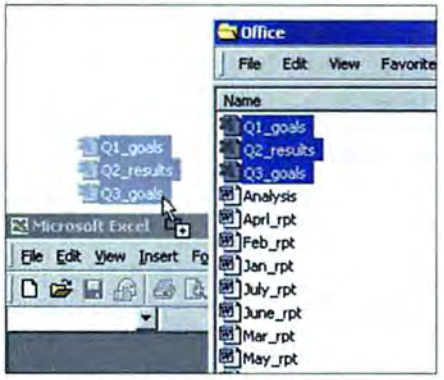

FIGURE 1: OPEN DOCUMENTS by dragging them to running programs instead of via dialog boxes.

side of the 'File name' box (or click the box and press **<F4>** or **<Alt>-<Down Arrow>**) to see a list of the last ten files you accessed (see **FIGURE 2**). To select the type of file to list, choose an option from the 'Files of type' drop-down list at the bottom of the dialog box. **Note:** In Office 2000 apps, this works only in the Save As dialog box.

Learn from history, part 2: If you don't see the file you want in the Start•Documents menu or in the 'File name' drop-down list in Office 2000, Windows 2000, or Windows Me, click the *History* icon in the left panel of the Open or Save As dialog boxes in Office 2000 or in applications designed for Windows 2000 or Windows Me. This step displays a more thorough list of recently opened documents and folders. The list is filtered to show documents typically used by the current application. To see other file types, choose an option from the 'Files of type' drop-down list at the bottom of the dialog box.

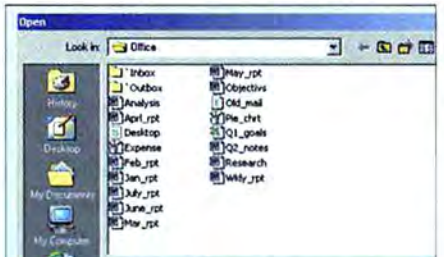

FIGURE 2: FIND FILES FAST via Open and Save As boxes in Office 2000, Windows 2000, and Me.

Navigate faster with autocomplete: The Open and Save As dialog boxes in Office 2000 and in Windows 2000 and Windows Me applications use the autocomplete feature when you type a folder path (such as C:\My Documents) and file name (such as resume.doc) in the 'File name' box shown in Figure 2. Just start typing any path name (it doesn't have to lead to a folder in the currently displayed window), and the autocomplete feature will find the first folder name in your system that matches the characters you type.

Annoyingly, Office and non-Office applications implement the feature differently. In non-Office applications, enter the first character or characters of the folder path in the 'File name' box and press **<Down Arrow>** one or more times to select the correct folder. Then enter a backslash (\) to begin typing the next part of the path, the last part of which will be the actual file name.

In Office apps, press **<Right Arrow>** when the proper folder appears in the 'File name' box; the slash is added for you. In any app, continue typing the next portion of the path. Repeat this process until the entire folder path and file name appear in the 'File name' box. Then press **<Enter>** once for non-Office applications or twice for Office apps to open or save the file.

Start off right: If you prefer to launch applications first and then open files, set your apps to display the folders you want each time you open or save a file. That way you won't have to navigate manually through your drives and folders each time you see the familiar Open and Save As dialog boxes. Locate the icon that launches the program whose default location you want to change: In Win 95, that usually means right-clicking *Start*, choosing *Open*, and navigating to the folder containing the appropriate shortcut icon, such as Word's blue 'W'. Right-click the icon and choose *Properties*.

In more recent versions of Windows, you don't need to open the folder containing the icon. Just right-click the icon on the Start menu and choose *Properties*. Make sure the *Shortcut* tab is selected. Click the *Start in* box and type the path to the folder containing the documents you typically open with the app (see **FIGURE 3**). Click *OK*. The next time you launch the program and choose File•Open or File•Save As, the dialog box should default there. If you select another location during the session, it will likely appear when you reopen the dialog box. But it will revert to the path you typed in the 'Start in' box when you next open the app.

FIGURE 3: SHORTCUT PROPERTIES let you choose the folder to open or save in.

Some applications require a different approach. As usual, Microsoft Office applications don't use the same tech- ▶

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online

CHECK OUT OUR expanded online coverage of Office XP at **www.pcworld.com/features/july2001/officexp.**

nique that other Windows applications do. To set the default folder location in Word or Excel, launch the program and choose *Tools•Options*. In Word, click the *File Locations* tab. Double-click the *Documents* line, navigate to the folder of your choice, and click *OK*. Double-click other lines and do the same thing to set the default folders for clip art, templates, and so on. Then click *OK*. In Excel, click the *General* tab in the Options dialog box, select the *Default file location* box, and type the path you want. Then click *OK* twice.

Use strategic shortcuts: If you frequently move files between the same few folders, you can save time by putting shortcuts within each folder that lead to the other folders. In Explorer, select one or more of your favorite folders, right-click and drag them to another commonly used folder (or into the file list of an Open or Save As dialog box with the desired folder displayed), and choose *Create Shortcut(s) Here*. To make your shortcuts appear together at the top of an alphabetized list, rename them and add a grave accent (`) or other uncommon character to the beginning of each (as shown in Figure 2). The next time you open or save a file, you can jump from one folder to the other by double-clicking the shortcut in the file list of the dialog box.

This ploy may not always work in older versions of Windows, however. For example, dialog boxes opened with Windows 9x's Browse button (found in the Run and Change Icon dialog boxes) interpret folder shortcuts as files to be opened rather than as paths to their target location. That's been fixed in Windows 2000 but (surprisingly) not in Windows Me. In addition, if you double-click a folder shortcut in Windows' common Save As dialog boxes, it properly takes you to that folder's location—but for some unknown reason it changes the name of the file you're saving (in the 'File name' box) to the name of the shortcut. Consequently, if you use this dialog box in Internet Explorer when downloading files, you could end up having a file saved from the Web with a name other than its original, making that file difficult to locate after downloading. Fortunately, this glitch has been fixed in Windows 2000 and Windows Me.

FIGURE 4: FREEZE WINDOWS ME menus by disabling drag and drop in the Start menu.

DRAG-AND-DROP DRAG

WINDOWS 98 AND the Desktop Update feature of Internet Explorer 4 introduced the ability to move items in any Start menu by dragging their icons. But if you change your mind in mid-drag, you may inadvertently put the menu icon somewhere you don't want it. If you begin an accidental drag, press **<Esc>** to return your pointer to normal and the icon to its original position. Windows can warn you with a sound effect whenever you drag an icon. Choose *Start•Settings•Control Panel* and double-click the *Sounds* icon. Then scroll through the Events list until you come to the Windows Explorer section. Select *Move Menu Item*, choose a sound (.wav) file from the drop-down list under Name (or choose *Browse* and select one located elsewhere on your system), and click *OK*.

To block this drag feature in Windows Me, choose *Start•Settings•Taskbar and Start Menu*, or right-click an empty area of the taskbar and choose *Properties*. Click the *Advanced* tab and scroll through the Start menu settings. Uncheck *Enable dragging and dropping* and click *OK* (see **FIGURE 4**). **Note:** Once you restart Windows you won't be able to drag menu items to new positions. You also won't be able to right-click an icon to see its context menu, nor will you see the context menu command to sort menu items by name. That could be inconvenient, since Windows will still add icons to the bottom of menus rather than sorting alphabetically by default. To find out how to change this setting, see the March 1999 *Windows Tips* (www.pcworld.com/heres_how/mar99/start).

Find files in this article at www.pcworld.com/downloads, and find more tips at www.pcworld.com/heres_how. We pay $50 for published tips and questions. Scott Dunn is a PC World *contributing editor.* ■

WINDOWS TOOLBOX

Applications at Your Fingertips

WINDOWS PROVIDES several ways to track the last document you used or the last Web site you visited, but it doesn't care much about helping you launch a recently used program. I never knew how useful such a feature could be until I tried RunIt from AN Soft. This utility lets you display menus of the applications you opened most recently or use most often—up to 50 in each menu (you decide how many). It also includes a Favorites menu that you can configure with your favorite applications or documents. You can launch these menus, as well as a more sophisticated version of the Windows Run dialog box, from an icon in the taskbar tray near the clock, via a keyboard shortcut, or from a precious tiny floating toolbar. It even has a feature for shutting down applications, including many that you don't even know are running. Configuration options abound. It doesn't remember Microsoft Office 2000 applications, but you can always add those to your Favorites menu. This $20 shareware utility is available from PCWorld.com's Downloads or from AN Soft's Web site at www.runit.com.ua.

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YOUR QUESTIONS ON: PC checkups at shutdown • Autorunning CD-Rs • Zip in Me

Prep an Old PC for a New Home

I RECENTLY purchased a new computer and would like to give away my old machine. How should I prepare the old PC for use by its new owners?

Victoria Bernhardt, Brewster, New York

FIRST YOU NEED TO transfer your data files from the old computer to the new one. You can use a CD-RW, a Zip drive, a network, or a simple cable connection. You'll want to transfer all the files now in C:\My Documents and C:\Windows\Application Data. If you or your applications also store files somewhere else, find out where the files are (using Windows' Find/Search feature if necessary) and copy those as well.

Next, destroy any sensitive files that you do not want the new owners to see. Simply deleting such files won't do, because a deleted file can be recovered—even from a reformatted drive.

You may already have a program that can overwrite data so it can't be recovered. Norton Utilities, for instance, comes with an application called WipeInfo, which will securely delete a file or folder, or the "deleted" data in the free space of your drive.

If you lack such a program, download the free version of Ontrack's wonderful PowerDesk file manager, which you'll find at PCWorld.com's Downloads and at the vendor's site at www.ontrack.com. PowerDesk lets you permanently erase a file or folder by selecting *File•Destroy*.

Once you've destroyed your sensitive files, reformat the hard drive and reinstall your operating system. Windows tends to collect bugs and incompatibilities that can make it unstable after just a few short months of use. This will let the new owners start off with a clean slate.

To reformat your hard drive and reinstall Windows 98/Me, follow the instructions on the restoration CD your hardware vendor supplied. The process is more complicated when you use a Windows CD-ROM, however. First, you have to create a Windows start-up disk on your new PC. Next, select *Start•Settings•Control Panel*, double-click the *Add/Remove Programs* icon, choose the *Startup Disk* tab, then click the *Create Disk* button and follow the prompts. Put the start-up disk in your old PC's floppy drive and your Windows CD in the old system's CD-ROM drive, then reboot. You'll get a simple text menu. Select the option *Start computer with CD-ROM Support*.

That sequence will eventually bring you to an A> DOS prompt. To ensure access to the CD-ROM drive, type **dir *x*:**, where *x* is the letter *after* the one you normally use for that drive. For instance, if the CD-ROM drive is D:, type **dir e:**. If you get a list of folders and files that includes setup.exe, you're ready for the next step. (If you don't see the list, try re-creating the Startup disk, perhaps on the old PC.)

Type **a:** if you're not at the A> prompt again, and enter **format c:**. When asked if you're sure, press **y**, then **<Enter>**. The next time you're at the A> prompt, type ***x*:setup** (*x* is the drive letter you entered above). Press **<Enter>** and follow the prompts.

Reload any programs that came with the PC, including Windows and hardware drivers, and reload any upgrades to these programs. Most software you purchased separately can be reloaded onto the old PC or added to the new one, but check your licensing agreements first. Note that it is almost always illegal to put the software on both the old and the new machine.

Easier DUN Backup

IN MARCH 2001's *Answer Line*, I suggested that you use the Registry to back up and restore your dial-up networking settings. Guy Simmons of Ilford, Essex, England, offers a solution that's so much easier I'm kind of embarrassed that I didn't think of it myself. Just open *My Computer* and double-click *Dial-Up Networking*. Then drag one or more of the connection icons to a floppy disk. To restore the settings to another computer, simply open the floppy disk on that machine and double-click the icon.

MAINTENANCE AT SHUTDOWN

I WANT TO RUN my disk defragmenter and my antivirus utilities along with other maintenance programs at the time that I shut my computer down. Do you know of any way for me

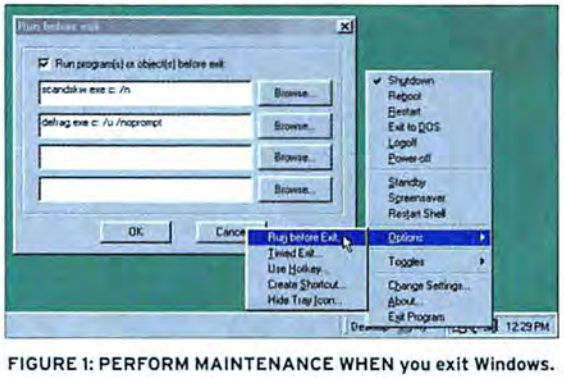

FIGURE 1: PERFORM MAINTENANCE WHEN you exit Windows. Exits95 can run four programs before shutting down your PC.

ILLUSTRATIONS: JOSEPH HART (LEFT); JEFFREY PELO (RIGHT)

to create a shortcut that will run these maintenance programs and then exit Windows?

Andrew Hobbs
Raleigh, North Carolina

THE BEST TOOL for this is Moon in June Software's Exits95 freeware, which you'll find at the author's Web site (come.to/windowsexits) and at PCWorld.com's Downloads. Don't worry about the name; Exits95 runs just fine with Windows 98 and Me, though not with NT or 2000.

Installing Exits95 is a bit unusual. After unzipping the files and saving them to a folder, right-click the file named *exits95.inf*, select *Install*, and follow the prompts from there. To make Exits95 run programs before shutting down, right-click the program's icon in your system tray and select *Options•Run before Exit*. The resulting dialog box, which lets you select four programs to run in sequential order, is pretty easy to figure out (see **FIGURE 1**).

To prevent an accidental shutdown, right-click the system tray icon and select *Toggles•Confirm Exit*. To remove Exits95 from your system tray, right-click the icon and select *Options•Create Shortcut*. Enter the location where you want the shortcut to appear, and click *OK* twice. Right-click the icon one more time and select *Change Settings*. Select *Save current settings to the registry*, uncheck *Enable auto-run from registry at startup*, and click *OK* twice.

Now when you click the Exits95 icon, it will run your maintenance programs, then shut the PC down. To load Exits95 so you can change your settings, select *Start•Run*, type **exits95.exe**, and press **<Enter>**.

MAKE AUTOSTART CDs

WHEN I PUT a disc into my CD-ROM drive, it launches a program automatically. I'd like to have this happen when I insert CD-Rs that I create myself. Is there any way for me to accomplish this?

Deepak Mansukhani
North Bergen, New Jersey

IT'S MUCH EASIER than you might think. You just have to add a text file named autorun.inf to the CD's root directory. You can create autorun.inf in Notepad, another text editor, or any other program that can create plain ASCII text.

The first line of the file contains only the text **[autorun]**. The text you enter after that depends on what you want the CD to do. If you want it to run a program, type **open=**. If you want Windows Explorer to open to the disc automatically, your file should read

```
[autorun]
open=explorer.exe /n,/e,.
```

Yes, as strange as it may seem, that last line ends with a comma, then a period. And don't forget to type a space before the first slash. The *n* in the second line of text indicates to Explorer that it should open in a new window, while the *e* tells Explorer to open in expanded view, which shows your folders in the left pane.

You'll find a list of all the commands that you can use in this file at msdn.microsoft.com/library/psdk/shellcc/shell/Shell_basics/Autoplay_cmds.htm.

WINDOWS ME AND .ZIP

WINDOWS ME'S help files say the program can read, write, and create .zip files, but I can't get this to work. Can you tell me how to find this feature?

Mike Ouyang, Los Angeles

WINDOWS ME adds .zip file support, which the operating system should have had all along. Microsoft calls the feature Compressed Folders, which people aren't likely to associate with .zip files. Microsoft also omitted Compressed Folders from the default Windows Me installation.

If you want Windows Me to use Compressed Folders to access .zip files, select *Start•Settings•Control Panel*, double-click *Add/Remove Programs*, click the *Windows Setup* tab, scroll down the Components list, and double-click *System Tools*. Then check *Compressed Folders*, click *OK* twice, and follow the prompts.

With Compressed Folders installed, .zip files will appear in Windows Explorer as folders with zippers. You can add, move, and delete the files inside just as with regular folders, but files launched within a 'compressed folder' go to C:\Windows\Temp when saved. To create a .zip file, right-click a blank spot in Windows Explorer and select *New•Compressed Folder*.

FIGURE 2: CREATE A Microsoft Office toolbar for fast access to Office tasks.

A BETTER OFFICE TOOLBAR

THE SHORTCUT Bar that comes with Microsoft Office 97 and 2000 is a convenient way to launch Office applications, record appointments, and start other tasks. For many people, however, the Shortcut Bar is simply a waste of Windows resources and screen real estate.

Dave Meekins of Los Angeles describes two tricks for tapping the advantages of the Office Shortcut Bar without wasting space. The first trick is best if you use only a few of the Shortcut Bar's icons. Open the folder containing your Shortcut Bar icons—it will probably be C:\Program Files\Microsoft Office\Office\Shortcut Bar\Office. Then drag the shortcuts that you regularly use to the taskbar's Quick Launch toolbar.

For easy access to all the Shortcut Bar's icons, right-click the taskbar and select *Toolbars•New Toolbar*. In the New Toolbar dialog box, navigate to C:\Program Files\Microsoft Office\Office\Shortcut Bar\Office (or whichever folder the icons are in), and click *OK*. This creates a toolbar on your taskbar. To regain screen space lost to the toolbar, drag its left edge until nothing is visible except its title (Office) and the button with the chevron—the greater-than symbol (see **FIGURE 2**). You can click the chevron for a pop-up menu of everything in the Shortcut Bar.

Now that you don't need the Shortcut Bar, you can remove it by double-clicking the colorful box in its upper-left corner. In the resulting dialog box, click *No*.

Find files from this article at www.pcworld.com/downloads. Send questions to answer@pcworld.com. We pay $50 for published items. You'll find Contributing Editor Lincoln Spector's humorous writing at www.thelinkinspector.com. ■

Double Up With Internet Connection Sharing

SO YOU HAVE TWO PCs? They'll be more useful if they're networked, letting you share printers, hard disks, and Internet connections. There are multiple ways to double up your Internet link. (For the scoop on wireless home networking, see "Wireless Comes Home" in this issue.)

All computers connected to the Internet are identified by a unique IP address, a four-part number such as 209.1.23.30 (the address of *PC World*'s Web server). Static IP addresses are often assigned to servers and to cable and DSL connections. They must be entered into your computer's network settings by hand, and they remain unchanged every time you go onto the Internet. Dynamic IP addresses are used by most dial-up ISPs and are dispensed by a DHCP (Dynamic Host Control Protocol) server that assigns a different address to your computer every time you connect. To see your Windows 9*x* or Me system's current IP address, choose *Start•Run* and enter **winipcfg**. For Windows NT or 2000, enter the command **ipconfig**.

A router forwards, or routes, TCP/IP data packets between your network and the Internet. One great new feature of Windows 98 SE was its Internet Connection Sharing option. ICS is essentially a simple router and DHCP server that dispenses the TCP/IP address a PC may require to connect to the Internet (see **FIGURE 1**). Another ICS component, NAT (Network Address Translation), works with the DHCP server to assign local machines nonunique addresses from a reserved address range (the most common is 198.168.0.*x*) and routes incoming and outgoing packets between the networks appropriately. Outside your shared connection, all packets appear to be heading toward a single computer that uses the ISP-assigned IP address. But on your side of the NAT server, the individual computers have distinct addresses, such as 192.168.0.1 or 192.168.0.2.

When URLs Attack

THAT E-MAIL MESSAGE looks legit, but it contains this link: www.pcworld.com&article=freestuff.html@microsoft.com. Is it a link to a *PC World* story? Nope. It actually points to the Microsoft Web site. Unscrupulous spammers and other sneaks can cook up URLs that obscure the real destination with bogus log-in data, hexadecimal numbers, and other tricks. To learn how to decode camouflaged URLs and avoid taking the bait, see Keith Little's site How to Obscure Any URL (www.pc-help.org/obscure.htm).

SKATING ON THIN ICS

ICS WORKS FINE for many but not all home networks. In Windows 98 SE, ICS has virtually no interface, so if something goes wrong, the simplest fix may be to uninstall and then reinstall ICS. To uninstall, launch Control Panel's *Add/Remove Programs* applet, choose *Windows Setup*, double-click *Internet Tools* in the Components window, uncheck *Internet Connection Sharing*, and then click *OK* twice.

An alternative to Windows 98 SE's minimal ICS interface is Alan McCombs's free, 22KB ICSConfig 2.03 utility. Get it at PCWorld.com's Downloads or from the author's Web site at lynx.neu.edu/a/amccombs/ICSC203.ZIP.

ICS has other drawbacks as well. If the ICS host system crashes, every machine on the network loses its connection. Sharing a cable or DSL connection may require two ethernet adapters in the host system, and figuring out which one connects to what can be confusing. One alternative is to switch to a separate hardware router or home gateway.

FIGURE 2: UPDATING YOUR Web site's logs, or blogs, is a snap with Pyra Labs' free Blogger.

SPICE UP YOUR WEB PAGE

WEB LOGS, OR BLOGS, are diary-like snippets of HTML that make it easy to update a Web site. Pyra Labs' free Blogger authoring tool lets you create blog entries at Pyra's Web site (www.blogger.com, see **FIGURE 2**). You do need to know your way around your site's FTP paths and file structure, but Blogger makes blog updates as simple to arrange as an e-mail message.

Find cited files at www.pcworld.com/downloads. Send tips to nettips@spanbauer.com. We pay $50 for published items. Scott Spanbauer is a PC World *contributing editor.* ■

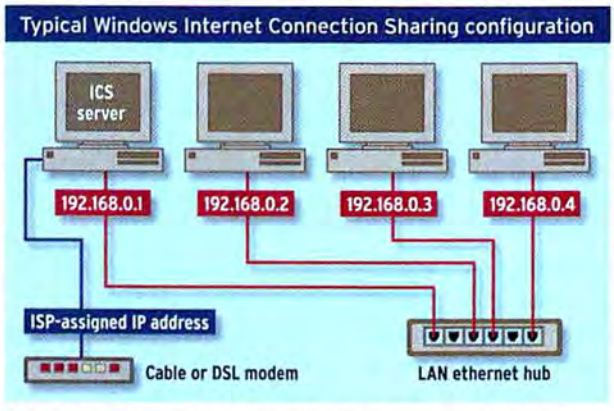

FIGURE 1: INTERNET CONNECTION Sharing in Windows 98 SE, Me, and 2000 makes it easy to share a connection among networked PCs.

ILLUSTRATION: JEFFREY PELO

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Find the Perfect Hard Disk for Your PC

MP3 COLLECTIONS, gargantuan software programs, and multimegabyte video files have left PC owners scrambling for free storage space. The best solution for most PC users is to buy and install a new hard disk. Fortunately, now is a great time to buy: Drives are bigger, faster, and cheaper than ever. (For more on the recent crop of drives, see "Livin' Large" at www.pcworld.com/reviews/march2001/large.)

But not every PC can accommodate today's ATA (EIDE) hard drives. Some drives may have more storage capacity than your PC can recognize, some may be too fast for your system, and some may not fit in your PC's case. Before you buy the latest drive, make sure your PC can use it.

Hard disks with double-digit–gigabyte capacities are no problem for most PCs purchased in the last three years. But older systems have drive-capacity limitations. Here are common size limits, and how you can get around them.

FIGURE 1: SEE DRIVE capacity as a graph in My Computer.

8.4GB: Systems with a BIOS date before 1998 typically don't support drives with capacities greater than 8.4GB. If your BIOS doesn't support large-capacity drives, see if your PC vendor's Web site offers a BIOS update for your machine.

If you install a drive with a capacity of 8.4GB or greater and your PC fails to recognize its full capacity (and you can't find a BIOS update), you can bypass the BIOS and the onboard disk controller by installing an updated ATA disk controller card such as the $34 Ultra100TX2 from Promise Technology (www.promise.com, 800/888-0245). To view your drive's capacity, open *My Computer*, right-click your hard disk, and select *Properties*. A graph shows the drive's capacity, the storage space in use, and the amount available (see **FIGURE 1**).

4.2GB or 3.2GB: Some PCs manufactured before 1998 have BIOSs that limit disks to one of these two capacities. To remedy this, either get a BIOS upgrade or buy a new disk controller card.

2GB: Any hard drive using the FAT16 file system can recognize only up to 2GB. This includes systems running Windows 3.*x* and the original version of Windows 95. If you have an old FAT16 drive in a PC using Windows 95B or Windows 98, you can upgrade the disk to FAT32 using the Windows FAT32 Drive Converter Utility. You cannot use any disk utilities designed for FAT16 drives after making the switch, but your 16-bit applications will run just fine.

A drive with the latest version of the ATA data transfer technology—currently the Ultra DMA/100 mode (also called Ultra ATA/100)—will work at top data transfer speeds only in PCs with the latest chip sets. Most PCs made since 1999 support the previous Ultra DMA/33 mode, and many support Ultra DMA/66 mode. To find out which mode your PC supports, check your system's documentation or visit your PC manufacturer's Web site.

There are six ATA standards (ATA-1 through ATA-6) and often several modes for each. Manufacturers have assigned their own names to some modes—sometimes to denote added capabilities. **FIGURE 2** provides some ATA perspective.

Your new hard drive's ATA mode does not *have* to match that of your PC. The latest drives will operate at the fastest mode your PC supports. Unless you often move huge files, a lower mode won't cut performance much. Still, save money and buy a drive that matches your PC's capabilities.

online *Find more tips at www.pcworld.com/heres_how. We welcome your tips and questions and pay $50 for published items. Kirk Steers is a* PC World *contributing editor.* ■

ILLUSTRATION: JEFFREY PELO

Fast Monitor Resets

DO YOU FREQUENTLY change your monitor's resolution and color-depth settings to accommodate various programs and graphics? Here's a shortcut: Enable Windows' Quickres utility, and a small monitor icon will appear in your system tray. Click it once to display a list of all resolution/color-depth settings that your PC's monitor supports. In Windows 98 and Me, select *Start•Settings•Control Panel*, open *Display*, select *Settings*, and click *Advanced*; then, under the *General* tab, select *Show settings icon on taskbar.*

The Many Names of IDE

STANDARD	Introduced data transfer mode	Also known as	Maximum burst rate (megabytes per second)
ATA-1	PIO mode 1	IDE	1 to 4
ATA-2	PIO mode 3, 4	Enhanced IDE (EIDE), Fast-ATA	11.1, 16.7
ATA-3	*No performance change; added diagnostic and security features.*		
ATA-4	Ultra DMA mode 2	Ultra DMA/33, Ultra ATA/33	33
ATA-5	Ultra DMA mode 4	Ultra DMA/66, Ultra ATA/66	66
ATA-6	Ultra DMA mode 5	ATA/100, Ultra ATA/100	100

FIGURE 2: THE ATA STANDARD HAS APPEARED in many variations over the years, so be careful to choose a hard drive that uses a version of ATA that will work with your PC.

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Edit Digital Video on Your PC

HOME VIDEO has gone digital. The current generation of mini-DV camcorders produce all-digital data that you can download to your PC, edit, and then write back to a fresh tape without losing quality as you copy and manipulate the video.

All DV camcorders have a high-speed serial connection for loading video into your PC. On the PC side, you'll need an IEEE 1394 (FireWire) card, and of course capable video editing software.

Prices of DV editing components are falling. If you're just getting started, you can buy entry-level packages with both an IEEE 1394 card and editing software for $80 to $150. You can also create a custom editing setup by purchasing a stand-alone IEEE 1394 card ($70 to $100) and editing software. Even lower-end software ($80 to $150) has plenty of capabilities to satisfy most home and semiprofessional users, but for really serious work, Adobe Premiere ($500) is the professional's choice.

Here's how to set up your PC for digital video editing. For a review of digital camcorders, along with links to other articles on digital video, see "DV Guide" at www.pcworld.com/reviews/june2001/dvguide.

Stan Miastkowski is a PC World *contributing editor.* ■

THE TOP DOWN

Benefits: Capture and edit video from DV camcorders
Cost: Starts at about $70 to $150
Expertise level: Intermediate
Time required: 30 to 60 minutes
Tools required: Phillips screwdriver, antistatic wrist strap (recommended)
Vendors: All-in-one packages: Avermedia (www.avermedia.com), Digital Origin (www.digitalorigin.com), Pinnacle Systems (www.pinnaclesys.com). Video editing software: Adobe (www.adobe.com), Digital Origin (www.digitalorigin.com), MGI Software (www.mgisoft.com), Ulead Systems (www.ulead.com)

BEFORE YOU BEGIN

Video editing pushes your PC (especially the processor, RAM, and hard disk) to its limits, so you need to make sure that it's in tip-top shape before you install the components.

1. **Make a full backup of your PC.**
2. **Tune up your hard drives.** Open *My Computer,* right-click the drive icon, select *Properties,* click the *Tools* tab, and select *Check Now.* Once the scan finishes, click *Defragment Now.* Repeat the steps for all drives in your PC.
3. **Stamp out hardware conflicts.** Select *Start•Settings•Control Panel,* and double-click the *System* icon. Select the *Device Manager* tab. If an exclamation mark appears next to any of the entries, highlight those entries one by one, select *Properties,* and follow the directions for resolving the conflict.

1 Install the IEEE 1394 card. Turn off your PC, unplug it, and remove the cover. Consider using an antistatic wrist strap to minimize the possibility of static-charge damage. Find a free PC slot, and remove the metal slot cover. Carefully insert the card, press it firmly into the slot, and screw it down.

2 Install the driver software. Plug in your PC and turn it on. Windows should detect the new card and start the *Add New Hardware Wizard.* Driver installation details vary by card manufacturer, so carefully read the directions that came with your card. Some cards include their own driver on CD-ROM, others require you to install Windows' own IEEE 1394 driver. (You'll need your original Windows installation CD-ROM.)

3 Install the editing software and start working. Follow the installation directions that came with your editing software. Then connect your DV camcorder to the IEEE 1394 card, using the cable that came with the card. Now you should be ready to go.

If you run into any problems capturing or editing video, first check all your connections. If that doesn't help, read the manual that came with your package for hints and tips, and consult the FAQ section on the maker's Web site. If you still encounter problems, call the manufacturer's tech support line.

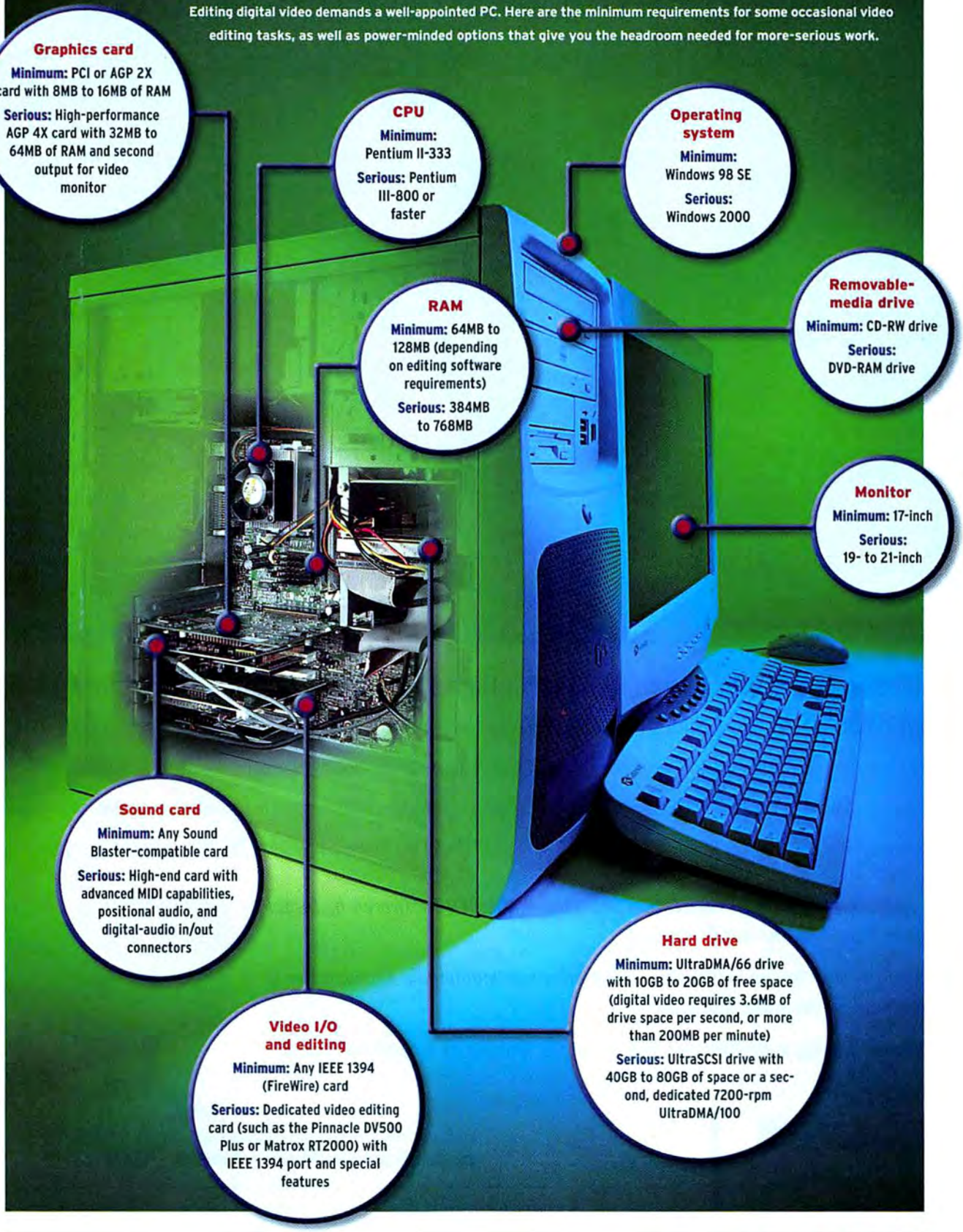
HINT

Video editing takes a heavy toll on system resources. One way to avoid problems is to free up resources by turning off all but the most essential background operations: Open Windows' Task Manager (press <Ctrl>-<Alt>-<Delete>) before you start your editor, and highlight, one by one, all tasks except Explorer and Systray; then click the *End Task* button for each.

PHOTOGRAPHS: MARC SIMON

VIDEO EDITING SYSTEM REQUIREMENTS

Editing digital video demands a well-appointed PC. Here are the minimum requirements for some occasional video editing tasks, as well as power-minded options that give you the headroom needed for more-serious work.



Graphics card

Minimum: PCI or AGP 2X card with 8MB to 16MB of RAM

Serious: High-performance AGP 4X card with 32MB to 64MB of RAM and second output for video monitor

CPU

Minimum: Pentium II-333

Serious: Pentium III-800 or faster

Operating system

Minimum: Windows 98 SE

Serious: Windows 2000

RAM

Minimum: 64MB to 128MB (depending on editing software requirements)

Serious: 384MB to 768MB

Removable-media drive

Minimum: CD-RW drive

Serious: DVD-RAM drive

Monitor

Minimum: 17-inch

Serious: 19- to 21-inch

Sound card

Minimum: Any Sound Blaster–compatible card

Serious: High-end card with advanced MIDI capabilities, positional audio, and digital-audio in/out connectors

Hard drive

Minimum: UltraDMA/66 drive with 10GB to 20GB of free space (digital video requires 3.6MB of drive space per second, or more than 200MB per minute)

Serious: UltraSCSI drive with 40GB to 80GB of space or a second, dedicated 7200-rpm UltraDMA/100

Video I/O and editing

Minimum: Any IEEE 1394 (FireWire) card

Serious: Dedicated video editing card (such as the Pinnacle DV500 Plus or Matrox RT2000) with IEEE 1394 port and special features

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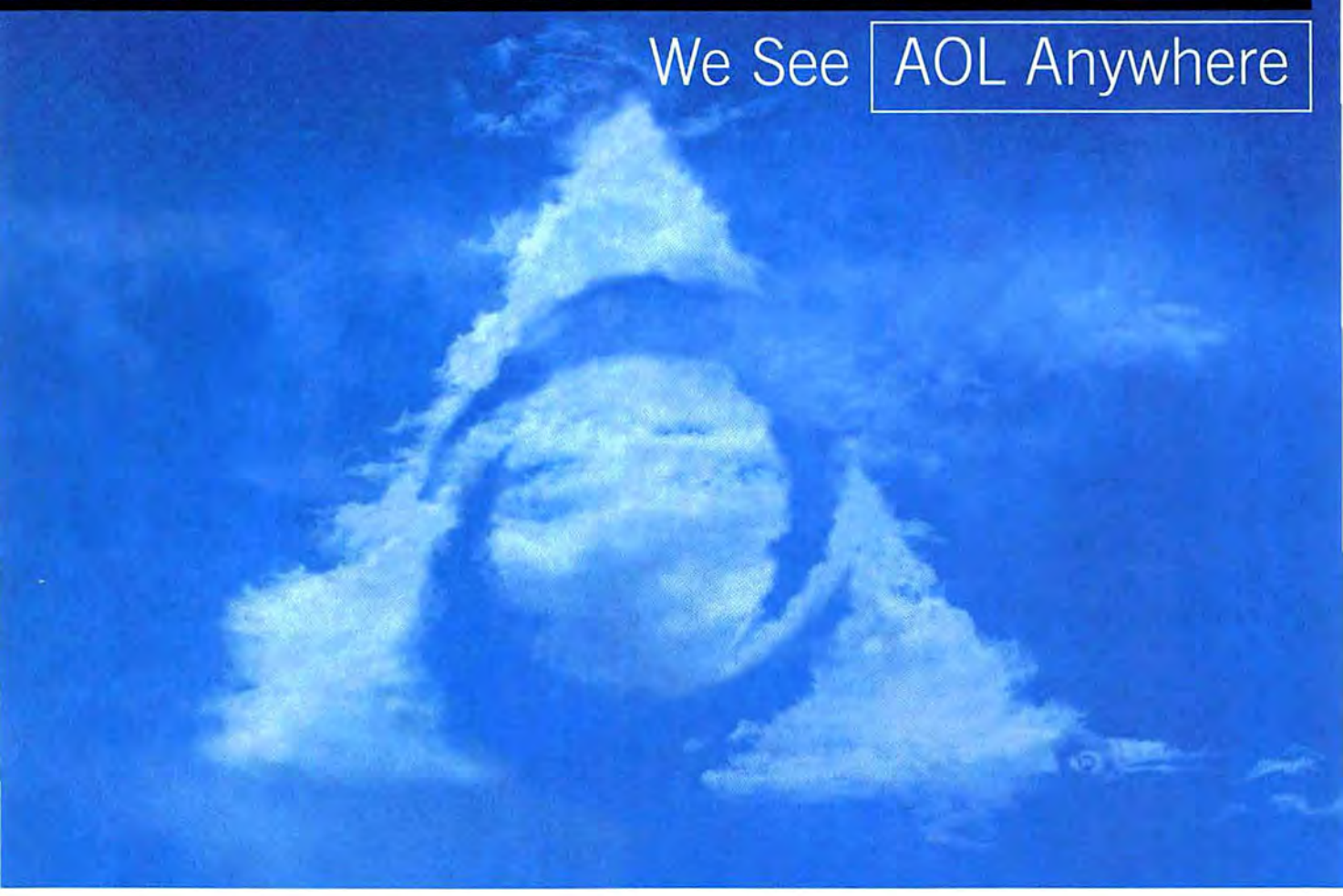

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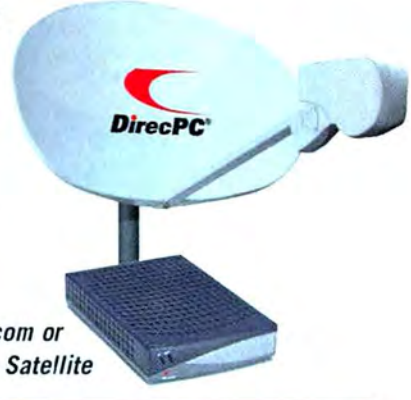

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Base Monthly Server Cost	$18.95	$59.95	$89.95	$149.95	$199.95	$18.95	$89.95
Max. per domain cost @ $2.00/domain/mo	N/A	$50.00	$50.00	$150.00	$150.00	N/A	$125.00*
Max. possible cost to you/ month	$18.95	$109.95	$139.95	$299.95	$349.95	$18.95	$214.95
Your monthly gross profit @ $19.95 domain	N/A	$498.75	$498.75	$1,496.25	$1,496.25	N/A	$498.75
Your monthly net profit reselling hosting	N/A	$388.80	$358.80	$1,196.30	$1,146.30	N/A	$283.80
Additional Profit Reselling AIT Extras**	N/A	$1,250.00	$1,875.00	$3,750.00	$5,625.00	N/A	$1,250.00
Total Monthly Profit	N/A	$1,638.80	$2,233.80	$4,946.30	$6,771.30	N/A	$1,533.80

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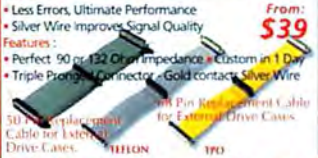

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PT-L501U Ultra-Portable SVGA Projector

Simple, Smart, Stylish and only 8.4 Pounds

Stylishly designed and lightweight at 8.4 pounds, the PT-L501U delivers 1100 ANSI lumens of brightness with SVGA resolution (SXGA maximum). It's equipped with an extra short-throw lens that shortens the necessary projection distance by 25%. Its one-touch Auto Setup with digital keystone correction makes it simple to use. The PT-L501U picture quality with stereo audio is exceptional and it can display HDTV images.
Suggested List Price: $3,995

PT-L511U Ultra-Portable SVGA Projector

1500 ANSI Lumens Bright, Feature-Rich Unit

The value-packed, ultra-portable PT-L511U projector provides 1500 ANSI lumens of brightness, SVGA (UXGA maximum) resolution, extra short-throw lens and highly attractive styling. The DTV-ready projector also offers two-mode lamp operation, 9X digital zoom, one-touch Auto Setup with digital keystone correction, ultra-quiet cooling fan, 10-bit digital gamma correction, card-type remote control and full 16.7 million color palette. For greater connection flexibility, two RGB input terminals are provided for connecting two computers at the same time.
Suggested List Price: $4,495

PT-L711U Ultra-Portable XGA Projector

1400 ANSI Lumens Bright, Cutting Edge Technology

The ultra-portable PT-L711U XGA projector with Micro Lens Array delivers 1400 ANSI lumens of brightness, and a 300:1 contrast ratio. Offering a refined, super sleek design and weighing only 8.4 pounds, the projector provides presenter-pleasing benefits, such as the world's shortest focal lens in an ultra-portable unit; "Auto-Everything" Setup with digital keystone adjustment; and exceptional video quality featuring a unique Digital Cinema Reality™ circuit for film-based video contents. Full-featured but small and light, it can display vibrant images in 1024 x 768 true XGA resolution and maximum SXGA (1280 x 1024) resolution. The video-enhanced projector is HDTV compatible, automatically resizing 1080i and 720p images for 16:9 wide-aspect display; 480p, 480i and 625i component video signals and S-Video can also be displayed in either 4:3 or 16:9. The unit offers broad compatibility ranging from PAL, PAL-M, PAL-N, PAL 60, SECAM, NTSC and M-NTSC.
Suggested List Price: $6,995

PT-L759U Portable XGA Projector

One-Touch Auto Setup, 2500 ANSI Lumens

The sleek PT-L759U portable XGA LCD projector with Micro Lens Array delivers exceptional brightness of 2500 ANSI lumens. The 13-pound projector displays a native resolution of 1024 x 768 XGA, with a maximum resolution of 1600 x 1200 UXGA. This unit features a high contrast ratio of more than 250:1, and a remarkably high center-to-corner uniformity ratio of 95%. The PT-L759U features one-touch Auto Setup to tune and adjust the image for optimal viewing. This projector is compatible with PC and Macintosh computers; accepts NTSC, M-NTSC, SECAM, PAL, PAL-M and PAL-N video signals and is capable of front, rear, desktop or ceiling mount projection on screens ranging in size from 20"- 300". Additional features include a digital zoom, two sets of RGB inputs, USB input, S-video compatibility, selectable 6-language on-screen menu, status code indicator, security lock system, warning indication for lamp replacement, Universal AC power supply, RS-232C computer interface, mute/freeze for video and RGB, and a detachable carrying handle.
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PT-LC50U Micro-Portable SVGA Projector

At 5.5 Pounds, You'll Want to Take It Everywhere!

At only 5.5 pounds, this ultra-sleek Panasonic projector travels wherever you do, yet it is so automatic (with one-touch Auto Setup and digital keystone correction) that the only thing you need to worry about is making sure it's plugged in. The highly-affordable PT-LC50U offers exceptional SVGA resolution (SXGA maximum) and 700 ANSI lumens of brightness. It's loaded with special benefits, including a detachable swivel stand, 5X Digital Zoom, and Manual Focus.
Suggested List Price: $2,499

PT-L701SDU XGA SD Memory Projector

World's First Memory Unit SD™

The PT-L701SDU ultra-portable XGA projector comes complete with a postage stamp-sized 16MB SD (Secure Digital) Memory Card, a PC card adapter, and software that converts BMP or TIFF images and entire Microsoft PowerPoint files into JPEG images, allowing PC-free as well as unattended, continuous-play presentations. As the world's first SD Memory model, Panasonic's PT-L701SDU offers outstanding presentation functions, including Auto Slide Show, which automatically shows the data from an SD Memory Card in succession; Capture, which captures and saves the displayed screen directly onto an SD Memory Card in JPEG file format; and Thumbnail Display, which provides an index-type display of all the images on an SD Memory Card, and lets the user change the image sequence.

The PT-L701SDU offers exceptional automatic features including one-touch Auto-Everything Setup and digital keystone correction.
Suggested List Price: $6,495

PT-L701U Ultra-Portable XGA Projector

"Auto-Everything" Setup with Digital Keystone Correction

The PT-L701U XGA is an unbeatable value, delivering 1000 ANSI lumens with a high contrast ratio of 350:1. It's integrated with the most advanced DSP technology, including the industry's first Digital Cinema Reality circuit, 10-bit Digital Gamma Correction, an Intelligent Image Resizing circuit, and a 3-D digital comb filter. At 8.4 pounds light, this projector offers user-friendly features like one-touch "Auto Everything" Setup, automatic keystone correction and auto input selection, allowing a user to automatically tune and adjust an image for optimal viewing. A newly-developed built-in gravity sensor detects the projector angle relative to the floor, then corrects for keystone distortion accordingly.
Suggested List Price: $5,995

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Ultra-Bright 3600 ANSI Lumens Exclusive Dual Lamp System

The PT-L6600/6500U Series of S-XGA and XGA Series projectors offer the exclusive BriteOpticTM dual lamp system that guarantees presentors that the lights will not go out during their presentation. These state-of-the-art projectors deliver the brightest, most vibrant images (up to 3,600 ANSI lumens) in its class for data and video, plus longer lamp life and multiple inputs, include DVI. Both units offer an exceptional contrast ratio (600:1 in the L6500U and 400:1 in the L6600U). With its center-mounted lens, motorized lens shift, digital keystone correction and wide selection of short, long and extra long throw lenses, the PT-L6600/6500U Series will never let you down.
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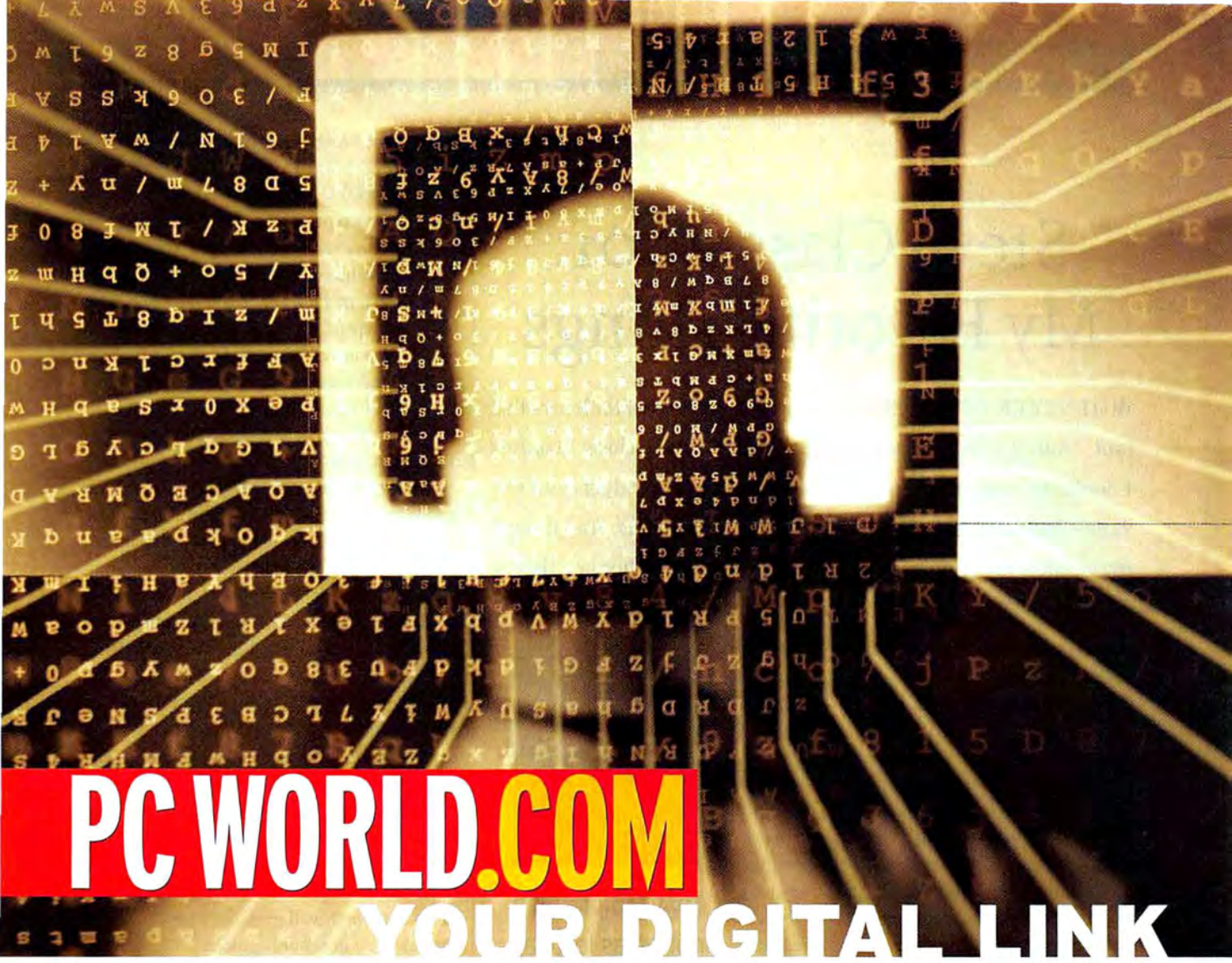

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Steve Class 2001: My Favorite Things

WHENEVER I CRITICIZE a product, I gird myself for letters that rant, "Admit it: You just don't like anything!" Well, close: I confess I don't like *everything*. But I do appreciate lots of products and services—including ones I buy with my very own dollars. And though my verdicts may not be as lofty as our World Class honors, they're definitely a lot more personal. Call them the Steve Class awards.

Most indispensable product: Come to think of it, I didn't pay a cent for the best of the bunch: Google, the search engine that sneakily becomes an essential part of your life. After loading like lightning, Google finds information that even a particular site's own engine may not reveal—such as a rebate coupon it recently unearthed for me. Google is so darned self-effacing that you wish it would toot its own horn more; I often miss a new function, like the ability to search .pdf files, until someone tells me about it. Take it from this erstwhile AltaVista addict: Google is almost always the engine of choice.

Most enjoyable hardware: The most fun I've had from hardware in eons has come from Sony's $1300 DCR-PC5 DV camcorder. Weighing in at about a pound, this unit has almost every imaginable feature, including an LCD touch screen that offers one particularly slick user interface element: With its spot-metering mode, you choose the area for proper exposure simply by touching it on the screen. Sure, the unit's battery life, viewfinder brightness, still-photo resolution, and microphone position could all be better, but this little giant points the way to a digital-video future. A successor I haven't tried, the DCR-PC9, adds even more features and promises extended battery life.

My verdicts may not be as lofty as our World Class honors, but they're definitely a lot more personal.

Best-designed software: Online editing on a home PC is the other great thing about digital video. Alas, nothing I've tried thus far for Windows matches Apple's Mac-only IMovie. Editing is never a snap, which is why it's a high-priced specialty in Hollywood, but IMovie is easier to use than any competing program I've seen. Apple brings a similarly simple interface to its IDVD software for burning videos to recordable DVD media, though for that you need Apple's most expensive machine.

Most addictive service: Broadband connectivity now has me hooked, even though my AT&T@Home cable-modem service remains less than perfectly dependable. It's just a shame that so many sites are inherently slow and that installing and maintaining broadband connections can be so maddening.

Most promising simple technology: Sony's Pen Tablet desktop PC lets you work by writing, drawing, or pointing directly on the screen with a pressure-sensitive stylus. There's something downright magical about not having to translate hand motion in one place to cursor motion in another. I haven't bought one, but the concept will be a foundation of machines based on Microsoft's forthcoming Tablet PC platform.

Most promising overly complex technology: The 3Com Home Wireless Gateway I recently installed in my house delivers much of the speed of my broadband connection just about anywhere under the roof via the 802.11b Wi-Fi standard. Installing it was a nightmare, though, thanks largely to inadequate documentation from 3Com and my broadband provider—not to mention Microsoft's mediocre Windows docs. Somebody will eventually get this right; for now it's a geeks-only process.

Best lower-tech ideas: Several simpler items deserve prizes of their own. Priced at about $100, the Stowaway folding keyboard can make just about any PDA more useful; the only reason I haven't bought one is that I'm still not PDA-enabled. Another winner: Targus's retractable phone and network cables, which eliminate snaking wires in the briefcase.

Where will the next prize crop of Steve Class winners come from? Right now, I'm excited about rewritable DVD drives, cell phones with built-in PDAs, tiny digital projectors, and progressive-scan DVD players that can deliver filmlike images to advanced displays. But as always, the big winners will be the surprising products that confound our expectations because their inventors figure out what we really want before we do.

PC World *Contributing Editor Stephen Manes is a cohost of* Digital Duo, *a series appearing on public television stations nationwide. For program information, see www.digitalduo.com.* ■

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- 64MB 100MHz SDRAM ■ 5GB[5] Ultra ATA HD
- Fixed Internal 24X Max Variable CD-ROM
- Intel® Integrated 3D® AGP Video with up to 8MB Shared System Memory
- 26.5WHr Li-Ion Battery
- Internal Mini-PCI 56K Capable[6] Modem
- MS® Works Suite 2001 ■ MS® Windows® Me
- 1-Yr Ltd Warranty,[2] 1-Yr Mail-in Service, 1-Yr Phone Tech Support

$999 E•VALUE CODE 03876-890609

BUSINESS LEASE: $28/MO., 48 MOS.[11]

- 3-Yr Mail-in Service with Lifetime Phone Tech Support, add $99
- Upgrade to 14.1" XGA TFT Display, add $149

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Pinnacle of Performance Notebook

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- Modular Floppy (Upgrade to Optical or Zip)
- 8MB ATI® Mobility™-M4 3D® Video, 4X AGP
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- MS® Windows® Me
- 1-Yr Ltd Warranty,[2] 1-Yr Mail-in Service, 1-Yr Phone Tech Support

$1849 E•VALUE CODE 03876-890618

BUSINESS LEASE: $51/MO., 48 MOS.[11]

- NEW Fixed Internal CD-RW/DVD Combo Drive, add $399

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NEW—Network-Optimized Value Notebook

- Intel® Celeron™ Processor at 700MHz
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- Modular 24X Max CD-ROM/Floppy Drive
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- Li-Ion Battery w/ExpressCharge™ Technology
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- 1-Yr NBD On-Site Service[4]

$1349 E•VALUE CODE 03876-790613

BUSINESS LEASE: $37/MO., 48 MOS.[11]

- 14.1" XGA Active Matrix Display, add $150
- Deluxe Nylon Carrying Case, add $69

DELL™ SERVERS AND WORKSTATIONS:

DELL™ POWEREDGE™ 300SC

NEW—Basic Server at Our Lowest Price

- Intel® Pentium® III Processor at 800MHz
- Dual Processor Capable
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- 48X Max IDE CD-ROM
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- 7x24 Phone Tech Support

$899 E•VALUE CODE 03876-290608

BUSINESS LEASE: $24/MO., 48 MOS.[11]

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- Red Hat® Linux™ 7.0 Installed Upon Request

DELL™ POWEREDGE™ 1400SC

NEW—Small Business Value Server

- Intel® Pentium® III Processor at 933MHz
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- 48X Max IDE CD-ROM
- Embedded Ultra3 (Ultra 160) SCSI Controller
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- 3-Yr NBD Bronze On-Site Service[4]
- 7x24 Phone Tech Support

$1199 E•VALUE CODE 03876-290611

BUSINESS LEASE: $33/MO., 48 MOS.[11]

- 2nd 9GB[5] (10K RPM) IDE HD, add $249
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Advanced Performance Workstation

- Intel® Pentium® 4 Processor at 1.3GHz (up to 1.7GHz)
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- NVIDIA® TNT2 Pro 16MB 4X AGP Graphics Card
- Integrated NIC & Sound ■ 48X Max CD-ROM
- MS® Windows® 2000 Professional
- 3-Yr NBD On-Site Service[4]
- 7x24 Dedicated Workstation Phone Tech Support

$1299 E•VALUE CODE 03876-490612a

BUSINESS LEASE: $36/MO., 48 MOS.[11]

- Monitor Sold as an Upgrade

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Top 10 Value PCs
Dell™ Dimension™ 4100
– June 2001

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DELL™ DIMENSION™ 4100 Series

Advanced Business Desktop

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- 48X Max CD-ROM
- SoundBlaster 64V PCI Sound Card
- harman/kardon® Speakers
- PCI Telephony Modem for Windows®
- MS® Windows® Me & MS® Office XP Small Business & Norton® AntiVirus™
- 1-Yr Ltd Warranty[2] ■ 1-Yr NBD On-Site Service[4]

$999 E•VALUE CODE 03875-590609b

BUSINESS LEASE: $28/MO., 48 MOS.[5]

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- Flat Panel Monitor Sold as an Upgrade

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