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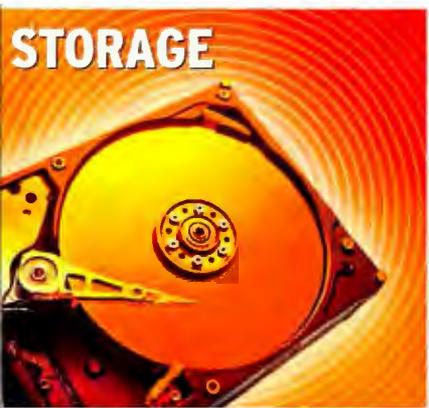
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- CD-RW/DVD-ROM combo drive
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 10/100 Network Card & 56K V.92 Modem  
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& SERVICE

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## FEATURES

### WI-FI TECHNOLOGY

#### 84 Wireless Networking: Faster! Farther!

The latest breakthroughs in Wi-Fi involve products that employ innovative antenna technologies collectively known as MIMO—multiple in, multiple out—to extend a network's range and increase its data transfer speed. We tested various MIMO and non-MIMO routers and PC Cards to see which combos deliver on performance and price.

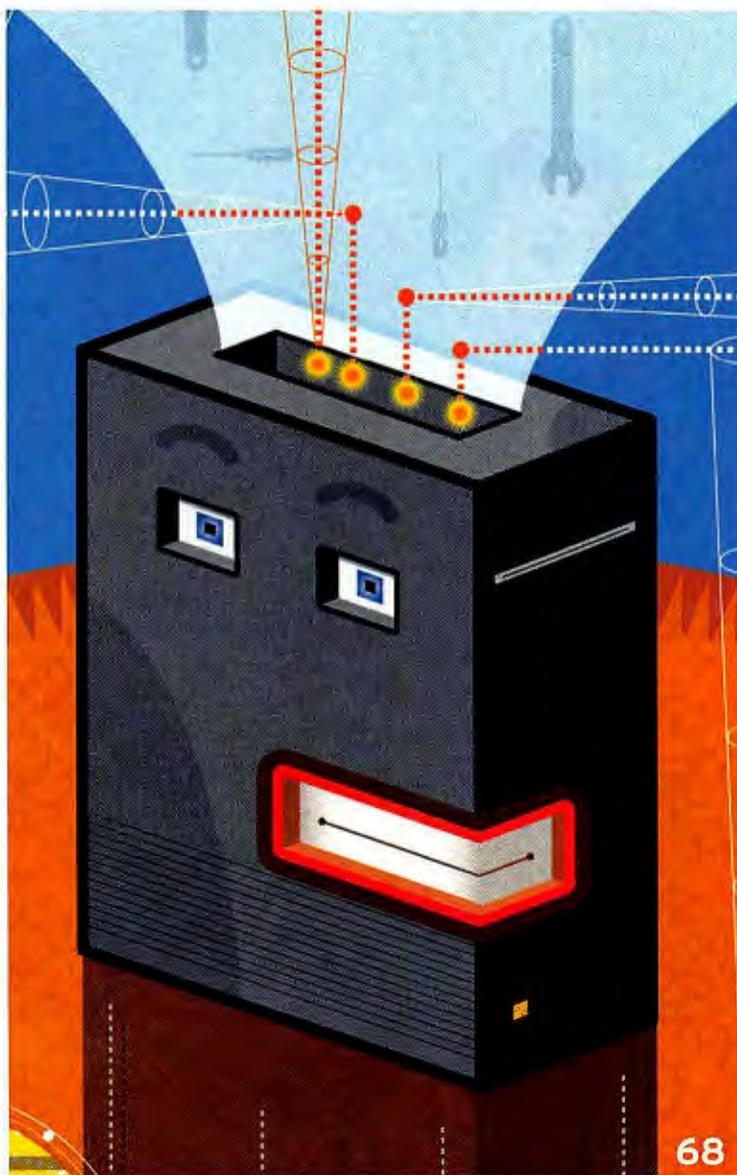
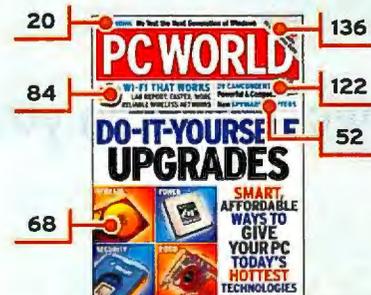
### REMOTE ACCESS

#### 105 PC in a Browser

If you're frequently on the road and concerned that you might forget an important file back at the office, a number of services can offer you real-time access to your work system from any PC that has a Web browser. We tested six such services, looking for top-of-the-line speed, features, and security. In addition, we evaluated two other services that specialize in file sharing and synchronization.



### ON THE COVER



68

## COVER STORY

### 68 Reinvent Your PC

If you're feeling envious about the new technologies built into the latest systems—but lack the green to buy a new PC—don't despair. The right upgrades can do wonders for an aging machine, providing more storage, better performance, new entertainment capabilities like TV recording, superior graphics, and enhanced security. We show you how to do it.

Cover photography by Marc Simon.



84



# Power Can be a Beautiful Thing.

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Tri Huynh  
Senior Engineer, Corporate IT  
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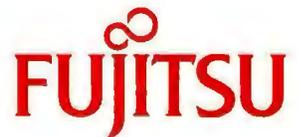
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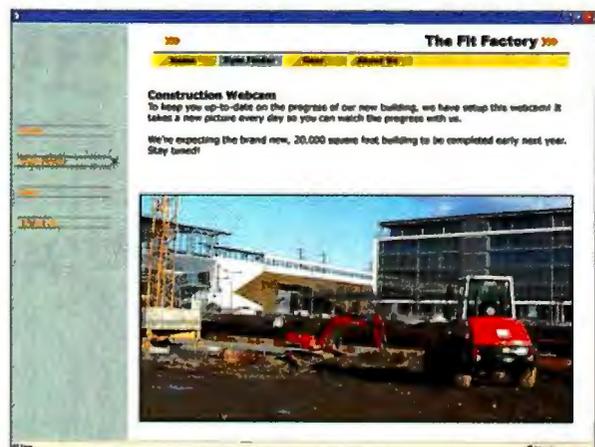
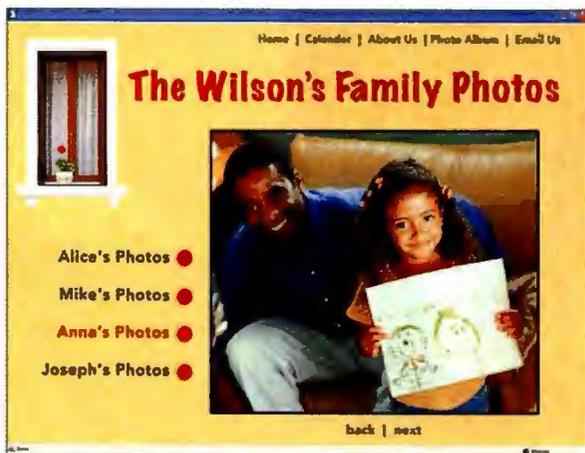
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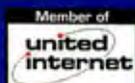
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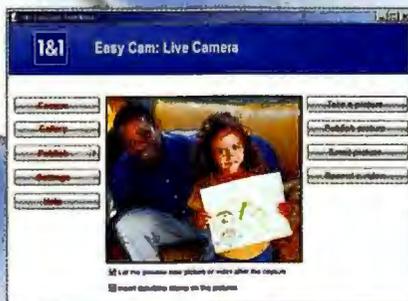
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## A Google, Google, Google, Google World

The sovereign of search wants to organize everything. Is there a catch?

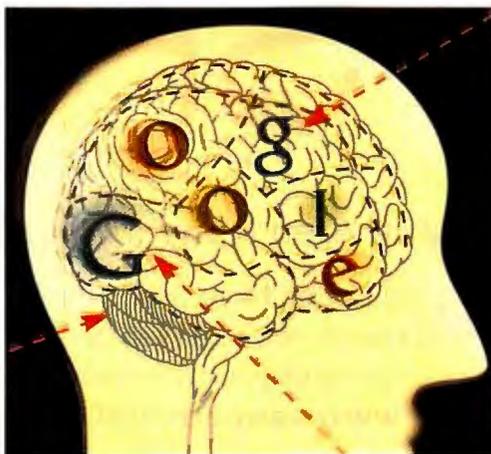
GOOGLE'S MISSION STATEMENT—"to organize the world's information and make it universally accessible and useful"—has always expressed an astonishingly audacious goal. But now, more than ever, Google seems to be taking the far-reaching implications of those words quite literally.

At last count Google's index consisted of more than 8 billion Web pages, and the search engine can examine them and return results for you almost as fast as you can enter a query. More recently the service has launched specialized Googles for everything from inboxes (Gmail) to photos (Picasa) to your hard drive (Google Desktop Search) to the dead-tree contents of some of the world's great libraries (Google Print).

"Google's pace of innovation over the past year has been breathtaking," says John Battelle, author of *The Search: The Inside Story of How Google and Its Rivals Changed Everything* (Portfolio, September 2005). He's right. But the company may just be getting started.

As Marissa Mayer, Google's director of consumer Web products, puts it, "the number of new [Google] products is related to the number of engineers—it's a linear function." Translation: So long as putting profitable little text ads next to search results enables Google to hire more smart people, it will keep "launching products at an equal rate or maybe a greater rate."

As Google tries to manage more information, its Brobdingnagian data warehouse increasingly stores and interprets highly personal information. Turn on the new My Search History feature, for instance, and it will track the terms you search for and the results you click on.



Use Gmail, and you can save gigabytes of correspondence on Google servers. In both cases, Google holds onto the data until you decide to delete it.

You don't need to be a privacy nut to worry about the implications of this detailed paperless trail of bytes, or to wonder who might get their hands on it. (For one thing, the Patriot Act, passed after the events of September 11, 2001, grants the government broad rights to examine personal data stored by Internet companies such as Google without notifying the users under investigation.)

To its credit, though, Google has a history of treating its users' data with respect. Just about every feature that the service offers can be disabled, the company's privacy policies are easy to find and decipher, and little of the information that it collects can be associated with any specific user.

But even if Google's intentions remain

pure and Uncle Sam keeps his distance, accidents can happen. In May, Google introduced a free Windows download that it called the Google WebAccelerator. Almost as soon as the application appeared, users reported that its caching technology was giving them access to password-protected pages that other users had visited after signing in at Web-based services such as message boards. (Shortly after reports of WebAccelerator's flaws cropped up, Google stopped accepting new users.)

WebAccelerator didn't actually log anyone in as someone else, and encrypted services such as online banking operations remained secure. But the lesson is clear: As godlike as Google can seem, it's a decidedly human enterprise. And its track record of unleashing new services before thoroughly testing them (like many other Google offerings, WebAccelerator debuted as a public beta) could mean that a more serious breach might go undetected until the service went live.

"It is important to remember that Google has little self-consciousness about releasing very early conceptions of features that might mature into significant services," says Brad Hill of the Unofficial Google Weblog ([google.weblogsinc.com](http://google.weblogsinc.com)).

Ultimately, Google got where it is by being great—and I expect to use its services, both old and new, for years to come. Still, Spider-Man had it right: With great power comes great responsibility. Let's hope that the most important company on the Web remembers this maxim as it seeks to become the planet's one-stop, all-purpose wrangler of information. ■

Contact Editor in Chief Harry McCracken at [mageditor@pcworld.com](mailto:mageditor@pcworld.com); read his blog at [blogs.pcworld.com/techlog](http://blogs.pcworld.com/techlog).



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# Longhorn Preview

THE NEWEST VERSIONS OF THE NEXT WINDOWS ADD GRAPHICS SIZZLE AND MORE SEARCH FEATURES BUT LACK VISIBLE PRODUCTIVITY ENHANCEMENTS. **BY SCOTT SPANBAUER**

THE MOST RECENT build of Longhorn—Microsoft's next Windows—has some impressive visual touches, including the kinds of translucent objects found now in Apple's OS X, and more powerful ways of finding files. But it doesn't yet exhibit any breakthroughs in productivity, or promised features such as security improvements and smarter connections to handheld devices.

We tested the 64-bit version of the latest code released to developers (Longhorn build 5048) and have also viewed demonstrations of a subsequent build. The first beta version of the operating system is due for release this summer.

Over the last several years, Microsoft has touted Longhorn's trio of significant innovations: a graphics engine dubbed Avalon; a technology

called Indigo that enables programs on different computers or devices to communicate; and an indexed, searchable data storage layer called WinFS. But when faced with a self-imposed release deadline of late 2006, Microsoft decided last year to pull WinFS out of

Longhorn, promising to release that component as an add-on at a later date.

So what of the two remaining Longhorn design pillars? A new desktop theme called Aero is about the only sign of Avalon graphics in our pre-beta. Turning mundane buttons, window frames, title bars, and icons into animated,



3D-rendered, and sometimes transparent objects, Aero brings the Windows interface to life. Indigo, which supports enhanced Web services, won't be visible to end users.

But even though WinFS is now out of the mix, Microsoft has taken advantage of file attributes in the NTFS file system already available in Win-

dows XP to make Explorer better at ferreting out documents according to author, camera model (for photographs), or genre or album title (for music files). The operating system lets you create virtual lists based on these attributes so that, for example, you can see every

photo on your system or all Microsoft Word files, regardless of where they are stored and without having to explicitly search for them.

Longhorn will also do a better job of connecting to smart phones (Microsoft wouldn't indicate whether the phones would have to run the company's Windows Mobile operat-



**SEEING THROUGH WINDOWS:** Longhorn's Avalon graphics engine supports the Aero desktop theme's semitransparent window frames.

ing system), cameras, and audio players, improving their integration into Explorer and making file transfers and synchronization more consistent across device types. Still notably absent from the Longhorn builds we've looked at are new versions of the Internet Explorer browser (even though Microsoft has said it is close to releasing a beta of IE 7) or any other bundled utilities. Gone, for the time being anyway, is the desktop sidebar that lurked in previous preliminary versions of Longhorn.

And in spite of announced planned enhancements such as monitoring of outbound data (Windows XP's firewall watches inbound traffic only), protection against malware, a new type of restricted user account, and a secure startup scheme to ensure that a PC hasn't been tampered with, Longhorn so far has the same minimal security toolbox as Windows XP with Service Pack 2.

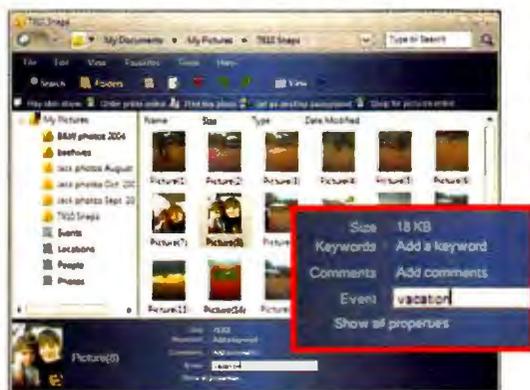
Though security remains an unre-

solved issue, build 5048 brings Longhorn's graphical user interface into sharper focus.

### CATCH-UP EYE CANDY

THE NEW AVALON graphics engine includes a programming interface that permits Microsoft and third-party software makers alike to write applications that put the latest and greatest graphics cards to work rotating, texturing, and fading windows, as well as making menus, title bars, and other elements translucent—finally enabling Windows to catch up to Apple's OS X, several years after the fact.

We managed to activate a subset of these features in our copy of Longhorn build 5048,



**PICK YOUR PROPERTIES:** Longhorn lets you customize file attributes that you can then use to index documents.

and they're certainly welcome refinements (see the screen at left). Nevertheless, the integration of accelerated graphics effects into Windows is a luxury upgrade, not a must-have productivity enhancer. And although the effects in Avalon won't necessarily require bleeding-edge hardware, they will call for a graphics board compatible with the new Longhorn Display Driver Model, likely ruling out many legacy systems.

Microsoft has yet to announce minimum Longhorn system requirements, but for PC buyers seeking insurance that a new system will run Longhorn, the company advises getting 512MB of RAM and a "modern" CPU—more than Windows XP needs. As with most of the recent Windows updates, the easiest way to get Longhorn will be on a new PC, and by late 2006 most PCs will be 64-bit. Reflecting that trend, all editions of Longhorn will include both 32-bit and 64-bit versions. (Microsoft officials say that they are still mulling over whether features included in the Tablet PC and Media Center editions of XP will continue to require special editions of Windows.)

Less clear in build 5048 is Microsoft's vision for searching, indexing, and grouping files. WinFS was intended to create a systemwide data-indexing system accessible to Windows and to various applications, both on the local computer system and on linked devices. With ▶

## IN BRIEF

### Product Pipeline



#### CHEAPER DUAL CORE:

Intel's new Pentium D CPUs bring dual-core technology—two processor cores in one package—to midpriced PCs. Models range from the 2.8-GHz 820 to the 3.2-GHz 840. All have two 1MB L2 caches, 800-MHz frontside bus speed, and 64-bit support. Pentium D CPUs require a motherboard with one of two new 945 chip sets (the 945G has integrated graphics, while the 945P doesn't). Prices (in quantities of 1000) range from \$241 to \$530 each; Intel's upscale Pentium Extreme Edition 840 goes for \$995.

### Tidbyte

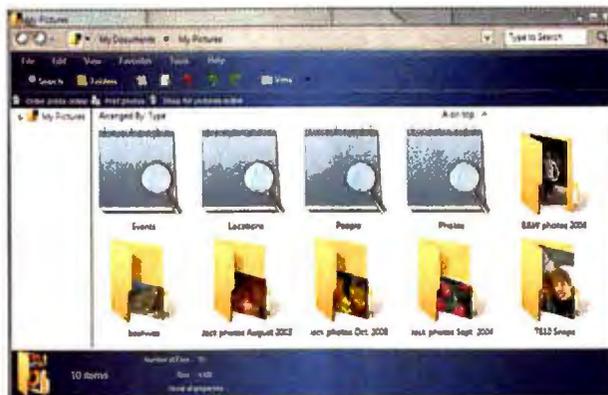


#### FLY THE WI-FI SKIES:

United has become the first U.S. airline to receive Federal Aviation Administration approval for installing Verizon Airfone equipment necessary to offer Wi-Fi Internet access to passengers. The FAA granted its approval to a United B757-200 after testing showed that the equipment would not interfere with operation of the aircraft. United expects to offer Wi-Fi service by the middle to the end of 2006.

the removal of WinFS from Longhorn, indexing is scaled back, although not forgotten. Familiar folders like My Documents and My Pictures still allow you to sort contents according to attribute type, such as file date, size, author, title, subject, attached keywords, bit rate (in the case of audio files), or camera model (in the case of digital pictures).

Regrettably, Microsoft won't immediately extend virtual lists and other Longhorn search and indexing capabilities to third-party apps. Those programs will have to wait for the



**VIRTUAL FOLDER REALITY:** Longhorn's virtual folders let you view files by a specific attribute, regardless of their actual location.

appearance of WinFS sometime after Longhorn's release.

Perhaps conscious that its failure to satisfactorily secure

Internet Explorer has driven millions of the browser's users to switch to the Mozilla Foundation's Firefox—and possibly

hoping to avoid a similar exodus to Mac OS X or Linux—Microsoft has announced several security initiatives such as a new low-rights user account that will let the owner make routine system changes (such as installing a driver) while limiting malware exposure.

Buyers of new 64-bit computers will undoubtedly opt for Longhorn's enchanting interface and new device support—especially if security improves. It remains to be seen, though, whether additional innovations will give Windows XP users more reason to upgrade.

## MOBILE

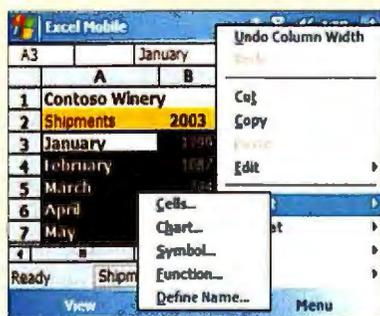
# MICROSOFT UPGRADES WINDOWS FOR HANDHELDS

THE NEXT VERSION of Microsoft's flagship desktop operating system won't see release for at least another 14 months, but a new edition of the Windows Mobile OS for handhelds and smart phones is much closer to arriving. Windows Mobile 2005 (previously known by its code name, Magneto) should make its debut by fall, both in new devices and in for-pay upgrades to at least some existing Windows Mobile 2003 models.

The first major upgrade in almost two years, Windows Mobile 2005 offers improvements ranging from support for flash memory (which won't lose data when your handheld loses power) to more capable versions of Microsoft Office apps and a Windows Media Player upgrade. For enterprise customers with Exchange Server 2003, Microsoft has also announced an upgrade pack with instant messaging, synchronization, and security features.

We'll know more when we test devices running the OS (Dell and HP have said they will offer the upgrade to owners of certain Windows Mobile 2003 devices sometime this summer, but have not said how much it will cost). But on paper at least, the upgrade seems promising.

The Office changes should please people who've been frustrated by the rather hap-



**PORTABLE EXCEL:** Windows Mobile 2005 lets you create and edit spreadsheets. In the past, you could only view them.

azard formatting support for Excel and Word in their Pocket Office counterparts in earlier incarnations of Windows Mobile. Now known as Excel Mobile and Word Mobile, the new versions will allow you to create, edit, and view Excel spreadsheets, and to edit Word documents with graphics without disturbing the formatting of the original desktop documents.

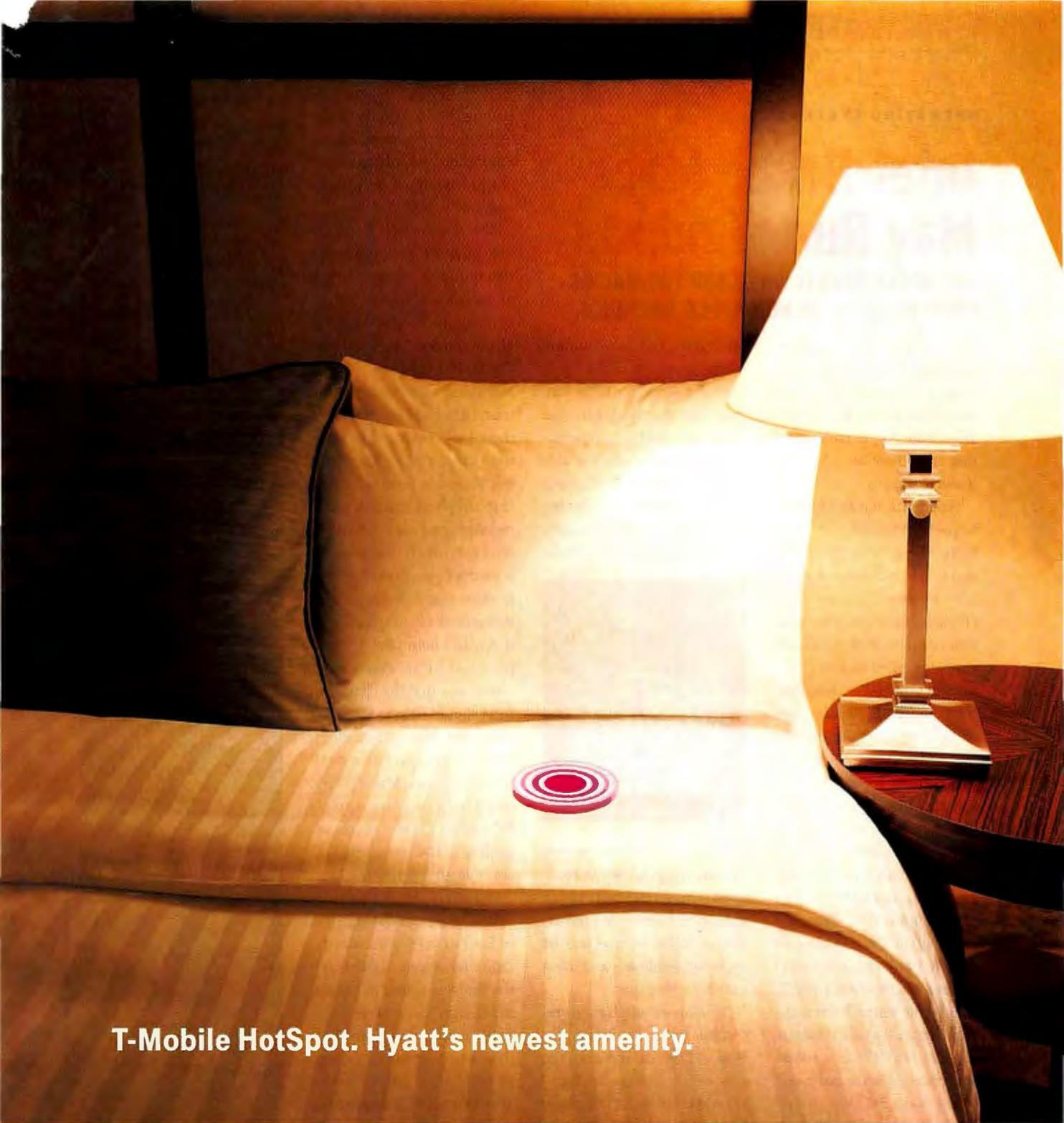
Outlook Mobile makes it easy for you to add a photo to a contact and then sync it to a desktop copy of Outlook (which has supported contact photos for a couple of years). A new PowerPoint Mobile application lets you view and rehearse (but not edit or create) PowerPoint presentations.

Windows Mobile 2005 ships with Windows Media Player 10, which includes Microsoft's Janus digital rights management technology for playing copy-protected content from music and video services such as Musicmatch, Napster, and TiVoToGo.

In addition to supporting flash memory, Windows Mobile 2005 supports landscape displays on smart phones and improved one-handed navigation on handhelds—reflections of Microsoft's commitment to making the phone and PDA versions of the OS more consistent. Also new: support for 3G networks and Wi-Fi on smart phones, plus the ability to easily enable technologies such as push-to-talk and videoconferencing. The OS also enhances support for Bluetooth (you can use it for stereo headsets, for example), USB 2.0, and integrated hard drives—items that will appeal to people who want to transfer lots of digital music files from PCs to their handhelds.

Finally, Microsoft says it has improved security, including making Active Sync more hacker-resistant, supporting more-secure remote access features, and allowing users to limit Web access to secure sites. If it all works, Windows Mobile 2005 should be an upgrade worth getting.

—Yardena Arar



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## OPERATING SYSTEMS

# Intel-Based Macs May Run Windows

**BUT APPLE SAYS IT WILL STOP THE MAC OS FROM RUNNING ON NON-APPLE MACHINES.**

APPLE'S DECISION TO abandon IBM PowerPC chips in favor of processors from Intel raises the possibility of new, affordable Apple computers that could boot both Mac OS X and Windows.

"Apple will not do anything to prevent it," says Michael Gartenberg, vice president and research director with Jupiter Research in New York. (Today, Macs can run Windows only on a sluggish x86 emulator called Virtual PC.)

At the Apple Worldwide Developers Conference in June, CEO Steve Jobs said that the first Macs with Intel processors would appear next year, with the migration to Intel expected to be mostly complete by the end of 2007. Apple did not say which Intel CPUs it planned to use or where they would appear first. But given that Mac OS X is a 64-bit operating system and Intel hasn't yet announced a 64-bit mobile chip, Apple will probably make desktops such as the iMac and the Mac Mini the first recipients of Intel architecture, says Shane Rau, PC chip analyst for the research firm IDC.

## MAC OS ON MACS

IF YOU'RE HOPING to load Mac OS X on an existing Windows PC, though, you'll be disappointed. Apple has made it clear that the Mac OS will install only on Mac hardware. Likewise, if you've been hop-

ing that the switch to common hardware will mean more software developed for both Windows and Mac computers, you are in for a letdown. Developers say that they won't be able to develop Mac and PC applications simultaneously, because the coding languages are still vastly different. While



Mac lovers who have to run the occasional Windows application may rejoice at being able to run native Windows, the migration to Intel may be rocky for developers and users of today's Mac apps.

Developers will have to recompile programs written for PowerPC Macs, and until the new versions appear, longtime Mac fans who buy a new Intel-based Mac will have to run their legacy apps with an emulation technology called Rosetta (named after the famous stone used to decipher Egyptian hieroglyphs). Rosetta will run code created for PowerPC on Intel's chips at a pace that Jobs described in a presentation slide as "fast

(enough)." In a demo of the technology, however, Adobe Photoshop took a fair amount of time to launch on a prototype Intel-based Mac.

Why the switch? Rau says that Intel can assure Apple a steady supply of chips for all of its products—including desktops, servers, and a range of notebooks. "And not just CPUs, but chip sets, Wi-Fi, and so on," Rau says. In contrast, IBM had been unable to meet Apple's demand for desktop chips, and neither IBM nor Freescale (another Apple chip supplier) had a comprehensive road map similar to Intel's. Further, IBM couldn't solve the PowerPC CPU's heat problems in order to create a PowerBook G5 notebook, and it couldn't help Jobs deliver a promised 3-GHz Power Mac.

Rau says that the change to Intel should help to lower the prices for Macs. That, along with the prospect of a dual-boot Windows/Mac system, could help increase Apple's PC market share—which, according to IDC, currently hovers at about 3 percent.

However, not all observers believe that abandoning IBM in favor of Intel is a smart decision for Apple. "Intel is not the 'de-facto leader in processor design' that it was a few years ago; in the recent past Intel has been out-innovated by both AMD (with a better approach to 64-bit computing) and IBM (with a better long-term strategy around multi-core chips)," wrote Ovum Ltd. research director Gary Barnett in an e-mail message.

—Narasu Rebbapragada  
PC World Senior Editor Yaredena Arar and Tom Krazit of IDG News Service contributed to this story.

## IN BRIEF

## Tidbyte

### NOT JUST ANOTHER

**YAHOO:** America Online makes some of its previously members-only content and services available to the internet at large with the relaunch of AOL.com this summer. The advertising-based Web portal features updated news content, Internet radio, music videos, and articles from AOL's sister publications at Time Inc. The AOL.com relaunch coincides with the release of a major update to the AIM instant messenger software ([find.pcworld.com/47968](http://find.pcworld.com/47968)), which bundles an AOL Explorer browser, a Voice-over-IP service, and an anti-spyware scanner.

## Product Pipeline

**TAPE AND TOSS:** Drugstore giant CVS has introduced a \$30 disposable camcorder with internal memory that captures up to 20 minutes of video. Just bring the CVS One-Time-Use

Video Camcorder back to CVS's 1-hour DVD mini-lab, and in exchange for a \$13 processing fee you will receive a DVD for playback on your computer or DVD player. The pocket-size camcorder is made by Pure Digital Technologies and sports a built-in microphone and a 1.4-inch color LCD display through which you can review your videos and delete unwanted segments.





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## INTERNET ACCESS

# ISPs Attempt to Stop Public Broadband

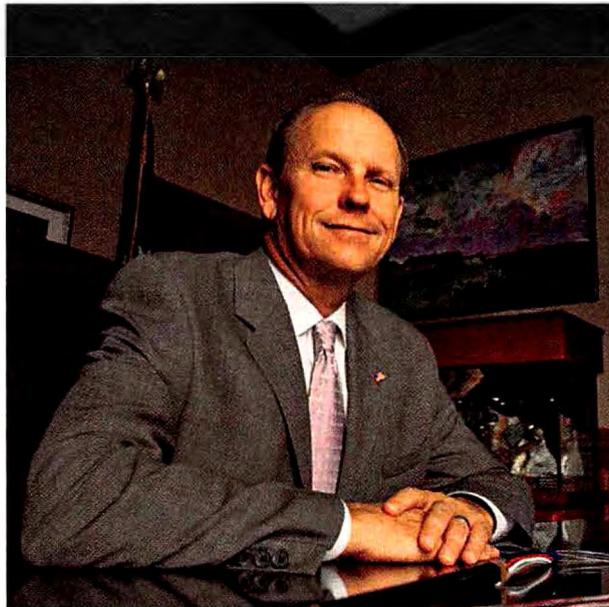
CABLE AND DSL PROVIDERS BATTLE CITIES THAT WANT TO OFFER ACCESS TO RESIDENTS.

WHEN TINY NORTH Kansas City, Missouri, announced that it planned to offer affordable high-speed Internet access much the way it does other public services, local attorney Brian Hall was ecstatic. Though Hall could get DSL service from SBC Communications, he says that he found the service unreliable, supplying lower speeds than he expected. But then goliath Time Warner Cable asked a Missouri federal court to block the city's efforts.

Time Warner's initial case was dismissed, but the company appealed the ruling and vows to stop North Kansas City from offering services it plans to provide residential customers later this year.

Other cable and telecommunications companies are fighting similar battles in major cities and rural communities across the United States, to prevent the municipalities from supplying their residents with fast, low-cost Internet access, either via wireless or high-speed fiber wired networks. In places where no laws currently prohibit a city or town from entering the broadband-provider market, the companies are lobbying for new legislation that would.

If a municipality can offer Net access at lower prices than most telephone and cable TV companies, why shouldn't it, municipal-broadband advocates argue. The opponents counter that cities would have an unfair competitive advan-



JOEY DUREL, mayor of Lafayette, Louisiana, says that the practices of corporate America are hurting communities like Lafayette.

tage and that service and support might not be as good as that from private companies.

## CASE FOR THE CITY

CITIES SEE wireless broadband as a low-cost way to offer low-income residents Internet access. High-speed offerings are good for local businesses, schools, and hospitals, they argue, and make the community a better place to live. And when private industry can't or won't give the service, how can you blame the city for doing it, asks Jim Baller, an attorney who represents municipalities.

Lafayette, Louisiana, mayor Joeey Durel says that his city "begged" its phone and cable companies for years to wire it with fiber-optic access—to no avail. The city now plans to build its own fiber network,

but Bell South and Cox Communications have filed court motions to stop the plan.

"The practices of corporate America are hurting communities like Lafayette," he says.

Durel says a Lafayette-owned fiber network delivering Internet, cable TV, and phone service would save residents over 20 percent on their monthly bills, and would let the city give its schools fast Net access.

## THE OPPOSITION

THE MUNICIPAL Internet trend is irking giants such as Bell South, Comcast, SBC, Time Warner Cable, and Verizon Communications. SBC representative Marty Richter says basic policy and conflict-of-interest issues arise when government enters markets where it can tax and regulate

its private-sector rivals, making the competition unfair.

However, cities and towns can't regulate telecom providers or ISPs—that's up to state and federal agencies. Cities do regulate cable franchises; but where cities offer such services, they are still subject to state and federal rules, says attorney Baller.

Though it has acted to block municipal Wi-Fi efforts in Philadelphia, Verizon says it is prepared to compete with municipalities. Verizon says it can do a better job of network management and customer care. "Cities need to go into these projects with their eyes wide open," says Eric Rabe, spokesperson for Verizon.

Many of these networks have high up-front costs—the Lafayette plan will cost \$125 million—and there will be service and maintenance costs. If too few users sign up, revenue may not cover upkeep costs, and the city will lose money. This year, for example, Washington State's Whatcom County had to sell its unfinished fiber system for \$126,000 after spending \$2.3 million on it. Private firms jumped in and saturated the broadband market, say county representatives.

Besides, "do you really want to call city hall when your Internet access goes down?" Verizon's Rabe asks.

For Mayor Durel, who says service from his local phone company is awful, the answer to Rabe's question is yes.

—Tom Spring

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## NAVIGATION

# Phones Use GPS to Show You the Way

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WHEN YOU unexpectedly need driving directions or you have to find the nearest hotel, chances are you won't have access to a map or a guidebook. How about getting the information from your cell phone? Several companies are



**TELENAV** is the first GPS navigational service on the BlackBerry platform.

offering innovative ways to bring navigational tools and location-based directory listings (such as restaurants, gas stations, and movie theaters) straight to your phone—all in real time via the Global Positioning System. What's more, the services cost less than stand-alone in-car GPS devices.

We tried out three of the newest services: America Online's MapQuest Find Me, Gate5's Smart2go Mobile Navigator, and TeleNav for

Research In Motion's new BlackBerry 7520. MapQuest and TeleNav operate only on GPS-enabled Nextel phones; Gate5's Smart2go is not tied to a carrier and functions on Bluetooth-enabled Symbian Series 60 phones (such as the Nokia 6600 and 7610), Microsoft Windows Mobile phones and PDAs, and the PalmOne Treo 650 and Tungsten T3.

Both TeleNav ([www.telenav.com](http://www.telenav.com)) and MapQuest Find Me ([company.mapquest.com](http://company.mapquest.com)) use Nextel's Assisted GPS technology to pinpoint your cell phone's location, allowing you to find businesses in close proximity and get maps and driving directions. TeleNav gives graphical and audible turn-by-turn directions, while MapQuest has only graphical and text-based information. (TeleNav has existed since early last year, but it's the first vendor to offer GPS service on a BlackBerry handheld.)

MapQuest has a Web feature ([findme.mapquest.com](http://findme.mapquest.com)) by which people you authorize can track your location. The service costs \$4 a month, or \$6 monthly if you don't have Nextel's data plan. TeleNav is \$10 a month on top of Nextel service. To get either GPS service, you download it to the phone as an additional app.

Gate5's \$349 Smart2go ([www.smart2go.com](http://www.smart2go.com)) setup is more complex. First, you need a phone equipped with one of the operating systems listed above, Bluetooth (to transfer the GPS signal from the supplied GPS receiver to the phone or PDA), and a mem-

ory card (to store the supplied data, including Tele Atlas maps of the United States and Canada). Then you transfer the information using the supplied card reader.

To identify the phone's location and acquire the spoken driving directions, Smart2go looks for the Bluetooth signal from the GPS receiver and transfers the info to your handset. The application helps you find points of interest (including museums and shopping centers), and provides reviews of places such as bars, cafés, and restaurants.

In our tests, TeleNav using the BlackBerry 7520 and Nextel loaded maps and directions relatively fast. But Smart2go on Nokia's 6600 and T-Mobile, and MapQuest Find Me using Motorola's i830 and Nextel, were sometimes slow in loading information. In addition, Smart2go's driving directions and maps were sometimes off by a few streets; a weak GPS signal may have been the

**MAPQUEST FIND ME**, installed here on Motorola's i830, delivers maps, listings, and a way for people to find your location.



**GATE5 SMART2GO** Mobile Navigator provides reviews from W Cities on venues like hotels.

problem, the company says.

On all three services some of the listings are out of date, supplying information about restaurants that no longer exist while omitting entries for newer establishments. And compared with the detailed maps displayed on dedicated in-car GPS setups (such as Garmin StreetPilot or Magellan RoadMate), the mapping info on these services is spartan. The small screen on a cell phone or PDA is partly responsible for the limitation.

It was sometimes difficult to find commands on Gate5's Smart2go and on MapQuest Find Me. Granted, the phone design takes a share of the blame. Despite such drawbacks, however, all three services prove useful for getting driving directions and for finding local businesses, regardless of whether you're traveling or in your own town.

—Grace Aquino, with additional reporting provided by Dennis O'Reilly and Narasu Rebbapragada

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# PLUGGED IN

STEVE FOX

## Office 12: Easier Data Updates

PLUS: NET RADIO RISES, AND A MOTHERBOARD FOR AMD AND INTEL.

### OFFICE OPENS UP

**The Buzz:** Microsoft has spilled the beans on "Office 12," due out in the second half of 2006. Most significantly, the native file formats for Word, Excel, and PowerPoint will now be XML—an open standard that creates smaller, more secure files (though .doc, .xls, and .ppt will still be supported). The XML format should also ease collaboration and make pulling dynamic info from a database simpler. Meanwhile, in an attempt to woo the Microsoft Office set, Sun is readying StarOffice 8, its bargain-priced multiplatform productivity suite. The big news: better importing and exporting of Microsoft Office file formats; improved PowerPoint interoperability, migration tools for



converting Excel macros; and piles of usability improvements, like one-click PDF creation. Built on the open-source OpenOffice.org 2 code base, StarOffice 8 standard edition includes word processor, spreadsheet, database, drawing, and presentation apps. At \$60 (as a download), this ultracompatible suite could tempt small businesses. **Bottom Line:** Microsoft's long-overdue embrace of open industry standards will cheer big business and developers; consumers will likely greet the news with a big yawn.

### GADGET WATCH

## A Robot With a Mop

THE FOLKS AT IROBOT, makers of the Roomba robotic vacuum, have found a better way to mop. The Scooba robot vacuums up loose debris, dispenses a cleaning solution (created with partner Clorox), scrubs the surface, and then sucks up the whole



mess to leave a dry, clean floor—all in a single pass. It navigates any hardwood floor, but its low-slung bumper ensures that it won't glide over a threshold and try to mop the carpet in the next room. Models should be available by year-end (irobot.com).

### THE SOUND OF RADIO

**The Buzz:** A raft of rockin' products is making Internet radio irresistible, while staying on the right side of the law. RadioTime (\$39 to \$59 a year for premium service) allows you to time-shift and record Internet programming TiVo-style. (You can also record local radio content using USB tuner hardware). Mercora (\$48 a year) makes a huge and eclectic mix of programming drawn from users' "personal radio broadcasts" (more than 20,000 streams per day) available to subscribers' systems. Its new IM Radio Mobile brings Windows Mobile-based Pocket PCs and Pocket PC phones into the mix. And for Windows users who have new SanDisk or iRiver MP3 players, AudioFeast's service (\$36 a year) offers programs from thousands of content providers—all with industry-blessed digital rights management built in.

**Bottom Line:** Radio may be free, but these services are worth paying for.

### A MOTHERBOARD BUILT FOR TWO

**The Buzz:** Motherboards for current x86 systems come in two flavors: Intel and AMD. Or at least they did until ECS built the

### HERE\NOW

**1 AIRSET** Networked calendar and contact list also works with your cell phone. [airset.com](http://airset.com)

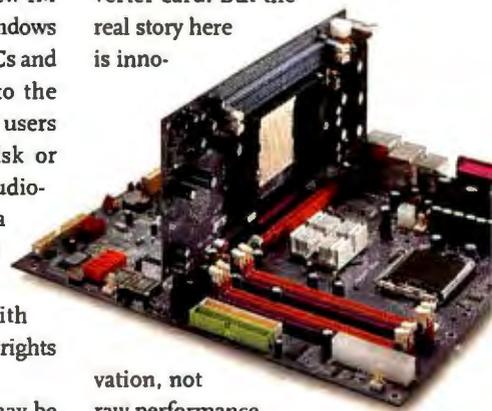
**2 SAMSUNG NUMBER ONE** Stylish, superslim 5-megapixel camera, with 2.5-inch screen, for \$450. [samsungcamera.com](http://samsungcamera.com)

**3 OMNIPELAGOS.COM** Intriguing application maps relationships between any two search items.

**4 PODSCOPE.COM** Search engine for spoken words within online audio or video podcasts.

**5 FREE AIM MAIL AOL** Joins the throng: 2GB of storage, and spam filtering built in. [www.aim.com](http://www.aim.com)

PF88 Extreme, a \$95 hybrid board that handles AMD and Intel CPUs—including Pentium M chips and present and future dual-core chips. For the upgrade from P4 to Athlon 64, you'll need to add a \$50 converter card. But the real story here is inno-



vation, not raw performance.

**Bottom Line:** An odd duck. Still, future upgraders and system builders who just can't commit will be charmed. ■

Contact PC World Contributing Editor Steve Fox at [steve\\_fox@pcworld.com](mailto:steve_fox@pcworld.com); visit [find.pcworld.com/31643](http://find.pcworld.com/31643) to read additional Plugged In columns.

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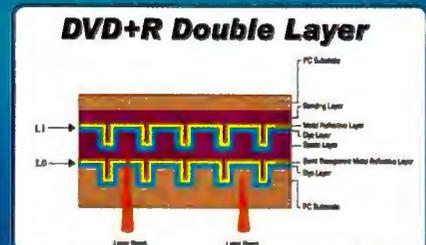
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# LETTERS

LETTERS@PCWORLD.COM

**GOT ADWARE?  
GO SUE 'EM!**

**SPARE PARTS AT  
THE THRIFT STORE**

**IS THE BROADCAST  
FLAG NEEDED?**



## HARDWARE TORTURE HISTORY

THOUGH AMUSED by June's "Hardware Torture Tests," I was looking for something a bit more informative than the stunts it described. No technology magazine has been willing to do true, systematic torture tests on computer hardware since *PC Computing* ceased publishing.

Every year that magazine would do a notebook torture test in which laptops from all makers would be dropped from a 3-foot tabletop; have a prescribed amount of coffee spilled on them from a foot above their keyboards; and suffer freezing, heating, and other common day-

to-day atrocities. After each test, they would see if the PC could boot, run software, and/or do a hard-disk scan. The results were tabulated and published.

As I remember (and this was almost a decade ago, an eternity in computer years), IBM and Dell would be first and second interchangeably. I think this test was one of the major reasons both IBM and Dell developed robust, hard-disk shock-absorbing systems for their laptops.

*PC World* could do its readers a service by starting up an annual, systematized, "real-world" torture test for all of our portable technology—laptops, cell phones, PDAs, flash memory, and so on. You could then add a new column to your *Top 100* lists: torture toughness.

*Kevin Reed, San Diego*

MY CHILDREN thought your article was hilarious. By the time I got to the part about running over the cell phone s-l-o-w-l-y with the BMW, they were rolling with laughter. I hope they don't decide to try out any of those tests with my stuff.

My own torture test story: I bought an

IBM ThinkPad T40 and everything was working great—until a strange glitch appeared. Every time I squeezed the front left corner of the notebook, it would inexplicably restart. I hate going to the tech folks to get stuff fixed, so I simply avoided touching that corner. Then one day I accidentally flung the PC through the air in my office. It crashed down, breaking a piece off a back panel. I held my breath as I booted it, but it worked with no problems. Even better, I have not had the pesky glitch that I had before. I don't recommend this solution for all users.

*John Hunt, Thailand*

## PERMISSION-BASED FILTERING

I READ WITH INTEREST Andrew Brandt's column on how spam slips past defenses [*Privacy Watch*, June]. Filter-based and community-based products such as Cloudmark's (which Brandt mentions) simply escalate the problem, as spammers keep working to find new ways around them. But the permission-based process (including challenge/response) blocks 100 percent of spam without the need for continued monitoring, attempting to measure trust, or other heuristics.

The main objections to permission-based systems stem from misunderstandings or poor implementation by some vendors, and downright indignation from a few people who feel they have the absolute right to shove their e-mail at anyone they choose. That might have been acceptable in the early days, but it is simply unrealistic in our current environment.

*David H. Jameson, DigiPortal Software*

## FIGHTING SPYWARE

ANTI-SPYWARE PACKAGES work only until the adware authors develop new programs capable of evading those defenses.

There is another, more proactive ►

## SUBSCRIBER SURVEYS

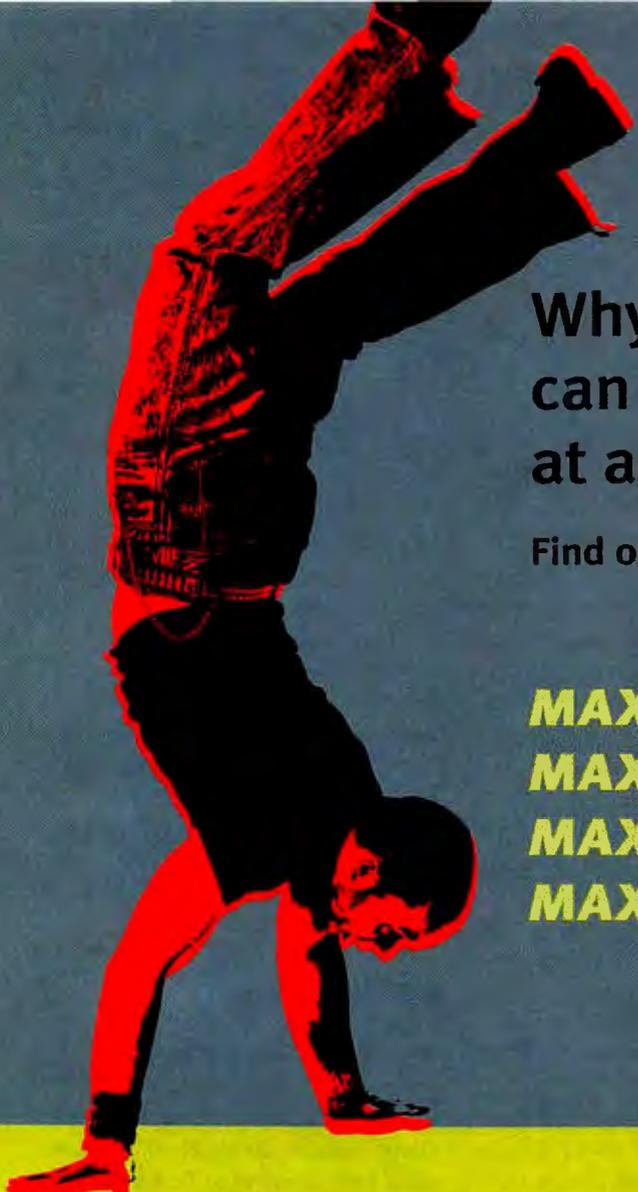
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approach to combatting this garbage.

My computer was attacked by an adware program that eluded removal and hampered my PC. Because the company that developed the program got its revenue from advertisers and promoted its services, I identified this firm and sent a demand for removal software and compensation for my costs. When my demands were not met, I filed a small-claims suit. Just prior to the hearing date, the company settled for what I asked.

As computer users take a more aggressive approach to the producers of these invasions of our privacy, the purveyors will find that the costs of being in business will outweigh the benefits.

*Jim Fasbender, via the Internet*

### SYS'S WOES-WHO'S TO BLAME?

REGARDING YOUR STORY about Sys Technology ["PC Maker Fumbles Technical Support," *News and Trends*, June]: I am using my third Sys Technology comput-

er. I believe that no one builds a faster and more trouble-free computer than Sys. Having to take your computer to a store to have it repaired, as Nicholas Starin in your story did, is 110 percent easier than if you had to call tech support that was based abroad. That Sys had problems with the company it used for its tech support can happen to anyone, even the best. It bothers me that your magazine has suspended coverage of Sys products because of a temporary situation.

*Brenda Cane, Encino, California*

YOUR ARTICLE states that Sys is blaming Integrated Automation International for some of its recent problems.

Up until the day we cut Sys off (for non-payment), the company was actively dispatching us to go on-site to repair its customers' systems. If our service was really so bad, why would Sys keep sending us out to service its customers?

Quite a few small companies developed

a nice business during the PC boom, but are now just barely holding on, still trying to pretend being big-time manufacturers. When they get into trouble, it isn't unusual to see them look around for someone else to blame. Sometimes they blame their service company.

*Glen C. Simmons, President  
Integrated Automation International*

### A SOURCE FOR PC PARTS

A READER COMMENTED on trying to obtain parts for PC hardware [*On Your Side*, June]. I too had a broken item, on my HP printer: A small piece of plastic holding the cartridge in place broke, though the printer was only 1.5 years old.

I went to a local Goodwill with an electronics section, found my model of printer, and purchased it (\$12) for spare parts. I was able to transfer the holder, and it worked fine. So thrift stores may offer a cheap way to repair a product.

*Brigitte Shipek, via the Internet* ▶

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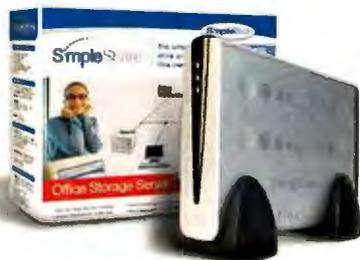


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## BROADCAST FLAG DEFENDED

JUNE's "TV Limits Copies" [*News and Trends*] describes some groups that are fighting the FCC's proposed broadcast flag to limit TV copying.

I can't understand, however, why any group would object to a network or film company having the ability to keep its product from being stolen. This objection to an anticopy measure is no different from requiring all stores to keep their doors unlocked so that their inventory may be stolen each night. Will these people object to losing their jobs with a local company because of losses due to theft?

Lee Ellis, Indio, California

**Editor's note:** A federal appeals court struck down the broadcast flag mandate on May 6; see [find.pcworld.com/48050](http://find.pcworld.com/48050).

PC World welcomes letters to the editor. We reserve the right to edit for length and clarity. Send e-mail to [letters@pcworld.com](mailto:letters@pcworld.com). ■

## CORRECTIONS

IN JULY'S "Can You Trust Your Spyware Protection?" we should have indicated that although Lavasoft's Ad-Aware and Computer Associates' PestPatrol temporarily stopped detecting adware from WhenU and Claria, respectively, both companies have since resumed detection of those programs. Lavasoft told *PC World* that detection of WhenU was disabled as a result of Lavasoft employee error. We did not mean to imply that Ad-Aware had stopped detecting Claria products or that PestPatrol had stopped detecting WhenU software. We also should have specified that Aluria's Spyware Eliminator detects and removes adware from Claria. Although Spyware Eliminator failed to detect WhenU's SaveNow program in recent *PC World* tests, Aluria executives told *PC World* the company has never delisted software from WhenU or any other compa-

ny whether in response to legal threats or otherwise. They said the test results indicated the presence of a new SaveNow variant that Spyware Eliminator did not detect. As we went to press, Aluria released an update that it said would detect SaveNow.

July's *Top 15 Desktop PCs* should have listed these PCs as follows: Xi M Tower 64 AGE-SLI, Alienware Aurora 5500, and CyberPower Gamer Ultra 7500 SE.

In July's *Plugged In*, the URL for Google's beta hosting service for Internet videos should have been listed as <https://upload.video.google.com>.

In June's "The Best (and Worst) ISPs," the sidebar "Fixed Wireless Fills the Broadband Gaps" should have said cable and DSL Internet service is available in parts of Loudoun County, Virginia and the area lies within an hour's drive of Washington, D.C.

PC World regrets the errors.

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# CONSUMER WATCH

ANNE KANDRA

**BEST WAYS TO BOOK YOUR TRIPS ONLINE**

**PRIVACY WATCH: STAY INVISIBLE ON THE WEB**

**ON YOUR SIDE: MP3 PLAYERS KEEP FAILING**

## Online Travel: Smarter Search Options

Travel sites can help you snag a great deal. Just don't get taken for a ride.



(www.travelocity.com). Here's why: All three sites generally do a better job than the newcomers of delivering targeted results. You can use their results to gauge price ranges and get a sense of the kinds of packages that are available. And armed with this data, you can turn to the search sites to hunt for even better deals. The large sites also have lots of photos, resort descriptions, hotel reviews and ratings, and so on, while the search sites' content tends to be bare-bones in this regard.

### THE DRAWBACKS

EACH OF THE Big Three serves as a sort of online travel agency, so you're doing business with the site—not with the airline, hotel, or car rental company. This one-stop arrangement is not necessarily a problem as long as everything goes smoothly. But if you have a billing dispute or somehow end up booking an incorrect itinerary, you'd better be prepared for some serious finger-pointing. Make sure you know who to call if you end up at Billy Bub's Snooze 'N' Cruz when you thought you had booked a suite at the Ritz.

Be forewarned, too, that the rules aren't always clear even to the sites' customer service personnel. Daniel Mormino, a district manager for a payroll company in Scottsdale, Arizona, reports that when he tried to change a fully refundable ticket that he'd purchased through Orbitz, the company charged him a \$100 service fee to cancel the ticket and advised him to book the new ticket directly through the airline. He did so, only to be told by a second Orbitz rep that he should have booked through Orbitz after all. It took hours on hold and several disconnected con- ▶

IF YOU'RE LIKE A lot of folks these days, the only part of your compensation package that's increasing is your unused vacation days. With the dog days of summer right around the corner, your thoughts may be wandering off to white, sandy beaches or idyllic country inns.

If you yearn for a late-summer getaway but your budget's more Toledo than Tahiti, take heart. You'll find lots of Web sites that specialize in scoping out bargain-basement travel packages. The buzz? A new breed of travel site is making a big splash in the online travel world. Sites

such as Kayak and SideStep serve as comprehensive travel search engines. Unlike Expedia and Travelocity, for example, which search for available fares and rates in particular databases, these newer sites scour the entire Web for the best deals.

### THE USUAL SUSPECTS

EVEN THOUGH ALL the excitement in the online travel world involves the newer search sites, I highly recommend that you start your research with one (or all) of the Big Three: Expedia (www.expedia.com), Orbitz (www.orbitz.com), and Travelocity

ILLUSTRATION: EDWIN FOTHERINGHAM

ference calls between Mormino, Orbitz, and the airline to resolve the problem.

Probably the most common complaint about online booking involves “fare jumping”: fare increases that show up in mid-transaction, after the customer thought the price was locked. Since agency sites aren’t linked directly to the airlines’ inventory systems, the fares they list may not be current. When you see a price you like, you select it on the site; but when the site contacts the airline or hotel to seal the deal, the price may already have gone up, and you get charged the new, higher rate. The sites generally cover themselves on this point in their Terms and Conditions; but of course, if you get bitten by a fare increase, this is no consolation.

**BEYOND THE BIG THREE**

SEARCH-ENGINE travel sites—including Kayak ([www.kayak.com](http://www.kayak.com)), Mobissimo ([www.mobissimo.com](http://www.mobissimo.com)), Qixo ([www.qixo.com](http://www.qixo.com)), and SideStep ([www.sidestep.com](http://www.sidestep.com))—provide a great service. When you use one of these to select a flight, hotel, or car rental, the site redirects you to the service provider’s own site, where you complete the transaction directly with the airline,

hotel, car rental company, or travel site.

Bill McGee, who is a travel consultant for Consumer Reports WebWatch ([www.consumerreportswebwatch.org](http://www.consumerreportswebwatch.org)), believes that the search-engine sites have the potential to revamp the online travel land-

Before you pay for your trip, find out who to call if you run into a problem.

scape. “They can help reduce comparison and shopping time,” he says. But McGee warns that the jury is still out on whether these sites will prove to be an entirely positive thing for consumers. “Our research with agency sites [such as Travelocity] shows that it’s not always clear who is responsible when problems happen, because the sites are acting as a third party in the transaction,” he explains. With the search sites, an extra layer of participation has to be included. “[Search] sites are at least one [additional] step away from the

booking process, and if they end up directing you to another agency site, the search sites start looking more like a third, or even fourth, party in the transaction.”

My advice: If you’re serious about tracking down a terrific travel bargain, search sites are a great resource. But before you hand over your credit card info, make sure you understand who you’re doing business with. If it’s not the airline or hotel itself, do a little homework to find out who to call if you run into a problem.

**MORE TIPS FOR THE ROAD**

BEFORE HEADING online to book your next trip, here are a few tips to help you find a great deal with no hidden hassles.

**Shop around:** After you’ve scoped out one (or more) of the Big Three and the search sites, be sure to visit other sites like Hotwire.com and Priceline.com. And don’t forget to check discount airlines like JetBlue ([www.jetblue.com](http://www.jetblue.com)) and Southwest ([www.southwest.com](http://www.southwest.com)), which may not show up in some search results.

**Compare and contrast:** Always compare a travel site’s fare against the price listed at the airline’s own site. You might just find an equal—or even better—

**PRIVACY WATCH**

Free Tool Makes You Anonymous on the Web



NO MATTER HOW meticulously you remove cookies and cleanse spyware and adware from your PC, snoops can still track your movements on the Web. The telltale sign is your IP address.

For a Web server to send your browser information, the server needs to know that you’re at 192.168.234.10, for instance. Some Web servers can reveal the city you’re in, the Internet service provider you use (or the company you work for), and the type of connection you have—in other words, a lot more than a cookie ever could.

Fortunately, a free tool named Tor from Electronic Frontier Foundation can close this privacy loophole. Tor—a World Class Award winner last month (see [find.pcworld.com/48306](http://find.pcworld.com/48306)), and available at [tor.eff.org](http://tor.eff.org)—strips the identifying IP address from the headers of each data packet that leaves your computer, by bouncing the packet through a special network of computers called “onion routers.” The trade-off for this kind of anonymity, of course, is the speed of your Web browsing. Bouncing from server to server takes time.

Tor’s advantage over previous anonymizing services is that it can anonymize more than browser communications. Tor works with apps like Thunderbird, Outlook, and Eudora—and with IM programs.

Before you can use Tor, you must download a small freeware app called Privoxy ([www.privoxy.org](http://www.privoxy.org)). After installing Privoxy, you must alter a line in one of the program’s settings files so that Privoxy can talk to Tor (go to [find.pcworld.com/48052](http://find.pcworld.com/48052) for instructions).

Without directions to send their data through Tor, your apps won’t know how to transmit packets over the network. In Internet Explorer, click *Tools*•*Internet Options*, then the *Connections* tab, and then the *LAN Settings* button. Check *Use proxy server for your LAN* and click *Advanced*. In the HTTP field, type *localhost*; and in the Port field, enter *8118*. In Firefox, go to *Tools* and click *Options*. Click *Connection Settings*, and in the field labeled ‘HTTP Proxy’ fill in the same information as outlined above for IE.

You’ll have to enter these proxy settings into each app you want to use with Tor, and you’ll lose a little extra time to Web browsing each day. But if you want complete privacy, it’s a small price to pay.

—Andrew Brandt

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ON YOUR SIDE

## Help for Malfunctioning MP3 Player

**I** PURCHASED a Neuros Digital II Audio Computer from Neuros Audio. It refused to work from the start. The company has sent me four different players, and all four have failed. All I want is a refund (I paid with a credit card) but the company wants to continue sending me different units. This has been going on for four months. Can you help?

*R.J. Watts, Atlanta*

**On Your Side** responds: I contacted Neuros Audio, and the company was uncertain about what caused the repeated failure of the players Watts received. The company

sent Watts a full refund shortly afterward. Our advice: Though legislation to protect against lemons has yet to materialize for the computer and consumer electronics industries, always pay for your equipment with a credit card, as Watts did. Doing so offers protection under the Fair Credit Billing Act ([find.pcworld.com/48066](http://find.pcworld.com/48066)). To find local consumer advocacy groups that tackle lemon-law issues (among other things), go to [find.pcworld.com/48068](http://find.pcworld.com/48068) for a link to the Federal Citizen Information Center Consumer Assistance Directory.

*—Stephanie Layton*

deal if you buy direct. The same goes for hotels and car rental companies.

**Be skeptical about "special offers":** If you have your eye on a last-minute flight-and-hotel package but aren't sure

whether it's a good deal, plug in some dates that are much farther out to see where the prices fall. Or check how the rates compare—if they're available—on the airline and hotel sites themselves.

**Move fast and check it thrice:** Before you click the Buy button, triple-check the final itinerary. Making changes after you pay for a ticket is usually costly.

**Think before you cancel:** Be prepared to pay dearly if you cancel your booking. Unless you buy a refundable ticket, the cancellation charges may be steep. And if you opt for an eleventh-hour package, the ticket may not be refundable at all.

Caveats aside, there are more ways than ever to find a great travel deal on the Web. So fire up your browser and start burning through those vacation days. ■

*Anne Kandra is a contributing editor, Andrew Brandt is a senior associate editor, and Stephanie Layton is an editorial assistant for PC World. You can address e-mall to them at [consumerwatch@pcworld.com](mailto:consumerwatch@pcworld.com). To read previously published Consumer Watch, Privacy Watch, or On Your Side columns, visit [find.pcworld.com/31703](http://find.pcworld.com/31703), [find.pcworld.com/31706](http://find.pcworld.com/31706), or [find.pcworld.com/31709](http://find.pcworld.com/31709), respectively.*



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STEVE BASS

## Stop Instant Messaging Interruptions

Sick of videos that won't play or attachments that bounce back? Here's relief.

THIS MONTH, LEARN how to conceal yourself while instant-messaging, play uncooperative videos, and slip huge files past corporate servers.

### CLOAK OF INVISIBILITY

**The Hassle:** I love instant messaging, but I hate it when strangers interrupt me. Plus, my boss can tell when I'm away from the PC. Even the alerts when buddies come and go are getting annoying.

**The Fix:** Become invisible. In AOL's full version of AIM, click *Setup* at the bottom of the window, choose *Preferences*•*Privacy*, and select *Allow only users in my Buddy List*. Don't want anyone to know you're goofing off? Uncheck *how long I've been idle*. To squelch the alerts, choose *Notifications* in the *Category* list, uncheck *Show pop-up notifications*, and click *OK*.

In MSN Messenger, choose *Tools*•*Options*•*Privacy*, highlight *All others* in the 'Allow list' pane, and click *Block*. Next, return to the options list, pick *Personal*, and under *My Status*, uncheck *Show me as "Away"*. Then go back to options; and for *Alerts and Sounds*, uncheck all the boxes.

In Yahoo Messenger, choose *Messenger*•*Privacy Options*•*Ignore List* and then select



*Ignore anyone who is not on my Messenger List*. Next, select *Privacy* and check *Do not show anyone how long I've been idle*. Finally, choose *Alerts & Sounds*, uncheck *Enable alert sounds*, and click *OK*. To cloak yourself from specific buddies: Right-click one of them, choose *Stealth* settings, and then select *Permanently Offline*.

### SNEAK FILES PAST IT-TYPES

**The Hassle:** I sent a funny video to a friend, but the e-mail came flying back with the admonition: "Our mail system does not accept video files." I tried reducing the size by zipping

the file before attaching it to a message. It still didn't go through. Now what?

**The Fix:** Try renaming the file extension to *.zi* (with a letter space at the end)—or *.duh*, for that matter. I've fooled corporate servers because they often ignore the file contents and look strictly at file names. Use the same trick with other files that IT-types like to block, such as *.jpg* and *.gif* files. If it doesn't work, upload your large file to *Droplod* ([find.pcworld.com/47946](http://find.pcworld.com/47946)) for your pal to pick up. The maximum file size there is a whopping 1GB. The IT folks won't be any the wiser.

### CODEC CONUNDRUM

**The Hassle:** Coworkers and friends send me critical "business" (ha!) videos, many of which won't play. I've upgraded *Windows Media Player*, tried using *WinAmp*, and even downloaded a few codecs [file decoders needed to play videos], without success.

**The Fix:** You need *K-Lite Codec Pack* ([find.pcworld.com/47948](http://find.pcworld.com/47948)). This set of codecs includes *Media Player Classic*, a small player that plays all types of videos. On the installation routine's *Select Components* dialog box, uncheck *Player* in the first dialog box if you want to continue using your current video player. You need to be aware of one potential hassle, however: *K-Lite* may change some of your existing video file associations. If that happens, fix them from *Windows Explorer* by selecting *Tools*•*Folder Options*•*File Types* and changing the file association to the app it was originally assigned to. ■

*Contributing Editor Steve Bass is the author of PC Annoyances, published by O'Reilly (see [find.pcworld.com/43818](http://find.pcworld.com/43818)). Contact him at [hasslefreepc@pcworld.com](mailto:hasslefreepc@pcworld.com).*

### TOOL OF THE MONTH

## Shipshape Start Menu

I DON'T KNOW ABOUT the one in yours, but the stack of programs in my Start menu sometimes gets out of control. A nifty program and a quick tweak can help organize the clutter. Use the freeware version of *Tidy Start Menu* ([find.pcworld.com/47953](http://find.pcworld.com/47953)). The tool lets you move programs and folders into one of nine new folders,

such as 'Office' or 'Utilities'; you can back up the Start menu beforehand in case you don't like the results. The tweak? Change your Start menu from cascading to scrolling: Right-click the *Start* button, select *Properties*•*Customize*•*Advanced*, scroll down the 'Start menu Items' list, and select *Scroll Programs*.

ILLUSTRATION: JOHN HERSEY

## Cash Register Express Software for Windows...\$495

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- ◆ Barcode Express
- ◆ Label Works
- ◆ Inventory Track Express

- ◆ Credit Card Software
- ◆ All Single or Multiuser

All PC America Software requires Microsoft Windows. The software was written in Visual Basic using Microsoft Access Files. The source code is available.

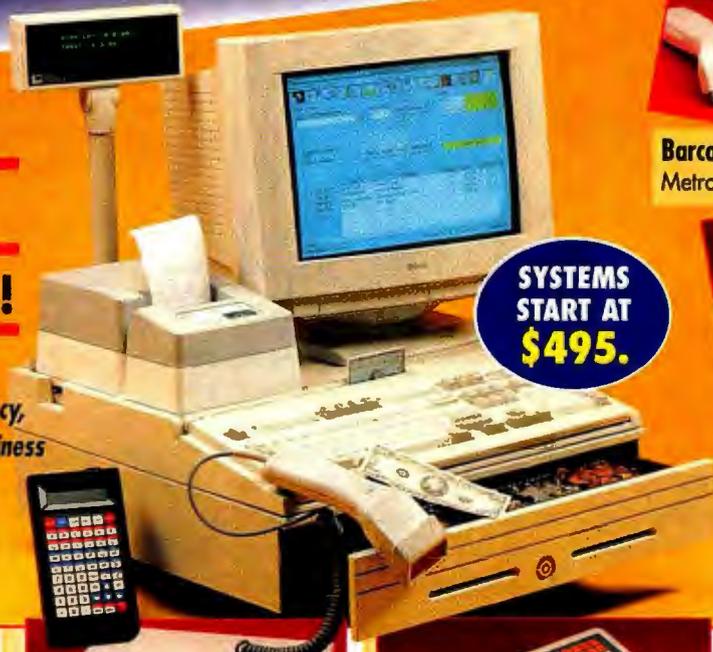
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American Microsystems AMS3000

\*All prices depend on make and model.



STUART J. JOHNSTON

## Plug Critical Firefox and Netscape Holes

Plus: Microsoft rolls out Security Advisories and a wireless security update.

FIREFOX'S POPULARITY has been phenomenal. In fact, the editors of *PC World* named it Product of the Year in last month's World Class Awards. But the browser's success also makes it a tempting target for security attackers.

So it's not at all surprising that someone figured out a way to break through the browser's security structure. Yet in a matter of just a few days, the Mozilla Foundation's volunteer team of Firefox developers produced and made available a patch for two critical holes in versions 1.0.3 and earlier that, left uncorrected, could enable crackers to hijack your computer. The first of these flaws relates to the way Firefox installs add-ons, and it could permit an attacker to obtain system administrator rights on your PC.

Taking advantage of the second hole—a cross-site scripting vulnerability—the bad guy could then inject a piece of code triggering an attack program. At that point, a clever

operator could take over your machine, wiping your hard disk or stealing information. To update your version of Firefox to 1.0.4 (or later), go to [find.pcworld.com/48218](http://find.pcworld.com/48218).

Meanwhile, AOL has had to patch its practically new Netscape 8 browser because that program is based on Firefox code. The Netscape problems

that require patching involve the same vulnerabilities found in Firefox. If you're a Netscape user, download version 8.0.1 at [find.pcworld.com/48304](http://find.pcworld.com/48304). But there's another problem: Some Web pages may not display correctly if you have both Netscape's latest version and Internet Explorer on your PC. Microsoft advises you to uninstall Netscape 8.x. For details, go to [find.pcworld.com/48342](http://find.pcworld.com/48342). Net-

scape said it is working on a patch that should be available by the time you read this.

### EARLY WARNING SYSTEM

IN THE PAST, Microsoft generally did not acknowledge security flaws in its products until it was ready to issue a patch, even when researchers or crackers had already posted exploit code online. Microsoft has repeatedly said that it must balance informing users about how to keep their PCs safe from attacks with not giving bad guys a recipe for exploiting vulnerabilities.

Now Microsoft has changed its tune—slightly. It has introduced a pilot program called Microsoft Security Advisories that's designed to alert users to security problems earlier in

### IN BRIEF

#### Patch ZoneAlarm

ZONE LABS fixed a hole in ZoneAlarm Antivirus and a hole in Security Suite that could let an attacker control your PC. (Both programs use Computer Associates' antivirus engine.) Users should have received the fix via auto-update. To update manually, open the antivirus application, and in the Status area click *Update Now*. Select *Overview*•*Product Info*, and verify that you have version 11.9.1 or higher.

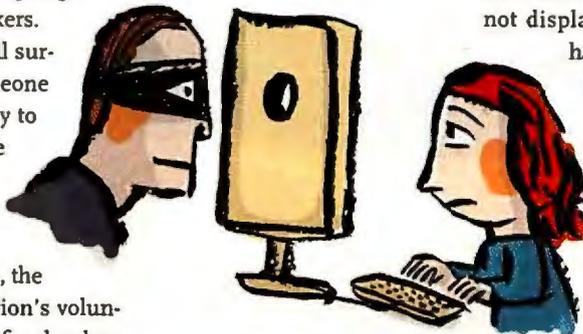
the process. The program also provides solutions for those problems, including ones that may not require a patch.

Security Advisories will supplement Microsoft's monthly Security Bulletins, which provide information on the company's latest patches. You can read the latest advisories at [find.pcworld.com/48220](http://find.pcworld.com/48220). To subscribe to the service, go to [find.pcworld.com/48340](http://find.pcworld.com/48340). ■

*Stuart J. Johnston is a contributing editor for PC World. Visit [find.pcworld.com/31580](http://find.pcworld.com/31580) to see more Bugs and Fixes columns.*

### BUGGED?

FOUND A hardware or software bug? Tell us about it via e-mail at [bugs@pcworld.com](mailto:bugs@pcworld.com).



### IMPROVE WINDOWS XP'S WIRELESS SECURITY

MICROSOFT HAS INCREASED security for wireless connections on Windows XP Service Pack 2. The Wi-Fi Protected Access 2 update adds support for the highest level of standards-based Wi-Fi security, including the Advanced Encryption Standard.

In addition, the update lets XP display previously hidden service set identifiers (SSIDs). To view the details, right-click the system tray icon for wireless connections, select *View Available Wireless Networks*, and go to the 'Choose A Wireless Network' dialog box. The enhancement makes it possible for your home wireless network to have enterprise-grade security. Hop to [find.pcworld.com/48228](http://find.pcworld.com/48228) to download the update.

ILLUSTRATION: ROBERT NEUBECKER

ThinkPad recommends Microsoft® Windows® XP Professional.



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ThinkPad X40



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Mainstream performance and features.

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30GB Hard Drive

CD-ROM

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ThinkPad T43

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(monitor not included)

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1-yr limited warranty with limited onsite service<sup>12</sup>

**THINK EXPRESS MODEL**

**\$519** (P/N 8148D3U)

**ThinkCentre A51**

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1-yr limited warranty with limited onsite service<sup>12</sup>

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1-yr limited warranty with limited onsite service<sup>12</sup>

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**\$319** (P/N 6734AC0)



ThinkCentre A51  
(monitor not included)

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PCI Express technology.

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# NEW PRODUCTS

EDITED BY LIANE CASSAVOY AND MELISSA J. PERENSON

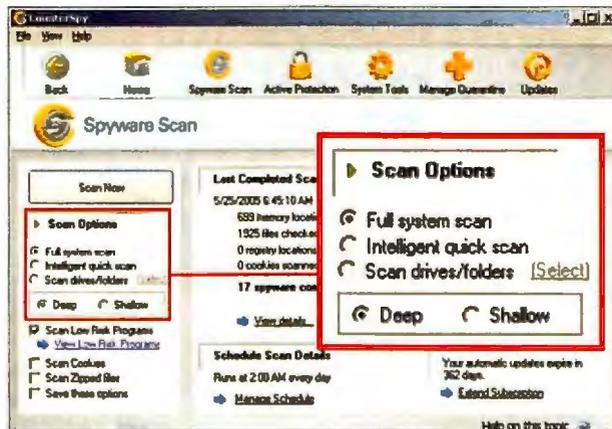
## Spyware Stoppers Still Improving

We tested new versions of three anti-spyware apps and like them, but an old favorite stands out.

### SECURITY

SPYWARE AND adware continue to evolve—as does the software expressly designed to thwart these pests. I looked at new installments of three anti-spyware applications: a pre-release version of Sunbelt Software's **CounterSpy 1.5**, plus shipping versions of Webroot's **Spy Sweeper 4** and FBM Software's **ZeroSpyware 2005**.

Previous versions of both CounterSpy and Spy Sweeper performed well in our April "Spyware Stoppers" roundup ([find.pcworld.com/48466](http://find.pcworld.com/48466)), giving me reason to believe that their latest iterations would do equally well in this round of tests. Both apps contain new capabilities, and of these, CounterSpy's DNR (Do Not Resuscitate) technology sounded particularly interesting. According to Sunbelt,



**A DEEPER, MORE THOROUGH SCAN** is now the default option for users running the newest version of Sunbelt's CounterSpy.

DNR improves the chances of killing off resuscitators—parts of spyware applications that prevent their deletion.

My expectations were ably met. Spy Sweeper 4 demonstrated significant improvements, removing 88 percent of our target components (up

from 81 percent in April). And the CounterSpy 1.5 beta removed even more of the adware and spyware in our tests than the program had in the April review, raising its overall effectiveness to 95 percent, improving by a whopping 10 percentage points from before.

CounterSpy's 1.5 update reflects changes Sunbelt has made under the hood, and the tool no longer uses the same engine as Microsoft's Anti-Spyware product (see [find.pcworld.com/48468](http://find.pcworld.com/48468)). Later on, the company plans to launch version 2, which will include a revamped interface.

ZeroSpyware 2005 performed impressively, too: It removed 86 percent of the target components and distinguished itself further by removing 96 percent of all nasty in-memory processes in our tests. By comparison, Spy Sweeper removed 85 percent of the target in-memory processes, and CounterSpy also removed 96 percent.

In addition to scanning for spyware that's already on a computer, each of the three products I tested provides real-time monitors designed to prevent spyware and adware from gaining a foothold in the first place. ZeroSpyware set itself apart here, successfully blocking all but one attempt to penetrate my system. Unfortunately, ZeroSpyware and the other two pro-

#### CounterSpy 1.5

Sunbelt Software

Beta software, not rated

Robust detection and easy-to-use protection at an affordable price make it stand out from the crowd.

Street: \$20

[find.pcworld.com/48346](http://find.pcworld.com/48346)

#### Spy Sweeper 4

Webroot Software

★★★★☆

With integrated alerting, Spy Sweeper is a solid choice; but it still can't best CounterSpy.

Street: \$30

[find.pcworld.com/48344](http://find.pcworld.com/48344)

#### ZeroSpyware 2005

FBM Software

★★★★☆

Intrusive alerts and a less-than-friendly interface offset this app's excellent protection.

Street: \$30

[find.pcworld.com/48348](http://find.pcworld.com/48348)

- 52 ANTI-SPYWARE UTILITIES**  
Sunbelt Software CounterSpy 1.5,  
Webroot Software Spy Sweeper 4,  
FBM Software ZeroSpyware 2005
- 54 LCD MONITOR**  
Samsung SyncMaster 242mp
- DESKTOP PC**  
HP Dx5150 Business Desktop
- 56 GRAPHICS CARD**  
ATI Radeon X800 XL 512MB
- OFFICE SUITE**  
Corel WordPerfect Office 12 Small  
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- 58 ONLINE CALENDAR**  
Trumba OneCalendar
- AUDIO**  
Xitel Soundaround
- 60 PHOTO PRINTER**  
Epson PictureMate Deluxe Viewer  
Edition
- IMAGE EDITING**  
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Netscape 8
- 63 ONLINE MUSIC SERVICE**  
Yahoo Music Unlimited



54

grams all permitted Web sites to be automatically added to my Trusted Sites zone.

CounterSpy and Spy Sweeper also allowed other potentially harmful behavior. CounterSpy let the ISTbar toolbar slip past its defenses; ISTbar then added itself to the Windows Registry and ran as an active process. Spy Sweeper allowed ISTbar as well, and also permitted the SideFind BHO—which can retrieve and install additional files—to integrate into my browser. In both instances CounterSpy and Spy Sweeper later detected and removed the apps during their next scheduled scan.

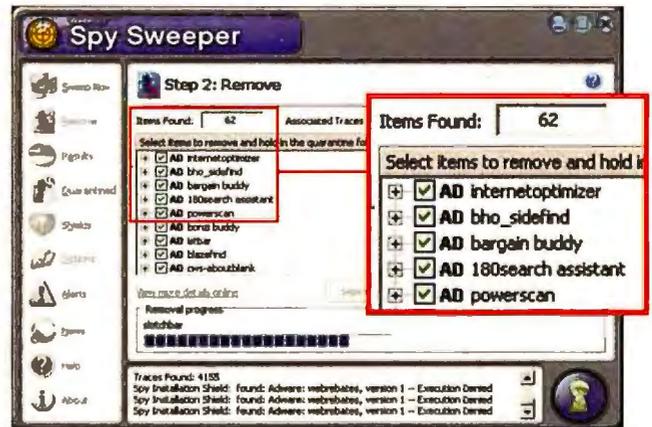
Though ZeroSpyware performed the best at preventing infections with its real-time monitor, I found that the posi-

tioning of the alerts within the application's interface actually thwarted my efforts to update and run a scan.

In contrast, CounterSpy launches alerts in the bottom-right corner of the screen, so they don't compete with the program interface and other open windows. Spy Sweeper blends both approaches. For known spyware threatening to infect, Spy Sweeper launches its main program window and overlaps it with an alert. Otherwise, it launches the alert in the bottom-right of the screen.

**USABILITY HEADACHES**

ZEROSPYWARE impressed me with its performance, but I was less taken with the utility's usability. For example, the



WEBROOT SOFTWARE'S SPY SWEEPER displays an easy-to-understand scan report, so selecting items for removal is simple.

update menu was difficult to find (it's hidden within the 'General Settings' menu), and some of ZeroSpyware's program options launched in a separate window that was often inaccessible, since a portion of the window remained outside of my viewing area.

One trick for disabling processes that resuscitate adware and spyware is to boot the PC into Safe Mode. Unfortunately CounterSpy's interface was too large at the lower screen resolution of Safe Mode, which made reaching the scan button nearly impossible. Both Spy Sweeper and ZeroSpyware performed well in Safe Mode, and Spy Sweeper has a special diagnostic version just for this purpose.

Any of the three programs I tested is very capable of pro-

tecting your system. Though ZeroSpyware excelled at preventing infection, its intrusive alerts might make it less than ideal for a heavily infected PC. Spy Sweeper, with its more integrated alerts, could be a better choice. Both ZeroSpyware and Spy Sweeper are priced at \$30, which includes one year of free updates and free online support.

While both Spy Sweeper and ZeroSpyware put in a good showing, CounterSpy continues to impress me the most. Its new engine and improved technology offered up the best removal rates in my tests. Add to that its unobtrusive alerts and its \$20 price (including one year of updates and online tech support), and CounterSpy is a clear winner.

—Mary Landesman



FBM SOFTWARE'S ZEROSPYWARE has an immunization feature that lets you automatically block a wide range of known spyware.

PHOTOGRAPH: MARC SIMON

## Good LCD Is a So-So TV

### LCD MONITOR

SAMSUNG TOUTS the **SyncMaster 242mp**'s included TV tuner as the model's major draw. But this 24-inch wide-screen LCD monitor deserves a closer look instead for its stellar still-image quality.

I tested a shipping version of this \$1700 monitor and found that for office tasks, its bright screen ranks among the best large wide-screen LCDs I've seen; the unit deft-

#### SyncMaster 242mp

Samsung

★★★★☆

A television tuner doesn't turn this otherwise gorgeous monitor into a good TV.

Street: \$1700

[find.pcworld.com/47842](http://find.pcworld.com/47842)

ly showed sharp text, dramatic contrast, and rich colors.

Unfortunately, like other LCD monitors, the 242mp is not as adept at switching gears between work and play. Whenever I played a DVD—either via the DVI signal from a PC or through a component signal from a high-quality DVD player—I had to fuss with multiple controls to reduce the picture's graininess, including changing the color settings and switching to a movie mode using the small but functional remote control.

Alas, even after my adjustments, ghosting, image artifacts, and a dark picture still plagued this screen during both DVD and TV playback. Its 16-millisecond black-to-



SAMSUNG'S SYNCMASTER 242mp includes a set of speakers.

white response time couldn't keep up with the swordplay action in *The Lord of the Rings: The Return of the King*, either.

Offering S-Video, composite, and component inputs as well as DVI and analog PC inputs, the 242mp hooks up to many external devices and PCs. Its TV tuner connects easily to your cable via an included adapter. Its speakers pack a decent punch.

For about \$500 less, you could buy the similar-size Dell UltraSharp 2405FPW (which lacks speakers and a TV tuner). You could then add speakers and a TV-tuner card to your PC and even get TiVo-like functions—all for less than you'd pay for the 242mp. You'll have to decide whether the Samsung's all-in-one convenience is worth the cash.

—Laura Blackwell

## HP's First 64-Bit-Ready Business PC

### DESKTOP PC

IF YOU'VE BEEN waiting to purchase a business PC prepared for tomorrow's 64-bit world, the **Dx5150 Business**



HP'S DX5150 BUSINESS DESKTOP is the company's first to have AMD's Athlon 64 CPU.

**Desktop**—HP's first business system to have an Athlon 64 CPU—may be just what you need. Built around AMD's 2.2-GHz Athlon 64 3500+ processor, the Dx5150 is ready for future 64-bit operating systems; plus, it comes stocked with components.

HP shipped our preproduction unit with 32-bit hardware device drivers and the 32-bit Windows XP Professional. HP also offers the unit with Microsoft's 64-bit Windows XP Professional X64 Edition at no extra charge.

In addition to its 64-bit-ready processor, the Dx5150's motherboard features ATI's Radeon Xpress 200 graphics chip set. It also supports dual monitors (one VGA, the other

DVI-D), a rarity for a PC with integrated graphics.

Three of our test unit's six easy-to-access, tool-less drive bays were occupied (by CD-RW, floppy, and hard drives), leaving available space for two externally accessible (one 3.5- and one 5.25-inch) drives and one internal (3.5-inch) drive. The Dx5150's surprisingly robust array of expansion options includes two open PCI-Express slots (one x16 for

#### Dx5150 Business Desktop

HP

Preproduction model, not rated Expandable options and a 64-bit CPU make this business PC a good investment for the future.

Street: \$915

[find.pcworld.com/48350](http://find.pcworld.com/48350)

graphics cards, one x1 for compatible modems and LAN cards), two open PCI slots, and two open memory slots.

Our Dx5150 microtower test system came with 512MB of RAM and a 40GB hard disk. This PC's cost, as configured with the 17-inch HP L1740 LCD monitor, is \$915.

The Dx5150 earned a respectable score of 88 on our WorldBench 5 tests, in line with what we would expect for a desktop with this configuration. The L1740 monitor that came with our unit displayed sharp, clean text and colorful graphics with good details.

The Dx5150 is a solid PC with an excellent warranty. It should prove a good fit for anyone who wants to make a forward-looking investment in a 64-bit business system.

—Richard Jantz



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C5000 Series

C7000 Series



C9000 Series  
November 2003



C5200 Series  
August 2004



C7350n Series  
February 2005



C7350n/C5150n  
May 2005

# OKI

PRINTING SOLUTIONS

# ATI's Overstuffed Graphics Card

**GRAPHICS**

ATI REDEFINES gluttony with its latest PCI Express-based graphics board, the **Radeon X800 XL 512MB**. Yep, that's 512MB of memory, double that of most high-end cards (and as much RAM as your average value-priced PC). Estimated street price: \$449.

Who needs all that memory? According to ATI, the additional RAM will let serious game players run their games

**Radeon X800 XL 512MB**

ATI  
Preproduction model, not rated  
Memory-laden board offers too  
slight a boost to recommend over  
its less-pricey kin.  
Street: \$449  
[find.pcworld.com/48234](http://find.pcworld.com/48234)

at the highest resolutions without slowing down the action. The company also states that the added memory could, in some instances, lead to better performance than that of boards brandishing its faster X850 XT chip.

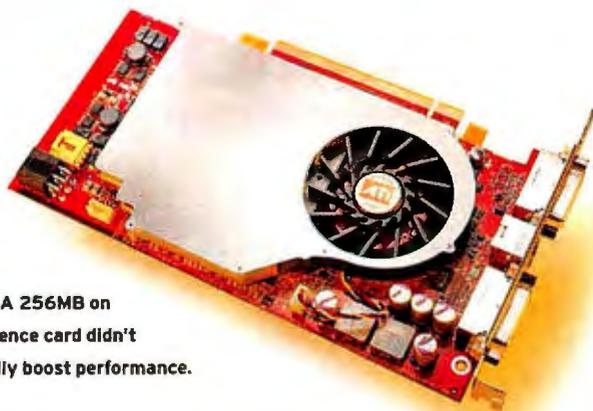
Those claims weren't borne out in our tests, though. We actually found that the X800 XL 512MB failed to dramatically outperform comparable ATI X800 XL-based cards that carried less memory.

We tested a preproduction version of the board supplied by ATI; shipping versions from ATI's partners should be available by the time you read this (ATI won't be offering its own cards this time around).

In our Doom 3 test run at

**THE EXTRA 256MB on ATI's reference card didn't dramatically boost performance.**

1600 by 1200 resolution, the board cranked out an impressive 39 frames per second. However, a previously tested PowerColor card with ATI's X800 XL chip and 256MB of memory managed a comparable 37 frames, and an ATI X850 XT Platinum Edition board with 256MB produced 45 fps. Results were similar in our Far Cry tests, where the 512MB board netted 64 fps, versus 62 fps for the standard X800 XL card and 67 fps for the X850 XT board.



Just as the 512MB card's performance lands squarely between that of its two brethren, so does its price of \$449. The PowerColor X800 XL card with 256MB of memory sells for about \$350, and ATI prices its X850 XT Platinum Edition board at about \$549.

Bottom line: The 512MB card's nearly imperceptible performance jump makes it tough to recommend over the less pricey 256MB version.

—Tom Mainelli

# Improved WordPerfect Is Still a Hard Sell

**OFFICE SUITE**

NO ONE APPRECIATES saving money more than small-business owners. Corel is betting on that with its \$399 **WordPerfect Office 12 Small Business Edition**, which it touts as a low-cost suite alternative to the market leader, Microsoft's \$449 Office 2003 Small Business Edition. But is a \$50 savings enough of an incentive to warrant making the switch?

**WordPerfect Office 12 Small Business Edition**

Corel  
★★★★☆  
Corel's Office alternative adds e-mail and an image editor, but you'll face some compromises.  
List: \$399  
[find.pcworld.com/48352](http://find.pcworld.com/48352)



**WORDPERFECT OFFICE 12 SMALL BUSINESS EDITION** includes the top-notch mail client formerly known as Bloomba.

The answer depends on how willing you are to leave behind what you know. Even with Corel's assurances of app-by-app compatibility with Office and the addition of the great Bloomba e-mail client (rechristened WordPerfect

Mail) and the Paint Shop Pro 9 image editor, I found that forgetting Office is not easy.

That isn't to say the Corel program fails to provide all the features you need to operate a small business—including a host of OfficeReady templates

for business management and planning. However, even if your company standardizes on WordPerfect Office 12, you'll eventually have to work with files—created by someone using Office—that have lost some functionality.

I managed to switch from my standard Office apps to their WordPerfect equivalents with only a few hiccups. For example, I missed Word's Reviewing toolbar, which lets me see or hide the changes made by the various people who worked on the file—WordPerfect's Review Document feature works only for files created in that program.

WordPerfect Office 12 SBE is a solid Office alternative. But the price you pay for swimming against the current is many minor concessions.

—Dennis O'Reilly

PHOTOGRAPH: MARC SIMON



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# Trumba's OneCalendar Keeps You Organized

## PRODUCTIVITY

TIRE D OF constantly updating two separate calendars with your work and home appointments? With Trumba's **OneCalendar**, you can kiss that annoyance good-bye. This Web-based application lets you create a group or personal calendar that can sync with

### OneCalendar

Trumba

★★★★☆

For personal and group calendaring, this Web-based tool has an appealingly simple look and shows no ads.

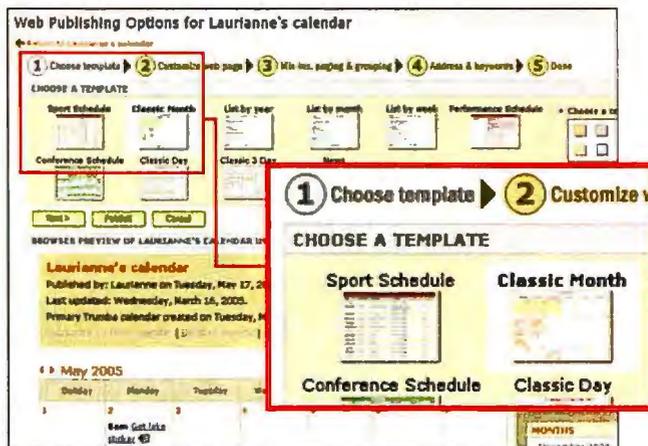
List: \$40 per year

find.pcworld.com/48212

Outlook. So if you use Outlook for business scheduling, you can use OneCalendar to see family activities and work commitments all at once.

I tested a free beta version of OneCalendar; the final version is expected this summer and will cost \$40 per year (with a two-month free trial period). So why pay, when you can use Yahoo's syncing calendar for free? I found Trumba's product easier to use, better looking, and more flexible.

Once you have set up your personal OneCalendar, you can either add events to it manually or import existing schedules from Outlook, Ya-



TRUMBA'S WIZARD GUIDES you through the process of selecting a template and publishing your OneCalendar to the Web.

hoo, or Apple iCal calendars.

You may also share your OneCalendar, with your significant other, childcare provider, anyone. (You can mark individual events as private.) Publishing a calendar to the Web for a group is simple, too: A four-step wizard guides you through the process and

takes less than 10 minutes.

Your personal OneCalendar has no ads, and you decide whether your group calendar will display them. This is valuable for anyone who is tired of online dating pitches and the other baggage that travels with free Web calendars.

—Laurianne McLaughlin

# Surround Sound Sans Extra Speakers

## AUDIO

IF THE POOR SOUND from your television's wimpy built-in speakers is ruining your DVD movie and console video game experience—but you're unwilling to pony up the cash, space, and effort to install a true 5.1 surround-sound setup—check out the **Soundaround** audio processor from Xitel. The \$100 device literally tricks your brain into hearing audio from speakers that aren't really there.

I tested a shipping version of the paperback-book-size silver unit using a Microsoft Xbox and a stereo television. Installation was straightforward, as the product has only one set of coaxial audio inputs



XITEL'S SOUNDAROUND audio processor provides a simulated surround-sound setup, with fairly impressive results.

and outputs. I ran the Xbox cables to the device, used the included cable to connect it to the television, plugged in the AC adapter, and selected my TV's real speaker size.

Xitel recommends listening for a bit before passing judgment, to let your brain warm up to the technology, which uses principles of psycho-

acoustics (the study of sound). I tested it by playing a game and then watching several DVD clips. The Soundaround improved the sound stage and offered greater detail, but I never experienced the sensation of sounds behind me.

The remote control offers access to additional features such as enhanced dialogue

clarity (which worked pretty well) and additional bass response (which seemed less effective). The device itself includes a headphone jack, which will make the product worth the purchase price for many.

I enjoyed using the Soundaround, but I wouldn't swap it for my actual 5.1-stereo system. Still, if you're looking to spruce up your audio experience without spending much cash, the device is a worthy investment.

—Tom Mainelli

### Soundaround

Xitel

★★★★☆

Relatively inexpensive device proves that simulated surround sound is much better than no surround effect at all.

Street: \$100

find.pcworld.com/48210



# THREE QUESTIONS YOU SHOULD ASK BEFORE YOU DECIDE WHERE TO BUY RAM...

## Can you guarantee your RAM will be compatible with my system?

Use the Crucial® Memory Advisor™ tool, and we guarantee that our memory will be compatible with your system, or we'll refund the price of your module.

The Memory Advisor is a one-of-a-kind online tool that contains detailed information about more than 110,000 upgrades for more than 20,000 PCs, including many older systems. Our database is so specific that we know more about the memory in your PC than your computer manufacturer (OEM) does. The information comes from our close working relationship with computer manufacturers and from the Crucial Compatibility Lab, where seven certified lab technicians perform tests on nearly 3,000 different motherboards.

Even though it contains so much complex information, the Memory Advisor is surprisingly easy to use. Simply tell us the make and model of your system, and in just three clicks you'll know exactly what kind of RAM you need.



## Do you actually make the memory chips you sell?

Other memory companies may claim to manufacture memory, but what they actually do is just attach chips to a memory module—someone else makes the chips.

Why does it matter? Quality. Those other guys buy the cheapest chips they can find—often chips that haven't even been individually tested to make sure they'll work in your PC. If you install inferior memory, your computer might not boot. Or it might seem to work fine at first, but later experience mysterious crashes and error messages.

Crucial is the only consumer memory upgrade supplier that's part of a major DRAM manufacturer—we're backed by 26 years of Micron expertise. We actually make (and test) our own chips. In fact, because the world's leading computer manufacturers rely on our high-quality RAM, chances are good that the OEM memory in your system came from Micron. Crucial brings this same high-quality memory directly to you. It just costs less because you don't pay middleman mark-up fees.

## What kind of support do you offer if I have questions?

We offer superior customer service right from the start. The Memory Advisor tool is so easy to use that most customers find exactly what they need on their own, but if you ever do have a question, we make it easy to find fast, free answers. You can call us directly, e-mail us, chat with a live Expert Online, or learn on your own with our 3,000 articles and FAQs.

And our free tech support really is free. Our certified support agents are true Memory Experts™, averaging 15 hours of technical training each month and 20 hours a month "hands-on" in the Crucial Performance Lab. We don't keep you waiting when you have a problem—the average hold time (over a six-month period) is just over one minute, and the average time spent resolving an issue by phone is about three minutes.

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# Epson PictureMate Printer Will Make Shutterbugs Smile

**PHOTO PRINTER**

EPSON'S ORIGINAL PictureMate snapshot printer has been a *PC World* Best Buy ever since we first reviewed it in June 2004. Now, for about \$50 more the company is offering the **PictureMate Deluxe Viewer Edition**, which addresses the few quibbles we had with the

**PictureMate Deluxe Viewer Edition**

Epson

★★★★☆

Epson's excellent upgrade to the PictureMate adds a color monitor and faster performance.

Street: \$250

[find.pcworld.com/48213](http://find.pcworld.com/48213)

previous excellent version.

The most notable difference is the 2.4-inch color monitor that flips up from the top of the printer and lets you view and edit your photos.

The Deluxe Viewer Edition is also faster. When we connected our shipping unit to a PC, our test photo printed in 1 minute, 39 seconds—37 seconds faster than the original and swifter than many of the other desktop photo printers we've tested. The quality is excellent, too: Our photos appeared bright and sharp, with plenty of shadow and high-light detail. Part of the reason for the speed increase may be

the printer's USB 2.0 Hi-Speed port.

While the PictureMate's handle makes it easy to carry, the Deluxe Viewer Edition becomes truly portable with the addition of an optional rechargeable battery. It slots away neatly inside the printer, but at \$70 it's pricey.

The Deluxe Viewer Edition uses the same Epson six-color ink and paper packs as the original model, which rated the lowest-per-print cost in our April issue's roundup of 4-by-6-inch photo printers



**EPSON'S PHOTO PRINTER** has the look of a mini boom box.

(see [find.pcworld.com/48271](http://find.pcworld.com/48271)).

The PictureMate Deluxe Viewer Edition's high-quality photos and low per-print costs should land it on any amateur photographer's short list.

—Paul Jasper

# Easy Online Photo Sharing

**IMAGE EDITING**

ORGANIZING AND sharing your digital photos can be a tricky proposition—especially when you are dealing with high-resolution images. The new **OurPictures Deluxe 2** software and services package

tackles both problems at once.

I tested a shipping version of the software, which lets you browse through thumbnails or search by file name or keyword. The photo editor allows you to crop, adjust brightness, and reduce red-eye.

If you worry about losing your photos, you'll appreciate the app's PictureSafe feature, which automatically backs up your collection online. Users of the Deluxe Edition, which costs \$30 per year, get 250MB of storage space. (The free Starter Edition does not include the backup feature.)

The program's appeal lies in its ability to share full-size photos. Select the images to share, and enter an e-mail address; within just minutes those images appear in the recipient's copy of OurPictures. If the recipient doesn't use OurPictures, they'll be directed to a Web site to view and download the images.

You can also print directly to a local photo store. There are 25,000 participating locations nationwide, and prices vary. (My 4-by-6-inch prints cost about 30 cents each.)

OurPictures is still relatively new to the online photo game. It's off to a great start, but we found a few flaws. Since the service supports only JPEG images, it can't handle RAW-format files. And though you can tag photos with keywords, the process is about as much fun as querying a database.

Once the company smooths out these rough edges, however, OurPictures will be a compelling choice for anyone who is looking for an easier way to organize and share photos.

—Dave Johnson

**OurPictures Deluxe 2**

OurPictures

★★★★☆

Application makes it simple to organize, edit, and share your high-resolution photos.

List: Starter Edition free, Deluxe Edition \$30 per year

[find.pcworld.com/48214](http://find.pcworld.com/48214)



**OUR PICTURES DELUXE 2** lets you import all of your images and organizes them according to your existing folder structure.

PHOTOGRAPH: MARC SIMON



LG

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2-Tone 19" 12ms LCD Monitor  
250 cd/m2 500:1 0.294mm Pixel Pitch

**\$549<sup>00</sup>**



intel.

**Pentium® 4**  
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LGA 775 Processor

**\$239<sup>00</sup>**



SONY.

**DSC-P200**  
7.2MP Digital Camera 1/1.8" CCD  
2.0" LCD 3X Optical Zoom

**\$359<sup>95</sup>**



D-Link

**DGL-4300**  
Wireless Router 802.11g/b

**\$143<sup>00</sup>**



**JEFFREY STEPHENSON:  
HUMIDOR CL  
SERVER PROJECT**

**System Specs:**

- 40GB Toshiba 2.5" drive
- Twin Linksys® antennas
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Converting a humidor into a computer turned this hobbyist into a case mod icon. What's your vision? Go to [Newegg.com](http://Newegg.com) to find everything the world's most artful modders are running.



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# Netscape's Two-Headed Browser

## INTERNET

THE PROGRAMMERS at Netscape have made a two-headed monster of a browser in the new **Netscape 8**, which lets you view Web pages as if you were running Mozilla Foundation's Firefox version 1.0.3 or Microsoft's Internet Explorer 6. Unfortunately, the resulting program lacks some of Firefox's most useful features.

### Netscape 8

Netscape

★★★★☆

Browser combines Firefox and Internet Explorer engines, but gains unnecessary bulk.

Free

[find.pcworld.com/48216](http://find.pcworld.com/48216)



NETSCAPE 8 piles on the features, including a new Web mail option located on the Personal toolbar.

Netscape 8, available as a free download, features both the Firefox and IE engines; with a single click you can switch between the two views. The browser's choice of which engine to use when opening a particular page is determined by a whitelist of safe sites and a blacklist of risky sites. Sites on the whitelist open in Internet Explorer, while sites missing from the whitelist (but not

on the blacklist) open in Firefox, which isn't susceptible to IE's potential ActiveX security breaches. If you visit a site on the blacklist, a warning pops up. If you open the page anyway, Netscape automatically blocks scripting and other potentially unsafe functions.

While Firefox takes pride in offering only the functions you need, Netscape 8 piles them on. Examples include

the Web mail option and the Datacard and Passcard features for filling in Web forms automatically. Meanwhile, Netscape leaves out Firefox's excellent pop-up controls.

Netscape 8 feels like a case of subtraction by addition. The new features may make the browser look more conventional, but it loses Firefox's simplicity in the process.

—Dennis O'Reilly

# YOU ARE BEING WATCHED.



# Yahoo Does Portable Music Downloads

## ENTERTAINMENT

LISTEN TO MUSIC on your PC and fill your portable music player with tunes for \$7 a month: That's the promise

of **Yahoo Music Unlimited**, which costs about half as much as competing services Napster To Go and Rhapsody To Go. I encountered my fair share of

problems with the Music Unlimited beta, but this service is definitely one to watch.

Yahoo Music Unlimited boasts a library of more than a million songs available for streaming, downloading to your computer, or transferring over to a subscription-compatible portable player. Permanent downloads are available for 79 cents a track, 99 cents for nonsubscribers.

I experienced a few issues while testing the beta service. Most of the problems were minor, but I did run into one showstopper: I couldn't get subscription-based tracks to download to the IRiver H10 audio player I used to evaluate

the service, despite repeated attempts. *PC World* encountered the same problem with Rhapsody To Go (see [find.pcworld.com/48294](http://find.pcworld.com/48294)), but at least Music Unlimited is upfront about its beta status. That's refreshing. If Yahoo can get the portable subscription feature working well, and if it doesn't jack up the price, Yahoo Music Unlimited could quickly become the subscription music service to beat. ■

—Eric Dahl



YAHOO MUSIC UNLIMITED'S Music Engine jukebox uses Gracenote's music-recognition engine to find album art for each CD you've ripped.

### Yahoo Music Unlimited

Yahoo  
Beta software, not rated  
Media jukebox and subscription service should be a good one, once the bugs are worked out.  
List: \$7 per month  
[find.pcworld.com/48366](http://find.pcworld.com/48366)



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# Back to School in Style

**From learning to music to gaming to communications, student life has gone all digital**

**T**HEY ARE COMING by the millions, students heading off to college and back to high school—tanned, rested, and eager to learn as well as to enjoy student life. These are young people who, by and large, grew up as part of the first all-digital generation. They are totally Internet savvy. Their music is digital as are their games and other entertainment. They keep in close touch with one another and with their world via an ever-broadening range of digital technologies.

These students also share many other common traits. Most of them are on tight budgets, and from an early age they became very discriminating buyers of digital products. They know the features and functions they want and can be smart consumers when it comes to stretching limited resources. They recognize value as well as quality.

Today's students also operate at warp speed—they are constantly on the go. That's why the standard features and durability of iriver America's award-winning H10 family of portable music players are striking such a resonant chord with this demanding, active audience.

## A Music Dynamo

All players in iriver's H10 series come with the same functionality and color-screen GUI; they vary only in storage capacity. These consistent features include player navigation, photo viewing, FM tuner, voice recording, and touch-strip control. Because the iriver H10 series includes these features in all players, users never have to sacrifice functionality

**The iriver H10 portable music players include player navigation, photo viewing, FM tuner, and touch-strip control.**



are everything students want and need to maximize their enjoyment of music on the run.

■ For more information on the iriver H10 series of portable music players or to learn more about the full line of high-quality iriver products, visit [www.iriveramerica.com](http://www.iriveramerica.com).

for capacity, regardless of the memory they need to suit their listening styles. Memory capacities in the H10 series run from 1 GB to 20 GB, while the players are available in a variety of hot colors.

The iriver H10 series players are designed to work effortlessly right out of the box. They also interface seamlessly with Microsoft Windows Media Player 10, and include support for Auto Sync to synchronize music, photos, and play lists. In addition, H10 users can access the fast-growing number of music download and subscription services, such as Napster, Yahoo! Music Unlimited, Wal-Mart Music Downloads, and others.

The iriver H10 players come bundled with iriver earphones, a sturdy carrying case, installation software CD, AC adapter, USB 2.0 cable, and a comprehensive user manual. In other words, the H10 portable players

## The Student PC User

This digital music generation also grew up at the PC keyboard. The evolution of the student PC continues to shape the way both high school and college students interact with their learning environments and with each other. From single-purpose machines designed largely as word processing engines to produce term papers, PCs have evolved into multifunction devices capable of harnessing the Internet as peerless learning tools while serving to entertain as well as inform. It is not uncommon to find students effortlessly "togglng" from research to gaming to instant messaging to music, driving multitasking to new heights.

In pushing the envelope of PC use as a multifunction device, students need power, functionality, and features that previously were reserved for PCs in the workplace. But a student's world typically has more boundaries, including very tight living spaces and equally tight budgets.

*Continued on page 3*

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Vivid color display . Simple touch control . Displays your digital photos . Elegant, lightweight design  
PlaysForSure enabled to play more music . With Napster To Go™, fill and refill your player



players shown actual size

iriver H10

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- ▲ H10 1GB† - ultra-portable, skip-free player
- ▲ H10 6GB - sleek and versatile jukebox
- ▲ H10 20GB - high-capacity jukebox



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†1GB equals one billion bytes, not all memory space available for file storage. 1GB equals approximately 24 hours of music. Features may differ from photos shown. © Iriver America, Inc. Iriver America, the Iriver logo, and PlaysForSure are trademarks of Iriver America, Inc. or its subsidiaries. All other brand and product names are trademarks of their respective companies or organizations.

Continued from page 1

### Small Box, Huge Performance and Value

Ask students, especially college students, about their biggest challenges and near the top of the list will be the space crunch of dorm rooms along with the typical student budget crunch. For these students and other PC enthusiasts, the creative professionals at AOpen, Inc. ([www.aopen.com](http://www.aopen.com)) have unveiled the XC Cube Mini, the ultimate choice in space-saving and cost-saving PC solutions.

Measuring a mere 5.9 x 5.9 x 1.96 inches, the XC Cube Mini provides performance, style, and upgradeability that is unrivaled. Powered by the Intel Pentium M processor, this small but powerful PC also comes with a 250 MHz integrated graphics solution with Intel Extreme Graphics 2, Intel SpeedStep technology with multiple voltage and frequency operating points, and complete I/O ports.

The XC Cube Mini with its wide array of high-quality features has broad appeal not only to students but also to a range of potential users:

» **Musicians and multimedia designers** will appreciate the near-silent performance of the XC Cube Mini in addition to the power it delivers for producing sophisticated designs and musical creations.

» **3D gamers** who are always looking for that extra measure of high performance will get all that and more with the power-rich XC Cube Mini.

» **PC consumers** who are also fashion and style conscious will give two thumbs up to the sleek, state-of-the-art look of the XC Cube Mini.

» **Just about anyone** on a tight financial or space budget will admire the way the compact yet powerful XC Cube Mini fits just about any space and any budget.



**The XC Cube Mini from AOpen measures just 5.9 x 5.9 x 1.96 inches and sports a wide array of high-quality features.**

Founded nearly a decade ago, AOpen employs more than 2,300 dedicated profes-

sionals worldwide and is a leading supplier of PC component solutions.

■ *For more information on the XC Cube Mini or on the many other outstanding products and technologies from AOpen, Inc., visit [www.aopen.com](http://www.aopen.com).*

## Earning Your Digital Grades

There is no question that the student's world today is a digital world. Given the typical student's limited means coupled with a strong demand for digital products, experts suggest the following five steps for students and their parents to maximize value for their money when exploring the dizzying array of digital products targeting students:

✓ Log on to the sites of quality, independent publications, which routinely publish comparative, widely respected product reviews emphasizing value, functionality, features, service and support.

✓ Make an informal list of your specific needs and requirements before going shopping.

Otherwise you may succumb to the glitz and glamour of marketing messages that don't target what you are looking to buy.

✓ Remember: Digital products occasionally break or malfunction, like any other product. Look carefully at warranties and service capabilities before you buy.

✓ Be sure to examine whether the school you will attend has any specific product requirements that must be met for a particular curriculum.

✓ As often as you can, purchase multifunctional devices that can fill your different needs as well or nearly as well as a series of more expensive standalone devices.

# Silent Sophistication & Stylish Sensation

XC Cube Mini



Actual Width 7.75"  
(7.75" x 4.25" x 12.75")

Don't be fooled by the compact  
form of the XC Cube MZ Mini  
Small in size, BIG in features

Where to buy:



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[www.thebookpc.com](http://www.thebookpc.com)

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Good Design



Award Winner

Go to [find.pcworld.com/47435](http://find.pcworld.com/47435)



For further information on the  
entire XC Cube line, visit:



[WWW.AOPEN.COM](http://WWW.AOPEN.COM)

# Reinvent Your PC

Ever feel like your system's being left behind by today's technology? Here's how to make any machine run faster, store a lot more data, and serve as your entertainment hub.

BY JIM ASPINWALL

YOU SAY YOU WANT to take advantage of the new technologies that hit PCs in the past two years, but don't want to buy a new computer? While that might sound suspiciously like having your cake and eating it, too, the right set of upgrades can rejuvenate your older machine.

You've probably heard about Serial ATA hard drives, which are faster (and easier to set up) than IDE drives. Maybe your wireless network cuts out when you sit in your favorite chair, and you're interested in a MIMO wireless access point, which could solve the problem. Or you might just want to play the latest games without ▶

ILLUSTRATIONS BY STEVEN LYONS

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Storage

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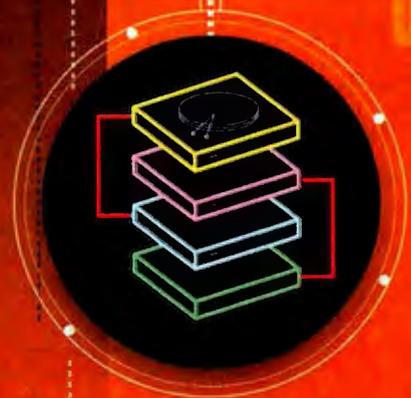
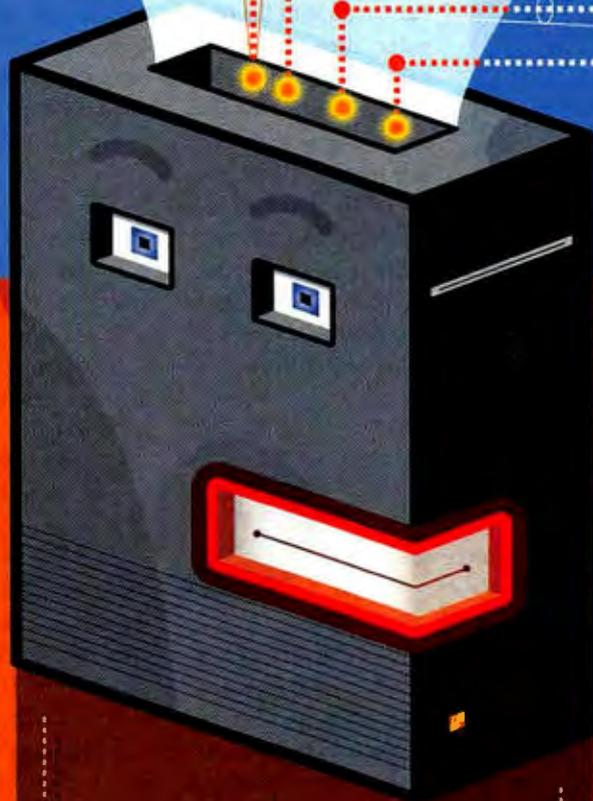
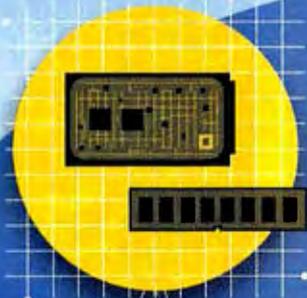
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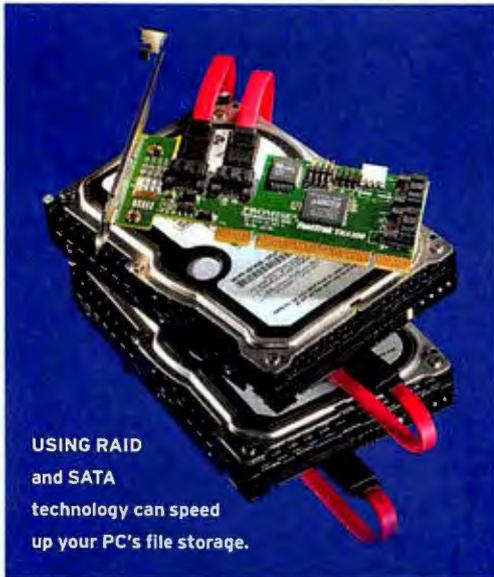
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Entertainment

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Security





USING RAID and SATA technology can speed up your PC's file storage.

having jumpy graphics that make fast action look more like a slide show.

As it turns out, your less-than-new PC still has a lot of useful life left. In many cases, you can add these and other new technologies fairly easily. The most important thing to do is figure out what you want to do with the computer, then choose the right upgrades for the job.

We've selected the four upgrade projects that will give your PC the biggest jolt of life: boosting the

capacity, flexibility, and speed of your data storage; replacing components that have become performance bottlenecks; adding media center functions, such as TV recording; and improving the security of your PC using hardware that protects your data.

## Maximum Storage

REMEMBER THE DAYS when you pondered how you'd ever fill your cavernous 20GB hard drive? With ever-growing demands for data storage to house photos, music, movies, and other large files, hard drives have ballooned in capacity. As file sizes grow, the drives also have to push more data to the PC faster. And while simply buying and installing one new hard drive might suffice for some people, how do you ensure that if one day that drive dies, your data will be protected? You could back up your files to an external hard drive, or you could use RAID technology, which, in one configuration, could let you keep working if a hard drive dies.

To keep ahead of the performance curve for storage, you might want to consider adding new technologies, such as Serial ATA hard drives, to your PC. You can also use a different configuration of RAID to speed up data transfers.

Serial ATA is a high-performance replacement for the old parallel ATA (also called IDE) connection between the system board and disk drives. The newer drives transfer data at 150 mbps, roughly 50 percent faster than your present IDE disk drives.



SATA is not only faster than IDE, it's also easier to set up: You don't have to deal with jumpers, and SATA's smaller cables fit inside the PC's case more neatly than wide, crumpled ribbon cables.

RAID (which means Redundant Array of Independent Disks) offers enormous performance gains—double the performance of a standard IDE hard drive, compared with a SATA drive's improvement over IDE. If you use SATA drives in a RAID configuration, the performance gains can be even higher. But RAID is harder to set up and more expensive. For example, unless your motherboard has a RAID controller built in, you will need a special adapter card, such as the Promise FastTrak TX4300 (pictured at left; prices start at \$125; [find.pcworld.com/48382](http://find.pcworld.com/48382)), plus two or more hard drives.

### SWITCHING TO SATA

IF YOUR SYSTEM board already has a SATA interface (look for a pair of thin black connectors), you're already set up to add a SATA drive. Otherwise, you'll need an add-in board.

Adding to or replacing IDE drives with SATA requires some preparation. You must first install the drivers for your SATA interface so Windows will recognize the newly connected drives. If you want to replace the IDE drive, you must also copy (or install) Windows and your programs to the SATA drive. If you're using the SATA drive just for additional storage, simply power down the system, plug in the SATA drive(s), and then after you reboot, use Windows Disk Manager to partition and format the drive. (For full steps and instructions, head to [find.pcworld.com/47488](http://find.pcworld.com/47488).)

Most hard drive makers also include a data copying utility with their drives; alternatively, you can use a program like Symantec's Norton Ghost 9 (\$50; [find.pcworld.com/48384](http://find.pcworld.com/48384)).

### THE RAID UPGRADE

IF YOU'RE LOOKING for the highest performance boost, RAID is what you're after. The decision to use RAID depends on your reliability and performance requirements, your budget, and your ability to deal with the complexity of the setup.

Possible ways of using RAID range from simply duplicating the contents of one drive on another (called "mirroring"), which provides an instantly available, working copy if one of the drives fails; to splitting data bits across multiple drives (called "striping"), which increases writing and reading performance; to a mixture of both features. Your

#### TEST Center tip:

Don't lose small screws, jumpers, or other metal parts—stick them to a magnet or put them in a paper cup.

approach dictates how many drives you'll need and how complex the setup will be (see "Basic RAID Improves Performance, Fault Tolerance," below).

Installing and configuring a RAID controller and drives involves using setup software built into the RAID controller itself, as well as a lot of cabling. If you buy a third-party controller, it will likely include detailed instructions about how to arrange the drives in the computer and how to set the drive jumpers (if necessary).

You usually get to the RAID setup by pressing a hot-key combination (it will be shown on screen when the system is booting up). Most RAID setup programs guide you through selecting a configuration; then they automatically configure the drives and controller to support that configuration. Once setup is complete, you can install a fresh copy of Windows on the RAID drives, or you could partition and format those volumes with Windows' Disk Manager and use them for additional storage.

After the installation, Windows treats your RAID configuration as if it were any typical local hard drive. As with all drives, you should back up your data regularly. RAID mirroring will not protect you if, for example, you delete important files from a mirrored RAID setup: You'll delete files from both drives.

If you don't have the budget for RAID but still want your data stored in two places, consider a software-based mirroring scheme. One mirroring utility is TechSoft's MirrorFolder (\$40; [www.techsoftpl.com](http://www.techsoftpl.com)). MirrorFolder duplicates data to any mapped drive—either a local disk or LAN-based storage. MirrorFolder works in the background, so you won't even notice that it's running.

### TAKE IT WITH YOU

IF YOU HAVE an old IDE drive gathering dust, it can enjoy new life as a portable data storage vault when installed in a USB-drive enclosure (prices start at about \$40; [find.pcworld.com/48386](http://find.pcworld.com/48386)). Simply mount and connect your drive in the case, hook up the power adapter, and connect the USB cable to your

PC, and you've got a great backup or portable transport system. Enclosures are also available for 2.5-inch laptop drives and 3.5-inch SATA drives. You can also get enclosures that use FireWire (IEEE 1394) connections.

Making your own external hard drive isn't for everyone, so several companies make external drive kits designed for backups. Many of these drives, such as Maxtor's 300GB Shared Storage Drive (\$350; [find.pcworld.com/48388](http://find.pcworld.com/48388)), also have network connections, so you can use them as stand-alone file servers on a network. (Look for a comprehensive review of these drives next month.)

But if you want the flexibility to use a drive as either an internal or a portable disk, the Saturn Mobile Rack system from Addonics (prices range from \$40 to \$90 depending on features; [find.pcworld.com/48389](http://find.pcworld.com/48389)) lets you put either an IDE or a SATA hard drive into an enclosure, which fits into a slot that you install in a drive bay. You can then pull the drive out and take it with you when it's time to go. The portable enclosure has either a USB or a FireWire jack (depending on the model); the jack conveniently allows you to plug the drive into a different computer when you're away. ▶

### TEST Center tip:

SATA drive connectors are fragile; be careful not to snap one off when hooking up a cable.

## HARD DRIVE UPGRADES

### Basic RAID Improves Performance, Fault Tolerance

NO LONGER RELEGATED to corporate servers, RAID in desktop PCs can turbocharge drive access, help protect your system from a failed drive, or (if you use enough drives) do both at the same time.

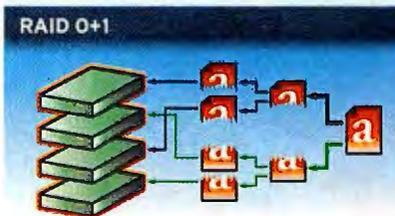
**RAID Level 0:** Data is "striped" (broken into chunks that are spread out across two or more hard drives). BENEFIT: Nearly twice the data access speed. TRADE-OFF: If one drive dies, you lose all your files.



**RAID Level 1:** Files on one drive are "mirrored" (duplicated) on another. BENEFIT: Fault tolerance; the system can still run if one drive breaks down. TRADE-OFF: You get only the storage capacity of the smaller drive; the system can't use the excess space on any larger drives.



**RAID Level 0+1:** Combines the benefits of both striping and mirroring using four (or more) drives. TRADE-OFFS: At least four drives are required, which raises the cost of the upgrade, and makes your PC much noisier and hotter.



## Performance Boosters



YOU CAN IMPROVE performance significantly by enhancing two basic components—the CPU and memory. Whether you built your computer or bought it, it can probably use more RAM. And some motherboards respond to a new CPU like a NASCAR engine does to a shot of nitro fuel. But adding high-performance components will generate extra heat, and more heat can shorten your PC's life expectancy; by adding a case fan or two, you can help prevent crashes and extend the system's life.

### RATCHET UP THE RAM

AS UPGRADES GO, adding RAM almost always gives you the most bang for your buck. Even today, some new PCs ship with only 256MB of memory, the minimum recommended amount for Windows XP. With memory still quite affordable (a typical 512MB memory module for a desktop PC will set you back only \$60 to \$90), no Windows XP system should run with less than 512MB.

Too little memory forces Windows to swap programs and data between RAM and the hard drive, slowing down performance. Adding as much RAM as you can afford will cut down Windows' demands on the hard drive, making everything run faster and more smoothly.

Most experts recommend at least 512MB of RAM for XP; some people upgrade to 1GB, 1.5GB, or even 2GB of RAM to put issues of insufficient memory and sluggish file swapping to rest. If you use the PC mainly for office applications, the Web, and e-mail, then consider upgrading to 512MB of RAM. If you run a lot of applications at the same time, frequently use large databases or spreadsheets, or edit large audio or video files, then a gigabyte of memory will make your computing life much easier.

Some RAM modules, designed for high-speed computing, have addi-

tional features that may be useful for serious performance seekers. Crucial's Ballistix Tracer RAM modules (about \$125 for 512MB; [find.pcworld.com/48390](http://find.pcworld.com/48390)) use rows of LEDs on each unit to indicate how much of it is in use at any one time. Corsair's XMS Xpert memory modules (prices start at about \$185 for 1GB; [find.pcworld.com/48392](http://find.pcworld.com/48392)) feature a bright LED display on top of the module that gives you an instant read-out of system temperature and diagnostics.

When shopping for RAM, check your system manual to determine the type and speed of memory that your PC uses. You can add single DDR modules to a DDR system, but DDR2 memory must be added in matched pairs. And while you can safely use RAM that runs faster, it won't speed up your PC—though you sometimes can save money buying slightly faster RAM than your system is rated to use (see our sidebar, "Newer, Faster RAM Can Be Cheaper Too," page 74, for details).

The free version of SiSoft's diagnostic utility Sandra 2005 ([find.pcworld.com/47836](http://find.pcworld.com/47836)) can tell you what kind of memory you have installed (use the Mainboard Information module, and look for the information category labeled Memory Modules). Taking your system manual or one of your RAM modules to the store can help the tech or salesperson select the right type and amount of RAM for your PC. (For detailed steps on how to upgrade your RAM, surf to [find.pcworld.com/32711](http://find.pcworld.com/32711).)

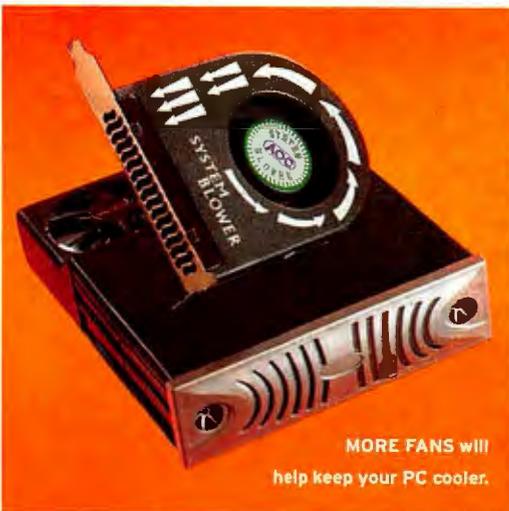
One other rule applies generally to upgrades but particularly to RAM: Stick to the reputable manufacturers and avoid the bargain-basement generics. Poor-quality memory can cause your PC to crash and freeze. Those substandard modules are usually cheaper and sold with a very brief warranty period—perhaps just days—for good reason: You're likely to bring them back to the store after a few weeks. Reputable memory companies include Corsair, Crucial, Micron, and WinTec.

### CAN YOU UPDATE YOUR CPU?

NORMALLY, if you want to upgrade the processor that runs your PC, you also need to buy a new motherboard (and usually new RAM). However, if you already use a 64-bit AMD processor in your PC, there's good news: AMD is now shipping a dual-core CPU, the Athlon 64 X2 (\$537 to \$1001 each; [multicore.amd.com](http://multicore.amd.com)), that can give your present Athlon 64 system a huge boost without your having to buy and install a new motherboard. The X2 fits into the same CPU socket as the current

#### TEST Center tip:

Avoid touching the card-edge connectors on RAM modules or expansion boards, and the top of your CPU, before you install the heat sink.



MORE FANS will help keep your PC cooler.

Athlon 64 CPUs and has the same power requirements. For more details about this upgrade's benefits, go to [find.pcworld.com/48406](http://find.pcworld.com/48406). You can also look at AMD's Web page ([find.pcworld.com/48407](http://find.pcworld.com/48407)) for an overview of the installation process.

If you plan to perform this upgrade, you'll also need to install a BIOS update to your motherboard. If you know your motherboard's brand, check the manufacturer's Web site to see if it will support the X2. Otherwise, go to [Motherboards.org](http://Motherboards.org) for help identifying your board. Once you've found it on the maker's site, look for a revised BIOS version that adds support for the Athlon 64 X2.

You'll need to apply the BIOS patch before you install the new CPU. Once you're sure that the system boots and runs with the new BIOS, shut down the PC and swap your old CPU for the new one (see [find.pcworld.com/43512](http://find.pcworld.com/43512) for an overview of the steps involved, but always follow the manufacturer's instructions). Before you power up the PC, ensure that you have properly reinstalled the heat sink.

### BUMP USB UP TO 2.0

USB 2.0 LETS you more quickly transfer data to and from USB storage devices and download pictures from digital cameras. If you have only USB 1.1 on your PC, you're living in the stone age; USB 2.0 is much faster. Adding USB 2.0 support is as simple as buying and installing an add-in card; you can find models for desktops or laptops.

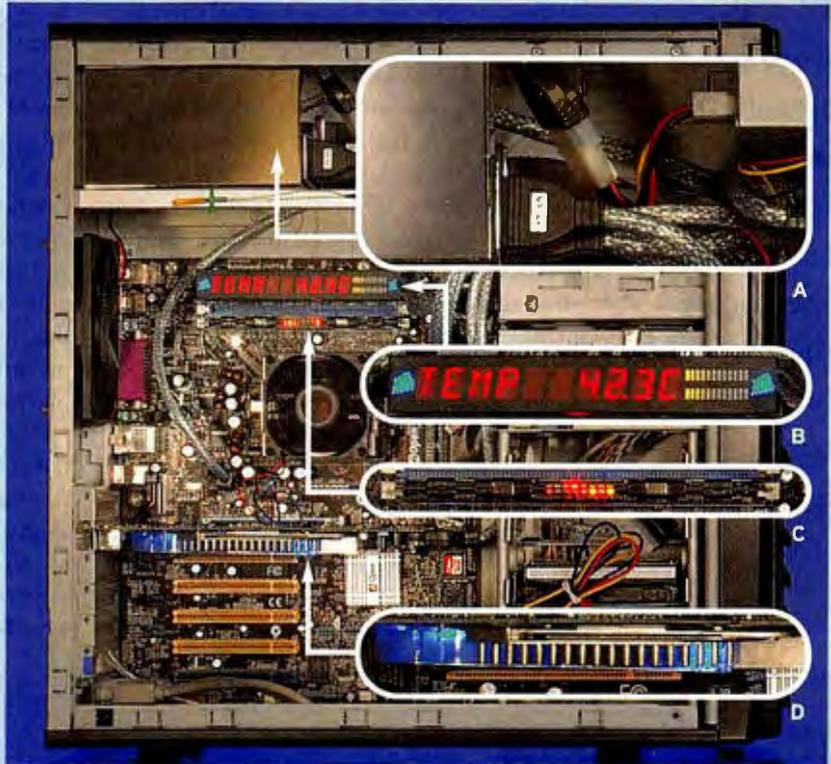
These cards range in price from \$15 to \$60, depending on how many ports the card has (see [find.pcworld.com/48421](http://find.pcworld.com/48421) for a selection of different models). The card fits into a standard PCI slot on desktop PCs, or a CardBus/PC Card slot on notebooks, such as Belkin's F5U22 CardBus USB 2.0 adapter (\$65; [find.pcworld.com/48420](http://find.pcworld.com/48420)).

A USB 2.0 add-in card is as easy to install as any other peripheral: You turn off the computer, insert the card into an available slot, power the system back up, and then install the device drivers. Some PC Card models require you to connect a power cord directly to the card before it'll work.

## COMPONENT UPGRADES

### A Clean, Well-Lighted Case for Computing

SOME NEW UPGRADES improve more than performance. These internal components aren't your average parts; they keep the case interior neat, cool, and, well, brightly lit.



**A)** Ultra's X-Connect power supply uses fewer, tidier cables. **B)** Corsair's XMS Xpert RAM has LED info displays. **C)** Crucial's Ballistix Tracer RAM uses LED indicators along the edge. **D)** ASUS's 256MB V9999 graphics board has an LED-illuminated fan.

### SPEEDY NETWORKS

CHANGING YOUR wired network over to gigabit ethernet, or your old 802.11b or 802.11g wireless network over to the faster MIMO or "pre-N" (an early version of what will become the 802.11n standard), will help reduce the networking bottlenecks you experience when you move data between PCs. The changeover from 11b to 11g, MIMO, or pre-N may let you stream video and music without pauses, or back up a PC over the network.

Most people will need to buy only a new router, and possibly a new network adapter for each PC on the network, to take advantage of these benefits. Of course a gigabit connection to a 1.2-mbps DSL or cable modem won't speed your Internet downloads, but connections on your local network ►

**TEST Center tip:**

Before you do even the simplest upgrade, back up your important files—just in case.

**TEST Center tip:**

Always ground yourself to a metal part of the PC (it doesn't have to be plugged in) before touching any component inside the case.

for file sharing, gaming, and streaming media files to other systems will still be faster.

The current state of the art in Wi-Fi is called MIMO, though different companies use this term to refer to different technologies; these types of wireless network products typically use multiple antennas to improve the radio signal coverage. (You'll find a comprehensive review of MIMO-enabled network setups on page 84.)

The cutting edge will move a little farther out when 802.11n, the next standard, appears in 2006. The 802.11n standard, in theory, will transfer data a lot faster than 802.11b or 802.11g networks. You can already buy pre-N devices, including many of the products we tested in this month's issue.

In general, the MIMO products seem to smooth out "dead spots" in wireless network coverage, and let you connect to the network at a greater distance from the router. But at short distances, you won't necessarily see any speed improvements.

**COOL IT DOWN**

IF YOU'RE GOING to crank up the speed, you'll also be increasing the temperature inside your PC's case—and a hot computer is an unhappy computer. Every new component you install will

pump more heat into the mix, which is why most new graphics boards include their own on-board cooling fans—and require you to connect extra power cables to run them. Hard drives, add-on cards, and even RAM can all generate heat that you'll have to remove from the case. If you don't, some hard drives could fail before their time, and your system might crash more frequently.

Installing a fan or two isn't exactly a hard job—most PC cases have extra fan mounting points at the rear (and several now include fan mount points on the top and sides of the case). All it takes is a new fan, a screwdriver, and a few minutes of your time. At \$5 to \$15 per fan (for the least expensive—and loudest—varieties), adding a fan or two is one of the easiest upgrades that you can do yourself. But before you go out shopping for fans, carefully measure the size of the vacant fan mounts built into your case so that you buy the right size.

If you're tight on space, or don't have any additional fan mounting points, you might consider fans that mount in unusual places. A slot fan (such as the \$5 Spire Exhauster; [find.pcworld.com/48408](http://find.pcworld.com/48408)), which screws into a vacant expansion slot, can fit neatly between add-on cards. If you want an extra boost of air circulation inside the case and you have an unoccupied 5.25-inch drive bay, the Bay Freezer (\$10 to \$15; [find.pcworld.com/48414](http://find.pcworld.com/48414)) sucks air in from the front of the case and pushes it over your drives.

Serious upgraders also like to use a fan controller, which adjusts fan speeds as the internal temperature changes; this keeps cooler PCs quieter. To use a fan controller, you may have to attach one or more included temperature sensors inside the case. Thermaltake's \$70 HardCano 13 fan controller ([find.pcworld.com/48416](http://find.pcworld.com/48416)) powers up to four fans, and gives you a digital readout of each fan's speed. To make it even more useful, it also includes slots for several common types of memory cards.

For the quietest cooling you can get, water is the way to go. Water-cooling systems pump water through special heat sinks you can attach to your CPU and other internal components; warm water ►

**MEMORY UPGRADES****Newer, Faster RAM Can Be Cheaper, Too**

WHEN YOU SHOP FOR MEMORY, you might be able to save some money by buying RAM that's slightly faster than, but backward-compatible with, the RAM your system now uses.

When you shop for RAM upgrades, you usually need to figure out what memory your computer already has and buy the same kind. But RAM is almost always backward-compatible (though you need to get the right type, typically referred to as DDR or DDR2), and sometimes slightly faster RAM is cheaper than slower, older versions of RAM.

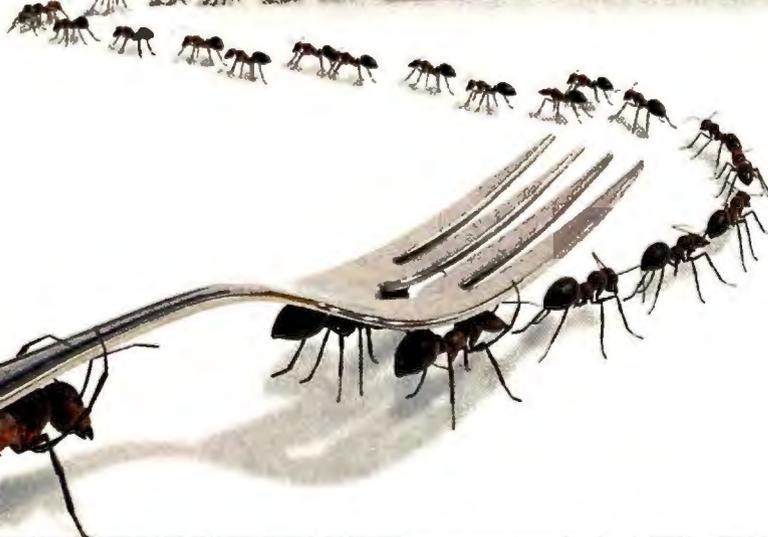
As the factories that make memory switch to making faster models and older RAM becomes more scarce, prices for older modules tend to rise.

We compared the average price (on June 1) for two 256MB DDR2 memory modules (DDR2 modules must be upgraded in matched pairs) rated for a range of motherboard bus speeds. Our results at right show that, if you needed PC2-3200 RAM, you would have gotten a better price for the faster, more plentiful PC2-4200 RAM, which works just as well.



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**TEST Center tip:**

Mirrors, your body, and chicken wire in walls can block Wi-Fi radio signals.

circulates to a radiator outside the PC. These water-cooling systems, however, aren't cheap (the Zalman Reserator 1 will run you anywhere from \$200 to \$280, depending on how you configure it; [find.pcworld.com/48418](http://find.pcworld.com/48418)), and they're not exactly child's play to install. But if you're serious about keeping your system cool and quiet, they're worth consideration—and you shouldn't skimp on quality here. After all, your CPU's heat sink is your insurance policy against a system meltdown.

## Create Your Own Entertainment System

**WHO NEEDS A TIVO?** Well, you do, of course. But with the appropriate blend of PC hardware and software, you can turn your PC into a personal video re-



recorder (PVR) à la TiVo, and then use it to stream your music or videos around the house.

### ADD A TV TUNER CARD

**THE FIRST STEP** to take in building your own media center is deciding what you want to accomplish. For most people, that's capturing TV shows from the airwaves or from a cable or satellite hookup. Companies such as ATI, Hauppauge, NVidia, and Pinnacle Systems make a wide selection of products to accomplish this: TV tuner add-on boards, external TV tuner boxes that plug into your USB ports, and graphics boards with on-board TV tuners. These products almost always include software to record TV (or sometimes video

from other sources, such as a camcorder), plus program guides to help you find what's on.

If you're planning on upgrading a graphics board anyway, and you want to add a TV tuner at the same time, ATI's All-in-Wonder family of graphics boards are a good compromise. The All-in-Wonder X800 XT (\$500; [find.pcworld.com/48423](http://find.pcworld.com/48423)) combines a top-notch graphics board with a TV tuner and an FM radio receiver, and includes all the software you need to schedule TV or radio recordings, plus a radio-frequency (RF) remote control that works with other applications, as well.

The X800 XT also provides S-Video and composite inputs and outputs for most video interconnections, as well as DVI-I and VGA outputs for your PC display. It also comes with its own PVR software, plus Gemstar's Guide Plus program lookup and scheduler and DVD-burning software to archive your saved programs.

RF remote controls are handy, not only because you don't have to aim the remote at a sensor, but also because you can change channels from a different room. If you buy another company's TV tuner card or box, but want to take advantage of the nifty RF remote control that comes with the All-in-Wonder, you can buy the Remote Wonder (\$40; [find.pcworld.com/48425](http://find.pcworld.com/48425)) separately.

If you do decide to add some form of TV tuner to your computer, you'll be at an advantage if you're a cable modem user—you already have a TV cable in close proximity. If you have to extend your TV cable to your PC, give yourself plenty of slack in the cable, or else run it underneath the carpet. Otherwise, if you (or your dog) trip over or yank the cable, it could wrench the TV connector right out of the back of the tuner card.

### UPBEAT GRAPHICS CARDS

**IF YOU OPT** for a dedicated TV tuner card instead of the All-in-Wonder, you can buy a new, ultrafast graphics board to get the display data to your monitor with the frame rates necessary for live video and 3D gaming. The new card you choose can also give you coveted features like video capture, a TV tuner, and a combination of connectors that lets you use multiple monitors: dual-DVI, DVI and VGA, or two VGA outputs.

You should remember that many newer PCs include a new type of expansion slot, called PCI Express, that older computers probably don't have. This is important because graphics board makers sell models designed to be inserted in either ▶

## SPECIALTY UPGRADES

### Drive Bay Makeover

ADD SOME PIZAZZ, and useful features, to your desktop with these unusual add-on components.



**A)** The PlusDeck 2 PC cassette deck.

**B)** Thermaltake's HardCano 13 fan controller.

**C)** Matrix Orbital's MX6 information display.

# Tune in, get smart, buy wise.

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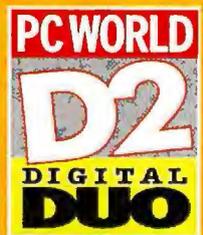


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**THE QUICKER FLICKER:** ATI's Remote Wonder remote control.

PCI Express slots or the older AGP slots. When buying a new graphics board, you need to buy one designed to fit into the slot your computer already has—they're not interchangeable.

Installing a new graphics board is relatively straightforward: Shut down your system, open the PC case, locate the correct slot (there's only one, and it's indented just a bit from the white PCI card slots), plug the new board in, and secure it with an appropriate screw or clamp. Then

close and secure the system case, connect your monitor cable to the new card, and start up your PC. You're ready to go. (For more detailed instructions on how to install a new graphics board, point your browser to [find.pcworld.com/48428](http://find.pcworld.com/48428).)

Once you install the new drive and power up the PC, Windows will identify the new board and attempt to load new drivers. While you can use the drivers on the CD that came with the board, we recommend that you visit the manufacturer's Web site and download the latest drivers, which will almost certainly be newer than the ones on the CD.

A reboot may be necessary; then you simply need to set the desired display resolution and refresh rate (right-click any empty space on the desktop, select *Properties*, and click the *Settings* tab to make these changes). You'll probably see a sharper, faster display right away; the true test will come when you run full-motion video or your favorite game.

### RECORD AND SHARE

ONCE YOU'RE recording and managing entertainment sources on your PC, you'll probably want to watch your shows in the living room. Pinnacle Systems' ShowCenter 200 (\$270; [find.pcworld.com/48427](http://find.pcworld.com/48427)) can distribute your programs, photos, or music to every TV or stereo hookup in the house. The ShowCenter 200 software streams your music and videos over your wired or wireless network, and it can archive programs to DVD for safekeeping and replay elsewhere—though you will obviously need a DVD recording drive to do this.

## Secure the PC



FOR YEARS, we've been telling you to use security software to protect your computer. But you can get serious security benefits by upgrading your hardware and adding physical protection for it.

Get a jump-start on identity theft protection right at home or in the office by physically locking down your system and hard drives, and also by adding a biometric input device to secure your operating system and applications (for an in-depth examination of these topics, see "Lock Down Your PC," at [find.pcworld.com/41908](http://find.pcworld.com/41908)).

### TIE DOWN YOUR DATA

ANY LEVEL OF PHYSICAL SECURITY on a PC will help deter theft. If you're ready to get serious about eliminating the risk of someone tampering with your data, you'll want to lock your hard drive in place when you need it, and store it in a locked cabinet or vault when you're not using it.

Start with a cable lock to tie your PC, either desktop or laptop, to a substantial object in your workspace. Kensington's MicroSaver cable lock (\$6 and up; [find.pcworld.com/48429](http://find.pcworld.com/48429)) is one of many such products that are small and light enough to carry when traveling and tough enough to keep your laptop secure at your desk. Compu-Lock's 007 security system for desktop PCs (\$29; [find.pcworld.com/48430](http://find.pcworld.com/48430)) includes a set of adhesive pads and a cable lock to secure desktop boxes to any solid surface.

### TAKE IT WITH YOU

ONE EFFECTIVE WAY to keep your data away from prying eyes is simply to remove it from your PC. Swappable drive trays with locks that secure the drive in place are available from several companies, including Addonics, DataStor, and Promise. At your desk, you can lock the drive into the case. When it's time to take your data with you, unlock the drive, slide out the drive tray, and go. Prices range from \$8 to \$50 per bay with one drive tray.

If you're looking for something a little smaller, check out the CardMedia BioDisk USB flash memory drive (prices vary by storage capacity; [find.pcworld.com/48432](http://find.pcworld.com/48432)) or the FBIdrive flash memory drives ([www.fbidrive.com](http://www.fbidrive.com)) by Newport Scientific Research. Both products also have a built-in fingerprint reader; to get your data off the drives, you'll need to scan your fingerprint using the built-in reader. You can also use it to log in to your PC. ▶

### TEST Center tip:

Treat your portable hard drive as if it were made of glass: Handle it gently.



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## SECURE STORAGE

KEEP THAT FINGER HANDY, because you can use it to unlock portable storage devices as well. Micro-Solutions' LockBox (prices start at \$200; find [pcworld.com/48434](http://pcworld.com/48434)) is an external hard drive with its own fingerprint reader built right in. The Lock-Box holds anywhere from 80GB to 200GB, depending on the model you choose. Up to eight users can share the drive and its contents.

Before connecting the LockBox to your PC, you have to set up the software. The software guides you through establishing an administrative user account, which gives you full control over the drive and its use by others. You can give everyone access to the entire drive, or you can assign a separate fingerprint-protected drive space to each user. Other fingerprint-enabled software may also take advantage of the LockBox's fingerprint sensor.

## ADD BIOMETRIC SECURITY

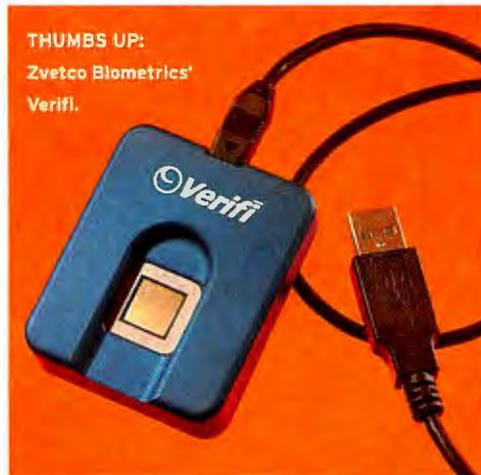
PASSWORD MANAGERS do a good job of taking the pain out of remembering your countless passwords, but you still need to set a password to protect all those other passwords. That safeguard is great until you forget the master password. That's why biometric devices are so handy—they identify you to the PC using a fingerprint or some other biological detail unique to you. You can log in to your computer, Web sites, and e-mail accounts just by pressing the flesh with your PC, so to speak.

If you're ready to swap out most of your text passwords for biometric-based identification using your fingerprint, check out Microsoft's IntelliPoint biometric line of keyboards and mice (prices start at \$45; find [pcworld.com/48436](http://pcworld.com/48436)). These input devices let your fingers do the talking. They substitute Windows' own passwords for fingerprint authentication, employing extremely user-friendly Password Manager software from DigitalPersona ([www.digitalpersona.com](http://www.digitalpersona.com)).

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THUMBS UP:  
Zvetco Biometrics'  
Verifi.

DigitalPersona also sells a keyboard with fingerprint reader (the \$130 U.are.U Keyboard), as well as a stand-alone fingerprint reader. Zvetco Biometrics' Verifi P3400 (\$99; [www.zvetcobiometrics.com](http://www.zvetcobiometrics.com)), another fingerprint reader, connects to USB and includes a different password manager app.

Once you install the hardware and drivers for a biometric security device such as the Microsoft fingerprint pad, setting up fingerprint authentication for Windows and Web sites is quick and easy. For example, to establish fingerprint log-on at a favorite Web site, simply click in the user-name or log-in space on the Web page, apply your finger to the fingerprint reader, type your user name and password for the site into the fingerprint reader's pop-up dialog, and then apply your finger to the reader once more. Henceforth, you can log on to that site literally with the touch of a finger. The Microsoft products also support Fast User Switching in Windows XP for setting up convenient one-touch log-on.

## PREVENT PRYING EYES

LAPTOP USERS who fly know all too well the problem of the nosy seatmate. If you're trying to get work done and you don't want the person next to you to see what you're working on, check out 3M's line of Privacy Filters (prices start at \$35; find [pcworld.com/48438](http://pcworld.com/48438)). These thin plastic sheets fit over your laptop's screen and reduce the viewing angle so only someone who is sitting directly in front of it can read or see what's on it. If you're worried about the guy in the next cubicle sneaking a peek at your desktop, 3M also sells a 17-inch flat-panel LCD monitor (\$500; find [pcworld.com/48439](http://pcworld.com/48439)) with the privacy filter built in. ■

*Freelance writer Jim Aspinwall frequently upgrades PCs in the San Francisco Bay Area.*



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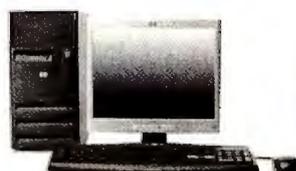


  
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WIRELESS NETWORKING IS SPEEDING UP again—and splintering. In the past year, an abundance of new products that use innovative antenna technologies have delivered significant speed and coverage gains over standard 802.11a, b, and g networking components. These improvements should delight people who routinely move large files within a local area network or those who experience dead spots or inadequate range with their current setups.

As a group, the new antenna technologies are known as MIMO—multiple in, multiple out—because products based on them increase their throughput and range by using multiple smart antennas to optimize transmissions depending on the location of client devices. By contrast, older Wi-Fi products generally transmit signals in all directions, regardless of where those signals are received. Vendors of MIMO products make extravagant claims regarding performance ►

# Farther!

BY YARDENA ARAR

PHOTOGRAPHS BY GEOFF SPEAR



BELKIN Wireless Pre-N Router and PC Card.



LINKSYS Wireless-G with SRX.

improvements, with theoretical maximum data rates of 108 megabits per second. In practice, data rates are likely to be much lower—but still faster than those of previous enhanced 802.11g products that similarly claimed 108-mbps theoretical maximums.

We tested five MIMO product combos—routers with their corresponding PC Cards—that use one of three competing technologies. Belkin's Wireless Pre-N, Linksys's Wireless-G Broadband with SRX, and Netgear's Pre-N all use Airgo Networks' True MIMO technology. Netgear's RangeMax line uses Video54's BeamFlex antenna technology with the Atheros Super G Wi-Fi chip that powered the enhanced 802.11g products we looked at in

our November 2004 story "The Ultimate Wireless Guide" ([find.pcworld.com/48332](http://find.pcworld.com/48332)). D-Link's Super G MIMO line uses the Super G chip, too, but in concert with Atheros's Smart Antenna technology. (For more about how these versions of MIMO differ, see "Inside the New MIMO Technologies" on page 90).

To establish a baseline for comparison, we tested a sixth product combo that uses no MIMO technology at all. Instead, U.S. Robotics' relatively new Wireless MaxG router and PC Card package relies on less-expensive enhancements such as increased signal strength and more sensitive receivers.

To see how fast and how far these products could go, we ran tests at close, middle, and long range in a house in a neighborhood that had no other detectable Wi-Fi network. We also ran the short-range tests with a standard 802.11g client on the network to measure this client's impact on performance—a likely scenario, as many people's MIMO networks will still contain some standard Wi-Fi devices.

Our tests revealed that no single product—or type of MIMO—consistently outshone the others. In fact,

the winner of our close-range and midrange tests was the non-MIMO U.S. Robotics line. MIMO excelled, however, in our long-range tests, which the U.S. Robotics products couldn't even complete. At long range, the best performers were the Airgo-based Belkin, Linksys, and Netgear combos. These results suggest that people who are interested primarily in speed over short distances can safely stick with a non-MIMO network. But for better range and coverage than today's existing 802.11g networks can provide, MIMO products deliver. Factoring in other product attributes—including price, features, and technical support policies—we gave our Best Buy award to Belkin's Wireless Pre-N product combo.

## Quality of Service (QoS)

THE MORE DEVICES YOU HAVE on your network, the more obviously they'll compete for bandwidth, and the likelier an attempt to e-mail a large digital photo will be to affect a coworker's VoIP call.

Quality-of-service (QoS) technologies let you establish priorities for concurrent network activities—specifying, for example, that VoIP calls should never be interrupted by other types of traffic. While businesses and consumers wait for the IEEE to ratify a

QoS standard (802.11e), a proprietary QoS technology from Ubicom called StreamEngine has emerged. It's available now in Hawking's \$106 HBB1 Broadband Booster ([find.pcworld.com/48376](http://find.pcworld.com/48376)) and will be coming soon in D-Link's Broadband Internet/VoIP Accelerator (the product's price has yet to be determined).

Ubicom says that, by default, StreamEngine gives VoIP the highest priority, followed by gaming traffic, streaming video, and file sharing. Users can set their own priorities, however. In a future issue of *PC World*, we'll examine whether Ubicom's QoS delivers.

—Narasu Rebbapragada

## THE REALITIES OF MIMO

THERE ARE A FEW things to bear in mind if you're considering upgrading to MIMO gear. First, these items can cost more than twice as much as their previous-generation counterparts. Second, most MIMO clients today are for notebooks, and there are no MIMO peripherals.

Third, speed gains will apply only to data transfers that occur within a local area network; they won't boost performance for Internet-related activities. Most broadband connections top out at a couple of megabits per second, a speed that a slow 802.11b network can match.

Fourth, streaming video, especially full-screen high-definition video, is apt to be a hit-or-miss experience. At close range,



you might have the 19 mbps or so that high-definition TV requires, but you'll likely experience stutter if there's other activity on the network. A good streaming-media experience is likelier for DVDs, music, standard-definition TV, and Voice-over-IP

content, none of which demands a throughput of greater than 10 mbps.

Finally, today's MIMO technologies aren't linked to a standard and won't be upgradable to the upcoming 802.11n standard when it emerges. Because vendors use different proprietary technologies, boosts in speed and range aren't fully available on networks that include equipment from different vendors or from the same vendor's older lines.

That may sound like a fatal flaw, but in reality things aren't so bad. All of the products we tested are compatible with existing 802.11g and

802.11b equipment—and with each other in 802.11g mode. And their multiple antennas help them deliver at least some performance benefits on networks populated with legacy equipment.

True 802.11n products are unlikely to appear for another year.

But since the eventual 802.11n standard will be backward-compatible with 802.11g, current MIMO products and future 802.11n products will work together. Though the MIMO products may produce only 802.11g speeds, they shouldn't degrade the performance of future 802.11n products.

### TEST RESULTS

IF YOUR WIRELESS network doesn't have to reach very far and if you value speed, you can save money—and get a USB print server in the bargain—by buying the U.S. Robotics combo. It was the top performer in our close- and



### FEATURES COMPARISON

## TEST Center PRICELY LINKSYS WINS FOR SETUP, PERFORMANCE

AIRGO-BASED PRODUCTS excelled at long range, while U.S. Robotics' combo had the best features and short-range performance.

	WI-FI ROUTER AND CARD <sup>1</sup>	Type of antenna technology	Features rating <sup>2</sup> and security	Performance rating and average throughput (mbps) <sup>3</sup>	Bottom line
1	Linksys Wireless-G Broadband Router and Wireless-G Notebook Adapter with SRX \$274 (★★★★☆) find.pcworld.com/48324	Airgo True MIMO	• Very Good • 128-bit WEP and WPA encryption	• Good • Short range: 18.1 • Long range: 13.8 • Short range with g client: 18.0	This pricey product offers an excellent combination of easy setup, documentation, and tech support. It has the best VPN support and ranked number two overall in our performance tests.
2	Belkin Wireless Pre-N Router and Wireless Pre-N Notebook Network Card Best BUY \$238 (★★★★☆) find.pcworld.com/48322	Airgo True MIMO	• Very Good • 128-bit WEP and WPA encryption	• Very Good • Short range: 16.0 • Long range: 14.0 • Short range with g client: 16.0	This Airgo-based combo has a fair price and a nice design plus strong long-range performance, ease of use, and support. But its short-range performance is worse than that of cheaper non-MIMO products.
3	Netgear Pre-N Wireless Router and Pre-N Wireless PC Card \$217 (★★★★☆) find.pcworld.com/48326	Airgo True MIMO	• Good • 128-bit WEP and WPA encryption	• Good • Short range: 15.9 • Long range: 15.3 • Short range with g client: 14.2	Netgear's Airgo-based product aced our long-range tests, but it straggled at shorter distances. Antennas easily slipped out of a boxy case that seems best suited for small businesses.
4	D-Link Super G MIMO Wireless Router and Super G MIMO Wireless Notebook Adapter \$205 (★★★★☆) find.pcworld.com/48323	Atheros Super G with Smart Antenna	• Good • 128-bit WEP and WPA encryption	• Good • Short range: 22.6 • Long range: 4.6 • Short range with g client: 22.6	The D-Link was a middle-of-the-pack performer at short and middle ranges, but slower at long range. For best results it uses channel bonding, which may not kick in if other Wi-Fi networks are in range.
5	U.S. Robotics Wireless MaxG Router and Wireless MaxG PC Card \$121 (★★★★☆) find.pcworld.com/48330	Broadcom Encore	• Outstanding • 128-bit WEP, WPA encryption, and WPA2 encryption	• Average • Short range: 33.1 • Long range: 0 • Short range with g client: 28.1	This low-cost, non-MIMO product includes a built-in USB print server and earned top marks in our short-range and midrange tests. But it couldn't complete our long-range tests and lacks 24/7 phone support.
6	Netgear RangeMax Wireless Router and RangeMax Wireless PC Card \$206 (★★★★☆) find.pcworld.com/48328	Atheros Super G and Video54 BeamFlex	• Fair • 128-bit WEP and WPA encryption	• Good • Short range: 31.0 • Long range: 7.9 • Short range with g client: 23.8	The strongest MIMO performer at close and middle range but undistinguished at long range, this model lost points for a default setting that kept channel bonding on with other 802.11b/g networks in range.

FOOTNOTES: <sup>1</sup> Price represents combined street prices of the router and the PC Card as of 5/25/05. <sup>2</sup> Features rating is a weighted average of hardware options, software, security features, and overall design. <sup>3</sup> Performance rating is based on several tests, including ones with unlisted results. Average throughput is the average of the test results for FTP downloads and uploads; mbps = megabits per second. HOW WE TEST: Visit find.pcworld.com/48450 for our test methodology and results. CHART NOTES: Star ratings are based on overall design, performance, features, setup, software, and security. Price is taken into account for Best Buy honors only. See find.pcworld.com/10860 for details on PC World's Star Ratings.

medium-range tests, recording average download and upload throughputs of 33.1 mbps and 27.8 mbps, respectively.

In our close-range tests, we placed the router and PC Card about 6 feet apart in the same room. The Airgo-based products performed the worst over short distances: Throughput from the Netgear Pre-N line dipped as low as 15.9 mbps. Our results suggest that MIMO products tend not to provide much of a performance boost within such proximity. In our most recent previous Wi-Fi roundup—one that did not include any MIMO products—a Buffalo Technology router achieved an average throughput of 27.6 mbps at close range, which is only a little slower than the 33.1 mbps achieved by the U.S. Robotics Wireless MaxG.

Because many users will be combining MIMO gear with older equipment, we ran a second set of close-range tests with a standard 802.11g client attached to the network. The performance of the Belkin, D-Link, and Linksys products remained essentially the same with and without the g card on the network. The other setups took only a slight speed hit; for example, the average throughput for the U.S. Robotics router declined from 33.1 mbps to 28.1 mbps. In this respect, they differ markedly from previous MIMO products, which incurred significant declines in performance when devices lacking their proprietary enhancements were added to the mix.

We didn't test speed and range for a standard 802.11g card on a network with a MIMO router, so we don't know how fast and how far a notebook with standard Wi-Fi would operate on one of these networks. But in April's "Stretching Wi-Fi" story ([find.pcworld.com/47688](http://find.pcworld.com/47688)), we discovered that the range for the standard 802.11g cards improved significantly. This result suggests

that simply upgrading your router might deliver the performance boost you need.

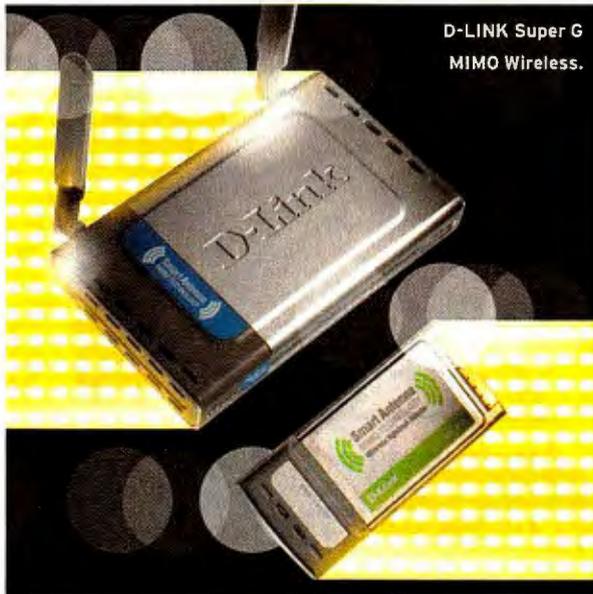
In our midrange tests, we moved the notebook to a bedroom located two rooms and several household obstacles (or about 30 feet) away from the router. Performance was only marginally slower than at close range. Again, the U.S. Robotics setup emerged on top; and the three Airgo-based lines turned in the worst numbers, with the Netgear Pre-N products finishing in last place at 15.1 mbps.

Performance results were more or less reversed, however, when we took the notebook outside and tried to connect from a

far corner of the backyard—about 100 feet away from the home office—for long-range testing. Here, the previously unimpressive Netgear Pre-N combo achieved the top average throughput, 15.3 mbps, followed closely by the other two Airgo-based product lines (from Belkin and Linksys). The U.S. Robotics gear, on the other hand, failed to complete the long-range test. Considering these results, if range and coverage are your top priorities, you'll

likely be happy with an Airgo-based unit.

You might wonder why our test results fall far short of the theoretical maximum of 108 mbps for MIMO products. One reason is that performing Wi-Fi testing is notoriously tricky: Radio waves are subject to all sorts of interference such as from physical objects, other radio waves, and even the weather. Equipment placement is another speed variable. The greater the distance between a Wi-Fi router and a network card, the greater the speed boost over standard 802.11g becomes—especially as standard g signals peter out at the outer edge of a network. Finally, vendors generally don't secure their networks when they test—because doing so can reduce performance—but we tested using WPA, the security technology we rec- ▶



D-LINK Super G MIMO Wireless.

## Wi-Fi Locators



WI-FI LOCATORS SAVE YOU THE TROUBLE of unpacking your laptop to see whether a hotspot is convenient. These small devices are designed to find nearby 802.11b and 802.11g Wi-Fi networks. Some can determine signal strength and tell you whether the network in question is secure. In our March issue we looked at Wi-Fi locators from Canary, Kensington, and Smith Micro (see [find.pcworld.com/48410](http://find.pcworld.com/48410)).

One newcomer, by Hawking Technology, is the \$33 HWL1 802.11b/g Wi-Fi Locator ([find.pcworld.com/48378](http://find.pcworld.com/48378)). Hold down the device's Locate button, flip up its high-gain directional antenna, and watch up to five blue LEDs light up to indicate signal strength. This device can recognize WEP, WPA, and WPA2 encryption.

You charge the HWL1's lithium ion battery by plugging it into your notebook or PC's USB port, where it doubles as a Wi-Fi adapter. Hawking includes its own proprietary wireless utility for locating and logging on to available networks, but this app balked when we tried to use it. We had better luck with the standard Windows Wireless Network Setup Wizard.

—Narasu Rebbapragada

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ommend to readers (see “Wi-Fi Security Options” on page 96).

Routers that use Atheros Super G chips—among them, Netgear’s RangeMax and D-Link’s Super G MIMO lines—employ a somewhat controversial technology called channel bonding to boost the range and speed of their products.

Channel bonding works like this: In the United States, stan-

dard 802.11b and g equipment, as dictated by the IEEE standard, transmits data on one of eleven channels in the vicinity of the 2.4-GHz frequency. Of the eleven channels, only channels 1, 6, and 11 are spaced sufficiently far apart that all three can be used simultaneously without interfering with each other. The availability of these noninterfering channels enables standard ▶

HOW THEY WORK

INSIDE THE NEW MIMO TECHNOLOGIES

ALL OF THEM ARE CALLED MIMO, but that’s where the similarities end among the multiple-antenna technologies that most of the products in this roundup use.

**Standard 802.11g Wi-Fi**

The antennas on standard 802.11g devices send and receive data in all directions on one of eleven channels at the 2.4-GHz frequency used by 802.11b and g Wi-Fi.

**Airgo Networks’ True MIMO**

**Used by:** Belkin Wireless Pre-N Router, Linksys Wireless-G Broadband Router with SRX, and Netgear Pre-N Wireless Router

**Test report:** The most consistent performer in our tests—and, at longer ranges, the fastest.

Airgo Networks’ patented True MIMO technology exploits what is known as spatial multipath characteristics of radio waves. Airgo-based products simultaneously use two radios to send two unique streams of data over a single 2.4-GHz channel. At the receiving end, three antennas and radios decode these disparate data streams, which are recombined into one. The extra antennas and other transmission enhancements improve speed and coverage for non-True MIMO devices that don’t otherwise benefit from spatial multipath technology.

**Atheros’s beamforming**

**Used by:** D-Link Super G MIMO Wireless Router

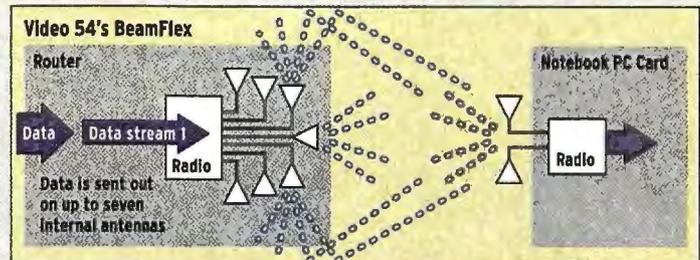
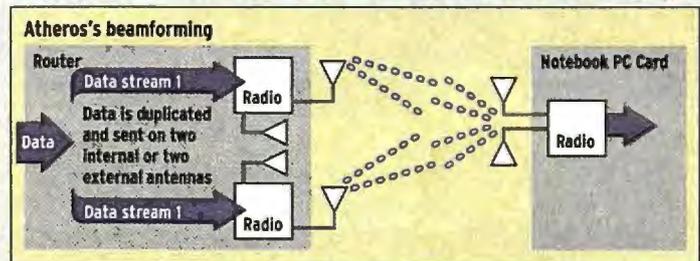
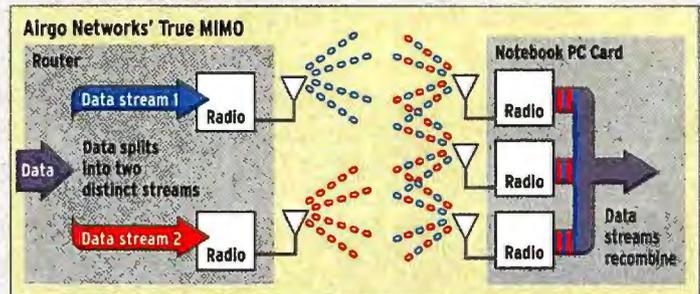
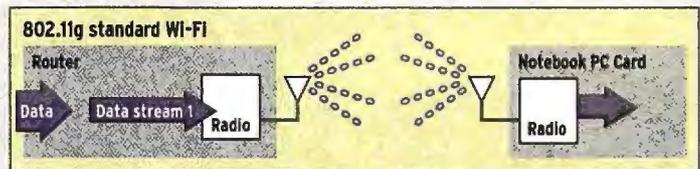
**Test report:** Strongest results occurred at middle range.

In products that use beamforming antenna technology, the transmitting unit aims data streams directly at the antennas on the receiving devices. D-Link’s MIMO products use a smart-antenna chip set from Atheros to add beamforming to Atheros’s Super G Wi-Fi chip. The antennas sense the location of clients and focus data streams accordingly.

**Video54’s BeamFlex**

**Used by:** Netgear RangeMax Wireless Router

**Test report:** Produced the fastest throughput of any MIMO product at midrange distances, but results overall were inconsistent.



Netgear’s RangeMax line uses Video54’s patent-pending BeamFlex Smart MIMO Technology. Instead of employing the usual stick-like external antennas, the RangeMax router uses seven internal antennas that can be arrayed in different combinations optimized to transmit data based on the location of client devices and environmental obstacles. RangeMax clients also benefit from their multiple antennas and their BeamFlex-optimized software.



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802.11x wireless equipment to deal with interference from nearby wireless networks; thus, if your network is using channel 1, your neighbor's equipment might automatically hop over to channel 6 or 11.

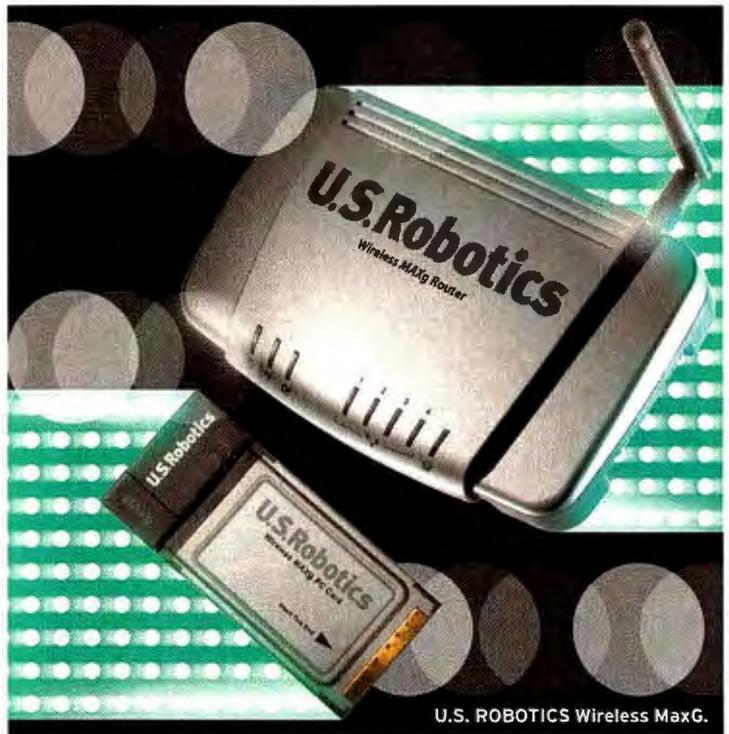
But equipment that uses channel-bonding technology beefs up throughput by hogging all three noninterfering channels, effectively shutting out all other networks within range when transmitting data; as a result, a neighboring network could slow down. The problem is so significant that the Wi-Fi Alliance will not certify products that don't stop using channel bonding when another network is in range.

We tested all of the wireless products for this review at their default settings, since that's the way most people will use them. Dismayingly, our Netgear RangeMax router continued to use channel-bonding technology by default—whether or not a neighboring network was in range—unless we added a network client that didn't use channel bonding. In other words, the RangeMax network wouldn't automatically step down from channel-bonding mode if a neighbor's network was in range, which we consider bad-neighbor technology.

Netgear representatives say that, since we received our evaluation unit, the company has altered the default settings on RangeMax routers to abandon channel bonding when the device detects another network nearby. Clearly, however, some people will buy products that shipped with the unfriendly setting as the default, and we docked a few points in our ratings for this reason.

### THE USER EXPERIENCE

WI-FI VENDORS ARE working hard to make networking products easier to use. Of the products in this roundup, the Linksys offered the best combination of easy setup, documentation, and tech support policies—but no competitor fell far short.



U.S. ROBOTICS Wireless MaxG.

Installation routines varied. The Belkin, Linksys, and Netgear RangeMax routers, for example, come with wizards that attempt to detect your existing broadband modem settings to save you the trouble of inputting them manually. In our informal tests, however, none worked perfectly. The Linksys automated setup was designed for people who start out with a single PC and a broadband modem. It worked fine for us; but if you're upgrading from an older router, it doesn't help at all: You must manually change the router's firmware settings via the browser interface.

In our hands-on tests, the Belkin router failed to identify our fixed IP address setting. The Netgear RangeMax installation routine took an unusually long time—and when it wrapped up, we discovered that it had somehow shut down Windows' Wireless Zero Config (WZC) software, which manages Wi-Fi connectivity. Without WZC, we couldn't even scan for available wireless networks, much less connect to one. Netgear attributes our experience to a bug that it says it has since fixed.

The remaining products had browser-based setup wizards, which require you to manually enter the relevant broadband settings—user IDs and passwords, equipment MAC IDs, fixed IP addresses, and whatever else your ISP requires for authentication. The wizards all worked flawlessly in our hands-on tests—but that's a lot of information to input. If you have a home network or are thinking about getting one someday, write down all of your broadband configuration ▶

## Range-Extending Cards



AN AFFORDABLE ALTERNATIVE to an expensive MIMO router is a range-extending PC Card to use in place of your notebook's built-in Wi-Fi card on an 802.11b or g network. We looked at the latest version of one of the best: Hawking Technology's HWC54D Hi-Gain Wireless-G Laptop Card ([find.pcworld.com/48379](http://find.pcworld.com/48379)).

Like its predecessor, which we tested last spring ([find.pcworld.com/48372](http://find.pcworld.com/48372)), the HWC54D uses a pop-up directional antenna to extend the range for a standard 802.11g connection: I connected to the Belkin Wireless Pre-N router from a good 90 feet (and several walls) away—that's 30 to 40 feet beyond the maximum distance at which a standard 802.11g card could function. The new card adds support for the WPA security protocol plus LED lights (similar to those in Hawking's Wi-Fi finder) to show signal strength. For \$45, it's a great way to make the most of your existing Wi-Fi router.

—Yardena Arar

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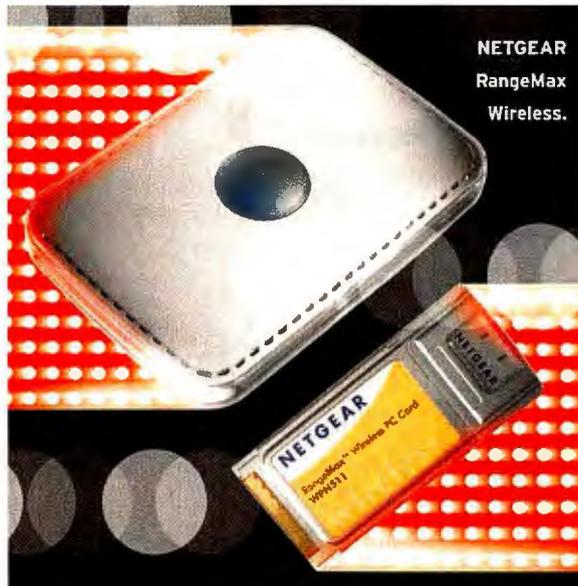


information (you can get it from your broadband provider) in a document and keep it handy for the next time you want to upgrade your network equipment.

Once they were set up, the products worked similarly, although their physical design varies. The Netgear Pre-N router is boxy, corporate-looking, and somewhat fragile—when the product fell a foot or so from a sofa to the floor, two of its three antennas popped out of the case. The Linksys router is futuristic and silvery. The Netgear RangeMax has no external antennas; its seven internal antennas are represented by a small circle of blue LEDs that shine through the router's case. The lights flicker and swirl as the antennas reconfigure to suit the environment. Some people may like this effect; others won't.

### OTHER FEATURES

MOST OF THE MIMO ROUTERS we tested provide the same basic hardware package: All have four switched ethernet ports plus a wide-area network port for the cable that connects to your cable or DSL broadband modem. All have a reset button that returns the router settings to factory-default values. And all have an ethernet cable to use during setup. The one unusual extra was



network) and remote management (for changing your network settings when you're away from your home). All have filters that block unwanted visitors based on hardware identifiers and block Web sites based on content or URL, and all support pass-through VPN connections. Only the U.S. Robotics line supports WPA2, the latest security technology (see "Wi-Fi Security Options" below).

The dearth of extras in most products is not a deal-breaker. If you're unhappy with your wireless network's range and file transfer speeds, the new Wi-Fi may be a true problem-solver. ■

*Yardena Arar is a senior editor and Narasu Rebbapragada is an associate editor for PC World.*

## STANDARDS

### WI-FI SECURITY OPTIONS

HERE'S A QUICK RUNDOWN OF TODAY'S three Wi-Fi security standards. Remember that a network's security is only as good as the best standard that every piece of connected equipment supports. Right now, the most widely supported standard is WEP.

#### WEP

##### (Wired Equivalent Privacy)

ALTHOUGH IT'S notoriously easy to break, this original security standard for Wi-Fi remains the one most commonly used. That's because WEP is available in every Wi-Fi device on the planet (since it was part of the original 802.11b spec), including such increasingly popular components for wireless networking as streaming media players. Until these products start supporting stronger standards, WEP will be the only choice for many home users—and it's certainly better than nothing.

#### WPA

##### (Wi-Fi Protected Access)

PC WORLD recommends that, where possible, you use WPA-PSK (WPA in Pre-Shared Key mode—as opposed to enterprise mode, which requires an authenticating server). WPA-PSK uses the same RC4 encryption cipher as WEP, but in a different and more hacker-resistant way: Its TKIP (Temporal Key Integrity Protocol) technology relies on mathematical scrambling formulas to check whether a key has been tampered with. All of the products tested for this review support WPA-PSK.

#### WPA2

##### (Wi-Fi Protected Access 2)

THE NEW 802.11i standard, also known as WPA2, provides the strongest security. It abandons RC4 encryption in favor of the harder-to-crack AES encryption. It's not easy to upgrade WPA hardware to WPA2, which generally requires a dedicated chip. WPA2 significantly slows down a network and is overkill for most home users and for many small businesses. Of the products PC World tested, only the U.S. Robotics Wireless MaxG router supports WPA2 (however, we tested it with WPA for consistency).

Acer recommends Microsoft® Windows® XP Professional.

acer

July/August 2005

Acer®, like Ferrari, is the technology driver of tomorrow. Both produce desirable, eye-catching and devastatingly fast products that embody the passion, spirit and experience of years leading the competition. The magnificent carbon fiber casing of the Ferrari 4000 conceals the very latest 64Bit technology, full wireless connectivity and widescreen monitor. Powerful, dark and purposeful, the Ferrari 4000 has the presence of a true champion.

# NEW Ferrari 4000 NOTEBOOK TECHNOLOGY DRIVER

Ferrari

OFFICIAL LICENSED PRODUCT



- AMD Turion™ 64 Mobile Technology ML-37
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  - HyperTransport™ Technology
  - Enhanced Virus Protection Technology¹
- Microsoft® Windows® XP Professional
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- 100GB² hard drive, 5400RPM
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- 15.4" WSXGA+ (1680 x 1050) TFT display
- ATI® MOBILITY™ RADEON® X700 graphics, 128MB DDR
- 802.11b/g WLAN, Bluetooth®, gigabit LAN, V.92 modem
- One-year limited warranty³

Ferrari 4005WLMi

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**\$1,999**

(LX.FR406.035)

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Prices shown are estimated street prices and do not include tax or shipping. Retailer or reseller prices may vary.

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## Acer® Flat Panels: Displaying Quality & Value

### Acer AL2032wd

- 20.0" TFT LCD
- 1680 x 1050 native resolution
- 600:1 contrast ratio
- 178° horizontal viewing angle
- 178° vertical viewing angle
- 2 x 5.0W integrated speakers
- VGA, DVI-D signal connectors
- 300 cd/m<sup>2</sup> brightness
- 16ms response time
- Gloss-black color

Acer AL2032wd

**\$599**

20.0" LCD



**600:1 CONTRAST RATIO**

### Acer AL1932d

- 19.0" LCD
- 1280 x 1024 native resolution
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- 140° horizontal viewing angle
- 140° vertical viewing angle
- 2 x 2.0W integrated speakers
- VGA, DVI-D signal connectors
- 400 cd/m<sup>2</sup> brightness
- 12ms response time
- Gloss-black color

Acer AL1932d

**\$399**

19.0" LCD



**DVI & SPEAKERS**

Acer recommends Microsoft® Windows® XP Professional.

- Mobile AMD Sempron™ Processor 2800+
  - AMD PowerNow!™ Technology
  - HyperTransport™ Technology
  - Enhanced Virus Protection Technology¹
- Microsoft® Windows® XP Professional
- 512MB DDR333 SDRAM
- 60GB² hard drive
- Integrated CD-RW/DVD-ROM combo drive
- 15.4" WXGA (1280 x 800) TFT display
- SiSM760GX chipset with integrated Mirage™2 graphics
- 802.11b/g WLAN, 10/100 LAN, V.92 modem
- One-year limited warranty³

## Acer® Aspire™ 3000

Entertainment Starts Here

**COMBO DRIVE**



Prices shown are estimated street prices and do not include tax or shipping. Retailer or reseller prices may vary.



Acer Aspire 3002WLCi

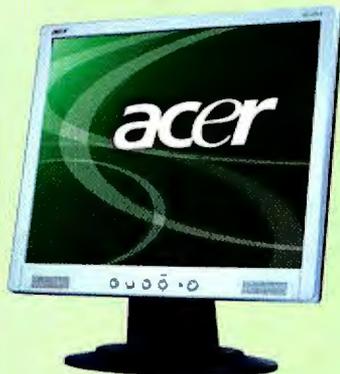
**\$799**

Mobile AMD Sempron™ Processor 2800+  
Microsoft® Windows® XP Professional  
(LX.A5506.005)

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# acer

## Compare Monitor Prices/Features & You'll Choose Acer®



Acer AL1914s-8  
**\$329**  
19.0" LCD

### Acer AL1914s-8

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- 140° horizontal viewing angle
- 140° vertical viewing angle
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- VGA, DVI-D signal connectors
- 250 cd/m<sup>2</sup> brightness
- 8ms response time
- Silver color

**8MS, DVI, SPEAKERS**



Acer AL1912  
**\$289**  
19.0" LCD

### Acer AL1912

- 19.0" TFT LCD
- 1280 x 1024 native resolution
- 500:1 contrast ratio
- 140° horizontal viewing angle
- 140° vertical viewing angle
- VGA signal connector
- 250 cd/m<sup>2</sup> brightness
- 16ms response time
- Black color



Acer AL1715s-8  
**\$249**  
17.0" LCD

### Acer AL1715s-8

- 17.0" TFT LCD
- 1280 x 1024 native resolution
- 500:1 contrast ratio
- 150° horizontal viewing angle
- 135° vertical viewing angle
- 2 x 1.0W integrated speakers
- VGA, DVI-D signal connectors
- 300 cd/m<sup>2</sup> brightness
- 8ms response time
- Silver color

**8MS, DVI, SPEAKERS**



Acer AL1714cb-8  
**\$229**  
17.0" LCD

### Acer AL1714cb-8

- 17.0" TFT LCD
- 1280 x 1024 native resolution
- 350:1 contrast ratio
- 160° horizontal viewing angle
- 120° vertical viewing angle
- VGA signal connector
- 370 cd/m<sup>2</sup> brightness
- 8ms response time
- Black color

**8MS RESPONSE TIME**



Acer AL1715  
**\$229**  
17.0" LCD

### Acer AL1715

- 17.0" TFT LCD
- 1280 x 1024 native resolution
- 500:1 contrast ratio
- 150° horizontal viewing angle
- 135° vertical viewing angle
- VGA signal connector
- 300 cd/m<sup>2</sup> brightness
- 12ms response time
- Black color



Acer AL1511  
**\$169**  
15.0" LCD

### Acer AL1511

- 15.0" TFT LCD
- 1024 x 768 native resolution
- 350:1 contrast ratio
- 140° horizontal viewing angle
- 125° vertical viewing angle
- VGA signal connector
- 250 cd/m<sup>2</sup> brightness
- 25ms response time
- Black or beige color

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# AMD Turion™ 64 Mobile Technology

## Uniquely Optimized for Mobility

AMD Turion™ 64 Mobile Technology is a new family of simultaneous 32- and 64-bit notebook processors that Acer® currently offers in the Ferrari 4000 and Aspire 5000. At the core of these processors is AMD64 architecture, which provides leading-edge 32-bit performance and investment protection thanks to seamless 32- to 64-bit migration.

If you run a business, AMD64 technology lets you adopt new 64-bit applications at your own pace while you get the best from your critical 32-bit software. At home the AMD64 processor core delivers superior multimedia capabilities for both 32- and 64-bit applications, enabling cinema-quality digital entertainment, life-like games and powerful creativity and productivity tools.

AMD Turion™ 64 Mobile Technology, with full wireless compatibility, incorporates three features that will benefit you whether you travel with your notebook around the house or across continents:

- **AMD PowerNow!™ Technology** delivers extended battery life for more work or entertainment away from a power source.
- **HyperTransport™ Technology** increases application responsiveness and decreases loading time.
- **Enhanced Virus Protection Technology<sup>1</sup>** helps to protect your system and, thus, prevent downtime.



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## Acer® Projectors with DLP™ Technology

Digital Light Processing™ from Texas Instruments is an all-digital display technology for projectors and other products that delivers the best picture in terms of clarity, brilliance and color.



### Acer PD525

\$1,249

(EYJ1501.W04)

- 2600 ANSI lumens
- XGA (1024 x 768) native resolution
- 2000:1 contrast ratio
- 16.7 million displayable colors
- PC and Mac compatible

PD525



### Acer PD116P

\$849

(EYJ1401.W04)

- 2100 ANSI lumens
- SVGA (800 x 600) native resolution
- 2000:1 contrast ratio
- 16.7 million displayable colors
- PC and Mac compatible

PD116P



### Projector Accessories

Acer PD525 and PD116P projectors come with these accessories: remote control (batteries included) with laser pointer; carrying case; lens cap; CD-ROM user's guide; quick-start instructions; AC power cord; VGA (D-sub) to component/HDTV adapter; VGA (15-pin D-sub), composite video (RCA), S-video, USB and audio (mini-to-mini phone jack) cables.

For permanent placement of a projector in a conference room or classroom, you'll want an easy-to-install Ceiling Mount. Also, consider keeping a Replacement Lamp Module on hand for your Acer projector.

#### Replacement Lamp Module

\$299

(ECJ1001.001)

- Expected life in hours: 2,000 standard mode, 3,000 economy mode
- Designed for Acer PD525 and PD116P

#### Ceiling Mount

\$79

(EZ.PCM03.007)

- 6.6 pounds
- Designed for Acer PD525 and PD116P

Acer recommends Microsoft® Windows® XP Professional.

## Acer® Aspire™ 5000 High Performance Value

For your home or for your office the full-featured Acer Aspire 5000 notebook provides the must-have computing features, including a versatile DVD-Dual drive (DVD+/-RW) and wireless connectivity. You can also expect desktop-caliber performance from this multimedia powerhouse thanks to AMD Turion™ 64 Mobile Technology.

- AMD Turion™ 64 Mobile Technology
  - AMD PowerNow!™ Technology
  - HyperTransport™ Technology
  - Enhanced Virus Protection Technology¹
- Microsoft® Windows® XP Professional
- 512MB DDR333 SDRAM
- 80GB² hard drive
- Integrated DVD-Dual drive (DVD+/-RW)
- 15.0" XGA (1024 x 768) TFT display
- SiSM760GX chipset with integrated Mirage™2 graphics
- 802.11b/g WLAN, 10/100 LAN, V.92 modem
- One-year limited warranty³



**DVD-DUAL DRIVE**



Acer Aspire 5002LMi-XP

**\$ 999**

AMD Turion™ 64 Mobile Technology ML-30  
Microsoft® Windows® XP Professional  
(LX.A5106.001)

Made for mobility with  
AMD64 performance



### Acer Notebook Service Upgrades Protect Your Valuable Investment

Quality is built into every notebook Acer makes, and each comes with a one-year standard limited warranty.¹ It includes 24/7 (excluding some holidays) hardware technical support via toll-free phone plus a concurrent International Traveler's Warranty for travel outside the U.S. and Canada. Extra protection is available with one of these upgrades:

2-Year Extension of Limited Warranty (146.AB820.EX2)

**\$99**

Prepays freight to and from Acer repair depot.  
Excludes extension of International Traveler's Warranty.

It's a tough world out there, and accidents do happen—sticky spills, dangerous drops, nasty knocks—which is why you should consider the Total Protection Upgrade. It runs concurrently with the limited warranty¹ and limited warranty extension and covers the cost of a replacement unit if your covered notebook cannot be repaired.

2-Year Extension of Limited Warranty + 3-Year Total Protection Upgrade (146.AD077.002)

**\$199**

Prepays freight to and from Acer repair depot.  
Excludes extension of International Traveler's Warranty.

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Retailer or reseller prices may vary.

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The Acer Aspire 3000 Series is a new family of notebooks based on the latest Mobile AMD Sempron™ processors with AMD PowerNow!™ Technology and designed for home users and professionals from small businesses in search of excellent mobile performance and high entertainment value. These slim, space-saving systems come with multimedia capabilities and full industry-standard connectivity. Energize your work and leisure time with the Acer Aspire 3000.

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  - HyperTransport™ Technology
  - Enhanced Virus Protection Technology<sup>1</sup>
- Microsoft® Windows® XP Home Edition
- 256MB DDR333 SDRAM
- 40GB<sup>2</sup> hard drive
- Integrated CD-RW/DVD-ROM combo drive
- 15.0" XGA (1024 x 768) TFT display
- SIS760GX chipset with integrated Mirage™2 graphics
- 802.11b/g WLAN, 10/100 LAN, V.92 modem
- One-year limited warranty<sup>3</sup>

## Acer® Aspire™ 3000 Entertainment Starts Here

COMBO DRIVE



### Acer Aspire 3002LCi

\$649

Mobile AMD Sempron™ Processor 2800+  
Microsoft® Windows® XP Home Edition  
(LX.A5505.107)



Prices shown are estimated street prices and do not include tax or shipping. Retailer or reseller prices may vary.

<sup>1</sup> Enhanced Virus Protection (EVP) is enabled by Microsoft® Windows® XP Service Pack 2. By default, EVP will protect the user's Windows operating system only. Users must enable the protection of their applications and associated files to be protected from memory buffer overrun attacks. AMD and Microsoft strongly recommend that users use third-party anti-virus software as part of their security strategy.

<sup>2</sup> When referring to storage capacity, GB stands for one billion bytes and MB stands for one million bytes. Some utilities may indicate varying storage capacities. Total user-accessible capacity may vary depending on operating environments.

<sup>3</sup> For a free copy of the standard limited warranty end-users should see a reseller where Acer products are sold or write to Acer America Corporation, Warranty Department, P.O. Box 6137, Temple, TX 76503.

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# PC IN A BROWSER

**Remote-access services** put your essential files and applications at your fingertips, through any browser. And they're fast, secure, and affordable. We crown a new distance champ.

BY BECKY WARING ILLUSTRATIONS BY MARC ROSENTHAL

**F**AR FROM THE OFFICE you discover that the important presentation you need is languishing on the PC back in your cube. Or on a visit to relatives you realize that you forgot to bring the family photos you scanned last year. There's simply no way to take it all with you anymore. There's also no way to anticipate every file you'll need on your travels. But you're in luck: There's no reason to. Numerous Web-based services let you "phone home" to the files and apps on your computer.

Traditional remote-control programs like PCAnywhere and Timbuktu rely on dedicated software installed on both

the host (the computer holding your files and applications) and the client (the machine you're using to access the host's files and programs from afar).

By contrast, browser-based remote-access services install in just minutes, and they require no special software on the client machine—you can log in from a standard Web browser on most any Windows computer. Some even allow you to connect from your smart phone or your PDA, as well as from a BlackBerry or Symbian phone. (The Remote Desktop feature in Windows XP Professional provides remote access for free, but with some limitations. Visit [find.pcworld.com/48310](http://find.pcworld.com/48310) for more information.)

Citrix's GoToMyPC pioneered remote PC control via a browser, but the service now has lots of competitors (including

traditional products such as Laplink that are evolving into services). The wide availability of fast Internet access makes these services more useful. (They're dog-slow over dial-up, but at their best over broadband they're almost like being there.)

**YOUR DESKTOP AWAITS**

WE EXAMINED SIX remote-access services: 01 Communique's I'm InTouch 4, 3am Labs' LogMeIn Pro, Citrix Online's GoToMyPC 4.1, Laplink Everywhere 4, MyWebEx PC Pro (beta), and Pro Softnet's RemotePC 3. Each takes its own approach, but all six deliver a real-time image of your desktop in a Web browser. From that screen, you can use any program installed on the remote PC and access corporate data that might not be available otherwise (when you don't have VPN access to your corporate network, for example). All six require that you keep the host PC on at all times and connected to the Internet.

Our Best Buy is MyWebEx PC Pro for its reasonable price, attractive interface, and phone-based log-in. GoToMyPC's PDA access, centralized management, and other features help it retain its market-leading status; however, it costs roughly twice as much as some alternatives. All six of the services we tested performed well. We did experience installation woes with RemotePC on

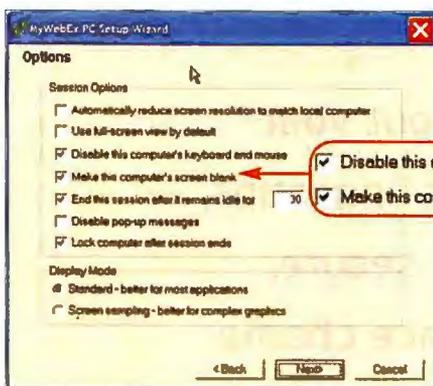
one of our test machines, however; and I'm InTouch lacks screen-blanking (for security) and other important features.

Two of the six companies offer a free service that allows you to send files from the remote PC to your e-mail account rather than transfer the files directly. This helps you avoid the paid services' subscription fees, which range from \$10 to \$20 per month.

We also tested two services that offer quick, simple, and safe file sharing as an alternative to remote control. See "Keep Your Files at Your Fingertips," page 108, for more on BeInSync and FolderShare.

We conducted our tests using Internet Explorer 6 because of its ubiquity. All of the services also work with the Mozilla Foundation's Firefox and with other browsers. (The services offer universal applications for Macintosh, Linux, and other non-Windows operating systems as well, but their file-transfer and other capabilities are limited.)

We tested seven operations: logging in from a Web browser with a high-speed connection; opening, editing, and saving a Word file on the host PC; transferring a set of files and folders from the host to the client machine; deleting a file on the host; sending and receiving e-mail messages on the host; changing the screen resolution of the host; and transferring files from a network drive attached to the host. The first six tasks were easy for all of the



MYWEBEX PC PRO'S SETUP and Install wizard helps you keep your remote sessions private.

services, although once we were unable to save a Word document remotely when using RemotePC. The network file transfer initially caused problems for many of the services, but we solved them by mapping the network drive in Explorer beforehand. (Visit [find.pcworld.com/48311](http://find.pcworld.com/48311) for more on mapping network drives.)

### START IN A SNAP

AFTER YOU CREATE your account at the vendor's site, you download and install the host software (the process usually took us only a few minutes to complete, and it never dragged on for longer than 30 minutes). All of the services we tested except I'm InTouch let you have more than one host attached to each account (for an extra fee, with the exception of Remote PC, which supports three hosts for one price). From then on, you access the host by returning to the vendor's site in a browser (the MyWebEx PC Pro beta

that we evaluated is the only one of the six services in this roundup that required Microsoft's Internet Explorer) and logging in to the account that you created previously. An ActiveX control (for IE) or Java applet (for other browsers) necessary for the connection typically takes only a minute or two to load on the client (GoToMyPC sometimes uses an executable file). Eventually your remote screen will appear in a window, ready for you to operate just as you would if you were right in front of the host. Well, pretty close, anyway.

### KEEP IT TO YOURSELF

THERE'S A GOOD chance that you'll be using one of these services at a wireless hotspot, a public computer, or another vulnerable location. That's why it's critical that the connection to the host be encrypted. All of these programs provide strong 128-bit or 256-bit encryption.

For open-office environments, you need

the ability to blank the host PC's screen while you're connected, thus keeping passersby in the office from seeing what you're doing. Some programs also let you block input from the host keyboard and mouse so that no one can use your computer while you're away. In addition to leaving your machine on and connected to the Internet, you'll need to turn off its hibernate function (although you can use password-protected screen savers), since none of the products we tested can wake up a hibernating computer. If you forget to turn off sleep, you won't be able to log on, period. GoToMyPC and RemotePC, however, each have a preference setting that automatically turns off sleep for you. We wish all of the services had such a setting, so we wouldn't need to remember to turn sleep off. MyWebEx PC Pro and GoToMyPC allow you to connect when the host PC is in standby mode, in which case you'll be asked to enter your ▶

## FEATURES COMPARISON

# MyWebEx PC Pro Is Tops for Remote Access

ALL SIX OPEN A REMOTE PC's files and apps in a browser, but our Best Buy is about half the price of market leader GoToMyPC.

	SERVICE	Price	Encryption	File synchronization	Network-drive access	Remote printing	Screen resolution auto-adjustment	Guest access	Other features
1	<b>MyWebEx PC Pro</b> (★★★★★) <b>Best Buy</b> <a href="http://find.pcworld.com/48314">find.pcworld.com/48314</a>	\$10 a month, \$89 a year	128-bit SSL	No	Yes	Yes	Yes	No	Optional phone call-back feature improves security by verifying each log-in. 24/7 toll-free and e-mail technical support.
2	<b>Citrix Online GoToMyPC 4.1</b> (★★★★☆) <a href="http://find.pcworld.com/48316">find.pcworld.com/48316</a>	\$20 a month, \$179 a year	128-bit AES	No	Yes	Yes	Yes	Yes	One-time password option for access; automatically prevents the host PC from "sleeping." 24/7 toll-free and e-mail tech support.
3	<b>3am Labs LogMeIn Pro</b> (★★★★☆) <a href="http://find.pcworld.com/48318">find.pcworld.com/48318</a>	\$13 a month, \$100 a year	128-bit or 256-bit SSL	Yes	Yes	Yes	No	Yes	Toll-free technical support available from 4:00 a.m. to 9:00 p.m. Eastern time; company also offers e-mail tech support.
4	<b>Laplink Everywhere 4</b> (★★★★☆) <a href="http://find.pcworld.com/48320">find.pcworld.com/48320</a>	\$11 a month, \$95 a year	128-bit SSL	No	Yes	Yes	No	No	Screen blanking for Windows XP Pro only. Free e-mail and chat tech support; call-back support costs \$30 per hour/issue.
5	<b>Pro Softnet RemotePC 3</b> (★★★★☆) <a href="http://find.pcworld.com/48321">find.pcworld.com/48321</a>	\$10 a month, \$100 a year <sup>1</sup>	128-bit SSL and RC4	Yes	No	No	No	No	Can use separate Viewer applet on client in lieu of browser. E-mail and chat tech support; toll-free support during business hours only.
6	<b>O1 Communique I'm InTouch 4</b> (★★★★☆) <a href="http://find.pcworld.com/48312">find.pcworld.com/48312</a>	\$10 a month, \$100 a year	128-bit SSL	No	Yes	No	No	No	No screen blanking. E-mail and toll-free (9:00 a.m. to 6:00 p.m. Eastern time, Monday through Friday) tech support.

**FOOTNOTE:** <sup>1</sup> Yearly fee provides access to three hosts.

Windows account name and password for an extra layer of protection. With the other four services, you'll have to deactivate the standby feature as well.

**ALMOST LIKE BEING THERE?**

ALL SIX OF THE remote-access services we tested operate just fine through normal NAT firewalls; all six also claim to operate through most corporate firewalls too, but we did not test this ability. They use normal browser ports. While all of the PCs we used for testing had their own firewalls, only a couple of the services

required unblocking when installing the host software, a minor inconvenience.

The services' performance depends on the speed of the connection, as well as on that of the client machine. We got much better results with a 1.6-GHz Dell Pentium M laptop than with an older 796-MHz Pentium III IBM notebook. To improve performance, most remote-access programs default to scaling the remote screen into a smaller browser window on the local desktop, usually in fewer colors and often with a plain blue background instead of your fancy desktop wallpaper.

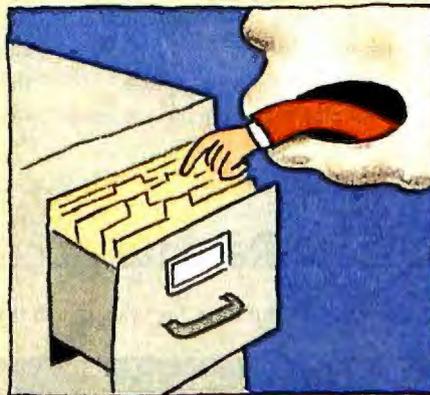
**FILE SYNC**

**Keep Your Files at Your Fingertips**

LOTS OF PEOPLE use remote access primarily for file transfer, and rarely (if ever) for desktop control. So why carry a Swiss Army knife when all you need is a can opener? If you want simply to access files remotely, share files, or sync folders on different PCs, there may be a better solution.

Two services specialize in file sharing and syncing: BelnSync (\$100 a year, with a \$60 introductory price) and FolderShare (\$50 a year for the Personal version; \$100 a year for the Professional version, which lets you share more files and folders). Both programs have free basic versions that will meet many users' needs by syncing only a few key files. This approach ensures that you'll have up-to-date information (via your local shared folder) even without establishing an Internet link.

We got both programs running in less than 10 minutes, although Windows XP's firewall asked us to approve each one. You install the software on at least two machines, and then you designate folders on each system that will be synced automatically across all machines in your subscription. This operation happens in the background and does not affect your normal use of any of the synced computers.



In addition to syncing changed files in the selected folders, you can designate some files and directories to be shared with other people, an extremely useful capability for workgroups. All file transfers are encrypted and sent peer-to-peer over an authenticated private network.

The primary difference between BelnSync and FolderShare is FolderShare Professional's speed, as it syncs only the files' changed data. However, FolderShare Personal's low cost and unlimited computer support get that service our nod.

**FolderShare** ★★★★★  
[find.pcworld.com/48448](http://find.pcworld.com/48448)

**BelnSync** ★★★★★  
[find.pcworld.com/48446](http://find.pcworld.com/48446)

The vagaries of transmission lines, system configurations, and Internet traffic in general made it impossible for us to meaningfully quantify the services' performance, so we offer only subjective observations comparing their results. For most tasks, the reduced colors and screen resolution work surprisingly well. While lag times were noticeable in our tests, we found the services' speed tolerable for typical applications over the 1.5-mbps DSL connection we used for testing.

All but RemotePC let you access network servers. The server must be mapped with a drive letter in some cases, or included in My Network Places in others. We were glad to see that GoToMyPC and MvWebEx PC Pro offer around-the-clock toll-free support: When you're on the road trying to get connected, it's often in the evening or on a weekend, and daytime-only tech support just won't cut it.

**MyWebEx PC Pro** ★★★★★

**Best BUY** THIS UPSTART remote-control service from the leader in Web conferencing is already our Best Buy, and it just emerged from public beta. The service costs half as much as GoToMyPC 4.1: \$10 a month, or \$89 a year. And it comes in a free basic version that provides all the remote access many PC users will need.

The service's installation wizard leads you through screen blanking, keyboard and mouse blocking, application-level access (you can limit remote access to just e-mail, for example), and other settings. You don't have to hunt for options, and the wizard helps introduce many features.

After installation, an icon appears in the system tray. Its pop-up menu lets you change preferences, log the host machine in and out (which makes it available and unavailable for access), and update the service. We had no problems connecting via MyWebEx PC Pro from two different client machines. The service's speed was good at lower resolution and window-size settings, and passable when we raised the screen resolution and enlarged the window, even on a slow client notebook. MyWebEx PC Pro is also the only Web ▶

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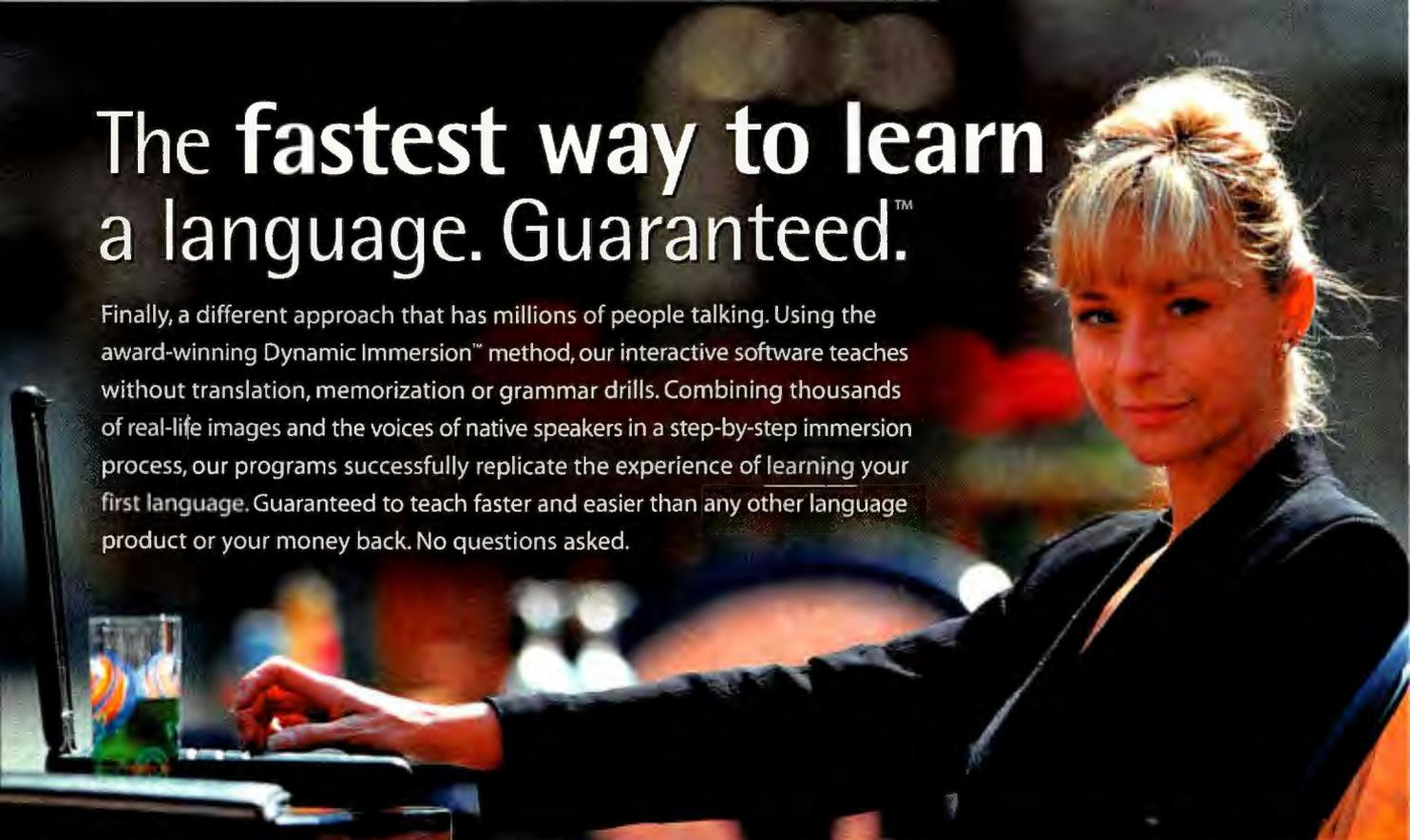
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access service of the six we tested that has an option for you to enter an access code by phone for added security. When you log in from the Web site, you get a call on a designated phone number (your cell phone, for example). You then enter a code on the phone to make the connection. This provides nearly foolproof protection. [find.pcworld.com/48314](http://find.pcworld.com/48314)

**GoToMyPC 4.1** ★★★★★

THE GRANDDADDY of browser-based remote-access services offers features that are tough to beat, but at a relatively steep price. While IT departments will appreciate the manageability of the Pro and Corporate versions, individuals will benefit from the standard service's easy installation, great performance, and range of features. Unfortunately, GoToMyPC costs about twice as much as the competition: \$20 a month, or \$179 a year. For people on a budget, cheaper—and in some in-

stances, free—alternatives are available. GoToMyPC's maturity shows in such details as its setting that automatically turns off the host system's sleep mode, which ensures that you can always get connected when you're on the road. A wizard guides you through installation and setup. By default, however, the service does not blank the host's screen while you're working, so you'll have to activate this important feature manually. The service supports sending files to remote printers and transferring files for local printing. It also allows network file access and provides a guest account, which lets you invite remote users to view your machine (a great feature for interactive conferencing). Your display is limited to 256 colors, but this keeps the service speedy; supporting more colors would slow you down. Unless you're viewing photos or doing some other color-intensive task, this is not an important issue.

If not for its higher price, GoToMyPC would share top honors with MyWebEx PC Pro thanks to its polish, performance, and features. [find.pcworld.com/48316](http://find.pcworld.com/48316)

**LogMeIn Pro** ★★★★★

ONE FEATURE THAT sets LogMeIn Pro apart is its integrated file sharing, which gives several people (rather than just one client) access to your documents. This allows your coworkers to retrieve files on the host system. And best of all, the service is available in a free basic version that lets you do remote desktop control but omits file transfer and file sharing. The full version costs \$13 a month, or \$100 a year.

The service is loaded with options for working with people who are at the host, making it a good choice for situations where a traveler may need to access a colleague's machine back at the office, or collaborate remotely with others on a document. Audible alerts can sound when someone is accessing the host, and you can lock out specific IP addresses for added security. LogMeIn Pro can also lock the host when you disconnect from it, although this option is not on by default.

While LogMeIn Pro's wealth of features is impressive, you have to exit the remote desktop viewer to transfer files, instead of being able to view the desktop and make the



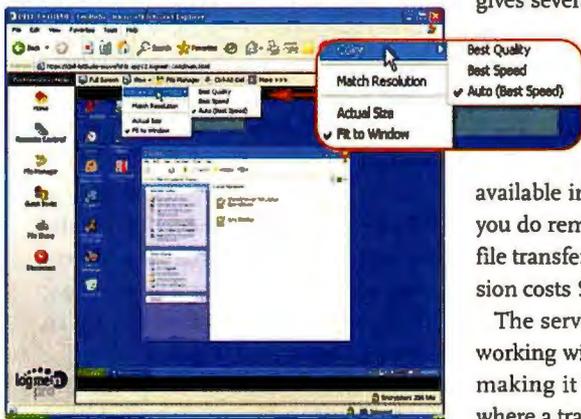
**GOTOMYPC LIMITS YOUR remote-desktop window to 256 colors to keep its response times quick.**

transfer at once. A more serious problem: We could not install the program properly on our Dell notebook due to a conflict with the laptop's graphics driver. (The company's tech support gave us a fix that involved adding a line to the Windows Registry.) [find.pcworld.com/48318](http://find.pcworld.com/48318)

**Laplink Everywhere 4** ★★★☆☆

LAPLINK HAS BEEN in the business of remote control and file transfer longer than any of the other vendors whose products we review here, and it shows in the depth of Laplink Everywhere's features, particularly those relating to file transfers. For example, the SpeedSync tool examines files as they're transferred and copies only the parts that have changed from previous transfers. This greatly hastens retrieval of the data you access frequently.

However, Laplink Everywhere's relative unfamiliarity with remote access through Web browsers is apparent. For one thing, we had to go to the manual to look up the meaning of the settings we agreed to during the installation. Though many ▶



**LOGMEIN PRO'S VIEWING options make choosing between speed and quality easy.**

stances, free—alternatives are available. GoToMyPC's maturity shows in such details as its setting that automatically turns off the host system's sleep mode, which ensures that you can always get connected when you're on the road. A wizard guides you through installation and setup. By default, however, the service does not blank the host's screen while you're working, so you'll have to activate this important feature manually.

The service supports sending files to

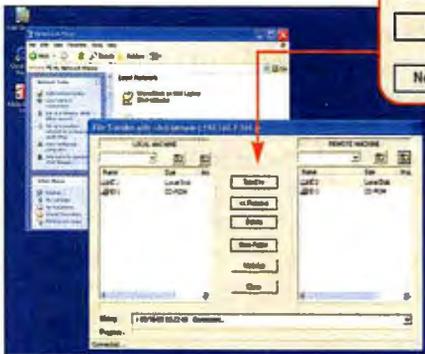


**LAPLINK EVERYWHERE lets you choose from a list of hosts registered to your account when you log on.**

users will be satisfied to leave these settings at their defaults, others will want to know what they are clicking OK to.

Furthermore, the service employs different applications to connect with different types of client PCs. If you are accessing the host from a Windows XP Home machine in one situation, and from a Windows XP Pro system in another, you'll be using two interfaces with different capabilities. Yet a third connection utility is used for Mac and Linux clients.

Laplinsk Everywhere's screen responsiveness was average for the services we tested. On XP Pro hosts you must enter your Windows user name and password as an added security check (it's the only one of the six services to require this). Unfortunately, you can't access the host when it is in standby mode, as you can with both GoToMyPC and MyWebEx PC Pro. This omission means that you must turn off the host's automatic log-outs and instead use a password-protected screen saver.



REMOTEPC LETS YOU transfer files between host and client PCs with the click of a button.

Phone support costs \$30 per hour and is available only during business hours. You have to schedule the call on Laplink's site. Laplink Everywhere's e-mail and live chat support are free, but this is a far cry from the 24/7 toll-free support that other services offer. [find.pcworld.com/48320](http://find.pcworld.com/48320)

**RemotePC 3** ★★☆☆☆

THIS AMBITIOUS service boasts several unique and valuable features, such as integration with ProSoftnet's IBackup ser-

vice for file storage and synchronization. RemotePC costs \$10 a month, or \$100 a year (which includes access to three separate PCs rather than to the single host system that the other services permit). Ultimately, though, the service has too few of the key features that competing programs deliver—such capabilities as remote printing and remote access to network drives.

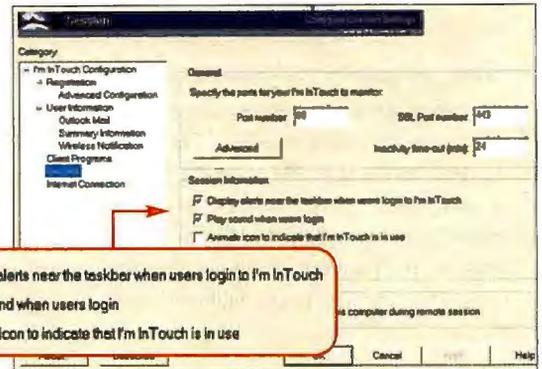
RemotePC claims it offers the fastest log-in around, but this is true only when you use its dedicated Viewer application, which you must download and install on the client machine separately; the service's Web-based viewer applet was noticeably slower. RemotePC's interface is also less polished than those of the other services we tested. In our tests we encountered several serious bugs, from an inability to connect on an old and slow laptop using the Web-based viewer to an installation glitch that caused the Start menu and system tray on the host machine to disappear. Reinstalling the host application seemed to fix the problem.

If ProSoftnet can figure out how to get rid of these bugs, RemotePC may turn into a good budget choice for people who work from multiple PCs, particularly considering the service's IBackup file-sync capabilities. [find.pcworld.com/48321](http://find.pcworld.com/48321)

**I'm InTouch 4** ★★★★★

I'M INTOUCH started out as a way to access e-mail and files remotely, even over dial-up and other low-bandwidth connections (which it still supports). The service, priced at \$10 a month or \$100 a year, has gradually beefed up its remote control features. But like RemotePC, I'm InTouch 4 lacks some of the key capabilities of competing services, such as remote printing.

The service does possess a number of unique capabilities, most notably remote access via BlackBerry devices; if you're a



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CHOOSE HOW YOU'RE alerted when someone logs in to I'm InTouch via the service's session options.

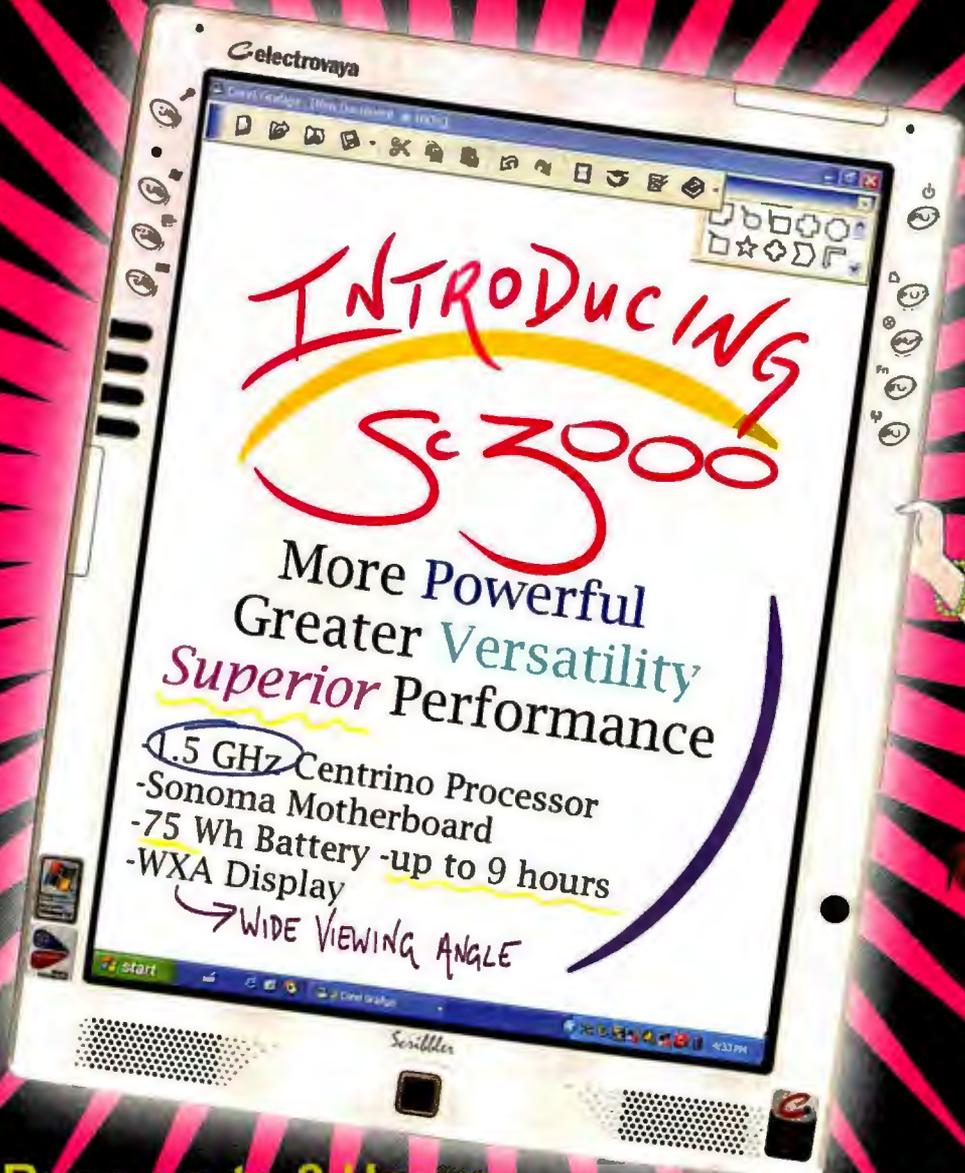
BlackBerry addict, the service's optional I'm InTouch Messenger may be the best way to log in to your PC remotely. In fact, 01 Communique claims that you can access the host using any computer or wireless device with a browser and Internet connection. You don't need to load any additional software onto the remote device, whether it's a desktop computer, a laptop, a wireless PDA, a cell phone, or an Internet kiosk, according to the company. But the definition of "desktop computer" does not appear to include Macs, at least in our testing. Even with this limitation, I'm InTouch has the broadest compatibility of any of the services we tried.

I'm InTouch also supports Webcams. When you log on to the service, it automatically sends video from any camera attached to the host—a cool way to check things out at home without buying an expensive networked Webcam.

The service's installation was straightforward, with one caveat: You must select a host PC name that isn't already in use by any other I'm InTouch user. PCs are not tied to specific user accounts, as they are in the other services we tested. This arrangement can make it tough to create a unique user name that isn't something like "Dell-4327876". I'm InTouch also seems less secure because it removes one layer of authentication: The other services require a host access key in addition to a user name and a password for your account. [find.pcworld.com/48312](http://find.pcworld.com/48312) ■

Becky Waring is a freelance writer and former editor of NewMedia Magazine.

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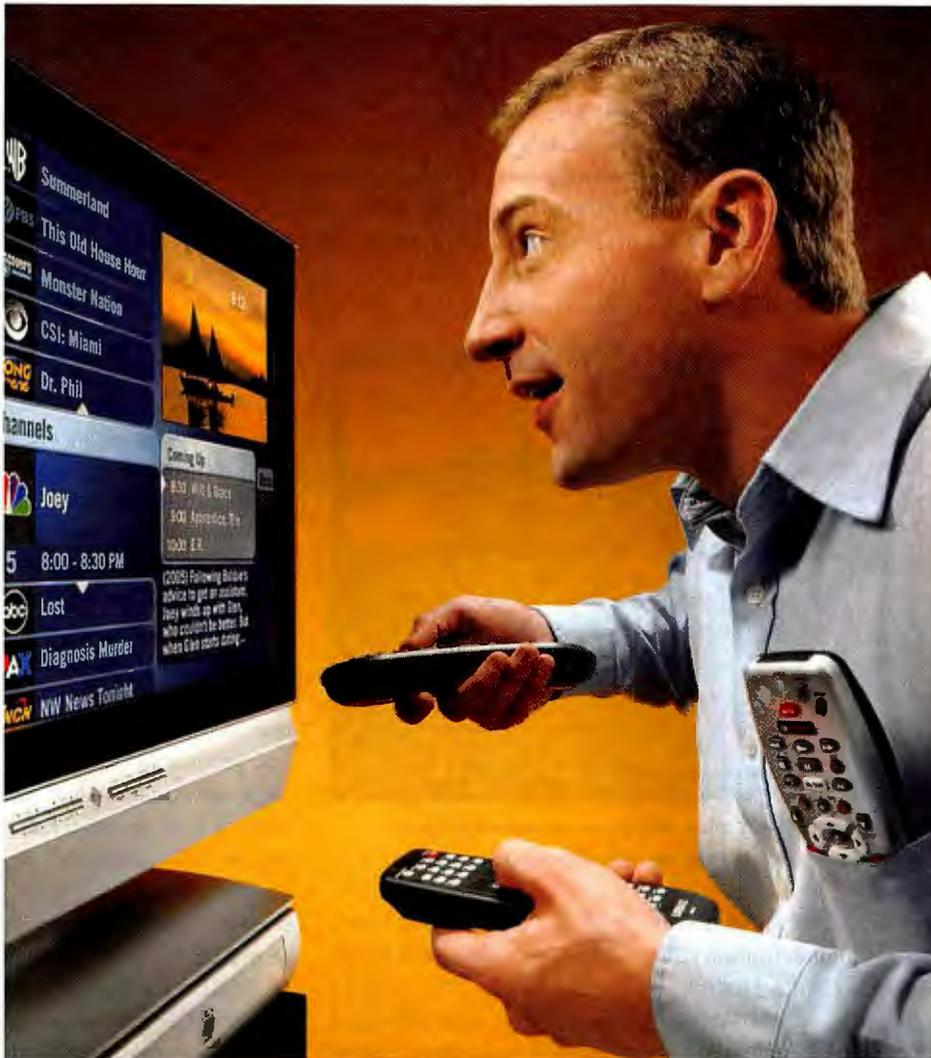


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**DIGITAL WORLD**

EDITED BY ANUSH YEGYAZARIAN

# TV TIME SHIFTERS

**DIGITAL VIDEO RECORDERS GAINED FAME WITH TIVO. NEW COMPETITORS RANGE FROM RENTED BOXES TO MEDIA CENTER PCs—AND OUR TV ADDICT TRIED THEM ALL. BY LINCOLN SPECTOR**

I LOVE MY digital video recorder. I don't even know when my favorite shows are on—they just appear on my DVR's drive, ready to watch.

But are there better DVRs than the DirecTV box with TiVo that I have? To find out, I took several DVRs for a spin,

each representing a different approach to the challenge of no-brainer, high-quality TV recording: recorders provided by satellite and cable companies, a stand-alone TiVo, a combination DVD/hard-disk unit, and a Media Center PC.

All of these DVRs have easy,

intuitive menus. They let you pause and rewind live TV. The hard drives each hold over 30 hours of programming. Every unit lets you record the program you're watching with the press of a remote-control button, and record a future show or even a series of shows

with a few menu selections.

Still, I wanted more than that, and so should you.

A good DVR should be trouble-free, with easy setup and simple ways to search recorded content and TV listings. It should also be a good value.

After trying the alterna- ▶

tives, I'm sticking with the DirecTV TiVo. For me, the convenience of a DVR/set-top box combination outweighs the optional features you can get with other DVRs. Besides, I haven't found another DVR with TiVo's searching capabilities. If your cable or satellite provider doesn't partner with TiVo, you may want to go straight to TiVo for your DVR.

### DIRECT FROM CABLE OR SATELLITE

IF YOU HAVE digital cable or satellite TV, you have good reasons to get a DVR through your service provider. These boxes combine DVR functions with a TV-signal receiver. You won't have to find a place for another box, deal with another set of cables, or wonder where to plug in yet another AC power connector. The recordings will look slightly better, too, since the signal won't have to be converted from digital to analog and back to digital again, as is the case with stand-alone products that have only analog inputs for the TV signal. Most important, you won't have one device (the DVR) recording the shows and another one (the set-top box) changing the channels—that's a scenario asking for trouble.

On the other hand, DVR/set-top combo units usually lack the finer options. If you want a huge hard drive, or the ability to add the DVR to your home network or burn your programs onto a DVD, you may prefer an off-the-shelf DVR. You also get little choice: Vendors typically have just one or two models.

I looked at two DVRs that double as set-top boxes: one with TiVo, from DirecTV

## PREVIEW

# MOXI: SET-TOP DVR CABLE BOX ON STEROIDS

DIGEO MOXI ([www.digeo.com](http://www.digeo.com)) gives TiVo a run for its money as a DVR. The interface looks a lot like Comcast's, with a live broadcast in the menu screen's upper-right corner. But the search capabilities just might beat TiVo's. You can search by any word in the title, not just the first one—useful if you're looking for Thatotherguy and Roeper.

And yes, there's a WishList-like keyword search.

If you like the news ticker on the bottom of CNN or Fox News, you may like Moxi's customizable version, which lets you stream news, weather, and sports along the screen's bottom. The unit also has a DVD player (but not a recorder—that's planned for future versions) and a "jukebox" fea-

ture that rips CDs to MP3 files on the hard drive.

A cheaper version of the Moxi, the Moximate, connects to the main device over a coaxial cable to feed a second TV.

The unit wasn't available for testing in my area, so I attended a demonstration conducted by the company. Right now you can get it from Adelphia in Los Angeles, from Charter in St. Louis, and in a few other cities.

So far Moxi works only with cable. Individual companies will set pricing, but expect it to cost about \$10 a month.



**MOXIE'S INTERFACE** offers information on current programs, shows a live feed, and gives you episode details in one screen.

(satellite), and another that records high-definition content, from Comcast (cable).

### DirecTV DVR With TiVo

[www.directv.com](http://www.directv.com)

**DVR rating:** Very Good

DIRECTV'S VERSION of TiVo sells for as little as \$50, depending on the hard drive size. DirecTV adds \$5 to your monthly bill for the service. (DirecTV has a non-TiVo, high-def DVR for \$749, too.)

I looked at a 40GB model that holds about 40 hours of video. As luck would have it, I had to replace my DirecTV TiVo just as I started this article, letting me reexperience setting the unit up. And that meant more experience with the atrocious tool for setting up channels. DirecTV expects you to create two lists: "Chan-

nels You Receive" (you'd think DirecTV would have this info) and "Favorites." Then it gives you a screen for selecting channels sorted by number and lacking any information beyond not-always-helpful acronyms. You can't view the channels to help you pick.

For other jobs, the menus are easy to navigate and figure out. And the tools for finding programs are first-rate. You can search by name either through a list of all upcoming shows in TiVo's database or in a narrower subgroup, such as action/adventure movies.

Best of all are WishLists, a type of saved search. I use them to find films by, and documentaries about, favorite directors such as Hitchcock and Kurosawa. I can easily bring up the search results to

see if there's something worth recording. You can also set a WishList to automatically record everything it finds.

**Bottom line:** Despite difficult setup chores and limited features, this is an all-around terrific DVR with fantastic search capabilities—provided that you subscribe to DirecTV.

### DVR From Comcast

[www.comcast.com](http://www.comcast.com)

**DVR rating:** Good

IF YOU GET digital cable from Comcast, you may be able to rent this very good, basic DVR for \$10 a month total. The 80GB drive holds about 60 hours of standard television or 15 hours of HDTV. This was the only DVR I tested that could record HD content.

The interface looked a lot nicer than TiVo's, with big

buttons and a live-TV feed in the corner. Picking favorite channels was also a lot easier because the interface had complete station descriptions.

However, I couldn't find the shows I was looking for with anywhere near the same ease. Sure, I could still find action/adventure movies. But the interface for entering titles to search on was clumsier than TiVo's. And you get no keyword search or anything like DirecTV's WishLists.

**Bottom line:** Comcast cannot match TiVo's excellent search capabilities, but it supports HDTV, takes care of the basics, and integrates seamlessly with your cable service.

### STAND-ALONE SELECTIONS

WHAT DO YOU get if you don't combine your DVR with your set-top box? More features—and more hassles. I

### PREVIEW

## SLINGBOX: MOVE YOUR CONTENT AROUND

A DVR FREES TV from time constraints. Sling Media's upcoming Slingbox ([www.slingmedia.com](http://www.slingmedia.com)) aims to free it from location constraints, enabling you to watch your home TV signal

from any computer with a broadband connection.

The Slingbox wasn't ready for testing in time for this article, so I saw a demonstration by Sling representatives. The unit should be available by the time you read this, with a list price of \$249.

This box contains a tuner and an ethernet connection and sits between your TV signal (antenna, cable connection, or set-top box) and your television. Programs that go into your set-top box can also travel over the internet, so you can watch the shows on a Net-connected PC.

Because of the tuner, the Slingbox can change



ON ITS QUICK ACCESS menu, Comcast's DVR includes large buttons with explanations to let you easily navigate through its features.

checked out three possibilities: a stand-alone TiVo box, a DVD/hard-disk recorder, and a Windows Media Center PC.

### TiVo Series2 DVR

[www.tivo.com](http://www.tivo.com)

DVR rating: Very Good

I LOOKED AT a bare-bones, low-priced model, the TiVo Series2 DVR. This one comes with a 40GB hard drive that

holds about 40 hours at the lowest recording quality setting (unlike cable- or satellite-provider set-tops, off-the-shelf DVRs typically let you choose between quality and quantity). It lists for \$199, but you don't get off that cheap. To actually use it, you must also fork over a subscription fee—either \$13 per month or \$299 for the lifetime of the product.



SLINGBOX lets you watch your TV signal from any PC with broadband.

channels—unless you have a set-top box. Then it uses an IR blaster to change the box's channels.

The receiving PC must have a broadband connection and Slingbox software. Only one PC can access your Slingbox at a time.

How does it look? Sling Media uses a unique technology dubbed Lebowski (yes, it's named after the movie *The Big Lebowski*) to ensure a steady video stream despite uncertain bandwidth. Judging from what I saw, the result is not that great. It's fine for watching news shows or other talking heads, but not movies or sports.

This was the only off-the-shelf DVR I examined with a way to successfully change the channels on a set-top box. Two ways, actually: a serial connector and an infrared blaster for set-tops that don't support the serial connector. I tried the IR blaster—basically a set of doodads that send remote-control-like signals to the set-top box to change its channels. Much to my amazement, it worked (unlike similar methods I've seen before).

Once set up, this box proved almost identical to DirecTV's TiVo. Same easy recording, same wonderful search capabilities, same lousy design for selecting favorite channels.

But even this low-end model has one cool feature that the DirecTV TiVo lacks. It connects to a home network (you'll need either a USB-to-ethernet or a USB-to-Wi-Fi adapter for this), which lets you access photos or music stored on a computer, or use TiVoToGo to transfer shows on the TiVo to your PC or notebook and then burn them. And if you have two TiVos, they can share each other's recordings.

Pricier TiVos, many made by other companies that license the name and technology, are better equipped. Some Pioneer and Toshiba models bundle TV recording with a DVD burner. Another, the Humax Series2 DVR, has a huge drive that can hold up to 300 hours of programming.

**Bottom line:** This basic TiVo model gives you the same search capabilities as the DirecTV version, plus networking and the ability to control many set-top boxes; TiVo units from other vendors include more options. ▶

**Lite-On LVW-5045**[www.liteon.com](http://www.liteon.com)

DVR rating: Fair

LITE-ON DVRs, like most you find at your favorite store, don't require subscriptions. You buy it, you can use it—just like any other appliance.

There's a downside: Since it lacks an electronic program guide—which gives you a grid of information on available shows, simplifies searching for shows, and lets you quickly select ones to record—the Lite-On becomes difficult to program. While some DVD recorders do have an EPG, the interface and search features typically don't match TiVo's.

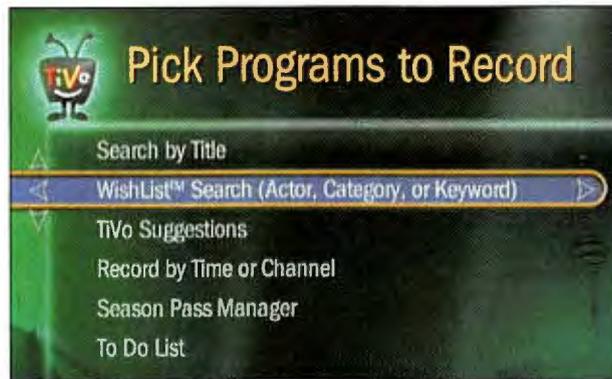
I tried the LVW-5045 (\$399 list), which has a 160MB drive that holds 33 to 148 hours of TV, depending on your quality-versus-quantity choices. It also has a DVD recorder, which lets you save programs permanently and get rid of your stand-alone DVD player.

But the Lite-On has its oddities. I pressed the Pause button while watching live TV, and nothing happened. The documentation revealed that I had to press the remote's Time Shift button before I could pause a live broadcast.

Programming the Lite-On to record is like operating a VCR. I had to enter the time and date without an on-screen schedule guide and turn the machine off so that it would record. (If I'd had a copy of *TV Guide* handy, however, I could have used VCR Plus+.)

Once I recorded a show to the hard drive, however, burning it to DVD was as easy as fast-forwarding through beer commercials. The resulting DVD had a chapter stop every 5 minutes—a nice touch.

**Bottom line:** This off-the-shelf



**TIVO GOES BEYOND** searching by title with its WishList feature—you can search for a particular actor, or by category or keyword.

DVR requires no subscription fee, and it can burn your saved shows to DVD, but it's as hard to program as a VCR.

**Dell Dimension XPS Gen 5 With Windows Media Center**[www.dell.com](http://www.dell.com)

DVR rating: Fair to Poor

INCLUSION OF Windows XP Media Center Edition turns a PC into an all-purpose home entertainment system with, among other things, the functions of a DVR. Media Center

computers usually come with a remote control, as well.

To judge how satisfactorily they work as DVRs, I looked at a Dell Dimension XPS Gen 5. This state-of-the-art PC has a dual-core 3.2-GHz Pentium Extreme Edition 840 CPU; a fast DVD±RW drive; 1GB of RAM; two 250GB hard disks; a large, eye-popping wide-screen LCD; and an equally eye-popping \$3999 price tag. (You can get lesser Media Center PCs for under \$500.)

For all its power, I found the Gen 5 a clumsy device to put between a TV signal and a television. I had major problems both in receiving a cable signal (this unit handles only standard TV) and in sending it to the set. I eventually solved these issues, after many hours of hard work and significant help from Dell tech support.

TV and PC technologies just don't merge well. Some people may get them going without trouble, but you can't yet count on being that lucky.

Microsoft's user interface is clean and easy to use, and has plenty of nice features. The keyword search, however, looks only in program titles.

**Bottom line:** As good as this high-end multimedia system is as a computer, difficulties in getting PC and TV technologies to cooperate make it a dubious choice as a DVR. ■

*Lincoln Spector is a contributing editor for PC World.*

**HANDS ON****ORB: THE FREE WAY TO SHARE MEDIA**

ORB NETWORKS' ORB ([www.orb.com](http://www.orb.com)) sends media over the Internet from your PC to any connected computer—for free. When you install the Orb program, it turns your Windows computer into a restricted Internet media server. You can use another PC or certain PDAs and smart phones to access your music, photos, videos, or television signal, if your host PC has a TV tuner. All the receiving device needs is broadband Internet access, a browser, and a media player.

Orb also works as a software DVR, and the programs you record are then available to anybody who logs in to your computer.

Orb isn't a perfect solution. Your PC must be booted up at home for you to be entertained from afar. And the video is far from TV quality.



**ORB LETS YOU** access your stored photos, music, and video from any device with a broadband connection.

What's more, Orb can't play copy-protected media, such as songs you buy from iTunes or Napster, even if you can play them on the PC running Orb. On the other hand...it's free.

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## DIGITAL AUDIO

# SATELLITE RADIOS THAT ROCK

NEW SATELLITE RADIO PRODUCTS OFFER A NUMBER OF TUNEFUL OPTIONS FOR HIGH-QUALITY SOUND, WHETHER YOU'RE LISTENING ON THE ROAD OR IN YOUR LIVING ROOM. **BY CATHY LU**

THERE'S NOTHING LIKE good tunes to keep you company on the road or at home. With the latest crop of satellite radio products, you get higher-quality sound and more listening options than FM can deliver. Digital HD Radio is making waves, too: In-dash units became available last year, and tabletop models should arrive this summer; see [find.pcworld.com/48297](http://find.pcworld.com/48297) for details.

## SIRIUS GETS SERIOUSLY COOL

TIVOLI AUDIO'S \$300 **Model Satellite** ([find.pcworld.com/48298](http://find.pcworld.com/48298)) is an AM/FM/Sirius tabletop radio tucked into an appealing retro wooden case. The shipping device features a beautiful blue-text-on-black display, an alarm clock, and sleep mode. But the remote has no volume control—a distinct inconvenience—and the radio's five programmable keys (an unusually low number for a tabletop model) can hold up to four stations each, for a maximum of 20 presets.

Compact and well integrated, Sirius's shipping \$100 **Starmate** ([find.pcworld.com/48299](http://find.pcworld.com/48299)) comes with everything you'll need to use it in your

auto of choice: a car dock, an antenna, and a charger that plugs into the cigarette lighter. Slightly larger and thicker than a deck of cards, it includes a windshield mount—good for small, cramped cars that don't have a lot of dashboard real estate. (A \$40 optional kit allows you to listen at home, as well.) Six buttons hold five stations each, for a total of 30 presets. I found navigation a breeze when using the buttons and two-way switch to scroll through lists of radio stations. Unfortunately, the display is difficult to read in bright sunlight; and the tiny screen displays only three lines of text at a time.



## XM SERVES UP MUSIC TO GO

THE NEWEST products in the XM2go line of portable satellite radios—compact, battery-powered units designed to keep you tuned in wherever you roam—are Pioneer's \$330 **AirWare** ([find.pcworld.com/48300](http://find.pcworld.com/48300)) and Tao's \$300 **XM2go** ([find.pcworld.com/48302](http://find.pcworld.com/48302)). Both devices feature the same navigation and functionality, including a number pad that lets you dial in stations or save up to 30 presets (three stations for each of ten numbered buttons), plus a customizable sports and stock ticker that appears at the bottom of the screen. The displays aren't flashy: Each has a black-and-white LCD with a backlight for adverse lighting conditions and measures about 1.5 by 1.7 inches. Both units come with a car kit, a home kit, and earphones. Each can record up to 5 hours of programming, according to the manufacturers. Unfortunately, they're bulki-

er than an iPod, and I found them too hefty to clip comfortably to my jeans. Also, reception in "to go" mode faded in and out as I walked through my Seattle neighborhood. Unintuitive navigation held me back as well. For instance, to maneuver through a list of stations on either unit, you have to use the scroll wheel on the side rather than the navigation pad on the front. Battery life for each device's rechargeable lithium ion cell is vendor-rated at about 5 hours.

The preproduction Pioneer that I tried features easy-to-use separate 0-9 keys for creating presets or dialing in a specific station, as well as a refined silver finish. In contrast, the shipping Tao has a wonky keypad layout (each key has two numbers) that made it harder for me to handle when I was driving. The unit is a bit shorter and curvier, however, which makes it easier to grasp. ■



# Access. Store. Share.

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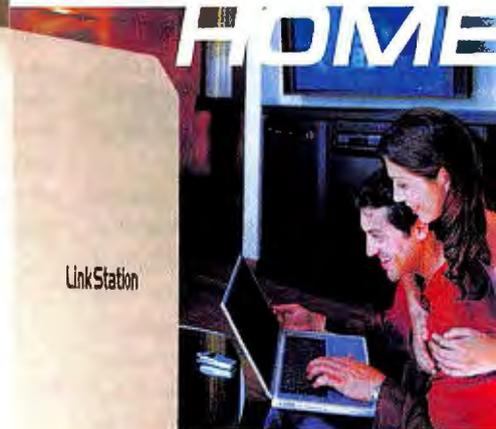
April 28, 2005  
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HD-H1.0TGL/R5



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Find out more: [pcworld.buffalotech.com](http://pcworld.buffalotech.com)  
Go to [find.pcworld.com/48246](http://find.pcworld.com/48246)

# BUFFALO™

# GADGET FREAK

DAN TYNAN

## Singing the Blog Electric: Podcast Your Way to Stardom

I'LL NEVER BE A movie star. I'm unlikely to leave my mark on Broadway, radio, or TV. But I may yet become a podcasting sensation.

Podcasting (a made-up word that's a combination of *iPod* and *broadcasting*) is a kind of do-it-yourself radio that uses the Web, not the airwaves. Instead of reading a blog online, for example, you could download a podcast of someone else reading it and listen to the file on an MP3 player.

Free tools like Doppler Radio ([www.dopplerradio.net](http://www.dopplerradio.net)) and IPodder ([ipodder.sf.net](http://ipodder.sf.net)) make it easy to subscribe to podcasts. Sites like Podcast-Alley.com and Podscope.com can help you find podcasts.

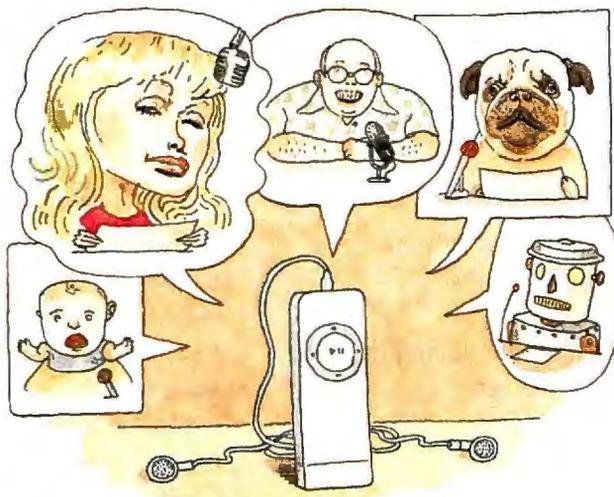
Unfortunately, most podcasts seem to consist of people talking about their cats, or Paris Hilton waxing moronic about her new movie. Even interesting podcasts, such as those of IT Conversations ([www.itconversations.com](http://www.itconversations.com)), are similar to stuff you'd hear on a good public radio station. Nice, but hardly revolutionary.

So the competition isn't exactly stiff. And if Paris Hilton can become a podcaster, why not me? All I needed was a microphone, a PC, and software to record and edit my musings. Once I had my recording, I needed a way to up-

load the MP3 files to my site so my fans could download them to their iPods. I also needed a way to enclose the podcasts in an XML site feed, so my adoring public could automatically download new

in which you want the file to appear. Your blog then displays a flash-based slider bar that readers can use to play the file. Audioblog also lets you create an RSS or XML feed on the spot, as well as

### If Paris Hilton can become a podcaster, why not me?



ones using an RSS (Really Simple Syndication) reader like Doppler Radio or IPodder.

#### BRILLIANT MISTAKES

I FOUND a near-perfect solution in the Web-based Audioblog service (\$5 a month, [www.audioblog.com](http://www.audioblog.com)). To post a recording, you just plug in the microphone, click a few buttons, and choose the blog

upload your favorite songs. (But be careful: Posting copyrighted music on your blog could make you fresh meat for the rottweilers at the RIAA.)

You can also record voice entries by phone. Simply dial the site's moblog number, enter your PIN and your blog's four-digit ID, and then start talking. You can even capture video clips with a

Webcam and podcast them as easily as audio. I posted to my blog several videos of me crooning Elvis Costello tunes. (When my kids are being really bad, I force them to watch.)

However, Audioblog provides no tools for editing audio or for stitching different recordings together into a show. For that, I used Mixmeister's Propaganda (\$50, [www.makepropaganda.com](http://www.makepropaganda.com)), which let me drag and drop separate recordings and add transitions between them, including the truly obnoxious "talk over the first six bars of the song" trick beloved by drive-time DJs. But publishing in Propaganda is a pain—you need to set up an FTP server, and it wouldn't work with my free Blogger account. So far, I've yet to find a tool that makes both editing audio files and podcasting them easy.

Another problem: With my PC's cheapo microphone and my breathy singing style, my show sounded like I'd wrapped the mike in cellophane. Jack Herrington, author of *Podcasting Hacks* (O'Reilly Media, 2005), suggests purchasing a noise-canceling mike such as Plantronics' Audio 45 USB Stereo PC Headset (\$60, [www.plantronics.com](http://www.plantronics.com)) or Audio-Technica's AT2020 Cardioid Condenser Microphone (\$169, [www.audio-technica.com](http://www.audio-technica.com)).

The podcasting craze is just gathering steam, but it already has its own Oscars: the Top-Cast Awards, which will be handed out in November. I've started working on my acceptance speech. And if I win, I'll be certain to podcast it. ■

*Contributing Editor Dan Tynan authored Computer Privacy Annoyances (O'Reilly Media, 2005).*

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# TOP 100

EDITED BY THE REVIEWS STAFF

## SPOTLIGHT: DV CAMCORDERS

**BIG AND SMALL:** Sony's DCR-DVD403 DVD Handycam (left) weighs 21 ounces; JVC's GR-DF550US tips the scales at just 14.4 ounces.



## Video Is Looking Better Than Ever

High-end features are making their way into easy-to-use consumer camcorders.

BUYERS OF STILL-IMAGE cameras have long benefited from manufacturers' cramming high-end features into ever-smaller, less expensive cases. But what if you want to capture moving pictures? Are video cameras also riding the better, smaller, cheaper technology wave?

We're happy to report that the answer is yes. Camcorder makers are producing cameras in more diminutive cases and packing them with features formerly found only on professional models. These bonuses include optical stabilization, in which the lens, not the CCD, compen-

sates for shaky hands; 16:9-mode image capture for wide-screen display; multiple CCDs for better color; surround-sound recording; and still-image resolutions good enough for casual shots. Best of all, these features are now available to amateurs at relatively affordable prices.

For this Spotlight we looked at six of the newest camcorders we could find with street prices below \$900. Our lineup: Canon's Optura 60, Hitachi's DZGX20A, JVC's GR-DF550US, Panasonic's PV-GS250, and Sony's DCR-DVD403 and DCR-HC42. Our pick for Best Buy is

Sony's DCR-HC42, a \$560 camcorder that can fit in a coat pocket, yet took some of the best-looking video in our tests. People who primarily want to record and watch without editing are likely to favor the Sony DCR-DVD403, which records directly to mini-DVDs. Avid videographers might prefer the Panasonic PV-GS250, a three-CCD model with a wider range of manual controls than the others.

All the camcorders here include low-light modes that make the most of existing light and thus take videos in situations such as dimly lit rooms that would

PHOTOGRAPHS: MARC SIMON

### 131 DESKTOP PCs

This month's chart features three debut systems: a 3.6-GHz P4 Polywell on the power side and two value PCs from Velocity Micro and IBuyPower.

### 132 NOTEBOOK PCs

Two desktop replacements from Acer and Alienware plus an all-purpose model from a new vendor, Medion, land on the chart this month.

### 133 PRINTERS

Tiny, inexpensive new monochrome laser printers hit the small-office portion of the chart, but the big winner is the retested Oki Data Oki B4350.

### 134 DVD DRIVES

Seven models debut, including new internal units from Asus, Lite-On, Samsung, and Sony; among external drives, our Best Buy is from Plextor.

### 135 MORE REVIEWS

PCI Express graphics boards and 19-, 23-, and 24-inch LCD monitors appear in our recap of previous *Top 100* charts.



134

have flummoxed most cameras a few years back. Sony's DCR-HC42 and DCR-DVD403 have special modes that can work in near-total darkness by adding a pinch of infrared light, which you can't see but the camcorder can. The Canon Optura 60 and the JVC GR-DF550US have built-in LEDs that illuminate your subject and improve video quality.

Camcorders that can shoot still images to memory cards used to be the exception, but today many models offer this capability. Those we tested take still images at resolutions of up to 3 megapixels and save them to memory cards or, in the DVD units, to disc. Several can take stills that would work well as 4-by-6-inch prints; nevertheless, in spite of their higher resolutions even those models can't match the quality of shots from a dedicated still camera. When we compared the images from the camcorders with those from a 5-megapixel Nikon Coolpix 5900 and an 8-megapixel Olympus C8080, the images from the two still cameras looked much sharper and exhibited better color and exposure, even when the Coolpix was shooting at a lower 3-megapixel setting. So although the still-image option is handy, we'd say not to recycle your favorite still camera just yet.

### WIDE SCREEN, WIDE VIDEO

IF YOU LIKE wide-screen video, you'll be glad to know that all the camcorders we tested support wide-screen mode. The resulting 16:9 (width to height) aspect-ratio video fits full screen on wide-format TV sets or in letterbox format on standard 4:3 TV screens. The two Sony models reviewed here have the advantage of wide-

screen LCDs. No camcorder we tested could record high-definition video; see "Next Up: High-Def Camcorders," page 126, for details on one model that can.

### TESTING THE QUALITY

TO EVALUATE THE camcorders, we took videos in a variety of settings, including outdoors, indoors under strong light (such as on an illuminated stage), and indoors under dim lighting (such as at an evening party). We found that although



**THE 3-CCD PANASONIC PV-GS250 offered the best manual controls and produced very accurate colors in low-light conditions.**

all of the cameras produced acceptable video, their color reproduction varied markedly. The Sony models, in particular, produced great-looking video with strong color and detail. The Sony DCR-DVD403 excelled at recording in normal light (unaided outdoor or indoor), while the Sony DCR-HC42 tied with the Panasonic PV-GS250 in both indoor and outdoor settings. The JVC GR-DF550US recorded the best video in our low-light test. The Hitachi DZGX20A turned in the poorest quality in low indoor light, but its normal-

light scores equaled most of the others'. The DCR-DVD403 and the Canon Optura 60 were tops at capturing high-quality sound, with the Sony DCR-HC42 and Hitachi DZGX20A close behind.

### Sony DCR-DVD403 DVD Handycam

THE LAST TIME WE tested camcorders, the quality of video from the DVD models didn't match the quality of that from the tape-based units. This time around, that's not the case: In our tests, the Sony DCR-DVD403 had the best overall quality, with strong, bright colors and smooth movement in both indoor and outdoor lighting. And the unit's zoom, photo, and record buttons fall comfortably under the fingers of the right hand.

You access most of the controls through the LCD's touch-sensitive screen. This minimizes the number of camera buttons, but it also means that you can't access these controls if you're using the viewfinder instead of the LCD. And some of the controls are buried a little deep: To change the recording-quality mode, for instance, you must press buttons in the on-screen menu seven times. A nice detail, however, is that the zoom and record buttons are duplicated on the edge of the screen.

The built-in microphone can record Dolby Digital 5.1 surround sound, which adds a lot to the viewing experience. The camera took video with clear, bright audio; good separation; and a strong surround-sound feel that would be great for, say, shooting video on a roller coaster. However, like most camcorders where the microphone is located on top, it didn't pick up voices well from a distance.

This Sony comes with two modes ▶

for shooting in near darkness: NightShot, which slows down the shutter speed, and Super NightShot, which switches on an infrared LED below the lens. Unlike the other camcorders we reviewed for this story, the DCR-DVD403 doesn't save still images to a memory card; instead, it writes JPEG files to a DVD. Its images were well exposed and had good color and reasonable detail. They would look fine up to a print size of 4 by 6 inches.

Although we liked many things about the DCR-DVD403, it has the inherent problems of most DVD camcorders: You must finalize the disc (so it can't record further) before playing it back in a set-top DVD player (the process can take up to 15 minutes); and at the unit's highest quality setting, you can squeeze only 20 minutes of video onto a DVD. The camera captures video as MPEG-2 files, which most video editing software can't open; to cut undesirable footage, you must use Sony's basic editing program, Picture Package.



**MINIDV TAPE REMAINS POPULAR, but camcorders using DVDs are progressing in features and usefulness—and gaining ground.**

### Sony DCR-HC42 MiniDV Handycam

**Best Buy** SURE, THE SONY DCR-HC42 is a lightweight in both price and heft, but it's far from lightweight in quality. The HC42 produced great-looking video in our tests, with smooth movement; it also captured strong, accurate colors, even in difficult lighting conditions. Unfortunately, its still images were disappointing—very fuzzy, with bland colors.

With a 12X optical zoom, the camera is 2 inches thick and 4.5 inches long, just fitting into a large pocket. The controls feel comfortable under the fingers, but the zoom control lacks resistance—anything more than slight pressure set off zooming in or out very quickly; it took a deft touch to slow it down. As with the other Sony model, the zoom and record controls are duplicated around the screen, which looked great in all but direct sunlight.

For recharging and linking to the PC, the camcorder docks in the included Handycam Station, which is also where the USB 2.0 and FireWire ports are. This design means that you don't have to unplug everything when you take the camera with you, but also that you can't connect the camcorder to your PC without the unit. And the camera fits rather loosely into the docking station. At one point we accidentally bumped the station while copying a tape onto the PC, disconnecting the camera and stopping the

## FEATURES COMPARISON

# DV Camcorders Show Off High-End Features

SONY LEADS THE FIELD with its DVD and MiniDV camcorders, which impressed us with their fine image quality. This field of camcorders boasts features such as 3-megapixel still-image capture, which a short time ago was unheard of in a sub-\$1000 model.

	DIGITAL CAMCORDER	Normal/low-light images quality	Battery life	Optical zoom	LCD size (diagonal)	Video-assist light	Still-image maximum resolution (megapixels)	Inputs	Outputs	Weight (ounces)
1	Sony DCR-DVD403 DVD Handycam \$850 (★★★★★ NEW) find.pcworld.com/48163	Outstanding/ Very Good	2:42	10X	2.7-inch wide aspect	Infrared LED	3.0	Composite, S-Video, USB 2.0	Composite, S-Video, USB 2.0	21.0
2	Sony DCR-HC42 MiniDV Handycam <b>Best Buy</b> \$560 (★★★★★ NEW) find.pcworld.com/48164	Very Good/ Very Good	1:48	12X	2.7-inch wide aspect	Infrared LED	1.0	Composite, FireWire, S-Video, USB 2.0	Composite, FireWire, S-Video, USB 2.0	14.5
3	Panasonic PV-GS250 \$850 (★★★★★ NEW) find.pcworld.com/48160	Very Good/ Very Good	1:54	10X	2.5-inch	LCD screen	3.1	Composite, FireWire, microphone, S-Video, USB 2.0	Composite, FireWire, headphone, S-Video, USB 2.0	17.6
4	Canon Optura 60 \$730 (★★★★★ NEW) find.pcworld.com/48150	Good/ Good	1:24	14X	2.5-inch	White LED	2.2	Composite, FireWire, microphone, S-Video	Composite, FireWire, headphone, S-Video	18.0
5	Hitachi DZGX20A \$750 (★★★★★ NEW) find.pcworld.com/48153	Very Good/ Fair	2:20	10X	2.5-inch	n/a	2.1	Composite, microphone, S-Video, USB 2.0	Composite, headphone, S-Video, USB 2.0	18.0
6	JVC GR-DF550US \$450 (★★★★★ NEW) find.pcworld.com/48158	Good/ Outstanding	1:05	15X	2.5-inch	White LEDs	2.0	FireWire, microphone, S-Video, USB 2.0	FireWire, S-Video, USB 2.0	14.4

**FOOTNOTE:** <sup>1</sup> In hours and minutes; time for the camcorder's battery to go from fully charged to exhausted while recording to tape or disc with the LCD active. **HOW WE TEST:** We tested the camcorders in a variety of lighting situations. The normal-light score combines results for both indoor and outdoor lighting tests. In the low-light test, we used the mode suggested in the manufacturer's manual. We did not use the camcorder's built-in lights. **CHART NOTES:** Cameras are ordered by star rating. n/a = not applicable. Street prices are as of 5/17/05. See find.pcworld.com/10860 for

transfer process. However, you don't need the station to recharge; just plug the power supply directly into the camera.

### Panasonic PV-GS250

THOSE WHO LIKE TO tinker with settings will appreciate the Panasonic PV-GS250's selection of features. This model provides more manual controls than any of the others we tested, and it has an external microphone socket. The camera also comes with a wired remote control/microphone combo to add narration.

Unique among cameras in this review are the Panasonic's three CCD image sensors, which are supposed to produce more-accurate color and better-looking video. But we discovered that the PV-GS250's video didn't look substantially better than what the models with a single image sensor generated. The PV-GS250 did a great job, however, of reproducing colors accurately, especially in low-light situations. The unit's still images had



THE HITACHI DZGX20A (LEFT) CAPTURES VIDEO TO DVD and can write stills to disc or to an SD Card. Sony's DCR-HC42 MiniDV Handycam, our Best Buy, has a wide-screen LCD.

accurate, bright colors but were a little fuzzy—the fine detail often got lost.

At 5.75 by 3 by 3 inches, this model is a little larger than the others; but it sits comfortably in the hand, with the curved side of its body fitting into the palm. You reach most settings through the joystick next to the record button on the camera rear. Though you can operate it with the right thumb for one-handed shooting, we found that bracing the camera with the left hand was more comfortable. Besides, to access the menu you must press a button too far away to reach with the thumb. The joystick lets you access Panasonic's MagicPix modes, which include a telephoto macro, automatic video fade, softskin (which softens video slightly to make skin look more attractive), and low-light.

You can use the LCD as a light: Set it to 0-lux, low-light mode and flip the screen around; the camcorder sets the screen to white and cranks up the backlight. This is clumsier and throws out less light than using the white LEDs of other models, but it's better than nothing.

The joystick also lets you access the camera's manual controls: shutter speed, aperture, white balance, and audio recording level. The front of the lens offers a manual-focus ring; in this group, only the Canon Optura 60 also has this feature.

### Canon Optura 60

COMPARED WITH THE slim Sony DCR-HC42 or the rounded Panasonic PV-GS250, the Canon Optura 60 looks posi-

tively bulky, yet it fits comfortably in the hand and at 18 ounces is reasonably light.

There are plenty of buttons on the camera body behind the bright LCD screen—11 in all, most of which have more than one use. A control wheel and a mode dial are also on the left side. Although this profusion may look complicated, it makes the controls accessible. For instance, the Optura 60 puts the shooting modes (such as manual, portrait, and sports) on a dial, while with other camcorders you must delve into an on-screen menu.

The Optura 60 provides a good degree of manual control, with aperture- and shutter-priority modes, plus a focus ring. But it has no fully manual mode, which avid videographers may miss. They will, however, appreciate the port for connecting an external microphone, as well as the manual controls for audio gain. The LED is impressively bright: It illuminated objects up to 6 feet away in total darkness. It includes a small flash for still images.

A special feature of the Optura is a network mode that allows a PC running the included DV Messenger software to control the camcorder remotely over a FireWire connection; you can zoom, focus, and start or stop recording (useful for finding out who sneaks into the kitchen at night to eat the cookies).

The Optura's video quality was good, with accurate color and smooth movement, but its video images lacked both the Sony camcorders' impact and the Panasonic's vividness. Still images were ▶

Bottom line	
	This direct-to-DVD model offers the best overall video quality, along with sharp still shots and terrific surround sound. Has touch screen for most controls.
	Lightweight camcorder provides strong video image quality, but its still shots fall short. Docking station has USB 2.0 and FireWire ports.
	Three-CCD camera reproduces colors very accurately, even in low light. Most-extensive set of manual controls in this group, plus remote/microphone combo.
	Easy-to-use camera takes good (but not great) video; best still-image capture; nice manual controls. Network mode allows remote control.
	Strong image quality in normal indoor and outdoor lighting, but inferior in low light; still images below par. Doubles as rewritable DVD drive.
	Top performer in low light. Images are generally sharp, but color quality lags behind that of other models. Has a handy quick-review button.

details on PC World's Star Ratings. Price is taken into consideration for Best Buy honors only. All tests designed and conducted by the PC World Test Center. All rights reserved.

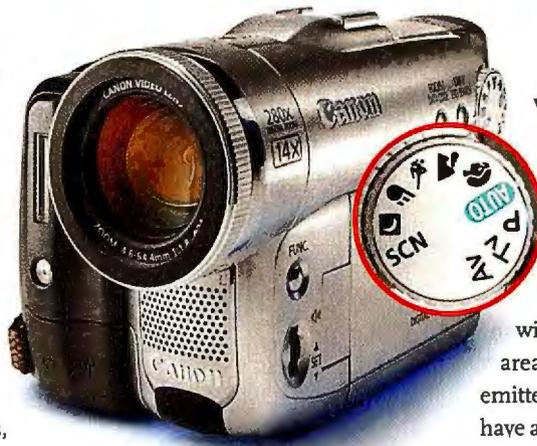
more impressive, the best among all the camcorders tested, with good colors, accurate exposure, and plenty of detail.

### Hitachi DZGX20A

CAMCORDERS THAT RECORD directly to DVD used to be bigger and bulkier than tape-based units, but no longer. The Hitachi DZGX20A weighs the same as the Canon Optura 60 and only a little more than the Panasonic PV-GS250; and at 3.5 by 2 by 4.9 inches, it's not much larger than either.

Changing discs entails a few steps: If you are using a DVD-R, you must format the new blank disc, including going through warning screens and waiting about 20 seconds. All in all, the prep takes a couple of minutes, by which time your subject may have stopped engaging in the cute behavior you wanted to capture. The camcorder can also record to DVD-RAM discs, which don't need formatting or finalizing; but these discs cost \$10 each and aren't widely available. A USB 2.0 port lets you connect the camera to your PC and use it as a rewritable DVD drive.

You can finalize a disc only when the camera is on the AC adapter; you can't do



**CANON'S OPTURA 60 captured the best still images among these cameras and provides extensive manual controls. Its network mode allows you to control it remotely.**

it on battery power. Most video editing apps don't let you import the MPEG-2 video that the camcorder records, but Hitachi does include the DVDfunStudio program for doing some basic edits.

One annoyance: We found we couldn't change the resolution level or switch to the wider 16:9 mode once we started using a DVD-R disc. If you forget to change these settings, you have to either stick with them or insert a new disc.

The quality of the recorded video was generally very good but disappointing in low-light mode—our testers rated the Hitachi's output here the lowest of the camcorders we tested. Although the colors in this mode were reasonably accurate, the video was plagued with noise, which showed as static in areas of flat color. The unit has no IR emitter or white LED to add light; it does have a small flash, but you can use it only for still shots. The still-image performance was below par: Images were fuzzy, and colors appeared pale and unrealistic.

### JVC GR-DF550US

THE JVC GR-DF550US goes for a boxy style that looks as if its two halves (one for the lens, one for the tape transport) were designed separately and then stuck together at the last moment. And although the camcorder fits comfortably in the hand, it tends to tilt—many of its heaviest parts (such as the battery) are positioned to the left, away from the hand. If you put your right thumb underneath the camera to stabilize it, that takes your thumb away from the record button.

The camcorder's video quality disappointed us. The images were sharp and had plenty of detail, but colors looked washed out, both under natural light and indoors. The GR-DF550US, though, outperformed all the other cameras in low light, doing an excellent job of reproducing colors in a very challenging lighting situation. You can set the two white LEDs to turn on automatically when a scene becomes too dark, but the lights are so bright that some subjects might not want to look toward the lens.

The JVC's still images were relatively poor in our tests, with muddy colors and a lack of clarity in fine details.

But we liked two design touches: Closing both the LCD screen and the viewfinder makes the camera turn itself off, lessening the chances of accidentally running down the battery. And the quick-review button rewinds the tape, shows the last several seconds of video, and then switches back to recording mode. ■

—Richard Baguley

## COMING SOON

### Next Up: High-Def Camcorders

YOU'VE OOHED AND AHMED at the rich, lifelike colors and eye-popping sharpness of high-definition TV sets. Are you ready to see similar superhigh-quality images coming from your camcorder?

Sony's new HDR-HC1—shipping as of July—records HD video in 1080i format, with a resolution of 1920 by 1080 pixels, or six times the resolution of the camcorders we looked at for this story. Though slightly larger than the cameras that we tested here, it's one-third the size of Sony's previous HD model, and at \$1600 it costs less than half as much. (You can read more details about this camcorder at [find.pcworld.com/48334](http://find.pcworld.com/48334).)

There are limitations on what you can do with the HD video, however. You can play it on your HDTV, but you can't run it in your set-top DVD player because current DVD



SONY HDR-HC1

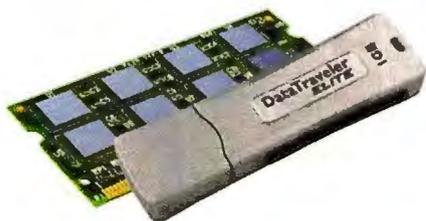
formats don't support HD. The next generation of optical discs will have this capability, but the two high-def formats it will use—Blu-ray and HD-DVD—are not widely available and are likely to be very expensive.

Video editing programs such as Adobe Premiere Pro and Apple iMovie support HD-video editing but require very powerful machines with prodigious memory and disk space to handle the strain.



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# IN THE CHARTS

EDITED BY THE REVIEWS STAFF

## Power PC With Dual Graphics Boards Makes Chart Debut

FOR \$3395, POLYWELL'S Poly 916NF4 (number seven in this month's power desktop rankings) doesn't offer the sci-fi looks that we've come to expect from gaming systems. Instead, what's futuristic about this new Polywell is on the inside: It's the first desktop system we've tested that uses NVidia's scalable link interface (SLI) technology, which enables you to connect two PCI Express graphics cards in the same PC. A typical PC user may not notice any performance enhancement, however. The two games we use in our video game tests don't exploit SLI's capabilities, though Doom 3 and a handful of other recent games do. You'll pay a lot for the feature, too: The same computer with a single graphics card costs about \$600 less.

Unlike the pricey Polywell, the two new value systems on this month's chart are inexpensive. The \$1377 Velocity Micro Vector PCX delivers plenty of computing power for the money; it performed on a par with similarly configured (yet more expensive) systems, earning a WorldBench 5 score of 89. Our test system came equipped with a CRT monitor,

although many buyers may want to upgrade to an LCD.

Gamers on a tight budget will appreciate the flashy IBuyPower Gamer FX. This \$1395 system sports LED lights on some components, and cold-cathode illumination gives the interior an otherworldly glow.



**POLYWELL'S POLY 916NF4**  
uses two graphics cards.

In our video game tests, the Gamer FX delivered above-average frame rates, and its WorldBench 5 score of 98 is the highest for any machine appearing on the value list.

### NOTEBOOKS

IF ACER'S TRADEMARK curvy ergonomic keyboard doesn't turn you off, you'll love the company's latest desktop replacement, the TravelMate 8100. This update improves on the not-too-shabby Travel-

Mate 8000 by introducing a smarter case design as well as a sleek 15.4-inch screen. A very well-rounded machine for home or office, the 8100 supports both short- and long-range wireless communications, and has a DVI port for connecting a digital monitor.

Regrettably, however, the notebook's weak speakers have not improved.

Two other newly tested laptops made the cut: Alienware's Area 51-M D9T and Medion's Akoya EX. The Area 51-M D9T's \$3214 price tag may be out of this world, but the machine is light years ahead of the competition in expansion options, with dual hard drives, dual optical drives, and four memory slots. We also liked its 17-inch wide screen, four speakers, and built-in Webcam. Options not present in our test unit include Microsoft's Windows Media Center Edition OS and a built-in TV tuner.

The Medion Akoya EX all-purpose laptop is a steal for \$1200, especially if you need a lightweight portable that can connect to a digital LCD. The unit's white case, however, will likely take extra effort to keep smudge-free.

### INSIDE INFO

#### Laser Printers

LIKE MANY OTHER devices, monochrome laser printers keep shrinking in size and price. Two compact models from Samsung and HP print crisp text, yet cost less than \$180 each. That's not to say that a workgroup printer has to break the bank: The model with the highest-quality output costs just \$300.

#### More on the Web

PC WORLD uses its industry-standard benchmarking application, WorldBench 5, to evaluate the performance of desktop PCs, notebook PCs, and tablet PCs. Our benchmark runs a number of real-world applications performing real-world computing tasks. For more information on the WorldBench 5 tool, go to [find.pcworld.com/44262](http://find.pcworld.com/44262). Visit [find.pcworld.com/10860](http://find.pcworld.com/10860) for more details about PC World's Star Ratings.

#### The Top 100 Team

FREELANCE WRITERS Paul Jasper and Melissa Riofrio, Contributing Editor Carla Thornton, and PC World editors Laura Blackwell, Eric Butterfield, Tracey Capen, Kalpana Ettenson, Tom Mainelli, Melissa J. Perenson, Narasu Rebbapragada, Dan Sommer, and Alan Stafford contributed to the *Top 100* section this month. Ulrike Diehlmann, Julio Giannobile, Elliott Kirschling, Jeff Kuta, Tony K. Leung, Thomas Luong, and William Wang of the PC World Test Center tested the products that are reviewed in this issue.

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## TOP 15 DESKTOP PCs

★ Products in this chart are ordered by star rating. Visit [find.pcworld.com/48208](http://find.pcworld.com/48208) for reviews of all products tested this month and ranked in this chart.

POWER SYSTEM		Features and specifications <sup>1</sup>		Performance	Bottom line
1	<b>Alienware Aurora 5500</b> <b>Best Buy</b> \$3500 (★★★★★: Feb 05) <a href="http://find.pcworld.com/45562">find.pcworld.com/45562</a>	<ul style="list-style-type: none"> <li>• 2.6-GHz Athlon 64 FX-55</li> <li>• 320GB drive space (RAID)</li> <li>• DVD±RW, DVD-ROM drives</li> </ul>	<ul style="list-style-type: none"> <li>• 19-inch NEC LCD monitor</li> <li>• 256MB ATI Radeon X800 Pro graphics</li> <li>• Logitech X-530 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 110</li> <li>• Graphics: Outstanding</li> <li>• Design: Outstanding</li> </ul>	Strong performance keeps this well-equipped, well-designed, nicely priced gaming system at the top of the chart.
2	<b>Xi Computer MTower 64 AGE-SLI</b> \$3876 (★★★★★: July 05) <a href="http://find.pcworld.com/47900">find.pcworld.com/47900</a>	<ul style="list-style-type: none"> <li>• 2.6-GHz Athlon 64 FX-55</li> <li>• 600GB drive space (RAID)</li> <li>• Double-layer DVD±RW drive</li> </ul>	<ul style="list-style-type: none"> <li>• 19-inch ViewSonic LCD monitor</li> <li>• 256MB EVGA E-GeForce 6800 Ultra graphics</li> <li>• Logitech X-620 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 125</li> <li>• Graphics: Outstanding</li> <li>• Design: Good</li> </ul>	Gaming PC turned in highest-ever WorldBench 5 score. With 600GB of storage, it's worth the steep cost.
3	<b>ABS Ultimate M5-64</b> \$3699 (★★★★★: Feb 05) <a href="http://find.pcworld.com/45558">find.pcworld.com/45558</a>	<ul style="list-style-type: none"> <li>• 2.6-GHz Athlon 64 FX-55</li> <li>• 348GB drive space (RAID)</li> <li>• DVD±RW, DVD-ROM drives</li> </ul>	<ul style="list-style-type: none"> <li>• 19-inch Samsung LCD monitor</li> <li>• 256MB EVGA E-GeForce 6800 Ultra graphics</li> <li>• Logitech Z-680 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 107</li> <li>• Graphics: Outstanding</li> <li>• Design: Very Good</li> </ul>	Feature-rich system comes with an industrial-strength metal case and a liquid-cooled CPU.
4	<b>Polywell Poly 939N-FX55</b> \$2835 (★★★★★: Apr 05) <a href="http://find.pcworld.com/46714">find.pcworld.com/46714</a>	<ul style="list-style-type: none"> <li>• 2.6-GHz Athlon 64 FX-55</li> <li>• 148GB drive space (RAID)</li> <li>• DVD±RW, CD-RW drives</li> </ul>	<ul style="list-style-type: none"> <li>• 19-inch ViewSonic CRT monitor</li> <li>• 256MB NVIDIA GeForce 6800 Ultra graphics</li> <li>• Creative Inspire T7700 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 113</li> <li>• Graphics: Outstanding</li> <li>• Design: Good</li> </ul>	Elegant-looking black-and-silver unit has top-notch performance; a CRT monitor keeps the price down.
5	<b>ABS Ultimate M6</b> \$3599 (★★★★★: May 05) <a href="http://find.pcworld.com/46942">find.pcworld.com/46942</a>	<ul style="list-style-type: none"> <li>• 2.6-GHz Athlon 64 FX-55</li> <li>• 320GB drive space (RAID)</li> <li>• DVD±RW, DVD-ROM drives</li> </ul>	<ul style="list-style-type: none"> <li>• 19-inch Samsung CRT monitor</li> <li>• 256MB ATI Radeon X850 XT graphics</li> <li>• Logitech Z-5500 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 122</li> <li>• Graphics: Outstanding</li> <li>• Design: Very Good</li> </ul>	Massive yet stylish gaming PC on wheels earned our second-best WorldBench 5 score. Comes in matte-silver case.
6	<b>Gateway 9310XL</b> \$2319 (★★★★★: July 05) <a href="http://find.pcworld.com/47896">find.pcworld.com/47896</a>	<ul style="list-style-type: none"> <li>• 3.4-GHz Pentium 4 650</li> <li>• 500GB drive space</li> <li>• DVD±RW, DVD-ROM/CD-RW drives</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch Gateway LCD monitor</li> <li>• 256MB ATI Radeon X800 Pro graphics</li> <li>• Gateway GMAX5100 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 93</li> <li>• Graphics: Very Good</li> <li>• Design: Good</li> </ul>	Lots of storage, a dual-layer optical writer, and a low price offset this PC's relatively slow performance.
7	<b>Polywell Poly 916NF4</b> \$3395 (★★★★★: NEW) <a href="http://find.pcworld.com/48130">find.pcworld.com/48130</a>	<ul style="list-style-type: none"> <li>• 3.6-GHz Pentium 4 560</li> <li>• 148GB drive space (RAID)</li> <li>• DVD±RW, DVD-ROM/CD-RW drives</li> </ul>	<ul style="list-style-type: none"> <li>• 19-inch Polywell LCD monitor</li> <li>• 512MB EVGA E-GeForce 6800 Ultra graphics<sup>2</sup></li> <li>• Creative Inspire P7800 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 102</li> <li>• Graphics: Very Good</li> <li>• Design: Good</li> </ul>	This fast system uses two graphics cards, but the performance increase isn't enough to justify the cost.
VALUE SYSTEM					
1	<b>IBM ThinkCentre A51p</b> \$1592 (★★★★★: Feb 05) <a href="http://find.pcworld.com/45626">find.pcworld.com/45626</a>	<ul style="list-style-type: none"> <li>• 3-GHz Pentium 4 530</li> <li>• 160GB drive space</li> <li>• DVD-ROM, CD-RW drives</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch ThinkVision LCD monitor</li> <li>• 64MB ATI Radeon X300 Pro graphics</li> <li>• Cyber Acoustics CA-3090 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 83</li> <li>• Graphics: Very Good</li> <li>• Design: Good</li> </ul>	Tool-less design and advanced security features distinguish this good-looking, all-business black tower.
2	<b>Shuttle Computer XPC i8600b</b> \$1611 (★★★★★: June 05) <a href="http://find.pcworld.com/47600">find.pcworld.com/47600</a>	<ul style="list-style-type: none"> <li>• 3-GHz Pentium 4 530J</li> <li>• 320GB drive space</li> <li>• DVD-ROM/CD-RW combo drive</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch Shuttle LCD monitor</li> <li>• Integrated Intel 915G graphics</li> <li>• Eight-in-one media card reader</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 82</li> <li>• Graphics: Good</li> <li>• Design: Very Good</li> </ul>	Packed with almost everything a larger unit offers, this PC provides strong value and performance.
3	<b>Velocity Micro Vector PCX</b> \$1377 (★★★★★: NEW) <a href="http://find.pcworld.com/48142">find.pcworld.com/48142</a>	<ul style="list-style-type: none"> <li>• 3.2-GHz Pentium 4 540</li> <li>• 120GB drive space</li> <li>• DVD±RW drive</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch CTX CRT monitor</li> <li>• 128MB EVGA E-GeForce 6600 GT graphics</li> <li>• Creative Inspire P5800 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 89</li> <li>• Graphics: Good</li> <li>• Design: Very Good</li> </ul>	This affordable system supplies plenty of power for the money; a CRT monitor keeps the price low.
4	<b>Sony VAIO VGC-RA830G</b> \$1800 (★★★★★: July 05) <a href="http://find.pcworld.com/47874">find.pcworld.com/47874</a>	<ul style="list-style-type: none"> <li>• 3.4-GHz Pentium 4 550</li> <li>• 320GB drive space (RAID)</li> <li>• DVD±RW, DVD-ROM/CD-RW drives</li> </ul>	<ul style="list-style-type: none"> <li>• 19-inch Sony LCD monitor</li> <li>• 256MB Asus EAX300LE graphics</li> <li>• Logitech X-530 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 91</li> <li>• Graphics: Very Good</li> <li>• Design: Good</li> </ul>	Sony's Windows XP Media Center unit will be at home in the living room; \$400 price drop this month.
5	<b>Amax Kloss i915B</b> \$1469 (★★★★★: Feb 05) <a href="http://find.pcworld.com/45620">find.pcworld.com/45620</a>	<ul style="list-style-type: none"> <li>• 2.8-GHz Pentium 4 520</li> <li>• 120GB drive space</li> <li>• DVD-ROM/CD-RW combo drive</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch AG Neovo LCD monitor</li> <li>• 128MB Nvidia GeForce PCX 5750 graphics</li> <li>• AOpen SoundSphere 2.1 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 83</li> <li>• Graphics: Very Good</li> <li>• Design: Good</li> </ul>	Shoe-box system with excellent design will look terrific in any setting; see-through speakers match well.
6	<b>CyberPower Gamer Ultra 7500 SE</b> <b>Best Buy</b> \$999 (★★★★★: Feb 05) <a href="http://find.pcworld.com/45622">find.pcworld.com/45622</a>	<ul style="list-style-type: none"> <li>• 2.2-GHz Athlon 64 3200+</li> <li>• 120GB drive space</li> <li>• DVD±RW drive</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch AOpen LCD monitor</li> <li>• 256MB Nvidia GeForce FX 5700LE graphics</li> <li>• Creative SBS 5.1 560 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 91</li> <li>• Graphics: Very Good</li> <li>• Design: Good</li> </ul>	Funky-looking system includes top-mounted USB and audio ports, and a pop-up status panel.
7	<b>Gateway Profile 5.5C</b> \$1885 (★★★★★: June 05) <a href="http://find.pcworld.com/47602">find.pcworld.com/47602</a>	<ul style="list-style-type: none"> <li>• 3.2-GHz Pentium 4 540</li> <li>• 160GB drive space</li> <li>• DVD±RW drive</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch Gateway LCD monitor</li> <li>• Integrated ATI Radeon X300 LE graphics</li> <li>• Speakers built into monitor</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 84</li> <li>• Graphics: Very Good</li> <li>• Design: Very Good</li> </ul>	Gateway's innovative all-in-one design offers stability and makes the ports and optical drive easy to reach.
8	<b>IBuyPower Gamer FX</b> \$1395 (★★★★★: NEW) <a href="http://find.pcworld.com/48128">find.pcworld.com/48128</a>	<ul style="list-style-type: none"> <li>• 2.2-GHz Athlon 64 3500+</li> <li>• 200GB drive space</li> <li>• DVD±RW drive</li> </ul>	<ul style="list-style-type: none"> <li>• 17-inch ViewSonic LCD monitor</li> <li>• 128MB Gigabyte GV-NX66T128D graphics</li> <li>• Logitech X-530 speakers</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 98</li> <li>• Graphics: Very Good</li> <li>• Design: Very Good</li> </ul>	A nicely equipped, speedy system for gamers on a moderate budget who still want a bit of flash.

**FOOTNOTE:** <sup>1</sup>Features listings are not exhaustive; hard-drive capacity may represent multiple drives. <sup>2</sup>Two graphics cards. **CHART NOTES:** Street prices are as of 5/3/05. See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings. Price is taken into consideration for Best Buy honors only. All tests designed and conducted by the PC World Test Center. All rights reserved.

## TOP 15 NOTEBOOK PCs

★ Products in this chart are ordered by star rating. Visit [find.pcworld.com/48226](http://find.pcworld.com/48226) for reviews of all products tested this month and ranked in this chart.

DESKTOP REPLACEMENT		Features and specifications <sup>1</sup>		Performance	Bottom line
1	<b>Acer TravelMate 8100</b> \$2299 (★★★★★ NEW) <a href="http://find.pcworld.com/48221">find.pcworld.com/48221</a>	<ul style="list-style-type: none"> <li>• 2-GHz Pentium M 760</li> <li>• 15.4-inch wide screen</li> <li>• 7.6 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, Bluetooth, smart card slot</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 94</li> <li>• Overall design: Very Good</li> <li>• Tested battery life: 4:04</li> </ul>	Chic and pricey wide-screen model has a DVI port for connecting the latest digital monitors.
2	<b>IBM ThinkPad T43</b> <b>Best Buy</b> \$1999 (★★★★★ July 05) <a href="http://find.pcworld.com/47826">find.pcworld.com/47826</a>	<ul style="list-style-type: none"> <li>• 1.86-GHz Pentium M 750</li> <li>• 14.1-inch screen</li> <li>• 6.4 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD±RW-RAM drive</li> <li>• Touchpad and eraserhead pointing devices</li> <li>• 802.11g, Bluetooth, gigabit ethernet</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 84</li> <li>• Overall design: Very Good</li> <li>• Tested battery life: 5:02</li> </ul>	This slim unit includes a handy biometric fingerprint reader as well as an ExpressCard slot.
3	<b>Dell Inspiron 6000</b> \$2271 (★★★★★ May 05) <a href="http://find.pcworld.com/47230">find.pcworld.com/47230</a>	<ul style="list-style-type: none"> <li>• 2-GHz Pentium M 760</li> <li>• 15.4-inch wide screen</li> <li>• 8.4 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11a/g, SD Card slot, WordPerfect Office 12</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 89</li> <li>• Overall design: Good</li> <li>• Tested battery life: 5:07</li> </ul>	Big laptop has strong performance and a high native resolution of 1920 by 1200, plus great speakers.
4	<b>HP Pavilion Dv4000</b> \$1189 (★★★★★ July 05) <a href="http://find.pcworld.com/47827">find.pcworld.com/47827</a>	<ul style="list-style-type: none"> <li>• 1.8-GHz Pentium M 745</li> <li>• 15.4-inch wide screen</li> <li>• 7.6 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• Double-layer DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, ExpressCard slot, Microsoft Works 8</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 77</li> <li>• Overall design: Good</li> <li>• Tested battery life: 3:23</li> </ul>	Elegant 15.4-inch wide screen features an ExpressCard slot and includes a six-in-one media reader.
5	<b>Alienware Area 51-M D9T</b> \$3214 (★★★★★ NEW) <a href="http://find.pcworld.com/48222">find.pcworld.com/48222</a>	<ul style="list-style-type: none"> <li>• 3.6-GHz Pentium 4 560</li> <li>• 17.0-inch wide screen</li> <li>• 14.8 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, SD Card slot</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 90</li> <li>• Overall design: Very Good</li> <li>• Tested battery life: 1:10</li> </ul>	Heavy laptop has a built-in camera, optional dual RAID hard drives, and a built-in cable TV connection.
6	<b>HP Compaq Nx9600</b> \$2249 (★★★★★ June 05) <a href="http://find.pcworld.com/47498">find.pcworld.com/47498</a>	<ul style="list-style-type: none"> <li>• 3.6-GHz Pentium 4 560</li> <li>• 17.0-inch wide screen</li> <li>• 12.1 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, ExpressCard slot, USB digital drive</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 85</li> <li>• Overall design: Very Good</li> <li>• Tested battery life: 1:20</li> </ul>	Big laptop yields great sound, even without the extra-cost expansion base's Harman/Kardon speakers.
ALL-PURPOSE NOTEBOOK					
1	<b>HP Compaq Nc8230</b> \$2244 (★★★★★ May 05) <a href="http://find.pcworld.com/47228">find.pcworld.com/47228</a>	<ul style="list-style-type: none"> <li>• 2-GHz Pentium M 760</li> <li>• 15.4-inch wide screen</li> <li>• 7.3 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD-ROM and CD-RW combo drive</li> <li>• Touchpad and eraserhead pointing devices</li> <li>• 802.11g, Bluetooth, SD Card slot</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 85</li> <li>• Overall design: Good</li> <li>• Tested battery life: 5:11</li> </ul>	Classy-looking model has a quick-launching presentation button and a superhigh-resolution screen.
2	<b>Compaq Presario V2000</b> <b>Best Buy</b> \$1229 (★★★★★ May 05) <a href="http://find.pcworld.com/47226">find.pcworld.com/47226</a>	<ul style="list-style-type: none"> <li>• 1.8-GHz Pentium M 745</li> <li>• 14.1-inch wide screen</li> <li>• 7.0 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD-RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, six-in-one media card reader</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 75</li> <li>• Overall design: Good</li> <li>• Tested battery life: 5:48</li> </ul>	Sleek lightweight unit has it all: good sound and keyboard, fantastic battery life, and a vivid screen.
3	<b>IBM ThinkPad R52</b> \$1379 (★★★★★ July 05) <a href="http://find.pcworld.com/47828">find.pcworld.com/47828</a>	<ul style="list-style-type: none"> <li>• 1.73-GHz Pentium M 740</li> <li>• 14.1-inch screen</li> <li>• 7.0 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD-ROM and CD-RW combo drive</li> <li>• Touchpad and eraserhead pointing devices</li> <li>• 802.11g, Bluetooth, gigabit ethernet</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 77</li> <li>• Overall design: Outstanding</li> <li>• Tested battery life: 3:30</li> </ul>	This model's fine keyboard has dual pointing devices, and its modular bay accepts many optional drives.
4	<b>Micro Express CL5620</b> \$1599 (★★★★★ Mar 05) <a href="http://find.pcworld.com/46172">find.pcworld.com/46172</a>	<ul style="list-style-type: none"> <li>• 2-GHz Pentium M 755</li> <li>• 15.0-inch screen</li> <li>• 7.2 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, SD Card slot</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 97</li> <li>• Overall design: Fair</li> <li>• Tested battery life: 3:56</li> </ul>	Elegant-looking laptop sports a beautiful high-resolution screen and an ultrafirm keyboard.
5	<b>Toshiba Satellite R15-S822</b> \$1599 (★★★★★ July 05) <a href="http://find.pcworld.com/47829">find.pcworld.com/47829</a>	<ul style="list-style-type: none"> <li>• 1.6-GHz Pentium M 725</li> <li>• 14.1-inch screen</li> <li>• 7.0 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD-ROM and CD-RW combo drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, SD Card slot</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 69</li> <li>• Overall design: Good</li> <li>• Tested battery life: 5:18</li> </ul>	Convertible tablet is a bit heavy to carry around easily, but its 14.1-inch screen offers lots of room to write.
6	<b>Medion Akoya EX</b> \$1200 (★★★★★ NEW) <a href="http://find.pcworld.com/48225">find.pcworld.com/48225</a>	<ul style="list-style-type: none"> <li>• 1.7-GHz Pentium M 735</li> <li>• 14.1-inch wide screen</li> <li>• 6.4 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD-RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, Microsoft Works 8</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 78</li> <li>• Overall design: Fair</li> <li>• Tested battery life: 3:19</li> </ul>	Midsized notebook has a DVI port to connect to the latest LCDs, but the white case tends to show smudges.
ULTRAPORTABLE					
1	<b>Dell Inspiron 700m</b> <b>Best Buy</b> \$1567 (★★★★★ Dec 04) <a href="http://find.pcworld.com/44246">find.pcworld.com/44246</a>	<ul style="list-style-type: none"> <li>• 1.8-GHz Pentium M 745</li> <li>• 12.1-inch wide screen</li> <li>• 4.8 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, WordPerfect Productivity Pack</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 80</li> <li>• Overall design: Good</li> <li>• Tested battery life: 2:45</li> </ul>	Strongly built, lightweight laptop offers a wide-aspect screen but has a cramped keyboard.
2	<b>WinBook X540</b> \$1500 (★★★★★ Mar 05) <a href="http://find.pcworld.com/46174">find.pcworld.com/46174</a>	<ul style="list-style-type: none"> <li>• 2-GHz Pentium M 755</li> <li>• 12.1-inch screen</li> <li>• 5.5 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• Double-layer DVD±RW drive</li> <li>• Touchpad pointing device</li> <li>• 802.11g, three-in-one media card reader</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 83</li> <li>• Overall design: Good</li> <li>• Tested battery life: 3:03</li> </ul>	You can watch DVD movies, home videos, and slide shows without turning this lightweight laptop on.
3	<b>Sharp Actius MP30</b> \$1699 (★★★★★ Apr 05) <a href="http://find.pcworld.com/46510">find.pcworld.com/46510</a>	<ul style="list-style-type: none"> <li>• 1.6-GHz Efficeon TMB800</li> <li>• 10.4-inch screen</li> <li>• 3.7 pounds</li> </ul>	<ul style="list-style-type: none"> <li>• Fixed DVD-ROM and CD-RW combo drive</li> <li>• Touchpad pointing device</li> </ul>	<ul style="list-style-type: none"> <li>• WorldBench 5 score: 50</li> <li>• Overall design: Poor</li> <li>• Tested battery life: 3:00</li> </ul>	Small white laptop can also serve as an external hard drive, using the included USB cable.

**FOOTNOTE:** <sup>1</sup>Features listings are not exhaustive. **CHART NOTES:** Street prices are as of 5/13/05. Weight includes AC adapter, power cord, and optical drive. Optical drives are removable unless otherwise noted. Price is taken into consideration for Best Buy honors only. All tests designed and conducted by the PC World Test Center. All rights reserved. See [find.pcworld.com/70860](http://find.pcworld.com/70860) for details on PC World's Star Ratings.

## TOP 10 PRINTERS

★ Products in this chart are ordered by star rating. Visit [find.pcworld.com/48270](http://find.pcworld.com/48270) for reviews of all products tested this month and ranked in this chart.

THIS MONTH, we tested ten new monochrome laser printers and retested four previously ranked models under new protocols. Size is the big surprise—make that the small surprise. Samsung's tiny, low-cost ML-2010 and HP's similar LaserJet 1020 hold their own for output quality. Neither printed zippily enough for a speed-sensitive office, but either could satisfy a single user. Beefier models rule the small-office section with their superior swiftness and input capacity; Oki Data's Oki B4350 parlays its speed, capacity, and clear text into a Best Buy.

With top speed and the ability to hold 700 input sheets, Xerox's retested Phaser 4500N should satisfy even antsy members



OKI DATA Oki B4350, our text champ.

of a busy workgroup. Lexmark's T430dn and Oki Data's Oki B6200n demonstrated well-rounded abilities, but each also showed a flaw: dark graphics for the Lexmark, slow pace for the Oki Data. Nevertheless, the B6200n's image quality and ease of use make it a good deal for the price; it earns the Best Buy badge. HP's LaserJet 2430tn is a fast, high-input model, but the shade of black it printed wasn't very dark. Samsung reaches the chart with its small, 20-pound ML-2251N, whose output was the best of any on the workgroup list. Its setup is poorly documented, however—and once it's up and running, its slow printing will have users tapping their toes impatiently.

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SMALL-OFFICE		Features and specifications	Performance	Bottom line
1	<b>Oki Data Oki B4350</b> <b>Best Buy</b> \$299 (★★★★★) <a href="http://find.pcworld.com/44160">find.pcworld.com/44160</a>	<ul style="list-style-type: none"> <li>Rated 23 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>250 sheets input; one tray standard, one tray maximum</li> </ul>	Text quality: Very Good Graphics quality: Good Speed: 20.1 ppm text, 13.2 ppm graphics	This retested printer won hands down against other stand-alone printers in our tests. The first page prints quickly.
2	<b>Brother HL-2040</b> \$150 (★★★★★ NEW) <a href="http://find.pcworld.com/48106">find.pcworld.com/48106</a>	<ul style="list-style-type: none"> <li>Rated 20 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>250 sheets input; one tray standard, one tray maximum</li> </ul>	Text quality: Good Graphics quality: Poor Speed: 16.6 ppm text, 10.1 ppm graphics	Light graphics are the only weak spot of this solid performer, which delivers nice speed and text quality at a low price.
3	<b>Samsung ML-2010</b> \$150 (★★★★★ NEW) <a href="http://find.pcworld.com/48182">find.pcworld.com/48182</a>	<ul style="list-style-type: none"> <li>Rated 22 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>150 sheets input; one tray standard, two trays maximum</li> </ul>	Text quality: Very Good Graphics quality: Fair Speed: 15.8 ppm text, 9.1 ppm graphics	The ML-2010 produced attractive but slightly pale text. Though lightweight and compact, this model feels sturdy.
4	<b>Lexmark E330</b> \$399 (★★★★★ NEW) <a href="http://find.pcworld.com/48114">find.pcworld.com/48114</a>	<ul style="list-style-type: none"> <li>Rated 27 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to letter</li> <li>250 sheets input; one tray standard, two trays maximum</li> </ul>	Text quality: Fair Graphics quality: Poor Speed: 20.5 ppm text, 11.4 ppm graphics	At its default settings, the speedy E330 laid down heavy, dark tones that didn't do justice to graphics. Fast living will cost you.
5	<b>HP LaserJet 1020</b> \$179 (★★★★★ NEW) <a href="http://find.pcworld.com/48112">find.pcworld.com/48112</a>	<ul style="list-style-type: none"> <li>Rated 15 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>150 sheets input; one tray standard, one tray maximum</li> </ul>	Text quality: Good Graphics quality: Good Speed: 12.3 ppm text, 8.9 ppm graphics	Weighing in at 11 pounds and showing a slim profile, this svelte printer is the lightest, smallest, and slowest unit on the chart.
WORKGROUP				
1	<b>Xerox Phaser 4500N</b> \$999 (★★★★★) <a href="http://find.pcworld.com/44188">find.pcworld.com/44188</a>	<ul style="list-style-type: none"> <li>Rated 36 ppm black</li> <li>1200-by-1200-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>700 sheets input; two trays standard, four trays maximum</li> </ul>	Text quality: Good Graphics quality: Fair Speed: 25.1 ppm text, 13.8 ppm graphics	A snap to install on a network, this retested unit can print both text and graphics fast enough to please most workgroups.
2	<b>Oki Data Oki B6200n</b> <b>Best Buy</b> \$585 (★★★★★ NEW) <a href="http://find.pcworld.com/48236">find.pcworld.com/48236</a>	<ul style="list-style-type: none"> <li>Rated 25 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>400 sheets input; two trays standard, four trays maximum</li> </ul>	Text quality: Good Graphics quality: Fair Speed: 18.8 ppm text, 11.7 ppm graphics	It's about balance: The B6200n's output quality and speed fall in the middle range, but so does its price. Setup was simple.
3	<b>HP LaserJet 2430tn</b> \$999 (★★★★★ NEW) <a href="http://find.pcworld.com/48113">find.pcworld.com/48113</a>	<ul style="list-style-type: none"> <li>Rated 35 ppm black</li> <li>1200-by-1200-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>850 sheets input; three trays standard, three trays maximum</li> </ul>	Text quality: Fair Graphics quality: Good Speed: 23.9 ppm text, 6.0 ppm graphics	Grayscale graphics looked nicely balanced and letters were well formed; but soft, smeary blacks marred the text output.
4	<b>Lexmark T430dn</b> \$849 (★★★★★ NEW) <a href="http://find.pcworld.com/48235">find.pcworld.com/48235</a>	<ul style="list-style-type: none"> <li>Rated 32 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>350 sheets input; two trays standard, four trays maximum</li> </ul>	Text quality: Good Graphics quality: Poor Speed: 22.7 ppm text, 12.0 ppm graphics	The T430dn addresses the key workgroup issues with easy installation, handsome text, and fast output. Graphics looked harsh.
5	<b>Samsung ML-2251N</b> \$300 (★★★★★ NEW) <a href="http://find.pcworld.com/48138">find.pcworld.com/48138</a>	<ul style="list-style-type: none"> <li>Rated 22 ppm black</li> <li>600-by-600-dpi maximum true monochrome resolution</li> <li>Paper sizes up to legal</li> <li>300 sheets input; one tray standard, one tray maximum</li> </ul>	Text quality: Very Good Graphics quality: Fair Speed: 17.1 ppm text, 9.6 ppm graphics	This compact unit yielded excellent prints, but its slow pace and unhelpful setup docs make it nonviable for most workgroups.

**FOOTNOTE:** This printer was retested for the current month's chart. **HOW WE TEST:** We run time tests for text, line-art, and color and grayscale photo samples (at normal quality settings on plain paper); then a panel of judges rates image quality. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Prices given are street prices as of 5/27/05. Star ratings are based on print quality, features, ease of use, speed, and service and support. Price is taken into consideration for Best Buy honors only. See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings.

## TOP 10 DVD DRIVES

★ Products in this chart are ordered by star rating. Visit [find.pcworld.com/48184](http://find.pcworld.com/48184) for reviews of all products tested this month and ranked in this chart.

A BEVY OF FRESH FACES make the chart this month—seven in all, including new internal models from Asus, Lite-On, Samsung, and Sony. And our new external Best Buy, Plextor's PX-716UF, posted outstanding performance, logging the fastest time we've seen yet for double-layer DVD+R (though we had to upgrade the drive's firmware to achieve our tested speeds). This premium model comes in a selection of attractive colors (black, blue, red, and silver) and has Roxio's burning software for both Windows and Mac—making it a good choice if you need a drive to share across platforms.



PLEXTOR'S PX-716UF has a tapered design.

LaCie's D2 DVD±RW Double Layer with LightScribe also includes Roxio's PC and Mac software, plus the ability to etch labels onto LightScribe DVDs and CDs. Unfortunately, both the D2 and Hewlett-Packard's LightScribe-capable DVD Writer 640e suffered from poor double-layer write performance, but that result wasn't surprising considering each drive's low write-speed rating. Both drives took about twice as long as the Plextor to complete our double-layer write tests; neither HP nor LaCie currently has plans to offer a firmware update to boost double-layer performance.

INTERNAL DVD DRIVE		Features and specifications <sup>1</sup>	Performance	Bottom line
1	<b>Plextor PX-716A</b> \$125 (★★★★★ Apr 05) <a href="http://find.pcworld.com/46594">find.pcworld.com/46594</a>	• 4X DVD+R DL • 16X DVD-R, 16X DVD+R, 4X DVD-RW, 8X DVD+RW, 48X CD-R • Roxio Easy Media Creator 7.1 Basic software	• Double-layer +R: 27:11 • Single-layer +R: 6:30 • DVD+RW: 11:44	Feature-rich drive provides fine overall performance. A firmware update adds support for 6X +R DL and 2X -R DL.
2	<b>Toshiba SD-R537Z</b> \$130 (★★★★★ Apr 05) <a href="http://find.pcworld.com/46600">find.pcworld.com/46600</a>	• 5X DVD+R DL • 16X DVD-R, 16X DVD+R, 4X DVD-RW, 4X DVD+RW, 48X CD-R • Nero Express 6.3 (with Nero-Studio Deluxe, VideoStudio 8.5 PhotoShow Express) software	• Double-layer +R: 22:24 • Single-layer +R: 5:37 • DVD+RW: 12:49	Swiftest drive on the chart at burning a single-layer disc. Nero software is jam-packed with components.
3	<b>Pioneer DVR-A09XL</b> <b>Best Buy</b> \$115 (★★★★★ May 05) <a href="http://find.pcworld.com/47261">find.pcworld.com/47261</a>	• 6X DVD+R DL • 16X DVD-R, 16X DVD+R, 6X DVD-RW, 4X DVD+RW, 40X CD-R • Ulead DVD Movie Factory 3.5 Studio Deluxe, VideoStudio 8.5 SE, and NovaBackup 7.1 software	• Double-layer +R: 19:38 • Single-layer +R: 6:10 • DVD+RW: 11:51	Couples terrific DVD write performance with a stellar software bundle. CD-R writes took 25 percent longer than on the leader.
4	<b>Lite-On SOHW-1693S</b> \$65 (★★★★★ NEW) <a href="http://find.pcworld.com/48156">find.pcworld.com/48156</a>	• 4X DVD-R DL, 4X DVD+R DL • 16X DVD-R, 16X DVD+R, 6X DVD-RW, 8X DVD+RW, 48X CD-R • Nero Express 6.3 (with Nero-Vision Express 2.1, BackItUp, and PhotoShow Express) software	• Double-layer +R: 27:04 • Single-layer +R: 6:06 • DVD+RW: 11:56	Update to previous model (the SOHW-1673S) adds dual-layer support to an inexpensive drive; has older Nero version.
5	<b>Sony DRU-800A</b> \$130 (★★★★★ NEW) <a href="http://find.pcworld.com/48161">find.pcworld.com/48161</a>	• 4X DVD-R DL, 4X DVD+R DL • 16X DVD-R, 16X DVD+R, 6X DVD-RW, 8X DVD+RW, 48X CD-R • Nero Express 6.6 (with Nero-Vision Express 3, BackItUp, and PhotoShow Express) software	• Double-layer +R: 26:52 • Single-layer +R: 6:04 • DVD+RW: 11:48	Like its predecessor, this model is a speedy single-layer writer. Well-rounded, updated Nero software completes the package.
6	<b>Asus DRW-1608P</b> \$70 (★★★★★ NEW) <a href="http://find.pcworld.com/48178">find.pcworld.com/48178</a>	• 6X DVD-R DL, 6X DVD+R DL • 16X DVD-R, 16X DVD+R, 6X DVD-RW, 8X DVD+RW, 40X CD-R • Nero Express 6.3 (with Nero-Vision Express 2.1 SE) software	• Double-layer +R: 19:28 • Single-layer +R: 6:08 • DVD+RW: 12:04	Great overall performer with top specs, at a terrific price. Comes with an older Nero bundle that lacks some components.
7	<b>Samsung TS-H552U</b> \$60 (★★★★★ NEW) <a href="http://find.pcworld.com/48162">find.pcworld.com/48162</a>	• 5X DVD+R DL • 16X DVD-R, 16X DVD+R, 4X DVD-RW, 4X DVD+RW, 40X CD-R • Nero Express 6.3 (with Nero-Vision Express 2.1) software	• Double-layer +R: 23:54 • Single-layer +R: 6:09 • DVD+RW: 12:54	Bargain drive is a solid single-layer writer, but lagged on DL writes behind the Toshiba SD-R537Z, also rated at 5X for +R DL.
EXTERNAL DVD DRIVE				
1	<b>Plextor PX-716UF</b> <b>Best Buy</b> \$230 (★★★★★ NEW) <a href="http://find.pcworld.com/48180">find.pcworld.com/48180</a>	• 6X DVD-R DL, 6X DVD+R DL • 16X DVD-R, 16X DVD+R, 4X DVD-RW, 8X DVD+RW, 48X CD-R • Roxio Easy Media Creator 7.1 Basic and Toast Lite 6.1 software	• Double-layer +R: 18:56 • Single-layer +R: 6:12 • DVD+RW: 11:44	This drive has it all: stylish curves, Mac and PC software, and stellar performance. Comes in assorted vivid colors.
2	<b>Hewlett-Packard DVD Writer 640e</b> \$160 (★★★★★ NEW) <a href="http://find.pcworld.com/48152">find.pcworld.com/48152</a>	• 2.4X DVD+R DL • 8X DVD-R, 16X DVD+R, 4X DVD-RW, 4X DVD+RW, 40X CD-R • Sonic RecordNow 7.22, HP DLA 4.59, and ArcSoft ShowBiz DVD 2.2 software	• Double-layer +R: 45:54 • Single-layer +R: 6:09 • DVD+RW: 11:49	Double-layer writes were poky, as expected given the drive's speed rating. Has LightScribe labeling technology.
3	<b>LaCie D2 DVD±RW Double Layer with LightScribe</b> \$160 (★★★★★ NEW) <a href="http://find.pcworld.com/48154">find.pcworld.com/48154</a>	• 2.4X DVD+R DL • 8X DVD-R, 16X DVD+R, 4X DVD-RW, 4X DVD+RW, 40X CD-R • Roxio Easy Media Creator 7.1 Basic and Toast Lite 6.1 software	• Double-layer +R: 46:10 • Single-layer +R: 6:29 • DVD+RW: 11:46	Although unit is a slow DL writer, it has both LightScribe labeling and Mac software. The chassis is made of aluminum.

**FOOTNOTE:** <sup>1</sup> "DVD-R DL" refers to dual-layer -R; "DVD+R DL" refers to double-layer +R. **HOW WE TEST:** For full methodology, see [find.pcworld.com/47492](http://find.pcworld.com/47492). We test drives using media supplied by the vendor or by Verbatim. Write speeds are (in listed order) the times (in minutes:seconds) required to write 7.9GB to double-layer DVD+R and to write 4.35GB to single-layer DVD+R using the drive's bundled mastering software, and the combined time to format a blank rewritable DVD and to copy 3.4GB of data to that disc. **CHART NOTES:** Prices given are street prices as of 5/20/05. Price is taken into consideration for Best Buy honors only. See [find.pcworld.com/47491](http://find.pcworld.com/47491) for more details on software bundles, and [find.pcworld.com/10860](http://find.pcworld.com/10860) for more on PC World's Star Ratings.

# MORE REVIEWS

MISSED AN ISSUE OF *PC World* or passed your copy along to a friend? Here's a recap of *Top 100* topics from previous issues. To read reviews of the products listed in these charts, go online and type in the *PC World* Find-It URL from the top

of each chart. Next month in the *Top 100*, we'll examine PDAs and 17-inch LCD monitors, and our Spotlight review will focus on digital SLR cameras. Also be on the lookout for an in-depth feature on data backup products for your PC.



**BFG TECHNOLOGIES' GeForce 6600 GT OC** delivers good, economical performance.



**SONY'S 19-INCH SDM-HS95P** scored well in graphics- and text-quality tests.

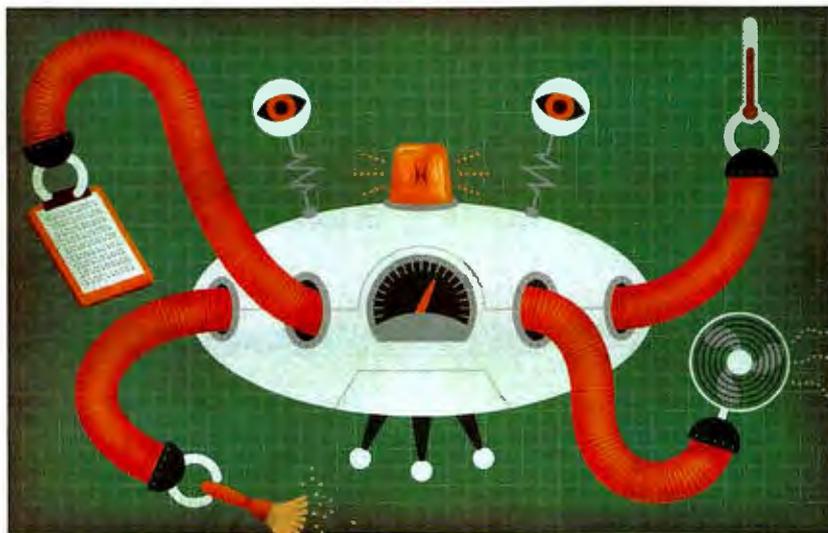


**HP'S FAST, NETWORKABLE OfficeJet 7210 All-In-One** prints fine pictures.

	PCI EXPRESS GRAPHICS BOARDS <a href="http://find.pcworld.com/47904">find.pcworld.com/47904</a>	LCD MONITORS <a href="http://find.pcworld.com/47860">find.pcworld.com/47860</a>	INKJET MULTIFUNCTION PRINTERS <a href="http://find.pcworld.com/47662">find.pcworld.com/47662</a>
POWER BOARD	1 MSI RX850XT-VT2D256E (★★★★★ July 05) <a href="http://find.pcworld.com/47867">find.pcworld.com/47867</a>	1 Sony SDM-HS95P (★★★★★ July 05) <a href="http://find.pcworld.com/47845">find.pcworld.com/47845</a>	1 HP OfficeJet 7210 All-In-One <b>Best BUY</b> (★★★★★ June 05) <a href="http://find.pcworld.com/47608">find.pcworld.com/47608</a>
	2 Asus Extreme AX850XT/2DHTV (★★★★★ July 05) <a href="http://find.pcworld.com/47864">find.pcworld.com/47864</a>	2 Eizo FlexScan L768 (★★★★★ Jan 05) <a href="http://find.pcworld.com/45206">find.pcworld.com/45206</a>	2 Canon Pixma MP760 <b>Best BUY</b> (★★★★★ June 05) <a href="http://find.pcworld.com/47556">find.pcworld.com/47556</a>
	3 PowerColor X800 XT VIVO (★★★★★ Jan 05) <a href="http://find.pcworld.com/45282">find.pcworld.com/45282</a>	3 Samsung SyncMaster 920t (★★★★★ Apr 05) <a href="http://find.pcworld.com/46538">find.pcworld.com/46538</a>	3 Canon Pixma MP780 (★★★★★ June 05) <a href="http://find.pcworld.com/47554">find.pcworld.com/47554</a>
	4 PNY Verto GeForce 6800 GT (★★★★★ July 05) <a href="http://find.pcworld.com/47866">find.pcworld.com/47866</a>	4 HP F1905 (★★★★★ July 05) <a href="http://find.pcworld.com/47846">find.pcworld.com/47846</a>	4 HP PSC 1610 All-In-One (★★★★★ June 05) <a href="http://find.pcworld.com/47610">find.pcworld.com/47610</a>
	5 Aopen Aeolus 6800GT-DV256 <b>Best BUY</b> (★★★★★ July 05) <a href="http://find.pcworld.com/47868">find.pcworld.com/47868</a>	5 Dell UltraSharp 1905FP <b>Best BUY</b> (★★★★★ Jan 05) <a href="http://find.pcworld.com/45204">find.pcworld.com/45204</a>	5 Lexmark P6250 (★★★★★ June 05) <a href="http://find.pcworld.com/47594">find.pcworld.com/47594</a>
VALUE BOARD	1 BFG Technologies GeForce 6600 GT OC <b>Best BUY</b> (★★★★★ July 05) <a href="http://find.pcworld.com/47865">find.pcworld.com/47865</a>	6 LG Electronics Flatron L19810 (★★★★★ July 05) <a href="http://find.pcworld.com/47850">find.pcworld.com/47850</a>	6 Epson Stylus Photo RX620 (★★★★★ June 05) <a href="http://find.pcworld.com/47561">find.pcworld.com/47561</a>
	2 EVGA E-GeForce 6600GT (★★★★★ Jan 05) <a href="http://find.pcworld.com/45268">find.pcworld.com/45268</a>	7 ViewSonic VP191b (★★★★★ July 05) <a href="http://find.pcworld.com/47848">find.pcworld.com/47848</a>	7 Dell Photo All-In-One Printer 942 (★★★★★ June 05) <a href="http://find.pcworld.com/47588">find.pcworld.com/47588</a>
	3 MSI NX6600GT-TD128E (★★★★★ July 05) <a href="http://find.pcworld.com/47871">find.pcworld.com/47871</a>	1 Samsung SyncMaster 243t (★★★★★ July 05) <a href="http://find.pcworld.com/44040">find.pcworld.com/44040</a>	8 Epson Stylus CX6600 (★★★★★ June 05) <a href="http://find.pcworld.com/43396">find.pcworld.com/43396</a>
	4 MSI RX600XT-VTD128E (★★★★★ Jan 05) <a href="http://find.pcworld.com/45274">find.pcworld.com/45274</a>	2 ViewSonic VP231wb (★★★★★ July 05) <a href="http://find.pcworld.com/47562">find.pcworld.com/47562</a>	9 Brother MFC-5840CN (★★★★★ June 05) <a href="http://find.pcworld.com/47552">find.pcworld.com/47552</a>
	5 EVGA E-GeForce 6200 (★★★★★ July 05) <a href="http://find.pcworld.com/47863">find.pcworld.com/47863</a>	3 Dell UltraSharp 2405FPW <b>Best BUY</b> (★★★★★ July 05) <a href="http://find.pcworld.com/47564">find.pcworld.com/47564</a>	10 Lexmark X7170 (★★★★★ June 05) <a href="http://find.pcworld.com/47563">find.pcworld.com/47563</a>
	From the July 2005 Issue	From the July 2005 Issue	From the June 2005 Issue

# HERE'S HOW

EDITED BY AOIFE M. McEVOY AND DENNIS O'REILLY



## HARDWARE TIPS

KIRK STEERS

### Ten Quick Tips to Keep PC Trouble at Arm's Length

WITH JUST A LITTLE effort, you can ensure that your PC runs smoothly and save hours in downtime and troubleshooting. From backup strategies and drive housings to PC cooling and scheduled maintenance, here are ten ways to keep your system on the job, and trouble off your back.

**Make a one-time backup:** Few of us are as diligent as we should be about backing up our system, applications, and data. No backup strategy is 100 percent effective, and most take more time to set up and

use than we're willing to spend on them.

The very least you can do is to create an image of your hard drive when everything works. That way, when trouble strikes, you merely restore the pristine image—which usually takes less than 45 minutes. Images are a sure thing: You get a guaranteed fresh start, with no spyware, no conflicts, and no hassles, although you lose all of the files you created or altered, programs you installed, and settings you changed since you created the image.

Still, you'll have a working PC, even if it lacks your most recent updates.

Symantec Norton Ghost 9 ([find.pcworld.com/47798](http://find.pcworld.com/47798)) and Acronis True Image 8 ([find.pcworld.com/47800](http://find.pcworld.com/47800)) restore Windows XP, Microsoft Office, and an assortment of other apps and utilities in half the time it would take to reinstall Windows, let alone the hours required to reinstall all of your programs, reload your data files manually, and reconfigure your system settings to the way you prefer them.

The downside: Norton Ghost costs \$70 retail, and True Image lists for \$50. While saving the image to a second hard drive is far more convenient than placing it on a DVD, it's also more expensive: An internal hard drive costs about \$100 to \$150, depending on its capacity and speed, and an external hard drive will set you back about \$150 to \$250. If you choose to store your disk image on DVD, make sure that the imaging program you use supports your make and model of optical drive. Incompatibilities between DVD drives and imaging software are common.

If you're budget conscious and have lots of extra space on your hard drive, you can save the cost of a second drive by storing the image file on a second partition of the same drive. Of course, if your hard drive fails, you'll lose your image file. And if you don't have a second partition, you'll have to use Windows XP or a program such as Symantec's Partition Magic (\$70; [find.pcworld.com/48374](http://find.pcworld.com/48374)) to create one.

To make your data easier to restore, keep your data files on a partition other than the one that holds Windows and your applications. For example, in Outlook Express, click *Tools•Options•Maintenance•Store Folder* and select a folder on the data partition to store your mail in

**136 HARDWARE TIPS**

Nip PC problems in the bud by following these ten preventive-maintenance tips for internal and external devices.

**140 INTERNET TIPS**

Place your e-mail, calendar, and Web bookmarks on a USB flash drive; Firefox's automatic security updates.

**146 WINDOWS TIPS**

A cure for Windows' aberrant right-click behavior; the fastest way to open XP's Picture and Fax Viewer applet.

**148 PHOTO PRINTER TIPS**

Improve the quality of your photo printer's output for free via settings in Windows and on the device itself.

**149 ANSWER LINE**

Thwart viruses that attempt to disable your security apps; recover lost files on a CD; jazz up your Auto Playlists in Windows Media Player versions 9 and 10.



140



**FIGURE 1: MAKE OUTLOOK Express easier to restore by relocating its Store Folder.**

(see **FIGURE 1**). Word, Excel, and other apps have similar options for changing their default file-storage location.

**Give your hard drive wings:** You can restore your image file in just seconds by using two removable hard drives: one as your system's primary drive, and the other as a ready-to-go backup. This entails buying a drive housing, such as the \$40 Saturn Mobile Rack 1 from Addonics ([find.pcworld.com/47840](http://find.pcworld.com/47840); see **FIGURE 2**).

Place the housing in an open drive bay in your PC. Keep the second hard drive—the one containing an exact image of the first—at the ready, so all you have to do in the event of trouble is shut down your computer, swap the drives, and restart.

**Avoid USB power crises:** Digital cameras, cell phones, mice, keyboards, and other devices compete for the limited electrical power from your PC's USB ports. If the demand for power overwhelms a USB port, the bus can shut down completely. A lack of sufficient USB power may also cause problems with devices attached to the port. Windows' Device Manager lets you check the power demands on your

USB ports. In Windows XP and 2000, right-click *My Computer* and choose *Properties*•*Hardware*•*Device Manager*; in Windows 98 and Me, right-click *My Computer* and click *Properties*•*Device Manager*.

Within Device Manager, double-click *Universal Serial Bus controllers* and then double-click the first *USB Root Hub* listing—there should be more than one. Click the *Power* tab (and also the *Power properties* button, in Windows 98 and Me); under 'Attached devices' ('Devices on this Hub' in 98, Me, and 2000), you'll see a list of the devices connected through that USB hub, along with the power requirements for each, in milliamps (see **FIGURE 3**).

An unpowered root hub supplies up to



**FIGURE 2: SPEED YOUR BACKUPS with a removable drive housing such as the Saturn Mobile Rack 1 from Addonics.**

500 milliamps. If your root hub is overloaded or close to the 500-milliamp maximum, move some of the devices linked through it to a different root hub, or connect a self-powered USB hub to your PC. **Lock your drive letters:** The drive letters

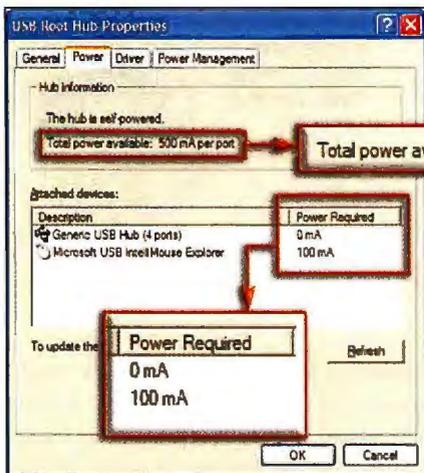
that Windows assigns automatically to removable hard drives, cameras, flash media, and other external storage devices change frequently. Consequently, if an application looks for data on a particular drive letter, it may not find it.

To make a drive letter permanent in Windows XP and 2000, right-click *My Computer* and select *Manage*•*Disk Management*. In the bottom-right pane, right-click the bar representing the drive whose letter you want to set. Click *Change Drive Letter and Paths*•*Change (Edit in 2000)*. Select a drive letter from the menu, and choose *OK* and *Yes* (see **FIGURE 4**).

In 98 and Me, right-click *My Computer*, select *Properties*•*Device Manager*, and then double-click the device's entry (if it lacks one, you're out of luck). Choose *Settings*, and in the section labeled 'Reserved drive letters', select a drive letter next to 'Start drive letter' and again next to 'End drive letter'. That device will thereafter be assigned the letter you selected.

**Stay cool:** An overheated PC may run erratically or suffer permanent damage to its CPU or other circuitry. Some newer motherboards have a thermal "circuit breaker" built into their BIOS, which automatically shuts down the PC when the internal temperature exceeds a certain threshold. You can enable

this feature in your PC Setup program: Hold down the appropriate key—it's often the **<F1>** or **<Delete>** key (you'll be told which one to press)—while your computer starts. Look for a reference to a temperature setting under the 'Power' or ►



**FIGURE 3: CHECK THE POWER** demands on your USB bus; use Device Manager to see the Power tab in the hub's Properties dialog box.

similarly labeled section of PC Setup.

The free Motherboard Monitor temperature utility (available at [find.pcworld.com/47824](http://find.pcworld.com/47824)) from Alex van Kaam allows you to check your system's temperature from Windows (see **FIGURE 5**).

**Avoid penalties for early withdrawal:** If Windows is still transferring data to or from a USB memory key or other external storage device while you're unplugging it, you may lose data. In Windows XP, 2000, and Me, double-click the Safely Remove Hardware icon in the system tray (the area on the desktop near the clock; see **FIGURE 6**) when you're ready to remove the device, and select it from the resulting list. Click *Stop* and then *OK*; a balloon will pop up to let you know when you can safely remove the hardware.

**Upgrade with caution:** Amazingly, many products ship with poorly tested drivers, which can cause all kinds of havoc. If you're replacing a device, reduce the likelihood of a conflict by removing the old equipment's drivers before installing the

new device. Find the hardware's entry in Device Manager (see above for instructions on opening this utility). In Windows XP or 2000, right-click the old hardware's entry and select *Uninstall*. In Windows 98 and Me, click the entry and choose *Remove*.

Always finish installing a driver and then, if necessary, uninstall it and start over. Stopping in midinstallation can alter files and prevent you from successfully reinstalling the device.

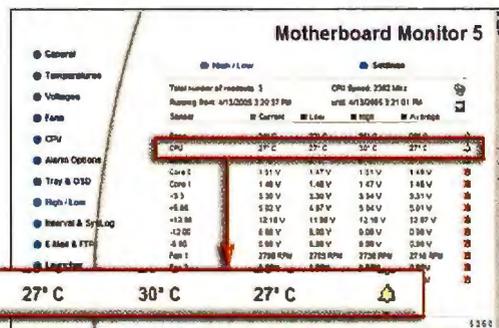
**Monitor your hard drive's health:** Over time, small sections of your hard drive may lose their ability to store data. Run a disk-diagnostic program once a month to spot these bad sectors, cordon them off so they won't be used, and move any threatened data out of harm's way. To perform a basic disk scan in Windows XP

and 2000, right-click the drive's icon in Windows Explorer or in any folder window, and select *Properties*•*Tools*•*Check Now*. In Windows 98 and Me, click *Start*•*Programs*•*Accessories*•*System Tools*•*ScanDisk*, choose the drive you want to check, and click *Start*. The results will tell you whether your hard drive has any bad sectors. For instructions on automating this and other disk-maintenance tasks, see last month's *Answer Line* column by Lincoln Spector ([find.pcworld.com/47830](http://find.pcworld.com/47830)).

Panterasoft's free HDD Health ([find.pcworld.com/47833](http://find.pcworld.com/47833)) constantly monitors your hard drive for signs of trouble in real time. Most PC makers include a diagnostic program that checks all the machine's hardware. If yours doesn't have one, download SiSoftware's Sandra Lite utility (free to try, \$35 to keep; [find.pcworld.com/47836](http://find.pcworld.com/47836)). Another option is #1-PC Diagnostics' \$10 #1-Tufftest Lite ([find.pcworld.com/47838](http://find.pcworld.com/47838)).

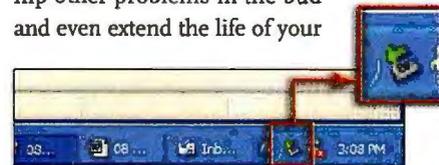
**Collect your discs:** Keep your important software CDs in one safe place. A \$7 CD wallet (available at nearly every department store or discount store) holds 25 CDs in an economical space. Write down any installation keys or registration numbers on the CD with a permanent marker. When you're prompted for the numbers during the reinstall, just open the drive and read the number off the disc.

**Keep it clean:** Cleaning your PC is about as appealing as visiting the Department of Motor Vehicles without an appointment. Still, you should check your PC case's ventilation ports a couple of times a year



**FIGURE 5: KEEP TABS ON YOUR** computer's internal temperature with the free Motherboard Monitor utility.

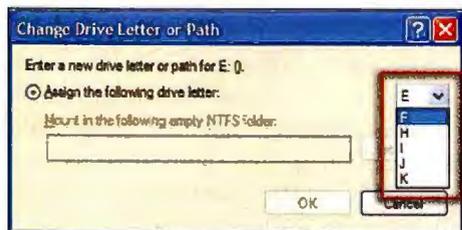
for dust or other obstructions. Clean them with a moist paper towel. Clogged vents invite overheating, which can cause all kinds of trouble for your machine. A more thorough cleaning of your PC can nip other problems in the bud and even extend the life of your



**FIGURE 6: IS IT SAFE** to disengage? Click the Safely Remove Hardware icon to find out.

computer. For more on what to clean and how to do it, read last August's *Hardware Tips* column ([find.pcworld.com/47839](http://find.pcworld.com/47839)) and my online-only "Top Tips for PC Hygiene" ([find.pcworld.com/47978](http://find.pcworld.com/47978)). ■

Go to [find.pcworld.com/31511](http://find.pcworld.com/31511) for past Hardware Tips columns. Send your tips and questions to [kirk\\_steers@pcworld.com](mailto:kirk_steers@pcworld.com). We pay \$50 for published items. Kirk Steers is a PC World contributing editor.



**FIGURE 4: LOCK IN A DRIVE** letter for your storage device in Windows' Disk Management utility.

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**Office DEPOT**

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CISCO SYSTEMS



# INTERNET TIPS

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INTERNET SUITE**

**MAKE PORTABLE  
PROGRAMS SECURE**

**YOUR FIREFOX  
UPDATE IS READY**

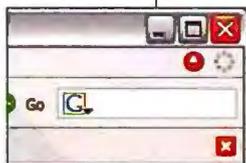
## Internet-on-a-Stick: Mail, Calendar, and Bookmarks

FOR BETTER or for worse, I am married to my e-mail. Wherever I go—to the library, on a business trip, for a visit with relatives, or on a journey to Baja—I check my e-mail compulsively. Unfortunately, Microsoft Outlook with its nicely sorted, spam-cleansed inbox, address book, appointments, and sent-mail folder remains behind on my office computer. When I return from my travels, I often have to download the same e-mail messages all over again. And whether I took a laptop with me or used only my ISP's Web e-mail interface, Outlook contains no record of the messages I sent from the road.

Browsing from other people's PCs was just as inconvenient as e-mailing from them. On my office machine, I logged in to

### FIREFOX UPDATE SIGNALS

INSTALLING SOFTWARE updates to fix security flaws is an important aspect of protecting your PC. Firefox quietly lets you know when a new version is available, although you may never have noticed this. When an update becomes available, Firefox displays a little red icon in its upper-right corner. Simply click the icon to download and install the new version. To ensure that Firefox checks regularly for updates, choose *Tools•Options*, click *Advanced*, scroll down to *Software Update*, expand it, and select *Firefox* in the list of updates to check for. End by clicking *OK*.



**FIGURE 1:** A USB FLASH DRIVE like this SanDisk 512MB Cruiser Micro (\$55 list price) lets you carry your e-mail inbox, calendar, bookmarks, and passwords with you, wherever you go.

a dozen or so personalized sites multiple times each day. Firefox's bookmarks toolbar brimmed with links to my oft-visited sites, which include Gmail, Craigslist, and other sites for news, investments, banking, and research. And the toolbar's password manager knew all my log-ins, simplifying access nicely. Too bad I lost those amenities when I left the house. When I browse from a computer at the local library or at an airport kiosk, for instance, I have no idea what the addresses of some of my lifeline Web sites are—much less my user name and password at them.

But suddenly, all of that has changed. Thanks to a USB flash drive, and to the efforts of the Mozilla Foundation and a New York City-based Web designer named John Haller, my e-mail and browsing have gone fully mobile. Haller has repackaged Mozilla's free

Firefox Web browser, Thunderbird e-mail program, and Sunbird appointment calendar as portable applications that you can install and run from any sufficiently large USB flash drive (a 512MB drive does the trick for me). Alternatively, you can run these applications from a flash memory card, a Zip drive, or even an iPod or other audio player that doubles as an external hard drive (see **FIGURE 1**).

And though it's beyond the scope of this column, Haller has created a portable version of Mozilla's Nvu Web page editor. This version is aimed at people who need to update their Web sites from the field.

### INTERNET TO GO

THOUGH THE MOBILE Mozilla suite isn't perfect—yet—making the switch from Outlook and my ISP's Web e-mail interface to portable versions of Firefox, Thunderbird, and Sunbird has simplified my life. Now, wherever I go, whether I'm schlepping along a laptop or using a USB-endowed public computer, I have my inbox, appointments, bookmarks, and passwords with me, even when I'm disconnected from the Internet.

And when I return to my office, I pick up right where I left off—without having to download the same e-mail all over again. My USB drive still has enough room for me to bring along a few important files and utilities (like the latest versions of AVG and Ad-Aware for disinfecting the in-laws' PC). Best of all, my stuff is secure: As long as my USB drive is

hanging from its lanyard around my neck, bosses and other busybodies can't pilfer my messages, passwords, or browser history. I call it Internet-on-a-Stick.

### THE CAVEATS

NATURALLY, A FEW CONS lurk among the pros. First, for best results you'll need to pick a USB 2.0 Hi-Speed drive and plug it into a USB 2.0 port. In a pinch you can run Haller's portable apps at USB 1.1 speeds, but they'll be noticeably slow.

Second, the latest USB drives are itty-bitty, which makes them easy to leave behind. Choose a device with a key-ring loop; that way, you can attach it to a lanyard, bungee cord, or anything else that will remind you to take the drive with you when you log out. Alternatively, you can leave the drive permanently tethered to your purse, briefcase, or nose ring.

If you do manage to lose the USB drive, the personal data it contains will be more secure if you used its bundled security

software to encrypt its sensitive contents. If you can't find any encryption software accompanying your drive, check the manufacturer's site for a free downloadable version, or try one of these two freebies: Cypherix's Cryptainer LE or Dekart's Private Disk Light (see "Portable Internet Tool Kit" on page 142 for links).

Personally, in most cases I find that decrypting and encrypting files whenever I want to use them is more effort than it's worth. So I leave Portable Firefox and Portable Thunderbird without encryption, but I use each program's own security settings to safeguard the Web site and mail

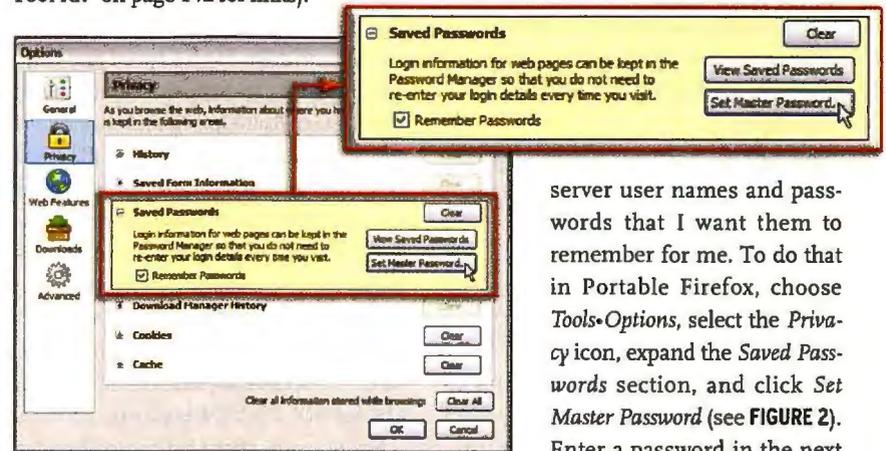
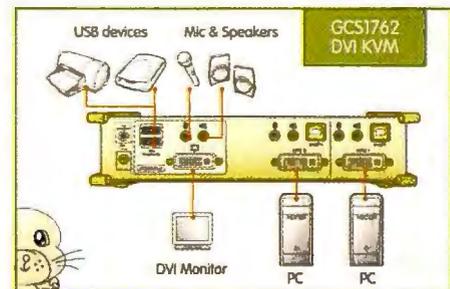


FIGURE 2: PASSWORD-PROTECT PASSWORDS in Portable Firefox in case you lose your USB drive.

server user names and passwords that I want them to remember for me. To do that in Portable Firefox, choose *Tools>Options*, select the *Privacy* icon, expand the *Saved Passwords* section, and click *Set Master Password* (see FIGURE 2). Enter a password in the next dialog box (you'll have to do it twice) and click *OK*. To ▶

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DOWNLOADS OF THE MONTH

Portable Internet Tool Kit

TRANSFORM YOUR USB flash drive into a secure, mobile Internet suite with these free programs.

Portable Firefox 1.0.4, free, 6.15MB;

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Portable Thunderbird, free, 7.33MB;

[find.pcworld.com/47756](http://find.pcworld.com/47756)

Portable Sunbird 0.2, free, 6.0MB;

[find.pcworld.com/47790](http://find.pcworld.com/47790)

Portable Nvu 1.0, free; 7.43MB;

[find.pcworld.com/47786](http://find.pcworld.com/47786)

Cypherix Cryptainer LE, free;

[find.pcworld.com/47758](http://find.pcworld.com/47758)

Dekart Private Disk Light 1.22, free;

[find.pcworld.com/47760](http://find.pcworld.com/47760)

password-protect your e-mail account information in Portable Thunderbird, select *Tools•Options*, click the *Advanced* icon, expand the *Saved Passwords* section, and click *Master Password*. In the next dialog

box, check *Use a master password to encrypt stored passwords* and then click *Change Password*. Enter your password in the provided fields and click *OK* twice.

Haller configured the portable Mozilla apps to minimize the number of times they write to a USB drive. By default Portable Firefox doesn't cache Web pages, and it doesn't track history. If you'd prefer to trade drive life for speed and functionality, you can re-enable both of these by selecting *Tools•Options* and clicking *Privacy*. To enable History, expand the *History* section and in the provided field enter the specific number of days for which you want Portable Firefox to track your browsing history. To enable caching, expand the *Cache* section and then enter the amount of USB drive space (in kilobytes) that you want to set aside for caching, something like 1000KB. Click *OK* to save the changes.

Haller made a few changes to Thunderbird's default configuration, too, with an eye toward prolonging your drive's life.

He warns against enabling Thunderbird's adaptive spam filter, noting that merely marking a single message as spam can require 1000 to 3000 disk writes. It will also slow performance noticeably. I may regret it when my USB drive conks out before its time, but life without a spam filter simply isn't worth living, so I enabled filtering by clicking *Tools•Junk Mail Controls* and altering the settings.

In view of the increased risk of losing your e-mail, addresses, bookmarks, and appointments, make sure that you back up your portable applications regularly. For detailed instructions on how to back up, install, launch, and configure the portable Mozilla programs, visit each application's official Mozilla Web site. ■

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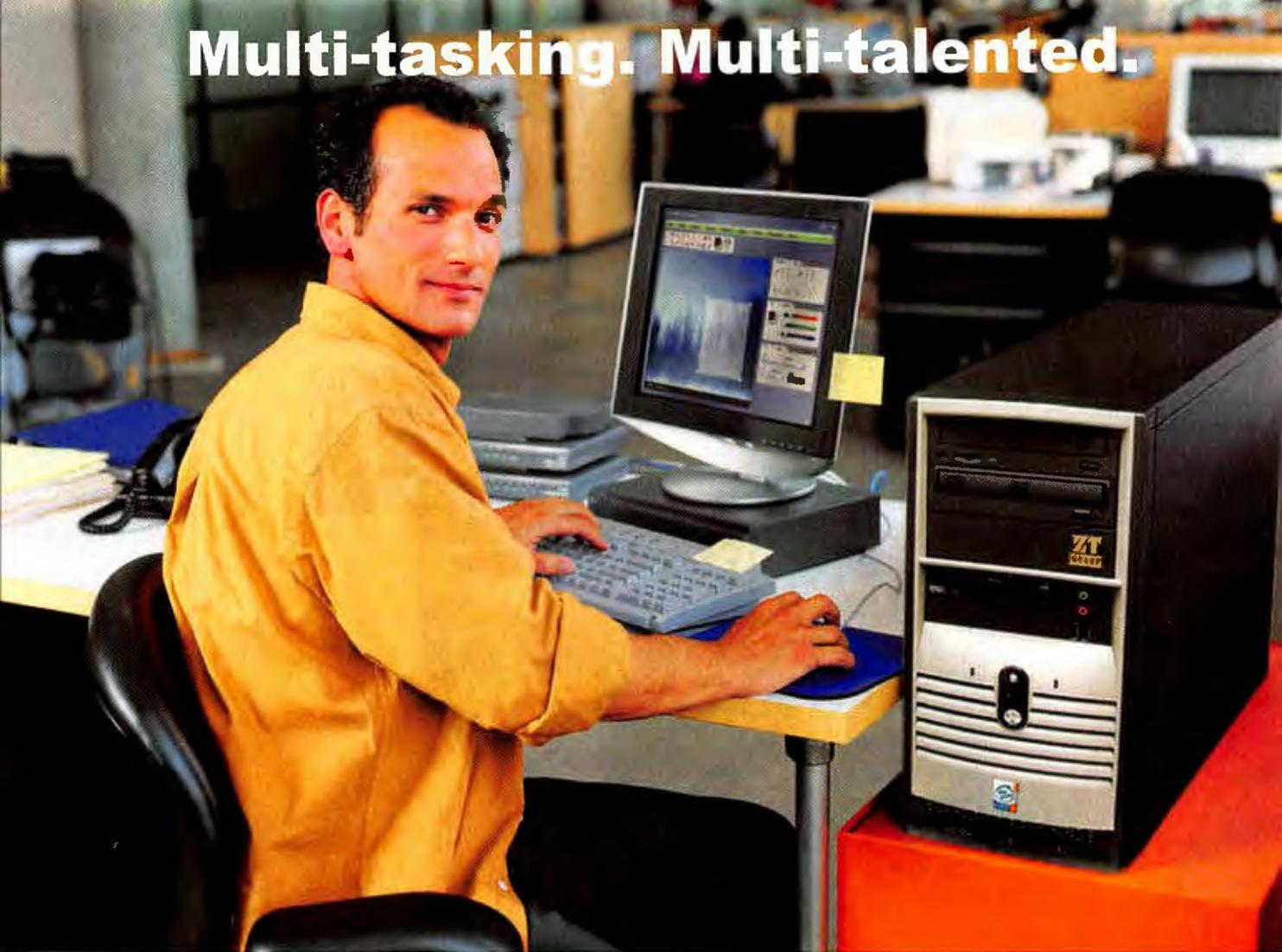


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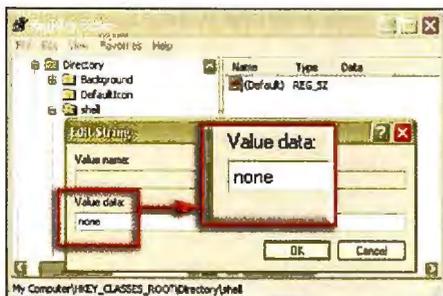
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## WINDOWS TIPS

SCOTT DUNN

# A Simple Fix for Windows' Misbehaving Folders

**Windows XP** IN MY JUNE column (see [find.pcworld.com/48100](http://find.pcworld.com/48100)), I described how to add a New Folder command to your right-click menu. Unfortunately several readers have reported that after they followed the steps I outlined, their default folder double-



**FIGURE 1: FOLDERS DON'T open like they used to? Add this word to your Registry.**

click behavior went crazy: In some cases, when they tried to open Explorer's Folder Options dialog box, they got the Edit File Type dialog box instead; in others, when they double-clicked a folder's icon in Explorer, Windows—rather than opening the folder—launched the Search Companion, the Open With dialog box, or some other application that the readers had set to work with folders. It turns out that these readers had uncovered a bug in Windows' Edit File Type dialog box. Microsoft confirms that this problem can arise after you open the dialog box for folders, even if you make no changes at all! Reader Peter Terry of Millsboro, Delaware, was kind enough to point out both the problem and the solution.

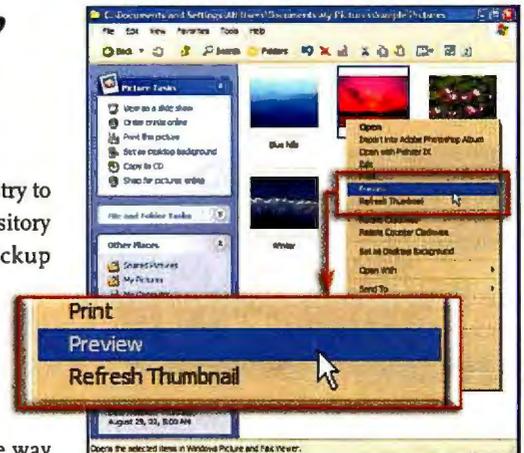
The wacky right-click behavior occurs because opening the Edit File Type dialog box can corrupt a section of the Windows

Registry. Before you enter the Registry to effect repairs on this complex repository of Windows settings, create a backup (see [find.pcworld.com/48101](http://find.pcworld.com/48101) for instructions). With your Registry backup in place, click *Start-Run*, type *regedit*, and press **<Enter>** to open the Registry Editor. In the tree pane on the left, scroll all the way down to *HKEY\_CLASSES\_ROOT\Directory\shell* (if the problem occurs when you double-click folder icons) or *HKEY\_CLASSES\_ROOT\Drive\shell* (if it happens when you double-click drive icons). With the *shell* icon selected in the left pane, double-click the *Default* icon in the right pane. In the Value data box, type *none* and click *OK* (see **FIGURE 1**); then exit the Registry Editor. The next time you double-click a folder or drive icon, it should behave properly. For a faster way to create new folders in Windows Explorer, see the item about BxNewFolder to the right.

## XP'S IMAGE-VIEWER SHORTCUT

**Windows XP** IN LAST MAY'S issue, I provided tips on working with Windows XP's built-in Picture and Fax Viewer application (see [find.pcworld.com/48102](http://find.pcworld.com/48102)). If you've already installed Adobe Photoshop, Photoshop Elements, or some other image editor, double-clicking a digital photo or Web image may open your pictures in that program instead of in XP's own viewer. Fortunately, reader Charles Rydell of Georgetown, Texas, tells us the simplest way to have your image editor and XP's viewer, too: Anytime you want to open one or more images in XP's Picture and Fax Viewer, just right-click a picture file (or a

selected group of them) and choose *Preview* (see **FIGURE 2**). The viewer applet will then launch with your first picture displayed. From there, you can use the *Next* and *Previous* buttons (or the left and right arrow keys on your keyboard) to cycle through all the pictures that are stored in



**FIGURE 2: OPEN THE IMAGE viewer in XP by choosing *Preview* on your right-click menu.**

the current folder (if you opened only one), or through only those pictures that you had selected previously. ■

*Send Windows-related questions and tips to [scott\\_dunn@pcworld.com](mailto:scott_dunn@pcworld.com). We pay \$50 for published items. Visit [find.pcworld.com/31607](http://find.pcworld.com/31607) for more Windows Tips. Scott Dunn is a contributing editor for PC World.*

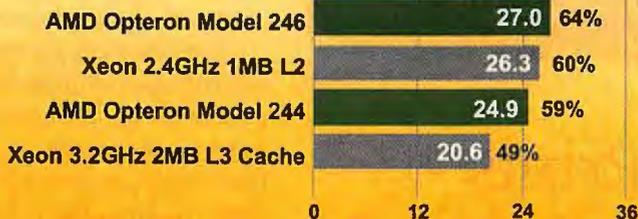
## ADD A 'NEW FOLDER' BUTTON TO WINDOWS EXPLORER

**AT LAST!** With BxNewFolder, the smart folks at Baxbex Software have added to Windows Explorer's toolbar a much-needed button for creating a new subfolder of the folder currently selected. Just click the button and a dialog box appears, prompting you for the folder's new name. Don't like switching from mouse to keyboard? Press **<F12>** to open the dialog box, type the new name, and press **<Enter>** to add your folder. (Or press **<Shift>-<Enter>** to finish naming the folder and navigate to it in one step.) To top it off, BxNewFolder is free for home use. What's not to like? Visit [find.pcworld.com/48104](http://find.pcworld.com/48104) for the download.

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# PHOTO PRINTER TIPS

JEFFREY FUCHS

## Get Great Photo Prints Without Breaking the Bank

AS MANY PHOTO-PRINTER OWNERS have found out, paper and ink costs can quickly exceed the cost of the printer. These six tips will help you get the most bang for your photo-printer buck. And see April 2004's "The Cheapskate's Guide to Printing" ([find.pcworld.com/47984](http://find.pcworld.com/47984)) for great cost-saving tips for any printer.

**Raise the resolution:** Any digital camera less than three years old can capture at least 1 megapixel of data with each shot. This is sufficient to print a good-quality 4-by-6-inch photo; a 2-megapixel image holds enough information to output a higher-quality print of the same dimensions. To generate an 8-by-10-inch print worth framing, you'll need a resolution of at least 3 megapixels. You're in a good position if you have a new camera. As our May point-and-shoot camera chart ([find.pcworld.com/47986](http://find.pcworld.com/47986)) indicates, most new models offer from 4 to 8.1 megapixels.

### KEEP YOUR NOZZLES CLEAR

LEAVING ANY INKJET idle for even a week or two can allow the ink in the tiny tubes that feed the nozzles to dry. The resulting clogs cause streaks and other anomalies in your pictures. If the tubes become too blocked, you'll need the services of a professional (at upward of \$85 an hour). The results of inkjet cleaning kits (which cost from \$15 to more than \$50) are mixed at best. To avoid clogs, print at least once a week. Some printers run a maintenance routine on startup, meaning that you can keep the nozzles clear simply by turning your printer on and off once a week. Check your device's manual to see whether it has this feature.

Adjust your camera to its highest resolution when taking shots you might want to print. Some newer cameras, depending on the manufacturer's menu setup, make it very easy to change resolution on the fly—on purpose or by accident.

**Save your originals:** Don't save the images you plan to print as JPEGs or in any other compressed file format. Each time you compress an image, you lose data. Before working with an image, make sure it's unaltered and in the TIFF format.

**Enhance the image:** Experiment with your image-editing program's cropping, brightness, contrast, and other controls until you're entirely satisfied with the image's composition. Always save the altered file with a new name.

**Plan your print drafts:** If you plan to make test prints that you'll discard later, reduce the image size and load the printer with plain-old \$2-a-ream paper. Your printer software may let you print multiple images on one sheet.

Use matte-finish photo cards instead of glossy photo paper when printing 4-by-6-inch images (assuming that your printer supports this paper size; most do). The cards have a nice look and feel, and they cost about 10 cents each, versus 20 to 25 cents each for full-size photo paper. Place the images that you print on 8-by-10-inch glossy photo paper behind glass for added protection from ultraviolet light, and hang them away from direct sunlight.

**Save on your ink:** Special photo inks such as those that come with Canon's i960 printer ([find.pcworld.com/47988](http://find.pcworld.com/47988)) can

provide your printer with a more refined color palette. Unfortunately, if such ink didn't come with your model, you may have to buy it separately and install it in place of the standard ink cartridges.

In some instances, photos printed using general-purpose cartridges look almost as good as ones printed using photo ink. Another effective trick is to print your black-and-white photos in color mode (with standard color cartridges). This forces the printer to use all of its inks to create the tones in your picture. The resulting prints can be as subtle and precise as pictures printed with photo inks.

**Get your cartridges in line:** Use your printer's controls to realign your cartridges—

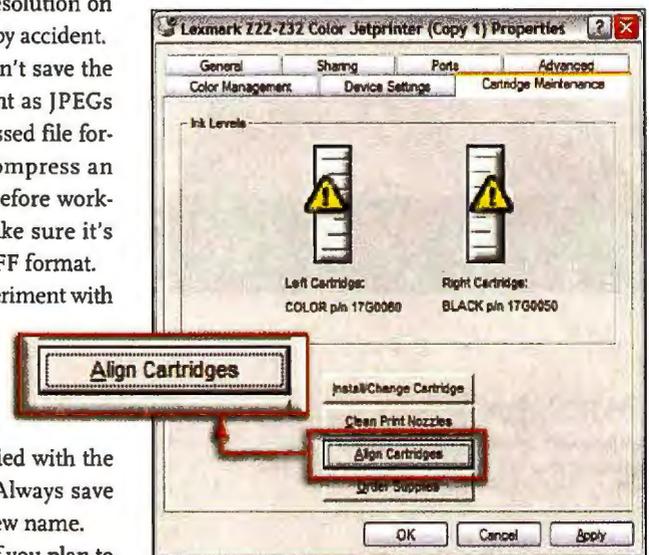


FIGURE 1: AVOID LOUSY PRINTS by making sure your printer's ink cartridges are properly aligned.

especially if you see horizontal or vertical bands, unwanted lines, gaps, or bleeding colors in your prints. Right-click the printer's entry in Control Panel's "Printers and Faxes" or "Printers" applet, click *Properties*, and look for a cartridge maintenance option (see FIGURE 1). If aligning your cartridges doesn't solve the problem, clean the cartridges with a cotton swab dipped in isopropyl alcohol. Use water only as a solvent, and clean just the cartridge itself, never the printhead or the nozzle plate. Always align new cartridges. ■

*Jeffrey Fuchs is a Northern California-based freelance writer.*

## ANSWER LINE

LINCOLN SPECTOR

# Prevent Viruses From Disabling Your Protection

**?** MY PC RECENTLY caught a virus that disabled my antivirus software and blocked my access to almost every antivirus Web site. What can I do?

*Robert Lamar Duffy, Eight Mile, Alaska*

SOME VIRUSES PROTECT themselves by blocking security Web sites, antivirus programs, and other tools that could be used against them, including Windows' System Configuration utility (Msconfig) and

file and choose Notepad or another text editor to open it. Delete any line in the file that refers to an antivirus Web site. Or simply delete the Hosts file; Windows recreates it automatically with zero entries.

Now browse to an online virus scanner to check your hard drive and (we hope) remove the virus. Visit [find.pcworld.com/47880](http://find.pcworld.com/47880) to use Panda Software's ActiveScan (e-mail registration required). It uses an ActiveX control to check your system, so you have to use Internet Explorer.

To keep your system's defenses unblocked, change the extension of any utility's executable file from .exe to

.com (which, like .exe, is executable). Thus, for instance, if a virus won't let you edit your Registry, select *Start*•*Run*, type **command**, and press **<Enter>**. At the prompt, type **ren c:\windows\regedit.exe regedt.com** and press **<Enter>**. Now the command **regedt** will launch the Registry Editor.

Change the System Configuration utility's executable file from 'msconfig.exe' to **msconfig.com**. In XP, this file is in the C:\windows\pchealth\helpctr\binaries folder. In Me and 98, it's in C:\windows\system. (Windows 2000 lacks this utility.)

Change the System Configuration utility's executable file from 'msconfig.exe' to **msconfig.com**. In XP, this file is in the C:\windows\pchealth\helpctr\binaries folder. In Me and 98, it's in C:\windows\system. (Windows 2000 lacks this utility.)

## READ UNREADABLE CDs

**?** YEARS AGO I burned thousands of photos onto CD-R discs using a Windows 98 machine. Now I find that I can't read the discs on my new XP-based PC. How do I get my photos back?

*H.C. Lott Jr., via the Internet*

YOU PROBABLY created the discs using a packet-writing application that came with

a third-party CD-burning program, such as Roxio's Easy Media Creator (it may have been called "Easy CD Creator" in those days) or Nero Burning (aka Nero Burning ROM). Packet-writing software works in the background, so it's easy to forget—or never realize—that you're using it. These programs often use proprietary formats, converting to a universal format only when you "close" the session. If it doesn't close properly, the disc will be unreadable on systems without packet-writing software—and maybe on any PC with a different packet-writing program.

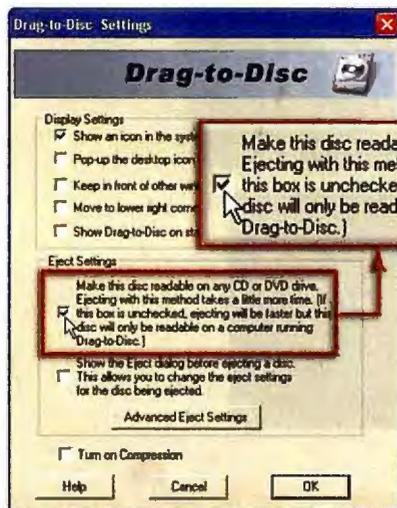
To address the problem, open a packet-writing program on your new PC. In Easy Media Creator, the packet writer is Drag-to-Disc (see **FIGURE 1**). If you use Nero Burning, the program is InCD (you may have to install it separately).

If you can view a disc's contents, close the "session" you just started. You will no longer need a packet-writing app to read that disc. If you don't have any packet-writing software, use the program on your old PC to open and then close the discs. If that computer is no longer available, open and close the discs in a packet-writing program on another machine. ■

Send questions to [answer@pcworld.com](mailto:answer@pcworld.com). We pay \$50 for published items. See [find.pcworld.com/31577](http://find.pcworld.com/31577) for more Answer Line columns. Contributing Editor Lincoln Spector's humorous and other writings are at [www.thelinkinspector.com](http://www.thelinkinspector.com).

## SPICE UP YOUR PLAYLISTS

IF YOU WOULD like Windows Media Player 9 or 10 to play songs in unique but controllable sets, explore your Auto Playlists options. In the Media Library's left pane, right-click *Auto Playlists* and select *New*. When you select *Click here to add criteria*, don't make do with the options on the pull-down menu. Choose *More* for a full selection of filters, including 'Genre', 'Mood', 'Writer', 'Composer', and 'My Rating'. There's even a filter called 'Randomize Playback Order'. By selecting the 'Date Played' filter, you can ensure that you won't hear anything you've listened to recently.



**FIGURE 1: MAKE YOUR CDs readable on any PC when using packet-writing software.**

Registry Editor (Regedit). They cleverly block antivirus Web sites by altering your Hosts file—a text file with no extension that individual programs use to assign a specific IP address to a Web page. In Windows XP, this file is in the C:\Windows\system32\drivers\etc folder; in Windows 2000, it resides in C:\WINNT\system32\drivers\etc; and in Windows 98 and Me, it inhabits C:\Windows. To correct the problem, double-click the Hosts

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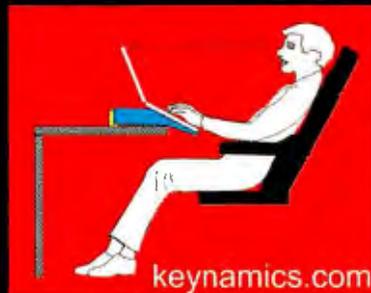
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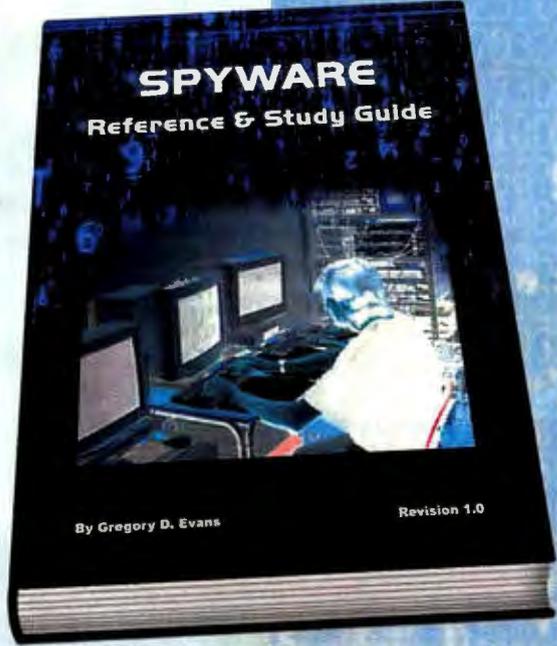
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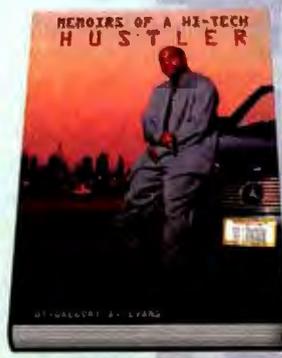
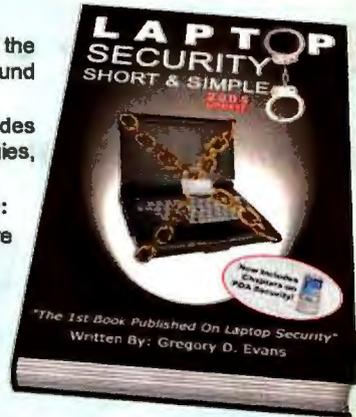
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## Backup Strategies: Increasingly Essential

IT'S TIME TO THINK about backup, and I don't mean just files. I'm talking about your entire digital life. As we increasingly depend on products and services that are anything but perfectly reliable, I keep rediscovering

how often I need to juggle alternatives.

Exhibit A: the cell phone, which we treat as though it were an always-on connection to voice and data. Unfortunately, it's a mostly-on connection, which is an entirely different thing. How many times have you apologized for the call you never received, the call you couldn't understand, the voice mail that announced itself an hour late, or the urgent call you couldn't make because you were out of range?

One alternative is the good old landline, but the venues where your cell phone won't work tend to be the same ones where you can't find a pay phone. I'm too cheap to try a solution some folks have adopted: Carry two phones linked to different carriers' networks. But I have on occasion resorted to the alternative called "My Wife's Phone," which sometimes inexplicably works when mine doesn't even though we use the same service.

When I collect e-mail on my Treo smart phone, I depend on AOL's Mailblocks service, which weeds out spam before messages hit the phone. But when Mailblocks recently stopped working for ten days, I was on vacation in France. It took me a couple of days—in a locale where I was being charged by the megabyte—to figure out what had broken and to develop a workaround that wouldn't break the bank. I settled on picking up mail

via a Web interface that my ISP offered, even though that alternative required a PC with a Net connection and forced me to wade through hundreds of spam messages that the ISP didn't whack.

When I came back to the states, Mailblocks was still on the fritz. My domestic phone plan offers unlimited data, so I picked up mail headers on the phone directly from my ISP and then chopped

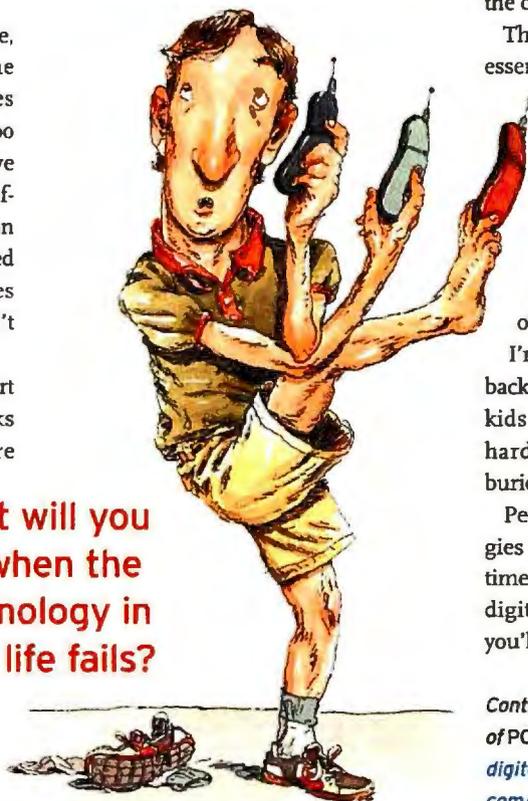
away at spam on the phone itself. But that backup strategy wouldn't have worked if I hadn't remembered the names of my incoming and outbound mail servers.

For years, I've held on to a low-cost, minimal-use dial-up ISP account. I almost never use it, since broadband is so widely available from hotels, coffee shops, and generous or ignorant souls with publicly accessible routers (in Paris, I glommed onto one called "NETGEAR" and in Lyon, one labeled "linksys"). But I know that the day I cancel dial-up will be the day I need to log on from a hotel whose broadband system is down or from my house when the cable service has an outage.

These days, alternatives of all sorts are essential. I generally do my browsing with Firefox, but it fails with enough of the sites I visit regularly (until recently, Mailblocks was one of them) that I have to fire up Internet Explorer. I use my notebook to check the DVD-R discs for my TV show, because the DVD drive on my older desktop PC can't play them. And I'm stunned at how few folks carefully back up precious digital photos that their kids will want to see when the original hard drive that stored the pictures is buried at the bottom of a landfill.

People rarely think about backup strategies until it's too late. Consider taking a time-out to ponder what elements of your digital life are most crucial—and what you'll do when they fail. ■

**What will you do when the technology in your life fails?**



*Contributing Editor Stephen Manes is cohost of PC World's Digital Duo ([www.pcworld.com/digitalduo](http://www.pcworld.com/digitalduo)) on public TV. Visit [find.pcworld.com/31595](http://find.pcworld.com/31595) for more Full Disclosure columns.*



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