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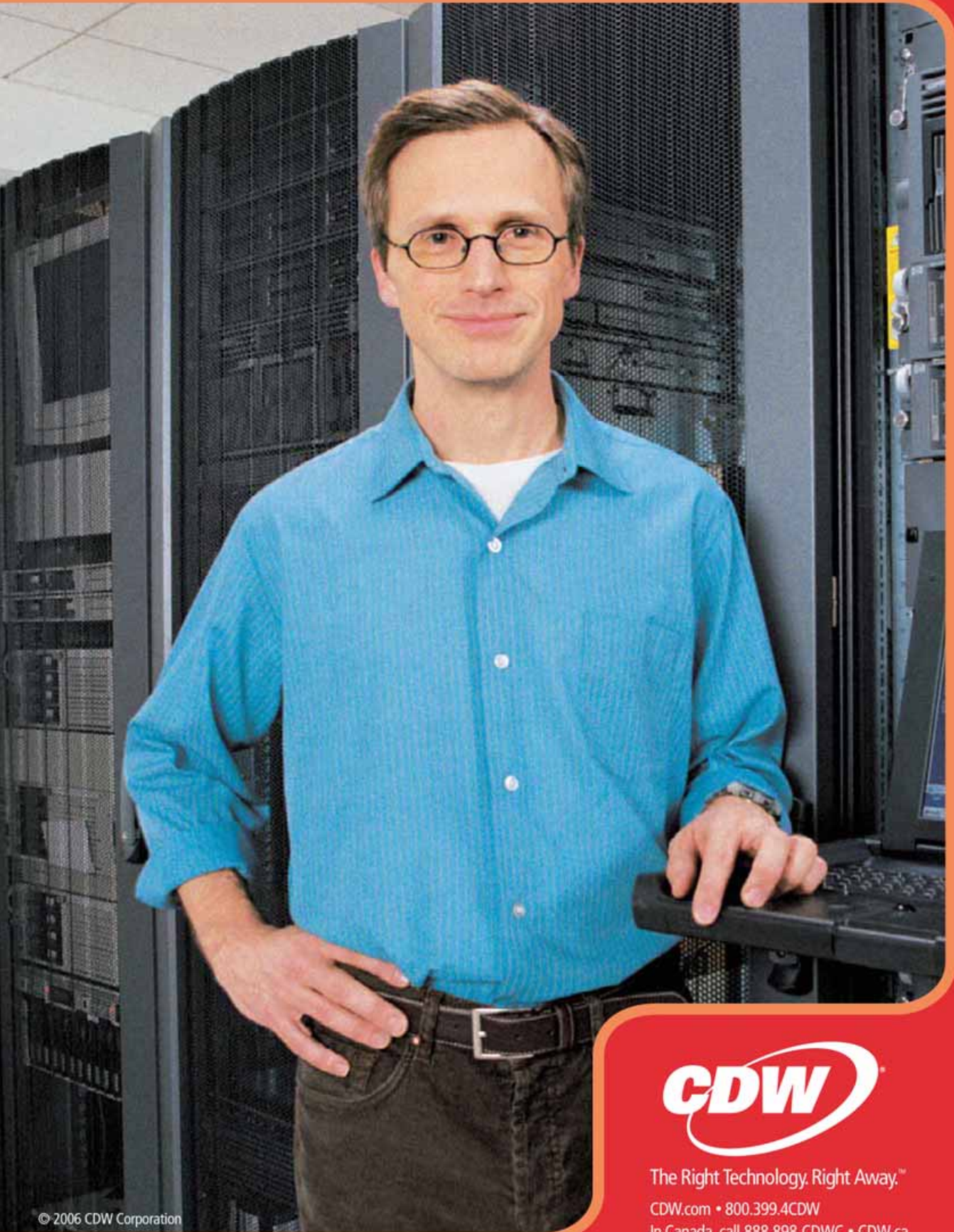
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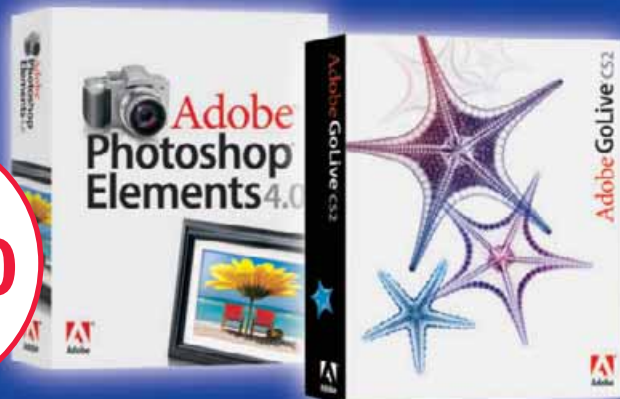


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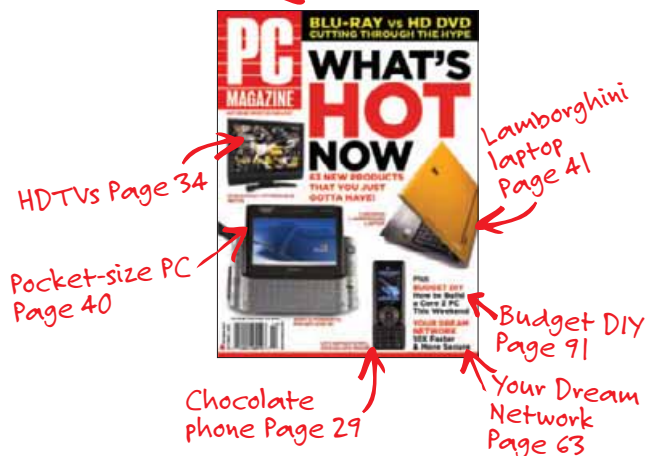
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## COVER STORY

### WHAT'S HOT FOR FALL

The dog days of summer are firmly behind us, and we're jazzed about a world of new high-tech gear and gadgets. Sony's turning our heads with its tiny VGN-UX180P handheld PC, and we can't get enough of the unbelievably affordable HDTV LCDs we have to choose from today. And don't even get us started about the yummy-looking Chocolate phone from Verizon. Want to enjoy the fall as much as we do? Check out our First Looks reviews and Buying Guides.

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## BLU-RAY VS. HD DVD

### THE BATTLE OF THE DVDS

**77** Can you make the switch to blue laser without getting the blues? An amazing amount of hype surrounds the new Blu-ray and HD DVD standards. We sift through it all, explain the new technology, and help you decide which next-generation DVD format is best for you.

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PC Magazine, ISSN 0888-8507, is published semi-monthly except monthly in January and July and three issues in November at \$44.97 for one year. Ziff Davis Media Inc., 28 E. 28th St., New York, NY 10016-7940. Periodicals postage paid at New York, NY 10016-7940 and at additional mailing offices. POSTMASTER: Address changes to PC Magazine, P.O. Box 54070, Boulder, CO 80328-4070. The Canadian GST registration number is 865286033. Publications Mail Agreement No. 40009221. Return undeliverable Canadian addresses to P.O. Box 503, R.P.O. West Beaver Creek, Richmond Hill, ON L4B 4R6, Canada. Printed in the U.S.A.

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## » PCMAG ONLINE

After reading our home-networking story, go to [PCMag.com](http://PCMag.com) for more practical information on wiring (or unwiring) your home. This week, networking expert Davis D. Janowski writes about the ups and downs of relying on VoIP ([go.pcmag.com/livewithvoip](http://go.pcmag.com/livewithvoip)). In addition, we share the details on what it takes to provide Wi-Fi to an entire apartment building in the city ([go.pcmag.com/unwiredapartment](http://go.pcmag.com/unwiredapartment)). And as always, you'll find expert reviews on the latest home-networking products and software.



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## FIRST WORD

BY JIM LOUDERBACK, EDITOR

***I come not to bury Dell, but to praise it. The company has made missteps, but I've been pleased with its products and its efforts to overcome mistakes.***

**D**ELL HAS CERTAINLY TAKEN IT on the chin recently. As I write this, the company is in the middle of a massive battery recall, profits are reported to be down by half, and for the first time in memory, its products do not sit atop our annual service and reliability survey results.

I come not to bury Dell, but to praise it. The company has certainly made some missteps, but I've been consistently pleased with its products and its efforts to overcome its mistakes. Just as Johnson & Johnson pulled every bottle of Tylenol off the shelves after 1982's fatal tampering incidents, Dell got in front of the battery problem. It was the right thing to do. In my meetings with top Dell executives, they uniformly understood the problems and were working together to right the ship.

When it comes to Dell's products, I've also been pleased. I've spent the last month toting around the high-performance, lightweight XPS 1210 subnotebook. I call it a subnotebook, even though it weighs more than five pounds, because the form factor is designed for portability and economy-class seating. It's small enough to fit almost anywhere, yet fast enough for movies, games, desktop search, and much more. Its real-world performance is far above that of the other subnotebooks I've been

testing, including the HP NC2400, the Gateway E-100M, and Lenovo's T series. The built-in EV-DO means almost universal connectivity, and the screen is beautiful. It runs a bit hot, yes, and the battery life is shorter than the HP's. Still, it's powerful enough to do almost anything I throw at it.

When it comes to PC design, however, Apple takes the crown. The new Mac Pro systems are a model of simplicity, probably the easiest-to-upgrade PCs I've seen. I'm still a bit leery of running Microsoft Windows on a Mac, but these new systems are starting to change my mind. Dell, HP, and everyone else ought to be looking at them closely.

Another company doing almost everything right is Motorola. I recently spent some time looking at its latest phones and set-top boxes, and came away impressed with the company's vision. It's all about seamless mobility, starting at home and moving into the network. Video, audio, and voice are all part of Motorola's anywhere, anytime strategy. I like the products so far, although some of the set-top box software still hasn't caught up to TiVo in ease of use and reliability. But the forward-looking concepts and beautifully designed phones are just the tip of the iceberg.

**In the issue:** I'm a huge fan of high-definition television, but I've been less of a cheerleader for the two competing next-generation DVD formats. With stratospheric pricing, few movies, and competing formats, I've been pessimistic about the whole category—at least in the short term. Inside you'll find a rational evaluation of both Blu-ray and HD DVD, and a mostly upbeat assessment of where they're going. After reading Don Labriola's thoughtful piece, I've changed my mind. Someday I'll probably adopt one or the other—but only after the dust settles and prices drop. If you're considering buying one today or you're not sure what to think, don't miss his analysis and our reviews of the first products. Other fun facts inside:

A DIY Conroe system can be put together for less than \$1,500 (sans monitor) and runs half again as fast as the system we built last year for the same price. Yowza. Page 91.

The age of UWB, ZigBee and Z-Wave is upon us. What are they? Our home-networking feature explains all. Page 63.

It's easy to partition a hard drive, and it could save your day. See how in Solutions. Page 102. □

### » TALK TO THE CHIEF

You can contact Jim Louderback at [Jim\\_Louderback@ziffdavis.com](mailto:Jim_Louderback@ziffdavis.com)

For more of his columns, go to [go.pcmag.com/louderback](http://go.pcmag.com/louderback)

Despite recent woes, Dell is doing some things right, such as the XPS 1210, a highly portable powerhouse.





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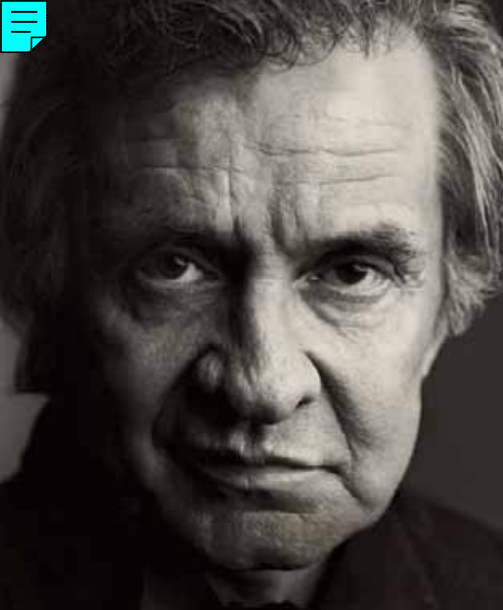


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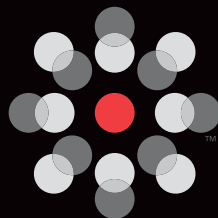
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**NET NEUTRALITY'S DOUBLE STANDARD**

*I have to disagree strongly with Bill Machrone's opinion piece ("Demand Net Neutrality!," August 22, page 58). I shouldn't be surprised that you, as a tech industry magazine, have a self-serving, knee-jerk reaction in support of the online giants on Net neutrality. Your parochial interests aside, Net neutrality is hugely hypocritical for an industry that has long opposed*

government regulation of tech and the Internet as unnecessary and contrary to market forces. Now when the entrenched online giants fear the emergence of broadband competition, they change their tune and run to hide behind the government's regulatory skirt for protection from competition.

In its rawest sense, the effect of Net neutrality is a blatant competitive double standard. eBay with Skype, Microsoft with its collaboration software, Yahoo! with its voice product, and Google with click-to-call all want the business freedom to compete, converge, and integrate into communications, but want to make

it illegal for communications companies to compete, converge, and integrate into tech and the Internet. How does one-way competition serve consumers or innovation? How is it good for the government to choose market winners and losers instead of consumers choosing them through the marketplace?

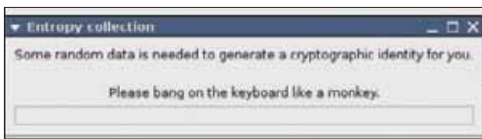
The tech industry's naïveté and shortsightedness on Net neutrality is staggering. They think they can invite the government into their sector to hyper-regulate an emerging adjacent industry competitor, and that the same regulatory appetite won't threaten tech and the Internet. It's playing with fire. I guess regulatory ignorance is bliss.

Be careful what you wish for. . . .  
—Scott Cleland

Scott Cleland is the chairman of Netcompetition.org, which he describes as a Net neutrality e-forum funded by broadband companies.

**ABORT, RETRY, FAIL**

BY DON WILLMOTT



Actually, like a gentle monkey.



Our typical kind of luck.



ARF on the Road: Cuenca, Ecuador. How not to name your computer store.

Hey, Arnold, it wasn't us! (It was Yahoo! News.)



» **ARF NEEDS YOU!** If your entry is used, we'll send you a PC Magazine T-shirt. Submit your entries via e-mail to [arf@ziffdavis.com](mailto:arf@ziffdavis.com). Ziff Davis Media Inc. shall own all property rights in the entries. Winners this issue: Frank Barrett, John Budway, Dave Rogers, and Jono Woodhouse.

**ENERGY CONSERVATION AND SAFETY**

Regarding Lance Ulanoff's "Top Tips for Energy Saving" ([go.pcmag.com/ulanoffenergy](http://go.pcmag.com/ulanoffenergy)), my dad worked for 44 years for the Long Island Lighting Company (LILCO) starting in 1934. I was born in 1936 and heard the "turn out the lights" song all my life. I sing it to my wife, sang it to my kids, and still sing it when they visit. (Kids who once knew enough to turn out lights develop bad habits in college where no one seems to care; they also believe that dad will support the college-learned 20- to 30-minute shower habit for them, their spouses, and their kids. He won't.)

I have also replaced my incandescent bulbs with fluorescent screw-ins. But in doing so, I encountered one problem. One 20+-watt fluorescent is in our timer-controlled lamp. One day we smelled a terrible odor, like something that was burning. We looked through the house and discovered that the innards of the 20+-watt fluorescent bulb were boiling up around the bulb's tubes. Unlike an incandescent bulb, this fluorescent did not burn out. *It burned!* Just what might



have happened had we been away from home, I don't know. But people should be aware that such a thing can happen.  
—Lowell D. Taylor

Wow, Lowell, that's a scary story. I think I'll go double-check all my fluorescent bulbs.—LU

### TECHNOLOGY AS STUPIDITY'S "CANARY"

Regarding Lance Ulanoff's column, "Technology for Idiots" ([go.pcmag.com/techidiots](http://go.pcmag.com/techidiots)), I don't think technology creates an epidemic of stupidity, nor do I believe that it is ruining anyone's life by stripping them of their privacy or their security. The problem is human nature. There are a small number of basic human flaws that apply whether you use technology or not:

1. People tend to be intellectually lazy. They don't want to have to learn anything new, they don't want to study or read, and in fact, they don't even want to have to *think* about anything. I'm not

#### CORRECTIONS & AMPLIFICATIONS

The picture on page 68 of our August 22 issue identified as the Sennheiser PX 100 (which are supra-aural headphones, not earbuds as the text calls them) actually shows Shure E4c earbuds.

talking about technologists here—we're a different breed. We like to learn. But most people actively resist anything new or different.

2. People tend to enjoy being bad. If a scammer can get away with something, it's likely that he'll at least try. There's an inbuilt tendency toward mischief in a large number of people.

3. People like new, interesting, shiny things. They want them for the status these things are perceived to supply. Of course (see #1), people can't be bothered to learn how to use their shiny toys properly. Most people are using equipment that is way outside their skill level.

I believe that technology isn't causing stupidity; it's acting as a "canary in a coal mine" and drawing our attention to the stupidity that already surrounds us. "Hey!" we ask, "where did all this stupidity come from all of a sudden???" It was here all along, we just didn't notice it until the complexity of modern life made it impossible to ignore.

As to what we can do, I'm not sure that there's anything we can do. We might just have to wait until a younger generation gets old enough to take over the reins. Having been raised in our

complex society, they're more adaptable. Until then, I suspect that things will be a little bit hairy.—Philip Perry

You make some very good points, Philip, although I'd tend to disagree with you on #2. I believe that people would rather be good.—LU

### STEALTH PANDAS

The caption under the whale photo in Connected Traveler (September 5, page 24) claims that the San Diego zoo is the home to the only giant pandas in the U.S. I already knew that Atlanta has two, and a quick Google search reveals that there are nine giant pandas in four zoos in the U.S.—Frank Eskridge

Thank you for pointing this out, Frank. We have also received letters on the subject from irate pandas in Atlanta, Memphis, and Washington.

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# PIPELINE

WHAT'S NEW FROM THE WORLD OF TECH



## LEAN INTO IT

Segway has launched round two of its effort "to revolutionize personal transportation." That revolution never quite happened in round one, but the company's new \$4,995 i2 line of self-balancing scooters lets users turn by doing nothing more than leaning to either side—rather like turning on a bicycle. Previously, a user had to use the handlebars and electronics built into the top of the scooter. The new models also let users start their devices with remote controls, and have sleeker-looking designs.

The scooters were originally touted by inventor Dean Kamen as headed for ubiquity, but so far they've been popular primarily with police departments (there is a police-specific i2 model). The leaning metaphor for turning makes the Segway "an extension of your body," says company CTO Doug Field. The jury's out on whether pedestrians at large will take a shine to the i2.



## Phoning with Feeling

**Synaptics wants to change the definition of "touch phone."**

**L**ET YOUR FINGERS DO THE WALKING" IS the idea behind the ultrasvelte Onyx concept phone seen here. This working phone—produced through a partnership between tech firm Synaptics and industrial-design firm Pilotfish—may soon make waves in the mobile handset community. It doesn't require the casing, buttons, and other external parts found on most handsets, and it features a unique touch interface.

The key technology in Synaptics' concept phone is the ClearPad clear capacitive sensor, which can tell with a high degree of accuracy (the resolution the sensor "sees" is greater than 1,000 dpi) where your fingertip is on the display. An example of what the touch input can do is that when playing music on the phone you might turn

a software-displayed scroll wheel rather than a physical one. Another example: The sensor can tell when you've raised the phone to your ear by detecting your cheek, so that you could answer a call by simply putting the phone near your face.

The sensor's presence also means that the concept phone can have what Mandi Mena, senior marketing manager at Synaptics, calls an *adaptive user interface*. "There are no mechanical buttons whatsoever, which allows for a very thin, portable design," she says. "You can have music features, phone features, GPS features, and more, running at the same time."

Synaptics is showing the concept phone to mobile-handset manufacturers around the globe. Phones based on the concept may show up as early as the holiday season.—*Sebastian Rupley*

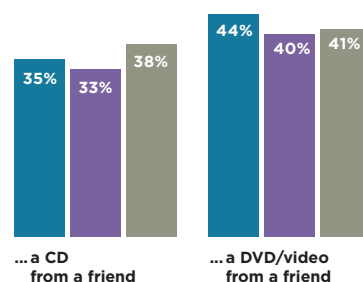
## NOW YOU SEE ME . . .

Futurist Ray Kurzweil has been awarded U.S. patent No. 7,084,874, titled Virtual Reality Presentation, for his technology used to simulate the presence of a speaker at an event. The patent includes "capturing motion of a user, capturing audio of the user, transforming the audio of the user into audio of an opposite gender of the user, and animating a character . . . in real time." Kurzweil often "appears" for lectures from remote locations.

## COPYING CONTENT? NO PROBLEM

Young consumers are aware that downloading music and movies from piracy sites is illegal, but only a minority of them believe it's a crime to burn discs from friends.

Surveyed respondents aged  
■ 15-17 ■ 18-20 ■ 21-24  
believe it's a crime to copy..



Survey of 839 U.S. Internet users Source: Los Angeles Times/Bloomberg, August 2006

**NET SOLDIERS** DARPA (the United States government's Defense Advanced Research Projects Agency) is working on a next-generation version of the Internet, dubbed Knowledge Based Networking. It's intended for soldiers who need ad hoc wireless access.



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# FUTURE WATCH



## BOMB-SNIFFING BOT

**F**IRST CAME THE ROOMBA VACUUM CLEANER. NOW WE HAVE iROBOT'S PackBot EOD (short for *explosive-ordnance disposal*). It may look like a miniature tank, but it's really a robot that defuses bombs. More than 500 of them are deployed in Iraq and Afghanistan, and iRobot is developing several more powerful new versions. The basic PackBot's chassis costs \$58,000, but the ones deployed in Iraq are outfitted with an arm that troops can remotely maneuver, radio and fiber-optic control, several on-board video cameras, and a ruggedized PC, for a total cost of about \$117,000 each.

Using the PackBot, a soldier at a distance from a suspected explosive can send the robot to transmit video showing the nature of the object and, if it is a bomb, dismantle it, shoot forceful streams of water to detonate it, or move it.

"We are now building robots that are larger and more powerful, as well as several that are smaller and lighter," says Joe Dyer, an iRobot division president. These include unmanned vehicles suitable for urban warfare.—*Sebastian Rupley*

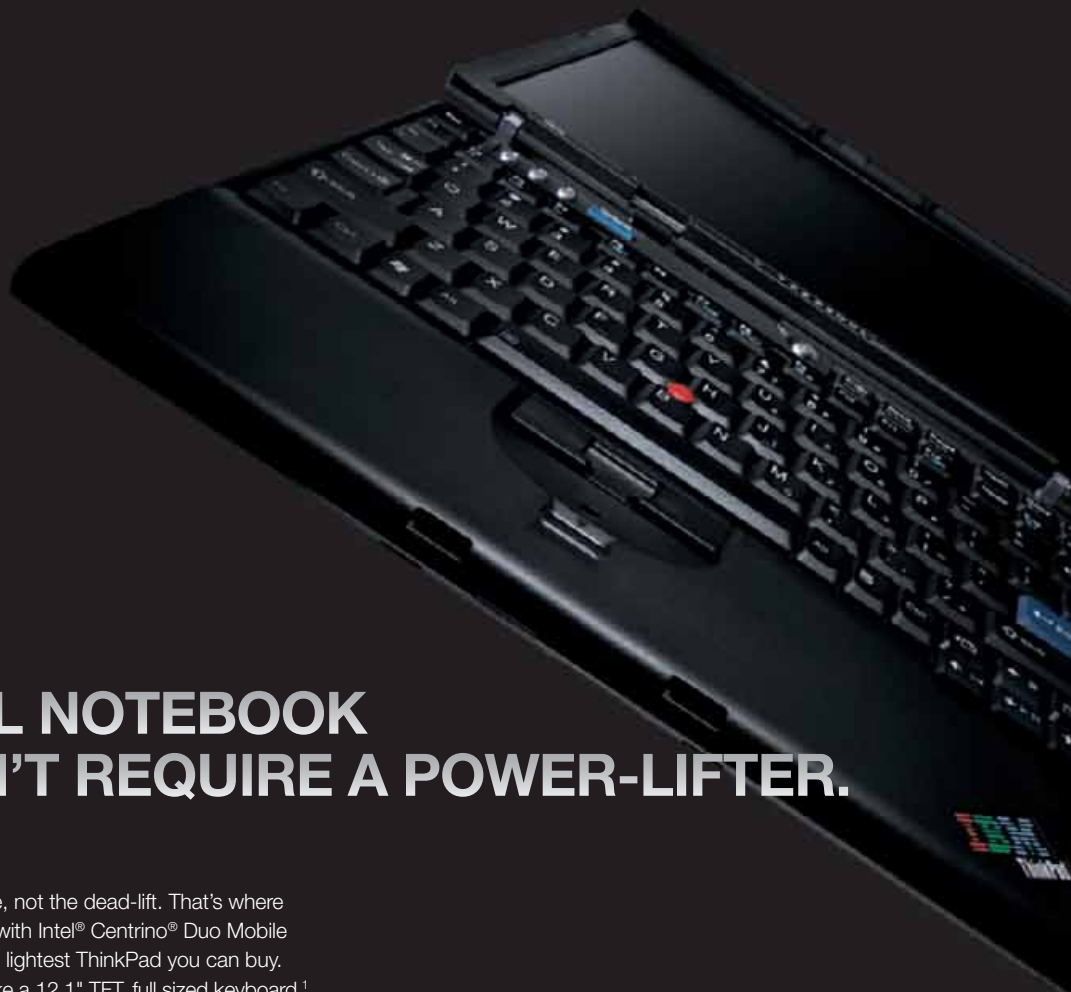


## PRACTICED HANDS

Surgery takes practice, and one of the most advanced ways to train is by using the virtual surgery that's taking shape at Rensselaer Polytechnic Institute. In the simulation shown here, a virtual stomach is cauterized—even including the puffs of smoke one might see during the procedure.

Led by assistant professor Suvranu De, the research team seeks to train surgeons without the need for cadavers or live patients. This photo is part of a set of virtual environments intended for surgeons, and each step in a successful surgical procedure is simulated. For example, another environment lets a surgeon-in-training use a virtual scalpel to work on an organ.

The simulations also include a small handheld haptic device that allows the surgeon to experience what holding and moving a scalpel during surgery feels like. De's team hopes to expand its series from virtual surgical environments to depictions of an entire "virtual human."



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**FAST FACTS** Would you believe there are over 100 streets in Atlanta that include the word "Peachtree"? The state's major crop is peanuts, not peaches. But Georgia is the nation's number one producer of peaches—and pecans.  
**High relief** Stone Mountain Park is home to the world's largest high-relief sculpture, 90 feet high and as much as 12 feet deep in places.



## ACURA MDX

**\$41,000 to \$47,000** (projected)



**EPA MILEAGE** (projected)

17 mpg city, 22 highway

**PROS** Excellent navigation (with real-time traffic information), A/V options, Bluetooth.

**CONS** The cockpit controller hasn't cut down console clutter. Automatic transmission stops at five speeds.

**BOTTOM LINE** Acura's second-generation midsize SUV retains its cockpit technology advantages and now feels equally at home on the track and on a snowy country road.

## TUNED ON A RACETRACK

**A**CURA'S ORIGINAL MIDSIZE MDX wasn't a classic chick car, but women tended to buy, own, and use it—especially upscale moms with car-pool runs. Acura tuned the second-generation MDX at the Nürburgring, Germany's famous racetrack, and the results are impressive, thanks to a combination of a 300-hp V6 engine, a five-speed automatic transmission, and an all-wheel-drive system that varies power not just front-to-back but also left-to-right. Now Dad won't mind leaving the Porsche in the garage.

This MDX continues Acura's tradition of superior technology in the cockpit. The optional Alpine navigation system works well, with its 8-inch display, cockpit controller, voice input, real-time traffic display, and Zagat restaurant ratings. Cockpit control knobs *can* simplify dashboard complexity, but the MDX needs 44 other buttons and dials as well as two displays to get the job done.

Acura makes the options simple. The must-have technology package bundles navigation, two-way satellite communication, a 410-watt DVD audio system, Bluetooth, a backup camera, and GPS-linked cooling (the sunny side gets cooler air). The sport package includes the tech goodies and also upgrades the suspension and leather seats and adds Xenon high beams. The entertainment package includes rear-seat DVD, heated second-row seats, a remote tailgate, and a 110-volt outlet.

The MDX's closest competition is the BMW X5. At the track, Acura was the equal of the outgoing X5 and will likely be several thousand dollars below the replacement X5 model, due out in November. —BH

>> A more in-depth review of the MDX resides at [go.technoride.com/acuramdxd](http://go.technoride.com/acuramdxd)



## LEXUS: MOST DEPENDABLE (AGAIN)

The company took first place in J.D. Power and Associates' 2006 Vehicle Dependability Study. J.D. Power surveyed 37 brands to determine problems found by owners of 2003 cars. The survey showed a fairly even mixture at the top among luxury cars (typically with more technology) and nonluxury brands. Lexus, Cadillac, Acura, Jaguar, BMW, and Infiniti made the top ten list, but so did Mercury, Buick, Toyota, and Honda. "In general, [tech features do] not have a very large impact on the vehicle dependability experience," says Neal Odde, director of product research and analysis for J.D. —BH



**BILL HOWARD**



## KENSINGTON RDS FM TRANSMITTER/CHARGER

The Kensington RDS FM Transmitter/Car Charger for iPod is the neatest way to integrate an iPod into your car and get a remote display. It transmits music through an FM modulator, and it also shows artist and song information on your car's radio display, provided you have an RDS (radio data system) radio. Kensington has managed to reduce the static common to FM modulators, though the transmitter is not completely immune from the static affecting RF modulators.

The Kensington recharges your iPod while you drive. But not all cars have RDS radios; also, there's no line-out jack and nothing to keep the iPod from sliding around as you drive. With Apple now providing iPod connections for the majority of new cars, you might want to check out those options as well.—BH

\$75 street. Kensington, [www.us.kensington.com](http://www.us.kensington.com)



## PICTOMETRY: AERIAL MAPPING FOR CAR NAV

**N**O MATTER HOW MANY STREETS, INTERSECTIONS, AND points of interest you add to your car's navigation-system database, it's hard to soak up more than a couple of gigabytes. When your next car has an in-dash hard drive of 20GB or 30GB—expect more than 100GB by end of the decade—what will you do with the extra storage? How about storing photos of the route, along with your music files?

That's the plan of Pictometry, a Rochester, New York, company that showed its *oblique aerial mapping* prototype at the 2006 Consumer Electronics Show. Developed with Panasonic and 3DVU, the technology uses low-flying airplanes to take digital photographs of streets and buildings from multiple 45-degree angles, so images are easy to understand without the need of a CIA photo interpreter. Already Pictometry is helping to plan golf courses, let SWAT teams see the area in which a suspect is holed up, and let nosy assessors see if your neighbor added a pool without a permit. Windows Live Local uses Pictometry images, too.

**A four-way intersection would have an image for each road of the intersection.**

Hard drive-based car nav systems, says Pictometry Senior Vice President Charles Mondello, have room for images of major intersections, buildings, and points of interest. A four-way intersection, for example, would have four images, one for each road facing the intersection.

One of the challenges for Pictometry has been getting automakers to set reasonable expectations. Having been burned by moving too slowly on tech in the past, some automakers would like every mile of every highway mapped, never mind that you'd need terabyte hard drives in-dash to stash the data.

For automakers, it's also a race to prove the value of \$2,000 in-dash nav systems when portable devices do the basics for \$500, and cell phones for \$10 a month. So cars have real-time traffic reports and Zagat restaurant ratings, and they will soon have predictive traffic information. Bird's-eye-view photos of routes would be one more benefit. But as cars obtain high-speed data access (that's what your cell phone provides), any device with storage or a fast connection could provide photo route guidance. Tech is a great leveler.

Bill Howard is the editor of *TechnoRide.com* and a contributing editor of *PC Magazine*.



## THE SHAPE-SHIFTING HYDROGEN Z.CAR

This drive-by-wire, three-wheeled, hybrid concept car was designed by renowned architect Zaha Hadid. An imaginatively styled two-seater, the Hydrogen Z.Car was commissioned by London art dealer Kenny Schachter, who hopes to put the car into limited production. The Z.Car's design makes it ideal for both urban and highway driving: At low speeds (driving through cities, for example), the passenger pod rises into a higher position, giving the driver a better view of the road and making the car easier to park. At high speeds, the car lowers 10 degrees, dropping the center of gravity closer to the road for better handling. The car's water-drop shape is an allusion to the intended use of hydrogen fuel to power the car.—Errol A. Pierre-Louis

# “We discovered that our network system was wide open to security attacks.”

## Is your mission critical data at risk?

The International Academy of Science, located in Independence, Missouri, recently had a server crash. “We lost weeks of work”, says Dr. Maria Sanchez, President at the Academy. “We had thought that having RAID-5 on our server would protect our data, but it didn’t.”

The Academy develops courses on Acellus, a computerized, video-based learning system. Acellus is helping students in schools and home study programs across America master difficult subjects like math.

After the crash, the Academy decided to bring in the local WideBand partner for a Network Health Analysis to avoid future problems. The analysis found several security holes and warnings on servers and PCs on the network. “We discovered that our network system was wide open to security attacks,” says Dr. Sanchez.

The Academy installed a 100% redundant server with automatic failover and got the security holes patched. Now, thanks to the local partner and WideBand, their data is protected and they can focus on their mission to improve education throughout the country.

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Dr. Maria Sanchez, President  
International Academy of Science

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# FIRST LOOKS

**OUR RATINGS KEY:**  
●●●●● EXCELLENT  
●●●●○ VERY GOOD  
●●●○○ GOOD  
●●○○○ FAIR  
●○○○○ POOR

## TECH ENVY

We all know that technology can increase our productivity and generally improve our lives. But sometimes it's fun just to have someone look at what you're holding and say, "Cool! What's *that*?" With its fist-size hidden keyboard, its antenna, and brilliant screen, Sony's new VGN-UX180P handheld PC is certain to elicit that kind of response. Our review is on page 40.

Sony's not the only company trying to do things a bit differently. Security stalwart McAfee has taken the kitchen-sink approach to system protection. Is that a good thing? Turn to page 46, dear friends.

This edition of First Looks also has its share of flash (Verizon's black Chocolate phone) and practicality (a pair of AIO printers from Brother and HP). We have hands-on reviews of these and 25 other intriguing and useful products. Which ones will get *your* glances?

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**Sony Alpha DSLR-A100**  
\$999.95 direct



**PROS** Very good image quality. Sensor-based image stabilization.

**CONS** Overpriced. Too noisy at high ISOs.

SONY ALPHA DSLR-A100

## GOOD START, BUT NOT THE BEST D-SLR

**S**ONY'S ALPHA DSLR-A100 IS THE COMPANY'S first attempt at bringing a digital SLR to market. You may find this camera familiar, since it's almost identical to the Konica Minolta's 6-megapixel D-SLR, the Maxxum 5D. This shouldn't come as a big surprise since Sony essentially took over Konica Minolta's camera business last year. But is the Alpha a rejuvenated 5D model or simply a rebranded device? It turns out that the A100 is somewhere in between.

New features include a 10.2-megapixel CCD, instead of 6, which is suitable for making very large prints or significantly cropped photos. There's also an anti-dust technology system that uses a static-free coating on the CCD, combined with vibrations to keep the sensor clean.

Overall, the Alpha A100 shoots very good pictures, especially when used outdoors with ample

lighting. The image stabilization feature worked well, and the burst mode let me shoot literally hundreds of consecutive shots on the CompactFlash card, which must be purchased separately.

Testing revealed some problems, however. Using a high ISO setting produced more noise than I like to see. I also found that the resolution is low for a 10MP camera; in fact, it scored more like an 8MP camera on my resolution tests. In addition, the camera took a sluggish 1.3 seconds to boot up and fire off a flash shot, and it had a relatively poky 1-second recycle time.

As a first digital SLR, the Sony DSLR-A100 offers consumers a lot to like. But given the price, competing D-SLRs offer better picture quality and more innovative features.—Terry Sullivan

>> For more in-depth analysis: [go.pcmag.com/a100alpha](http://go.pcmag.com/a100alpha)



Includes stereo Bluetooth

Feather-touch buttons are attractive but tricky to use

CHOCOLATE BY LG/LG VX8500

## LUSCIOUS AND DELECTABLE CELL

**V**ERIZON'S BEST MUSIC PHONE MAY BE AN ACQUIRED taste, but it's more sweet than bitter. The LG Chocolate (aka the LG VX8500) combines several ingredients, some of them gourmet: a pretty good phone with support for both MP3s and protected WMAs played from a microSD card, a flashy new interface (designed in Adobe Flash Lite) and—finally—stereo Bluetooth headphone support for a truly wireless music experience.

This chubby slider certainly won't be mistaken for any other phone, especially when you slide down the keypad and light up the touch-sensitive navigation buttons. But watch out! That may look like an iPod-style scroll wheel, but it's really just a cursor pad. An oddly placed End key will also cause some confusion, but you'll get used to it.

The screen is sharp and the earpiece is loud and quite clear, but unfortunately there's no speakerphone. Battery life is also less than I'd like, about 3 and a half hours of talk or 8 hours of music. But the music features here outpace those of Verizon's RAZR V3m, and the slick design stands out in a crowd. That's worthy of our Editors' Choice in my book. —*Sascha Segan*

>> For more in-depth analysis: [go.pcmag.com/chocolate](http://go.pcmag.com/chocolate)

### Chocolate by LG/LG VX8500

\$149.99 to \$299 direct

●●●●○



**PROS** Beautiful. Stereo Bluetooth. MP3 support.

**CONS** No speakerphone. Difficult learning curve with buttons.

JBL RADIAL

## THIS AUDIO SPEAKER RINGS TRUE

**T**HE JBL RADIAL IS AN EXTREMELY WELL-DESIGNED iPod speaker, but you definitely pay a premium for its smart looks and sound. Of course, there's always some room for improvement.

Built in a vertical ring-shaped design, the Radial is striking, elegant, and attractive, not to mention functional. Though the unit is quite small, four full-range drivers and a downward-firing subwoofer on the bottom provide impressive, full sound no matter where you are in relation to the speaker.

The universal iPod dock in the center of the ring works with all dock connector-equipped iPods. Other types of players can use the auxiliary port on the back of the unit with the included audio line-in cable. The Radial's remote control uses the 2.4-GHz radio frequency rather than infrared, so you don't need a direct line of sight to control the speaker.

A more accessible power button on the remote and some type of volume indicator for the speaker would be handy, but overall I recommend this speaker highly for its small size and clear, high-quality sound. It isn't as powerful as the Bose SoundDock or the Apple iPod Hi-Fi, but it's plenty loud enough to fill small to medium-size rooms. —*Mike Kobrin*

>> For more in-depth analysis: [go.pcmag.com/radial](http://go.pcmag.com/radial)

Distinctive, looks great, and produces pleasing sound



### JBL Radial

\$299 list

●●●●○

**PROS** Superb sound quality. Wide sweet spot. Attractive design. RF remote.

**CONS** No power button on the remote. Power button inconveniently located on the back of the unit. No volume indicator.

RF Remote doesn't need line-of-sight

Toshiba recommends Windows® XP Media Center Edition.

**NEW!**

**Qosmio™ G35-AV650 AV Notebook PC**

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Intel® Centrino® Duo Mobile Technology

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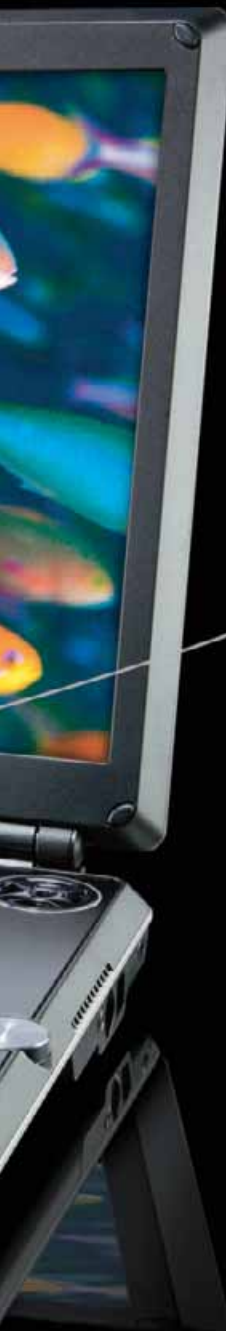
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Fingerprint reader to help prevent unauthorized access

17" diagonal 1080p Ultimate TruBrite WUXGA display



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Mounts on windshield with suction cup

Connect microphone for hands-free calling

**TomTom Go 910**

\$799 list

●●●●○

**PROS** Excellent language support. User-configurable navigation screen. Outstanding text-to-speech capabilities. Large 4-inch WQVGA screen.

**CONS** Traffic receiver not included. Limited cell-phone support.

TOMTOM GO 910

**A POWERFUL, PRICY NAVIGATOR**

**W**HEN STACKED UP AGAINST OTHER GPS DEVICES, the TomTom GO 910 holds its own by offering a nice range of features. But given the steep price, a few key extras are noticeably absent.

Equipped with a big 4-inch widescreen WVGA (480 by 272 pixels), the GO 910 measures 4.2 by 3.1 by 2.5 inches and weighs 12 ounces. It uses a 20GB hard drive to store maps and POIs (Points of Interest). The built-in lithium ion battery powers the unit for about 4 hours.

Like many new GPS devices, the GO 910 uses the ultrasensitive SiRF Star III receiver, which makes getting a satellite fix a cinch. Unlike the competition, however, it also includes detailed maps of Europe. This is a nice feature for world travelers, but most domestic drivers would be happy to do without it if it lowered the price. For language support, the GO beats all others hands down because it speaks 36 languages. Navigation prompts were issued at appropriate intervals in a natural-sounding voice.

Overall, the TomTom GO 910 is a solid machine and a pleasure to use. Also, the device's Bluetooth phone interface is pretty useful, although the list of supported handsets is quite small. Still, I did observe a few routing glitches, and the lack of a traffic receiver was disappointing. It's a nice device, but for this price you should have it all.—Craig Ellison

>> For more in-depth analysis: [go.pcmag.com/go910](http://go.pcmag.com/go910)

Press the call button to connect with your IM buddies quickly



Actual Size

MICROSOFT LIFECAM VX-6000

**CREATE ONLINE FACE TIME**

**T**HE MICROSOFT LIFECAM VX-6000 ADDS a layer of intimacy to instant messaging and makes video chatting with friends and family simple. Capable of 1,280-by-1,024 video and 5-megapixel (interpolated) still shots, the webcam also works seamlessly with the newly released Windows Live Messenger. Of course, the camera works with AIM and Yahoo! Messenger with Voice (beta) as well.

Making a video call with Live Messenger is easy. Just press the call button on top of the VX-6000 and choose from a list of current online buddies. I found the video quality to be good, and the 30-fps frame rate kept things steady. Unfortunately, the unidirectional microphone didn't pick up sound so well.

You can control pan, tilt, and zoom, and you can e-mail webcam photos or upload them to Windows Live Spaces with a mere mouse click. The VX-6000's 71-degree wide-angle lens allows multiple

people to crowd around the camera. There's also a cool face-tracking feature that always keeps your mug in the frame no matter how much you fidget.

The VX-6000 is a reasonably priced webcam with a good set of features, but I wish the microphone worked a little better.—Molly K. McLaughlin

>> For more in-depth analysis: [go.pcmag.com/vx6000](http://go.pcmag.com/vx6000)

**Microsoft LifeCam VX-6000**

\$99.95 list

●●●●○

**PROS** Easy to set up and use. Includes pan, tilt, and zoom control.

**CONS** Microphone volume needs to be turned up high in order to pick up sound.

# PERFORMANCE-DRIVEN DESIGN.

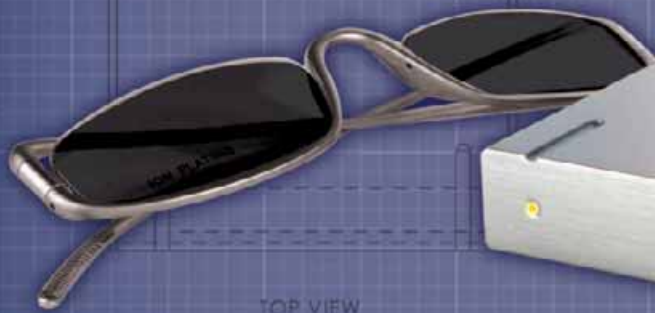


PHOTO ACTUAL SIZE

## LACIE MOBILE HARD DRIVE : DESIGN BY F.A. PORSCHE

The result of decades of expertise, this hard drive offers award-winning design and performance. The designers at Porsche Design GmbH believe that a formally coherent object needs neither ornamentation nor enhancement. Its neat, clean lines suffice; they are invariably understated, obvious and never stray from the product's spirit and purpose. [www.lacie.com](http://www.lacie.com)

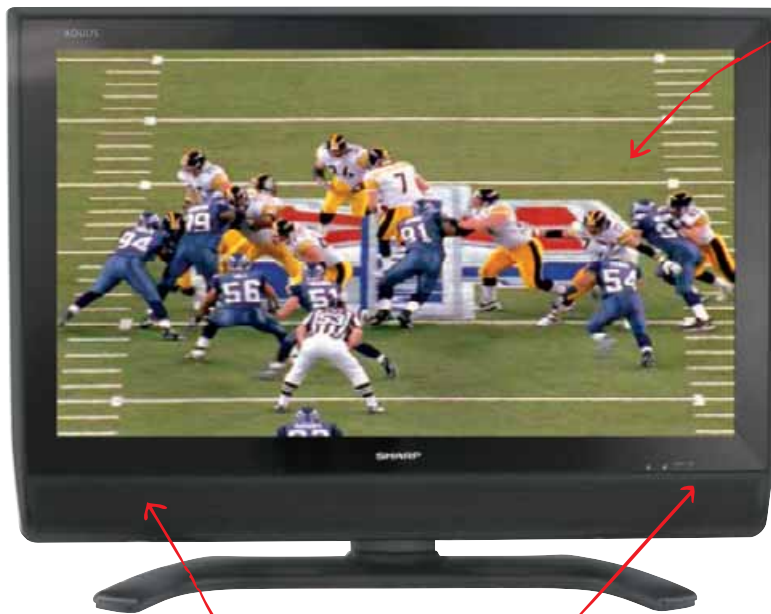
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High design. High performance.

## BUYING GUIDE

# LCD HDTVs



1,366-x-768-pixel screen supports 720p

10-watt stereo speakers pump out good audio

### SHARP AQUOS LC-32D40U LIQUID CRYSTAL TV

\$1,599.99 list



The Sharp LC-32D40U Aquos Liquid Crystal TV isn't the cheapest 32-inch LCD HDTV out there. But this impressive display delivers a more complete picture than most, including realistic, accurate color and dark detail that lesser LCDs discard.

Historically, adjusting the always-on backlight has been problematic with LCD TVs, but this set offers superior controls. The LC-32D40U really stood out, producing the darkest blacks I've measured to date from an LCD flat panel—darker than most plasma TVs can achieve.

Add to all this a stylish design—and plenty of quality video connections—and the LC-32D40U easily earns our Editors' Choice.—*Robert Heron*  
» For more in-depth analysis: [go.pcmag.com/32D40U](http://go.pcmag.com/32D40U)

**W**HEN SHOPPING FOR a thin, flat-screen HDTV that you can hang on your wall, you have two choices: plasma or LCD. For really large TVs, say 42 inches and up,

plasma displays remain the most cost-effective, but for small to mid-size screens, liquid crystal displays (LCDs) dominate the market. The average price of LCD HDTVs is steadily declining, but the old axiom “you get what you pay for” still applies. Knowing when you should spend a little extra, and what for, often means the difference between long-term satisfaction and simmering regret. Fortunately for you, I have everything you need know right here.

**LCD TV BASICS** As with any HDTV purchase, the first thing you need to consider is screen size. For LCD HDTVs, 50 inches (measured diagonally) is a good upper limit to keep in mind. Above that size,

LCD prices skyrocket; Sharp's 57-inch and 65-inch models command five-digit price tags! The few 32-inch LCDs that were approaching the \$1,000 mark a year ago have morphed into a growing crowd poised to dip below \$800, and prices for some models will go even lower before year's end. And now LCDs in the 40-inch range are starting to challenge similarly sized plasma panels in terms of pricing.

In any LCD size category, you'll find significant variation in pricing among the various models. As you would expect, lesser-known brands often offer the lowest prices, while more familiar names command a premium. I'll get into specific display characteristics to look for when shopping for an LCD HDTV in a moment, but generally speaking, the more you spend, the better the resulting picture quality will be.

A low price doesn't just magically happen. The inexpensive HDTVs often sacrifice something, be it image quality, integrated features, or even included accessories or customer support. Don't expect perfection from the cheapest LCDs, but if you're



# LCD TVS IN REVIEW

RED indicates Editors' Choice. Prices cited are list prices. Products are listed from best to worst by rating.

<b>Sharp LC-32D40U</b>	●●●●●	\$1,599.00	32 inches	<b>THE BEST</b> With a superior picture, good-sounding speakers, and stylish design, the Sharp LC-32D40U is a real treat for the senses.
<b>Westinghouse LTV-32w3 HD</b>	●●●●○	\$800.00	32 inches	<b>BUDGET BUY</b> A surprisingly well-equipped LCD HDTV that delivers solid image quality. Color and viewing angles aren't perfect, but the price is right.
<b>Westinghouse LVM-42w2</b>	●●●●○	\$2,299.99	42 inches	<b>LARGE FOR LESS</b> One of the least expensive 1080p monitors currently available. Though color quality lags, the set provides impressive detail.
<b>ViewSonic N3760w</b>	●●●●○	\$1,599.00	37 inches	<b>WIDE VIEW</b> This set has great viewing angles for a value-priced LCD. Also, its decent video processor keep the obvious artifacts at bay.
<b>Vizio L32 HDTV</b>	●●●●○	\$849.99	32 inches	<b>GO DIGITAL</b> A great value, this HDTV is attractively styled and priced. Video quality, however, is worse with component video than with digital.
<b>WinBook 32M0</b>	●●●●○	\$999.99	32 inches	<b>DUAL HDMI</b> The WinBook 32M0 delivers better color quality than many other LCD TVs, along with a nice selection of video inputs.
<b>Sony Bravia KDL-V40XBR1</b>	●●●○●	\$3,199.99	40 inches	<b>HDTV YOUR WAY</b> Possesses a highly customizable, if confusing, menu system. Performs admirably when displaying high-definition video.
<b>Sceptre X37SV-Naga</b>	●●○○○	\$1,499.00	37 inches	<b>FULL 1080P</b> Offers an impressive list of features, including 1080p resolution and both analog and digital video inputs. But color performance is subpar.

>> Get more LCD HDTV reviews online at [go.pcmag.com/LCDTV](http://go.pcmag.com/LCDTV)

willing to sacrifice a little bit here and there you can save a lot of money.

Liquid crystal TVs offer two distinct advantages over plasma displays: high resolution and a bright picture. LCD TVs offer more pixels per given screen size than plasma displays. And because LCDs pack pixels more closely together, a person can sit closer to the screen before noticing the individual dots that make up the picture. LCD HDTVs with at least 720p resolution (1,280 by 720 pixels progressive) are available in screen sizes starting at just over 20 inches. By comparison, the smallest plasma TVs that offer 720p resolution start at 50 inches and use larger pixels spaced further apart, thus increasing the optimal viewing distance. Hence, in a small room LCDs have an edge.



**Westinghouse LVM-42w2**  
Big screen for a decent price.

Resolution is often used as an HDTV selling point ("it's 1080p!!!"), but factors like image contrast and color quality are more critical to the quality of a viewing experience than the number of pixels a particular display offers. I also see video-processing features such as noise reduction as very important for LCD HDTVs. For example, the **WinBook 32M0** delivers impressive color quality for a value-priced LCD, but its lack of effective video-noise reduction magnifies the film grain of some movies to the point of distraction. If you want to get the best possible picture from your HDTV, make sure the vendor didn't skimp on the video processing.

LCDs are a *transmissive* display technology, meaning that the light you see originates from a source located behind the screen. That source, or backlight, is usually a set of very bright fluorescent lamps that enable modern LCD TVs to produce up to three times the light output (luminance) of a plasma television. Factor in an antireflective screen surface and you have an ideal display for a well-lit room.

Of course, the ideal environment for watching video is a very dark room. Once acclimated to a dimly lit environment, the eye's perception of image contrast increases dramatically, enhancing a person's ability to see dark details that would otherwise appear indistinct from a black background or from the bars of a letterboxed movie. Some LCD TVs provide a "movie" mode that reduces light output to eye-comfortable levels, but a better solution is a backlight control that enables the viewer to tailor the display's overall light output to ambient lighting conditions. The **Sharp LC-32D40U**, for example, provides a good manual backlight control whose lowest setting is ideal for a completely dark



**Vizio L32** Affordable and has a lot of ports.



**WinBook 32M0** Two HDMI ports are always better than one.



## EXPERT VIEW

BY ROBERT HERON

### BIG SCREENS DON'T ALWAYS MEAN HDTV

**S**AD BUT TRUE: MANY HDTV OWNERS AREN'T ACTUALLY viewing high-definition video on their new sets. I like to describe the HDTV "experience" as a three-part puzzle consisting of a source, the delivery, and the display. And if any one of these pieces is missing, then what is seen is simply not in high definition.

Starting with the *display*, an HDTV provides a wide-screen picture, a minimum screen resolution, and a digital broadcast tuner. Thankfully, any TV that has the HDTV logo on the box must provide all of these features. Anything described as an "HD monitor" or "HD Ready" means that the display lacks an integrated digital broadcast tuner but offers a widescreen picture and HD resolution.

The *source* refers to the video itself. Video shown on an HD channel isn't necessarily high-definition. ESPN HD broadcasts in a high-definition format,

**The most insidious problem is the fact that all video on TV is highly compressed.**

but sometimes the network displays video with pillar bars on the left and right sides of the picture. In such cases, the pillar-barred video was not originally recorded in high-definition resolution. Same thing applies to in-car cameras used in NASCAR races.

*Delivery* describes how high-definition video reaches the TV and eventually our eyes. Most people receive hi-def programming via cable or satellite subscription services. To display an HD picture, you need to subscribe to HD service and have a set-top box that can receive HD programming. In addition, the connection between the set-top box and the HDTV must support a high-definition signal. The only video connections on an HDTV that support HD signals are component (YPbPr), HDMI, and DVI.

Unfortunately, other delivery dangers are more difficult to quantify. The most insidious problem is the fact that all video on TV is highly compressed. And as much as I appreciate the convenience of cable and satellite HD programming, I've yet to see either deliver a visually complex movie in HD without pixelation. Compared with these sources, Blu-ray and HD-DVD deliver three times as much video information per second, ensuring that fast-action sequences don't turn into a blocky mess. In short, all "HD" is not equal.

Robert Heron is PC Magazine's lead analyst for HDTVs.



**ViewSonic N3760w**  
Bright, wide viewing angles; nice picture.

environment, while its maximum level delivered well-contrasted imagery in a brightly lit room.

Unfortunately, not all LCDs offer this functionality, and some that do limit the range of backlight control, making it ineffective. Some LCD TVs—using a sensor that measures ambient lighting conditions—automate the backlight setting. I consider a good backlight control, manual or automatic, a must-have feature in an LCD HDTV, and I wouldn't recommend a system without it.

One downside of an LCD's transmissive nature is viewing angle. Because an LCD produces imagery by channeling light through a sandwich of

32-inch diagonal



**Westinghouse LTV-32w3 HD**  
Budget model with pleasing image quality over its DVI port.

glass filters, picture qualities such as color, color saturation, and luminance can alter significantly as viewing angles increase. With the least expensive LCD TVs, such as the **Westinghouse LTV-32w3**, viewing-angle artifacts are noticeable starting at about 30 degrees off center. The more expensive **Sharp LC-32D40U** exhibited less severe artifacting, starting at about 40 degrees off center.

**KNOW YOUR CONNECTIONS** As with any HDTV, having the right video inputs and enough of them will ensure the best picture quality from a variety of sources. The two most common video inputs capable of carrying a high-definition video signal are component and HDMI. Component video is a common connection available on many progressive-scan DVD players and video-game consoles. Unless the source device offers a digital video output such as HDMI or DVI, a component-video connection is the way to go.

Nowadays, most LCD HDTVs provide at least two component-video inputs, and there is really no reason to use anything less than this capable analog video connection. LCD TV manufacturers are starting to equip their sets with two or more digital video inputs as well—typically, HDMI and DVI inputs. When possible, use an LCD's digital video input for improved image quality. If the LCD you are considering has only one digital video input, as is the case with the **Sony Bravia KDL-V40XB1**, be sure to use it with the source that you watch most often and that offers this output, be it digital cable, satellite, or DVD player.—RH

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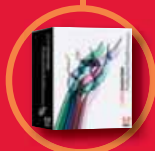
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SONY VAIO VGN-UX180P MICRO PC

## FREE TO BE A TINY PC

**T**HE TINY, AND PRICEY, SONY VAIO VGN-UX180P Micro PC gives you the functionality of a Windows XP-equipped PC with the convenience of a miniature handheld device. Well, almost. At 3.7 by 5.9 by 1.3 inches (HWD) and 1.2 pounds, the UX180P is significantly smaller and lighter than a laptop. It's loaded with a full-blown edition of Microsoft Windows XP Professional, two webcams (in front and back), and a sharp, amazingly bright 4.5-inch XBrite LCD screen.

Pushing the screen upward reveals a QWERTY thumb keyboard with a blue LED backlight, which I found extremely handy for late-night browsing. But the keys lie flat against the surface, making typing anything longer than a couple of sentences a pain. I had to use the tips of my fingers to punch in each keystroke. Forget typing in combinations of keys, such as Ctrl-Alt-Del. Still, the UX180P is perfect for

tasks like answering short e-mails and navigating through the Web.

With its 1.2-GHz ULV Intel Core Solo (U1400) processor, 512MB of non-upgradable RAM, and integrated graphics, don't expect lightning-fast speeds. The UX180P's battery life could also be better, at 3 hours 55 minutes on MobileMark 2005 tests. The flip-up antenna on the back of the unit is an excellent feature that gives you access to Cingular's EDGE network, allowing you to surf at broadband speeds with a cell-phone connection. It also has built-in Wi-Fi and Bluetooth capability.

The UX180P is a device I'd use to compose short e-mails, browse the Web, watch my favorite videos, and even substitute for my MP3 player. Anything more than that would require the patience of Job (and really tiny fingers).—*Cisco Cheng*

>> For more in-depth analysis: [go.pcmag.com/sonyux180p](http://go.pcmag.com/sonyux180p)



**Sony VAIO VGN-UX180P**  
\$1,799 direct



**PROS** Pocket-size PC. Integrated cellular modem from Cingular. Built-in QWERTY keyboard. Touch screen. Flashlight-bright LCD screen. Front and back webcams.

**CONS** Difficult to do any real work on the keyboard. Less than desirable performance.



Unmistakable  
Lamborghini logo

Sloped lid  
mimics  
the hood  
of a sports  
car

ASUS-LAMBORGHINI VX1

## A FAST, SEXY LAPTOP

**T**HE LOVE AFFAIR BETWEEN LUXURY CARS AND powerful laptops continues with the ASUS-Lamborghini VX1. The one I tested comes with a bright yellow top that slants downward like the hood of a car and bears the distinctive raging-bull Lamborghini logo.

The system is only 1.2 inches thick, but it feels quite heavy at 5.7 pounds. It features a brightly lit, 15-inch, 1,400-by-1,050 screen, a DVD+R dual-layer burner, and a 120GB hard drive that provides copious storage space. The real question is how to get your hands on one. Most ASUS notebooks are available from online retailers, but through August the Lamborghini VX1 was available only from Newegg.com. After that, it was set to go on sale at retail stores Data-View and RCS Experience, but only in New York City.

The Lamborghini VX1's power fits its flashy moniker. Its speedy 2-GHz Intel Core Duo T2500 CPU and 1GB of RAM yielded scorching performance numbers on SYSmark 2004 SE. Its nVidia GeForce Go 7400 graphics subsystem produced competent, though not impressive, 3D gaming scores. I only wish it offered more battery life than the 3 hours 33 minutes I measured on MobileMark 2005. All told, the ASUS-Lamborghini VX1 matches other luxury car-inspired laptops in design and power (and price).—*Cisco Cheng*

>> For more in-depth analysis: [go.pcmag.com/asusvx1](http://go.pcmag.com/asusvx1)



Intel Core Duo  
T2500 inside

### ASUS-Lamborghini VX1

\$2,799 list



**PROS** Cool racing-car design. Nice screen. Excellent typing and navigating experience.

**CONS** Available through limited channels. Pricey.

Largest-capacity  
portable drive on  
the market



Cooling vents

SEAGATE ST9160821U2-RK  
EXTERNAL 160GB HARD DRIVE

## SAVE THAT SPACE

**S**EAGATE'S ST9160821U2-RK EXTERNAL 160GB hard drive makes short work of backing up your huge media files and multitudinous text documents. Thanks to the perpendicular recording technology it employs, this notebook-class external hard drive has the largest capacity of any portable hard drive currently on the market. It can fit 160GB in a physical space that used to top out at 100GB.

The Seagate drive comes in a protective metal case with cooling vents milled in its sides. At three-quarters of a pound, it's a little heavier than other drives in its class. The drive also bundles in Mac OS X-compatible software and features a well-thought-out dual-head USB cable with each plug able to reach either end of a large notebook.

Seagate  
ST9160821U2-RK  
External 160GB  
Hard Drive

\$290 street



**PC** MAGAZINE  
EDITORS'  
CHOICE  
**PROS** Largest-capacity portable drive available. Mac OS X-compatible software included. Well-thought-out dual-head USB cable.

**CONS** Somewhat pricey. Heavy compared with other portable hard drives.

Between the cross-platform capabilities, the best-of-class capacity, and the intelligent cable design, the Seagate 160GB portable drive truly earns Editors' Choice. Yes, it's expensive (at \$290), but it has a good dollar-to-gigabyte ratio (about \$1.80 per gigabyte). If you need to back up a lot of data from a desktop or a notebook, and if you need that data to go, this is the drive to buy.—*Joel Santo Domingo*

>> For more in-depth analysis: [go.pcmag.com/seagate160](http://go.pcmag.com/seagate160)

## BUYING GUIDE

# Document Scanners

Comes with plenty of useful software



Small footprint won't take up too much space

## XEROX DOCUMATE 152

\$595 direct



The Xerox DocuMate 152's healthy balance of speed, price, and software makes it the first Editors' Choice for a sub-\$600 document scanner. It's small enough to fit easily on a desktop, fast enough to handle the needs of a small office, and, most important, comes with plenty of software.

The \$595 price tag includes Nuance PaperPort 10, Nuance OmniPage Pro 14, X1 Enterprise Client 5.2, and a Twain driver. This combination gives you everything you need for small-office document management—even with past-generation versions of PaperPort and OmniPage.

The DocuMate 152 does well with other office applications, too. It's easy to scan not just to a searchable PDF file but also to e-mail, a fax program, a printer, or elsewhere. And thanks to the included NewSoft Presto! Bizcard 5 and a reliable ADF, the 152 is suitable for business cards.

—M. David Stone

>> For more in-depth analysis: [go.pcmag.com/xerox152](http://go.pcmag.com/xerox152)

ONE OF THE BENEFITS OF CREATING text-based documents on a computer is that it's easy to find the documents again. All you need is a desktop search program like X1 and some keywords from the document. But if you want the same convenience for documents that you *didn't* create on your computer—like incoming faxes and letters—you're ready for a document scanner.

Document scanners are designed specifically to scan, use optical character recognition technology to turn the scanned image into searchable text, and

save the result. While most are heavy-duty beasts, with prices well into four figures, there are a growing number suitable for an individual desktop in any size office.

The overwhelming majority of document scanners are sheetfed with an automatic document feeder (ADF). Part of what distinguishes document scanners from other sheetfed scanners is that most offer both a simplex mode to scan one side of each page and a duplex mode to scan both sides.

Don't confuse a duplex scanner, which scans both sides of the page at once, with a duplex ADF, which scans one side, turns the page over, and then scans the other side. You can confirm that the scan-

# DOCUMENT SCANNERS IN REVIEW

RED denotes Editors' Choice. Products listed from best to worst by rating.

<b>Canon DR-2580C</b>	●●●●○	\$875 street	<b>SPEEDY</b> The Canon DR-2580C is the fastest document scanner we've tested for scanning and saving in searchable PDF format.
<b>Fujitsu ScanSnap fi-5110EOX2</b>	●●●●○	\$495 direct	<b>JOB WELL DONE</b> We were impressed with how well this ScanSnap performed in its twin roles as a document and business card scanner.
<b>Xerox DocuMate 152</b>	●●●●○	\$595 direct	<b>GREAT PACKAGE</b> A complete document management solution and a good choice for convenient desktop scanning.
<b>Fujitsu ScanSnap S500</b>	●●●●○	\$495 direct	<b>NICE OUTPUT</b> The ScanSnap S500 stands out as a high-quality personal scanner for documents and business cards.
<b>Plustek OpticSlim M12 Corporate</b>	●●●●○	\$299 direct	<b>TAKE IT AWAY</b> Whether you need a portable scanner or a light-duty desktop scanner, this Plustek OpticSlim can be a handy companion.
<b>HP Scanjet 7800</b>	●●●●○	\$799 direct	<b>LOOKS ARE DECEIVING</b> This oddly designed scanner offers solid capability, good speed, and an exceptional amount of useful software.
<b>Visioneer Strobe XP 450</b>	●●●○○	\$650 street	<b>ONE-SIDED</b> This Visioneer Strobe is certainly worth considering for its speed, especially if you scan mostly single-sided documents.

>> For the full scanner reviews online: [go.pcmag.com/scanners](http://go.pcmag.com/scanners)

ner duplexes from its claimed speeds. The rating for pages per minute (ppm) tells you how many sheets of paper it scans per minute. The rating for images per minute (ipm) tells you how many images it scans, with one on each side of the page. Make sure the duplexing ipm speed is double the ppm speed.

**SPEED AND SOFTWARE** Comparing speeds between scanners isn't as easy as it might seem. Scan speed varies with resolution and whether the scanner is set for black and white, grayscale, or color. Make sure that you're comparing speeds for the same settings.

Another issue is that scanner ratings are based on scanning to an image file without text recognition. Adding recognition can add a significant amount of time or hardly any, depending on the software. Thus, one scanner can have a slower scan speed than another but be so fast at recognition that it's faster in real-world use. The only way to find that out is to test the scanners. If you can't run a test yourself, look for the information in our reviews.

Check out the process of scanning as well, to make sure the software lets you scan, recognize, and save to the file format you want—usually searchable PDF—in one step. And speaking of software, if one scanner you're considering comes with programs you need and another doesn't, add in the cost of the missing programs when you're comparing prices.

Simply creating files isn't much help for finding them again, so you'll need a desktop search program. But keep in mind that you can download Google Desktop for free. You might also want a document management program to help organize files. And you might want to use the scanner for other office tasks as well.

If you want to scan and edit files, you'll need an OCR program or module that can send files to your word-processing program. If you need to scan and recognize business cards, look for a good business card program in the software bundle and make sure the scanner itself can do a good job of feeding business cards. Similarly, if you want to scan and fax, or scan and e-mail, make sure the scanner comes with software that can automatically send a scan to the appropriate program, as an attachment to an e-mail message, or as an image for faxing.

And don't give extra points for photo-related programs. It's generally a bad idea to scan photos on a document scanner—or any other sheetfed scanner—because the paper feed rollers tend to leave marks on the photos.

**BUSINESS CARD SCANNING** The original Fujitsu ScanSnap was the first low-cost document scanner, and the first aimed at the individual desktop instead of workgroups or backroom operations in large companies. The **Fujitsu ScanSnap S500** is the third-generation version, and it remains one of the best—as well as one of the least expensive, at \$495 direct. Fujitsu's decision not to include a driver means you can't use the ScanSnap with most programs' built-in scan commands. But you can still start a scan from the S500 software and let the software launch and send the result to any program. The ScanSnap also comes with its own business card software, and it outdoes most, if not all, dedicated business card scanners.

**SOPHISTICATED SCANNING** With a cross section that's basically a triangle with one angle sawed off, and resting on the shortest side, the **HP Scan-**



**Plustek OpticSlim M12 Corporate** A light-duty desktop scanner.



**HP Scanjet 7800** Oddly designed, but offers solid capability.



## EXPERT VIEW

BY M. DAVID STONE

### THE TRUE BLUE DOCUMENT SCANNER

**A**

LMOST EVERY TIME I TALK ABOUT DOCUMENT SCANNERS, someone asks whether I just mean sheetfed scanners. The answer is no, but the distinction is subject to argument. I could just say I know one when I see one. But let me try for a better definition.

Three years ago, it was easy to spot a document scanner. Such scanners were aimed strictly at large companies or other businesses that dealt with lots of paper; they were generally too big for a desktop, and they chewed through reams of paper at double-digit speeds, starting at about 25 ppm. And the only software they came with was for scanning documents.

Today, you can find scanners that are less expensive, smaller, and less heavy-duty, and that often include software for other applications. But they are still designed, first and foremost, for documents. To some extent, that

**There must be a simple, one-step option to scan, recognize, and save the file.**

The bundled software is at least as important as the hardware. The goal in document scanning—to create a searchable text file that looks like the original—is tailor-made for searchable PDF format. Briefly, the format shows a graphic image on screen but ties the image to a searchable text layer. If you search for a word, you'll go to the image of that word in the file.

To get from hard copy to a searchable PDF file, you need to scan the document, recognize the text, and then save the result. To qualify as a document scanner, having a bundled OCR program isn't enough; there has to be a simple, one-step option to scan, recognize, and save the file. So if a scanner has an ADF with at least a 20-page capacity, scans at 15 ppm or better, and scans easily to searchable PDF, I'll call it a document scanner. And that's the definition I'll stick with unless someone convinces me otherwise.

*M. David Stone is PC Magazine's lead analyst for printers and scanners.*

**jet 7800** is the oddest-looking desktop scanner around. But it comes with a long list of highly capable software, which is impressive given that many document scanners don't come with anything but a scan utility. The programs bundled with the 7800 include ReadIris Pro 10 OCR for optical character recognition, Nuance PaperPort 10 for document management, and Kofax Virtual ReScan (often called Kofax VRS), which is the leading program for digitally improving hard-to-scan originals, like documents marked up with a highlighter. And, yes, you also get HP's own scan utility, and a Twain and ISIS driver so that the scanner will work with essentially any Windows program.



**Fujitsu ScanSnap S500**  
Impressive document and business card scanning.

**KILLER SPEED** By most computer time-line standards, the **Canon DR-2580c**, around since late 2005, is an oldie but goodie. But it still deserves its Editors' Choice designation, thanks to blazingly fast real-world speed. The DR-2580c scans at a pretty good clip for its price, with a 25 ppm and 50 ipm rating at both 200 and 300 pixels per inch (ppi). More impressive, though, is that it doesn't slow down when you set the scan utility to recognize text. Whether you scan to an image file or searchable PDF, 25 duplex pages take 1 minute 1 second, just shy of the 50 ipm mark. It also doesn't hurt that its combined Twain and ISIS driver lets it work both with standard Windows programs that use Twain and with more sophisticated programs that need ISIS, such as Kofax VRS.

**DOCUMENT SCANNING ON THE GO** You could argue (correctly) that the **Plustek OpticSlim M12 Corporate** isn't a document scanner. There's no ADF (you feed pages manually, one at a time); it doesn't duplex (although you can turn each page over and feed it through again); and it doesn't even have a ppm rating (the speed depends, in part, on how coordinated you are). But it comes with OCR and document management software, scans directly to searchable PDF format, and makes a terrific, if low-volume, personal document management *solution*. And because it weighs only 0.7 pounds, is smaller than a stack of one-foot rulers (at 1.3 by 10.8 by 1.9 inches), and gets power over its USB connection, it will fit unobtrusively on a desktop or in your notebook case to take with you anywhere.—MDS

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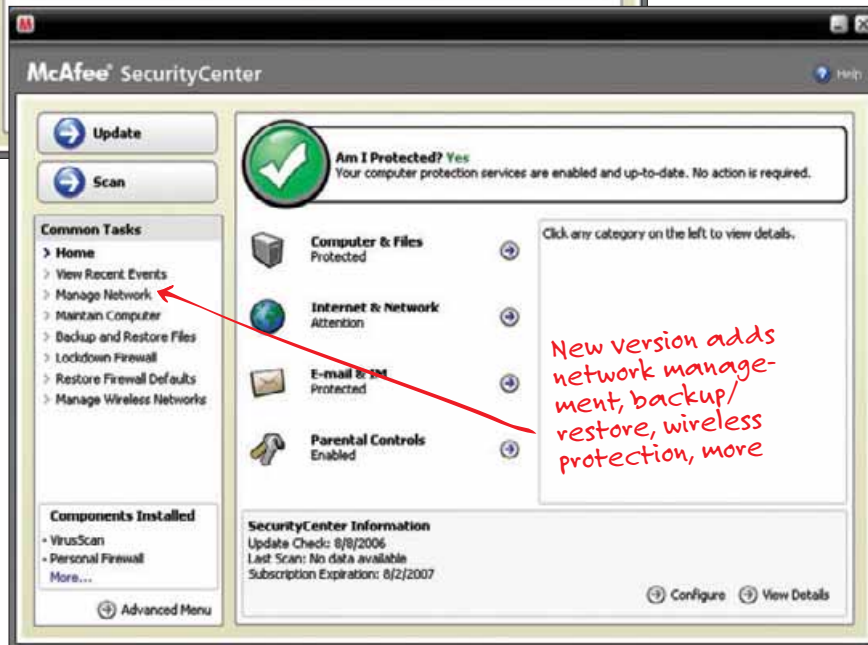
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More features than other suites—but only a few work well

New version adds network management, backup/restore, wireless protection, more

**McAfee Total Protection**

\$79.99 yearly;  
3-pack, \$99.99  
●●○○○

**PROS** Powerful anti-virus. Good antispyware. Easy access to a huge feature set. Mostly preconfigured for full protection.

**CONS** Antispyware wrecked some systems. Default firewall settings lack in-bound protection. URL logging endangers privacy. Program slows system performance.

MCAFEE TOTAL PROTECTION

**MCAFEE'S MAGINOT LINE**

OVERLOADING A SECURITY SUITE CAN BE like putting a battleship in a bathtub. McAfee Total Protection takes that a step further and tries to float a super-tanker. The suite is an ambitious collection of just about every program the company ever published. The result is unwieldy and hard to steer. The program responds sluggishly and slows system performance. McAfee says it concentrated on including the newest technologies rather than improving performance. It shows. But the company is working on the latter now.

In many ways, the suite's simplified new interface succeeds, and almost everything is configured for maximum protection out of the box. VirusScan puts up a strong defense, as always; SpamKiller didn't

mark any good mail as spam (bummer for a curmudgeon like me); and I like the new backup feature.

Flaws plague many other tools, however. Antispyware effectively killed one test system. The firewall's default configuration doesn't hide the computer from hackers. Phishing protection crashed in testing. Parental Control logs all of your surfing habits with no way to stop it. I could go on! McAfee plans to fix most of these problems, but some are intrinsic to the program's design.

Avoid this initial release. If you're a McAfee security subscriber, leave automatic updates on, but until things improve, consider ignoring alerts that ask you to upgrade.—Neil J. Rubenking

>> For more in-depth analysis: [go.pcmag.com/totalprotect](http://go.pcmag.com/totalprotect)



Catches known—and unknown—rogue sites



NORTON CONFIDENTIAL (BETA)

## ID CONFIDENTIAL

**S**YMANTEC MAKES A STAB AT CURING THE growing pandemic of identity theft with a reasonably promising public beta—currently for Internet Explorer only—of Norton Confidential (NC). When you attempt a secure log-in, NC sweeps your PC’s memory for crimeware, then checks that you’re at a legitimate site. If all is well, the InfoVault feature can fill in the required ID after pulling it from secure storage. But if the log-in page is a known phishing site, the NC toolbar blares “Fraudulent Web page detected.” When NC detects a phish on an unknown site, it temporarily disables the page. You can open the page (bad idea!), switch to a blank one, or get more information.

The scanner slows performance and doesn’t work well with some Symantec products, but it was about as effective as the similar IE 7 feature. NC missed two sites that IE caught; IE overlooked one that NC spotted. The utility attempts to delete

only running spyware. Failing that, it feeds garbage to programs that grab keystrokes or screens. The dual approach worked perfectly on my tests. InfoVault also did well but tripped on some sites, most likely because they had extra security.

Although I wouldn’t yet put this app on a production system, it’s worth a look, and it promises to be a useful security tool on its final release in September.—*NJR*

>> For more in-depth analysis: [go.pcmag.com/nortonconfide](http://go.pcmag.com/nortonconfide)

### Norton Confidential (beta)

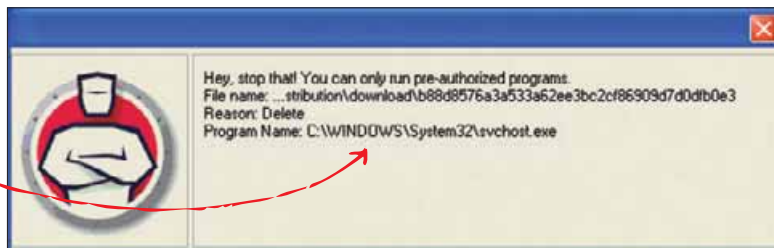
Free



**PROS** Spots fraud sites. Clears memory of crimeware before secure log-in.

**CONS** Currently for IE only. Missed some fraud sites. Bugs slow system performance.

Zero tolerance means that even useful apps—like windows installer—get stopped



FARONICS ANTI-EXECUTABLE STANDARD

## NEUTERING MALWARE

**T**O WORK ITS BADNESS, MALWARE HAS to *run*. Otherwise, it’s just a harmless collection of bytes. With Faronics Anti-Executable, approved apps are allowed, and *everything* else is shut down before it gets started.

On installation, Anti-Executable scans for executables and puts all the ones it finds on the approved list. Be sure that your system is clean—installed malware gets approved, too. After that, no other programs can run. Period. It’s a simple but powerful approach. For one thing, the app doesn’t need signature updates, as standard anti-spyware does. And it works. The app blocked every malware sample I tried to install—and every nonmalicious program, too. That’s the rub: Zero tolerance means that Anti-Executable

blocks installations and automatic updates—even Windows Update. You have to turn it off to install or update programs.

The app can prevent deletion or copying of executable files and disallow launching of files from elsewhere on your network. And it can trust your AV to modify other executables. But you can’t strike programs from the approved list. This could be a problem if you had malware onboard when you initially installed the app.

I find Anti-Executable’s restrictions draconian and inflexible. But your experience may be different, especially if you’ve got a system that needn’t be changed often. If this strategy sounds good to you, check out the 30-day free trial.—*NJR*

>> For more in-depth analysis: [go.pcmag.com/antixecutable](http://go.pcmag.com/antixecutable)

### Faronics Anti-Executable Standard

\$29.95 direct



**PROS** Won’t let non-preapproved apps run. Needs no signatures.

**CONS** Approves malware present at install. Must disable for program updates. You can’t remove apps from the approved list.



PowerExecutive is available on all System x servers except the x3455. The System x3655 shown is expected to be available on October 3, 2006. IBM, the IBM logo, System x, PowerExecutive and Take Back Control are trademarks or registered trademarks of International Business Machines Corporation in the United States and/or other countries. AMD, the AMD logo, and AMD Opteron Processors are trademarks of Advanced Micro Devices, Inc. Other company, product, and service names may be trademarks or service marks of others. ©2006 IBM Corporation. All rights reserved.



\_INFRASTRUCTURE LOG

\_DAY 28: These slow, inefficient boxes don't have enough power to run my high-end business apps. They can't do anything. Though I guess crashing counts as doing something.

\_Need sleep. Will try to dream that I am I.T. King of a distant planet that only produces stupefyingly powerful servers.

\_DAY 30: I've taken back control, thanks to the IBM System x™ server with the AMD Opteron™ Processor. It has more power and more efficiency than I ever imagined in a standards-based server. The PowerExecutive™ tool assigns power as needed for each server. It helps optimize our power consumption. Maximize performance. Increase reliability. I can finally sleep in my own bed again.

\_I have taken back control. I am Ned, benevolent I.T. King of this...uh, data center.



[IBM.COM/TAKEBACKCONTROL/X](http://IBM.COM/TAKEBACKCONTROL/X)

GOOGLE READER

### EASY NEWS-FEED READER

**W**EB APPLICATIONS DON'T COME much easier to use than the free Google Reader. It probably won't pull away My Yahoo! devotees, and news-crazed individuals will still want FeedDemon, but it's a step up from the rudimentary Internet Explorer 7 reader.

I like the simple interface, which, among other things, lets you show all items or just previously read ones (for all your feeds or for single feeds), view only selected stories, see and edit a list of your subscriptions, and select labels (category names) as well as change them. To add a feed, you can type in a URL and hit *Enter* (a Subscribe button appears if a feed exists), or do a keyword search and Subscribe buttons will appear next to every result. Navigating through feeds is easy using supplied buttons or keyboard shortcuts. If you have a personal Google

home page, you can add a Reader module to it and scroll through feeds right in the page.

Reader is still percolating in Google Labs, so work remains to be done. Clicking on my labels sometimes failed to open up any feeds, for example, but that's a minor problem. I enjoyed Google Reader, and for those who haven't had much experience with RSS or Atom and just want the feeds, Google Reader delivers.—*Davis D. Janowski*

>> For more in-depth analysis: [go.pcmag.com/googlereader](http://go.pcmag.com/googlereader)

#### Google Reader

Free



**PROS** Very easy to use. Free.

**CONS** Still in Google Labs—some quirks need to be worked out.



Navigate feeds using the menu or shortcut keys



#### TurnHere.com

Free



**PROS** High-quality travelogues produced by local residents give you info you'd never get from a guidebook.

**CONS** Films can be quirky. Doesn't yet cover many areas outside the U.S.

You won't find the Mud truck's java geniuses in a tour book

TURNHERE.COM

### GUERRILLA TRAVEL GUIDE

**T**URNHERE.COM IS AN ONLINE CATALOG of short films about the experiences individual cities and neighborhoods offer. Local filmmakers create videos about their homes, and the results provide viewers with a unique, behind-the-scenes look in a way that traditional guidebooks never will.

Videos usually run 3 to 4 minutes and vary greatly in focus. Only a limited number of films

depict places outside the U.S., but that's sure to increase with time. And just because the filmmakers are local doesn't mean they're not good—the site holds them to professional standards.

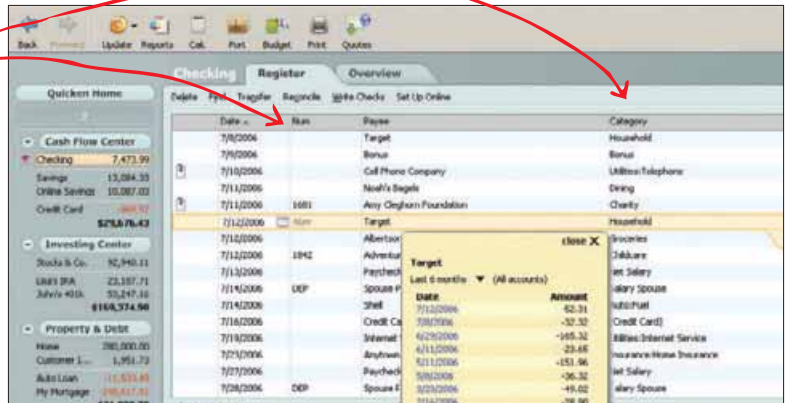
You'll find videos organized into two categories: Locations and Activities. The second is separated into subcategories like Ethnic Cultures, Foodie Havens, Shopping, and Tourist Attractions. Google Maps nestled into the pages pinpoint the location of each video and the surrounding neighborhoods.

The informative, entertaining, and unique travelogues often cover off-beat and colorful locales, so they can really help you get the feel of a place before you visit. As you might expect, some videos get a tad eccentric—a black-clad vampiress narrates one. But as long as you're not weirded out by some of the nichier films, TurnHere.com is a great resource for finding cool stuff, both in your own city and in those you plan to travel to.—*Jen Trollo*

>> For more in-depth analysis: [go.pcmag.com/turnhere](http://go.pcmag.com/turnhere)



Filter the view by transaction type and by category, too



QUICKEN BASIC 2007

## QUICKEN TRUMPS MONEY

**Y**OU WON'T FIND BETTER ENTRY-LEVEL personal financial software than Quicken Basic. The latest version solidly bundles account tracking and bill payment with cursory but acceptable investment-, property-, and debt-tracking tools, all wrapped in a great, revamped interface.

Importing existing financial data is a snap. If you already have usernames and passwords that enable online access to your financial accounts, setup takes just a few minutes. You can create a "vault," protected by a single password, that can access all your accounts in one fell swoop using One-Step Update. This grabs investment quotes and then updates your accounts on Quicken.com, where you can get access to your investment portfolio from any computer.

The program's redesigned home page—the most effective Intuit has ever made—gives a bird's-eye view of your accounts, upcoming bills,

critical graphs, and more. A mini calendar for bills shows due dates. Click on it and the full calendar appears.

You can easily categorize a transaction by type, such as ATM withdrawal or online payment, and by category (groceries, for instance). The software even lets you split transactions among categories, and you can print checks locally, too. You'll also find plenty of very customizable reports and graphs. Quicken Basic is all many consumers will need, and I highly recommend it.—*Kathy Yakal*

>> For more in-depth analysis: [go.pcmag.com/quickenbasic07](http://go.pcmag.com/quickenbasic07)

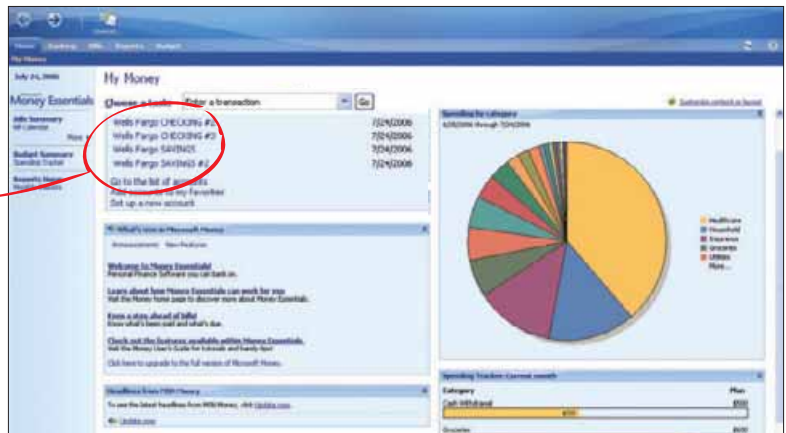
**Quicken Basic 2007**  
\$29.99 direct

●●●●○

**PC MAGAZINE EDITORS' CHOICE**  
**PROS** Excellent elementary personal finance management and online account tracking. Easy setup. Terrific interface. Effective online bill paying.

**CONS** Weak portfolio management. No tax or planning tools.

Automatically gathers info from all your online accounts



MICROSOFT MONEY ESSENTIALS

## SIMPLER? YES. BETTER? NO.

**S**IMPLIFYING PERSONAL FINANCE IS AN IDEA we like. But Money Essentials proves that personal financial software needs a certain degree of complexity. With Essentials, you can't import existing data, so if you're already using another financial-management product and want to switch, you're out of luck. Nor can you split transactions: If a single purchase includes groceries and personal items, you have to categorize the entire transaction as one or the other. You can't even add notes to your transactions.

Unlike other Money apps, this one requires you to manage all bills and financial accounts online. You enter transactions locally, but they're handled online—even remittances to payees who don't accept online payments. In that case, the service will mail a paper check. You can't, however, print checks locally. Bill setup is a snap, though.

Obviously, you need online access to any accounts that Money Essentials will handle. In most cases, to get full use of the product, you need a Windows Live ID. You add your accounts to your Live ID via a wizard, supplying log-in information for each. You also need to have an online banking account with MSN Bill Pay, unless you're a CheckFree customer.

Microsoft Money Essentials is a fine program for all-online, all-the-time consumers. But if you already use financial-management software or have more than very basic needs, it isn't for you.—*KY*

>> For more in-depth analysis: [go.pcmag.com/msmoneyessentials](http://go.pcmag.com/msmoneyessentials)

**Microsoft Money Essentials**

\$19.99 direct

●●●●○

**PROS** Well-designed, simple application for basic online account aggregation and management, scheduling and paying of bills, budgeting, and financial reports.

**CONS** Can't import existing data. Can't print checks at home. Limited reporting.

# FIRST LOOKS

## SMALL BUSINESS

### Brother MFC-8860DN

\$499.99 list



**PROS** Fast. Prints, scans to, and faxes from PCs over a network. Stand-alone copier and fax. Scans to e-mail.

**CONS** Text quality is a smidge below par, although not enough to be a serious issue.

BROTHER MFC-8860DN

## SPEED PLUS FEATURES

**S**MALL BUSINESSES ARE ALWAYS ON THE lookout for products that can perform more than one function at a reasonable price. The Brother MFC-8860DN monochrome laser AIO certainly fills that bill. It's a near-perfect fit for busy small offices, delivering fast print speeds and just about every function you can think of for an all-in-one device. It can print, copy, fax over a network, and scan to your PC and to e-mail. A built-in duplexer lets you print on both sides of a page, and the 50-page automatic document feeder (ADF) also duplexes, so you can scan and fax both sides of a page.

All of this capability is shoehorned into an 18.7- by 20.9- by 17.7-inch (HWD) unit. And at 36.8 pounds, it's reasonably easy to move around. The 8860DN's total time on our business applications suite was 6 minutes 30 seconds, making it the fastest AIO in its category. Graphics and photo quality

50-page ADF has duplexing capabilities



are both within the typical range for a monochrome laser. The text quality is slightly below par, but it's really a minor issue unless you have an unusual need for small fonts. With its impressive speed and long list of features, this is one of my new favorite AIOs.—*M. David Stone*

>> For more in-depth analysis: [go.pcmag.com/brother8860dn](http://go.pcmag.com/brother8860dn)



Prints excellent (but not waterproof) photos

35-page ADF handles large documents easily

HP OFFICEJET 6310 ALL-IN-ONE

## AN ALMOST-TERRIFIC HP AIO

**N**EW FROM HP, THE OFFICEJET 6310 ALL-in-one *almost* gets everything right. At a compact 9.3 by 17.9 by 15.3 inches (HWD) and just 17 pounds, the 6310 is a comfortable fit for a desktop. This AIO prints, scans, faxes, and e-mails from a PC over a network. It works as a standalone copier and fax machine. It also offers relatively speedy performance, and it can print directly from memory cards and PictBridge-enabled cameras.

The photo output quality is among the best I've seen from an ink jet AIO, with most photos qualifying as true photo quality. The only caveat: As is typical of ink jet printers, the photos aren't water-resistant. On the other hand, both text and graphics quality are below par. Two heavily stylized fonts with thick strokes couldn't qualify as easily readable even at 12 points. I also saw moderate banding on some images, obvious dithering on others, and a severe tendency for thin lines to disappear in whole or in part.

The Officejet 6310 delivers all the features you need for a small or home office, and it does most things reasonably well. But given its issues, it's not the slam-dunk choice it could have been.—*MDS*

>> For more in-depth analysis: [go.pcmag.com/hp6310](http://go.pcmag.com/hp6310)

### HP Officejet 6310 All-in-One

\$279.99 direct



**PROS** Standalone copier and fax machine. Automatic document feeder. Network connector. Prints from cameras and memory cards.

**CONS** Text and graphics are below par.



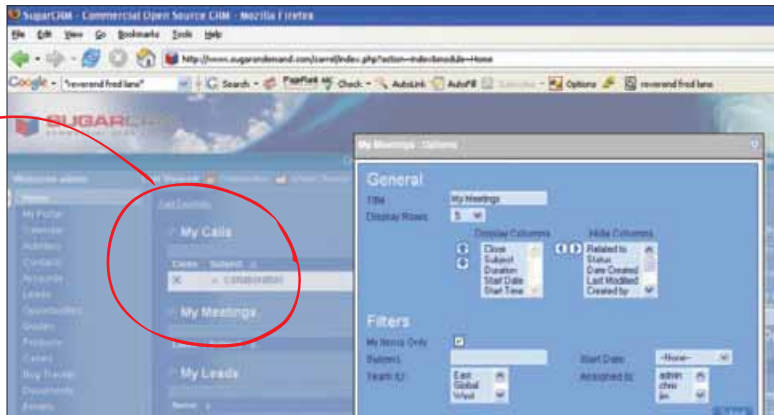
Customizable "dashlets" give fast access to critical CRM tasks

## SUGAR ENTERPRISE 4.5 ON DEMAND OPEN-SOURCE CRM

**S**UGAR ENTERPRISE 4.5 ON DEMAND IS A fine example of commercializing open source the right way. The two commercial versions—Professional and Enterprise—come as hosted (on-demand) services, on-site appliances, or software that runs on your own hardware.

An AJAX layer blasts the software's customization features into the stratosphere. You can modify nearly everything on the fly. You can also store a bookmark list called My Portal and select news feeds to appear within the interface.

For the main functions, the interface makes navigating and finding features easy, and the app's context-sensitive help will serve you well. With the more detail-oriented functions—for editing an entry, say—the menus become less intuitive, and often you'll find help only in the manual—a 6MB download. But other than that, I encountered no real disappointments.



Clever interconnections between modules save time. To schedule a meeting, I could choose invitees from the list of users as well as from contacts entered into the system. I could also easily create employee accounts, a new company, and contacts within that company. Another very powerful feature—a plug-in for Microsoft Outlook—allows users to synchronize calendar and contact information and share e-mail between Sugar and Outlook without requiring Exchange Server.

—Matthew D. Sarrel  
>> For more in-depth analysis: [go.pcmag.com/sugarent45](http://go.pcmag.com/sugarent45)

**Sugar Enterprise 4.5 On Demand**  
\$75 monthly per user  
●●●●○

**PROS** Highly customizable interface, closely interlinked modules. Extensive feature set includes project, document, and e-mail campaign management.  
**CONS** Interface is not always intuitive. Help is not always context-sensitive.

## NOVATEL WIRELESS V640 34MM OF FAST CELL DATA

**T**HE 1.3-BY 3.0-INCH NOVATEL WIRELESS V640, THE FIRST EXPRESS-Card for the Verizon Wireless Broadband Access EV-DO network, performs on a par with much larger (2.1-by 3.4-inch) PC Card versions like the Editors' Choice Kyocera KPC650. More important for many, it works in ExpressCard/34 slots such as those in new Apple, ASUS, Dell, HP, and Lenovo laptops. The card uses the same VZAccess Manager software as Verizon's other EV-DO cards.

In an ASUS laptop, the V640 more than held its own against the KPC650 (installed in a Toshiba Qosmio) when the signal was moderate to strong. But for areas with a weak signal, you may want to pick up an external antenna. I was also easily able to install the V640 in a MacBook Pro after loading the drivers.

As the first EV-DO PC ExpressCard for laptops, the V640 represents a greatly needed upgrade option. It's expensive, however, at nearly \$180 with a two-year contract, plus \$60 to \$80 a month for service. Novatel Wireless is working to get the card out on Sprint. Dell sells an identical card, at the same price, for its laptops. But those who don't own Dells can get online fast with the V640.—Sascha Segan

>> For more in-depth analysis: [go.pcmag.com/novatelv640](http://go.pcmag.com/novatelv640)



**Novatel Wireless V640**  
\$179.90 direct, plus monthly service fee  
●●●●○

**PROS** Speedy. Works with both PC and Mac laptops that have ExpressCard slots.  
**CONS** Expensive.

# THE BEST STUFF

EDITORS' CHOICES IN KEY CATEGORIES



## HEADPHONES Shure E500PTH

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*Shure Inc.*  
[go.pcmag.com/e500pth](http://go.pcmag.com/e500pth)

## HDTV (LCD) Sharp Aquos LC-32D40U

It may not be the least expensive 32-inch LCD TV around, but the stylish Aquos provides stunning color quality and an extremely realistic picture, along with plenty of ports. \$1,599.99 list  
*Sharp Electronics Corp.*  
[go.pcmag.com/32d40u](http://go.pcmag.com/32d40u)

## PORTABLE SATELLITE RADIO PLAYER Pioneer Inno

Receives live content. Records 50 hours of XM radio. Plays MP3s and WMAs. Good sound quality. Color screen. \$350 direct  
*Pioneer Electronics (USA) Inc.*  
[go.pcmag.com/inno](http://go.pcmag.com/inno)

## PROJECTOR Toshiba TDP-T95U

6.4-pound portability. Bright image. Excellent contrast ratio. Plenty of connection options. \$1,299 direct  
*Toshiba America Inc.*  
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## LAPTOP Dell Inspiron E1505

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*Dell Inc.*  
[go.pcmag.com/delle1505](http://go.pcmag.com/delle1505)

## COLOR LASER PRINTER HP Color LaserJet 1600

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## SPEECH RECOGNITION Dragon NaturallySpeaking 9.0 Professional

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## SECURITY SUITE ZoneAlarm Security Suite 6.5

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## ANTISPYWARE Spy Sweeper 5.0

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*Webroot Software Inc.*  
[go.pcmag.com/spysweeper5](http://go.pcmag.com/spysweeper5)

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[go.pcmag.com/spywaredoctor4](http://go.pcmag.com/spywaredoctor4)



## CAMCORDER (HD) Sony HDR-HC3 HDV 1080i Handycam

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*Sony Electronics Inc.*  
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### HP LaserJet 4220n

Q7785A#ABA

- Choose this printer if you want versatile paper handling and stapler/stacker options
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- Ethernet 10/100Base-TX, high-speed USB, parallel

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**\$100 INSTANT REBATE!**

Offer ends 10.31.06.



### HP Color LaserJet 3800n

Q5982A#ABA

- Choose this printer if you want easy work team sharing with fast speeds
- Prints up to 22ppm
- 600 x 600 dpi max resolution
- Ethernet 10/100Base-TX, high-speed USB

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[insight.com/hp\\_printers](http://insight.com/hp_printers) ▼ 800.359.2990

<sup>†</sup>Hewlett-Packard, 2005.

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invent

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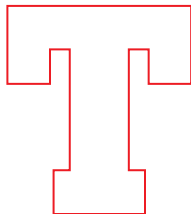
THE POSSIBILITIES ARE INFINITE





MICHAEL J. MILLER

# A Nation of Searchers



THE TERM "WEB BROWSER," I'VE always thought, is a misnomer. Most of us use the Web to search for information, not just browse randomly. That's why search sites such as Google have become by far the most profitable sites. And it's

why every significant browser is now including a search box. Firefox popularized it, Safari followed, and now Internet Explorer 7 offers one.

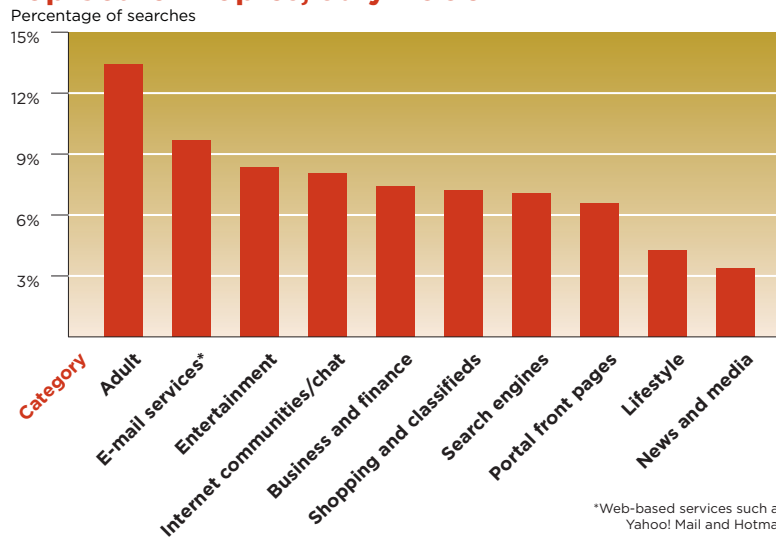
Google and its competitors make money in two ways. First, they serve you search results on their pages, along with advertising, charging the advertisers for the impressions (page views). And now Google serves ads on many of its search results pages as well. Google has the biggest such ad network, but Yahoo! and MSN are struggling to compete.

Search sites in general, and Google in particular, are growing rapidly. According to market researcher comScore Networks, Americans conducted 6.4 billion searches in June 2006; that's up 29 percent from a year before. Google's market share is only getting bigger: The search giant accounted for 44.7 percent of searches this June, compared with 36.9 percent a year before. Yahoo! is in second place with 28.5 percent of all searches, followed by MSN and Microsoft sites with 12.8 percent, with the rest covered by AOL and other Time Warner sites and Ask.com. Google keeps getting bigger, and all the other sites have their work cut out if they want to just stay even, let alone gain share.

So what are people searching for, and where are they going? According to market researcher Hitwise, the most popular subject is what is euphemistically referred to as "adult entertainment." But other areas are growing as well, especially e-mail services—Yahoo! Mail, Hotmail, and Gmail. And in the past year, we've seen significant growth in MySpace and other Internet communities.

In July, according to Hitwise, MySpace surpassed Yahoo! Mail to become the top-ranked Web site in the U.S., based on number of visits. It accounted for 4.5 percent of all Web visits, just slightly ahead of Yahoo! Mail and the main Yahoo! page. Google is in fourth place, and MySpace's mail was fifth. The rest of the top ten includes MSN and its Hotmail and search pages, Yahoo! Search, and eBay, by far the largest commerce site. In many ways, eBay is a

## Top Search Topics, July 2006



community as well, as people post their own pages and rate the buyers and sellers.

In the past few months, it seems as if every Internet company wants to get into social networking. MySpace is the leader here by a wide margin, but I've seen interesting moves by a number of other sites. Facebook is a slightly more grown-up version of MySpace, though still mostly aimed at students. Yahoo! 360 and Microsoft Live Spaces are both now integrated with their companies' instant-messaging products. TagWorld is promoting better controls on who visits what pages. And Glide Effortless has an interesting Flash-based interface. I'm not counting out AOL, which is trying to build a much bigger presence around AIM, as well as AOL's e-mail and Web services, which are now free.

It seems natural to me that community sites will continue to grow, but I wonder how many people will bother to update their pages once the novelty wears off. I've already seen one study that says only 3 percent of blogs are updated regularly.

There will always be new people, new blogs, and new pages to check, and that's why search will continue to be important. We'll all keep looking for new information, new contacts, and new sites. Most of our ancestors came to this country searching for new beginnings, and we're still a nation of searchers. □

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# Wi-Fi Fun on Vacation

**S**UMMER IS SLIPPING AWAY EVEN AS I write this, and our family's vacation at the Jersey Shore is beginning to wind down. We've been coming back to the same community for more than 20 years, and I can measure the march of technology by what I've had to go through to file my column each year. (Magazine columnists typically don't get vacations; you're expected to file your column on schedule no matter where you are or what you're doing.) The first year that we vacationed here, my portable computer was a Radio Shack TRS-80 Model 100. I wrote my column on the beach on that 8-line, 40-character display.

The house that we rented didn't have a phone line, so I stood in the phone booth outside the volunteer fire department with acoustic couplers, making a computer-to-computer call after first negotiating baud rates, framing, and handshaking protocols in a prior phone call: 300 bits per second, 8 bits, no parity, one stop bit. It was 95 degrees outside the booth; I can only imagine what the temperature was inside. The column went through on the third try, after I spent the better part of an hour in the sweltering booth.

Things got better in the succeeding summers. The house that we rented the following year had a telephone line, but it didn't have a phone. By then, I had become a master at wielding my alligator clips and RJ-11 connector; I could get a dial tone from anywhere.

We have been coming back to the current beach house for 17 years. It had phones, and by then the magazine had dial-in 800 numbers by which we could access our e-mail. A couple of years back, the owner put in a cable modem. I brought a Buffalo Wi-Fi base station, and several family members brought along their laptops. This year, the owner upgraded the cable modem to a wireless gateway, so I didn't have to bring my own.

But the house phone system is 2.4-GHz wireless, so until this summer, every time the phone rang, I lost my Internet connection and couldn't reconnect while the phone was in use. Switching to another frequency didn't help; the phones were evidently as selective as a microwave oven, blotting out everything. Or sometimes sheer signal strength

overwhelms a receiver, and selectivity goes right out the window.

I decided to fight fire with fire this year and brought along a Hawking Wi-Fi corner antenna. As the name implies, this antenna is designed to mount in a corner and give you directional coverage, with up to 15-dBi gain. (dBi signifies the difference between the signal strength in an idealized isotropic or nondirectional antenna and in a directional antenna.)

I've recommended these antennas for coverage in problem locations, such as old stone farmhouses where the thick walls are a veritable black hole for Wi-Fi signals. Plaster-on-lath construction is murder on Wi-Fi, too. I've recommended placing these antennas in the attic, where their signal can shine down through the wooden floors instead of trying to push horizontally through the walls. This often

***Back at the beach house, I had excellent signal strength everywhere with the antenna mounted high in a corner on the main floor.***

works surprisingly well. If it doesn't, the only cure is repeaters, but I have found that the repeater and base station sometimes steal bandwidth from one another unless the repeater is located right at the edge of the base station's range. In those cases it might be better just to run Ethernet.

Back at the beach house, however, I had excellent signal strength everywhere with the antenna mounted high in a corner on the main floor. I called the house number from my cell phone while I had the wireless phone close to my laptop. As soon as the phone rang, I lost my Wi-Fi connection. But when I answered it, the computer reconnected. I don't know whether the phone base station uses a higher-intensity signal to ring the handset or whether it blasts the ring signal out on multiple channels, but once it connected, the phone and computer coexisted. The indicated speed on my laptop dropped from 54 megabits per second to an indicated 12 Mbps while the phone was in use, though.

Maybe next year we'll try to get Wi-Fi from the house to the beach so we can make Skype calls from there. □

## » MORE MACHRONE

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For more of his columns, go to [go.pcmag.com/machrone](http://go.pcmag.com/machrone)



## INSIDE TRACK

BY JOHN C. DVORAK

**W**HILE THE WORLD of semiconductor memory seems to be forever headed toward **faster and smaller**—like the rest of the semiconductor business—there seldom appears a **new type of memory** so different that it could change the way people do business. A case in point is the Grūvi card from SanDisk. The company is toying with something called 3D matrix memory and with distribution of content in formats amenable to **mass production on silicon**. I'm wondering when the day will come for the now ubiquitous CD album to become a small chip and be sold as such. You can't play CDs on phones, PDAs, or MP3 players without transcoding and download-

*You can't play CDs on phones, PDAs, or MP3 players without transcoding and downloading them. What if you could buy a chip that was an entire album and just plug-and play it?*

ing them. What if you could buy a chip that was an entire album and just plug and play it?

I'm unsure where all this is leading, but I suspect that **something is up**. I will be watching SanDisk closely. The company has been the **most innovative** in the flash memory business since its inception.

**The government is cracking down** on one Silicon Valley company after another regarding the improper **back-dating of stock options**. This practice isn't new, but the allowances for it have tightened significantly, and numerous brand-name companies seem to be getting in trouble over this. In fact, the way things are going, it looks as if **jail time could be in the works** for a few people the government would love to make an example of. Think of what they did to Martha Stewart.

One laundry list of **typical charges**, taken from a news report about the indictment thrown at some executives from Brocade, is "conspiracy to commit securities fraud, securities fraud, mail fraud, making false statements in SEC filings, and falsifying books and records."

This situation is **boiling over to Apple Computer**, where Steve Jobs is apparently under the microscope. This would account for his reported **lack of enthusiasm** during the last Apple World-

wide Developers conference. Shortly after the meeting, Apple had to delay its all-important 10-Q filing, causing a bit of a stir.

The nastiest part of all this will be the **inevitable shareholder lawsuits**, which always stem from actions such as this. These are nightmares dreamed up by shark attorneys. The shareholders they represent **usually get nothing** out of the deal, and the law firms get a lot of fees and a payout.

**Mighty Mice Dept.:** Mice have changed over the years. If you're using an old clunker, **you need to upgrade**. If you're a gamer, you must consider the Razer line of specialty mice with their on-the-fly variable resolution. This is a handy feature for **fine-tuning a kill shot** at one extreme or bolting from a scene in one quick move at another. Razer's primary mice are named for deadly snakes: the Krait, the Copperhead, and the Diamondback. There is also the outstanding ProSolution, which sells for about \$60. All are available at [www.razerzone.com](http://www.razerzone.com).

**Not to be overlooked** in this scene is the **king of the mouse-makers**, Logitech. It probably has the most extreme line of mice available from anyone. And power users who must have the best usually end up with a Logitech mouse. I'd advise you to look at your mouse and ask yourself if you wouldn't be better off with the new Logitech **MX Revolution**. This mouse practically works an application **without you**. With built-in search, scroll, and page-flipping, this cordless beauty will enhance any computing experience. It's also the most comfortable mouse you can imagine ever using. Get one. Shop around for the best price; anything under \$100 would be a good deal.

**Whither HD DVD versus Blu-ray.** People keep asking about a combination Blu-ray/HD DVD player so they can get started with a movie collection and not **worry about** one of the two formats dying. When it comes up in conversation, I have to mention that it is believed in some circles, although not verified because of numerous nondisclosure agreements, that licensees of one of the two formats (Blu-ray, I think) cannot engage in **manufacturing a dual-format player**. It's part of the licensing agreement. This would explain why various companies promised to do a dual player and then changed their minds after the lawyers looked at the licensing agreements.

I can assure you that these agreements are **covered in depth** by various nondisclosure agreements, and nobody can say anything. NDAs should be **unconstitutional**. They are used far too often and apparently enforced by the judicial system. □

### » WANT MORE DVORAK?

John writes a weekly column for our Web site, too. [go.pcmag.com/dvorak](http://go.pcmag.com/dvorak) You can e-mail him at [pcmag@dvorak.org](mailto:pcmag@dvorak.org)

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# Pump Up Your Home Network

*We have a plan for your LAN. Find out how to surf, stream, and access files faster, as well as add cool features.*

BY ERIK RHEY

ANYONE READING THIS PROBABLY lives in a digital household. But are you getting the most out of your network? Sure, you're sharing an Internet connection and maybe swapping files. If you're one of the technorati, maybe you're even streaming music. But how would you like to double the speed of your network (see below)? Stream TV from your TiVo or cable box to any TV in the house—or even to a laptop while you're on the road (page 70)? Check on your home while you're away (page 75)? Control your home's lights, curtains, and temperature with a remote (page 74)? If you're ready to take your LAN to the next level, read on.

## **Boost Your Network with Gigabit**

Wireless networks can be as convenient as e-mail—and as slow as the Postal Service. Maybe you haven't noticed this, because you aren't pushing many bits around. But just try to use a home wireless network to back up your digital music collection or copy a 2-hour digital video off your camcorder or DVR.

Today's 100MB Ethernet can be poky, too, and moving big media files can take forever. Tired



of waiting? With real-world speeds of up to 600 megabits per second (Mbps), you need Gigabit Ethernet (Gig E), friend, and you need it now.

The first step toward upgrading to Gig E is to check out your router. If you have a wireless router, chances are it supports only 10/100 Ethernet, so you'll need to upgrade to one that supports Gigabit. Some of the new generation of draft 802.11n routers, such as the Netgear RangeMax Next WNR854T (\$159.99 direct, [www.netgear.com](http://www.netgear.com)) and the new Linksys WRT350N (\$230 street, [www.linksys.com](http://www.linksys.com)), offer Gigabit. (The Linksys router also has StorageLink, a technology that turns any USB storage into a network-attached device.) The draft-n routers, however, may not be the best option, as you'll read in the wireless section.

If you have a wired network and are already using a standard Ethernet switch, upgrading to a Gig E switch is typically as simple as pulling the old switch and reconnecting the cables' plugs.

Next, you'll need to see if your PCs are Gig E-compatible. That's easy enough: In the Windows Control Panel, go to *Device Manager* in *System | Hardware* and check under *Network adapters*. You'll typically see either "1000" or "Gigabit" in the adapter's name, or you can check the manual.

If your PCs don't have Gig E cards, you'll need to add them (about \$25 each) to every computer on your network. Cat 5 ca-



**Gig E Wirelessly**  
The Linksys WRT350N is a draft-n router with Gigabit Ethernet.

ble might work, but Cat 5e is better, because it adds some stricter data-control specs. The only thing left is to find some big files to move around—so get out your camera and start recording.

### A Plug-In Home Network

It could be a new day for an old technology. Power-line networking uses your home's electrical wiring to transmit broadband signals to your PCs, gaming consoles, VoIP phones, and more via AC outlet adapters and routers. What has dogged power-line in the past, however, is speed. The original version had a throughput of about 10 Mbps, a tenth the speed of regular Ethernet. When wireless networking was introduced with 802.11b, it was comparable with power-line in speed and price, and it didn't hog your power outlets; thus, many people went wireless.

The second generation of power-line products (aka "turbo") got faster, with maximum throughputs around 85 Mbps. Most of the major networking companies, such as Netgear and ZyXEL, sell these adapters at big-box stores for \$100 to \$200.

Consumers are often confused by the different standards that have cropped up to operate under the umbrella of power-line technology, such as HomePlug and UPA (Universal Powerline Association). The newest HomePlug standard, called HomePlug AV, was announced this summer, but products will not be available until late this year.

## WIRED OR WIRELESS? HOW THEY STACK UP

Consider the pros and cons of each technology before choosing one for your home network.

	WIRED			WIRELESS		
	Fast Ethernet	Gigabit Ethernet	Power-Line	802.11n	802.11g	802.11a
<b>Cost of basic AP, bridge, router, or switch</b>	\$40-\$100 (switch)	\$100-\$200 (switch)	\$70-\$200 (adapter or router)	\$100-\$200 (AP or router)	\$50-\$100 (AP or router)	\$200-\$300 (AP or router)
<b>Cabling requirements</b>	Category 5 or 5e (7¢-30¢ per foot)	Category 5 or 5e (7¢-30¢ per foot)	None	N/A	N/A	N/A
<b>Operational frequency</b>	N/A	N/A	N/A	2.4 GHz	2.4 GHz	5 GHz
<b>Theoretical maximum throughput</b>	100 Mbps	1.0 Gbps	First-gen: 14 Mbps; Turbo: 85 Mbps; HomePlug AV/UPA: 200 Mbps	540 Mbps	54 Mbps	54 Mbps
<b>Actual expected throughput</b>	50-60 Mbps	500-600 Mbps	10 Mbps, 50-60 Mbps, 100 Mbps	150-200 Mbps	15-20 Mbps	15-20 Mbps
<b>Pros</b>	Mature technology; inexpensive devices.	Besides fiber, Gigabit is the fastest home technology available.	No additional wiring needed; operates on existing power sockets.	Much faster than 802.11g.	Backward-compatible with "b" devices; faster than "b."	Faster. Ideal for streaming large media files.
<b>Cons</b>	Cat 5e wiring required; not portable; expensive to install.	Same as for Fast Ethernet. Peripherals must be compatible.	May be inconvenient in rooms where power outlets are limited.	Standards-based products may not be backward-compatible with pre-n equipment.	Less client compatibility than "a/g" devices.	Expensive. Not compatible with 802.11b.

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[go.pcmag.com/belkinmimo](http://go.pcmag.com/belkinmimo)



### KYOCERA KR1 MOBILE ROUTER

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The Kyocera KR1—a full-featured 802.11g wireless router made by D-Link—includes a four-port switch and incorporates a slot in the back for your cell carrier's EV-DO PC Card. Or, if you prefer, you can use a data-capable cell phone as a cellular modem by connecting it to a USB port on the device.

[go.pcmag.com/kr1](http://go.pcmag.com/kr1)



### LINKSYS WRT54G

\$50 street



With the Secure Easy Setup utility and free firmware upgrades, the Linksys WRT54G is a good performer at a bargain price.

[go.pcmag.com/wrt54g](http://go.pcmag.com/wrt54g)



### NETGEAR RANGEMAX 240 WPNT834 WIRELESS ROUTER

\$135 street



The RangeMax 240, based on True MIMO technology, has great speed and range, as well as a good overall feature set, including port forwarding and triggering, VPN pass-through, dynamic DNS, service blocking, and UPnP.

[go.pcmag.com/wpnt834](http://go.pcmag.com/wpnt834)



UPA, on the other hand, has already partnered with Netgear to release the Netgear HDX101 (\$100 street), a power-line adapter reportedly capable of speeds up to 200 Mbps. With that kind of speed, power-line could give Wi-Fi a run for its money.

### Wireless to the nth Degree

If you keep up with the goings on in the Wi-Fi world, you've no doubt heard about the new IEEE wireless standard dubbed 802.11n. Though the final standard hasn't been ratified yet, a draft version was passed recently, and products with the "draft-n" technology hit the market early this year. Given the raw specs, you'd think these devices would be the fastest on the market, but they're far from fully baked.

Products using "pre-n," however, have been available for about a year. These are the best bet for those who need speed. Pre-n routers use MIMO (multiple in, multiple out) technology with three antennas, each dedicated to upstream or downstream traffic. The gains of pre-n over 802.11g are clear: Most of the pre-n routers we tested broke 100 Mbps at close range and got as much as 30 Mbps at 160 feet. By comparison, 802.11g routers maxed out at around 25 Mbps.

So how do the draft-n routers compare? The Netgear RangeMax Next WNR854T is the fastest router we've seen at 10 feet (125.3 Mbps). But at greater distances, it clocks in far below pre-n routers such as the Linksys SRX400—and even Netgear's own pre-n RangeMax 240! The draft-n products also seem overly sensitive to antenna adjustments and require many firmware and driver upgrades. We have not yet tested the Linksys WRT350N mentioned earlier, but stay tuned for a full review.

With that in mind, you are better off with a pre-n router and notebook adapter—or wait for the second generation of draft-n products. If you can hold out even longer, wait until the 802.11n standard is ratified and get a true standard-based router.

### A Cable-Free Future

Wi-Fi and Bluetooth are no doubt wonderful inventions. But you still have all those devices tethered to your PC. And Wi-Fi keeps you on a short leash. Ultra wideband (UWB) and WiMAX could liberate you and your devices.

UWB is the technology behind Wireless USB, which lets you transmit data to your PC wirelessly from a USB device. Used by police and firefighters since the late 1990s, it's faster and more power-efficient (thanks to its pulse-based frequency) than Bluetooth or 802.11. It could become the standard for cable TV, medical imaging, home theaters, and more. Some people expect Apple to create UWB-enabled iPods.

One of the few Wireless USB products available now is the Belkin CableFree USB Hub and Dongle set (\$129.99 list), a four-input hub. Start-ups such as Staccato are creating their own USB hubs and the first PCI Express Mini Cards.

As for WiMax, a wireless broadband technology with a point-to-multipoint architecture, Sprint Nextel CEO Gary D. Forsee announced in August that the company will build the first nationwide mobile WiMax network, giving 100 million Americans wireless Internet that would boost real-world download speeds to 2 to 4 Mbps—four times faster than the current speed—by the end of 2008.

—Jeremy Kaplan, Sascha Segan, Craig Ellison, Pamela S. Ahn; Tim Gideon, Oliver Kaven, freelance writers



**Plug-in power** The Netgear HDX101 is a UPA power-line adapter capable of 200-Mbps throughput.



# Safe at Home

*Hackers, burglars, and other devious types are trying to get into your network or even your house. Here's how to stop them.*

**W**HEN YOUR BROADBAND ISP IS YOUR CABLE COMPANY, phone company (for DSL), or some other mammoth provider, you're part of an enormous network of connected computers. Most of those computers belong to law-abiding customers just like you, but there are always those few with a more sinister agenda: hacking into your PC or home network for fun and profit—or worse!

Needless to say, you need adequate security to stop these prying eyes from accessing sensitive data, such as bank account numbers, passwords, personal e-mails, or photos of you and your family.

Chances are, you've heard some of this before, but when it comes to security, refresher courses are never a bad thing.

## Securing Your Router

Connecting your PC directly to your broadband modem is a definite no-no. You want to stop intruders before they access your computer, and the easiest way to do this is by using a router with a built-in firewall, which can block most attacks before they reach your PC.

If you have a wireless router, enabling encryption is vital. WPA-PSK (Wi-Fi Protected Access—Pre-Shared Key) is the security standard that has replaced the older WEP (Wired Equivalency Protocol) in most routers. It should be your minimum level of security. You can usually follow the installation wizards to enable WPA, or log on to the router's Web-based configuration interface by entering your router's IP address in a Web browser's address bar. Make sure to buy the matching PC Cards for your notebooks from the same manufacturer in both cases, however. If your laptop already has a wireless chipset, check to make sure it supports WPA. If not, then get the PC Card or go with WEP, which is better than disabling security altogether.

**The wireless eye**  
The D-Link DCS-3420 is a wireless network camera with the ability to see in very low light.





### Setting up your router

A typical router configuration interface lets you set a dynamic or static IP address, forward ports, configure security encryption, and more.

The trickiest part in configuring your security suite is probably the firewall.

Most personal firewalls are application-aware, meaning that they can identify which application wants to access the Internet, connect to another computer, or execute a file on your PC. You will get occasional messages that a certain application is trying to do just that. Unfortunately, the messages can be somewhat cryptic. As a rule of thumb, deny access unless you get a clear recommendation from your firewall that it is safe to do otherwise.

### Security Beyond Your Network

Once your home network is secured, you may want to think about other home security options, such as a networked security camera. When choosing a networked camera, you should first determine where you're going to install it. In some locations, you may not have the option to run cable, so you're better off with a wireless model. And if you're dealing with a low-light location, pay close attention to the camera's lux rating. The lower the lux rating, the better the security camera will perform in low light. Some cameras even come with night vision that is aided by infrared beams. (Since infrared light is invisible to the human eye, these cameras often have a lux rating of 0.)

Setting up the network portion of the camera is usually done through a Web interface. But you'll probably need to sign up for a service such as DynDNS or TZO (both free for basic versions) in order to access your camera from a remote location. You can also set up a personal VPN (virtual private network) to access your home network. Check out our ExtremeTech article "Secure Surfing to Go: VPN Made Easy," at [go.extremetech.com/vpn](http://go.extremetech.com/vpn), for in-depth setup advice.

Just make sure you configure the security setting properly or disable the camera when you want privacy, to prevent hackers from gaining access to the camera and spying on you.—*Oliver Kaven*

### One-stop security

An Internet security suite (such as Zone Labs' ZoneAlarm) bundles antivirus, antispyware, and firewall software in one package.



### Hitting the Suite Spot

After you've set up your router, you still need to secure your desktops and laptops to protect them from malware. Though some people will tell you to run multiple software programs to be on the safe side, sticking with one vendor is a better move. Competing antivirus apps, for example, can interfere not only with each other but also with software you may want to install on your PC. Complete security suites are usually the best choice, as they don't require you to cobble together all necessary components piecemeal, and all aspects of the system are designed to work together. Security vendors such as Symantec, Trend Micro, and Zone Labs (which is our current Editors' Choice) have suites that offer all-round protection.

## NANNYCAM CONFIDENTIAL



For the record, I do *not* have a nannycam.

I prefer to call it my Tommycam, because this is how I stay connected to my 8-month-old son while I'm at work. I can check the little Yahoo! Messenger with Voice window on my screen and watch Tommy crawl across his play mat or drop Cheerios on the floor. I can see when he's napping, and when he wakes up, our nanny often brings him to the camera so I can pinch his cheeks on my monitor.

No doubt, these live cams are a sensitive issue. Fortunately for me, our nanny doesn't mind having an eye on her, probably because she knows she has nothing to hide. But not every caregiver feels so comfortable.

If you're a parent considering a live cam at home, here's my humble advice: Be straight with your caregiver from the start. Explain why you want to do it, and make sure he or she feels okay with it before you move ahead.

If you've made the decision to set up a cam, there are plenty of options. WiLife's LukWerks Digital Video Surveillance System ([www.wilife.com](http://www.wilife.com)), for example, offers support for up to six cameras, Web-based monitoring from anywhere, and even cell phone and e-mail alerts. A one-camera starter kit costs \$299. Or if, like me, you'd rather not invest so much, you can just broadcast the video from a run-of-the-mill webcam via the free Yahoo! Messenger with Voice app. (You control who can watch.) The video isn't high-quality, but it's good enough for my purposes—mainly, real-time cooing.—*Stephanie Chang*

### KEEP IT SAFE

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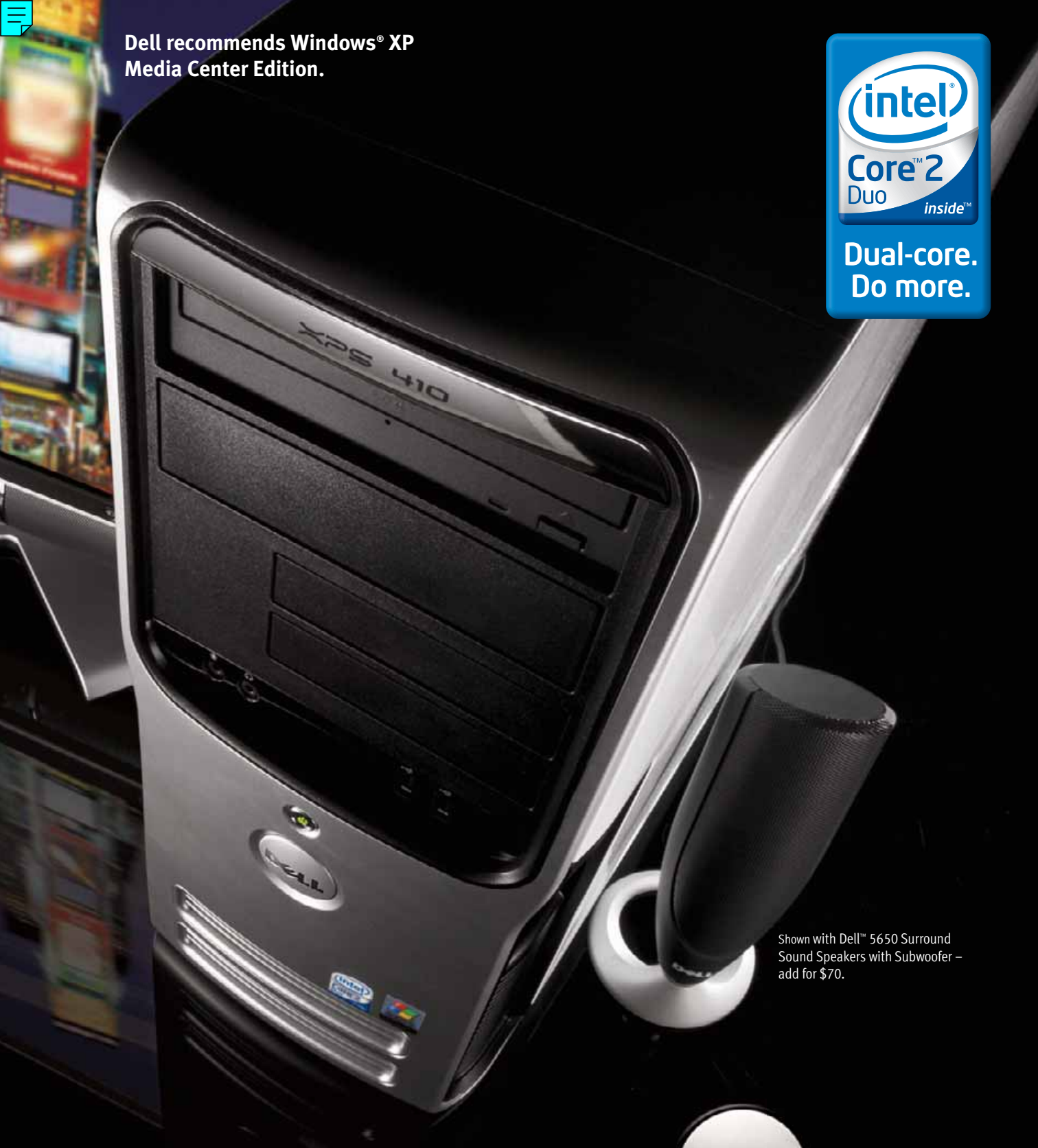
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Please visit <http://www.microsoft.com/technet/windowsvista/evaluate/hardware/vistapc.mspx> for more information. **WINDOWS VISTA PREMIUM READY:** Based on currently available information from Microsoft. Requirements subject to change. Since the operating system and drivers are not final at this time, Windows Vista has not been tested on all user configurations. Only systems with sufficient graphics and memory will meet Microsoft's requirements for running the Premium interface. Those which meet only minimum requirements for the Vista Capable designation will not provide the full benefits of Premium. Please visit <http://www.microsoft.com/technet/windowsvista/evaluate/hardware/vistapc.mspx> for more information. **TRADEMARKS/COPYRIGHT NOTICES:** Intel, Intel logo, Intel Inside, Intel Inside logo, Celeron, Celeron Inside, Centrino, the Centrino logo, Intel Core, Core Inside, Pentium, and Pentium Inside are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. All other registered trademarks or trademarks are property of their respective owners. Microsoft and Windows are registered trademarks of Microsoft Corporation. ©2006 Dell Inc. All rights reserved.



# Own the Airwaves

*Streaming TV and movies around your house, especially in HD, is no simple task. But at least you have a few options.*

**F**OR YEARS, WE'VE BEEN EXTOLLING THE VIRTUES OF STREAMING video. And since the advent of TiVo and Media Center PCs for recording and replaying TV content without commercials, companies have been throwing products at consumers to do this with mixed success. More bandwidth and video-compression technologies have made this possible, but is it practical?

Part of the problem is that most folks don't know all the possibilities of streaming video content. Here are some scenarios: How would you like to watch an R-rated movie in another room while the kids watch a family-friendly movie in the living room? How about watching all the cable channels you get at home on your laptop while you're traveling? Or maybe show a home movie stored on your PC on your big plasma TV? Well, after testing and tinkering with various solutions, our experts have found easy, affordable setups.

## Streaming HD Over a Wired Connection

*PC Magazine* editor-in-chief Jim Louderback has been one of the early adopters in streaming and online TV, spearheading DL.TV ([www.dltv.com](http://www.dltv.com)) and using his home as a test bed for the latest audio and video equipment. Not satisfied with a "good enough" solution, Jim fiddled with his HD setup until he found the right way to stream it.

After replacing all three of his TVs with flat-screen HDTVs (a plasma in the living room, an LCD in the playroom, and another LCD in the kitchen) and dropping another \$800 on an HD TiVo, he wasn't about to buy even more high-def set-top boxes to stream the HD TiVo content to the two LCDs. His challenge was to figure out a way to distribute output from one HD TiVo to three flat-screen TVs simultaneously.

After trying a few options that fell short, Jim finally found an affordable solution. The HD TiVo is stored in the garage and is connected to the plasma set

### Video adapter

The Intelix V3AD component-video balun lets you split a video and audio signal for streaming content to another TV in your house.





via HDMI cable (see the diagram below). But to split the signal to stream to the two LCDs, he attached two Intelix V3AD component-video baluns (\$121.95 direct, [www.intelix.com](http://www.intelix.com)), one at the TiVo location in the garage, and one near the playroom. The baluns convert an unbalanced digital or analog signal into a balanced one that will run over Cat 5e or Cat 6 cabling (hence the name “balun”). Technically, the signal transmitted to the two LCD TVs is analog, which Jim found sufficient for the secondary sets. To split the signal between the two LCDs, Jim added the VPI HDA-2 component-video splitter (\$90 direct, [www.vpi.us](http://www.vpi.us)), which let him watch TiVo content on the plasma or simultaneously on the two LCD TVs on the first floor.

Finally, to control the TiVo box from anywhere in the house, Jim picked up the pyramid-shaped Powermid Infrared Extender Set (\$49.99 direct, [www.radioshack.com](http://www.radioshack.com)) from Radio Shack, which converts IR into radio and then back into IR, across long distances. See the diagram for a detailed schematic of his setup.

### Streaming Video Wirelessly

If you don't have Ethernet wired throughout your home, obviously wireless or power-line is the way to go if you want to stream content stored on a PC to a TV—or stream it from one TV to another. (For more on power-line and HomePlug, see “A Plug-In Home Network,” page 64.) The best way to do this, according to lead analyst and TV junkie Robert Heron, is to go with a media hub-type device, such as the Belkin PureAV RemoteTV (\$499.99 direct, [www.belkin.com](http://www.belkin.com)), a user-friendly A/V extender. Simply attach a source device to the transmitter, connect the receiver to a TV or video recorder, and enjoy. The receiver, which has an integrated antenna, delivers composite, S-Video, and component connections, and standard RCA stereo jacks handle the audio. The only downside



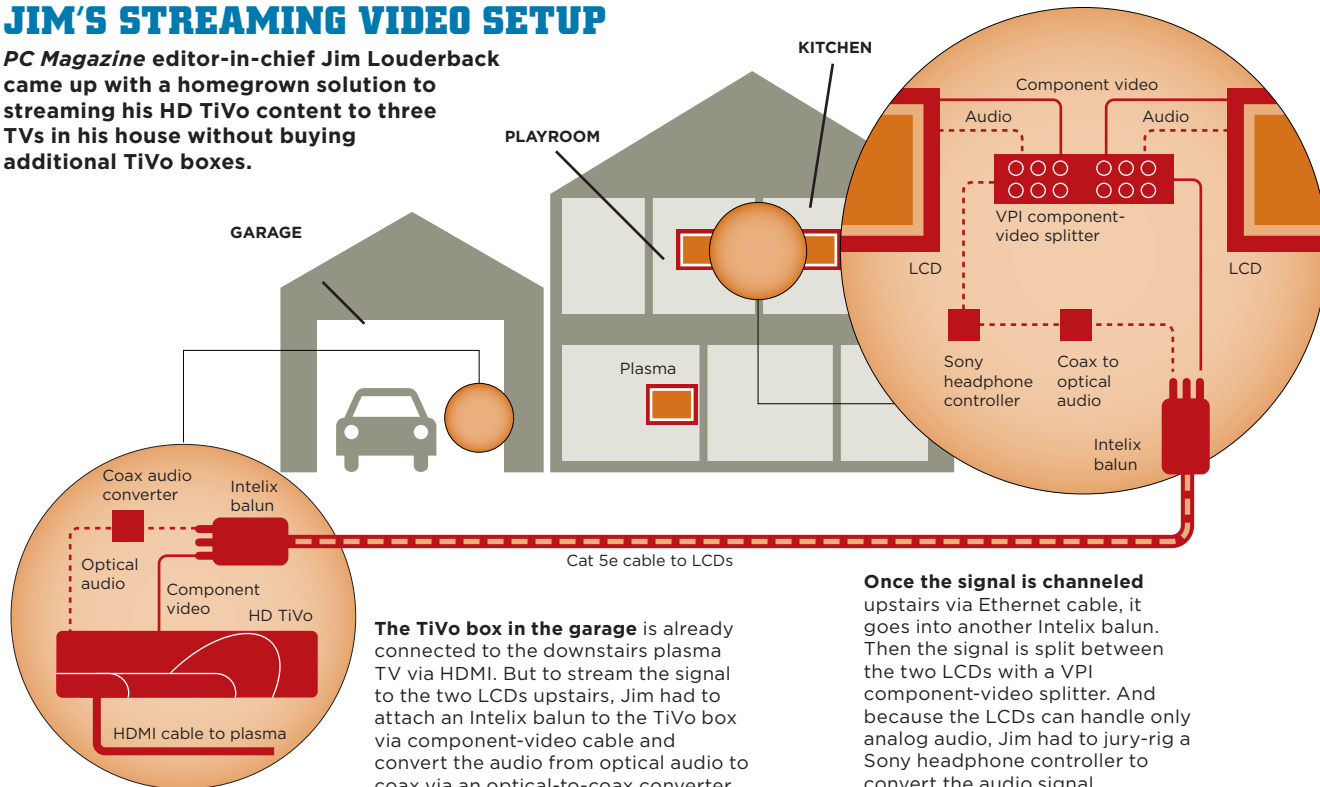
An online remote Web site Orb.com offers an online interface for streaming your TV signal to another source, such as a PC, cell phone, or PDA.

### » STREAM ON

For more in-depth analysis of the Slingbox, Location-Free TV, and RemoteTV, as well as advice and tips for streaming TV, visit [go.pcmag.com/streamingt](http://go.pcmag.com/streamingt)

## JIM'S STREAMING VIDEO SETUP

*PC Magazine* editor-in-chief Jim Louderback came up with a homegrown solution to streaming his HD TiVo content to three TVs in his house without buying additional TiVo boxes.



The TiVo box in the garage is already connected to the downstairs plasma TV via HDMI. But to stream the signal to the two LCDs upstairs, Jim had to attach an Intelix balun to the TiVo box via component-video cable and convert the audio from optical audio to coax via an optical-to-coax converter.

Once the signal is channeled upstairs via Ethernet cable, it goes into another Intelix balun. Then the signal is split between the two LCDs with a VPI component-video splitter. And because the LCDs can handle only analog audio, Jim had to jury-rig a Sony headphone controller to convert the audio signal.



**Sony Location-Free TV**



**Sling Media Slingbox**



**Belkin PureAV RemoteTV**

**Streaming TV Devices**

The Sling Media Slingbox, Sony LocationFree TV, and Belkin PlusAV RemoteTV are all easy ways to stream TV or watch shows on your PC.

is that you're limited to standard-definition TV instead of HD. The RemoteTV also acts as an IR transmitter, so you can control the playback from any room.

If you have a Media Center PC and a Microsoft Xbox 360 (\$300 street, [www.xbox.com](http://www.xbox.com)), you can leverage your Xbox as a Media Center extender. Just connect the Xbox to your TV and stereo, install the update to MCE 2005, turn on the PC's Windows Media Connect software, and make sure your PC remains on if you want media always available. Then you can stream music, photos, and video.

Finally, there is the Sony LocationFree TV (\$1,499.99 direct, [www.sonystyle.com](http://www.sonystyle.com)), which lets you stream video over your wireless network to a battery-powered 12-inch touch-screen LCD you can carry around the house. The base station connected to your TV or PC will also stream content to the display if you're in a wireless hot spot.



**Streaming with the Xbox**

The Microsoft Xbox 360 can also be used as a Media Center extender to stream music, video, and photos.

**Watching TV on Your PC**

The obvious, easiest way to watch TV on your PC is simply to download shows from iTunes, the TV network's Web site, or a Torrent site (but there could be legality issues there). And if you have a Series2 TiVo, it comes with TiVoToGo, which lets you copy taped shows (albeit at slow speeds) to a networked PC and watch them on the computer or stream to another TV.

There are hardware devices and software that can stream your TV at home to your PC. One example is the Sling Media Slingbox (\$199.99 direct, [www.slingmedia.com](http://www.slingmedia.com)). With the included software, you can control your TV—change channels, fast-forward, and play taped shows, but in standard-def only.

There are even free, software-based solutions that allow you to watch TV on your PC. One of Robert's favorites is Orb ([www.orb.com](http://www.orb.com)). Once you register and download the app, Orb can stream content stored in your personal media library to a laptop, cell phone, or PDA. The best part is that Orb software has automatic bandwidth detection and will adjust the video to match the screen size and bandwidth of the device you're playing it on. The interface is also straightforward and user-friendly.

With all this technology, it's now possible to watch what you want, when you want, anywhere in your house or on the road.—*Jim Louderback, Robert Heron, and Bill Howard*

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# Control Your Home Remotely

*No longer a pipe dream of future-kooks or an accoutrement of the ultrawealthy, home automation is here—and easier than you might think.*

**I**T'S BEEN A DECADE OR MORE SINCE MOST PEOPLE WALKED OVER TO the TV and changed channels by hand (except when the remote goes missing). Imagine controlling your whole house—from the lights to the temperature to the garage-door opener—just as easily. With new advances in home automation (HA) technology, this is becoming a real-life scenario, and not just the opening scene of *The Jetsons*.

## Automation Basics

Within home automation, there are four broadly supported technologies, which use either power-line networking or radio-frequency (RF) signals that transmit from node to node (a node is a network junction or connection point) in a wireless mesh network.

**X10** ([www.x10.com](http://www.x10.com)), out since the late 1970s, is the oldest. Though widely adopted, it is beginning to show its age. X10 devices have been known to miss commands, and they lack two-way signaling (acknowledging receipt of commands). X10 Pro is more robust but uninspiring.

**INSTEON** ([www.insteon.net](http://www.insteon.net)), however, is the little engine that can. It uses both power-line signaling and RF. Developed by SmartLabs and its subsidiary Smarthome, Insteon devices are primarily controlled via wall panels.

**Z-WAVE** ([www.z-wavealliance.org](http://www.z-wavealliance.org)) was a small-company product until Cisco lent its name to the RF-only protocol, which was developed by Zensys.

**ZIGBEE** ([www.zigbee.org](http://www.zigbee.org)) boasts the biggest group of backers. An RF-only protocol, it can support 65,000 devices or nodes at the same time on a single network, making it good for businesses and homes. Like Z-Wave, it uses mesh networking, so you can extend the range by adding nodes.



## Home Automation Choices

With all four protocols, most starter kits come with a basic remote or one wall panel, and you can add wall sensors, touch panels, or more remotes as you see fit. Some products even support multiple standards.

X10 products are cheap (\$10 to \$20 at Radio Shack), but again, the technology is a bit out of date. Insteon wall panels are reasonably priced at \$30 for an outlet plug-in, \$40 for a wall switch, and \$100 for a starter kit with four switches and a controller. Products that use the Insteon technology include kits from Smarthome and Icon (a value version sold through Home Depot), Broan-NuTone (fans), Chamberlain (garage openers), and Somfy (window blinds).

Leviton uses Z-Wave for its Vizia and IlluminEssence lighting controls, and Monster Cable makes a Z-Wave home-theater remote that can also control home settings. Other Z-Wave-compatible brands include Cooper Wiring and Intermatic. Again, prices are about \$30 per outlet module, \$40 per wall switch.

Custom installers like ZigBee because it is supported by most alarm systems, and also because it works with the pricey Crestron home-automation panels they love to sell; a ZigBee-based Crestron wall switch sells for \$200-plus. Mainstream switches may cost around \$100.

## How to Get Started

Lighting is a good place to start. A basic installation involves simply plugging in the power outlet adapters, plugging lamps into the adapters, and configuring the controls (via a wall panel, remote control, or software installed a PC, PDA,

or cell phone) to set what times you'd like the lights to turn on and off.

You can buy a low-cost starter kit for lights from your local hardware or big-box store for between \$30 and \$100 (but save the receipt in case you have problems). Or if you have a friend who is using home automation, ask to borrow a couple of plug adapters and a remote. Make sure the setup works exactly the way you want it to; from there, you can scale up and add functions. If you're building



### Trip the lights

Insteon's remote log-on interface lets you check your home to see which lights are on or off.

a new home and want to go whole hog, consider having a professional do the job. Just make sure the installer is certified by a home-electronics group.

## Checking In from Afar

Perhaps the most exciting aspect of home automation is the ability to check on your house from another location and adjust your settings via installed software (most kits come with it) or a Web interface. From the office, you can check to see if you left a light on, or turn on the air conditioner a half-hour before you arrive. While you're on vacation, you can turn lights on and off, or open and close curtains so it appears as if someone is home.

Aside from the software included with the starter kits, there are third-party solutions that let you turn your cell phone or PDA into a remote, such as Promixis NetRemote (Pocket PC version, \$42.50 direct, [www.promixis.com](http://www.promixis.com)).

Home automation can offer you peace of mind, savings on utility bills, and an easy way to control your home environment. With products getting better and cheaper, you could have the home of tomorrow today.—Bill Howard, contributing editor

## HOME AUTOMATION PRODUCTS



### PLUG-IN DIMMER INSTEON STARTER KIT

For \$100, you get a tabletop control module (to control the lights when you're in the house) and four wall-outlet dimmers. The controller is also compatible with X10. \$99.99 direct. [www.smarthome.com](http://www.smarthome.com).

### MONSTER MCC AVL300-S

Monster Cable and Leviton paired to create this 50-button home-theater remote and Z-Wave controller. You can use it to control both your home environment and your A/V equipment. Programming is simple: Connect the remote to your PC via USB, then go online and pick the brand and model of your TV, DVD player, and other media devices; the AVL300 downloads the right codes. \$599.95 list. [www.monstercable.com](http://www.monstercable.com).



### HOMESEER HOME CONTROL HS2

This software package lets you control dozens of lights and set on/off times. HS2 works with Insteon, X10, and Z-Wave, and it even has plug-ins for control of iPods, security cameras, and thermostats. And you can check and configure settings over the Internet. \$199.95 direct. [www.homeseer.com](http://www.homeseer.com).—BH

Device List	Location	Name	Units	State	Last Checked	Refresh
Media Player	Atlanta	#1	Media Player	Off	8/23/2006 8:07:28 AM	Refresh
Living Room	Atlanta, GA	#18	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Bedroom	Atlanta, GA	#19	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Media Player	Atlanta	#4	Media Player	Off	8/23/2006 8:07:28 AM	Refresh
Computer	Atlanta, GA	#2	Webcam	Off	8/23/2006 8:08:07 AM	Refresh
Outside	North Street, Atlanta	#16	Light Switch	Off	8/23/2006 8:08:07 AM	Refresh
Bedroom	Atlanta, GA	#17	Light Switch	Off	8/23/2006 8:08:07 AM	Refresh
Dark Weather Station	Atlanta	#15	Weather Station	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#14	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#13	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#12	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#11	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#10	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#9	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#8	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#7	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#6	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#5	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#4	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#3	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#2	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh
Garage	Atlanta, GA	#1	Appliance Module	Off	8/23/2006 8:08:07 AM	Refresh

# Restore and Maintain Peak Performance

## Eight things you need to know about fragmentation – a special report

As an IT Professional, you know the importance of maintaining system performance and reliability. Your team is the one called to the rescue when desktops or servers crash, slow down or freeze. Many of these issues stem from a single, hidden source: disk fragmentation.

### 1. Reliability issues commonly traced to disk fragmentation:

Crashes and system hangs/freezes; slow boot times and boot failures; slow back up times and aborted backup; file corruption and data loss; errors in programs; cache issues; hard drive failures.

Having files stored contiguously on the hard drive is a key factor in keeping a system stable and performing at peak efficiency. Even a small amount of fragmentation in your most used files can lead to crashes, conflicts and errors.

### 2. The weak link in today's computers:

A computer system is only as fast as its slowest component. The disk drive is by far the slowest of the three main components of your computer: CPU, memory and disk. Even with the fastest CPU system performance would be affected by disk fragmentation.

### 3. Is Daily Defragmentation needed in today's environment?

More than ever! Large disks, multimedia files, applications, operating systems, system up-dates, virus signatures – all dramatically increase the rate of fragmentation. Fragmentation increases the time to access files for all common system activities including opening and closing Microsoft® Word documents, searching for emails, opening web pages and performing virus scans. To keep performance at

peak, defragmentation must be done daily.

### 4. Increased server uptime:

Fragmentation can cripple server performance and reliability resulting in downtime and lost production. Diskeeper can easily and safely be used on your servers including: file and print, web, domain controllers, SQL, Exchange, and any other database or application servers.

### 5. Virtualization and fragmentation:

Server virtualization can be used to reduce the number of physical systems for more efficient CPU utilization. However, there is a downside; the disk subsystem must now account for increased disk I/O. Disk fragmentation the primary cause of unnecessary I/O overhead. Automatic defragmentation is more important than ever for maximum performance.

### 6. Hidden manual defragmentation costs:

Manual defragmentation is not “free” — it has heavy hidden costs, such as IT time to manually defrag every system. This results in either staying after hours to defrag, giving the users administrator privileges (not likely!), break-fix handlings, or more often *no defrag whatsoever*.

### 7. How do I find out how much fragmentation I have?

Download a free trial version of new Diskeeper 10 at:  
[www.diskeeper.com/pcm6](http://www.diskeeper.com/pcm6)

Install it, select a volume, select Analyze and view the report.



Diskeeper's interface shows fragmentation levels and relative location of all the files and folders on the selected volume.

### 8. Advanced, automated defragmentation:

Manually defragmenting every system every day is simply not possible in even small networks let alone enterprise sites. IT Managers use Diskeeper's “Set It and Forget It”® operation for automatic network-wide defragmentation. Customers agree Diskeeper maintains the performance and reliability of their desktops and servers, reducing maintenance and increasing hardware life.

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# Battle of the New DVDs

*Next-generation DVD technology has finally arrived.  
But which format will work better for you—Blu-ray or HD DVD?*

BY DON LABRIOLA





### Blue-laser Governor

We've watched InterVideo's WinDVD EX grow over a period of weeks into a mature Blu-ray/HD DVD movie player that was at least as stable and responsive as InterVideo's DVD version.

**C**OULD IT BE TIME TO DITCH YOUR DVD player and replace it with one of the shiny new Blu-ray or HD DVD players that hit store shelves over the summer? Or should you wait for a victor in the format war?

Nah, you want one now, though you aren't sure which format supports the most movies, which player offers the best value, or which delivers the best quality. But wait! Rumor is that dual-format players are in the works, so maybe it's best to wait for one of those.

If nothing else, the high-definition DVD battle has succeeded in totally confusing consumers. In this story, we answer your practical questions and explain the technology behind the emerging standards, which—to hear some tell it—are both dead on arrival.

The DVD industry spent years working us into a frenzy of anticipation over its new high-definition blue-laser discs, so it had nobody to blame this summer when the first Blu-ray and HD DVD releases didn't meet what had become unreasonable expectations. For several months after the first players shipped from Pioneer, Samsung, Sony, and Toshiba, the blogs, newsgroups, chat rooms, and review sites were filled with passionate opinions, many of them resoundingly negative.

We disagree. The early players may be flawed, but their deficiencies don't dim blue laser's long-term promise. With the ink barely dry on the Blu-ray and HD DVD specifications, drawing definitive conclusions now is premature. Blue laser is still a work in progress, but the facts are undeniable. Today's red-laser DVDs hold at most 8.5GB of content; blue-laser discs cram tens of gigabytes into the same area—more than enough to hold an entire movie at high definition. These first tentative offerings confirm the standards' potential to combine a stunning HD movie-viewing experience with the ease of use, stability, and cost effectiveness of today's DVDs.

As for whether Blu-ray or HD DVD is likely to win the format war, not only do we think it's too early to declare a winner—we also think it doesn't matter. Despite the less-than-perfect movies currently available, it's hard to tell the difference between the two formats on the overwhelming majority of displays. The first batch of both HD DVD and Blu-ray discs have been uneven, but most people agree that the HD DVD movies are superior overall.



### Toshiba HD-XA1, \$800

After several months of having the only blue-laser player on the market—the HD-A1—Toshiba complemented the line with an \$800 HD-XA1 model that has a motorized door and an RS-232 jack for home automation. Otherwise, the two units are the same and produce identical 1080i interlaced 1,920-by-1,080 video. (Neither offers progressive 1080p output.) More HD DVD players are imminent, but as we went to press, the only other shipping model was RCA's HDV-5000, a repackaged HD-A1.

The HD-XA1's picture quality was excellent under the right conditions—that is, when a well-encoded HD DVD was playing through a digital HDMI or DVI connection on an exceedingly large HDTV. On a 50- to 60-inch screen, mediocre titles like *Kiss Kiss Bang Bang* were painfully contrasty and grainy. But the meticulously remastered release of *Goodfellas* delivered sumptuous, detailed images as good as those of any HD source we've seen. On midsize displays, the picture was crisper than that of a well-encoded standard-definition DVD, but the difference wasn't as profound. If your TV is under 36 inches or isn't equipped with digital or component inputs, you won't see much difference.

The bad news is that the Toshiba players are nightmares to use. Despite their trappings, they're actually Linux boxes disguised as consumer electronics devices. They take close to a full minute to start up, load a disc, or shut down. And their hard-to-use and unresponsive remotes are some of the worst we've seen. [go.pcmag.com/toshibahda](http://go.pcmag.com/toshibahda)





## First, a Little Backstory

Much like the development of DVDs in the 1990s, the development of blue-laser discs was slowed by years of quarreling among the consumer electronics, computer, and film industries. Driven by the lure of gargantuan royalty revenues, some of the world's most powerful companies fought fiercely to have their patents included in the blue-laser specifications. But despite repeated efforts, the industry could not agree on a single solution—an outcome that split the market into Blu-ray and HD DVD camps, each with its own set of patented technologies.

This format war is worse news for consumers than was the DVD-RW/+RW imbroglio that hindered the DVD rewriter market. While +RW and -RW drives could both play DVD-Video titles, Blu-ray and HD DVD players work only with movies recorded in their respective formats. This is particularly troublesome for filmmakers, distributors, and retailers, who need to create, manufacture, and stock two versions of each release. But worse for us, most Hollywood studios are adamant about supporting only one standard (generally Blu-ray), which means that they won't release films in both formats.



### Toshiba Qosmio G35-AV650, \$2,800

We had a disappointing experience with the Toshiba Qosmio G35-AV650 notebook, which ships with an internal HD DV player. When the G35-AV650 was used with an early release of InterVideo's WinDVD EX movie player software (bundled with our test unit), the HD video was unacceptably jerky and pixilated, and key menu-navigation functions simply didn't work. Like that of the Toshiba set-tops, the G35-AV650's HDMI digital video output was limited to 1080i. [go.pcmag.com/toshibag35av650](http://go.pcmag.com/toshibag35av650)

Another roadblock was Hollywood's insistence on choosing antipiracy technology that would be substantially harder to crack than existing DVD's ineffectual Content Scrambling System. After prolonged debate, the Blu-ray and HD DVD camps both chose the elaborate AAC (Advanced Access Content System) technology, a flexible digital rights management system that allows functions such as the ability to revoke the

## OUR PICKS RIGHT NOW AND IN THE FUTURE

	TODAY	WHEN THE SMOKE CLEARS	OUR TAKE
<b>HARDWARE</b>			
<b>Picture quality</b>	Blu-ray	Tie	This one was close. Both formats specify the same video codecs, frame rates, and resolutions. Current HD DVD players are limited to 1080i, but given the scarcity of true 1080p TVs today, that's not a tiebreaker.
<b>Sound quality</b>	Tie	Tie	The two formats specify similar audio options, and their corresponding hardware products don't differ much in this regard.
<b>Features</b>	Blu-ray	Tie	The first HD DVD devices are read-only players, but Blu-ray rewriters are already shipping. Other than that, there's not much difference.
<b>Ease of use</b>	Blu-ray	Tie	Toshiba's HD DVD players are a horror show of unusability. But in the long term there's no reason why either Blu-ray or HD DVD should have the edge in this area.
<b>CONTENT</b>			
<b>Picture quality</b>	HD DVD	Blu-ray	The first batch of HD DVD titles look better than the first Blu-ray releases. This will likely change when next-generation compression tools and dual-layer Blu-ray movies appear.
<b>Sound quality</b>	Blu-ray	Tie	The first BD titles have great-sounding uncompressed PCM soundtracks, but eventually both formats will offer similar audio options.
<b>Selection</b>	HD DVD	Blu-ray	There's a better selection of HD DVD movies on the market today, but the total number is still minuscule. Blu-ray will probably win this one in the long term because, unlike HD DVD, it's supported by nearly all major Hollywood studios.
<b>Functionality</b>	Tie	Tie	Content developers haven't yet taken advantage of either format's more advanced capabilities. Despite Blu-ray's more powerful authoring tools, both types of discs will probably offer similar features.
<b>Cost</b>	HD DVD	Tie	Toshiba's HD DVD players cost half as much as the competition, but this is an artificially low price. There's no reason why Blu-ray and HD DVD hardware and media should be priced differently in the long term.

# The Bottom Line: Is Blue for You?

Once you've read our explanation of the marketplace and the technology, you'll still have one question: "Should I buy or wait?"

**C**HANCES ARE, A BLU-RAY OR HD DVD movie player is in your future, but it's way too soon now for most people to buy.

Pioneer's BDR-101A is a good choice for developers who need to burn data today onto single-layer blank Blu-ray discs. But if you're looking for a way to play HD movie discs in your living room, your best bet is to give it some time.

Today's blue-laser movies and hardware can produce a superb viewing experience under the right conditions, but lower-priced, more stable, better-performing units will certainly outclass them over the next year. We don't recommend that anyone other than the most ardent early adopters consider a Blu-ray or HD DVD movie player today. If you do, you may find yourself replacing it sooner than you expected.

One reason why you don't need to rush out and buy one today is that you won't be able to find some of the other components you'll need to view movies at their best. Here's what you should be watching for in the coming months.

- A 1080p HDTV that displays HD content as high-quality 1,920-by-1,080 progressive-scan video. In addition to interlaced 1080i inputs, the set should offer a 1080p HDMI digital input. A TV that deinterlaces a 1080i signal internally into 1080p won't necessarily produce the same results you'd get from a pure 1080p signal path.  
**ETA:** True 1080p displays are just coming on the market, but they're still pricey.

- Your disc player, receiver, and TV should all have HDMI 1.3 interfaces. You can get away with an older DVI connection (as long as it's protected by HDCP), and even analog 1080i component video doesn't look half bad. (Both specs call for *image constraint*, a copy protection mechanism that, if used on a title, restricts analog output to DVD-class 720p video. So far, though, no movies implement it, and no studio has announced plans for it.)

But HDMI lets you pass both audio and video over the same wire. And unlike the current HDMI 1.1 spec, HDMI 1.3 has the bandwidth to handle content encoded with blue laser's next-generation 7.1-channel audio codecs. So why run nine cables instead of one?

**ETA:** Imminent.

- Your receiver should decode multichannel soundtracks encoded with the latest Dolby and DTS audio codecs into 7.1-channel surround. Today's home theater receivers don't yet support these codecs, so it pays to wait if you're planning an upgrade.

**ETA:** Q4 2006 through Q2 2007

- When you need to record blue-laser data discs, a rewriter such as Pioneer's BDR-101A will do the job on most late-model XP systems. But playing protected Blu-ray or HD DVD video requires a Vista-class system equipped with a fast processor and high-powered 256MB graphics board. Hint: Look for high-end gaming machines such as the Velocity Micro Vision A/V/D Custom Digital Media PC we used in our testing.

**ETA:** These systems are out there now if you have the cash, but prices should drop considerably over the next year.



**Metabeam** Lionsgate was the first to release discs that employ Metabeam Corp.'s easy-to-use Metamenu on-screen menu technology.

- If you want to play protected blue-laser movies on a PC, you'll want to do it under Windows Vista. XP can be retrofitted with most of the necessary Vista-native components, but right now, it's up to you to fit everything together.  
**ETA:** 2007. Probably.

- To have your PC play protected Blu-ray or HD DVD movies on an external HDTV, your graphics board will need an HDCP-protected digital output, preferably an HDMI 1.3 interface.

**ETA:** Next 6 to 12 months.

- The best hardware is useless without application software, but at the moment few offerings are blue laser-compliant. The best is InterVideo's WinDVD EX, which we use to play Blu-ray and HD DVD movies in PC Magazine Labs. Other products are imminent, including Ulead's DVD MovieFactory 5 Plus V5.3 (which should be shipping by the time you read this) and a mid-autumn upgrade to Nero 7 Ultra Edition, both of which will extend most of their DVD production and playback tools to Blu-ray and HD DVD. Surprisingly, the first notable application to be distributed on blue media is Human Computing's Comic-Base 11 Archive Edition, a popular comic book collector's database program that ships with gigabytes of photographs and HD videos.

**ETA:** Here now.—DL

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### Not so Basic Instinct

The first blue-laser discs don't take full advantage of the functionality offered by Blu-ray and HD DVD, but their navigation systems are still miles ahead of anything possible with DVD.

rights of cracked devices to play copy-protected discs. Blu-ray developers went even further, adding the BD+ component (which shifts part of the cryptographic algorithm to the disc itself) and a watermarking mechanism known as BD Mark. But reaching that point took years.

All this added up to repeated delays. Just when it looked as if players might ship in time for last year's holiday season, the industry lurched into a last-ditch attempt to unify Blu-ray and HD DVD into a single format. That effort failed, but even if it had never been attempted, manufacturers would still have been delayed by a seemingly endless stream of last-minute content-protection tweaks.

These setbacks created strategic problems for name-brand manufacturers like Pioneer and Sony, which had hoped to introduce blue-laser players in time to replace revenues lost when DVD prices plunged last year. Some industry players were also concerned that if the blue-laser market was delayed too long, the delay might provide a window of opportunity for alternative HD video-distribution mechanisms like Internet downloads, HD on red-laser discs, and ultra-high-capacity

Holographic Video Discs. Add in the widely held fear that a format war would significantly slow market growth and it's no surprise that by early 2006, the industry was anxious to get blue-laser products out as quickly as possible.

No company was more eager than Toshiba, one of the driving forces behind HD DVD and arguably the one with the most to lose if the format fails. Sensing that the key to HD DVD's success would be to build market share before Blu-ray had the chance to establish itself, it rushed out the \$500 HD-A1 player in April, months before and at about half the price of any Blu-ray model.

Much has been made of the fact that Toshiba was first to market with a blue-laser player, but we don't see this as being significant in the long run. Sales today are so tiny that Toshiba's three-month lead doesn't amount to much. And if a head start made much of a difference in a contest between two similar technologies, DVD+RW would have had more trouble catching up with DVD-RW.

Pricing is another nonissue. The Toshiba players cost about half as much as most Blu-ray players, but the company is reported to have artificially lowered the price to several hundred dollars below cost. Ultimately, we expect to see minimal price differences between Blu-ray and HD DVD.

Samsung, Sony, and other manufacturers pushed just as hard to ship the first Blu-ray set-tops and notebooks by midsummer, and Hollywood was equally hard pressed to rush a few dozen titles to market before the players shipped. Despite these Herculean efforts, all we saw was a few exorbitantly priced products that lacked key features, didn't play nicely with legacy equipment, were awkward to use, didn't support promised audio and video formats, and required hardware and software components that were



### Pioneer BDR-101A, \$995

Pioneer ships its BDR-101A internal Blu-ray rewriter without movie playback software because the company designed it for commercial authoring, backup, and archiving applications—not as a consumer player. Nevertheless, when we drove it with a copy of WinDVD EX, our test unit handled the most challenging Blu-ray content. Output was jerky on older machines, but we obtained silky smooth performance from our high-performance Velocity Micro Vision A/V/D Custom Digital Media PC test bed (outfitted with an AMD Athlon 64 3000+ processor and a 256MB eVGA GeForce 7900 GT Velocity PCI Express graphics board). Our test beds didn't have the HDMI output jack necessary to route protected Blu-ray video to a big-screen TV, but we didn't detect any artifacts on LCD computer monitors as large as 21 inches. The BDR-101A also excelled as a data-recording device, burning 22GB of mixed files to BD-R media in 50 minutes—far superior to the 3 hours the Sony notebook took to complete the same task. [go.extremetech.com/blu-ray](http://go.extremetech.com/blu-ray)



### Our favorite

We thought that *Underworld: Evolution* looked the best of all the Blu-ray titles currently available. Our favorite HD DVD: *Goodfellas*.

prohibitively expensive or not yet available. Many early adopters were impressed with these early releases, but after years of anticipation, it's no surprise that others wasted no time finding reasons to roast one or both of the new formats.

### The State of the Content

The first blue-laser movies were rushed to market, and many of them look it. Most are older, and some have been remastered from less-than-perfect source material, resulting in high-resolution discs that reveal grain and film defects in stunning detail. Because professional-quality commercial H.264/AVC codecs aren't yet available, most HD DVD authors used the VC-1 codec (developed by key HD DVD backer Microsoft) to compress content. Blu-ray authors chose a popu-

lar MPEG-2 HD encoder that Blu-ray evangelist Sony made.

Many industry insiders feel that MPEG is one reason why so many Blu-ray titles have disappointing picture quality. The newer, more efficient VC-1 and H.264 codecs have little problem compressing a movie, menus, and special features onto a dual-layer 30GB HD DVD disc. But MPEG isn't optimized for the lower bit rates necessary to shoehorn that content into a 25GB single-layer Blu-ray disc. We expect 50GB dual-layer replicated Blu-ray discs to improve Blu-ray picture quality greatly over the next six months. The issue may become moot next year as production-quality H.264/AVC codec tools become available to authors. Both specs support those codecs, yet as we go to press, no movies are using them.

Another weakness of the first batch of blue-laser movies is their lack of advanced functionality. The Blu-ray and HD DVD formats specify sophisticated authoring environments that let developers implement advanced features such as multiple-video-stream playback and interactive links to Internet content. Few authors, however, have had the time to explore fully the capabilities of HD DVD's XML-based iHD or Blu-ray's Java-based BD-J authoring tools. This will likely change over the next few years, and as it does,

## BLU-RAY AND HD DVD FACE OFF

	Blu-ray	HD DVD
<b>Number of layers per side</b>	BD-ROM: 1 now, 2 later this year, 8 theoretical maximum; BD-R:	HD DVD-ROM: 2; HD DVD-R: 1; HD DVD-RW: 1
<b>Capacity per layer</b>	25GB	HD DVD-ROM: 15GB; HD DVD-R: 15GB; HD DVD-RW: 20GB
<b>Total disc capacity</b>	1 layer: 25GB; 2 layers: 50GB	HD DVD-ROM: 30GB per side; HD DVD-R: 15GB; HD DVD-RW: 20GB
<b>Video bandwidth</b>	48 Mbps (54 Mbps total data rate)	36.55 Mbps
<b>Anti-piracy technologies</b>	AACS, ROM Mark, BD+	AACS
<b>Video resolutions</b>	1920 x 1080 HD (50i, 60i and 24p), 1440 x 1080 HD (50i, 60i and 24p), 1280 x 720 HD (50p, 60p and 24p), 720 x 576/480 SD (50i or 60i)	1920 x 1080 HD (50i, 60i and 24p), 1440 x 1080 HD (50i, 60i and 24p), 1280 x 720 HD (50p, 60p and 24p), 720 x 576/480 SD (50i or 60i)
<b>Video codecs</b>	MPEG-2, MPEG-4 Part 10 AVC/H.264, SMPTE VC-1	MPEG-2, MPEG-4 Part 10 AVC/H.264, SMPTE VC-1
<b>Audio codecs</b>	Uncompressed PCM, Dolby Digital Plus Lossy, Dolby TrueHD MLP Lossless, DTS-HD, Dolby Digital, DTS	Uncompressed PCM, Dolby Digital Plus Lossy, Dolby TrueHD MLP Lossless, DTS++ Lossy, DTS++ Lossless, Dolby Digital, DTS
<b>Primary industry supporters</b>	Dell, HP, LG, Mitsubishi, Panasonic, Philips, Pioneer, Sony, others	Intel, Microsoft, NEC, Toshiba
<b>Studio backers</b>	Disney (exclusive), Fox (exclusive), Lionsgate (exclusive), MGM (exclusive), Paramount, Sony Pictures (exclusive), Warner	Paramount, Universal (exclusive), Warner
<b>Availability today</b>	Set-top players, notebook rewriters, aftermarket rewriters	Set-top players, notebook players
<b>For more information</b>	Blu-ray Disc Association: <a href="http://www.blu-raydisc.com">www.blu-raydisc.com</a>	DVD Forum: <a href="http://www.dvdforum.org">www.dvdforum.org</a>



blue-laser titles will offer a far more interactive entertainment experience than they do today.

Audio is yet another area where the first titles fall short. Although both formats promise 7.1-channel sound and specify a variety of next-generation multichannel Dolby and DTS codecs, no release to date has implemented all these options. Current HD DVD titles provide 5.1 soundtracks in Dolby Digital Plus and plain old DVD-class Dolby Digital formats, while Blu-ray discs let you choose between Dolby Digital and great-sounding 5.1-channel uncompressed PCM audio. This isn't a crucial issue right now, since no receivers yet offer Dolby Digital Plus or DTS-HD decoding, and 7.1-channel sound systems are still uncommon outside of the gaming community. But these new standards may become *de rigueur* for videophiles over the next few years. If that happens, new titles will be expected to support all the major audio codecs in Blu-ray and HD DVD.

### The Format War: Is Anybody Winning?

The short answer is that it's too soon to call a winner. The early production units we evaluated made it clear that both Blu-ray and HD DVD are still under construction. Most of the performance and stability problems we wrestled with should be resolved over the next six months. Furthermore, several vendors have hinted at plans to release dual-format Blu-ray/HD DVD players in 2007, a move that would render all existing models obsolete. And many observers expect the balance of power to tip toward the Blu-ray camp when Sony releases its much-anticipated PS3 gaming console, which will incorporate a Blu-ray drive. This move is expected to power Blue-ray sales tremendously.

We expect Blu-ray and HD DVD movie releases to improve significantly as developers gain familiarity with iHD and BD-J, and as new audio and video compression tools become available. Blu-ray discs should also improve dramatically later this year with the introduction of dual-layer replicated media. They may even leapfrog HD DVD titles in picture quality.

Industry support is a more complicated issue, but the balance is currently tilted toward Blu-ray, which all but one (Universal) of the major studios backs. Blu-ray also has the support of more computer and consumer electronics companies than HD DVD does. Microsoft and Intel, on the other hand, are firmly in the HD DVD camp, possibly due to Blu-ray's potentially cumbersome BD+ copy protection technology. BD+ could force users to upgrade all their HD media player software whenever an algorithm is cracked. The iHD authoring environment will be integrated into Vista as a native technology.

Though alliances can shift unexpectedly, blue laser has the potential to become at least as big as DVD. If you know what you're doing and have

### Sony VAIO VGN-AR190G, \$3,400

The first Blu-ray units appeared at our door about six weeks after the Toshiba players. Sony's \$3,400 VAIO VGN-AR190G notebook, which is equipped with an internal Blu-ray rewriter (not a read-only player), suffered from Qosmio-like video problems. Upgrading it to the most recent build of WinDVD EX smoothed out the video considerably but played havoc with the system's drivers, ultimately creating display configuration errors that prevented us from playing any protected Blu-ray content. After restoring the original disc image several times and running the same gauntlet of playback problems and configuration errors, we gave up.

[go.pcmag.com/sonyvgn-ar190g](http://go.pcmag.com/sonyvgn-ar190g)



### Samsung BD-P1000, \$1,000

The first Blu-ray set-top player we evaluated was Samsung's \$1,000 BD-P1000, which offers a responsive, easy-to-use remote, 1080p output, and a flash card reader for viewing digital images. Its picture quality was easily in a class with that of the Toshiba set-tops, but only when used with top-notch source material and a large display. This setup was wasn't as easy as it sounds, because few of the Blu-ray discs we viewed were a match for the best HD DVD titles. A couple of releases, like *Underworld: Evolution*, were remarkably realistic and detailed, but most were plagued to varying degrees by grain, compression artifacts, garish or washed-out color, and excessive contrast.

[go.pccmag.com/samsungbd-p1000](http://go.pccmag.com/samsungbd-p1000)

money to spend, you can assemble a blue-laser system that produces stunning images. The catch is that in a year or two you'll be able to create a system that looks and sounds better, has more features, and costs much less. There's no reason to avoid this first round of blue-laser products, so long as you know what you're doing. But don't make too many assumptions about the technology as a whole from the products we see today. □



*Our favorite new player!*

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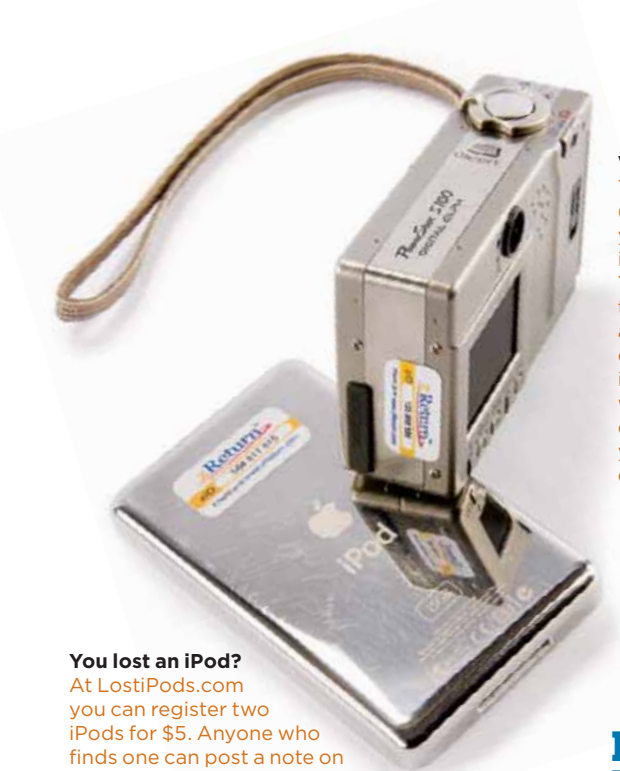
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Think again.

BY BEN Z. GOTTESMAN

**Y**ou can call me a loser. You wouldn't be the first. In more than a dozen years of commuting between New Jersey and New York and flying around the country, I have constantly lost things in trains, airplanes, buses, and cars. You name it—my train pass, jackets and coats, umbrellas, a gym bag with my special-order ultra-narrow tennis shoes, a birthday cake (no joke!), hundreds of dollars' worth of computer modems, a cell phone, and an MP3 player. None of these items were stolen. I just zoned out and forgot to take them with me when I got off the train. Or I didn't notice that they had fallen out.





### You lost an iPod?

At [LostiPods.com](http://LostiPods.com) you can register two iPods for \$5. Anyone who finds one can post a note on the Web site with the player's serial number, and the service puts you in touch with the finder. This is an inexpensive way to protect your player.

### What worked for us

The zReturn service (about \$15) gives you six adhesive labels in two different sizes. You can easily affix them to devices such as iPods or digital cameras. The labels instruct someone who finds a lost device to contact you via the Web and either e-mail or IM.



### Your own label

Just as your mom used to put your name on your backpacks and lunchboxes, you can make your own labels for your gizmos. If you use PrivatePhone's service (see sidebar), finders can contact you by a phone number other than your primary one or by an e-mail with an audio file attached.

## LABELS ARE YOUR BEST BET

Labels can bring back your stuff, whether it's an iPod or a lunchbox.

## PRIVATE-PHONE

Nervous about giving out your real phone number? Then use United Online's free service ([www.privatephone.com](http://www.privatephone.com)). It gives you a phone number with a voice mailbox. When people leave messages, you get e-mail with the audio file attached or an SMS message to your mobile phone.



The only item that was ever returned was my train pass, and this happened a couple of times. Why? Because it was in a small ID wallet with my building pass and business cards. And the pass had my name on it. The first Good Samaritan who found the pass searched the local phone book, found my name (which, fortunately, is not too common), and took a chance and called me. The second one sent me an e-mail, using the info on my business card.

So much of our lives these days is defined by the mobile electronics we carry—cell phones, iPods, digital cameras, and laptops. Losing any of these is a very painful experience. But our precious electronic devices are so tiny and easily misplaced that we're all bound to lose one eventually, if we haven't already. That's why my ears perk up every time I hear about some new service that helps recover lost and stolen items.

One of the most recent recovery services that I came across was zReturn. It seemed like a clever idea: For \$14.90, you get a package with six adhesive labels (in two different sizes) and one key tag. The labels and the tags all say "If found go to [www.zReturn.com](http://www.zReturn.com)," and each has your unique PIN code. You put the labels on your items and then go to zReturn's Web site to register the PIN and describe what it's affixed to (for your reference). Anyone

who finds a labeled product can go to the Web site, enter the PIN code, and find a place to write you a note with contact information. The note gets to you by e-mail and IM. (At this point, only AOL Instant Messenger is supported.)

I said to myself, brilliant idea! Then I told my wife. She said, "Why don't you just make your own label with your contact info?" Duh, I said. That's an even brillianter idea! I posed the question to Sergio Caplan at zReturn, and he said, sure, you could do that, but your homemade label probably isn't waterproof. And do you really want personal information exposed on all these devices? Good points. I decided to see if one approach worked better than the other.

I put out an appeal to the *PC Magazine* staff to give me their tired and poor—and dead—mobile electronics yearning to be lost. I gathered up a digital camera, a couple of BlackBerrys, an iPod, and several cell phones. One advantage of using dead units for testing is that the finders couldn't use numbers stored in the device to find me. They'd have to use the info on the labels.

On some devices I affixed zReturn labels, and on some I put my own label with my phone number and e-mail address. But I didn't put any personal information on my own label. How's that? I signed



up for a free voice mail number from PrivatePhone (see sidebar) and created a new disposable e-mail address (DEA) in my Spamex account ([www.spamex.com](http://www.spamex.com), \$9.95 a year for 500 addresses). Of course I could have used a free mail account, but Spamex DEAs auto-forward to any e-mail account you want, so I didn't have to go hunting all over to see if anyone had tried to contact me.

I tried to add one other service to the mix, Lost-iPods ([www.lostipods.com](http://www.lostipods.com)). For \$5 you can register two Apple iPods. Finders post a note on the Lost-iPods site with your player's serial number, and the service hooks you up with them. For two dollars more, you get two stickers, just like zReturn's, so you don't have to go DIY. But more than two weeks after I placed my order, the stickers still hadn't shown up. So I couldn't "lose" my dead iPod.

I found another service similar to zReturn called Trackitback ([www.trackitback.com](http://www.trackitback.com)). For \$29.95 you get ten tags, and finders can report recovered items by the Web or phone. Finders also get a reward—a Trackitback gift pack of labels. That reminded me of my grandmother's reward for eating my peas:

more peas. Trackitback costs nearly twice as much as zReturn.

It was time to start "losing it." Over the course of a week, I lost a BlackBerry on a bench at my train station, a Sprint Samsung phone on the train, a Nextel phone in a bar, a GoodLink G100 (BlackBerry competitor) in a cab, a Pocket PC phone in my public library, and a digital camera at a local Burger King.

How'd I do? Every item was reported back to me and recovered, except for the BlackBerry and the Sprint phone. I was impressed. To me, it showed that there are a lot of good people in this world. Of course the cynic in me notes that none of my lost devices worked. A big ol' dead cell phone from circa 1992 is a lot less tempting than a gorgeous new iPod nano. But I do believe that most people would like to do the right thing, especially if they're not too put out by trying to do so.

Which recovery technique works best? The homemade/PrivatePhone/Spamex approach works well instead of or in addition to zReturn, but buy weatherproof labels. □

## STOP, THIEF!

Losing a gadget is different from having one stolen. Fortunately, there are some services that can make a big difference if the wrong person pulls a fast one on you.

**W**hat happens if someone steals something of yours or finds something you misplaced and decides to use it for himself rather than giving it back? I looked at a couple of services that may increase the odds that you'll recover what's rightfully yours.

Absolute Software's Computrace LoJack for Laptops (\$49.99 per year) installs on your notebook PC and silently connects to Absolute's servers once a day to report its IP address. The software is virtually undetectable.

If the computer is stolen, you report it to the company (and the local police, of course), and, should the thief connect the system to the Internet, the software will be instructed to start reporting the PC's IP address every 15 minutes. Once Absolute has the IP, it will work with proper authorities to subpoena the ISP to find the physical location of the address. Several major notebook vendors, such as Dell, HP, and Lenovo, include support for LoJack for Laptops in their BIOS so that, even if the thief replaces or tries to bypass the notebook's hard drive, the system will still phone home.

To test the service, I reported my notebook stolen and then went wardriving around my town, hopping onto all the open wireless networks—and, believe me, I was never at a loss to find a connection. For some



**Trackable Dots** Use the DataDot Personal I.D. kit to apply dots that the police can identify.

reason, the software continued to operate as if it wasn't in recovery mode. But Absolute claims that over 90 percent of LoJack-protected notebooks are recovered. Bear in mind that the average recovery time is 50 days. By that point, you'll probably have moved on to a new PC.

If property of yours that was stolen is recovered by the police, you may have a hard time proving it's yours. DataDot, an Australian company, has developed a unique way to put your personal stamp on all your equipment—tiny little dots about the size of a grain of sand that are laser-etched with a unique ID code. When you file a police report on the theft, you let the police know that your purloined gear has these dots on it. If the po-

lice find what they think might be your device, they're supposed to put it under a black light to find the dots and then read the information on the dot with a high-powered microscope.

That's the theory, anyway. I ordered the DataDot Personal I.D. Kit (\$24.95) from the company's U.S. partner ([www.datadotusa.com](http://www.datadotusa.com)). The kit includes a little container filled with dots suspended in what seems like Elmer's Glue. It contains about 500 dots, so you can coat several items. I'm skeptical that the police would take the time to search for these little things on a recovered iPod. Still, it might be worth a shot.

## IMPROVE YOUR ODDS

Here are five tips that can come to your rescue in securing your gizmos and your data.

- 1 Cell phone:** Create an address book entry called "Me" or "If found" with other ways to contact you.
- 2 Digital camera:** Take a picture of your contact info and store it in your camera's Favorites so it's never deleted.
- 3 MP3 player:** Record an audio file with your contact info. Make the artist and track title "(If found)" and sync it to your player.
- 4 Make it easy.** Don't inconvenience the finder. Go to pick up the item, or pay for shipping. Give the person a small thank-you present.
- 5 Back Up Your Devices!!!** You can't count on their being returned.

**See more.  
Do more.  
Get more.**



## **19" Digital True View™ LCD**

The W1961G 19" Wide Screen LCD display solution features the latest in hardware and software technology. CTX's new Digital True View technology combines vivid color, and sharp-cut enhancement technologies with multi-gamma modes giving users customizable viewing experiences for text, graphics, sports cinema, or natural environments. Perfect for gaming, home theater and/or professional office use.

For more information, visit [www.ctxtec.com](http://www.ctxtec.com).

### **Multi-function LCD**

- Watch movies**
- Play games**
- Multi browser use**
- Spreadsheets/CAD**

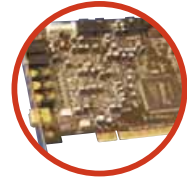
**Also available in silver/black - W1961A**



**COMMITTED TO XCELLENCE™**



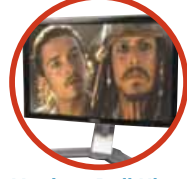
**CPU:** Core 2 Duo E6600—\$350



**Sound card:** Sound Blaster Audigy 2 ZS (OEM)—\$60



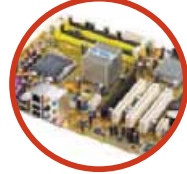
**Graphics:** XFX GeForce 7900 GT—\$280



**Monitor:** Dell UltraSharp 2007WFP—\$370



**Keyboard:** Microsoft Ergonomic 400—\$45



**Motherboard:** ASUS P5B—\$160



**Mouse:** Logitech G5 Laser Mouse—\$45



**Speakers:** Logitech X-530 70W 5.1—\$60



**Optical drive:** Lite-On SHM-165H6S Dual Layer DVD3RW Writer—\$40



**Memory:** OCZ Gold 2GB (2 x 1GB) DDR2 800 (5-5-5-12)—\$200

**Hard drive:** Seagate Barracuda 7200.10 200GB SATA (ST3200820)—\$80

# *The Best PC for the Money*

Dell is a giant corporation. You are not. Therefore, your goals and Dell's are not the same. Fortunately, your goals and mine are: It's all about saving money. Follow in my footsteps, and build a PC for \$1,900 using parts found at the nexus of price and performance.

**BY JASON CROSS**

## Bang for Your Buck

**P**C VENDORS ARE LASER-FOCUSED ON providing a single, optimal solution. Perhaps it's a money-is-no-object gaming PC, or maybe it's a slim, quiet Media Center computer. The very nature of the PC is to be flexible and customizable, but we realize that not everyone's needs can be pigeonholed into these purpose-built PCs. Most of us use our PCs for a whole wealth of activities and need a flexible computer that's great for typical office desktop applications, downloading music and video, syncing with a music player, burning DVDs, lightweight video editing, playing games, watching movies,

editing photos, and more. And because it's almost 2007, it has to run Windows Vista well too.

The idea for this project was simple: Rather than picking a price or a particular task and optimizing for it, I examined each component inside a general-purpose PC and chose the ideal part based on the best mix of performance, features, and price.

This isn't the be-all, end-all solution for everyone's needs, of course. This is a system in which each component represents the best value for your dollar, with an eye toward longevity—because nobody wants to buy a whole new PC next year. This system isn't all things to all people, but then again, no man is an island... or a Dell, for that matter.

## The Main Stuff

**T**HE MOST IMPORTANT RULE FOR this project is a simple one: These parts have to be readily available, in stock, at vendors I trust with my own money. I don't go with the lowest price I can find anywhere in the wild land of online commerce. I'd rather err on the side of reality than promise a supercheap system you could never build yourself.

This system's total price is around \$1,900, but don't let that shake you. It's common for upgrading do-it-yourselfers to recycle their current monitor, speakers, keyboard, and mouse, and the cost without those components is under \$1,400. This system isn't all about price, of course. It's about

building an awesome computer that won't break the bank. The performance of this new system is really impressive too. Here's the breakdown of all the components I chose—and why.

When building a PC, you start with the CPU first; that choice informs the rest of your decisions. I've been a fan of AMD chips for a while now, but I couldn't resist switching to Intel's new Core 2 Duo. The \$350 E6600 is the least-expensive CPU with 4MB of L2 cache, and it's a real speed demon. And it kicks butt on most popular games, so this system should be a great gaming box.

The ideal complement to a brand-new Intel chip is a brand-new Intel chipset, and the \$160 ASUS P5B, based on Intel's 965 core logic, packs

## Drive In, Hook Up



**1 Unboxing day** Made with everything you see here (some assembly required). The box for the CPU isn't pictured, but you know what a CPU looks like by now, right?



**2 Optical drive rails** The first things you'll install in your PC are the drives, starting with the optical drive. Just screw on the rails and slide it in from the front.

Those are tough rubber bands!



**3 Anti-vibration slings** The P150 suspends your drives in rubber slings to eliminate vibration. If you're concerned, you can always mount them in standard drive trays.

a lot of features into a pretty affordable motherboard. It's got Gigabit Ethernet and plenty of USB 2.0 ports, as well as five SATA ports, support for DDR2 800 memory, overclocking and BIOS-tweaking options, and even an external SATA port. Best of all, it's passively cooled, so there's no whirring chipset fan to make it a noisy wreck.

On the memory front, you could easily get by with 1GB of RAM these days. For most tasks in Windows XP, that's plenty. But there are a few games that benefit from extra memory, with more titles on the way. Heavy Photoshop users or video editors could use a bit more, too. We had a better reason for pushing this system to 2GB, though: Windows Vista. Vista will use RAM more efficiently than XP does, with its advanced prefetching algorithms. I found a good deal on a pair of OCZ 1GB sticks that offer pretty good latency for

800-MHz DDR2 RAM. This level of performance for \$200 is too sweet a deal to pass up.

Finally, wrap your gear in the new P150 case, \$140 from Antec. Its soft white finish and silver front make it fairly attractive, and the hinged front panel makes it easy to work on. The included 430W power supply delivers plenty of juice for the power-efficient Core 2 Duo CPU.

### Audio and Video, Input and Output

When you talk about the best dollars-to-frame-rate ratio for graphics cards, you don't need to go any further than the XFX GeForce 7900 GT; it's an exceptional value. Fast enough to run all the latest games without sacrificing features, it can be found for around \$280. Nongamers might insist that they don't need a fancy graphics card, and they're right—as long as they don't want Windows Vista.

## The Guts of Your System



- 1 Screw in the motherboard** After installing the drives, snap in the back I/O plate that comes with the motherboard and then carefully screw it down. But don't overtighten those screws!



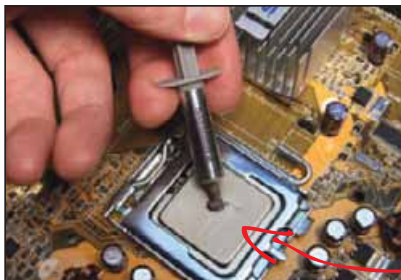
- 2 Attach tiny wires** Once the motherboard is in, plug in the front panel connectors (for the power and reset switches, hard drive light, USB ports, etc). The motherboard manual will tell you where things go.



- 3 Remember memory** Snap in the RAM before the CPU—it's just easier that way. To get dual-channel memory performance, plug the two sticks into slots A1 and B1 (as shown) or A2 and B2.



- 4 Place the processor** Installing the CPU is easy. Just lift up the hinge and gently lay the CPU down in the socket. It's notched to fit in only one way, so you can't really mess it up.



- 5 Grease it good** If there's no thermal compound on the included heat sink/fan combo unit, you'll have to add your own. As with Brylcreem, a little dab'll do ya.

*Don't overdo it—too much can be dangerous*

*There should be a standard...*

Vista's desktop is composed of 3D surfaces, improving usability while adding scaling, animation, and anti-aliasing. This means you'll need a decent 3D graphics card to get a basic desktop experience. With an eye toward the future, I'd recommend this card for Vista future-proofing as well as for today's games. You could go cheaper, but you'll need to upgrade your graphics card when you move to Vista.

Sound goes right along with video, but if you're on a tight budget, you can skip the sound card entirely and just use your integrated PC audio. That's almost always a bad idea, though: The signal-to-noise ratios are typically awful, the 3D audio options are limited, and because you're forcing the audio processing onto the host CPU, games that use many audio channels can slow down a bit. If you really want your games, movies, and music to sound good, you need a decent sound card. The Sound Blaster Audigy 2 ZS—just about the most full-featured consumer card on the market—can be had for only about \$60. The ZS model supports up to 7.1 sound for DTS-ES and Dolby Digital EX movies, it's THX certified, and it lets you record and play back full-resolution 24-bit audio.

While you're thinking about sound, pick up Logitech's X-530, a pretty good set of speakers. It lacks the pure wattage and volume of the Z-640, but the sound is good, and you can't beat the price.

Mice and keyboards (very personal things) are harder to pick out. What one person absolutely loves, another is certain to hate. That said, I recommend Microsoft's Natural Ergonomic Keyboard 4000: You can find it pretty cheaply online, and it includes all the media keys and programmable shortcuts you could want. It's comfortable

to type on too, of course, which is the primary concern. And Logitech's G5 Laser Mouse is still my favorite gaming mouse, and a pretty good bargain at around \$45. The adjustable sensitivity (up to 2,000 dpi) and weighting system are as useful for precision Photoshop work as for your Counter-Strike LAN parties.

## Drives and Display

The boom in peer-to-peer media downloading has exploded the typical PC's storage needs. Whether you're legally sucking down songs with a subscription service like Urge or illegally snagging every episode of *Family Guy*, you'll find that digital media will fill your hard drive in a heartbeat.

The solution: Seagate's \$80 Barracuda 7200.10 200GB, tenth-generation hard drive. Compared with earlier models, performance is substantially improved, and you get a lot more storage per dollar with the new model. Hard drive prices continue to plummet, so if you're building this system or one like it, shop around carefully. And speaking of shopping, I've found what might be the deal of the century: Lite-On's 16X dual-layer DVD±RW burner sells for a whopping \$40 in online stores. It even supports LightScribe so you can burn pretty pictures or labels into the top of your discs.

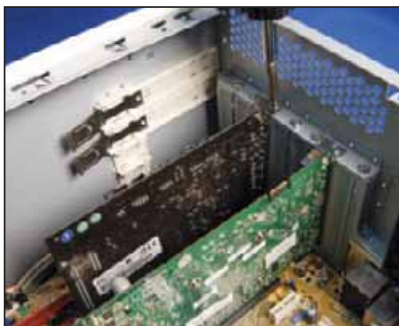
Finally, on the display front, I'm mightily impressed by Dell's \$370 UltraSharp 2007 WFP. It's one of the best bang-for-the-buck monitors on the market. Some may balk at spending several hundred dollars on a monitor, and that's understandable. There are plenty of good 19-inch LCDs out there, too. But I just love widescreen monitors—they're the wave of the future.

### » EXTRA SAVINGS ONLINE

Shave \$150 off this system's cost by taking an inch off your monitor. See our story on ultra-cheap 19-inch LCDs: [go.pcmag.com/199lcsd](http://go.pcmag.com/199lcsd)

## Apply the Finishing Touches

Special PCIe graphics power cord



**1 Arrange your cards** Seat the graphics card in the PCI Express graphics slot; the sound card sits in a PCI slot. Which one doesn't matter, but I used the slot furthest from the graphics card.



**2 Cord order** Plug the optical drive in with the IDE cable, and the hard drive with the SATA cable. Then plug in the power connectors (don't forget that little four-pin plug in the motherboard's corner!).



**3 It's a wrap!** That's basically all there is to it. Double-check all your plugs and connections, slide the side panel back on, and you're ready to fiddle with the BIOS and install Microsoft Windows. Easy, right?

# Performance

**T**EST RESULTS ARE IMPORTANT, but don't get too caught up in the numbers. This system is about utility as much as performance. It's about putting together a "really nice" system:

One that's aesthetically pleasing, quiet, feature-rich, and fast enough to tackle all kinds of different apps for everyone in the family, whether it's games, programming, scientific calculations, DVD authoring . . . or a massive iTunes library.

To give you a feel for the overall evolution of the PC industry, I've compared it with a similar-purpose system I built almost exactly one year ago (for details, see [go.extremetech.com/2005b4b](http://go.extremetech.com/2005b4b)). And just for kicks, I've compared it with the fastest, most expensive system Dell makes today: the Dell XPS 700, which is based on a Core 2 Duo Extreme CPU and sells for almost \$4,000.

Start with the PCMark2005 chart, where you'll notice my new system puts the old configuration to shame: The score is a whopping 48 percent higher. You can thank Intel's Core 2 Duo and faster RAM for that (the earlier system used an Athlon 64 X2 3800+ processor and DDR 400 memory). In fact, the only area in which the old system outpaces the new one is in hard drive performance, and considering that we're getting more gigabytes per dollar in the new system, we'll take that tradeoff.

The super-high-end Dell kicks butt across all tests, but you'll notice the law of diminishing returns taking effect. This year's bang-for-the-buck system is almost 50 percent faster than last year's, while the supercharged Dell is just 12 percent faster than that. The CPU scores tell the story even better: The Dell's Core 2 Extreme scored about 11 percent better than my system's Core 2 Duo. But that Core 2 Duo was nearly 70 percent faster than last year's 3800. Is the Dell worth the extra \$2,000? If you absolutely need the speed, yes. But for everyone else, this DIY system is rock solid and very fast.

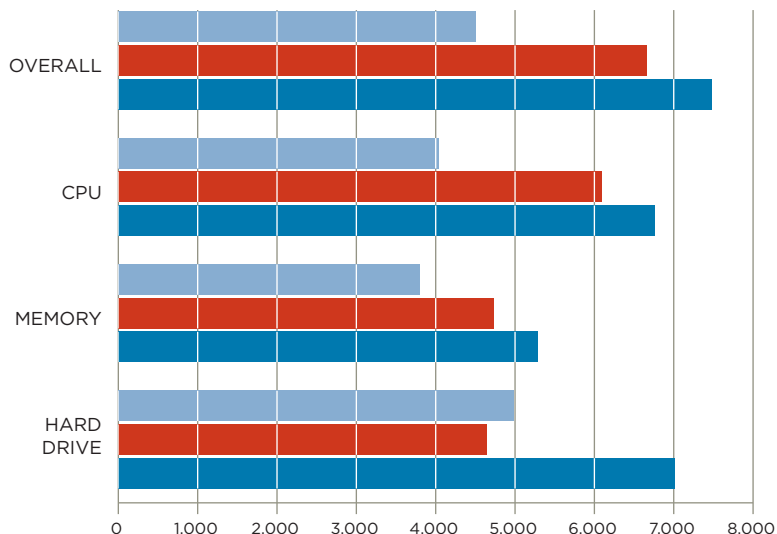
3DMark 05 tells a similar story. Though Dell's system scores 56 percent higher—and to be fair, it does have a pair of nVidia 7900 GTX cards—my new system outperformed last year's ATI Radeon X800 XL by nearly 100 percent. Zoinks!

It's important to keep in mind that we're not simply going for the highest possible benchmark scores at the lowest dollar amount. What makes this PC special is the *value* of the package as a whole. It's not just that the PC is fast, it's *nice*, too. It's a complete package that can do almost everything today, and will still be peppy a year or two into the Vista era. □

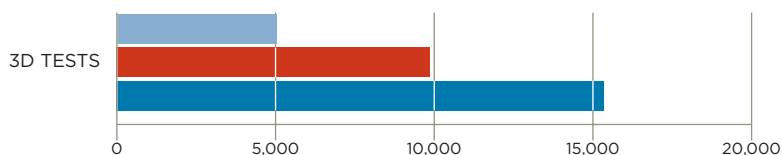
## PERFORMANCE TESTS

Old bang-for-the-buck PC    New bang-for-the-buck PC    Dell XPS 700

**PCMARK05** Scores in PCMarks (higher is better).



**3DMARK05** Scores in 3DMarks (higher is better).



### YOU BUILT IT!

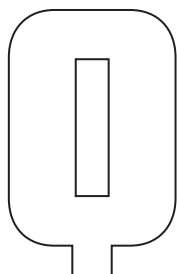
When we debuted the DIY iPod boombox a few months ago, some laughed and some shook their heads. Others, like Brendan Hughes of New Albany, Ohio, took up the challenge. Here's his project, halfway done. Were you inspired? Send your submission to [diy@pcmag.com](mailto:diy@pcmag.com)





## ASK NEIL SOFTWARE

### WORD TEXT IS NOT BLACK



**In my Microsoft Word, the default automatic font color was changed from black to a bluish color. Do you know how to change it back to black?**—Louis Hong

**» NEED ANSWERS?** Each issue, *PC Magazine's* software expert, Neil J. Rubenking, tackles your toughest software and Internet problems. Send your questions to [askneil@ziffdavis.com](mailto:askneil@ziffdavis.com)

**A** Word gets that color from your system's color scheme or desktop theme. Most likely, you happened across an attractive theme and chose to install it on your system, without realizing the full extent of the changes it would make. The change won't affect your printed documents—anything formatted to use the "Automatic" font color will still print in black. If you wish, though, you can change the display back to black without having to get rid of your theme completely.

Right-click the desktop, choose *Properties*, and click the *Appearance* tab. If you're using Microsoft Windows XP, click the *Advanced* button. There's a list of items shown; scroll down to the one named *Window* at the bottom and select it. You'll see two colored boxes shown. The upper one is the default window background color and the lower is the default text color. Just click the lower box and choose black. Now click *OK* and, if you're using Windows XP, *OK* again to accept the change. All fixed!

### TEACH OUTLOOK TO SPELL YOUR NAME

**Q** When I installed Microsoft Outlook XP, I misspelled my name as the owner. Now it shows up wrong as the owner name in the

*Task Window, and it's spelled wrong for every new task I create. Is there a Registry place that I could change to correct this?*—Tony Triano

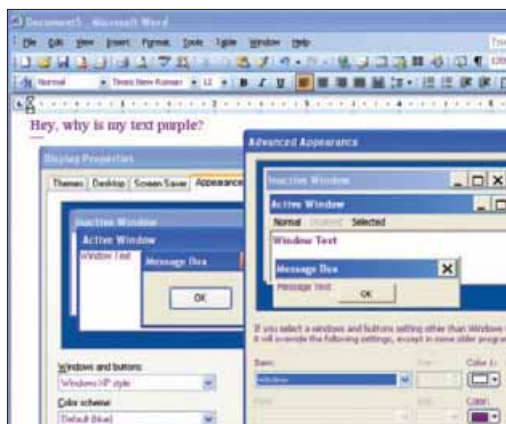
**A** The task owner shows up in a variety of places, most commonly in the Owner column when you list tasks *By Person Responsible*. The name shown there is the same as the name for the corresponding e-mail account, so you'll definitely want to correct the spelling. Select *Tools | E-mail Accounts* from the menu, choose the option *View or change existing e-mail accounts*, and click *Next*. If there are multiple accounts, choose the one you normally use and then click the *Change* button. Correct the spelling in the *Your Name* box, click the *Next* button, and click the *Finish* button. This won't fix the tasks that already have the misspelled name, but all new tasks will show the correct spelling.

### READ E-MAIL CAUTIOUSLY

**Q** With all the current emphasis on new worms, Trojan horses, viruses, and other malware, I have a question about my Microsoft Outlook Express application. I've shut off the preview pane to prevent some wacko from owning my PC, but every time I'm purposely viewing my e-mail and elect to delete it, the next message in my queue opens up. I really want the application to go back to the Inbox view. I haven't a clue how to do that, nor have I found anything in the Help file. Any idea how I can make that happen? I'm so completely up to date with Windows XP and everything else Microsoft, it's almost scary!—Garth Cooper

**A** By turning off the preview pane and deleting suspect mail without opening it, you greatly reduce the possibility that an HTML-based message could exploit some security flaw and compromise your system. You also foil any attempts to snag private information that's stored in Web browser cookies using a "web bug" image.

It's true that when you delete the current message, the next message in the queue will take its place. Fortunately, there's a simple solution: Scan your list of messages starting at the bottom. Delete any that don't look right and read the ones from your known correspondents. If you delete the last message in the list, you'll go back to the Inbox view, as requested. And if the message you deleted is not the last, the one that takes its place will be one that



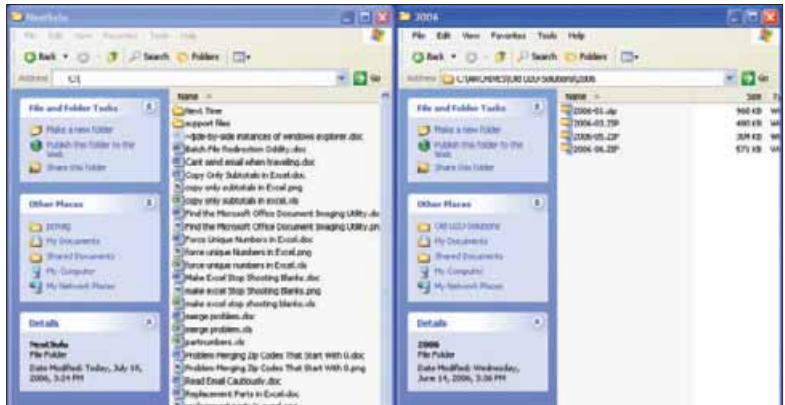
Text whose color is set to "Automatic" in Microsoft Word will display using the system-defined Window Text color, though it will still print as black.

you've already approved, since you're working up from the bottom.

## SIDE-BY-SIDE INSTANCES OF WINDOWS EXPLORER

**Q** I often need to move files and have found that the best way to do it is to open two instances of Windows Explorer and then size them so they fit side by side on the screen. It's cumbersome to go through the motions of opening one instance of Explorer, sizing it, opening another instance, and sizing that one. Is there any utility or program that can do this automatically?—Harry G. Pappas

**A** You don't need any special utility—Windows makes it easy to get the effect you want. Exactly how you'll do it depends on the circumstances. Start by launching your two instances of Windows Explorer. If Windows combines the taskbar buttons for the two windows into a single one with a title like "2 Windows Explorer," simply right-click that button and choose *Tile Vertically* from the pop-up menu. If each of them has its own button on the taskbar, do this: (1) Click one button;



*There are a number of ways to make Microsoft Windows share the screen equally between two instances of Windows Explorer.*

(2) Ctrl-click the other; (3) right-click either button; (4) choose *Tile Vertically* from the pop-up menu.

Here's another method, possibly necessary if you have more than two instances of Windows Explorer sharing a button on the taskbar: (1) Minimize all windows except the two Explorer instances; (2) right-click the taskbar itself; (3) choose *Tile Windows Vertically* from the pop-up menu.

As you can see, you have lots of choices! □

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## ASK LOYD HARDWARE

### ASK LOYD: THE READERS RESPOND

*One great thing about writing this column is all the neat stuff I learn from readers. Rather than the usual question-and-answer format, where I play guru, I'm featuring three of the more interesting responses I've received from readers recently, along with some comments of my own.*

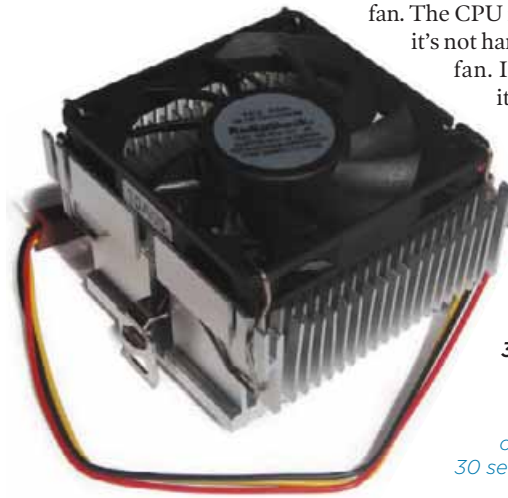
#### REPLACING YOUR CPU FAN

*I recently realized that my system's CPU fan was slowing down. The system was getting glitchy, even shutting down or spontaneously rebooting. I think the fan had been slowing down for months, but I never realized it. I bought a new CPU fan for \$10 at Radio Shack, snapped off the old one, and put on the new one—and my PC is snappier than it's been in months. I didn't understand the importance of replacing an old fan until now. Everything seems to work better—fewer errors, delays, and problems multitasking.*—Leon Erlanger

Leon, a former executive editor for *PC Magazine*, is absolutely right. Cooling fans are mechanical devices that eventually wear out. Sometimes they fail catastrophically, but usually they just run slower and slower, eventually not moving enough air to keep critical components cool.

Key fans in your system include the CPU fan, your graphics card's fan, and the power supply fan. The CPU fan is easiest to replace, and it's not hard to replace a graphics card fan. If a power supply fan dies, it's probably best to just get a new power supply.

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#### SATA AND PATA DRIVES

*I have something to add to your response to "SATA and PATA drives." Even if the PATA drive is a 3GB, 5,400-rpm drive, you*

##### EASY FIX

*Replacing the CPU fan (at a cost of about \$10 and maybe 30 seconds of work) can do wonders for a balky system.*

*can still use it to double your day-to-day system performance by turning the drive into a dedicated swap drive.*

*My overall system responsiveness has about doubled since I turned an old 3GB 5,400-rpm drive into a swap drive. Most computers don't have enough memory to do many tasks, so Microsoft Windows automatically creates a file called a pagefile that it can use when the main system memory runs out. A pagefile on its own hard drive is fastest, followed by a pagefile on its own partition, and one on the main partition (the partition Windows defaults to) is slowest. Since hard drives can read from only one part of the disk at a time, having the pagefile on the same disk can slow the system a lot. With the pagefile on its own disk, it can be accessed simultaneously with files on the main Windows disk.*—Micah Makaiwi

Micah's idea is a great one, and one I use myself. I don't have a drive for just the pagefile, but I do have a second physical drive (a RAID 1 array) that's used as a secondary data drive. I don't access it frequently, so I put the pagefile on that drive. You can specify the drive on which the pagefile resides by going to *Control Panel | System | Advanced (tab) | Performance settings*. Click the *Change* button in the *Virtual Memory* section.

#### BENT CPU PINS

*Your suggestion for fixing bent CPU pins is an okay method, but I'd like to suggest one that works a lot better. With a card, you're working against all of the pins in a row. But if you use a mechanical pencil with the lead removed and place the hollow tip of the pencil on the pin, you can straighten each pin perfectly and reduce the risk of breaking them when you straighten them. I like using the 7mm pencils, but the 5mm will do just fine. This works extremely well when the bent pin is in one of the middle rows. It's another reason geeks have pencils in their pocket protectors.*—William Bonfiglio

William's solution works best if you have one or two bent pins on a CPU. The card solution I've used in the past is good if an entire row—or several rows—of pins is bent, as can happen if you yank a CPU fan off with too much force, pulling up the processor that happens to be stuck to the heat sink's surface. But if you have only a single bent pin, or just a few, the tiny tube that houses mechanical pencil lead is a great way to zero in on individual pins. □



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# VoIP Sends the Message

If you're opening a new office or looking to switch out your phone system, an IP PBX VoIP system could save you money.

BY MATTHEW D. SARREL

COMMUNICATION IS THE LIFEblood OF any business. E-mail is a great way to share information, but voice still remains the number one synchronous method of communication. Any delay in transmission can be very costly. A historical example: The Treaty of Ghent ended the War of 1812 in December 1814, but fighting continued until March 1815. In fact, one of the biggest battles of the war, the Battle of New Orleans, was fought two weeks after the treaty was signed. Many lives could have been saved if the U.S. and British had had better communications.

If your business is considering new or replacement phone systems, then a VoIP PBX may be the answer. And with IP PBX revenue forecast to grow 82 percent, while traditional PBX revenue plunges 88 percent, VoIP is here to stay.

There are several reasons for the move from traditional phone systems to VoIP systems, primary of which is cost savings. Since VoIP providers typically charge a flat monthly fee for calls,

companies can almost always save money by eliminating toll charges on their monthly bill. In addition, simplified billing can reduce the workload associated with monthly billing because your accountant won't have to spend hours going through a 100-page phone bill.

One of the most expensive parts of any phone system installation is cabling and the cost of adding, moving, or removing telephone jacks. An IP PBX runs over standard Ethernet cabling and, depending on your network traffic, will probably be able to run over your existing data network. You can save a considerable amount of money by not having to install separate voice cabling.

The array of useful features with IP PBX systems is staggering, and many businesses have switched for this reason. Depending on the system's configuration, users can receive, send, and forward voice mail just as easily as e-mail. They can use their laptops anywhere on the network as softphones (software-based phones), and they can store contacts in Outlook or another app.

Many systems allow employees to work remotely, with access to all of the system's features. If your business operates a call center, then IP telephony offers many handy features, such as the ability to provide customer data to your employees from the incoming phone number.

The top IP PBX system vendors in North America are Cisco, Avaya, and Nortel. Cisco leads the IP phone market, with 39 percent unit market share; the next closest competitors are 3Com and NEC, which are tied for second. Prices vary according to the hardware and features you choose, ranging from \$5,000 to \$15,000 for 20 users.

One caveat about jumping into the IP PBX pool is that your data network must be robust enough to support both data and voice communications. You'll need a switched 100-Mbps Ethernet environment as a minimum. Test your network to make sure that there is enough bandwidth left over during peak usage to support voice traffic.

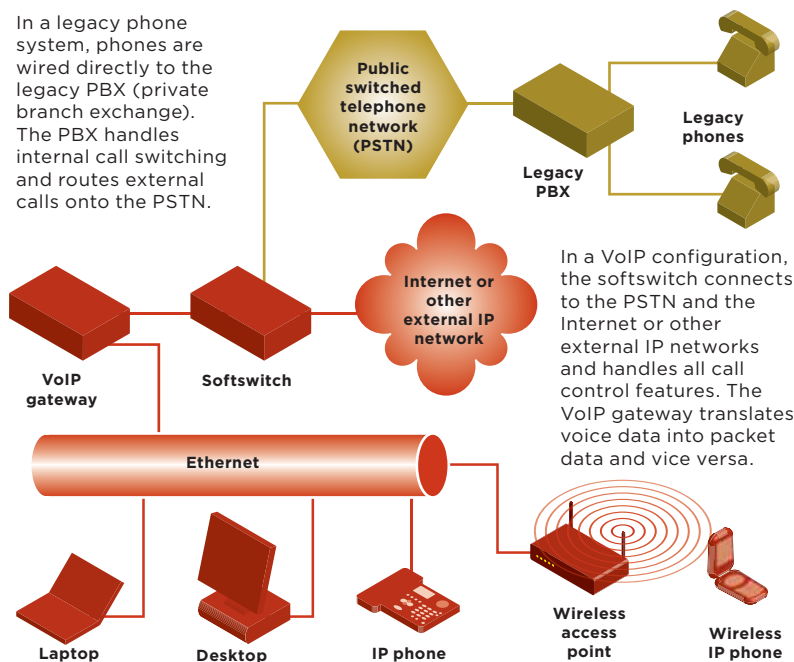
Communications have changed since 1815. Don't leave your employees to fight yesterday's battles, especially when the war's already over.

*Matthew D. Sarrel is a consultant and former technical director of PC Magazine Labs.*

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## LEGACY VS. VOIP PHONES

In a legacy phone system, phones are wired directly to the legacy PBX (private branch exchange). The PBX handles internal call switching and routes external calls onto the PSTN.





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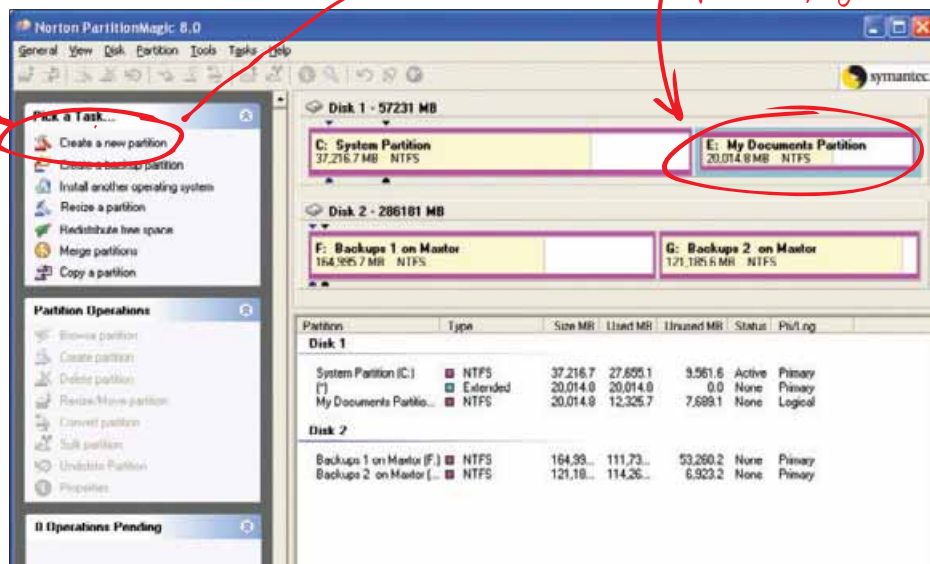
For the best results, start with a fresh install of Windows, then load your applications, utilities, and drivers. Make sure to install all the latest updates as well, especially for Windows and your security software. Finally, tweak your system so it's exactly the way you like it: video resolution, wallpaper, the works.

Click here to get started

You've already got a data partition, right?

## 2 CREATE THE PARTITION

Fire up PartitionMagic (or a similar utility) and create a partition with enough available space to hold Windows and your apps. Ten gigabytes should be ample for most users (remember, the backup image will be compressed), but consider making it larger if you have a lot of programs installed or storage space to burn.



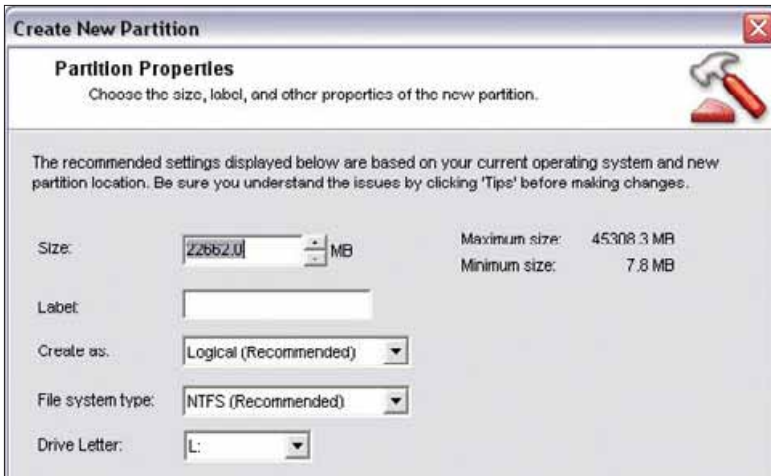
## Make a Recovery Partition

IF YOU'VE EVER REFORMATTED YOUR HARD DRIVE, REINSTALLED Microsoft Windows, reloaded all your applications, and reset all your settings, you know what a time-consuming and generally heinous process it can be. I've had root canals that were more pleasant—and way less of a hassle. But sometimes, such as after a nasty spyware attack or when Windows has accumulated too much sludge, that kind of radical reconstruction is absolutely necessary. And Vista will only amplify the problem. Before you move to Vista, make sure you back up!

Many PCs come with recovery CDs that will restore your system to factory-new condition, but you can get the job done faster—and add all your favorite programs and system settings to the restoration—by creating a recovery partition. A partition, of course, is a cordoned-off section of your hard drive that

gets its own drive letter. All you need is the right software and enough available space to hold your stuff.

The “right software,” in this case, is a partition utility and a backup program that can create a compressed “image” of your newly reformatted and reloaded hard drive. We're partial to Symantec's Norton PartitionMagic 8.0 and Norton Ghost 10.0, respectively—they're both *PC Magazine* Editors' Choices—but you can use any nondestructive partitioning utility and the backup app of your choice, of course. And all you need to do is create a partition that's large enough to hold your stuff; then back up your primary drive to the partition. If and when the time comes to restore, run Ghost and expand the backup image to your primary drive. Presto: You're back in business.—Rick Broida, freelance writer



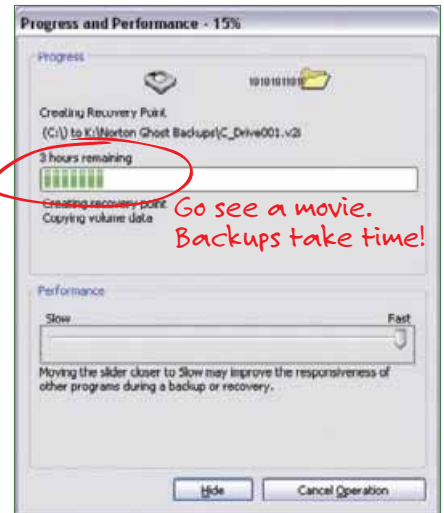
### 3 OPTIONS, OPTIONS

Unless you're going to dual-boot with Windows 9x, which can't read NTFS, NTFS is the right file system. As for the partition type, the active partition is the one that boots the system. You need to create a logical drive (that is, one you can assign a drive letter), which will live in an extended partition—the app takes care of that part.

### 5 SCHEDULE BACKUPS

Incidentally, take advantage of Ghost's backup schedules to update your backup incrementally every week or so. That way, you'll always be sure of having the latest applications, system updates, and settings when the time comes to restore. If you're using an external hard drive, make sure to leave it on and plugged in. For the record, this really isn't a substitute for off-site or off-PC backups, especially if the partition is on the same hard drive as your data and programs. If the drive goes south, you are out of luck.

Bonus feature: Ghost can copy your stuff to a new, bigger hard drive



### 4 SET UP GHOST

Run Ghost (or a similar utility) to create a new backup. Don't bother with scheduling, as this particular backup is a one-time-only affair. Disabling your virus checker prior to starting the backup is a good idea; AV can gum up the works.



### 6 RECOVER

To use the recovery partition, make sure you've backed up all your vital data to another drive or removable media, then boot your PC with the Ghost CD loaded in the optical drive. You'll then be able to restore from the partition to your primary drive, resulting in a ready-to-roll PC with all your apps, drivers, and settings loaded.

# Keeping Web Miners Safe

Whether they call them canaries, monkeys, or guinea pigs, more security companies are using virtual PCs to protect users.

## VIRTUAL MACHINES, REAL BENEFITS

Emulating a PC in software allows virtual PCs to be quickly created, deleted, and restored, giving researchers a faster way to test malicious code. However, that's just the start of what the systems can do.

**1 Malicious code analysis** Using a virtual machine, researchers can watch what changes a malicious program makes to the operating system and create a removal tool or signature capable of detecting the attack tool.

**2 Reliable computing** A large distributed computing system hosting virtual machines can replace a hardware-based server farm. The failure of a single server does not take down the system, and a virtual machine encountering reliability problems can be restarted in a clean state.

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BY ROBERT LEMOS

**M**INERS LEARNED TO love the humble canary. After a mine fire or explosion, miners would descend with the birds into possibly dangerous areas. The canaries' high metabolism made them the first to succumb if significant amounts of carbon monoxide or methane were present, thus giving miners warning of unsafe areas so they could escape alive.

Security companies are now applying the same theory to the online world.

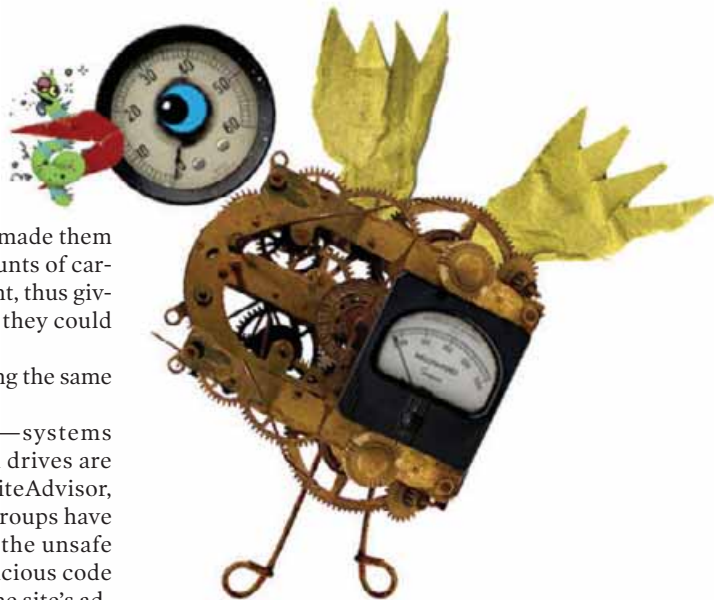
Using thousands of virtual PCs—systems whose processors, memory, and hard drives are all emulated in software—McAfee's SiteAdvisor, Microsoft's research arm, and other groups have automated the process of going into the unsafe areas of the Web. If a site hosting malicious code compromises one of the virtual PCs, the site's address is recorded for further investigation, the virtual machine is erased, and a new virtual machine is set up in its place.

Some security companies refer to the virtual PCs as *canaries* or *guinea pigs*, or by the technical term, *client-side honeypots*. Microsoft calls them *honeymonkeys* in reference to the million-monkeys theorem. The theorem goes that a million monkeys typing random characters on a million typewriters for an infinite period of time can eventually produce the complete works of William Shakespeare.

Though it's unlikely that a million monkeys could ever write even one Shakespeare play, they most certainly could help to secure the Web. Today, tens of thousands of virtual machines are crawling the Internet, clicking on untrusted links, getting compromised, being deleted, and then doing it all over again.

Various companies are pursuing different plans for the technology. Microsoft uses its honeymonkey system to research threats to Windows and map out the links connecting malicious Web sites—a part of the Internet that its researchers refer to as the *ExploitNet*. McAfee's SiteAdvisor uses the resulting database of bad sites as one component of its Web site ratings, accessible through free plug-ins for Internet Explorer and Firefox.

Easy, cheap virtualization software is the key to



the technology. Microsoft and SiteAdvisor both run thousands of virtual PCs with management servers capable of cataloging sites. The virtual PC, which almost always runs Microsoft Windows, appears to malicious software to be a normal, albeit vanilla, PC. The latest Trojan horses, spyware, and Web viruses infect the virtual system without detecting that it is really a sterile environment that will quickly be deleted.

Yet the attackers are adapting to security methods such as virtual PCs. Some are working on ways to detect virtual machines by creating software for exactly that purpose; if a virtual machine is detected, they avoid infecting that system in order to delay exposure. Other attackers are identifying major Web sites that have a type of flaw known as *cross-site scripting*. This essentially allows an attacker to load malicious code on a victim's machine from another Web site while the user believes he's still browsing safely on the original trusted site.

Despite the arms race that continues between attackers and defenders, virtual PCs promise to automate the patrol of the Web for malicious Web sites. In the end, we may come to appreciate the automated monkeys of the Web as much as miners appreciated the canary.

Robert Lemos is a freelance journalist and the editor-at-large for SecurityFocus.

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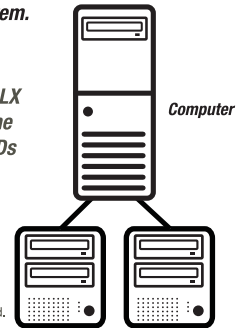
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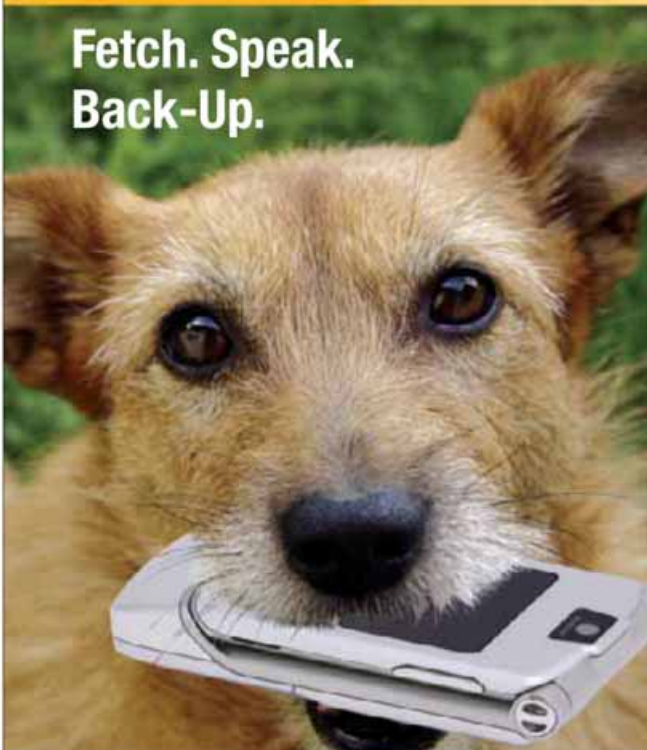
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*Suikoden 2* Sony PlayStation



*Radiant Silvergun* Sega Saturn



*Stadium Events* NES



*DDR: Mario Mix* Nintendo GameCube



*Metal Gear Solid 3: Subsistence* PS2



*Chrono Trigger* Super Nintendo

## Instant Rarity

Are “rare” games worth the extra dough?

BY DANNY COWAN, 1UP.COM

**W**E’VE ALL BEEN THERE BEFORE. You anxiously await an upcoming title for months. Then, on the day of the scheduled release, you go to pick it up—and it’s not there. “We’re out of stock,” they say. It hits you like a punch to the gut.

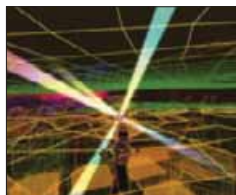
What if the game you want is permanently out of stock? What if a reprint never occurs, and what if used copies on eBay are more expensive than the retail price of a sealed copy? The game you want has become rare, friend, and you’re in for a world of hurt. In recent months, gamers have had to pay exorbitant prices on online auctions for titles such as Phoenix Wright: Ace Attorney, Dance Dance Revolution: Mario Mix, and the limited-edition version of Metal Gear Solid 3: Subsistence. For these and many other games, secondary market prices often shoot past the \$100 mark within weeks of their initial release, and the trend shows no sign of stopping. Fortunately, however, the commissioned reprint-

ing of rare titles has recently become common, and with a little smart shopping, you might just avoid a financial hit from the phenomenon of instant rarity.

Rarity-induced price inflation goes back to the rise of the collectors’ market. During gaming’s infancy, immature standards of quality control allowed for the release of imperfect games that would eventually become genuine rarities and collectors’ items. Other factors were limited releases, recalls, legal injunctions, and unlicensed production.

Take Stadium Events for the Nintendo Entertainment System, for example. To the untrained eye, Bandai’s Stadium Events and Nintendo’s World Class Track Meet are exactly the same game. So why is World Class Track Meet so common that a copy of the game is worth a fraction of a penny, while Stadium Events is a prized collectible that’s worth several hundred dollars?

Collectors speculate that Nintendo itself had the most to do with it. Back in the day, Nintendo wanted to license the title from Bandai and release its own



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# TOP 10

## MOST POPULAR PC GAMES

- 1 Gothic 3**  
Due in November; already a buzz.
- 2 Defcon**  
Politics and nuclear war meet.
- 3 UBO 2006**  
Want to join a baseball team?
- 4 Half-Life 2: Episode 1**  
Expansion set for the shooter game.
- 5 LOTR: Battle for Middle-earth**  
Lord of the Rings action.
- 6 Alone in the Dark**  
Survival horror gets a revival.
- 7 Grand Theft Auto: Vice City**  
Action amidst the urban sprawl.
- 8 Crysis**  
Aliens have invaded the Earth!
- 9 Grand Theft Auto: San Andreas**  
More criminal adventure.
- 10 CivCity: Rome**  
Recreating the empire.

Source: 1Up.com. Ranked by online buzz.

version of Stadium Events for use with an upcoming NES fitness accessory, the Power Pad. Because of a miscommunication, a small number of Stadium Events cartridges were released before Nintendo could secure the license. Most of these were recalled, but the few that remain in existence today are worth more than even legendary NES grails such as Tengen's recalled version of Tetris.

Phoenix Wright: Ace Attorney for the Nintendo DS has been the subject of much discussion in recent months, both for its innovative game play and its rarity. The game initially had a limited release of only a few thousand copies—a common occurrence for titles that belong to niche genres, as sales for such games often don't necessitate higher production numbers. Once Phoenix Wright started generating positive buzz in the weeks after its release, the few copies available at retail stores proved insufficient to satisfy consumer demand.

The game soon became a rare find, and gamers flocked to eBay in search of a copy to call their own.

These gamers were then confronted with a shocking sight. Used copies of Phoenix Wright—a title that carries a list price of \$34.99—were garnering eBay bids of \$70 or more. The buzz the game

had generated created a level of demand that was too much for existing stock to accommodate, and collectors were taking advantage of eager buyers by offering multiple copies at auction.

“Our philosophy is to always leave the market a little hungry,” says Zach Meston, Atlus USA's assistant marketing manager.

Meston elaborates that Atlus's practice of limiting initial production works to the advantage of retailers, who are ensured that there will be high demand for the games they have in stock. Consumers benefit from this as well, since a game that remains in demand is guaranteed not to lose its value. The tactic also serves to protect publishers, since a low first print run will, according to Meston, “minimize our financial risk if a game fails to catch fire at retail.”

Some titles are simply going to become rare and stay that way. They don't even have to be particularly

old to take on that status. If you want to avoid becoming a victim of eBay price gouging on a future rarity, it helps to follow three simple rules: preorder, buy early, and buy used. With patience and a good eye for bargains, you'll track down the title you want for the price you want to pay. □



**Phoenix Wright: Ace Attorney** This Nintendo DS game has commanded top prices on eBay since its limited release.

## AUCTION BLOCK MOD WORLD



**Pokia retro cell-phone handset**  
Sick of those hip flip-phones? Honor history by plugging this baby into a cell phone's headphone jack. eBay price: \$8.95

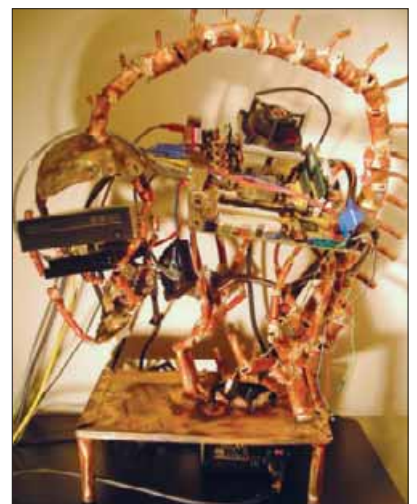


**Jesus door**  
The person auctioning this door claims it has a ghostly apparition of Jesus on the cross. eBay price: \$1



**Jar of Mario Andretti air** This jar of air is from the gate of Mario Andretti's Pennsylvania home. eBay price: \$5

*This is Spinal Tap! Bryant Baker built his Skeleton PC mod from bronze-brazed, hammer-beaten copper. The drive support is a silver-plated skull made from the same material. The "spine" and the skeleton hands that support the ASUS M2NPV-VM motherboard (with an AMD 64 Athlon 3500+ CPU) are made from refrigerator piping beaten into the shape of bones. A 300GB hard drive and a DVD writer frame the skeleton's face, jiggling when they start up. The on switch and reset switch are made from defective setback thermostats. Baker also used a couple of old USB flex lights to highlight the skull face for an eerie effect in the dark.*



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## JOHN C. DVORAK

*Photos of the war in Lebanon were enhanced with additional smoke. Done competently, nobody would have cared.*

**P**HOTOGRAPHY, BY NATURE, IS an inaccurate purveyor of the truth. But in the past few years, there has been much consternation over the use of Adobe Photoshop and other photo-editing software to alter photos that are then fed to the public.

When did photographs become so sacrosanct that we assume their images represent some sort of truth? After all, even when film was used, photos could be misleading. Hasn't everyone seen pictures, say, of Uncle Dave keeping the Leaning Tower of Pisa from falling over? The focal length of different lenses makes a huge difference to reality. And there's the lucky shot of someone scrunching their face during a yawn. Is that moment in time actually reality?

A camera is an artist's tool. There is seldom truth in a photo, whether or not Photoshop is used. Moving pictures convey more truth than still photos; although they can be manipulated, in their raw form they are very honest. But most still photographs are far from the truth, and photos usually need enhance-

ments to be useful. In that lies the problem. Thus we have photos of the war in Lebanon enhanced with additional smoke. This could have been done competently, and nobody would have cared. It created a stir because it was so obvious.

The side-by-side covers of O.J. Simpson's mugshot on *Newsweek* and *Time* in 1994 were another public example of enhancement. On *Time*'s cover, the image was darker, and O.J. looked more like a lurking villain. But this was nothing more than an interpretation of the photographic information that existed on the film. It was just an increase in contrast and a reduction in brightness. Since the information captured on film is seldom accurate, how is this a bad thing? O.J. was widely portrayed as villainous—was it wrong to convey that in the image? Or do we actually want to try to make things bland?

Before photographs there was art, which reflects the artist's view of reality. Years ago there was a stink about *Newsday* compositing skaters Nancy Kerrigan and Tonya Harding into the same picture. If it had been an artist's drawing, nobody would have cared. It's not as if it was a legal document.

When we really examine photographs, most of them are fakes in the sense that they don't capture reality. When you see photos of President Bush shaking hands with some diplomat, how fake is that? "Mr. President, look over here. Shake his hand again." Ribbon cuttings, Derek Jeter signing an autograph, Aunt Millie holding a baby, all posed, fake by any standard. Nobody complains.

The same holds true for almost all portraits done with a camera. The lighting is bogus when a large parasol flash is used to blow out every crevice and blemish on a face. This isn't what the person looks like—it's an idealized image.

Photographers relish the accidental shot where someone has a goofy look or half-closed eyes that lasted a split second and which hardly represents reality. Editors eat these shots up and congratulate the photographer for good work! They run these pics, and nobody says jack. You may as well load up an image editor and give the guy a second head.

Photos are representations, nothing more and nothing less. Sure, taking a head from one picture, dropping it into a porn photo, and saying that it's real is obviously wrong. But enhancing and interpreting photographic data has its place and is an important communications tool. Just stop believing everything you see. □

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