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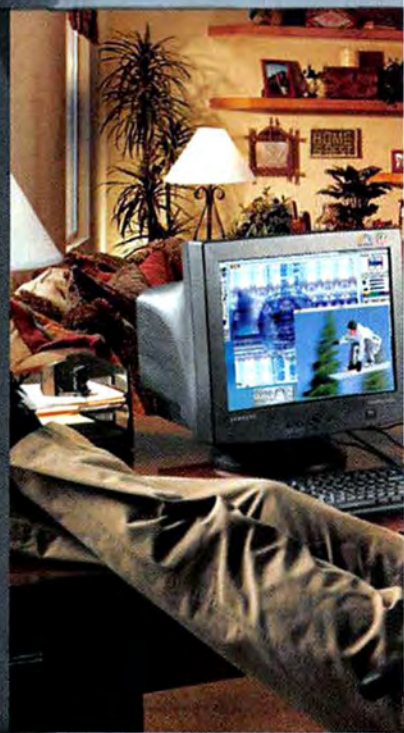
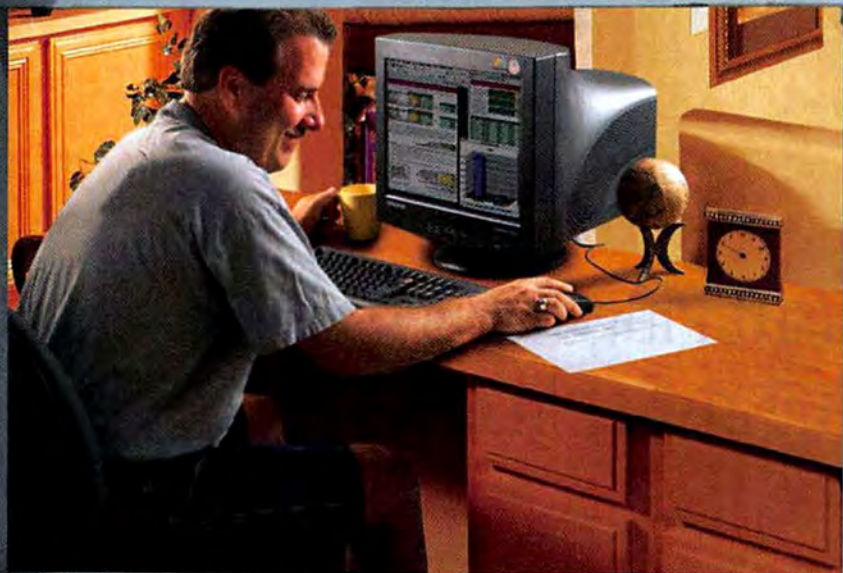


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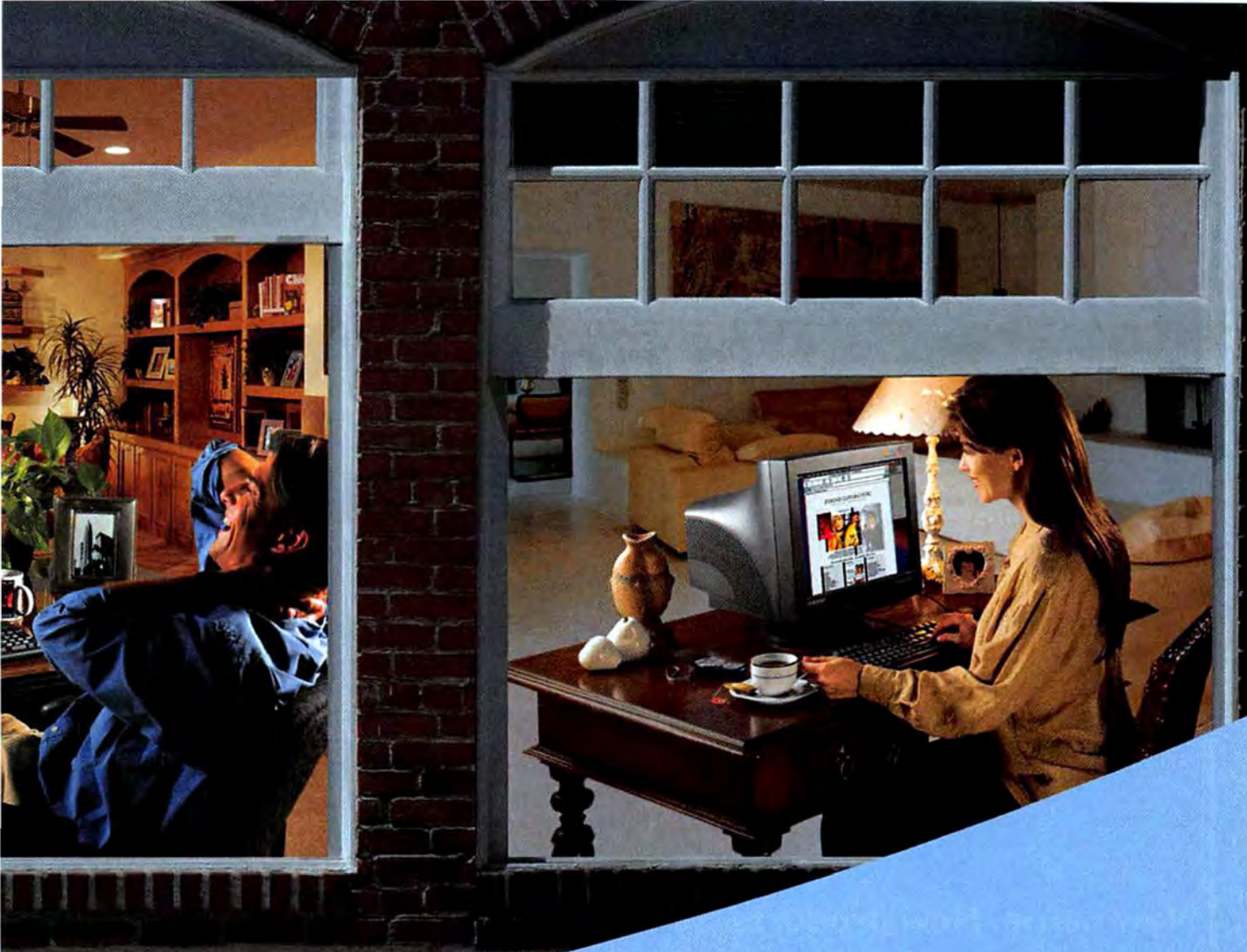
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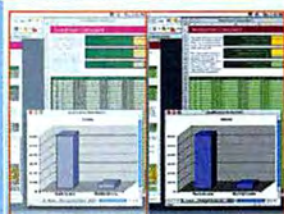


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COVER STORY

84 The Insider's Guide to Fixing Windows

You don't have to bend to Windows' will—just follow our tips to shape it to *your* liking. Plus: Discover what improvements may lie in the next edition of the OS, and take a look at our vision of the ideal Windows.

97 Linux vs. Windows: The Rematch

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Cover photo-illustration by Marc Simon



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FEATURES

DIGITAL CAMERAS

110 Full Exposure: Today's Best Digital Cameras

Whether you want a sophisticated model packed with everything but the dark-room sink or prefer a simple point-and-shoot, plenty of moderately priced digital cameras can meet your needs. We look in depth at 12 models and identify two Best Buys that offer winning combinations of picture quality, price, and ease of use.

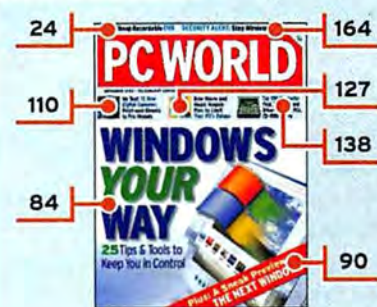


COPY PROTECTION

127 Hollywood vs. Your PC

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Top Graphics Boards
We review ten next-generation cards that will make your PC soar.
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COMING UP IN DECEMBER

Home PCs: We find models ideal for gaming and video editing.
Recordable DVD: All you need to know to pick the right drive.
Top Tools for Under \$99: Low-cost hardware accessories you'll

wonder how you've lived without.
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UP FRONT

KEVIN MCKEAN

A Corporate Posse for Copyright Thieves?

That's how a tough new bill proposes to stop movie and music pirates.

LIKE A FRONTIER JUDGE, California Representative Howard Berman believes that when there's trouble on the range upright citizens should be able to take the law into their own hands. And the range, in this case, is the peer-to-peer (P2P) networks that flourish on the Internet.

Berman, a Los Angeles-based Democrat, wants to end rampant illegal file sharing on P2P venues like those reached through Grokster, Kazaa, and Morpheus. His solution? Make it legal for entertainment industry minions to hack into such networks in order to block the transfer, copy, or display of stolen works. (For more, see "Hollywood vs. Your PC" on page 127.)

This aim is laudable. Writers, composers, filmmakers, and others depend on fair and enforceable intellectual property laws for their livelihood.

COPYRIGHT VIGILANTES

BUT THE BERMAN proposal, spelled out in a bill introduced in Congress earlier this year (go to find.pcworld.com/31046 for the full text), could foster a new kind of corporate vigilantism. Copyright owners—without a warrant—could decide whose machine to hack, provided they gave the U.S. Department of Justice seven days' advance notice of the technologies they intended to use.

Once that requirement was satisfied, copyright owners might, for example, infect pirated MP3s with a virus that crashes your PC when you try to play the song. Or they could launch spyware—installed without your knowledge when you view a movie trailer, perhaps—that monitors the movies you watch to make sure they were legally obtained. Owners could even mount a denial-of-service (DOS) attack against a PC that trades

pirated files on a P2P network. And while the bill is clearly designed for the entertainment industry, *any* copyright owner would have the power to use "self-help" technology against a suspected thief.



In fairness, the Berman bill tries to keep things from getting out of hand. For example, the attacks must be limited to P2P networks, they cannot harm anyone who is not doing anything illegal, and they cannot cause more than \$50 in damage to an affected pirate. The Justice Department would serve as referee, reviewing complaints from aggrieved users and determining which parties could pursue claims for damages in court.

But it's hard to imagine this law working well. Pirates would quickly develop countermeasures, preventing the law from having its intended effect. And it would spawn endless legal tangles from innocent people harmed in error and from pirates who claim excessive damage. About the only good thing you can say is that the bill has little chance of passing.

The real flaw in the Berman bill—as in other antipiracy proposals, including that of Senator Ernest Hollings of South Carolina (find.pcworld.com/30968)—is that it seeks a technological fix for a human problem. File sharing is not inherently wrong; the problem is how some people use that technology. So let's go after wrongful users. The record industry should take a few individual high-volume traders of illegal files to court under existing law first. And it must come up with a better alternative to existing services so honest people can buy particular songs and make copies for personal use.

Those moves wouldn't stop copyright theft altogether. But they would cause many otherwise well-meaning citizens to think twice before breaking the law.

On a happier note, this month *PC World* welcomes back a former editor, Steve Fox, who's writing the new *Plugged In* column (see page 43) that surveys the digital world with a uniquely Foxian twist. ■

Kevin McKean (kevin_mckean@pcworld.com) is editorial director of *PC World*.

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NEWS & TRENDS

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THE FADE FACTOR

INK JET PHOTOS CAN LAST FOR YEARS—OR A FEW MONTHS, DEPENDING ON THE PRINTER, INK, AND PAPER. WE IDENTIFY THE BEST PRODUCTS AND DEALS. BY ANUSH YEGYAZARIAN



WHEN YOU'VE taken a perfect photo, you want to keep the image fresh for years to come. But for digital shutterbugs who make their own prints, that isn't as easy as it sounds.

Both the paper you choose for your ink jet printer and the ink you use with your hardware make a big difference in whether your snapshot will last or will fade within a year or

two—and sometimes whether it will print well at all.

Fortunately, since we first looked at photo-print longevity last year (see find.pcworld.com/31094), manufacturers

have made big improvements. For \$152, you can buy HP's Deskjet 5550, a *PC World* Best Buy this month (see *Top 10 Printers*, page 149), which produces great-quality prints that should last over 70 years—with the right paper and ink (see "Someday Your Prints Will Fade," page 20), and with the proper care.

As consumers switch from film cameras to digital models in droves, more and more people are expected to face these choices. Lyra Research, which covers the imaging industry, says that 63 percent of PC-owning households print digital photos, and photo printing even accounts for 10 percent of printer usage among people without digital cameras.

To evaluate the best printer/paper/ink combinations this year, we again worked with Wilhelm Imaging Research

DOES LOW-COST PAPER LAST?

PAPER	Display permanence rating (years)				
	Canon S900, S9000	Epson Stylus Photo 785EPX, 820, 890, 960, 1280	Epson Stylus Photo 2200	HP Deskjet 5550, Photosmart 7150, 7350, 7550	Lexmark Z55, Z65
CompUSA High Gloss Photo (\$0.25 per sheet)	10 ¹	5 ²	n/a	22 ¹	5 ¹
CompUSA Super High Gloss Photo (\$0.37 per sheet)	9 ²	2 ²	n/a	16 ¹	5 ¹
Hammermill Jet Print Photo, Professional (\$0.50 per sheet)	12	4 ²	Approximately 30	8	2 ²
Kodak Ultima Picture Paper High Gloss (\$0.87 per sheet)	7 ¹	4	n/a	21	3
Staples Premium Glossy Ink Jet Photo (\$0.25 per sheet)	3	2	Approximately 30	2	1
Printer manufacturer's best paper (costs vary)	38	27	More than 90	73	6

n/a = Not applicable; this paper is not suitable for a pigment-ink printer. ¹ Inks puddle or resist drying even after two weeks. ² Visible color distortion or surface gloss irregularities occur (unrelated to fading). See "Someday Your Prints Will Fade" on page 20 for test methodology.

(www.wilhelm-research.com), an Iowa-based firm whose founder, Henry Wilhelm, has been researching the topic for more than 30 years.

Wilhelm employs special high-intensity lighting and temperature techniques to accelerate the aging process and project print longevity. This year he looked at the latest crop of printers, inks, and papers from the leading printer manufacturers—Canon, Epson, Hewlett-Packard, and Lexmark—to see which produce the longest-lasting prints.

For the first time, the study also tested five common third-party papers sold at computer and office-supply stores. We found some to be fairly good bargains, combining lower cost with acceptable print longevity. But prints made on many third-party papers won't endure long, and in some

cases the print quality is so poor, you wouldn't want them around anyway (see "Does Low-Cost Paper Last?" above).

FEW BARGAINS

FOR THE best longevity and quality, the Wilhelm study confirms that you're better off with the manufacturer's recommended papers and inks instead of the typically cheaper third-party brands.

Bargains do exist: In a few cases, the study shows prints on third-party papers were projected to last as long as 12 and sometimes even more than 20 years (all reported results are for prints framed under glass in a fairly bright room—see find.pcworld.com/31136 for details on the testing procedures). But in many more instances, photos either were projected to fade within a couple of years or didn't print well

in the first place. The inks dried improperly and ended up pooling or smudging onto nearby paper; in some cases the photos exhibited defects such as bronzing, in which blacks and other colors take on a metallic sheen. Still, using inexpensive paper for test prints might make sense.

Moreover, paper that works well with one printer may not work well with others. For example, pictures printed on Kodak's 87-cents-per-sheet Ultima Picture Paper High Gloss were projected to last 21 years with HP's printers—a good showing—but just 3 and 4 years with some printers from Lexmark and Epson, respectively. Prints from Canon's S900 and S9000 series should last for about 7 years, but the Kodak paper didn't absorb the ink properly—it puddled on the surface and never dried as it should have.

Hammermill's Jet Print Photo Professional paper did reasonably well with Canon printers, yielding prints rated to last about 12 years, and was fairly good with HP and Epson printers, producing prints projected to last 8 and 4 years, respectively. With Lexmark's printers, however, neutral colors ended up bronzing. At 50 cents per sheet, it was also the second-most-expensive third-party paper that we saw. (We dropped Jet Print Photo Multi-Project Photo Paper from the study because it yellowed after exposure to light.)

Prints on CompUSA-brand papers had good fade resistance; they were estimated to last over 20 years with HP's printers. But the papers consistently had problems absorbing inks and drying properly, or they distorted colors. ►

IN BRIEF

Product Pipeline

SAFE: Trekstor is now shipping its security-focused USB 1.1 Trek ThumbDrive Touch, which employs biometric technology to authenticate and verify users. Its sensor uses your body's natural electrical charge to measure the difference in potential energy between the ridges and valleys in a fingerprint, and then creates a set of data points to recognize you. Drive sizes range from 16MB for \$69 to 128MB for \$199, and up to three other users may be authenticated to share a drive. find.pcworld.com/31121



Tidbyte

ZOOM: Want to see what your neighborhood looks like from a satellite? With Keyhole's EarthViewer3D installed on your PC, type in an address and watch the viewer zoom in from outer space to just a few thousand feet above the chosen location. The images shown are built from recent satellite photographs. To use the viewer, your PC must have an NVIDIA graphics processor (either nForce or a GeForce2 card—or better). You pay nothing for the first 30 days, then \$80 for 12 months. Go to find.pcworld.com/31109.



Staples' Premium Glossy Ink Jet Photo paper, at 25 cents per sheet, was the cheapest in the study; but its print life was rated at just 1 to 3 years with most of the printers (although it did not exhibit drying or color-distortion problems).

The Staples and Jet Print Photo papers were the only third-party media able to print with Epson's new Stylus Photo 2200. Like its predecessor, the 2000P, the 2200 uses pigment-based inks, which tend to be more stable than the more common dye inks. That often helps prints resist damage from light, water, and air pollutants, so they last longer. But pigment inks require specially matched papers to ensure that images look good.

The Kodak and CompUSA papers couldn't handle the 2200's inks properly, and so were not included in the results. The Jet Print Photo and Staples papers did very well with this printer: Their print life was projected to be approximately 30 years. (As we went to press, these longevity tests were still in progress.)

PRINTS AND PAPER

WHY DO results vary so much with different printer-and-paper combinations? It's all in the chemistry. Each printer manufacturer has its own set of formulas and creates products that work together to give the best results.

HP has made a particularly noteworthy breakthrough by

creating new papers and inks for the company's Deskjet 5550, as well as its Photosmart 7150 (\$180), 7350 (\$250), and 7550 (\$400) printers. Using dye-based inks—including a specially developed magenta—and a new Premium Plus Photo Paper (Glossy), HP's printers produced prints that Wilhelm's study projected to last for 73 years. That kind of longevity rating was previously exclusive to pricey archival printers such as Epson's Stylus Photo 2000P (\$899) and 2200 (\$699)—and to the best traditional prints from film.

What's more, in *PC World's* tests of the Deskjet 5550, we found its photo quality among the best we've seen. The model also offers good speeds and

reasonable ink costs of 4.4 cents per page for text and 13.1 cents for graphics. For the best photos, though, you'll have to pay for the premium paper, which runs about 80 cents per sheet and is one of the more expensive we tested.

One snag: HP's system has three different ink cartridges, and with the low-cost Deskjet you will have to switch them manually—it can handle only two at a time. The defaults are the regular #56 black and the standard color cartridges, not the #58 photo cartridge (which includes special black, magenta, and cyan inks and must be purchased separately, as it does not come with the printer). You do get the #58 photo cartridge (but not the #56 black) with the company's Photosmart printers, along with other amenities like digital camera media-card slots (for easy printing) or preview screens (on the 7550, which also chooses between the inks for you). You will pay more for those units, however.

Both Canon's printers and Epson's dye-based Stylus Photo printers make prints with good projected longevity: for example, up to 38 years for the \$499 Canon S9000 Bubble Jet Photo wide-format printer (see find.pcworld.com/31100) and 27 for the \$149 Epson Stylus Photo 785EPX (see find.pcworld.com/31097), often with good print quality as well. (Results apply to other Canon and Epson printers that use the same inks and papers.) But for the longest-lasting prints, you must spend 77 cents per sheet for Epson's paper and a pricey 93 cents per sheet for Canon's. Still, Epson's \$99 Stylus Photo 820 is such a good value that you may

SOMEDAY YOUR PRINTS WILL FADE

PRINTER/INK	Paper	Cost per sheet	Display permanence rating (years) ¹
Printer: Canon S900 Bubble Jet Photo Printer (\$349), S9000 (\$499) Ink: Canon BCI-6 (\$72 for six individual colors)	Canon Photo Paper Pro PR-101	\$0.93	38
	Canon High Gloss Photo Film (11 by 17 inches)	\$5.50	12
	Canon Glossy Photo Paper GP-301	\$0.50	5
Printer: Epson Stylus Photo 785EPX (\$149), 820 (\$99), 890 (\$299), 925 (\$299), 960 (\$349), 1280 (\$499) Ink: Epson black cartridge (\$25), color cartridge (\$22; for 1280, \$30)	Epson ColorLife SemiGloss Photo Paper	\$0.77	27
	Epson Matte Paper, Heavyweight	\$0.26	18
	Epson Premium Glossy Photo Paper	\$0.70	5
	Epson Photo Paper, Glossy	\$0.45	3
	Epson Photo Quality Glossy Film	\$0.59	2
Printer: Epson Stylus Photo 2200 (\$699) Ink: Epson UltraChrome (\$75 for seven individual colors)	Epson Watercolor Paper, Radiant White (13 by 19 inches)	\$1.25	90
	Epson Premium Glossy Photo Paper	\$0.70	50
	Epson Premium Luster Photo Paper	\$0.70	47
	Epson Enhanced Matte Paper (formerly Archival Matte)	\$0.32	30 ²
Printer: HP Deskjet 5550 (\$152); Photosmart 7150 (\$180), 7350 (\$250), 7550 (\$400) Ink: HP #56 black (\$20), #57 tricolor (\$35), #58 photo cartridge (\$25)	New HP Premium Plus Photo Paper, Glossy	\$0.80	73
	Ilford Printasia Photo Glossy Paper	\$1.00	6
Printer: Lexmark Z55 (\$129), Z65 (\$170) Ink: Lexmark black cartridge (\$30); color cartridge (\$35)	Fujicolor Crystal Archive	\$0.30 ³	60
	Kodak Ektacolor 8	\$0.30 ³	22
<i>Traditional color photographs</i>			

HOW WE TEST: Tests conducted by Wilhelm Imaging Research; results provided to *PC World*. Wilhelm Imaging Research tests prints as follows: Prints are carefully prepared and dried for two weeks in a controlled environment, then exposed to high-intensity fluorescent light at a constant temperature and humidity. Data from these accelerated tests is extrapolated to a "real world" display condition of fairly bright room illumination (45 lux) for 12 hours per day, with prints framed under glass. For details on test methodology, see find.pcworld.com/31136. All papers are 8.5 by 11 inches unless otherwise noted. Each manufacturer's ink cartridge is of unique size. ¹ Time of display before noticeable fading occurs for prints framed under glass. ² Prints resist fading to 62 years, but yellowing becomes objectionable at 30 years. ³ Cost of print development not included.

BREAK OUT



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not mind the high paper costs.

Costs are higher for prints with the longest life expectancy. Epson's new high-end photo printer, the 2200, boasts the longest projected print life in this study—more than 90 years—but it costs \$699 and paper for prints projected to last longest costs about \$1.25 per sheet. This printer is the first model in the mainstream market to print in seven colors (see find.pcworld.com/31106), and it uses new pigment-based Ultra-Chrome inks that produce images that are more vibrant than those from the 2000P.

Those new inks do sacrifice some longevity: In last year's study the 2000P produced images that were projected to last more than 100 years with each of the tested papers, while the 2200's prints should last over 90 years with specialty watercolor paper—but only from 30 to 50 years with all-purpose (and cheaper) glossy and matte papers. Still, all of the 2200's prints should last about as long as the best traditional photographs.

At the other end of the longevity spectrum are Lexmark's Z55 (\$129) and Z65 (\$170) Color Jetprinter models. But even Lexmark has improved its inks since the last study: Prints made with the recommended Ilford Printasia Photo



Glossy Paper should last six years, compared to less than one year with the Kodak Premium Picture Paper and the Z52 printer tested last year. (Lexmark is the only printer vendor in this group that does not have its own photo paper.) Lexmark's printers are fairly inexpensive and have been well rated in *PC World* tests (see *Top 10 Printers*, page 149).

Overall, we found that you

don't have to break the bank to create long-lasting prints. Advances by HP and other companies mean that you can create prints with extremely long life expectancy by using a printer that costs just \$150.

In addition, Epson is working to bring pigment inks into the mainstream with its new \$149 Stylus C82 (which also made our Top 10 chart this month). The company markets this four-color ink jet printer as a general-purpose model and not as a photo printer (which is the reason we excluded it from this study), but its prints are rated to last for up to 80 years, depending on the paper. If the Stylus C82 is successful, Epson may introduce a six-color version into its Stylus Photo line.

You can also save some money by using third-party papers, though you will have to experiment to see which brands work with your printer. The bottom line: Select your printing hardware and supplies carefully, because printers, inks, and papers are not created equal. ▶

IN BRIEF

Product Pipeline

GET REAL: Media-savvy PC users tired of launching different applications to access RealVideo, QuickTime, and Windows Media files online can now run all those files with a single tool, RealNetworks' new RealOne Player-Plus Version 2. In addition to playing the three popular media types (and 50 others), the software offers DVD playback and new tools for CD burning. Free to subscribers of RealNetworks' monthly \$10 SuperPass service and its \$6 RadioPass service, the player also is available for a one-time fee of \$30. Get it at find.pcworld.com/31211.

Did You Know?

IN A GLOBAL SURVEY of more than 225 companies,

33 nearly one-third admitted that they **PERCENT** may not be adequately equipped to deal with cyberterrorist attacks on their networks.

SOURCE: INFORMATION SECURITY ALLIANCE/INSTRON ASSOCIATION OF MANUFACTURERS AND RESEARCH TECHNOLOGIES

PHOTO PRINTING OPTIONS PROLIFERATE

How should you print your pictures? Here's a quick snapshot of the most popular methods, with prices, pros, and cons.

OPTION	Print costs ¹	Pros	Cons
Film photo processors	\$0.30 for 4 by 6, \$2.30 for 5 by 7, \$4.30 for 8 by 10 ²	No special camera required. One-hour processing widely available. Standard-size prints are inexpensive.	Larger prints and additional copies get expensive, as do special papers. You must print and pay for all shots on a roll to see what you've got.
Kiosks (for digital photos, applies to Kodak Picture kiosks)	\$0.50–\$2.33 for 4 by 6, \$3.50 for 5 by 7, \$7 for 8 by 10	Service is becoming widely available. You can print only the photos you want. Basic image editing tools and CD burning may be offered.	Upload times may be long. Print sizes and paper choices are typically limited.
Online services (e.g. Shutterfly, Ofoto)	\$0.49 for 4 by 6, \$0.99 for 5 by 7, \$3.99 for 8 by 10	Services are accessible from home. You can print only the photos you want. Basic image editing tools, online access for friends and family, and many printing options (such as cards and frames) are available.	Upload times may be long. Services may not handle all file formats. You must pay shipping. You must wait for prints. Paper choices may be limited.
Ink jet printing	\$0.96 per 8.5-by-11-inch page ³	You can print at home (or on the road with a portable printer). You can select photos, sizes, and number of copies. Image editing is at your discretion.	Learning how best to use printer and editing tools may take time. A PC is usually required (except for printers that accept digital media).

¹ Prices vary by region and by individual manufacturer and store; prices listed are averages for 24-exposure rolls. ² Includes development. ³ Includes average cost of glossy paper (about 71 cents per page), with average ink consumption (assumed to be twice that of nonphotographic images; 12.7 cents is about average for color graphics).

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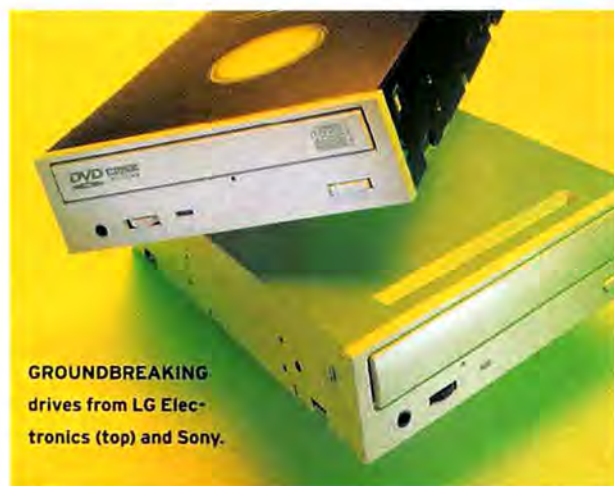
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PREVIEW

DVD BURNERS BYPASS FORMAT WARS

SONY, LG ELECTRONICS REWRITE THE RULES ON DVD RECORDING.



GROUND BREAKING drives from LG Electronics (top) and Sony.

WITH THE DVD format battle in full swing and no clear winner in sight, manufacturers are hedging their bets by introducing drives that handle more than one standard.

One of the most exciting newcomers is Sony's groundbreaking \$349 DRU-500A. Not only does this uber-burner write DVD+RW and +R at 2.4X, it also writes the competing DVD-R and DVD-RW formats. And get this: It does so at 4X and 2X—twice as fast as current dedicated DVD-R and DVD-RW drives. Toss in

up to 24X CD-R burning and 10X CD-RW burning, and this is the drive that every fan of rewritable technology will search for this holiday season.

Another contender is the \$499 GMA-4020B from LG Electronics, which writes DVD-R at 2X, DVD-RW at 1X, CD-R at up to 12X, and CD-RW at up to 8X—and also writes DVD-RAM discs at 1X (0.5X with data verify activated). The more popular DVD-RW drives lack this last talent. The GMA-4020B is a minor boon for people who have

DVD-RAM video recorders or use the format for backup, but it offers no relief to average buyers, who are more likely to be concerned with choosing between drives supporting the DVD Forum's DVD-RW/-R standard and models supporting the DVD+RW Alliance's DVD+RW/+R standard.

LGE's engineering sample of the GMA-4020B performed flawlessly with every type of media the drive supports, and even surprised us by reading DVD+R and DVD+RW discs.

Unfortunately, the tray mechanism won't accept the protective cartridges in which DVD-RAM discs normally reside—you'll have to pop the discs out to use them. LGE says the drive will ship with BHA Software's B's Recorder Gold 5 Basic for mastering, B's Clip for packet writing, and B's DVD for authoring DVD movies, plus a DVD-RAM driver and InterVideo's excellent WinDVD 4 software for DVD movie playback.

Our informal testing of a preproduction Sony DRU-

GMA-4020B

LG Electronics

(Preproduction unit, not rated)

DVD-RW/-R/-RAM and CD-RW/-R burner offers a well-rounded software bundle and decent, reliable performance.

List: \$499

DRU-500A

Sony

(Preproduction unit, not rated)

Superfast DVD-RW/-R, DVD+RW/+R, and CD-RW/-R burner eliminates the need to choose formats.

List: \$349

500A was limited by the device's immature software and by the lack of available high-speed 4X DVD-R and 2X DVD-RW media. Still, we confirmed that the drive will write to all four of the DVD formats it claims to support. Sony plans to ship the DRU-500A with Veritas RecordNow for mastering chores, Veritas Simple Backup, Musicmatch Jukebox, Sonic MyDVD 3.5 for movie authoring, Cyberlink PowerDVD for playing DVD movies, and Arcsoft ShowBiz for video editing.

Even in its preproduction stage, the LGE model proved to be an exceedingly reliable burner. But the Sony DRU-500A promises to run much faster, cost less, and eliminate the +R versus -R conundrum. Unless you need DVD-RAM support—and assuming the Sony drive stands up under more stringent testing—the DRU-500A is the rewritable DVD drive to buy.

—Jon L. Jacobi ►

DVD FORMATS AT A GLANCE

- ♦ **DVD-R:** A write-once format. Good for archiving data and recording home movie discs; media is relatively inexpensive. Compatible with about 85 percent of drives and players.
- ♦ **DVD+R:** A write-once format. Good for archiving data and recording DVD movies. Compatible with about 85 percent of drives and players.
- ♦ **DVD+RW:** The DVD+RW Alliance's fast, 1000-times-rewritable format. Excellent for backups; good for movies and DVRs. Compatible with

about 65 percent of drives and players.

- ♦ **DVD-RW:** The DVD Forum's 1000-times-rewritable format. Suitable for backups, DVRs, and movies. In most burners it writes at half the speed of DVD+RW. Compatible with about 65 percent of drives and players.

- ♦ **DVD-RAM:** The DVD Forum's 100,000-times-rewritable format. Suitable for backups and DVRs; much slower than DVD-RW and DVD+RW. Compatible with far fewer drives and players.



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FIRST LOOK

MULTIMEDIA WINDOWS XP TAKES MICROSOFT OUT OF THE OFFICE

OS TURNS HP'S NEW PC INTO A REMOTE-CONTROLLED ENTERTAINMENT CENTER.

MICROSOFT wants to conquer your living room. Its first salvo is a modified version of Windows XP Professional, called Windows XP Media Center Edition, that runs new PCs designed to let you easily capture, organize, and play back TV shows, DVD movies, music, photos, and other types of digital content.

We put the first system loaded with the new OS—Hewlett-Packard's Media Center PC—through its paces. This sleek black-and-silver machine is packed with audio and video gear. It can record TV shows in the style of a TiVo digital video recorder and play DVDs, games, and music (CDs, MP3 files, or streaming audio). The PC can also download photos directly from your digital camera's flash-storage card and connect to other devices via a fistful of USB 2.0 and FireWire ports.

SEAMLESS INTERACTION

THOUGH EXISTING PCs already can do much of the above, we found that XP Media Center Edition (XP MCE)

Media Center PC

Hewlett-Packard
(Preproduction unit; not rated)
Estimated price: Less than \$2000 without monitor



NOT JUST for work anymore? HP's Media Center PC is the first system to use the new XP OS.

makes interacting with all types of multimedia fairly seamless. Eventually, you also should be able to run TVs and other consumer appliances remotely—if they incorporate Microsoft's technology.

On specs alone, the Media Center PC is impressive. HP hasn't set the final configuration, but our preproduction unit (which HP estimated would cost less than \$2000 without monitor) had a 2.67-GHz Pentium 4 CPU, 512MB of RAM, a high-speed graphics card with 64MB of DDR SDRAM, a TV-tuner card, a V.92 modem, Klipsch Pro-Media 5.1 high-end surround-sound speakers, a 120GB hard drive, a DVD+RW/+R/CD-RW drive, a six-in-one media reader (for Memory Stick and other flash media), and two

dozen ports—ethernet, USB 2.0, FireWire, coaxial (for TV), S-Video, and more. Our test system's sexy 17-inch LCD monitor would add another \$749 to the system's price.

SOME CONSTRAINTS

MASTERING the PC's dozens of connections, from the coaxial cable to the infrared remote, was a bit daunting; HP promises to make that easier in the future with more wire/port color-coding. But using the system to record TV shows, play DVDs, and so on is generally straightforward, thanks to the XP MCE interface, which presents you with big, simple on-screen buttons labeled My TV, My Music, My Videos, Play DVD, and the like. You also get a keyboard (with preset buttons and VCR-

like controls) and a multipurpose remote control that lets you run the PC's functions from up to 26 feet away.

There are limits to the magic. Recorded TV shows are locked on the disk: You can't copy them to a VCR or easily skip past commercials or avoid recording them. And while HP's new PC is expected to ship before Christmas, Microsoft won't sell the OS separately (for more info, go to find.pcworld.com/31082).

Purchasing this system now may be worth it if you have the bucks and you need a compact entertainment center. But Martin Reynolds, an analyst with Gartner Dataquest, notes that PCs with XP MCE capabilities should cost about \$600 within a few years.

—Robert Luhn ►



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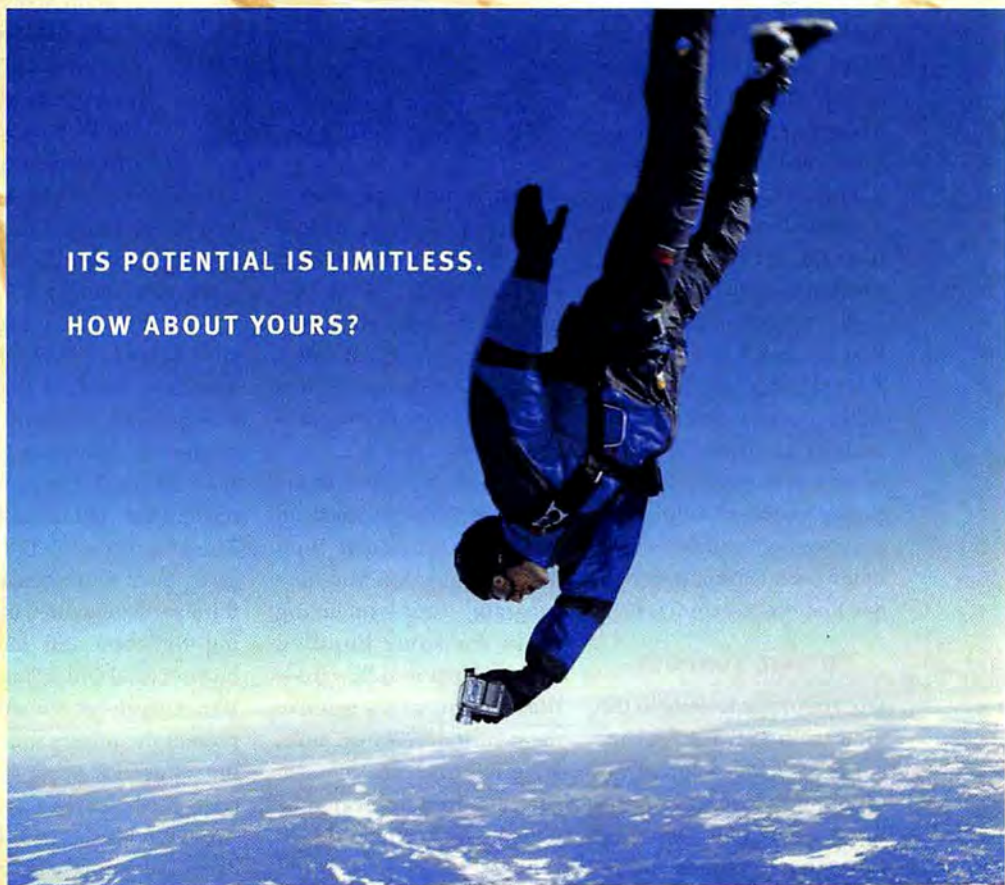


Card Photo Printer CP-100

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XP UPDATE

WIN XP SERVICE PACK 1— IGNORE AT YOUR PERIL

MICROSOFT QUIETLY SWATS BIG BUG.

AN INITIAL Windows Service Pack provides patches and drivers missing from an initial release, traditionally signaling to businesses that the OS is safe to adopt. But Windows XP SP1 plugs a hole serious enough to make the update essential, even for users who have conscientiously downloaded XP bug fixes.

Microsoft confirms that SP1 fixes the little-known flaw, which proved trivially easy to exploit when tested. It allows files on an XP system to be deleted simply by the user's clicking on a link—which could be distributed by e-mail or on a Web page. XP users having trouble installing SP1 are plugging the hole using a utility from Gibson Research (see find.pcworld.com/31217).

FUTURE SUPPORT

MICROSOFT is looking to the future with SP1. The September release adds support for upcoming services—such as those offered by the still-emerging .Net framework—and devices like Windows XP Tablet PC Edition, Windows Powered Smart Displays, and XP Media Center Edition (see the article on page 26).

Microsoft also makes a small but welcome change to its controversial Windows Product Activation antipiracy technology, which monitors key hardware specifications for changes and locks you out



if it sees enough differences to suspect you of having illegally installed your copy of the OS on a second PC. WPA now grants a three-day grace period before you must call a Microsoft rep to assure them you merely have a new motherboard, not a new PC.

To satisfy the terms of the November 2001 proposed antitrust suit settlement, Windows XP now lets you hide program icons—including those for some bundled apps dubbed middleware—though you can't remove them entirely. (For example, Microsoft has repeatedly said Internet Explorer can't be removed from Windows.) PC vendors using SP1 could begin selling systems that default to competing Web browsers, media players, and other middleware. Microsoft also restored support for the Java Virtual Machine (which Microsoft said it had removed from Windows XP because of a Sun Microsystems lawsuit).

I found the SP1 installation painless and error-free. To distinguish between the original

and updated versions of the OS, check the Control Panel's Add/Remove Programs. In SP1 the applet sports a new 'Set Program Access and Defaults' section where you can specify programs to handle Web browsing, instant messaging, e-mail, media playback, and Java interpretation. You hide apps by deselecting 'Enable access to this program'.

In my tests with a shipping copy of SP1, I managed to banish all traces of IE, Outlook Express, Windows Messenger, and Windows Media Player from the Start menu, the desktop, and the taskbar. The new feature didn't do a great job of finding installed third-party programs, including Netscape and Mozilla browsers and QuickTime and Winamp players, but it didn't prevent them from functioning as default apps when I configured them as such.

You can get the 137MB update in its entirety from Microsoft's Windows XP SP1 Web page (go to find.pcworld.com/31034), or order it on CD-ROM for \$10. All Windows XP users should get it, but if you've been downloading XP fixes all along, the Windows Update function will determine which elements you already have, and send only those you need.

—Scott Spanbauer ►

IN BRIEF

Tidbyte

TINY: The Nomad Muvo from Creative Labs is both an ultraportable MP3 player and a USB storage device in a 1-ounce package the size of a pack of gum. A 64MB shipping unit sells for \$130; a 128MB model runs \$170. For storage, you slide the memory portion out of the player casing, plug it into a USB port on your PC, and watch it appear as a drive (all versions of Windows 98 require included drivers). For music, you drag your MP3 or WMA files to the drive and then plug it back into the player casing. The downside: You get only basic controls and no LCD. find.pcworld.com/30941



Downloads

Head to find.pcworld.com/30998 to find these files.

TOP 5

- 1 Pop-Up Stopper 2.9** 442KB
Eliminate irritating pop-up windows with this free program.
- 2 Norton AntiVirus 2002** 27MB
Download the latest version of Symantec's virus-fighting utility.
- 3 MailWasher 1.33 Beta 2** 1.6MB
Delete spam or return it to its source, without having to download it first.
- 4 Microsoft Office XP Service Pack 2** 14.7MB
Repair Microsoft Office XP's master dictionary, picture handling in Word, and more.
- 5 IHateSpam 3.0.323** 4.4MB
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CONSUMER ALERT

SHATTERED: THIS CD'S IN TATTERS?

HIGH-SPEED DRIVES INCREASE THE CHANCES THAT A DEFECTIVE CD WILL EXPLODE.

IF YOU HEAR an intense vibrating noise or a bang from your superfast 48X CD-ROM or CD-RW drive beware. Your disc may be shattering.

Robert Resovich, application engineering manager at drive maker Plextor, says that a CD's generally vulnerable inner ring becomes more so when the disc is spun in the newest drives (currently the standard is 48X/24X/48X). "You get upwards of 10,000 rpm, and at the outer edge that's roughly the equivalent of 150 miles an

hour," he explains. "At that speed, things can come apart."

User Ricardo Kustner discovered that the problem may occur even with slower drives. When he put a Microsoft Windows NT 4 installation CD with a tiny crack into his 24X CD-ROM drive, "it started to make a spinning noise, and then suddenly a loud crack." When he opened the drive, the disc had shattered.

The threat isn't dire: Esteban Kim, marketing manager at CD-ROM and CD-RW drive



manufacturer Lite-On, notes that drives capable of reading at 48X and 52X have only a 0.01 to 0.02 percent risk of causing a disc to shatter—the equivalent of 1 to 2 discs for every 10,000.

Resovich says discs must suffer from a serious defect to shatter. Examples include brittleness caused by repeatedly snapping discs in and out of cases or drives in portable players or laptops, and imper-

fect balance, perhaps from an off-center or wrinkled label.

CD-ROM vendors such as Plextor are trying to improve disc balancing techniques and to build stronger drives. Still, the next time you pop a CD into a drive, be sure to look for abnormalities that could cause the disc to splinter.

—Melissa J. Perenson ■

MULTIMEDIA

WINDOWS MEDIA PLAYER: IT'S A SOLID 9

THE NEXT update of Windows Media Player might push you to get Windows XP—especially if you'd like the audiophile-quality music and multichannel movie surround sound available only under Microsoft's latest operating system.

Windows Media Player 9 Series for Windows XP, due by year's end as a free download, supports new Microsoft encoding for 5.1- and 7.1-channel digital recordings, which Microsoft asserts sound superior to standard stereo CDs. Such recordings aren't widely available now, but music labels may offer special editions—for a price, and with copyright protection. Another new encoding algorithm improves compression



WMP 9 SHRINKS to a taskbar window with essential controls.

on standard stereo WMA files.

You can burn WMA files to a CD within WMP 9, but you still need a third-party add-on to rip or burn MP3s. A new tag editor simplifies changing file information on downloaded music. WMP 9 can automatically build playlists based on your ratings or even your listening habits.

Also new: a cross-fading feature that blends a song into the next, and an autoleveling feature that eliminates sudden volume changes between tunes (usable when burning CDs, too).

Online functions include links to music subscription services—Pressplay in the beta form, with more options in the final version—plus a new Internet radio tuner and media guide. The new Info Center View has album art, artist information, discographies, links, photos, and more. But the player gets the data from an online service that captures your PC's IP address, which could interest potential pirates. Microsoft promises not to release the

data, but representatives couldn't say what the company would do if subpoenaed.

Like version 8, WMP 9 supports DVD playback through a third-party decoder supplied with most DVD drives. On PCs with a video output, WMP 9 can even generate interlaced video for display on regular TV sets.

A separate edition of WMP 9 without most of these features will run on older versions of Windows, all the way back to Win 98 SE. Regardless of the OS, WMP 9 needs at least a 233-MHz Pentium II PC with 64MB of RAM, 30MB of hard disk space, a CD-ROM or DVD-ROM drive, a sound card, and speakers or headphones.

—Stuart J. Johnston



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LETTERS

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READERS' TIPS ON WEB SHOPPING

PC VS. MAC: MAKE THE SWITCH?

FIGHTING VIRUSES— AND VIRUS ALERTS



FIRESTORM OVER WEB ADS...

IN SEPTEMBER'S "Web Ad Explosion" [*News and Trends*], Bonzi Software's John Epstein defended the company's gorilla mascot that pitches to you whether you're online or off: "All we are trying to do is grab your attention the same way the employee outside Wal-Mart does by telling you what's on sale as you walk in."

But the Wal-Mart employee doesn't:

- sneak into your car in the parking lot;

- follow you as you shop at other stores, telling you what's on sale at Wal-Mart as well as noting what you're shopping for;

- come into your house when you are eating dinner to let you know of a special sale;

- live off your home utilities and your closet space (system resources), unless you happen to be (tech) savvy enough to know how to kick them out!

Chris Morriah, Port St. Lucie, Florida

THANKS TO Web ads, I have to break my Internet connection constantly. I am always afraid they are going to download something to my machine or make a change to it. When I find a site that has aggressive advertising, I stop going back.

I am now at the point where I would pay for a separate Internet without adver-

tising. The Internet is no longer a fun place to be and is becoming less useful because I constantly have to be cautious.

J. B., New York

[name withheld by request]

...AND WHAT WE CAN DO

THE "OUTFOX THE MARKETERS" sidebar [*News and Trends*, September] left out the trick that has worked best for me: Change Web browsers. I recently installed Mozilla (www.mozilla.org). As a result, I've been able to eliminate pop-up, pop-under, and many banner ads.

Roger Sorensen, St. Cloud, Minnesota

I GO ONLINE. I never see an ad. I never have to contend with pop-ups. What's my secret? I use Zone Alarm Pro 3.0. Not only is it an excellent firewall, it also has an option for removing ads from Web pages and stopping pop-ups.

Y. Cruzinbritz, Southfield, Michigan

HOT BUTTON

Fighting the Viruses That Won't Die

I WAS SURPRISED that your safety tips on protecting PCs from worms and other Windows viruses ["Klez: The Virus That Won't Die," *News and Trends*, September] didn't include an obvious solution, the one we've implemented at my office: Don't use Microsoft Outlook—at all. Most of the viruses floating around in e-mail propagate because Outlook and Outlook Express execute attached code.

Robert Womack, Louisville, Kentucky

PERHAPS THE PROVIDERS of e-mail programs could modify the blocking function to key on the return path, not just the apparent sender. Perhaps collecting heavy fines from convicted virus perpetrators or assessing fees on ISPs that don't screen

mail for viruses could finance screening. Perhaps we could revoke the e-mail privileges of those who circulate viruses, even unknowingly, until their computer passes a clean test. Unless we take some such drastic measures promptly, viruses could soon spread completely out of control.

Dave Higgins, Toronto

PART OF THE PROBLEM is that the average user seems to think, "I have antivirus software on my computer, so I'm protected." An antivirus program is really a two-stage utility. Stage one is downloading new virus definitions weekly. Stage two is to scan all files on the computer using the antivirus program, once it's updated.

Randy Talbot, Lafayette, Louisiana

VIRUS HOAXES

SEPTEMBER'S "How to Spot Virus Hoaxes a Mile Off" [*Bugs and Fixes*] touches on one of my greatest aggravations—false virus alerts. People don't have to study the bogus alarms as carefully as your article instructs, however. Simply enter the name of the alleged virus in your preferred search engine. You'll get many results with the word *hoax* in the title. But apparently this is too much effort for many people, and it lacks the high drama of broadcasting a dire warning.

Peggy Sherman, Greenville, Florida

WINDOWS VS. MAC

STEPHEN MANES's latest column ["Sick of Blue Screens? Get a Mac!" *Full Disclosure*, September] was the last straw for me. He should quit *PC World* and go work for one of the Mac publications. ▶



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CNET and Computer Shopper, 4/2002

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LETTERS

In fact, why doesn't he just buy a Mac and report on how many programs there are for it compared with a Microsoft/Intel/AMD machine? Viruses, Trojan horses, and such happen to be a PC problem simply because there are so many PCs out there compared with Macs.

Gary F. DellaGuardia, via the Internet

I BOUGHT MY WIFE an iMac for her birthday and was intrigued by how easily she learned its operation—and this is a woman who was terrified of my PC running Windows 98. I watched her for a week—then purchased a Power Mac for myself. I have never been more satisfied.

Ed Wood, Clifton, New Jersey

THE PROBLEM WITH switching isn't the hardware, it's the software. Power users have thousands of dollars invested in games, applications, and fonts. Switching platforms means buying new software.

Sandy Campbell, New York

WEB SHOPPING HINTS

AFTER READING "Such a Deal?" [September], I thought I'd share two tips from personal experience: First, get an e-mail confirmation of your online order. If you don't receive one within 24 hours, call the company's customer service department. Second, print each Web page of your order, in case you need them later.

Robert Wenzel, Greensboro, North Carolina

ONE WEB SITE offers comprehensive customer reviews of online retailers: Reseller Ratings (resellerratings.com). I've found it to be an invaluable tool for online shopping. You can read reviews for any one of over 2500 online stores listed there, or you can rate them yourself.

Terry Ferrozzo, Roseville, Minnesota

AN INTERESTING alternative to shipping that I like is picking up an item ordered on the Web site at a brick-and-mortar store. Circuitcity.com will let me go to its nearest store and pick up the product—so I avoid shipping costs altogether. At that point, also, I can decide whether I really want the item or not.

Jason McMahon, Dolgeville, New York

THE 2002 BUYERS' GUIDE

THANK YOU FOR the September issue—the Buyers' Guide sections are fantastic. I really liked how your writers explained the technology behind each item.

Dave Morris, via the Internet

I HATE TO TELL you this, but the Buyers' Guide is nothing more than a rehash of previous articles. More in-depth and realistic reviews would be greatly appreciated.

Robert Kryl, Delray Beach, Florida

GOOD TIP, SAD COMMENTARY

BECAUSE OF SPAM, I now identify myself or my organization in the subject line of e-mail. To announce a scouting event, say, instead of a catchy "Ready for some fun" (easily misinterpreted as a porn spam), I'll use "Scout Den 342." Simple and boring, but it won't be discarded!

David Gooding, Rocky Mount, North Carolina

OH, THOSE PICTURES

I'M GETTING quite irritated with your product photography. On page 120 in the September issue, are the monitors really green? No! On page 129, is the Canon camera really yellow gold? No! Art directors may think this is cool, but some of us want to know the actual color of a product.

L. Sobaskie, Minneapolis

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

CORRECTIONS

OCTOBER'S Full Disclosure should have given www.instant-power.com as the URL for Instant Power.

The names of the VisionTek Xtasy GeForce4 MX 420 and the VisionTek Xtasy GeForce4 Ti 4400 were transposed in the "Antialiasing Demands Loads of Power" chart in October's "High-Flying Graphics Cards."

In September's New Products, FileMaker 6 should have been listed as FileMaker Pro 6, and its price as \$299 (upgrade, \$149).

PC World regrets the errors.



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Contact us at ANTHRO.COM or 1-800-325-3841.



What if there was only one god? And it was you?



What would the world be like if you created it? Peaceful? Filled with war? Welcome to Civilization III, created by Sid Meier, the Steven Spielberg of PC games. Named the Computer Games Magazine "2001 Game of the Year", this special edition features new scenarios and a strategy guide sampler. Also visit civ3.com to find out about Play The World, a multiplayer expansion pack that lets you go head to head, and play a game in about an hour. It's an all new way to play Civ. But no matter how you play, when you play Civ the ultimate creator is you.

Computer Games Magazine "2001 Game of the Year"



www.civ3.com

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PLUGGED IN

STEVE FOX

New Smart Phones—Not Smart Enough

Plus: Legalized hacking, Apple enticements, Palladium, and 64-bit CPUs.

1 So-Called Smart Phones

The Buzz: You've probably heard the news: Sprint and other companies finally have some wicked-fast wireless voice and data services to hawk. Unfortunately, you'll need more than that lowly old cell phone of yours if you intend to surf the Web, send e-mail, or maybe even trade photos wirelessly. So get ready for an explosion of phone-based convergence devices. Choices include Handspring's color-screen Treo 300 (above), Kyocera's stylish flip phone, and T-Mobile's Pocket PC/phone hybrid. Even stranger are the Frankensteinian devices from Nokia and Sony Ericsson that graft a camera onto a cell phone. Simply point, shoot, and push buttons to send a picture to a friend. The practical applications—including the frightful photo spam we're sure to start receiving—boggle the mind.

Bottom line: Ever surfed the Web on your phone? Press 1# ** # MENU 36# SND # LOCK Mem 421* if the answer is yes.



NAGGING QUESTION

Does Spam Pay Off?

AS MUCH AS WE HATE the stuff, junk e-mail seems to be effective. Louisiana spam sultan Ronnie Scelson offers the following example: He sends 80 million e-mail messages twice a month on behalf of a client who sells insurance. At least 700 people respond (Scelson gets \$12 a pop), and his client converts 400 of those into paying



2 Vigilante Computing

The Buzz: Think of it as government-sanctioned hacking. Representative Howard L. Berman (D-California) is pitching a bill that would allow the recording industry to hack into peer-to-peer networks that traffic in copyrighted material, even if said retaliation damages the networks. (See "Hollywood vs. Your PC," page 127.) The bill—a long shot to make it through Congress—has been sparking lively debate, including talk about the potential legality of hackers attacking servers that inadvertently spread viruses.

Bottom line: I thought two wrongs didn't make a right. Next: a bill that lets citizens loot the mansions of CEOs who've stolen their retirement savings.

3 Mac Envy

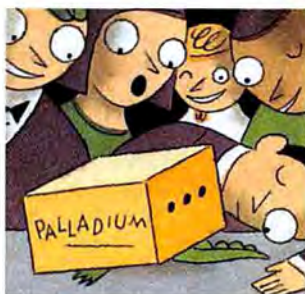
The Buzz: You've seen the advertisements, maybe even checked out the Web site (www.apple.com/switch) filled with tales of formerly harried ex-Windows users who've gone all Mac-happy.

customers. As Sara Radicati of the Palo Alto, California-based market research firm the Radicati Group notes, "Spam is unbelievably inexpensive." Of course, she adds, spammers who mistarget their audience "create a backlash against their product and brand name." Apparently, though, many businesses are willing to take that risk.

Bottom line: Wintel needn't worry just yet, given that a surprising number of the "switchers" seem to be beleaguered tech journalists. By the way, Mr. Jobs, the best time to reach me is late in the afternoon.

4 Microsoft's Mysterious Palladium

The Buzz: Microsoft's latest initiative is something called Palladium, a murky mishmash of hardware and software designed to secure your data. It's hard to tell exactly what it is, but we do know that Palladium will require a new chip in your system (both Intel and AMD are reportedly on board for the project) and will employ public-key encryption.



Bottom line: Can Microsoft pull off something this complex, much less explain it? Raise your hand if you understand .Net.

5 64 Bits on the Desktop

The Buzz: With this winter's debut of Clawhammer, AMD should be the first to market with a 64-bit desktop chip. Not to be outdone, IBM is touting a 64-bit PowerPC microprocessor, presumably for Mac desktops. Then there's Intel's Itanium 2—currently a workstation/server play, but who knows what the future holds.

Bottom line: For now, this is strictly about bragging rights, not performance. Unless you're running Linux, your 64-bit system won't have a complementary 64-bit operating system until 2004 or so. ■

Contributing Editor Steve Fox delivers the lowdown on ideas and products generating buzz in the tech world. You can contact him at steve_fox@pcworld.com.

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CONSUMER WATCH

ANNE KANDRA

**PUT YOURSELF BACK IN
THE DRIVER'S SEAT**

**PRIVACY WATCH: BAN
NETWORK INTRUDERS**

**ON YOUR SIDE: THE DAY
THE DIGITAL MUSIC DIED**

Don't Let Driver Woes Drive You Nuts

Here's how to cope when driver problems make your peripherals inoperative.



THINGS WERE HUMMING along just fine in Joel Baldwin's home office. Then his company sent him a new laptop PC running Windows XP. No sooner had he set up the new system than his HP OfficeJet K80 All-in-One device suddenly got a lot dumber—it still handled printing without a hitch, but Baldwin could forget about most scanning, faxing and even copying.

You can probably guess the reason for the shutdown: lack of an essential driver to enable the OfficeJet—which was just 14 months old—to communicate with Baldwin's brand-new operating system.

And it seemed to Baldwin that HP was in no hurry to open the lines of communication between the two, issuing unfulfilled promises month after month that a driver was forthcoming.

Baldwin, a tool company manager who lives in Parkesburg, Pennsylvania, says, "It doesn't seem to matter to HP that [its customers] can't use its All-in-One printers. I'm sure [the company] is selling new printers that work under XP—why can't they come out with drivers for their printers that are out there now?"

In response, HP spokesperson Katy

Doherty points out that XP shipped with a built-in driver for the K series of devices to allow basic print and scan functions. In addition, Doherty says, the driver Baldwin needed to obtain full functionality for his device is now available on the company's Web site (it was posted in June of this year, nearly eight months after Microsoft's release of Windows XP).

Although plug-and-play standards have helped reduce driver incompatibilities and conflicts in the past few years, poor product support and situations like Baldwin's—in which a peripheral maker effectively renders its own products obsolete by delaying or ditching driver development for them—are problems that continue to plague many users. They are also among the most common headaches reported to DriverGuide.com, a leading driver database and support Web site.

FROM DEVICE TO DOORSTOP

CUSTOMERS' FRUSTRATION is understandable. If you've shelled out several hundred dollars for a high-quality printer or other device, you should be able to use it—to its full potential—until you're ready to replace it. And if you're struggling with a device that has suddenly turned into a doorstop because you upgraded your operating system, the last thing you want to hear is that the company you purchased it from has moved on and isn't interested in your problems anymore.

Fortunately, in many cases you won't run into driver problems during the reasonable life of the device. Many companies do a good job of producing new drivers to support older products, and Microsoft has grown more attentive to ►

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CONSUMER WATCH

the issue when developing new OSs.

But if you have any doubt about the scale of the problem, you need only look on the Internet to see just how many people run into roadblocks because of driver issues. A quick search using the Google engine reveals well over a dozen sites that are dedicated solely to helping PC users find drivers—and that does not count all the sites operated by device manufacturers with large driver sections. Some sites—DriverGuide.com and WinDrivers.com, for example—collect driver software for all kinds of devices. Others, like Modem-Drivers.com and Printer-Drivers.com, are dedicated to specific types of devices.

SOME LIKE TO WATCH

DRIVERGUIDE.COM even has a strangely alluring feature for the true driver geek—Driver Voyeur. The page includes a box that shows you, one by one, what drivers visitors are searching for at that particular moment. And it includes a ranking of the top 10 most sought-after drivers. Topping the hit parade

are drivers for sound cards by Creative Labs, OPTi, and Yamaha; modems by Lucent, PCTEL, Rockwell, and U.S. Robotics; and video adapters by S3 and SiS Corporation.

The independent driver sites can be your best friend when you're madly trying to get your printer or scanner to work in time for a looming deadline. Not only do the sites have thousands of drivers you can search, but many also have an active community of driver hounds willing to help with workarounds and other suggestions if you can't find the driver you're looking for. DriverGuide.com, for instance, currently includes a searchable database of more than 77,000 drivers, as well as e-mail-based support, discussion and driver request boards, utilities, and tutorials—and it's a free site.

Many people in the technology industry argue that it's unrealistic to expect peripheral makers to continue supporting all their products indefinitely. "Ideally, they

should [support their devices]," says Charles Simmons, president of ICentric Corporation, which publishes DriverGuide.com. "But there's an economic cost at stake, and there's a limit to what companies can reasonably keep up with. For example, it's probably not fair to expect a [peripheral maker] to continue supporting a six-year-old device under XP.

"Major changes in an operating system make driver development a nontrivial task," Simmons continues. "Many drivers have to be redeveloped from scratch, beta-tested, and fixed before they're released to the public, and all of that work is very time-consuming."

Some companies pass the cost of support along to their customers. That's what happened to Martin Varga, an electrical contractor in Montreal. Earlier this year, when he needed a Windows 98 SE driver

Making customers
buy drivers is like
"highway robbery."

—Martin Varga, Umax customer

for his Umax Astra 600s scanner, he went to Umax's Web site to download it. But after searching the site, Varga discovered that the company no longer offered free support

for the three-year-old scanner. To get the driver, a Umax rep told him, he'd have to fork over about \$15 for a CD-ROM.

Outraged, Varga turned to a third-party driver site and downloaded the driver he needed—for free. "In my view, [charging for a driver] is a flawed policy," he says. "Highway robbery is highway robbery."

A Umax spokesperson says that the company decided to sell some drivers on CDs because offering all of them online attracted so many customers that download speed at the company's site slowed. The spokesperson acknowledges that the company has "removed many of the older drivers in order to optimize FTP service," but adds that it plans to resume offering them as free downloads in the near future.

FIND YOUR OWN FIX

ULTIMATELY, EVEN IF the maker of your printer, scanner, or other peripheral appears to be in no hurry to provide new drivers, you don't have to let your devices

Music Silenced by XP Upgrade

AFTER UPGRADING to Windows XP, I couldn't play back the digital music files I had copied from my music CDs on Windows Media Player. Instead, I got an error message saying that my Windows Media Audio licenses were corrupted. There was also a link to Microsoft's site, at which I was told I'm out of luck. When I did my upgrade, there was no warning about the potential problem, and there appears to be no cure on the horizon. I can't even remove WMP and download a current version. I'm open to any suggestions.

Howard Hilliard
Mammoth Lakes, California

On Your Side responds: I contacted Microsoft about a potential fix. After trying a few of the options that a Microsoft representative suggested, Hilliard was eventually able to get his music playing again by disabling Windows Media Player's copy protection.

In WMP 7.1 or earlier versions, go to *Tools•Options•CD Audio*, and uncheck the *Enable Personal Rights Management* box. In Windows Media Player for Windows XP, go to *Tools•Options•Copy Music*, and uncheck the *Protect content* box.

If you find that your Windows Media Audio licenses are corrupted, you can also try one of these alternative fixes:

- Make sure that you're using WMP 7.1. If you aren't, upgrade; you can download the program at find.pcworld.com/30656. Pre-

vious versions don't back up WMA licenses, which means that if you upgrade your OS, you must recopy all your music CDs onto your newly upgraded machine.

- If you already have WMP 7.1, back up your licenses. Go to *Tools•License Management* and choose *Back Up or Restore*.
- If you use WMP 7, use Microsoft's Personal License Update Wizard utility to renew corrupted licenses created in version 7. Go to find.pcworld.com/30656 to download the utility.
- If you didn't back up licenses in WMP 7 or 7.1, restore them by using Microsoft's Personal License Migration Service, a Web-based service that generates a single license for your media library when you move it from one computer to another. Since it's a Web service, you must be connected to the Internet, but you don't need to download or install anything. When you play your protected content on another machine for the first time, you'll be directed to the service.

These solutions allow you to listen to your licensed music files on as many as ten systems or multiple PCs on a network. Of course, the easiest option—unless you need licensed copies—is to create your music files without any licenses attached to them. Finally, jump to find.pcworld.com/30659 for more information on managing your media library.

—Grace Aquino

slide quietly into obsolescence. Here's a checklist of the tricks you can use to keep your add-on devices running:

- It sounds like a no-brainer, but before you upgrade to a new operating system, make sure that compatible drivers are available for all your peripherals.
- If you can't find the drivers you need at the manufacturer's site, run a search at a third-party site such as DriverGuide.com, DriversHQ.com, or DriverSearch.com.
- If you decide to post a message to a driver site, include all of the pertinent information in the message header. Users who

frequent driver sites—and who may have the answer you need—are looking for specifics, and a generic statement like "Driver needed" won't do the job. Driver site forums are surprisingly active places, so be sure to give their message boards a try. Even if you're searching for a particularly obscure driver, there's a good chance that someone with a similar problem has been there and can help you out.

- If you can't find what you need at a driver site, type the appropriate keywords—such as the name and model number of the product, the version of Windows ►



AMD
me.

that you're using, and the word *driver*—into your favorite search engine.

- If it ain't broke, don't fix it. Driver forums are full of horror stories from folks who added a new driver and discovered that their sound no longer worked, say, or that another component suddenly went flaky. It might be tempting to update your drivers every time a new version becomes available, but unless you're having trouble with your current driver or there's a compelling functional reason to update, the advantages probably don't outweigh the potential hassles.
- Before you install a new driver, check the user forums at driver sites for any feedback that's pertinent to your particular peripheral model and operating system. You can avoid a lot of headaches by learning from others' experiences.
- Keep track of your drivers. If you have

If all else fails, try drivers written for other versions of Windows.

drivers on CDs, store the disks nearby in case you need to reinstall them. A handy utility called Driver Detective (downloadable for \$15 at www.drivershq.com) helps you keep an inventory of what's already installed and efficiently finds updates or locates missing drivers.

- If all else fails, try using drivers written for other versions of Windows. You may be surprised at how frequently this works. For example, many Windows 2000 drivers work with XP, even though Windows

displays a warning when you install them.

- Pass it on. If you get hold of a hard-to-find driver, post it to one of the driver sites so other frustrated users can benefit from it too. Before you upload a driver, however, check to make sure that there are no restrictions on disseminating it. The vast majority of drivers are not restricted, but some *are* copyrighted and cannot be freely shared.

It's probably impossible to avoid all driver problems. But if you get stuck, it's reassuring to know that the tools and resources you need to get back on course are as close as your browser. ■

Anne Kandra is a contributing editor, Grace Aquino an associate editor, and Andrew Brandt a senior associate editor for PC World. Address e-mail to any of these three at consumerwatch@pcworld.com.

PRIVACY WATCH

Don't Let Digital Hobos Camp on Your Wireless Network

DURING THE GREAT DEPRESSION, hobos would mark a nearby fencepost or wall with a symbol if they found a safe barn to sleep in, so the next guy could take advantage of the discovery. In a modern twist, some traveling Wi-Fi users mark curbs or walls in locations where they find a freely usable wireless network.

The trend is called *war chalking*. (It derives its name from the now-ancient practice of *war dialing*, in which hackers would set their modems to dial every telephone number in town, in search of other modem-connected computers.) Nowadays, some ingenious mobile hackers do a *war drive* through cities, mapping any wireless network they find as they cruise past at 35 miles per hour. Some return to war-chalk the locations with the best networks.

At last summer's DefCon hacker conference in Las Vegas, I rode along with a team in the first-ever war-driving contest. More than 80 contestants raced through town for 2 hours, waving antennas out the windows of their cars. The team I observed found more than 200 wireless access points that had either no security or limited security within a 9-mile radius from our starting point just off the Strip. And the winning team found more than 500 vulnerable access points in the same amount of time.

War driving is so easy, and it is becoming such a popular pastime among hackers, that any individuals running a wireless

network—from administrators in large offices to families—should expect strangers to try to hop onto their network. The team I rode with found banks, law offices, and other businesses running wireless networks that were completely unprotected.

The privacy and security risks of having strangers on your network are not to be taken lightly. The war-driving contestants did

not trespass on the networks that they found, but people with malicious intent can (and sometimes do) break into networks and steal valuable data simply because the wireless network has not been properly protected.

Vendors ship wireless products with their built-in security turned off by default. Even though this security, called Wired Equivalent Privacy (WEP), isn't bulletproof, if you run a wireless network, you should enable it (see *Internet Tips*, page 164, for a full discussion of safeguards you can take). At the very least, enabling WEP keeps out casual hackers.

If you see war-chalk markings outside your home or business (to see what they look like, go to find.pcworld.com/30689), take it as a wake-up call to secure your network immediately. I learned from the war-driving contest that many users never change their wireless network's default settings, let alone secure them. Don't wait until your data has been stolen to protect your network.

—Andrew Brandt



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Read Any Good E-Books Lately?

Me neither, but here are some reasons you might want to try one.

WHATEVER HAPPENED to the e-book, that online manifestation of the age-old printed tome that was supposed to change the way we read? Join me as I browse the virtual aisles of online e-book stores, from EBooks.com (www.ebooks.com) to Barnesandnoble.com (ebooks.barnesandnoble.com). Here's a sampling from best-seller lists I've seen: *Slave Girl*, *Adam and Eve* (not the biblical story), and *The Multi-Orgasmic Couple*. Seems e-books have done for the well-known author Anonymous what the Web did for porn peddlers.

Perhaps I'm exaggerating, though I was interested to see that the erotica section of EBooks.com contains 201 titles and the mystery section has 351. I don't recall encountering a similar ratio of erotica to mystery titles at my local bookstore. Clearly, mainstream e-books haven't caught on yet. So what's holding them back?

A HALF-BAKED IDEA

WHAT E-BOOK marketers didn't know, Joe Public could have told them right from day one. Almost *no one* wants to read a novel-length book on-screen—no matter whether it's on a handheld PC, a notebook, or a special e-book device. Another

drawback is the intrusive technology: To download Microsoft Reader for reading Microsoft Reader-formatted e-books, you need a Microsoft Passport account, which keeps track of which MSN sites you visit.

Similarly, Palm, which maintains a pretty good selection of e-books (www.palm.com/ebooks), maintains a "convenient" library of your purchases (so it knows that you bought *The Multi-Orgasmic Couple*). And fancy e-book devices like the Franklin EBookMan aren't good alternatives because many major e-book sellers don't offer anything for those special formats.

Of course, e-books aren't all bad; they don't weigh anything, so you can carry ten in your pocket. But it takes more than that to win people over. So I've thought of a few more reasons to appreciate e-books:

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Contact PC World Contributing Editor Brad Grimes at websavvy@pcworld.com.

GIMME FIVE

Great Online Music Sites

1. **LaunchCast:** Learns your musical tastes to help you create your own online radio station. launch.yahoo.com/launchcast
2. **All Songs Considered:** Web version of National Public Radio's terrific music show includes archives and full versions of songs. www.npr.org/programs/asc
3. **Kazaa:** The next Napster-like file sharing tool. Kazaa Media Desktop helps you

find and download music files from connected Net users. www.kazaa.com

4. **Radio@Netscape Plus:** Formerly known as Spinner, this AOL site broadcasts more than 150 channels of music, with links for buying CDs. www.spinner.com
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HOME OFFICE

STEVE BASS

Today's Super Bargains? Look on the Web

But if you want to find the best Internet deals, you need the right tools.

WHO IN THE WORLD would spend 2 hours comparing the prices of sunblock and multivitamins on the Internet just to save a lousy three bucks? That unapologetic shopaholic would be me. Sure, there are great prices on the Web, but not all the e-bargains are easy to find. If not for the great tools and tricks I use in search of Web deals, I'd be better off pushing a cart down the aisles of my local discount store than shopping from my home office. (For the lowdown on some of the best-known shopping sites, consult Anne Kandra's tips at find.pcworld.com/30692.)

Here's a recent example of my online shopping approach: When it was time for a new barbecue at Bass Manor—a major purchase at \$500—the first online resource I tapped was the Web's wealth of user opinions. I started with a scattergun approach, checking newsgroups to get a feel for what barbecue brands and features people liked, and what their gripes were. At Google.com, choose the Groups tab and type what you're looking for into the Search field. Another site I relied on was Epinions.com. It's filled with practical advice and product reviews. Search for an item you're familiar with first to see if the site's opinions jibe with yours.

When I was ready to compare barbecues, I stuck *everything* on a spreadsheet. It's the best tool for a couple of reasons: I can list products with dozens of variables for each, and it helps me stay organized and maintain my sanity. When I shop online, I keep no more than two browser windows open. I drag and drop the pertinent product data into the spreadsheet, and then I move on to the next Web site.

The true beauty of a shopping-list spreadsheet is the matrix of options and criteria that you can create. For instance,

the Bass barbecue needed to have a cast-iron grill, an adjustable coal grate, and a large cooking area. I compared a dozen products, assigning weights to each criterion, and included the price, shipping costs, and sales tax. The spreadsheet told me which item best fit my needs.



Two of my computing buddies created nifty spreadsheet templates for me—one for simple product tracking, and another for weighted decision-making. They're free and come with basic instructions; go to find.pcworld.com/30665 to get them.

EASY COMPARISONS

YOU'RE CRAZY IF you shop on the Internet without using a price-comparison site. I'm an inveterate used-book buyer, and I rely on a couple of sites, AddAll.com and AllBookstores.com, to ferret out the best buys. One big caveat to all you emporors out there: Prices and available titles tend to change quickly, so some search results

you see at these sites may not be valid.

For prescription and over-the-counter drugs, nothing beats DestinationRx.com. The site displays an easy-to-read grid showing product names, vendors, prices, estimated shipping costs, and total cost. You can sort by total cost, price, or other criterion, and vendor info is a click away.

Looking for a digital camera? Digital Photography Review (DPRReview.com) has a handy way to compare the features of several cameras in a table, and its digital-camera timeline is ideal for determining the age of a used camera you're thinking of bidding for on EBay or elsewhere.

PC World's own Product Finder is a great tool for comparing computers and electronics. It helps me keep tabs on a product by sending me an e-mail when the price drops. Its quick access to the product's full spec sheet is invaluable. For digging up prices on computer peripherals, I also use PriceWatch.com. It's fast, and it can filter keyword search results.

If you bump into a special deal offering free shipping or a huge first-time buyer discount, it's a slam-dunk—grab it. But if you make more than minimum wage, don't work yourself into a frenzy hunting for virtual coupons or promotions. Your time may be better spent looking for reasonably low but gimmick-free prices.

It bugs me when Web sites don't show shipping charges until you start to check out. You *have* to consider shipping costs to make an accurate price comparison.

I'd love to tell you more, but the top sirloins are just about ready. ■

Contributing Editor Steve Bass runs the Pasadena IBM Users Group. Contact him at homeoffice@pcworld.com, and sign up for his online newsletter at find.pcworld.com/25821.

SETTING NEW STANDARDS IN WEB HOSTING

IT'S NO SECRET that Web hosting services can simplify the challenge and cost of creating and maintaining a Web site or Internet presence. Companies that outsource the hosting of their Web sites can save money and reduce IT headaches by eliminating the time-consuming chores of configuring and managing complex Web servers and networking technologies.

But too often, small-to-mid-sized organizations are faced with a difficult decision when it comes to Web hosting: the tradeoff between reliability and price. For an increased fee, dedicated hosting services can provide high reliability and strong security by isolating a company's Web site on a single, non-shared server.

Alternatively, organizations can reduce costs by using shared Web hosting services, where the Web server is shared among many companies. This considerably reduces costs, but introduces the possibility that prob-

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lems with one company's Web site could negatively affect another company's Web site. These "traditional" shared Web hosting services make it easy for small and mid-sized compa-

nies to get online, but they often lack the reliability, security, and features found on high-end, dedicated hosting solutions.

But now that's changing. By using a new Web hosting architecture that includes additional security measures and the latest storage and backup technologies, it's possible to create a shared Web hosting environment that rivals the reliability of a dedicated hosting configuration—all without significantly altering the price. This new standard, which delivers higher reliability, increased security, and better performance, is starting to change the face of the Web hosting market.

INTERLAND RAISES THE BAR

Now, businesses with a limited Web presence will no longer need to make price their only criterion. Instead, they should also be looking for strong, multi-level security features, highly reliable hosting architectures, and built-in redundancy, with no single point of failure—as well as a competitive price.

Interland, Inc. (www.interland.com), the leading provider of business-class Web hosting for small and medi-

um-sized businesses, is setting the standard for next-generation shared Web hosting solutions with the introduction of its blueHALO shared hosting services. BlueHALO (for High Availability Load Optimizing architecture) dramatically raises the bar for shared Web hosting. Unlike traditional shared hosting architectures, which tend to rely on single firewalls, stand-alone servers with stand-alone storage, and limited backup and recovery capabilities, blueHALO includes the following important architecture elements:

BlueHalo's Key Elements

- > **Redundant firewalls that provide added security and isolation**
- > **Load balancers that route traffic and guard against bottlenecks while increasing performance**
- > **Multiple Web server arrays that keep the Web site up and running even if one server fails**
- > **Duplicated Network Attached Storage (NAS) units, which deliver data instantly and offer immediate recovery in the event of a problem**
- > **Disk backup systems that include backups of all data to guarantee Web site continuity.**

But Interland didn't stop there. They've included two unique components that make the blueHALO architecture even more resilient: code management and process management. BlueHALO's Code Manager component runs on every account and monitors Web site code for common errors, while reporting possible performance improvements. Process Manager isolates resource-intensive server processes, increasing reliability by isolating Web sites from potential damage due to application problems on one of the Web sites running on the shared servers.

These features all add up to a new standard for shared Web hosting. With these fundamental changes to hosting architecture and new management capabilities, even small companies can have enterprise-class reliability, security, and performance in a cost-effective solution. In fact, Interland is backing this new approach by offering a Service Level Agreement of 99.99%, and even providing a money-back guarantee. No longer do organizations looking for cost-effective Web hosting have to make a tradeoff between price and reliability—blueHALO shared Web hosting delivers enterprise-class service at small-business prices. ■

Traditional shared hosting is dead.

Introducing blueHALOSM shared.

The hosting architecture that redefines an entire industry.

Two years and millions of dollars in research have been spent revolutionizing the face of Web hosting. For the first time ever, small- and mid-sized businesses have a reliable option in shared hosting architecture. It's called blueHALO shared.

Unprecedented security and redundant stability can be yours.

Redundant firewalls provide essential security. Load balancers route traffic and guard against bottlenecks. A server array keeps your site up and running

Traditional hosting		blueHALO shared
✓	Network Firewall	✓
	Primary Firewalls	✓
	Load Balancers	✓
	Server Array	✓
	Network Storage	✓
	Disk Backup	✓

even if one server goes down. Duplicated network-attached storage units deliver data with incredible speed and instant recovery. A disk backup system also

prevents data loss. Regardless of what you've been told, the old, shared technology you're currently using offers none of this. But blueHALO shared does.

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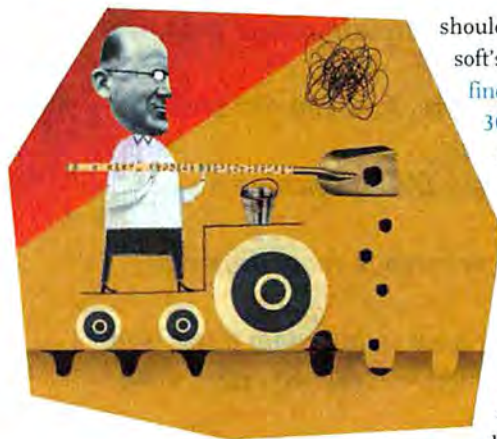


BUGS & FIXES

STUART J. JOHNSTON

Windows Flaw Makes Shopping Risky

Plus: Microsoft fixes other holes in Internet Explorer and Office XP.



WE HAVE GROWN to believe that if we see the little padlock icon at the bottom of Internet Explorer screens, our transactions are safe. However, in light of a new discovery we can no longer be sure: Microsoft recently admitted that fundamental problems exist in the way Windows handles encryption of secure Web sessions via the Secure Sockets Layer protocol.

Even though fooling the SSL protection is hard, security researcher Mike Benham found a way to crack it. The trouble? In theory, an attacker taking advantage of the flaw could entice you to a phony Web site that poses as the real thing—say, a shopping site that you usually trust—and persuade you to provide sensitive information, like your credit card details.

Before you panic, note that nobody has been stung by this flaw to date. But even so, you

should install Microsoft's patch. Head to find.pcworld.com/30863 to get the download.

A number of other Microsoft products have security woes as well. The company released another cumulative patch for

Internet Explorer that affects versions 5.01, 5.5, and 6.0. It also plugs six new vulnerabilities; one of the most serious flaws could allow a miscreant to execute commands on your system. The patch includes the fix that we've been awaiting for the hole in Gopher, too (visit find.pcworld.com/30869 for more details). Go to find.pcworld.com/30866 for a link to the cumulative patch.

BIG FIX FOR OFFICE XP

MICROSOFT ALSO shipped Service Pack 2 for Office XP. SP-2 corrects all previously known bugs in Office XP, so if you've put off installing the earlier individual fixes, you're in luck—now you can handle all of them at once.

Besides addressing a number of security holes in Office XP, SP-2 fixes various minor annoyances. One such irritation: If you have Word 2002's spelling and grammar dialog

box open and you press the <Esc> key, the application will hang. Another glitch: Excel 2002 freezes up in certain situations. Visit find.pcworld.com/30872 to grab SP-2.

OFFICE WEB COMPONENT HOLES

THE SAME day that Microsoft released Service Pack 2 for Office XP, the company announced yet another patch for Office XP and several additional Microsoft products, including Office 2000. The separate patch repairs three freshly discovered security holes. These vulnerabilities could leave your system under the control of Web villains who could take charge of your hard drive. (If you're an Office XP user, SP-2 has these three holes covered; you won't have to install SP-2 and then apply a different patch.)

The three newly discovered security holes aren't limited to Office XP, however. Anyone who uses Office 2000, Money 2002 or 2003, or Microsoft Project 2002, and has installed Microsoft's Office Web Components is at risk.

Microsoft rated these holes as "critical" on its severity rating scale, so be sure to get the patch. Hop to find.pcworld.com/30875 for the fix. ■

Stuart J. Johnston is a contributing editor for PC World.

IN BRIEF

Windows XP Update

MICROSOFT has released Service Pack 1 for Windows XP. Visit find.pcworld.com/31034 to install SP1 and read Microsoft's laundry list of bug fixes and installation notes. For more details about the service pack, turn to our news story on page 32.

Google Eyes

GOOGLE IS shipping an update to its popular Google Toolbar that fixes two flaws, both of which could let a bad guy read your files or run programs on your PC. Go to find.pcworld.com/30881 for the updated Toolbar and to find.pcworld.com/30902 for details about the holes.

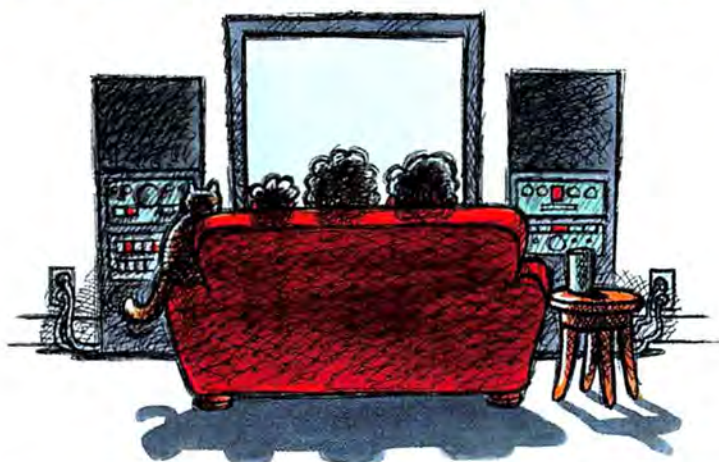
Undo Hoax Damage

IN RESPONSE to my discussion of virus hoaxes in September's *Bugs and Fixes* (see find.pcworld.com/30884), a lot of you asked me how to replace `jdbgmgr.exe`, the file that a widespread hoax persuaded users to delete. See find.pcworld.com/30887 for Microsoft's instructions.

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before. And you can show
your DVD movies on a
conference room projector
or your living room television.*

Video production and editing,

once the exclusive domain of professionals who understood the complexities of dedicated video-processing systems, are now within the reach of consumers and semi-professionals. Easy to install and configure and affordable, DVD recorders and editing software are replacing videotape and CDs as the media of choice for delivering streaming video, audio, and photo collections.

"DVD is definitely the format of the future," says Natalie Fischer, director of new media for the world-famous Culinary Institute of America. Based in Hyde Park, New York, the 50-year-old school is committed to converting its collection of instructional videos from videotape to DVD format. The videos, which are a course requirement for the Institute's students and in demand by aspiring chefs everywhere,

describe every aspect of food handling, preparation, and serving, as well as the business components of the hospitality trade.

"We are transferring all of our existing content into DVD. At the same time, we are transforming our entire in-house production facility to producing

DVDs," says Fischer, explaining that 50 percent of the people who buy CIA's instructional aids ask for it in DVD format. She predicts a sharp rise in the number of purchasers who will request DVD instead of tape.

Preserve and Protect

Transferring video material from videotape to DVD, say 66 percent of respondents in a Hewlett-Packard survey, is the primary appeal of DVD writers. In addition, you can create original content with crystal-clear audio and color images to share with friends and family who own a DVD video player or a DVD-ROM



The DVD Writer dvd200e, HP's first external DVD writer, will allow home moviemakers to edit DVD+RW video discs without rewriting the entire disc.

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photos or just transfer data, your DVDs will be compatible with most computers and home DVD players. Finally,

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Pinnacle's Studio DV editing suite makes home movie-making a breeze.

drive. And unlike videotape, which has a limited life span, DVD discs can last up to 40 years.

HP's recently announced HP DVD Writer dvd200i, a feature-rich internal drive, and the HP DVD Writer dvd200e, HP's first external DVD writer, are designed to be a snap to use, even for novices. The dvd200e drive's DVD+RW/+R format will allow home movie-makers to edit DVD+RW video discs without rewriting the entire disc, a significant timesaver. What's more, the dvd200e is one of the first to offer the convenience of dual high-speed connections—either IEEE 1394 (FireWire) or USB 2.0—with the flip of a switch, making it easy to install and share the drive among multiple desktops or notebook PCs.

HP DVD Writers come bundled with HP MyDVD by Sonic Solutions, a direct-to-DVD solution for DVD recording and authoring that provides consumers with an easy, step-by-step method to transform home videos into interactive DVDs, and ARC ShowBIZ, an intuitive, feature-rich video editing package that allows you to get creative with your video creations by adding music tracks, screen transitions, titling, and many other custom touches. Also included: HP RecordNow by Veritas, which quickly and simply makes custom music and data CDs and DVDs; HP DLA by Veritas, which drags and drops files to CD or DVD directly from any application; PowerDVD by Cyberlink, which plays DVD movies on PCs; and HP SimpleBackup, which stores critical data reliably. For more information or to purchase, go to www.hpshopping.com.

The ABCs of DVDs

Vito Barrina, who lives in Toronto, became involved with digital video because he had a problem to solve. His aging mother, a legendary cook, never worked from a recipe or used a measuring cup when she created a meal. Every one of her delicious Old World

recipes, from tomato sauce to Christmas cookies, was based on recipes that were handed down from mother to daughter in Italy. Determined to preserve this part of his family's heritage for future generations, Barrina purchased a Canon digital video camera and a copy of Pinnacle's Studio DV 7 editing suite.

With its prodigious 4.7-GB capacity, a DVD disc can store about two hours of quality MPEG-2 video including audio tracks, more storage than many home movie-makers need. Vito Barrina may never have a two-hour video, but he has already amassed a collection of short clips that may eventually fill a disc. He currently produces video CD discs, but he intends to purchase a DVD burner shortly. Typically he'll capture 40 to 50 minutes of digital video on tape ("Most of it is pretty boring," he admits) and then transfer the data onto his computer's hard drive via a FireWire card (bundled with the DV version of Studio).

To Barrina, the ability to edit, write, delete, and cut and paste content was critical, but he didn't want to be swamped with multiple interfaces and a steep learning curve, and Studio 7 made his job simple. He soon found that his mother liked appearing in the videos: "She's a bit of a ham," Barrina says with a smile. The rest of his family enjoyed his efforts, too; his five brothers and sisters have asked him to document family get-togethers, especially children's birthday parties.

Barrina uses Studio 7 for all of his editing, including adjusting light levels, and he tries to go easy on transitions. "When I first started editing," Barrina says, "I went crazy with transitions and effects, using nearly every fade, swirl, and wipe that Studio contains. Thankfully, I got over it." Now, most of his editing consists of cutting and pasting. "I shoot everything I want to in any sequence, then edit it later, so



Pinnacle's Studio DVD editing software allows you to work with transitions and effects and adjust light levels.



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Memorex's DVD+RW/+R Super Combo internal rewritable drive kit enables you to burn original DVDs (and CDs) that can be played on most DVD and CD players.

that each scene ends up exactly where I want it. For example, at a recent birthday party, the scene opens with my niece blowing out the candles and then steps back in time to show everyone gathered around the table singing, 'Happy Birthday'."

Pinnacle's newest release, Studio 8, adds some tweaks that can help transform less-than-exciting footage into an eye-arresting presentation. It also includes some new ease-of-use features. For example, users can now burn their movies directly to the CD or DVD disc instead of an intermediate file. As they build a movie, they can drag-and-drop menu and navigation points along a single continuous timeline, which significantly accelerates content placement. (More information on Studio 8 is available at

<http://www.pinnaclesys.com>.)

While conversion of video to DVD is helping to encourage adoption of DVD rewritable drives, this trend is also fueled by lower prices, increased features, and ease of use. For example, Memorex's DVD+RW/+R Super Combo internal rewritable drive kit enables you to burn original DVDs (and CDs) that can be played on most DVD and CD players. The DVD format allows you to record a honking 4.7 GB of video, audio, data, and digital photos on just one disc. This drive also reads, writes, and plays all CD media. In addition to the DVD+RW/+R drive, Memorex bundles a comprehensive suite of utilities, which includes Ahead Software's Nero for premastering audio, Sonic's MyDVD, Arcsoft's Showbiz for editing and authoring video, and Cyberlink's PowerDVD for DVD playback.

The new high-speed drive will record a full disc's worth of video, data, photo, or audio files in less than 30 minutes. It supports cutting-edge "plus" technology and multiple optical media formats, including DVD+RW, DVD+R, DVD-ROM, CD-RW, CD-R, and CD-ROM. Because it is compatible with the DVD "plus" standard as well as all CD formats, Memorex's new drive can help eliminate the uncertainty you may have about compatibility with industry formats. The new drive is a strong complement to Memorex's industry-leading blank DVD and CD media. More information on the drive and Memorex media is available at www.memorex.com.

DVD Tips, Tweaks, and Techniques

1. Enable your DMA! DMA enables your PC to transfer data directly from the DVD drive into the memory, bypassing the CPU. You could gain performance improvement of up to 50%. To enable DMA support in Windows 98 and ME, open Device Manager and turn to the CD-ROM branch. Highlight your DVD drive, click the Properties and Settings and then click on the Enable DMA check box. In Windows 2000 and XP, the DMA option is in the ATA/ATAPI Controllers branch in Device Manager. Be aware that some AMD chips do not support AMD CPUs

without the use of special drivers available from the motherboard's manufacturer.

2. As a guide, one hour of raw digital video requires about 13 Gigabytes of hard drive storage. MPEG-2 will compress that to between three gigabytes or less. Use a multipass encoder to increase the quality of the output, not the amount of compression.

3. If you have enough hard drive space, create a temporary folder on your hard drive that enables you to test your DVD con-

tent before burning the disc. Although DVD rewritable discs are coming down in price, there's still no sense in creating "coasters" when it's so easy to check the file's integrity first. After you gain experience, you can eliminate this step.

4. Similarly, buy a couple of rewritable disks to practice with. That way, you don't have to worry about damaging write-once disks as you gain experience mastering this technology. As an added bonus, you can later use the same rewritable disks for backing up data or sharing large files.

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Desktop Innovations

Evo D310v Microtower

Intel® Celeron® processor 1.70GHz
128MB PC2100 DDR SDRAM
20GB Ultra ATA Hard Drive
48X Max® CD-ROM Drive
Integrated Intel® Extreme 4X AGP graphics
Integrated Intel® Audio with premium internal speaker
Integrated Intel® PRO 10/100 NIC
Microsoft® Windows® XP Professional
1-year (parts, labor and next business day on-site)
Limited Warranty¹

\$549 Lease for
\$16/mo.†

Monitor not included.

D510 e-pc

Intel® Celeron® processor 1.80GHz
128MB PC2100 DDR SDRAM
20GB Ultra ATA Hard Drive
24X Slim IDE CD-ROM Drive
Integrated Intel® Audio with premium internal speaker
Integrated Intel® PRO 10/100 NIC
Microsoft® Windows® XP Professional
3-year (parts, labor and next business day on-site)
Limited Warranty¹

\$839 Lease for
\$24/mo.†

Monitor not included.

Evo D310 Microtower

Intel® Pentium® 4 processor 2.0GHz
256MB PC2100 DDR SDRAM
40GB Ultra ATA Hard Drive
48X Max® CD-ROM Drive
Integrated Intel® Extreme 4X AGP graphics
Integrated Intel® Audio with premium internal speaker
Integrated Intel® PRO/100 NIC
Microsoft® Office® XP Small Business
with Publisher 2002
Microsoft Windows® XP Professional
1-year (parts, labor and next business day on-site)
Limited Warranty¹

\$899 Lease for
\$26/mo.†

Monitor not included.



Notebook Innovations

Evo N1000v Notebook

Intel® Pentium® 4 processor 2.00GHz
14.1" TFT XGA Display
256MB DDR SDRAM
20GB SMART Ultra ATA Hard Drive
DVD-ROM Drive
ATI Mobility Radeon 7500 4X AGP Graphics with
32MB DDR SDRAM
JBL Pro Speakers
Integrated Mini PCI 56K V.92 Modem⁴
Integrated 10/100 NIC
Microsoft® Windows® XP Professional
1-year Worldwide Limited Warranty¹

\$1549 Lease for
\$45/mo.†

Evo N800v Notebook

Mobile Intel® Pentium® 4 Processor 1.80GHz - M
15.0" TFT SXGA+ Display
256MB DDR SDRAM
30GB SMART Ultra ATA Hard Drive
DVD-ROM Drive
ATI Mobility Radeon 7500 Graphics with
64MB DDR SDRAM
JBL Pro Speakers
Integrated Mini PCI 56K V.92 Modem⁴
Integrated 10/100 NIC
Microsoft® Windows® XP Professional
1-year Worldwide Limited Warranty¹

\$1968 Lease for
\$56/mo.†

Evo N610c Notebook

Mobile Intel® Pentium® 4 Processor 2.00GHz - M
14.1" TFT SXGA+ Display
256MB DDR SDRAM
40GB SMART Ultra ATA Hard Drive
DVD/CD-RW Combo Drive
ATI Mobility Radeon 7500 4X AGP Graphics
with 32MB DDR SDRAM
Compaq Premier® Sound™
Integrated Mini PCI 56K V.92 Modem⁴
Integrated 10/100 NIC
Microsoft® Windows® XP Professional
3-year Worldwide Limited Warranty¹

\$2449 Lease for
\$70/mo.†



Technology Innovations

Evo D510 Small Form Factor with 15" Flat Panel Monitor*

Intel® Pentium® 4 processor 2.00GHz
128MB PC2100 DDR SDRAM
20GB Ultra ATA Hard Drive
48X Max® CD-ROM Drive
Embedded Intel® PRO/100 NIC
Integrated Intel® Audio with internal speaker
Microsoft® Windows® XP Professional/Microsoft
Windows 2000 – dual install⁶
3-year (parts, labor and next business day on-site)
Limited Warranty¹
Compaq TFT5017 15" Flat Panel Monitor

\$1249 Lease for
\$36/mo.†

Offer ends 10/31/02.

Evo N1000v Notebook with hp iPAQ Pocket PC*

Intel® Pentium® 4 processor 2.00GHz
14.1" TFT XGA Display
256MB DDR SDRAM
20GB SMART Ultra ATA Hard Drive
DVD-ROM Drive
ATI Mobility Radeon 7500 4X AGP Graphics with
32MB DDR SDRAM
JBL Pro Speakers
Integrated Mini PCI 56K V.92 Modem⁴
Integrated 10/100 NIC
Microsoft® Windows® XP Professional
1-year Worldwide Limited Warranty¹
hp iPAQ 3850 Pocket PC with Microsoft®
Pocket PC 2002 operating system

\$1699 Lease for
\$49/mo.†

Offer ends 10/31/02.

hp ProLiant ML330G2 Server*

Intel® Pentium® III processor 1.26GHz
128MB Total SDRAM 133MHz
18.2GB Ultra3 SCSI Hard Drive
Integrated Dual Channel Wide-Ultra3
SCSI Adapter
High-speed IDE CD-ROM Drive
1.44MB Floppy Disk Drive
Compaq NC3163 Fast Ethernet NIC
10/100 TX UTP
SmartStart and Insight Manager
1-year Limited Warranty¹

\$1299 Lease for
\$37/mo.†

hp deskjet 5550 color inkjet printer

A professional desktop printer with
photo-quality color and laser-quality black text

\$149⁹⁹

hp officejet v40 all-in-one

Simple and convenient –
all color, all in one

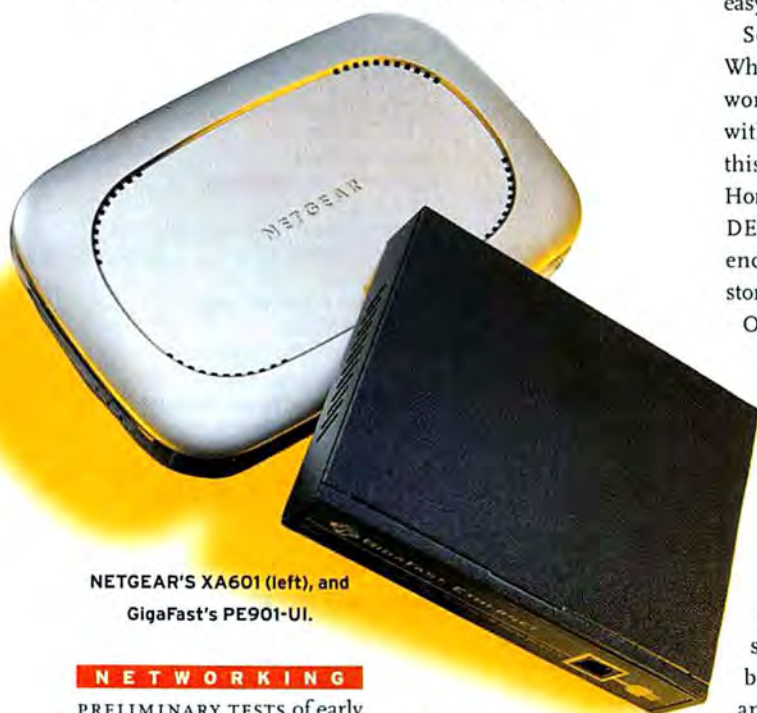
\$199⁹⁹

NEW PRODUCTS

EDITED BY TOM MAINELLI

HomePlug Networks Plug In and Power Up

FIRST SHIPPING POWER-LINE USB ADAPTERS OFFER GOOD SPEEDS, STRONG SECURITY.



NETGEAR'S XA601 (left), and GigaFast's PE901-UI.

NETWORKING

PRELIMINARY TESTS of early HomePlug networking products prompted us to give them a cautiously optimistic endorsement in our April issue, despite the dubious history of power-line technology. Now units are coming to market, and despite a few quirks this first batch of shipping USB products clearly represents a

viable alternative to today's wireless networks.

We tested three vendors' products: GigaFast's **PE901-UI**, Linksys's **PLUSB10**, and Netgear's **XA601**. The results were good—and shockingly similar. Whether we used a single vendor's adapters or mixed units from several companies,

the outcome was essentially the same: a serviceable and easy-to-configure network.

Security is another plus. While vendors of wireless networks continue to struggle with some thorny issues in this area, all producers of HomePlug adapters use 56-bit DES encryption, where the encryption key password is stored within the devices.

Our test environment was not favorable to power-line networking. Our three networks spanned all levels of a four-story house constructed in the 1920s; and we ran our tests during the dog days of summer, when the area's electrical supply suffers the greatest number of brownouts, spikes, and surges. If HomePlug could perform effectively there, we figured, it could do the job practically anywhere.

SEPARABLE BUT EQUAL

ALL THREE of the USB adapters we looked at moved data more slowly than the HomePlug standard's rated top speed

of 14 megabits per second; in our test house, each of the adapters averaged a transfer rate of about 5 mbps. Even so, that rate is significantly higher than the 1.5-mbps top speed most broadband Internet connections can manage—and that makes a HomePlug network ideal for sharing access to the Web and e-mail servers. It's also a good choice for sharing printers and occasionally swapping files (though you'll feel the pinch if you regularly swap 10MB-plus folders).

We observed some slight differences in data transfer speeds. On average, the Giga-

PE901-UI

GigaFast

★★★★☆

Tiny adapter fits anywhere; delivers speedy transfers.

List: \$99

find.pcworld.com/30896

PLUSB10

Linksys

★★★☆☆

Slightly slower adapter offers poor cable management.

List: \$99

find.pcworld.com/30890

XA601

Netgear

★★★★☆

Slender adapter performs well; has many mounting options.

List: \$120

find.pcworld.com/30893

68 POWER-LINE NETWORKING

GigaFast PE901-UI, Linksys PLUSB10, Netgear XA601 HomePlug power-line USB adapters

70 ANTIVIRUS SOFTWARE

Network Associates McAfee VirusScan Home Edition 7, Symantec Norton AntiVirus 2003, Panda Antivirus Titanium

CD-RW DRIVE

Yamaha CRW-F1

72 NOTEBOOK

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Microsoft Picture It Digital Image Pro 7

PRINTERS

HP PSC 2210, Lexmark PrinTrio X75

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GROUPWARE

IBM Lotus Notes/Domino Version 6

78 MUSIC PLAYER

Apple iPod for Windows

80 CELL PHONE

Nextel I95cl

MUSIC PLAYER

Toshiba Mobilphile



APPLE iPod.

Fast and Netgear adapters moved data about 8 percent faster than the Linksys did during our speed trials. But those averages conceal the actual story: Each adapter performed at widely varying rates at different times, presumably because of the unpredictable nature of the power supply.

The GigaFast PE901-UI is smaller than the other two products—about the width and length of a floppy disk—and it comes with a three-year warranty. The placement of its USB and power sockets, however, isn't terribly convenient. The USB socket is situated on the front, next to the indicator lights, and the power plug lies in the back; to view the indicator lights, you must tolerate having the USB cable strewn across your desk.

Linksys's PLUSB10 adapter (\$99) is the bulkiest of the three (approximately the size of a hard-cover book). Its power and USB sockets reside at opposite ends, which makes stretching the distance between socket and PC easier. The design doesn't improve cable management, however. And the unit has a puny one-year warranty (versus the three years offered by its two competitors).

TEST REPORT**HOMEPLUG ADAPTERS—TOO CLOSE TO CALL?**

SYSTEM	Transfer time for 20MB (minutes:seconds)	Transfer time for 10MB (minutes:seconds)	Response time (milliseconds)	Warranty	List price
GigaFast PE901-UI	2:42	0:54	12.1	3 years, limited	\$99
Linksys PLUSB10	2:56	0:56	11.6	1 year, limited	\$99
Netgear XA601	2:43	0:52	11.9	3 years, limited	\$120

These informal tests were performed between the ground and fourth floors of a 1920s-era house. In the 20MB test we transferred more than 500 small files in three folders. In the 10MB file test we transferred four MP3 files. We tested response time using the Windows Ping utility. Stated times are the average of three operations.

Netgear's slim, sliver-tone XA601 adapter (\$120) is approximately the size of a mass-market paperback. We liked the unit's socket placement best of the three, with power and USB cables plugged into the back, allowing for easy and tidy cable management. It comes with a wall-mounting kit and a desktop stand, so you can place it vertically next to the PC. The unit has a three-year warranty.



LINKSYS PLUSB10 (top) and PLEB10 (not reviewed).

Each of these adapters gets a thumbs-up, but with reservations. Since some surge protectors and universal power supplies treat the network signals as power surges and strip them out, you need a clear path between the adapters and the wall plugs for best results.

Because all three adapters use the same Intellon chip set, they share the same limitations. In theory you can connect up to 16 computers on a HomePlug network, but in practice that number drops to just 3 unless you run system-intensive background software on each computer.

USB adapters have a physical limitation, too: You can't plug them directly into an ethernet hub or router. To share ethernet-based broadband, you have to jump through some need-

less hoops—such as plugging an ethernet HomePlug adapter into a broadband router.

The main appeal of HomePlug power-line adapters is that they're easier to install in a home than ethernet or phone-line HomePNA networks (the former necessitates running cables, and the latter entails placing all PCs near a phone jack). HomePlug adapters are faster than most wireless networks, too, and they don't suffer the signal degradation between floors that Wi-Fi does. On the other hand, HomePlug products are slightly more expensive in general.

Although no clear winner surfaced among our three test units, two of them will satisfy particular needs. The Netgear adapter—the sleekest of the bunch—offers the best cable and mounting options, and the comparable-performing GigaFast is the smallest. Both offer generous warranties.

—Matt Lake ►

Install-and-Forget Antivirus Programs

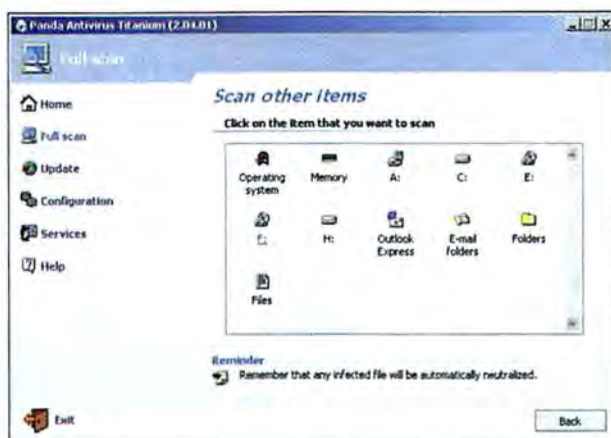
ANTIVIRUS

YOU CAN'T ignore the threat of PC viruses, but the latest antivirus programs let you devote less time and energy to defending against them.

Although they don't offer breakthrough features, **McAfee VirusScan Home Edition 7**, **Norton AntiVirus 2003**, and **Panda Antivirus Titanium** are closer than their predecessors to being "install and forget" tools.

Once in place, all three programs perform more tasks automatically, such as fetching updates and disabling viruses. The downside: Fewer controls remain for users who like to fiddle with settings.

I tested beta versions of the Norton and McAfee products and a shipping copy of Panda Titanium (final versions of all three products should be avail-



PANDA'S ANTIVIRUS Titanium program has plenty of set-and-forget features; however, navigation within this software can be tricky.

able by the time you read this), zeroing in on interface and automation improvements. We won't know how successfully each product nails viruses until we test shipping versions sometime in 2003.

NAV OUT IN FRONT

NORTON AntiVirus 2003 takes the lead, sporting the same lean and logical interface that its predecessor did. Installation was simple, and Symantec has just about every feature turned on by default.

Foremost among NAV's improvements: It can automatically remove worms and Trojan horses, along with viruses. NAV also stops worms from transmitting themselves from your PC via e-mail or their own Net connection protocol, and it blocks malicious files downloaded via AOL Instant Messenger, MSN Messenger, and Yahoo Messenger.

Panda Antivirus Titanium follows closely in NAV's footsteps, with most of its features enabled during installation (the exceptions include heuristics and compressed-file

scanning). The product also fetches new virus definitions from Panda's site whenever your PC connects to the Net.

Titanium does have some annoying quirks, though. For one thing, to return to a previous screen you might have to click OK, Back, or New Scan, depending on where you are. Furthermore, Panda provides only e-mail tech support, and the annual renewal fee is \$20 (Norton is \$15; McAfee, \$10).

At the tail end is McAfee's VirusScan Home Edition version 7. On the positive side, you get not only virus protection, but also a firewall that includes a visual trace route program. In addition, VirusScan watches for malicious outbound programs, blocks malicious scripts, and quashes viruses in the background.

Unfortunately, VirusScan continues to be hamstrung by a clumsy browserlike interface. The result is a bit of a navigational mess that leads to situations such as trying to back out of a page only to find the back arrow grayed out.

McAfee doesn't enable many

QUICK TAKES

Tattoo You: Burn Your Own CD Labels

AS A GROUP, CD-RW drives tend to do the same thing, albeit at different speeds. Yamaha's \$149 **CRW-F1** CD burner distinguishes itself however, with DiscT@2 technology, which etches a label onto the unused portions of the disc. Unfortunately, our tests revealed the feature to be rather poorly integrated into the burn process, with the included CD-burning software failing to offer any helpful prompts.

In addition to its kludgy "tattooing" capabilities, the drive can burn CD-Rs at 44X (in our 650MB tests, it took 30 seconds or so longer than 48X test drives). It also burns CD-RWs at a speedy 24X,



enabling it to copy 100MB in less than 1 minute. Yamaha, find.pcworld.com/31028.

—Melissa J. Perenson

of VirusScan's settings by default, either. As a result, to use features such as heuristics, Outlook e-mail scanning, and emergency disk creation, you must first turn them on.

Despite their various shortcomings and foibles, all three programs improve on their forebears, with Norton AntiVirus 2003 the overall leader in interface accessibility, automation, and new features.

—Robert Luhn ▶

McAfee VirusScan Home Edition 7

Network Associates
(Preproduction version, not rated)
Includes a firewall and features background virus killing, but the interface still needs work.
List: \$40
find.pcworld.com/31031

Norton AntiVirus 2003

Symantec
(Preproduction version, not rated)
Turn it on, walk away—NAV does just about everything, and well.
List: \$50
find.pcworld.com/31035

Panda Antivirus Titanium

Panda Software
★★★★☆
Fairly lean, clean, and automatic, but fails to take top honors.
List: \$25
find.pcworld.com/31037

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A fashion designer's studio scene. A woman in a red dress stands in the center, looking towards the camera. To her left, a man in a light blue shirt is kneeling, measuring her dress with a long white tape measure. To her right, another woman in a grey dress is looking at a large sheet of paper with a red dress design. In the foreground, a Sharp Color IMAGER copier is shown, with a printed design of a red dress emerging from its output tray. The background features a desk with a laptop displaying a red dress design, a vase of red flowers, and several framed fashion sketches on the wall. The copier has 'SHARP', 'IMAGER', and 'Full Color' labels on it.

Perfected.

Product shown is the AR-C160. ©2002 Sharp Electronics Corporation

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This Laptop Really Gallops

NOTEBOOKS

IN A MARKET full of work-horse notebooks, IBM's new **ThinkPad X30** is a thoroughbred. The \$2569 subnotebook offers a swift processor and considerable battery power, wrapped in a slim chassis that belies its strength.

Weighing in at a mere 3.6 pounds, this ThinkPad gallops at an appealing clip with its 1.2-GHz Pentium III-M processor and 256MB of memory. My shipping model scored an impressive 96 on PC World-Bench 4—that's at the high end of all comparably configured notebooks we've tested.

More notable was the unit's battery life. Using a standard rechargeable lithium ion battery, it achieved 4 hours of run time, very good for a notebook of this size. Using the optional \$189 Extended Life battery wedge, it managed 7 hours, 10 minutes—plenty of juice for a cross-country flight.

Beyond good performance and protracted battery life, the unit has one of most comfortable keyboards I've ever used, with good touch and feedback as well as a nice layout. The absence of a Windows key was a minor drawback. But a cleverly designed ThinkLight keyboard light let me work in dim conditions—a nice touch.

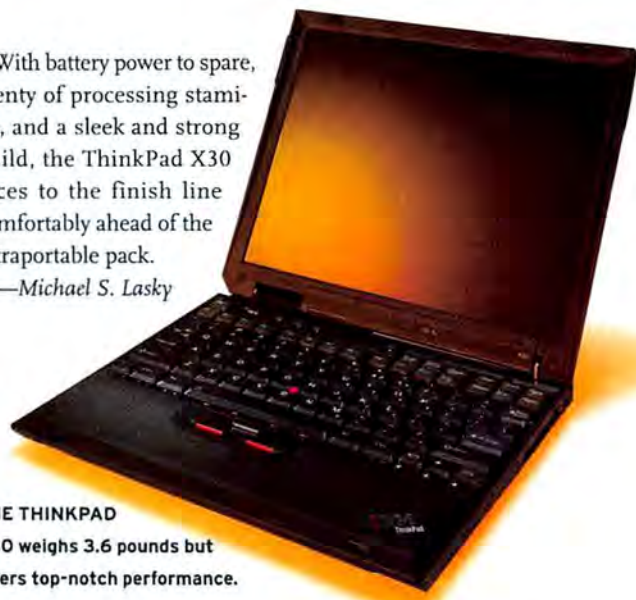
The strong titanium com-

posite cover protects the crisp, 12.1-inch, 1024-by-768-resolution TFT display and the integrated Wi-Fi antenna.

When no wireless network is handy, the integrated ethernet adapter and 56-kbps modem provide additional communications support. Add the optional (but necessary) \$199 docking station, and the X30 does double duty as a road/office machine that's pricey, but hard to outperform.

With battery power to spare, plenty of processing stamina, and a sleek and strong build, the ThinkPad X30 races to the finish line comfortably ahead of the ultraportable pack.

—Michael S. Lasky



THE THINKPAD
X30 weighs 3.6 pounds but offers top-notch performance.

Microsoft Goes Wi-Fi

WIRELESS NETWORKING

WHEN MICROSOFT builds hardware, it usually does the job right, and the company's **Broadband Networking Wireless Kit** is no exception. It's among the fastest Wi-Fi (802.11b) products I've tested, and it comes with great documentation and around-the-clock, toll-free support. The broadband base station sports deep firewall features, as well.

Installation is the main obstacle to using any home networking system, a fact that

Microsoft recognizes and covers well with step-by-step instructions for virtually any setup. The Setup Wizard (for Windows 98, Me, and XP, but not 2000) helps transfer your DSL or cable connection information and even saves existing connection settings to an included floppy disk in case the installation goes awry.

My shipping kit included a broadband base station and a USB Wi-Fi adapter; the kit is also available—at the same price (\$220)—with a PC Card, which is better for notebooks. Since the sleek, compact, silver base station comes with a

built-in four-port ethernet switch, either kit lets you connect up to four PCs via conventional ethernet, along with the single computer connected via the wireless adapter. You can buy additional PC Card and USB adapters for an extra \$80 apiece; the base station alone is \$150.

Aside from providing setup guidance, the documentation offers advice on sharing printers and files, multiplayer gaming, and network security. The plentiful firewall features include port forwarding, which is useful for games and videoconferencing apps, and Media Access Control (MAC) and client filtering, both of which let you decide who can access the network. My only quibble: I wish Microsoft had included examples of how to operate the firewall tools, which may be new to some users.

Overall, the kit is simply the best Wi-Fi setup on the market, especially for novice users who require the maximum amount of handholding.

—Becky Waring ►

MICROSOFT'S WI-FI
base station.



Microsoft Broadband Networking Wireless Kit

Microsoft

★★★★★

Great performance, super documentation, plenty of support, and a deep firewall make this the best wireless package currently on the market.

Street: \$220

find.pcworld.com/30959

ThinkPad X30 (Model 2672 4BU)

IBM

★★★★★

Street: \$2569

Well-engineered ultraportable offers great performance and battery life, for a price.

find.pcworld.com/31017

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Michael Touchstone
Manager of Energy Conservation,
Cox Communications



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Picture It 7: Still Fuzzy

IMAGE EDITING
WOULD YOU ENJOY having a drill sergeant supervise your housework? If you can't make the bed with hospital corners, he will gladly instruct you again and again until you get it right. Microsoft's **Picture It Digital Image Pro 7** image editor takes a similar approach: Just like sarge, it makes you perform tasks the correct way—

Picture It Digital Image Pro 7

Microsoft

★★★☆☆

Beginners will like the structure—until they outgrow it.

Street: \$109

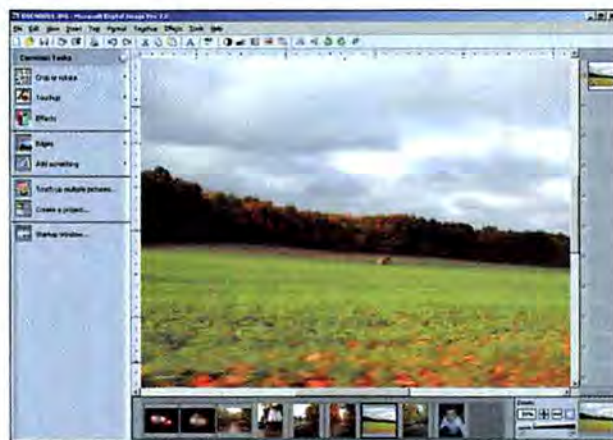
find.pcworld.com/30809

its way—every time, whether you want to or not.

Picture It comes in four different versions, each with its own capabilities and price; I tested a beta copy of the top-end, \$109 version (it should be in stores by the time you read this). Despite its Pro tag, however, the program would not let me escape its incessant hand-holding, often forcing me to take multiple steps to complete even simple tasks.

That said, the program does offer some advanced tools, comparable to those in Adobe's \$99 Photoshop Elements, making version 7 more sophisticated than past editions.

New tools include level and



PICTURE IT places many of its functions in vaguely named groups, forcing you to remember which one contains the exact tool you need.

tint adjustments, dodge and burn (color lightening and darkening), and a couple of tools that provide functionality first seen in Elements. Picture It contains a wide assortment of tools that will please new-

bies or people looking for a shotgun approach to image editing. But if you anticipate growing beyond novice status, Adobe's Elements is likely a better choice for you.

—Alan Stafford

HP, Lexmark Multifunction Units Do It All

PRINTERS
CONVENTIONAL wisdom says that while multifunction devices do many things, they rarely do any of them well. Lexmark's PrinTrio X75 and Hewlett-Packard's PSC 2210 help debunk that notion by offering high-quality ink jet printing, capable scanning, and a host of other goodies.

The shipping version of Lexmark's unique-looking, \$150 **PrinTrio X75** delivered good prints at reasonable speeds. Printing text, it averaged 4.8 pages per minute, similar to

LEXMARK'S PrinTrio X75 (left) and HP's PSC 2210.



the 5.0-ppm average of ink jets with comparable specifications that we've tested. Draft-quality text was acceptable; higher-precision settings produced sharp, crisp type.

PSC 2210

Hewlett-Packard

★★★★☆

Great prints, numerous features; well suited to small offices.

Street: \$400

find.pcworld.com/30962

PrinTrio X75

Lexmark

★★★★☆

Good prints, low price; better suited to home users.

Street: \$150

find.pcworld.com/30860

features. Photo print speeds were good, averaging 0.9 ppm. The PSC 2210 printed text at a slower-than-average 4.6 ppm, however, and scanning took longer than with the X75.

The HP offers an impressive set of tools, including multiple-format flash memory card readers, onboard faxing, and controls that often permit you to bypass the PC. Replacement cartridges run \$20 for black (450 pages) and \$35 for color (400 pages).

Aimed primarily at home users, the X75 has an appealing shelf price. HP's more expensive PSC 2210 targets small-business users, and offers better print quality and more features.

Neither unit will disappoint, but if you have the extra cash, go with the HP.

—Tom Mainelli ►

The X75's photo printing time was quite slow, averaging about 0.5 page per minute (0.9 ppm is average). Images looked good, though slightly washed out. Despite the printer's low price, replacement cartridges aren't cheap, at \$29 for black (rated at 410 pages) and \$32 for color (275 pages).

A shipping version of HP's **PSC 2210** justified its higher (\$399) price tag with better overall print quality and more

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Return of the Zip Drive

STORAGE

AT FIRST BLUSH, Iomega's new **Zip 750** drive—which can pack about 718MB of data onto a single durable, rewritable disk—might seem superfluous. After all, most current PCs have a CD-RW drive that can store 700MB of data on a write-once CD-Recordable or

530MB on a CD-Rewritable.

But while most folks like speedy, reliable CD-R media, they're less enamored with the slower and more error-prone CD-RW discs. Plus, both types of discs tend to be a bit fragile. That's where Iomega's new Zip comes in.

Both light and portable, this \$180 external drive uses high-speed USB 2.0. In addition to accepting the durable 750MB disks, it can write to 250MB disks, and it can read 100MB disks. You also receive a full complement of useful Iomega software, including Automatic Backup (to let you back up

changed files on the fly) and Iomega Sync (for synchronizing files among PCs).

If the Zip 750 is as reliable as Iomega claims, it could give optical drives a run for their money (at least until rewritable DVD drives reach the mainstream). The drive's biggest drawback is the cost of its media. A CD-R costs about 50 cents, and a CD-RW about \$1.25; but a 750 disk runs \$13.

Unfortunately, Iomega isn't nurturing its new baby very well. The company doesn't bundle or even sell a USB 2.0 PCI upgrade card, so I used Adaptec's spiffy \$70 USB 2.0 Upgrade Kit (with a four-port hub). Basic cards sell for less than \$30, but it's still a hassle. Iomega also did not include a 750MB disk in the box.

My shipping model was a snap to use, though the drive

was noisy. When spinning up, it emitted an annoying whine; and when accessing data, it sounded like a dentist's drill.

I can't, however, gripe about the Zip 750's performance. In my informal speed tests, backups moved at about 4MB per second—fast enough to blow by my 8X/4X/32X internal CD-RW drive on most tasks.

The Zip 750 is a competent, sturdy alternative to CD-RW for transferring files or doing data backups. And current Zip users will find its backward compatibility compelling.

—Robert Luhn



IOMEGA'S
Zip 750 drive
with USB 2.0.

Zip 750 (USB 2.0)

Iomega

★★★★☆

Solid performance and backward compatibility, but media is pricey.

List: \$180

find.pcworld.com/30815

Review Your (Lotus) Notes

GROUPWARE

IT'S BEEN WELL over three years since IBM's Lotus Software division rolled out the last major new version of its venerable IBM Lotus Notes groupware product, but long-time users will likely find version 6 worth the wait.

I tested a **Lotus Notes/Domino 6** release candidate (gold code should be shipping by the time you read this) and found a lot of things to like—from

an overhauled interface to improved mail tools to upgraded calendaring features.

The most notable improvement is a new look—one that is clearly inspired by Microsoft's Outlook. Lotus Notes' revamped welcome page now offers more options, including the ability to link to databases and file folders. And its upgraded preview pane is considerably easier to use.

Lotus claims it has introduced more than 1000 refinements into version 6's messaging and calendaring features. Among my favorites is the ability to edit and then resend

an attachment within Notes, instead of having to detach, edit, save, and reattach the file.

Another improvement lets you mark a document for deletion, removing it from the in-box and placing it in the Trash folder (retrievable until the trash is emptied). Previous

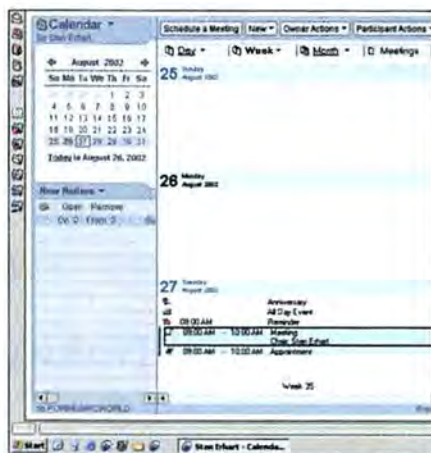
versions required you to irretrievably delete a document, or move it to a new folder, to remove it from the in-box.

Version 6 also lets you use colors to distinguish mail from key individuals and to differentiate calendar entry types. These changes help, but Notes

still needs some additional enhancements (such as the ability to highlight a meeting or to print more-usable calendars).

Despite the remaining deficiencies, version 6 marks a major improvement. System administrators have long embraced Notes; and with this upgrade, everyone else in the company may actually start to like it, too.

—Stan Erhart



NOTES 6 LETS YOU color your calendar, with meetings one hue and appointments another.

Lotus Notes/Domino 6

IBM

(Preproduction version, not rated)

Many small improvements yield a stronger overall product, but the calendar still needs some work.

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NEW PRODUCTS

The iPod Does Windows

MULTIMEDIA

SWITCH? To a Mac? PC music junkies who lust after Apple's iPod music player need no longer contemplate that desperate act—the classy device now works easily with PCs, too. Sure, third-party software eventually made the first iPod Microsoft-friendly, but with **iPod for Windows**, it's official. And the player's size (pocketable), capacity (gargantuan), speed (blistering), and endurance (10 hours per charge) make it tough to beat.

The version of the smudge-prone, Lucite-and-chrome iPod that I tried costs \$499 and is equipped with a 20GB hard drive that holds up to 4000 songs; 10GB (\$399) and 5GB (\$299) models are available, as well. MP3 audio sounded impeccable on the included headphones, and browsing around my music library was a cinch with the iPod's big LCD and sleek onboard controls (both the 10GB and 20GB iPods include a wired remote control as well).

Though the iPod's FireWire (IEEE 1394) interface is not standard fare on PCs (you can find upgrade cards for around \$30), it's quick indeed: My Athlon XP 1700+ desktop took less than 30 seconds to transfer a CD's worth of tunes, versus several minutes for USB 1.1-based players. Apple's iTunes software remains Mac-only, so Windows users get a version of the excellent Musicmatch Jukebox Plus that automatically keeps the iPod in sync with one PC's music collection and playlists. (You can also copy songs manually from

multiple PCs.) The iPod doubles nicely as an external hard drive, and it has rudimentary address book and calendar features. On the downside, it doesn't do music in Microsoft's space-efficient Windows Media format, and it can only import Musicmatch playlists. (Creative Labs' Nomad Jukebox lets you craft playlists on the device itself.) Neverthe-



APPLE'S shiny iPod for Windows.

less, if your goal is to put a massive music collection in your pocket—and if your PC speaks FireWire—this is the mobile audio machine to get.

—Harry McCracken ►

iPod for Windows

Apple

★★★★☆

Powerful, pocketable music player adapts to Windows with aplomb; requires a FireWire port. List: 20GB, \$499; 10GB, \$399; 5GB, \$299

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The Nextel I95cl: Java to Go

CELLULAR PHONE

WITH ITS CRISP 1.9-inch color screen, hands-free speaker-phone, and bevy of downloadable applications, the **Nextel I95cl** has only one drawback: the amount of time you'll need to figure out all it can do. It is, however, time well spent.

Chief among the Motorola-engineered phone's new capabilities is its support for Java applications that you can download over Nextel's data

network. Examples include an e-mail manager, a personal information organizer, and fun stuff such as MIDI musical ring tones and custom display wallpapers.

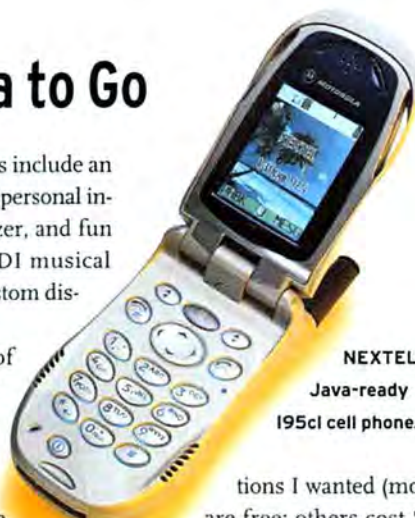
In my testing of a shipping unit, I experienced no call dropouts and a surprisingly strong signal. The Direct Connect service (a walkie-talkie feature that lets you connect with other Nextel phones) worked well, as did Nextel's Mobile Messaging and e-mail services.

Though downloading a Java application took a few minutes, it was easy to do. Using my PC, I picked the applica-

tions I wanted (most are free; others cost \$3 to \$20). Business-specific applications and custom-built programs are available as well.

At \$400 (with a service contract starting at \$40 a month), the Nextel I95cl is pricey, but its abundant (and growing) feature set could make it an indispensable tool for some.

—Michael S. Lasky ■



NEXTEL'S
Java-ready
I95cl cell phone.

QUICK TAKES

Toshiba's iPod Clone

IF IT WEREN'T for the Apple iPod, Toshiba's \$500 **Mobilphile** might have ranked as my favorite handheld MP3 player. Among its advantages are a smudge-proof matte-aluminum case and speedy USB 2.0 connectivity. But Toshiba's decision to use a removable PC Card hard drive in the Mobilphile makes the unit noticeably bigger and costlier than a comparable 5GB iPod (\$299). With Apple now shipping a Windows version of its popular player (see page 78), the Mobilphile just can't compete dollar for dollar. Toshiba, find.pcworld.com/30854

—Sean Captain

Nextel I95cl

Nextel

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Versatile color-screen cell phone handles PC-like apps with ease.

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The Insider's Guide to Fixing Windows



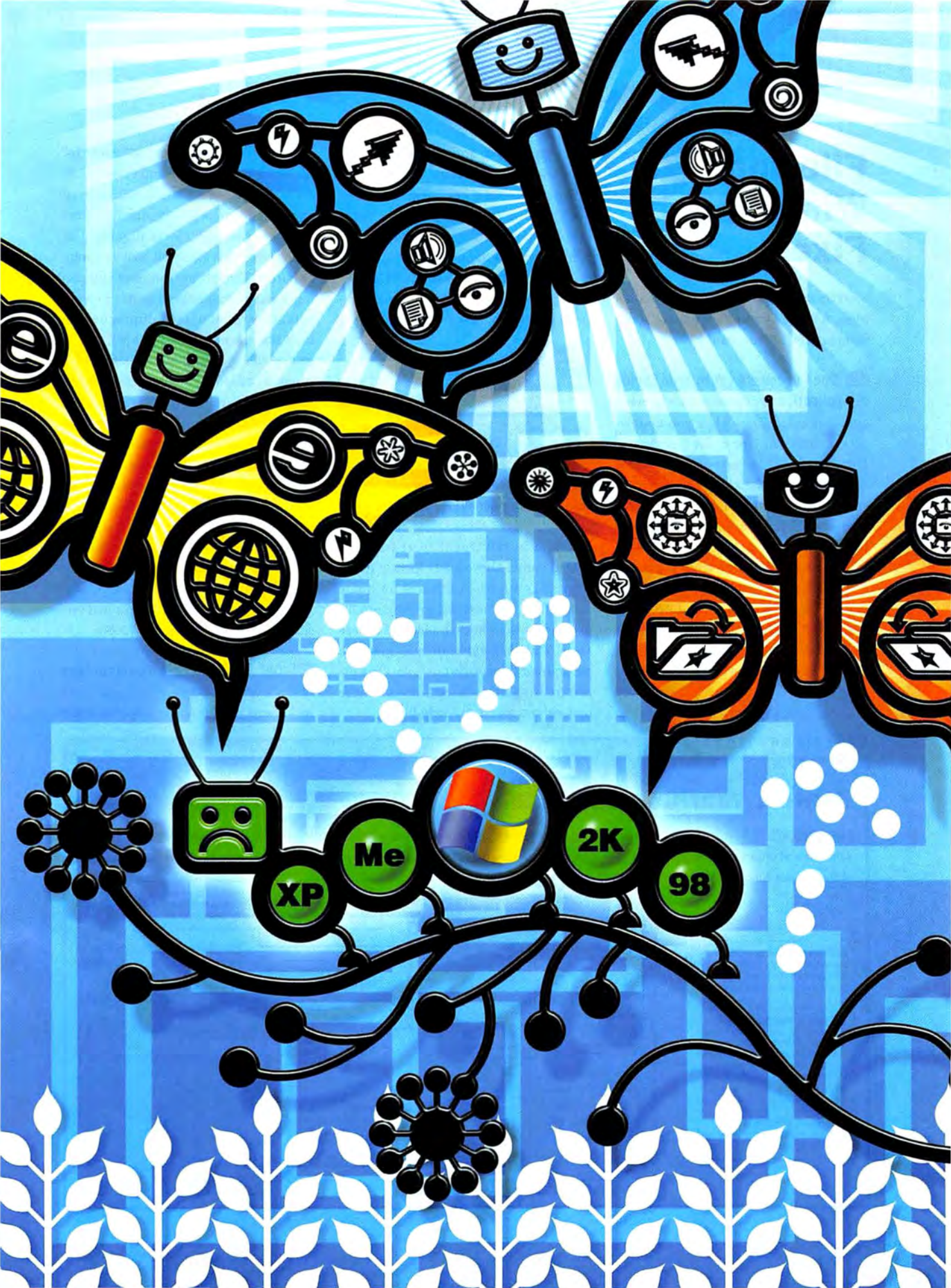
A show of hands, please: Who's deliriously happy with Windows the way it is? Probably not you, if you've found that making it work the way you want takes careful tinkering and the right add-ons. Not the staff here at *PC World*—we'd change more than a few things if we ran the show. Not even Bill Gates, who's already talking up the Windows we'll get to see two or three years from now. And definitely not the Windows XPatriates who have left the Operating System That Made Redmond Famous for the land of Linux.

In this special report, we cover a multitude of ways to build a better Windows—from Microsoft's next major update to our own wholly imaginary game plan for a new and improved version. We also pit Windows XP against the latest in Linux to reveal the ins and outs of Microsoft-free computing.

Most important, we've assembled a time-saving collection of tips and tools for fine-tuning your current Windows into the OS *you'd* design—no matter which edition you use, and starting right now. ...✦

BY SCOTT DUNN

ILLUSTRATIONS BY GLENN MITSUI



File and Window Fixes



EXPLORER IS A DECENT TOOL, but it's often not good enough. Here are some ways to get what you want faster.

All Open Documents With Your Choice of Applications It's easy to change what application launches when you double-click a particular type of file (see *Answer Line* on page 174 for instructions). But for some file types, one application just isn't enough. For example, usually you want to open an HTML file in your Web browser, but sometimes you need to open it in an HTML editor, or make a quick change in a text editor. Fortunately, you can make that choice on the fly. In Windows 2000, Me, and XP: Right-click the document icon and choose *Open With* or *Open With • Choose Program*. Select your application from the list. If it's not there, click *Browse* or *Other*, navigate to and select the desired

application, and click *Open*. Don't check the *Always use this program to open these files* check box at the bottom of the *Open With* dialog box. The application you use will appear on the *Open With* submenu the next time you right-click a file of that type (see **FIGURE 1**).

To get the same feature in older versions of Windows (9x or NT), just down-



FIGURE 1: OPEN FILES with any application you want by configuring your Open With menu.

load and install OpenExpert from PC World.com's Downloads library (find.pcworld.com/30965). It's free for home use, \$20 for business and government. To get going, just right-click a file and choose *Open With • Add application* to specify a program or *Open With • Configure OpenExpert* to bring up a dialog box with more options and access to a help file.

All Fix File Dialog Boxes Once and for All Windows' File•Open and File•Save As dialog boxes are among the OS's most annoying roadblocks—finding the folder you want can take a lot of digging. File dialog boxes that are small present another hurdle: Though you can resize file dialog boxes to make them easier to work with, they revert to their diminutive default size the next time you open one. If you're willing to shell out a measly \$18, a program called XFileDialog can help. This shareware utility lets you permanently resize file dialog boxes, customize the file list (large icons, small icons, details, and so on), and determine the sort order. Moreover, it puts on the dialog box's title bar pop-up menus that let you access favorite folders, as well as recently used folders and files (see **FIGURE 2**). It gives you complete control over each feature, and it even works with Microsoft Office 2000 and Office XP. Download a trial version from find.pcworld.com/15980.

All Get Easier Access to Important Folders Wouldn't it be nice if you could make your favorite folder easier to reach

SYSTEM SETTINGS

Control Your Control Panel

THE WINDOWS CONTROL PANEL is a morass of utilities, folders, configuration dialog boxes, and third-party appendages. Windows XP adds a measure of organization with its Category View, but your idea of logical categories may not agree with Microsoft's. Here's another look at the various functions that Control Panel tools provide.

LOOK AND FEEL: Change your wallpaper, fonts, sounds, pointers, folder views, clock settings, and more.

OUTSIDE CONNECTIONS: Contacting the outside world? These icons help you connect to another computer directly or to the Internet, and they also let you set preferences for Microsoft's included browser and e-mail software.

ADDITIONAL CONTROLS: Some programs, when you install them, automatically add Control Panel icons.



HARDWARE HEAVEN: Adjust settings for your computer's devices, from simple keyboard and mouse options to printer configurations. Add and remove hardware with the aptly named wizard.

ADMINISTRATIVE OVERHEAD: Tune your Windows engine and customize user access with tools for the power user or system administrator.

SYSTEM MAINTENANCE: Clear away unneeded programs, automate repetitive tasks, and set power-saving options.



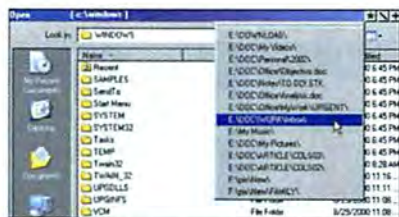


FIGURE 2: GET A BIGGER VIEW and access to any folder instantly when you customize your file dialog boxes with XFileDialog.

from any Explorer folder pane? Reader Gerald Schmidt of Seddiner See, Germany, has a way to make any folder appear under My Computer at the same level as your disk drives for quick access.

Open Notepad or your preferred text editor. Type `subst /d z:` and press **<Enter>**. Then type `subst z: %1` and press **<Enter>**. The first line removes any virtual disk drive assignments (such as any network drives) from drive letter Z:. The second line maps the Z: drive letter to a folder, as if that folder were a disk drive. Choose **File•Save As** and store the file in a convenient location. Name the file **"mapit.bat"** (be sure to include the quotation marks so Notepad doesn't add its default .txt extension), click **Save**, and close Notepad. In Windows 9x and Me, you'll need to make another quick tweak to the batch file. Right-click it and choose **Properties**. Then, on the **Program** tab, choose **Minimized** from the **Run** drop-down list and check **Close on exit**. Click **OK**.

In Explorer, choose **View•Folder Options** or **Tools•Folder Options**. Click the **File Types** tab and select the **Folder** file type. Click **Edit** or **Advanced**. In the **Edit File Type** dialog box, click **New** to add a new action for folders to your right-click menu. In the **Action** box, type the wording that will appear on the right-click menu, such as **Map Folder as Z: Drive**. In the 'Application used to perform action' box, type the path to the batch file, surrounded by quotation marks if any folder in the path uses spaces or long names. (Or use the **Browse** button to find the path.) At the end, type a space followed by **"%1"** (including the quotation marks). Your completed application path will look similar to **"C:\Program Files\mapit.bat" "%1"** (see **FIGURE 3**). Click **OK** or **Close** as many times as necessary to close all dialog boxes.



"WHEN I FIRST GOT THE XP BETA, I LOVED THE LOOK. SOON I REALIZED THERE WAS NO WAY TO CHANGE FROM BLUE, GREEN, AND SILVER."

From now on, any time you want a folder to appear at the drive level, just right-click it and choose **Map Folder as Z: Drive**. Your existing Z: drive assignment (if any) will change to that folder. The Z: drive is just an alias (not a copy) of your folder, so any changes you make to the contents of the folder will be reflected in the Z: drive and vice versa. Note that the command won't work if you try to use it on a folder that's inside the current Z: drive.



FIGURE 3: PUT FAVORITE FOLDERS at the drive level by adding a new command to your right-click menu for folders.

To change or delete this command, return to the **Edit File Types** dialog box, select the command in the **Actions** list, and click **Edit** (Windows 9x) or **Remove**. In Windows 2000, Me, and XP, these buttons are disabled, so your only choice is to remove the command by editing the Registry. Start by backing up your Registry in case something goes wrong. (See "Care and Feeding of the Windows Registry" at find.pcworld.com/30974 for details.) Choose **Start•Run**, type **regedit**, and press **<Enter>**. Choose **Edit•Find** and then type the name of the command you created, such as **Map Folder as Z: Drive**. The folder containing this text should have the same name but with underscores instead of spaces, as in **'Map_Folder_as_Z:_Drive'**. Delete this folder in the tree pane and exit the Registry Editor.

Look and Feel



IF YOU'RE GOING to stare at a cold computer screen all day, shouldn't it be as attractive as possible? Give Windows a look you like with these tips and tools.

XP A Stylish Solution to the Blue Menace Windows XP comes with a whole new visual style. If the blindingly blue (or green or silver) taskbar and title bars don't work for you, you have two solutions—switch to the classic look, or turn to a “skinning” utility for more control.

First, the free solution: To get the tradi-

tional Windows look in XP, right-click the desktop and choose *Properties*. Click the *Appearance* tab. In the ‘Windows and buttons’ drop-down list, choose *Windows Classic style*. Select a color scheme in the next drop-down list. To tweak it further, click the *Advanced* button, choose colors and sizes for the various elements, and click OK twice.

Note that you'll still have the wide two-column Start menu with its list of frequently used programs. If you want the traditional Start menu back, right-click the *Start* button and choose *Properties*. Click *Classic Start menu* and click OK.



FIGURE 4: GIVE WINDOWS XP a new look with downloadable styles enabled by the Style XP shareware.

If you like XP's new look but find the so-called Luna interface garish or simply limiting, you can give Windows a face-lift with a downloadable utility. Most such programs stay in memory constantly and can bring older computers to their knees.

WINDOWS TWEAKS

Behold the Power of the Properties Page

SOMETIMES A WINDOWS FIX is only a right-click away. When you don't have time to look for a tip to solve a problem, try the Properties page. See below for some examples of Windows settings you can change by right-clicking an object and choosing Properties.

REDIRECT DOCUMENTS: You don't have to store your work in My Documents. Use the Properties dialog box to set a custom path for this folder.

SEEK OUT THE SYSTEM: The System Properties dialog box lets you manage hardware and customize System Restore, Automatic Update, user profiles, and performance. If My Computer is already open, just right-click the Control box in the upper-left corner to find Properties.

NOODLE AROUND THE NETWORK: Set up network software and protocols, file and print sharing, and computer identification in the Network dialog box (Windows 9x and Me), Network and Dial-up Connections folder (Windows 2000), or Connections folder (XP).

CONFIGURE IE: Customize the browser's appearance, Internet connections, helper utilities, security settings, and more.

FINE-TUNE TRASH: Determine the Recycle Bin's size for one drive or all, and toggle confirmation prompts.

SET UP THE START MENU: Customize the taskbar and Start menu programs.

TOOL AROUND: Click the *General* tab and click *Disk Cleanup* to free space, or click the *Tools* tab for other utilities. The Tools tab in Windows 98 and Me tells you when you last did these chores.

TWEAK THE DISPLAY: Change the themes, colors, fonts, resolution, screen saver, and other details.

Arrange Icons By
Refresh
Paste
Paste Shortcut
New
Properties

My Documents
My Computer
My Network Places
Internet Explorer
Recycle Bin

My Computer
File Edit View Favorites Tools Help
Back Forward Stop Search Folders
Address My Computer Go
Hard Disk Drives
Local Disk (C:)
Local Disk (F:)

start My Computer 2:31 PM

That's why I like TGT Soft's Style XP, one of the few ways to revamp XP's look without taking up any system resources (if you choose). This \$20 shareware comes with a few replacement "styles" that completely overhaul Windows XP's taskbar, title bars, Start menu, and buttons. Once the program is installed, you can download dozens of free user-created styles from www.themexp.org (see **FIGURE 4**). Style XP also comes with an automatic theme changer that can alter your style, wallpaper, sounds, icons, pointers, and other elements at regular intervals.

All Give Windows a Theme-tastic New Look Desktop Architect, a freeware alternative to the themes utilities in Microsoft Plus and certain releases of Windows 98, lets you save, import, and export desktop decorations. These theme files collect your mouse pointer, sound, color, and wallpaper settings so you can change and reapply them at any time. Desktop Architect's themes give you control over more Windows elements than the Plus versions do, including the start-up and shutdown screens in Windows 9x, and the program can automatically change themes whenever you wish (see **FIGURE 5**). Desktop Architect can also make the backgrounds of icon labels transparent, allowing you a better view of your wallpaper. Visit find.pcworld.com/30989 to download a copy.

All Sort Start Menus Alphabetically When you install a new application, it often appears at the bottom of the Start

menu. Before long, you can't find anything. The solution? Right-click anywhere in a jumbled menu and choose *Sort by Name*. If that option doesn't appear on your PC, download the latest version of Internet Explorer, which will add it.

2K ME XP Kill Off Personalized Menus

Perhaps the most disastrous attempt to simplify Windows' user interface was Microsoft's introduction of "personalized menus" in Windows 2000 and later. In this scheme, many of the commands that used to appear on menus were hidden until you clicked a widget to return the menu to its full state. Microsoft forgot that most of us remember where commands are by their position on the menu and how we move the pointer to get there. The company removed the feature from the two-column Start menu in Windows XP, but it's still there if you use the 'Classic Start menu'.

Thankfully, you can turn it off. In Windows XP, right-click the *Start* button and choose *Properties*. Click the *Customize* button next to 'Classic Start menu'. In the scrolling list of options at the bottom of the dialog box, uncheck *Use Personalized Menus* and then click *OK* twice. In Windows 2000 and Me, right-click the taskbar and choose *Properties*. Make sure the *General* tab is in front. Uncheck *Use Personalized Menus* at the bottom of the dialog box and click *OK* (see **FIGURE 6**).

In most Microsoft Office applications that have this feature, right-click an empty part of the menu bar at the top of the window and choose *Customize*. Click the *Options* tab if necessary. In Office 2000, uncheck *Menus show recently used commands first*. In Office XP, check *Always show full menus*. Then click *Close*.

XP Burst Balloon Announcements One of the most irritating innovations of Windows XP is the plethora of pop-up messages, from Passport promos to warnings scolding about your hard-disk space. Though Windows itself does not feature an off switch for these bothersome balloons, you can puncture them with the Microsoft utility *Tweak UI*, part of the

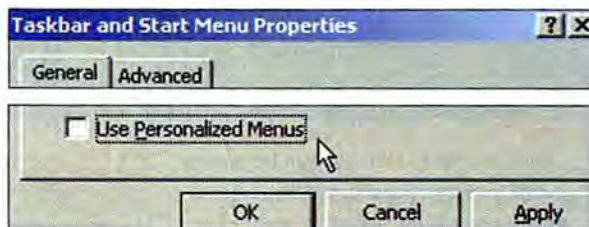


FIGURE 6: MAKE WINDOWS show the whole menu every time by turning off bothersome "personalized" menus.

free PowerToys for Windows XP. Go to find.pcworld.com/30992 to download a copy. You don't need to install all of the PowerToys unless you want to. Use the *Custom* setup option to install only *Tweak UI*. Follow the instructions in the setup wizard until the process is complete. Once it is installed, choose *Start>All Programs>PowerToys for Windows XP>Tweak UI for Windows XP*. Then click *Taskbar* in the left panel. On the right, uncheck *Enable balloon tips* and click *OK*.

2K ME Assign the Preview Pane Only to Specific Folders In Windows 2000 and Me, you can choose *Tools>Folder Options* and, in the *General* tab, decide whether folders should have the "Classic" look (*Use Windows classic folders*) or the "Web" look (*Enable Web content in folders*), which adds an information-and-preview pane to the left side of each folder. When you click *OK*, all your folders are affected. But what if you want some of your folders to have one look and some to have another? No problem. First, select *Enable Web content in folders* in the *Folder Options* dialog box and click *OK*. Now, in a folder that is to have an alternate look, choose *View>Customize* or *View>Customize This Folder* to start the *Customize This Folder Wizard*. Click *Next*. Check the box for ▶



FIGURE 5: ONE OF THE BEST theme changers on the market also happens to be free. Download Desktop Architect from PCWorld.com's Downloads library.

Choose or edit an HTML template for this folder, as well as any other options you want. Click *Next*. In the next panel, select a template that best suits that folder. Don't worry about Simple showing only a large-icon view; you can change it to whatever View-menu option you prefer. When you've made your choice, click *Next*. Step through any other options you specified,

until you click *Finish* to close the wizard. Repeat for any other folders that you want to have their own special look.

All Unhide System Files and Folders When you open certain folders containing important system files—notably the Program Files, Windows, System, or System 32 folders—you're likely to see a patronizing

warning that says modifying the contents of the folders could cause your programs to stop working correctly. Duh. Often, this warning requires you to click a Show Files link in order to see the list of files at all. If you find that annoying, you're not alone. Fortunately, there's a quick fix.

Things are easiest in Windows Me and XP. Just click either *Show the contents* ►

FUTURE WINDOWS

Windows 2004? The Road to Longhorn

THINK WINDOWS XP could stand improvement? So does Microsoft, and the company has begun talking about its next major upgrade. Code-named "Longhorn," this work in progress won't morph into a boxed product until at least late 2004. For now, it's more project than product—an array of ambitious, interlocking ideas foreshadowed in the fusillade of Windows variants and add-ons that will debut in coming months (see the chart to the right).

LONGHORN: LONG RANGE

AT FIRST BLUSH, Microsoft's long-term goals sound like so much pie in the sky: Windows, says lead product manager Greg Sullivan, should be "as convenient as paper, as simple as television, as connected as a phone." How that translates into specific features is mostly yet to be seen. But Sullivan speaks of a self-maintaining OS where "when you use the software, it modifies and customizes itself, it downloads patches and installs them, and just gets better." XP's Windows Update and Error Reporting tools are two trial balloons in this regard.

XP's digital photography tools and task menus hint at another major theme: helping users find stuff and figure out what to do with it. On this front, Microsoft has said it will replace Windows' aging file system with one based on technology in Yukon, the next edition of the company's SQL Server database. That could drive a smarter, more task-based Windows that could juggle everything from address books to photo albums, wherever they are stored. (Howev-

er, Microsoft has hyped database-like file systems before without delivering.)

A WEBBIER WINDOWS

DON'T BE STARTLED if the next Windows feels a little more like a service (potentially with pay-as-you-go components, Sullivan says). Web-based apps from MSN and from third-party sites, for instance, might be tightly integrated into the Start menu. Tools that build on today's MSN Messenger will probably have a high profile, as well.

The more Webified Windows becomes, the more you might fret about hackers, viruses, and other Net intrusions. Enter Palladium, another Microsoft initiative, which relies on new Intel and AMD chips to promise Fort Knox-like security. The big question? Whether Palladium will be fully baked in time for Longhorn's release.

One other Longhorn goal is to make Windows more entertaining. "We want to take advantage of the new hardware that's out there now and that will appear in the next couple of years," says Sullivan. Microsoft has already notified graphics vendors that its user interface will want 3D capability and lots of video memory for fancy effects.

It's a safe bet that the next Windows upgrade won't incorporate all the intriguing notions that make up Longhorn. "Some stuff will get dropped as deadlines loom," predicts Paul Thurrott, who tracks Longhorn at his SuperSite for Windows (www.winsupersite.com). Thurrott speculates that we might see a sort of XP Second Edition as a stopgap measure. But some people can't wait: Thurrott's site already has a collection of fake Longhorn "screen shots."

—Harry McCracken

Windows and More Windows

PRODUCT/TECHNOLOGY NAME	Due date	The lowdown
Windows XP Tablet PC Edition	November 2002	Pen-based notebooks running a Windows that uses "digital ink" for handwritten note-taking
Windows Media Player 9 ("Corona")	Late 2002	Savvier multimedia playback and burning for Windows XP (see page 26)
Windows XP Media Center Edition	Late 2002	Windows optimized for living-room entertainment (see page 26); code-named "Freestyle"
Windows Powered Smart Displays	Late 2002/early 2003	Portable pen terminals that talk to your home PC via a wireless net; code-named "Mira"
"Longhorn"	Late 2004 or 2005	Next major Windows revamp; could include elements of all of the above
"Blackcomb"	Unknown	Way-off Windows will pick up where Longhorn leaves off, says Microsoft

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of this folder or *View the entire contents of this folder* (see **FIGURE 7**). The contents should remain visible until you click the link in the left column to hide the contents again. If in Windows XP you don't see this text on the left, close the folder pane (if visible), and/or choose *Tools•Folder Options* and make sure *Show common tasks in folders* is selected in the General tab. If you want all warnings off in XP, choose *Tools•Folder Options* in any folder window, click the *View* tab, and under Advanced Settings check the box for *Display the contents of system folders*. Click OK.

In other Windows versions, start by showing hidden and system files: Choose *View•Folder Options* or *Tools•Folder Options*. Click the *View* tab and select *Show all files* or *Show hidden files and folders* in the 'Advanced settings' box (you may need to double-click the *Hidden files* or *Hidden files and folders* icon to see this



FIGURE 7: PERMANENTLY turn off file warnings in Windows XP with a simple click. The warning stays off until you turn it back on.

option). In Windows 2000, you may also need to uncheck *Hide protected operating system files* and click *Yes* to confirm. Click OK. In the Windows folder, locate and select the *desktop.ini* file (which appears simply as 'Desktop' when file extensions are hidden). Press <F2>, type a new name such as **Old Desktop** (or *Old Desktop.ini* if file extensions are visible), and press <Enter>. If you ever want to revert to the old warning, just give this file its original name. Repeat for the *desktop.ini* files in other system folders that are giving you grief.

Net Solutions

USE THESE TIPS TO GREASE the wheels of your system's Internet-surfing and network functions so that you can use your computer and Net time more efficiently.

All Rev Up Browsing With Internet Explorer

Every time you use Internet Explorer 4 or later to visit a Web site, it makes one connection to download the HTML code and another to download graphics. This practice follows the standard established by the HTML specification, but no one will arrest you if you ask IE to make more connections to the site. Increasing the number of connections can make better use of your bandwidth and significantly boost the speed at which pages appear in your browser. Naturally, this tweak won't have any effect if the site you're visiting is designed to block more than two connections.

Start by making a backup copy of your Registry in case something goes wrong. (Visit find.pcworld.com/30974 for complete details.) Next, choose *Start•Run*, type *regedit*, and press <Enter>. In the tree pane on the left, navigate to *HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Internet Settings*. With *Internet Settings* selected on the left, look for an icon that's labeled *MaxConnectionsPer1_0Server* and another labeled *MaxConnectionsPerServer*. If you don't see them, right-click in the right pane and choose *New•DWORD Value*. Type *MaxConnectionsPer1_0Server* and press <Enter>. Right-click a second time and create a DWORD value named *MaxConnectionsPerServer*. Now double-click *MaxConnectionsPer1_0Server*. The default value is 4, but since you want to increase this, enter a larger value in the 'Value



data' box (use the decimal setting)—say, 8. (Some Web sites recommend a value as high as 20, so feel free to experiment.) Now click OK, double-click *MaxConnectionsPerServer*, and change the Value data to 4 (the default is 2; some people go as high as 10). Click OK (see **FIGURE 8**). Exit the Registry. With luck, your surfing will be noticeably faster.



FIGURE 8: MAKE MORE CONNECTIONS to your desired Web site by adding these settings to the Windows Registry.

All Get the Fastest Connection Possible With TweakMaster

You could spend several weeks boning up on connection settings and searching for advice on configurations that get the best possible speed. Or you could just download and install TweakMaster (see **FIGURE 9**). This \$20 shareware program provides friendly wizards to guide you through experimenting with various Registry settings to improve your connection. Needless to say, this is a much easier—and safer—way to configure your system than rooting around in the Registry by yourself. Besides boosting the speed of your Internet link, TweakMaster also can keep America Online from hanging up on you, and it can synchronize your system's clock with Internet time servers. Go to find.pcworld.com/30225 to download a copy.



FIGURE 9: SIMPLIFY Internet performance tweaking with a utility like TweakMaster.

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XP Restore Control Over File Sharing

Windows XP's default file sharing settings lack many of the options you had in previous versions of Windows—specifically, the ability to specify permissions, the number of users who can use the shared objects, and so on. To regain that ability, choose **Tools•Folder Options** in any folder window. Click the **View** tab and scroll to the bottom of the 'Advanced settings' list. Uncheck **Use simple file sharing (Recommended)** and click **OK**.

All Skip the Dial-Up Connection Prompt

If your computer is in a secure location,

you don't need to enter password information in the Connect dialog box each time—or even have the dialog box appear. Launch your ISP account icon and enter your user name and password if necessary. Underneath that, check the box to save the password. In Windows Me, check the **Connect automatically** box as well. In Windows XP, you can also select whether this connection should be available for anyone on the computer or only those who log in to your account. In Windows 9x and Me, click **Connect** and log in to your account to preserve these settings; then disconnect. In Windows 9x, open

the Dial-Up Networking folder in My Computer, select your account icon, and choose **Connections•Settings**. In the General tab, uncheck **Prompt for information before dialing** and click **OK**. In Windows 2000 and XP, click **Properties** in the Connect dialog box and click the **Options** tab. Uncheck both **Prompt for name and password, certificate, etc.** and **Prompt for phone number**. Then click **OK**.

Contributing Editor Scott Dunn writes the Windows Tips column for PC World. Editor Harry McCracken and Associate Editor Eric Dahl contributed to this story. ▶

OUR TAKE

The Windows We'd Like to See

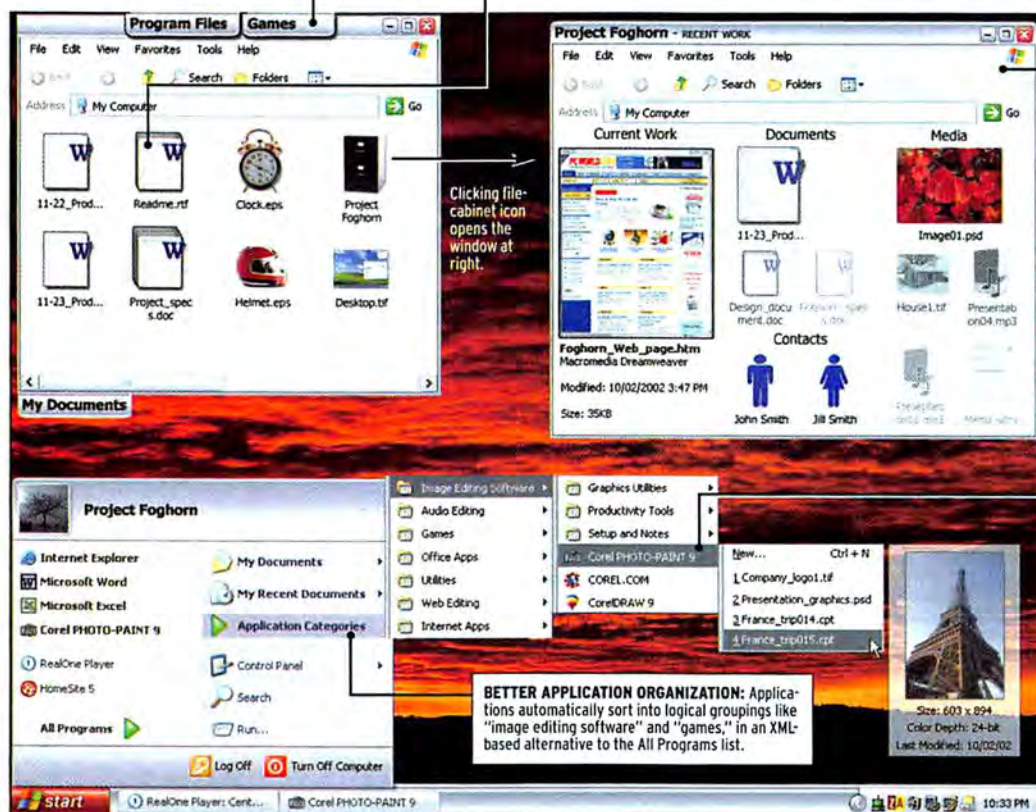
LONGHORN WON'T rear its head until at least 2004, but we're already tired of waiting. So we asked some leading user-interface experts about what works and what doesn't in today's OSs. Then we sat down to design our vision of a Windows that works the way we'd want it to.

TABBED WINDOW ACCESS: One of the nicer features in Mac OS System 9. Drag a window to a screen edge, and it morphs into a tab that can pop open for easy access.

DESCRIPTIVE ICONS: Thumbnails are good for images, but many documents or spreadsheets look the same. Here, the icon provides a thumbnail of the document's front page and changes to reflect the file size, an effective visual cue of a larger document.

SMARTER FOLDERS: Project-based file cabinets collect documents, media, and related contacts in one place. In this view, recently modified files appear as larger thumbnails, with a full preview of the last file edited. Transparency and size provide a compact way of representing when other files were last modified.

SUPER SHORTCUTS: Hovering the pointer over an application shortcut lets you start a new document or open recently edited files from a pop-up menu. Hovering over a file name in the list shows a preview of the file.



BETTER APPLICATION ORGANIZATION: Applications automatically sort into logical groupings like "image editing software" and "games," in an XML-based alternative to the All Programs list.

While developing this graphic, we consulted with Ed H. Chi and Jock Mackinlay, members of the Palo Alto Research Center's User Interface Research Group; Mary Czerwinski, research manager at Microsoft Research; and Bruce Tognazzini, a user-interface expert in the Nielsen Norman Group.



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Linux vs. Windows: The Rematch

Can a frustrated Windows user dump Microsoft? Even with lots of improvements, Linux is still no cakewalk.



You might be pretty happy with Windows XP. But Windows continues to suffer from more than its share of drawbacks: From the newer operating system's incompatibility with older software to Microsoft's well-known security problems, Windows still engenders a fair amount of user aggravation. Windows XP also subjects its users to the indignity of the Microsoft Product Activation service: You might have to ask Microsoft for a new key if you upgrade more than one or two major components.

The question for PC users, of course, is what's the alternative? When we last looked at Linux, it was still rough around the edges. Two years later, we can't say that Linux is better than Windows on all these counts, but Linux has matured. To find out whether it's finally ready for the average PC user, we looked at SuSE Linux 8.0 Professional (\$80 boxed, free download, www.suse.com), just one of many distributions (customized Linux versions). Popularized in Europe, SuSE has made it to retail shelves in America, with a hefty set of printed manuals and a massive amount of useful software on CD-ROM.

BY SCOTT SPANBAUER
ILLUSTRATION BY GLENN MITSUI

If you can't get Windows to work your way, or if you feel like it never will, Linux represents the pinnacle of the customizable operating system. You can change the entire desktop if you don't like the way yours works. Linux also provides superior security compared to Windows systems, and works on more hardware, from 486 processors to the latest Pentium 4s. In many ways, Linux is more a set of infi-

nately rearrangeable operating system building blocks than a unified OS.

But Linux still poses a number of challenges to new users. Linux drivers are hard to find for some hardware. Unfamiliar file systems, incomprehensible error messages, and the occasional need to compile applications from source code await Windows users who are considering a leap over the OS divide.

WHO NEEDS LINUX, ANYWAY?

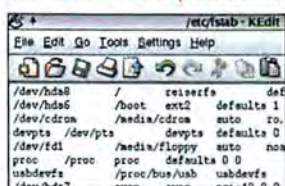
LINUX PUBLISHERS today add many of the user-friendly features that longtime Windows users expect, such as automated installers, printed manuals, tidy graphical interfaces, and (paid) phone support.

Linux is arguably far more secure than Windows—something of concern to PC users everywhere. The Linux community

PICKS & PANS

Five Things We Hate About Linux

You must be an expert: Commercial distributors and GUI makers



have simplified some tasks, but many procedures still require dropping to the command line, decoding cryptic system messages, or hand-editing what can be complex configuration files. If

you fail to learn at least a smattering of Linux's intricacies, chances are good that you won't get much done.

Lagging hardware support: Linux's altruistic band of designers does an admirable job of building in support for new types of hardware. Without a major push for Linux drivers from hardware manufacturers, however, your

Linux distribution may never support some peripherals.

Second-tier software: You can get every conceivable utility for Linux, most at no cost, but many can't match the best Windows or Mac apps. Premier Linux apps like StarOffice, Evolution, and The GIMP still provide only a subset of the features found in Microsoft Office, Microsoft Outlook, and Adobe Photoshop. What they do offer is more than adequate—unless you need one of the missing features.

A confusion of distros: Since Linux is free, anybody can package the operating system and sell their own distribution. Once you decide to give Linux a shot, you still need to determine which distribution is a good fit: Mandrake, Red Hat, SuSE, or one of dozens of others. Hardware support can vary, and user friendliness can be nonexistent in some versions.

Support at a price: People complain about the cost of Microsoft's \$35-per-incident tech support. With few exceptions, however, Linux distributors aren't any cheaper; with SuSE, the free installation support is severely limited. If you're a Linux beginner planning on calling for help, consider installing Mandrake Linux, with its \$15-per-call (or less, in quantity) support policy.

Five Things We Love About Linux

It's free, free, free: Even though distributors can add value to Linux

(by adding installers, providing tech support, and publishing multi-CD or multi-DVD installation sets), they also give it away. From the SuSE Web site, you

can download at no charge all of the software to install the same version of SuSE we tested. Download and give away as many copies as you want. Install it on as many PCs as you want. The only things that will cost you money are printed manuals, technical support over the phone, and a nice package with discs.

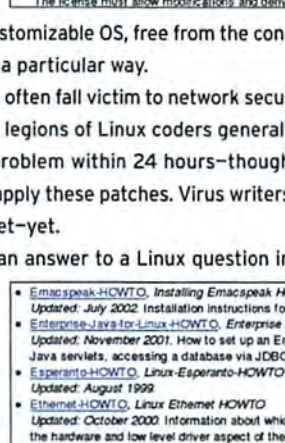
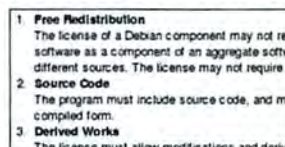
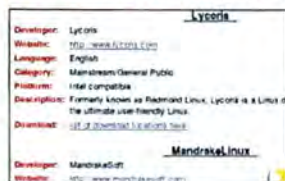
Highly adaptable: Linux distributors (like SuSE) can customize their version of Linux to target a specific type of user. Programmers can modify the source code to suit their needs, and redistribute the software for

free. The result is a completely customizable OS, free from the constraints of having to do things in a particular way.

Strong on security: Linux doesn't often fall victim to network security vulnerabilities. When it does, legions of Linux coders generally release patches that fix the problem within 24 hours—though users still need to download and apply these patches. Virus writers haven't made Linux a major target—yet.

Plentiful online help: Can't find an answer to a Linux question in the included documentation? You'll find hundreds of FAQs, how-tos, and message boards on the Web. Start your search at The Linux Documentation Project (www.tldp.org).

One OS fits all: Linux, in one form or another, will run on everything from a 486 doorstop with 8MB of RAM (try that with Windows XP) to clusters of high-speed servers. It won't be the same version of Linux running the same applications, but Linux is good at fitting in where Microsoft leaves machines behind with Windows' ever-increasing minimum system requirements.



regularly releases patches for security issues almost the same day that bugs are reported. Linux users also proudly claim that, to date, not a single virus outbreak has ever targeted this operating system.

Customization options in Linux can be too much of a good thing, and even experienced computer users can find them daunting. Some users may decide that the time spent installing and configuring Linux—and riding its learning curve—isn't worth its free installation.

In the end, the type of Windows user who will want to take Linux for a test drive will probably be moderately experienced, curious, and frustrated with some inflexible part of Windows. But if you're reasonably happy with Windows, and can manage to work with the applications and hardware you already own and use, it probably isn't worth the trouble to switch gears and learn a new OS from scratch.

MIXING LINUX WITH WINDOWS

IF YOU'RE NOT SURE Linux is for you, you can install it along with Windows. If you decide you need Windows applications for which there are no Linux substitutes, you can simply switch from Linux to Windows with a reboot.

Dual booting may not be necessary in some cases. Most distributions come with software called Wine, which claims to run nearly 1100 Windows applications (with some tweaking of configuration files) under Linux. The downside: Thousands more Windows apps are still incompatible with Wine, and getting the compatible ones running presents a challenge even to tech-savvy users.

The version of Linux I tested, SuSE Linux 8.0 Professional, includes seven CDs loaded with every app you could ever need, all free: office suites, photo editors, Web browsers, and even CD-burning utilities. The abundance of free software on disc, which saves a lot of download time, is a unique feature of SuSE's boxed set.

HEAD TO HEAD

Accommodating Many Users on One PC



AS IT MIGRATES AWAY from its single-user MS-DOS roots, Windows has acquired the ability to host multiple users, each with secure log-in controls and file access. With additional software, Windows can even allow multiple remote users to log on concurrently. However, Linux has always natively supported multiple users and concurrent log-ins.

GETTING IT INSTALLED

OVERALL, installing SuSE Linux isn't that different from installing Windows. The actual installation takes about 30 minutes to an hour, comparable to installing Windows from scratch. But the Linux process requires that you do a bit more manual tweaking of settings. The options might be confusing to folks with less than an intermediate level of computer skill.

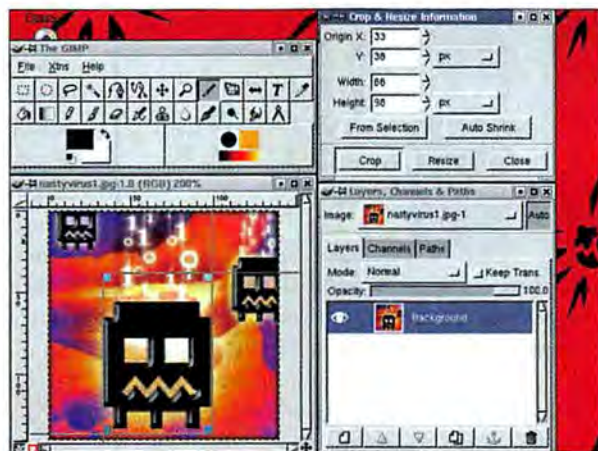
Installing Linux is a lot easier if your computer is new enough to permit booting from the CD or DVD drive (most systems that are less than four or five years old do). If you can't boot from the CD, you'll need to boot from floppies. During

the initial steps, Linux is very much like Windows 2000 or XP: The installation disc boots up, and the installer automatically detects much of your hardware, loads the appropriate drivers, and asks you partitioning questions.

Just before it starts copying files to the hard disk, Linux needs to set up partitions with its own file systems. As with Windows, your Linux distribution's installer may help you with this, but bear in mind that hard drive space set aside for Linux will be unusable by Windows. Depending on the distribution and the options you choose, you might need about 800MB of free hard disk space for a basic installation with a graphical user interface and an

office suite—about the same size as Windows 2000 or XP, with applications.

Another key step is choosing which graphical user interface to install. Multiple GUIs compete for your attention, but the two most advanced, KDE and Gnome, both work and look a lot like Windows, with similar system menus, taskbars, and window controls. I'm not sure which I like better: SuSE's version of KDE feels cluttered, but it's jam-packed with tools. Gnome running on the



THE GIMP is a powerful, no-cost graphics editor for Linux.

same system is reminiscent of Apple's Mac OS X. If you don't like one style, you can download others, or choose your interface at log-in. And the programs that come with one GUI run just fine under the other.

Finally, you'll also need to decide which applications, utilities, and tools to install. SuSE makes the decision process fairly easy with a 'Default system' set, the equivalent of the 'typical' Windows installation. New Linux users might be overwhelmed by the preponderance of free programs. On the other hand, the Windows way of getting software—grabbing your wallet and heading to CompUSA to buy a pricey copy of Microsoft Office—isn't much better.

OF LOG-INS AND LINUX

CREATING USER ACCOUNTS is another key step that may seem new to Windows users. In Windows 9x, user accounts are a trifling afterthought. In Linux (as in Windows XP/2000/NT), the operating system requires that a specific person be accountable for every action taken on the system. You'll end up with at least two accounts: the



THE GNOME DESKTOP on SuSE Linux works a lot like Mac OS X.

administrator account (called "root") and another you create for day-to-day use.

Only users logged in as root can install system software or change system settings. Linux lets you temporarily log in as the administrator to run specific tasks—a very nice timesaving convenience that helps maintain relatively high security. SuSE's YaST2 configuration and setup tool, for instance, routinely asks for the root password before it makes a change.

Windows XP Home, on the other hand, makes a security blunder in the name of convenience: All users get privileges equivalent to Linux's root account. On this point, Linux is clearly superior.

LIVING IN LINUXSPACE

AFTER THE FINAL Linux installation reboot, LILO (the Linux boot loader) briefly displays a menu of bootable operating systems. If you plan to boot into Windows more often, your distribution's configuration tool can change LILO's default operating system setting.

If you're lucky, your Linux installer will create links on the desktop to your Windows drive partitions. But if your distribu-

tion isn't compatible with Windows XP's version of the NTFS file system, you may not be able to grab files from the My Documents folder or elsewhere in Windows.

Where Windows would display a relatively static splash screen to hide the boot process, SuSE Linux tells all in a rapidly scrolling, highly technical list of the files it loads and the procedures it completes.

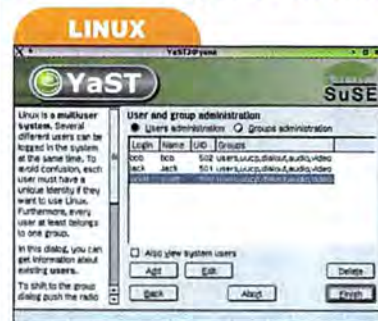
In some cases, setting up your Internet connection in Linux can be as easy as, if not easier than, doing so in Windows. If you run Linux on a network, your connection to the local network and to the Internet likely will work immediately following installation—you'll just need to pick a host name for your computer. If your network card has Linux drivers, you should be able to get online almost immediately. But so-called Winmodems, which rely on Windows, might not work in Linux. Linmodems.org offers some help for the unfortunate owners of these modems.

One of the nice things about Windows is how it makes connecting to networked printers easy. Linux emulates this feature using software called Samba, which makes the process almost as simple. And if you run into problems, you can find answers to common questions at the Linuxprinting.org Web site.

Linux also supports many USB devices, but there are no drivers for my Canon PowerShot S200 camera and HP Scanjet 5470c scanner. If the hardware maker doesn't have the driver you need, try the Linux Driver Foundry (find.pcworld.com). ▶

HEAD TO HEAD

A Confusing Profusion of Control Panels



LINUX OFFERS SUCH A HODGEPODGE of elements that it can be hard to know where to troubleshoot or configure hardware and software. The Linux GUIs have a control panel, and distributions sometimes have their own control panel (such as SuSE's YaST, above). Of course, almost everything in Linux is configurable from the command line as well. New users could be left wondering which to use. Windows offers near one-stop shopping in its Control Panel, but poor documentation hampers its powerful command-line tools.

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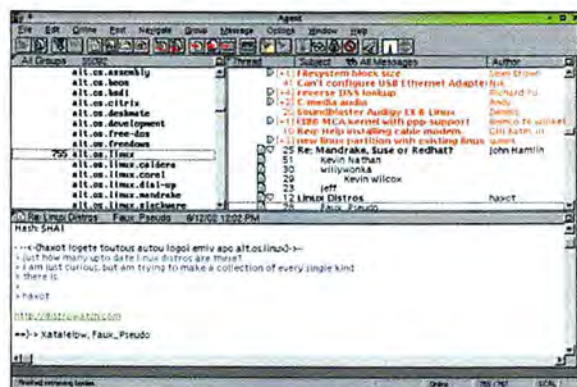
com/31127) or www.linuxhardware.org. If you need to use a product that has no Linux support, it will be a lot easier just to stick with Windows—or at the most, to run a dual-boot system—than to switch over to Linux exclusively.

APPLICATIONS ON LINUX

THE WORLD OF LINUX is filled with free software—some fantastic, some forgettable. Generally speaking, Linux has a reasonably good equivalent to every major Windows package. While a Windows user might edit images in Adobe Photoshop, Linux users turn to The GIMP. Microsoft's word processor, spreadsheet, and presentation applications from the Office suite are mimicked quite closely in OpenOffice and StarOffice on the Linux side. For the most part, the office suites in Linux are clean, professional-looking programs with support for many common Windows file formats.

But Linux applications have a few downsides. They often lack some features from equivalent Windows programs. Menu organization and toolbars can vary substantially from program to program. And while some products (like StarOffice) come across as top-tier suites, others feel considerably less polished.

If you can't find an application native to Linux that suits your needs, there's always Wine, which ships with almost every version of Linux. Wine can run many common Windows apps natively in Linux (for a list see find.pcworld.com/30836). Getting Wine working sometimes takes effort,



A BIT OF WINE helps Linux run some Windows applications.

HEAD TO HEAD

Linux's Customizable Graphical User Interface



MOST LINUX DISTRIBUTIONS let you choose between multiple GUIs, including the two most popular, KDE (left) and Gnome (not shown). These share features familiar to Windows users, such as a "Start button" in one corner where you can launch programs, and a trash can icon on the desktop where you can find deleted files. On older hardware, you can run Linux without a GUI at all, or with one of several feature-light GUIs. Windows is a one-GUI-fits-all system: No Windows applications—even the command-line tools—will run outside of Windows' bulky GUI, making XP unusable on older, slower systems.

so CodeWeavers (www.codeweavers.com) sells its \$55 CrossOver Office, which pre-configures Wine to run the popular Microsoft Office 97 and 2000 versions of Word, Excel, PowerPoint, and Outlook.

When I discovered that none of the Linux Usenet news readers that came with SuSE were as powerful as Forte's Windows-based Agent, I simply opened a terminal window, changed to the directory containing Agent.exe, and entered "wine agent.exe" on the command line. Agent opened and functioned without a hitch. Wine can come in handy, but it's no panacea: Neither Wine nor CrossOver Office promises anything close to complete Windows application compatibility. The latest games require tweaking, and some programs simply refuse to run at all. Even though CrossOver Office runs some Microsoft Office applications, it turns out that it can't handle Microsoft Access at all, nor any of the programs from Office XP.

But for savvy users who want to try out its myriad options, Linux can provide a stable, secure, and inexpensive computing experience. With the parts it already has and more spit-and-polish, Linux could become a top-tier operating system.

LINUX IN PRIME TIME

AS LINUX STANDS TODAY, a majority of Windows users don't have a good reason to make a switch. For folks who aren't all that technically adept, or who have hardware that isn't supported in Linux, sticking with Windows and the applications they already have just makes more sense.

As far as Linux has come, it still has far to go to achieve universal appeal. Over the past two years, the companies that sell Linux distributions have improved setup, the user interface, and technical support. But many rough edges remain. Without more fixes to smooth the operation of apps and more support from the major hardware makers (many aren't writing Linux drivers for their products), Linux's future continues to be uncertain.

But for savvy users who want to try out its myriad options, Linux can provide a stable, secure, and inexpensive computing experience. With the parts it already has and more spit-and-polish, Linux could become a top-tier operating system.

Scott Spanbauer is a contributing editor for PC World. Editor Harry McCracken and Executive Editor Ed Albro contributed to this story.

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BY NIKKI ECHLER McDONALD &
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FULL Exposure

Today's Best Digital Cameras

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snaps shooter or a
serious shutterbug,
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name on it.

GRAB YOUR SHADES, because the future looks bright for digital camera enthusiasts. Last year's \$200 digital cameras offered less than 1 megapixel of resolution, relied on digital zooming, and sometimes lacked an LCD or memory card slot. This year, \$200 buys you a 3X optical zoom and 2 megapixels—just what you need for sharp 4-by-6 snapshots. And last year, 4-megapixel cameras cost around \$1000; they're now selling for as little as \$400, if you're willing to settle for a stripped-down model. Even some decked-out cameras, like the Canon PowerShot G2, are priced under \$800.

So as you try to decide on a digital camera, you have more choices. Whether you're a first-time buyer looking for a simple point-and-shoot camera or an advanced photographer upgrading to a more powerful model, you'll find a wide and sometimes bewildering array of cameras to choose from, at affordable prices. ►



Advanced Best Buy:
Olympus C-4000 Zoom



Point-and-Shoot Best Buy:
Fujifilm FinePix 2800 Zoom

In fact, the hardest part of buying a digital camera is deciding which combination of resolution, features, ease of use, and price best fits your needs. To help you sort through the options, we've divided the 16 cameras that we ran through our Test Center for this roundup into two categories: point-and-shoots and advanced models.

Point-and-shoots, as a group, forgo advanced controls in favor of simplicity, light weight, and low cost. They're ideal as the primary camera for a casual photographer or as a backup or light travel camera for an advanced user. Point-and-shoots typically have a few basic controls, such as exposure compensation (EV) and white balance. Many models also include a number of scene modes—portrait, landscape, and action shot, for example—that you can match to your shooting conditions. All of the point-and-shoots on our chart have an optical zoom lens and movie mode (the capability to capture short video clips);

Best Buys

**Best
BUY**

Fujifilm FinePix 2800

Zoom: Equipped with a 6X optical zoom and capable of 2-megapixel resolution, the moderately priced FinePix 2800 takes nice photos.

Olympus C-4000 Zoom: This full-featured 4-megapixel camera offers excellent image quality for a great price.

most also include sound. And many have one or two of a hodgepodge of advanced features. The Fujifilm FinePix 2800 Zoom, for instance, comes with a 6X optical zoom and lets you add audio clips to still pictures. So if you're looking for a specific control or option, check the specs carefully.

Advanced cameras are for experienced photographers. Harder to use, often heavier and bulkier, and usually more expensive than the point-and-shoots, advanced models allow you wide scope for creative control.

With these units you can override most or all automatic settings. The advanced cameras we tested give you aperture- and shutter-priority modes and full manual exposure control. Only one of them, the Olympus C-720 Ultra Zoom, lacks manual focus. Other high-end features that many of these advanced cameras offer include special effects (black-and-white and sepia tone, for example), image sharpening, built-in histograms (graphs that

FEATURES COMPARISON

**TEST
Center**

Top 10 Digital Cameras

	POINT-AND-SHOOT	Street price (8/23/02)	Overall rating ¹	Image quality	Ease of use	Battery life (shots)	Effective megapixels ² / maximum resolution	Bundled media/ capacity (MB)	Picture capacity at highest/ lowest resolution ³
1	Best BUY Fujifilm FinePix 2800 Zoom find.pcworld.com/30473	\$379	80	Good	Good	Outstanding 492	2.0/ 1600 by 1200	SmartMedia/ 16	20/122
2	Nikon Coolpix 2000 find.pcworld.com/30479	\$199	80	Fair	Very good	Good 349	2.0/ 1632 by 1224	Compact-Flash/16	16/64
3	Olympus D-550 Zoom find.pcworld.com/30839	\$399	77	Outstanding	Fair	Very good 398	3.0/ 1984 by 1488	SmartMedia/ 16	7/165
4	HP Photosmart 720 find.pcworld.com/30494	\$349	77	Very good	Fair	Fair 306	3.18/ 2048 by 1536	Internal/ 16*	12/220
5	Sony Cyber-shot DSC-P9 find.pcworld.com/28122	\$599	72	Fair	Outstanding	Fair 206	4.0/ 2272 by 1704	Memory Stick/16	8/240
ADVANCED									
1	Best BUY Olympus C-4000 Zoom find.pcworld.com/30476	\$499	88	Outstanding	Good	Outstanding 700	4.0/ 2288 by 1712	SmartMedia/ 16	5/165
2	Canon PowerShot G2 find.pcworld.com/14800	\$799	84	Outstanding	Good	Good 373	4.0/ 2272 by 1704	Compact-Flash/32	14/337
3	Nikon Coolpix 4500 find.pcworld.com/30845	\$699	82	Good	Good	Fair 300	4.0/ 2272 by 1704	Compact-Flash/16	16/64
4	Fujifilm FinePix S602 Zoom find.pcworld.com/30470	\$799	81	Very good	Very good	Very good 425	3.1/ 2832 by 2128	SmartMedia/ 16	6/122
5	Olympus C-720 Ultra Zoom find.pcworld.com/30899	\$599	74	Fair	Fair	Outstanding 1100	3.0/ 1984 by 1488	SmartMedia/ 16	7/99

¹ Overall rating for point-and-shoot cameras is based on price (25 percent), picture quality (20 percent), ease of use (15 percent), features (20 percent), battery life (10 percent), and support (10 percent). Overall rating for advanced cameras is based on price (15 percent), picture quality (30 percent), ease of use (15 percent), features (20 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

² Millions of pixels at maximum resolution.

³ Bundled card's capacity.

* Continuous focus allows focusing from any distance. Stepped manual focus permits focusing at preset distances.

let you adjust the colors in the camera), ISO sensitivity control, and memory for storing your favorite camera settings. Keep in mind that advanced cameras have full automatic settings, too, so they can function as point-and-shoots when you want them to.

For this roundup, we eliminated very-low-end and extreme-high-end cameras, focusing on models with greatest appeal to average digital camera buyers. Our collection included cameras from Canon, Fujifilm, HP, Kodak, Leica, Nikon, Olympus, Panasonic, Sony, and Toshiba, at prices ranging from \$199 to \$895.

Canon's much-anticipated PowerShot G3, the successor to the company's G2, missed the party. According to Canon, the G3 should be released this December and will have the same 4-megapixel resolution as the G2, plus a longer 4X optical zoom, a larger grip, and a nine-point autofocus setting, among other new features. The G3 is expected to cost \$799, the same as the G2.

We evaluated each camera for photo quality, battery life, ease of use, manual control, features, and price, and we ranked the top five cameras in each category in the features chart below. Visit find.pcworld.com/31151 for reviews of the other models we tried.

Point-and-Shoot Cameras

1. FUJIFILM FINEPIX 2800 ZOOM



THIS SHINY, SILVERY metal 2-megapixel camera takes impressive shots and packs a few nifty features for an affordable \$379. It includes a whopping 6X optical zoom and a bright electronic viewfinder, which lets you see your camera settings while you compose your shots; this works well

for outdoor closeups taken in bright light. (Most digital cameras force you to use the LCD screen for macro shots.) The camera's battery life is phenomenal: We snapped 492 shots on four AA alkalines—the third-longest battery life of the cameras we tested.

The FinePix 2800 Zoom consistently ranked in the top third of its class for image quality. Though the camera produced low- ▶

	Focal range (35mm equivalent)/optical zoom	Aperture range	Shutter speed range (seconds)	Viewfinder(s)	Manual focus override *	Manual exposure controls *	Scene modes *	Video/audio recording	Weight † (ounces)	Batteries *	Comments
	38-228mm/6X	f2.8-f8.7	1/2-1/1500	Electronic, LCD	No	None	0	Yes/Yes	13.2	Four AA	The FinePix 2800 Zoom has a powerful optical zoom and long battery life for a moderate price. (★★★★☆)
	38-114mm/3X	f2.8-f4.9	1-1/1000	LCD	No	None	5	Yes/No	10.4	Four AA	Inexpensive, pared-down camera lacks an optical viewfinder, but intuitive buttons and menus make it easy for beginners. (★★★★☆)
	36-100mm/2.8X	f2.9-f8.6	1/2-1/1000	Optical, LCD	No	None	5	Yes/No	11.6	Four AA	The D-550 captures sharp, evenly exposed photos and adds a few extra features, such as the ability to take panorama shots. (★★★★☆)
	34-102mm/3X	f2.6-f8	2-1/1000	Optical, LCD	No	None	0	Yes/Yes	12.1	Four AA	Large, relatively heavy model lacks a macro mode, but takes nice-looking photos. (★★★★☆)
	39-117mm/3X	f2.8-f5.6	2-1/2000	Optical, LCD	Stepped manual	None	3	Yes/Yes	7.2	One rechargeable lithium ion	Small and fun to use, with extra features (like image editing in the camera). Photo quality is unimpressive, however. (★★★☆☆)
	32-96mm/3X	f2.8-f11	16-1/1000	Optical, LCD	Continuous	M, A, S	10	Yes/Yes	14.0	Two CRV3 disposables	Inexpensive camera combines great image quality, exposure settings, and long battery life. Menus can be confusing. (★★★★☆)
	34-102mm/3X	f2-f8	8-1/1000	Optical, LCD	Continuous	M, A, S	6	Yes/Yes	18.9	One rechargeable lithium ion	With sharp, vivid output and tons of exposure control options, the G2 is a great choice for photo hobbyists. (★★★★☆)
	38-155mm/4X	f2.6-f7.5	8-1/2300	Optical, LCD	Continuous	M, A, S	16	Yes/Yes	13.6	One rechargeable lithium ion	Nice range of features includes 16 scene modes and various optional lenses. Photos looked better printed than on-screen. (★★★★☆)
	35-210mm/6X	f2.8-f11	3-1/2000	Electronic, LCD	Continuous	M, A, S	5	Yes/Yes	20.4	Four AA	Expensive for a 3-megapixel camera, the S602 has a hot-shoe flash sync and an IBM Microdrive/CompactFlash media slot. (★★★★☆)
	38-320mm/8X	f2.8-f7.1	8-1/1000	Optical, LCD	No	M, A, S	5	Yes/No	14.7	Two CRV3 disposables	Longest battery life we've seen and 8X optical zoom are offset by lack of manual focus. Image quality could be better. (★★★★☆)

* Controls include full manual (M), aperture priority (A), and shutter priority (S).
 † Scene modes use predetermined exposure settings for particular shots, such as portrait, landscape, and night.

† Includes weight of standard batteries and media.

* Number and type of batteries bundled with the camera. In most cases, optional rechargeable batteries are available for cameras that use AA batteries.

* Also has an SD memory card slot.

contrast, slightly fuzzy shots in our outdoor tests, it captured colors and details nicely overall, both on-screen and in prints.

With its boxy shape and right-hand grip, the FinePix 2800 resembles the advanced cameras. But functionally, it's a point-and-shoot, with basic exposure controls tucked away in menus. Fortunately, the menus are easy to navigate, so you can make your selections relatively quickly. A simple switch on top includes icons for shooting, playback, and menu modes only, forcing you to wade through the menus to access such commonly used features as flash, macro mode, and delete.

Unlike most point-and-shoots, the FinePix 2800 Zoom does not have any programmed scene modes for hard-to-shoot situations, but it does come with useful metering options, broad exposure compensation (11 steps in 0.3-EV increments), five flash modes, six resolution/compression options, macro and movie modes, and 30-second voice annotation. You also get a 16MB SmartMedia card and an extensive software package that includes Adobe PhotoDeluxe 4.0 for Windows users (though we'd have preferred to get the newer Adobe Elements).

Upshot: The \$379 FinePix 2800 Zoom is a solid buy, offering long battery life, impressive image quality, and the convenience of through-the-lens-style viewing.

COMPARE

Print Samples

A HIGHER MEGAPIXEL count should result in sharper, better-looking photos, but that's not always the case. While our highest-scoring camera was the 4-megapixel Canon PowerShot G2, the 3-megapixel Olympus C-720 Ultra Zoom got the lowest overall score on our chart—trailing cameras with lower resolutions.

BEST

Canon PowerShot G2



WORST

Olympus C720 Zoom



2. NIKON COOLPIX 2000



AT JUST \$199, the silver-and-blue Coolpix 2000 is the least-expensive model on our chart. This small 2-megapixel camera aims for ease of use and scores with well-placed, clearly marked buttons on the back that control the self-timer; the landscape and macro modes; the built-in flash with five flash

modes; the zoom; on-screen menu navigation; and the quick-review mode. A few of the buttons do double duty—for instance, the button that controls landscape and macro modes also lets you upload your photos to a PC. The four-way multiselector at the bottom lower right lets you navigate the simple on-screen menus for exposure settings, seven white balance settings, three metering options, and four levels of sharpening.

In addition to offering full-automatic and movie modes, the mode dial on the top of the camera gives you quick access to five scene modes, making it easier to take well-exposed shots in tough lighting situations. Photographers of all levels, however, may feel shortchanged by the lack of an optical viewfinder. The 1.5-inch LCD screen, though bright and sharp, can be difficult to see in direct sunlight. The camera comes with a 16MB CompactFlash card, and the 3X optical zoom is responsive and fast.

We were less impressed with the Coolpix 2000's image quality than with its ease of use. Our still-life pictures and our outdoor shots appeared a bit dark, though the camera reproduced colors and detail well. The shots of our mannequin taken with the flash were significantly worse, displaying gray, ashy skin tones and a dull, low-contrast image overall. Battery life was slightly above average: The four AA batteries lasted 349 shots before expiring.

Upshot: Simple, easy to use, and inexpensive, the Coolpix 2000 is a good choice for beginners on a tight budget.

3. OLYMPUS D-550 ZOOM

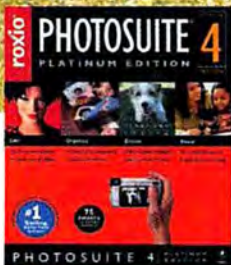


COMPACT BUT BOXY, the \$399 3-megapixel Olympus D-550 Zoom is not particularly light, shiny, or easy to use; but what it lacks in sex appeal, it makes up for in extra controls and superior image quality, earning the highest scores in its class. Both our indoor and outdoor photographs were

evenly exposed, with accurate colors, realistic skin tones, and sharp detail. Shots we took of our mannequin, using the flash, looked a tad overexposed, but no other point-and-shoot model performed so well across-the-board in our tests.

In addition to offering standard exposure compensation, metering, and white balance settings, the D-550 Zoom has some extra features, such as in-camera sharpening and contrast controls, the ability to take panorama and two-in-one picture-in-a-picture shots, and creative image-editing tools that let you ▶

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If you're willing to fine-tune your photos in an image-editing program, you might overlook the Cyber-shot DSC-P9's drawbacks simply because the camera is so much fun to use.

save pictures in black-and-white or sepia tones as well as reduce their file size to save space on the removable memory card (the camera comes with a 16MB SmartMedia card).

The camera is sparsely equipped with dedicated controls. A shutter button and a zoom toggle switch sit atop the camera, and a four-way arrow pad on the unit's back provides quick access to the macro mode, the flash, the self-timer, shooting modes, and a series of nested menus accessible via the Virtual Mode Dial, a carousel-style menu display that mimics the circular dial located on the top of many digital cameras. A few cryptic icons and the maze of menus—typical of Olympus digital cameras—may have you flipping back to the manual frequently to decipher all of the D-550's complex (for a point-and-shoot) features, such as the 14 different combinations of resolution and compression settings available in TIFF or JPEG format.

Upshot: For a camera that costs less than \$500, the D-550 Zoom generously compensates in added controls and stellar image quality for what it lacks in high-tech sizzle and ease of use.

4. HP PHOTOSMART 720



HP'S GRAY-AND-SILVER Photosmart 720 is built like a brick, with a large lens and a rubber hand grip to the right. Some users may prefer the blocky style and heavy feel—the camera weighs just over 12 ounces—but it's overkill in a point-and-shoot model. It ships

with 16MB of internal memory in lieu of a removable memory card, but it also includes a slot for the tiny SD memory cards.

The 3.18-megapixel camera has a mixed bag of features. It gives some control over exposure, letting you set the white balance and exposure compensation, and it includes a multiburst mode; but it omits core features like scene and macro modes. Some of the menu selections are oddly placed: Exposure settings are under the set-up menu in playback, instead of under the shooting mode, for example. On the other hand, three buttons on top of the camera offer instant access to the flash, the self-timer, the continuous shooting mode, and the image-quality settings.

In overall image quality, the Photosmart 720 ranked near the top of our point-and-shoot group. Though the 3X optical zoom felt slow and jerky, the camera produced crisp, well-exposed images that were pleasing both on-screen and as printed photos. The close-up of our still life looked sharp, and outdoors the camera delivered accurate colors and highlights, with adequate detail

in the shadows. Only the shots of our mannequin, taken without the flash, came out overexposed, with a slight yellow cast.

Upshot: The HP Photosmart 720 takes sharp, well-exposed pictures—both on-screen and in print—but for a point-and-shoot, the camera feels a bit too large and heavy to suit us.

5. SONY CYBER-SHOT DSC-P9



WITH A SEXY, high-tech exterior, intuitive menus and buttons, a 3X optical zoom, and near-top-of-the-line 4-megapixel resolution, the Sony Cyber-shot DSC-P9 would be a sure winner—if it took better pictures. Outper-

formed by lower-resolution, lower-priced models (it costs \$599), the DSC-P9 produced mediocre printed photos, and our on-screen tests scored its dark, poorly contrasted images near the bottom. Outdoor shots were passable but failed to pick up highlights and looked flat. Shots of our mannequin taken without the flash produced washed-out skin tones, while shots taken with the flash suffused her in an unhealthy orange glow. The camera's high resolution did help it capture detail well, producing sharp shots across-the-board.

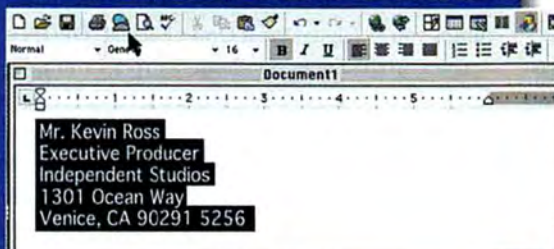
If you're willing to fine-tune your photos in an image-editing program, you might overlook these drawbacks simply because the DSC-P9 is so much fun to use. The small camera feels good in the hand, and its menus and buttons respond with satisfying beeps and clicks, reminiscent of a video game. The 1.5-inch LCD is bright and sharp, and the viewfinder is small but comfortable.

The mode dial on the roof of the camera houses the shooting, playback, scene, movie, and set-up modes, while the four-way multiselector on the camera's back provides fast access to commonly used features such as zoom, macro mode, a self-timer, and a quick-review option. Organized neatly in colorful, text-based menus are basic EV exposure compensation, white balance settings, spot metering, and compression settings. The camera includes a few extra features, too: in-camera sharpening, options for adjusting the brightness of the flash, four creative effects (solarize, black-and-white, sepia, and negative art), and stepped manual focus. It also lets you make simple cuts to movies in-camera, freeing up space on your memory card.

Upshot: The Sony Cyber-shot DSC-P9 is sexy and fun to use, and it might make a good choice if you don't mind compensating for its subpar image quality with an image editor. ▶

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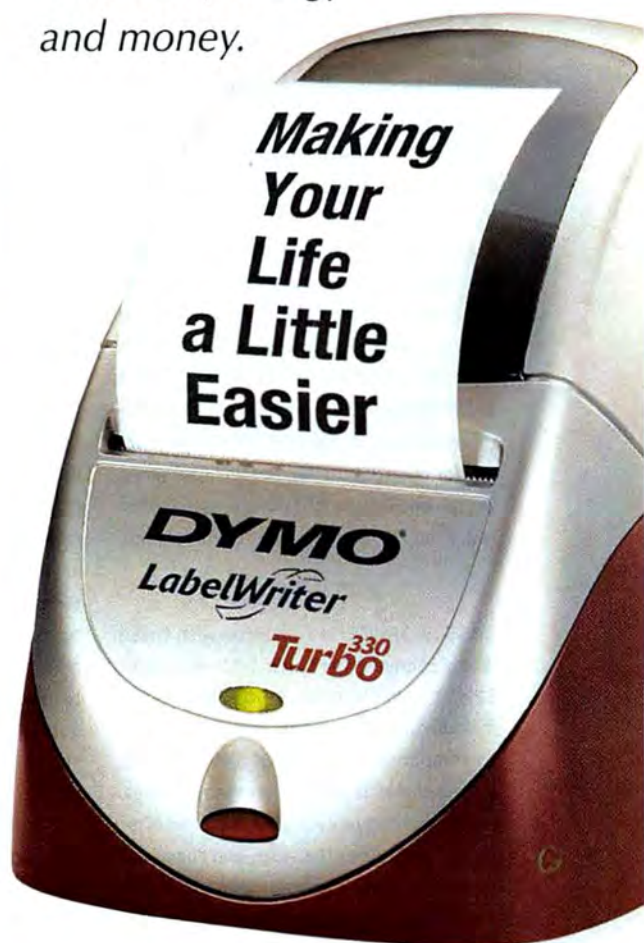


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Advanced Cameras

1. OLYMPUS C-4000 ZOOM



AT \$499, THE C-4000 Zoom is the least-expensive digital camera on our advanced chart, but it doesn't skimp on features. Besides offering manual control of aperture and shutter speed, the camera can shoot in black-and-white, and it has a multiburst mode. We liked the option to

take TIFFs at most resolutions, and the handy virtual-dial menu made switching among shooting modes and four sets of user-

saved settings easy (though the menu disappears quickly when you're trying to make a selection). A dedicated button on the back jumps you to Digital Print Order Format (DPOF) settings.

The C-4000 Zoom outshone its rivals in our image-quality tests, with the second-best overall score in the group, after the Canon PowerShot G2. Photos looked good on-screen and in print—only slight overexposure and loss of detail in flash mode brought its score down. The C-4000 Zoom's battery life of 700 shots on two CRV3 disposables is extremely impressive, though well behind the astounding 1100 shots managed by the fifth-ranked Olympus C-720 Ultra Zoom. Alas, replacement CRV3 cells cost about \$10 apiece, so most photographers will probably opt for less-durable but far cheaper rechargeable batteries. (You can also use standard AA batteries in a pinch.)

HIGH-END

Digital SLRs: The Other Option

IF YOU'RE SERIOUS about your photography, you probably have a 35mm single-lens reflex film camera and a boatload of expensive lenses. Does going digital mean dumping your system and starting over? No.

Several camera manufacturers now produce digital cameras capable of using their full existing range of 35mm film lenses. We took a quick look at two options: the Canon D60 and the Nikon D100. Both of these professional-quality cameras use the same interchangeable lenses that the vendors sell for their 35mm film cousins (primarily, D-type and G-type AF Nikkor lenses for the Nikon, and EF-series lenses for the Canon).

WHY GO PRO?

COST IS OBVIOUSLY an issue with these digital cameras: The Canon D60 runs about \$2200, while the Nikon D100 is \$2000, not including lenses. A good SLR film camera, by comparison, costs about \$400. In addition to the wide array of available lenses, professional-quality digital cameras offer higher resolutions than high-end consumer models: Both the Canon and the Nikon take images at a resolution of greater than 6 megapixels. And because lenses designed for 35mm cameras tend to use better glass and have faster optics than lenses in less-expensive digital cameras, images taken

with pro-level digital SLRs look sharper and have better color. At the highest resolution, both produce excellent 13-by-20-inch prints.

As you'd expect, the Canon D60 and the Nikon D100 give you extensive control over how your images look. Both cameras can take pictures in lower light, thanks to ISO settings up to 6400 and noise-reduction technology; both have a generous selection of metering modes (including through-the-lens metering for flashguns); and both give you greater control over how the camera interprets color. Finally, both can take pictures more quickly than a run-of-the-mill digital camera can: They have a large memory buffer that lets you take several pictures rapidly (the Canon can take three pictures in 1 second and hold eight pictures in buffer memory), without waiting for them to be written out to the CompactFlash storage card, so there's no waiting between shots. (The Canon Powershot G2 captures photos at up to 1.5 frames per second.)

One complication of using 35mm lenses with digital cameras involves the effective focal length of the lens. The digital sensor chip is smaller than a 35mm negative, so it effectively boosts the focal length of the lens, giving you a closer view of a subject. This may be a drawback for wide-angle lenses, but it's an advantage for zoom



NIKON'S D100 (top) and Canon's D60 both use standard film lenses and offer high resolution and extensive exposure control.

lenses, letting you get closer to the action without having to buy a longer lens.

Another interesting digital SLR, the Sigma SD9, was released too late for inclusion in this review, but we had a brief preview of the camera, the first model to use Foveon's long-anticipated X3 chip (see find.pcworld.com/31091 for more information). Though we couldn't conduct a full hands-on review of the SD9, the test pictures we took were impressive.

—Richard Baguley

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The Nikon Coolpix 4500's swivel lens is capable of pointing in any direction along a vertical axis, making it easy to take shots from almost any angle.

The Olympus C-4000 has some rough edges, including a stubborn diopter wheel, stepped playback zooms, and cryptic menu labels. It also has an awkwardly placed thumbpad: Situated above the right top corner of the LCD, the thumbpad's directional arrows are hard to reach while you hold the camera with one hand. The camera's manual focusing mode is difficult to use, requiring a lot of button pressing to set and then cancel the setting, but the autofocus mode gives you the option of moving the center-of-focus brackets to any part of the screen.

Upshot: The C-4000 Zoom is an inexpensive choice for hobbyists who seek a feature-rich camera that takes excellent photos.

2. CANON POWERSHOT G2



WHEN WE FIRST tested Canon's PowerShot G2 last year, it produced some of the best-looking photos we'd seen. This year we pitted the G2 against newer models and it won again, turning in the best photos in our tests, with rich colors and sharp details.

Although solidly packed with features and weighing just over a pound, the G2 manages to keep a fairly small footprint. The numerous buttons that sprinkle its two-tone case take time to learn, but they save trips into the menu. One of the camera's best features is its hinged 1.8-inch LCD, which can swing open like a camcorder display and point up, down, or in the same direction as the lens to allow easy self-portraits. The G2 offers all the control you could want, with an array of picture-quality settings, including a RAW mode (which saves photos without extra processing, so you can uncompress them), settings for creative shots (for producing black-and-white, sepia, and other effects), and a complete range of exposure modes, including aperture-priority, shutter-priority, and full-manual settings. For help with focusing manually, you can press a button that enlarges the center of a picture.

Because it can focus in macro mode at 2.4 inches, the 4-megapixel PowerShot G2 is also a good choice for close-up photography. Canon bundles a roomy 32MB CompactFlash card, Adobe's popular Photoshop LE, and a wireless remote.

Just a couple of gripes with this camera: The mode dial seems difficult to turn, and you have to reenter some picture settings when you switch from manual to some automatic modes. The camera's rechargeable lithium-ion battery pack saw us through 373 photographs—about average for the 16 cameras we tested.

Upshot: The \$799 PowerShot G2 remains one of the best choices for photographers who value flexibility and top-notch image quality. But you may want to wait for our review of the G3.

3. NIKON COOLPIX 4500



NIKON'S 4-megapixel, \$699 Coolpix 4500 produced some of the best prints we saw in this roundup. Our outdoor shots appeared sharp and realistic, while our indoor pictures showed only slightly oversaturated colors.

The camera lost just a little detail in our still-life shot of items on an office desk, and pictures darkened somewhat—though not excessively—when displayed on a monitor.

The 4500's swivel lens, its highest-profile feature, is capable of pointing in any direction along a vertical axis, making it easy to take shots from almost any angle. Though we found manual focusing difficult, Nikon's five autofocus brackets should help—especially if you're taking close-up photos with a tripod. The 4500 shoots beautiful macros at less than an inch away and works with the widest range of add-on lenses here, including a fish-eye.

You use a toggle instead of a button to turn the Coolpix 4500 on and off, which makes booting up the camera smooth and quick. And though this is an advanced model, beginners will appreciate the 16 preset scene modes for matching a wide variety of exposures. Less friendly initially are the slightly arcane hardware controls and Nikon's confusing menu tabs. Once you get the hang of holding down the camera's buttons while turning the command dial, however, it's a snap to tap into the 4500's lode of manual settings. We also had to get accustomed to using the unit's menu selection button. It took a little practice to remember to nudge—instead of press—the button in the direction we wanted to go, but we warmed to the task.

The camera's rechargeable lithium ion battery lasted for 300 shots—below the group average of 383. And its automatic pop-up flash is located where fingers often block it.

Also disappointing was the Coolpix 4500's 1.5-inch LCD, which gets too dark outdoors for easy use. Nikon bundles its limited NikonView viewer software with the camera.

Upshot: The midsize and midprice Coolpix 4500 is ideal for novice and advanced photographers looking to share a camera, or for beginners seeking a model they can grow into.

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4. FUJIFILM FINEPIX S602 ZOOM



WITH ITS FILM camera-like shape, Fujifilm's FinePix S602 Zoom is a professional-looking unit. Its large grip makes the 1.3-pound camera easy to hold in one hand—even while you work the top-mounted controls for flash, exposure compensation and autobracketing. One stand-out feature is its 6X optical zoom

lens (along with a 4.4X digital zoom). The camera houses dual media slots, one for a SmartMedia memory card (a 16MB card comes bundled with the unit) and a second slot for a CompactFlash card or a high-capacity IBM Microdrive.

Five preset scene modes give novice photographers (or advanced shooters who want to take quick shots) a range of exposure options. Loads of buttons scattered over the case help you

change modes, set the exposure, and accomplish other advanced tasks fairly quickly. A few controls are placed on the left side of the barrel, but memorizing them by touch isn't difficult. Focusing manually is relatively easy, thanks to a silky focusing ring and a focus-check button that can enlarge the center of the electronic viewfinder's image. If all else fails, a cancellation button quickly focuses the picture.

On the Web

FOR THE MOST recent information about the Sigma SD9 digital SLR camera—the first model to contain Foveon's new X3 chip—visit find.pcworld.com/31175.

You'll find photos of a range of the sample subjects we used in our tests of all 16 digital cameras—including a portrait, a still life, and a picture taken outdoors—at find.pcworld.com/31172.

The S602 Zoom's electronic viewfinder shows all of the same settings as the 1.5-inch LCD. When it's too bright outdoors to read the LCD, you can perform your work in the viewfinder—a valuable convenience. You can view a just-taken shot on the LCD for as long as you want, and you can pan and zoom within it, but you'll have to laboriously delete the rejects one by one.

The camera's long list of features includes a hot-shoe sync for an external flash; a supersensitive, top-end ISO of 1600; and sound movies. You can take photos interpolated to 6 megapixels, but in our tests of image quality, we found no difference between photos taken with the interpolated resolution activated and those taken with the effective resolution of 3.1 megapixels. Fujifilm rounds out the S602 Zoom with a thorough manual (marred only by lack of an index) and a software bundle that includes Adobe PhotoDeluxe and a videoconferencing program.

The S602 Zoom ranked in the upper half of our cameras in photo quality; it captured shades and details well but gave our mannequin slightly pink skin. With four AA batteries (rechargeables are optional), it took an above-average 425 photos.

Upshot: Though low on megapixels compared to the competition, the FinePix S602 Zoom compensates with a professional feel and lots of exposure, focus, and navigational features.

5. OLYMPUS C-720 ULTRA ZOOM



HEADS UP, NATURE paparazzi: A long zoom lens and longer battery life highlight the \$599 Olympus C-720 Ultra Zoom. The camera's 8X optical lens is equivalent to a 320mm lens on a traditional 35mm film camera. Powered by two disposable CRV3 batteries, the Ultra Zoom held out for an

amazing 1100 shots—or about 6.5 hours—in our tests, three times longer than the average. Admittedly, replacing the CRV3s at \$10 a pop would be expensive, but the long-lived option might come in handy for extended outdoor photoshoots.

Unfortunately, the results of a marathon picture-taking session may not meet your expectations, unless you tweak your shots with image editing software. The 3-megapixel C-720 did a nice job in automatic mode with no-flash portraits in well-lit rooms, but it washed out flash scenes and took dark pictures outdoors.

Aside from lacking manual focus, the C-720 Ultra Zoom offers the expected options for novices and pros alike, from preset scenes on the mode dial to panorama shooting. You can access the settings for most commonly used functions via buttons or dials, a couple of which you can assign other tasks (such as white balance) that you may use more often.

Of the C-720's many features, we especially liked its ability to turn color photos into monochrome ones after taking a shot (we turned a color picture of the Golden Gate Bridge into a moody black-and-white), and its two-in-one mode, which stores two shots as one, placing half of one shot on top of the other—this could be useful for a side-by-side comparison or a before-and-after shot.

On our Annoying Features list: The stepped playback zoom lets you enlarge previously taken shots in the LCD only by fixed increments; you can't mark specific photos for deletion; and the picture information disappears after only a few seconds. The C-720's confusing picture settings improve little on those of past Olympus cameras. Unintuitive labels, such as SQ1 and SQ2, represent combinations of resolution and compression, and the LCD and menus do a poor job of helping you recall what they stand for. In fact, you must consult a chart in the user's manual on CD to determine how much compression each label represents.

Upshot: The Olympus C-720 Ultra Zoom is a nice option for users who want additional telephoto capability; but photo output could be better, and it's not the easiest camera to use. ■

Nikki Echler McDonald is a freelance writer in the San Francisco Bay Area. Carla Thornton is a contributing editor for PC World. Richard Baguley is a senior associate editor at PC World.

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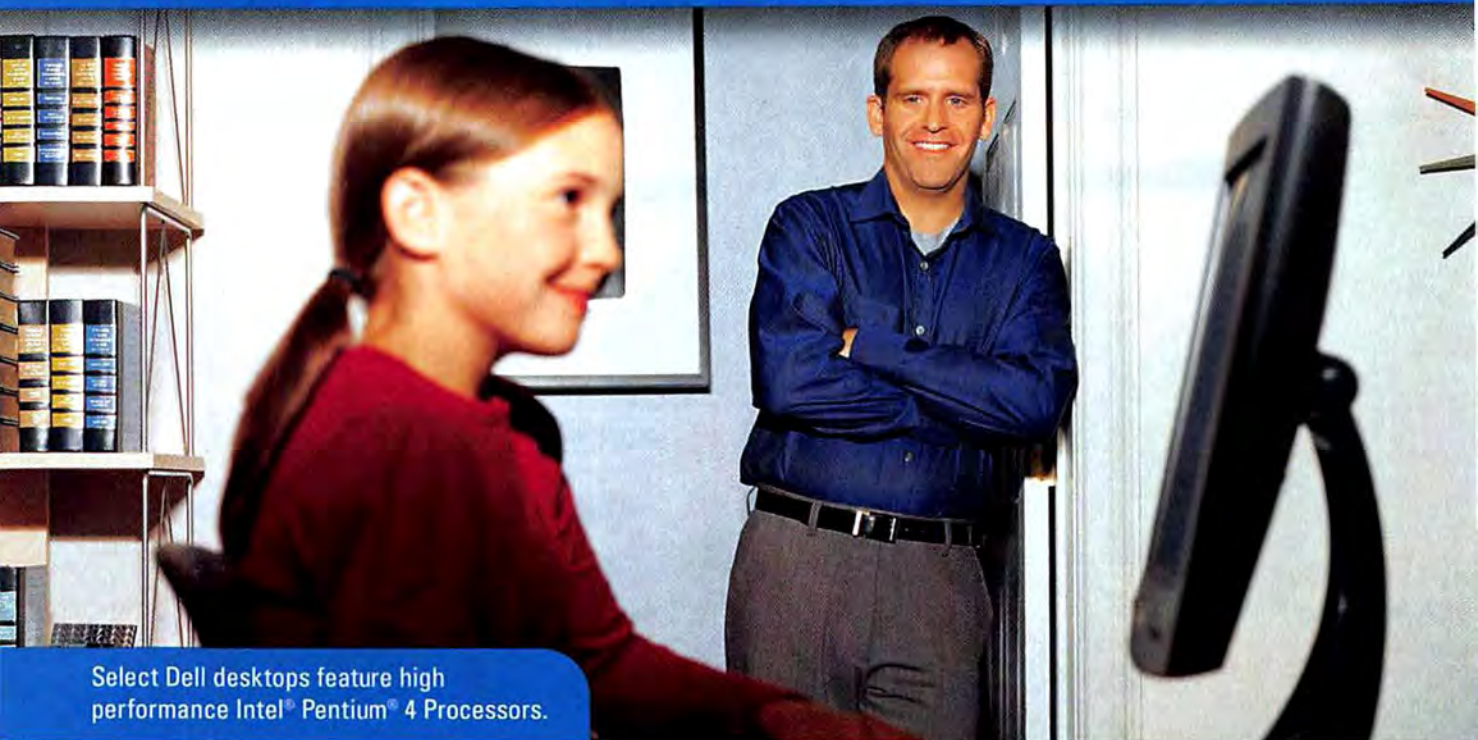
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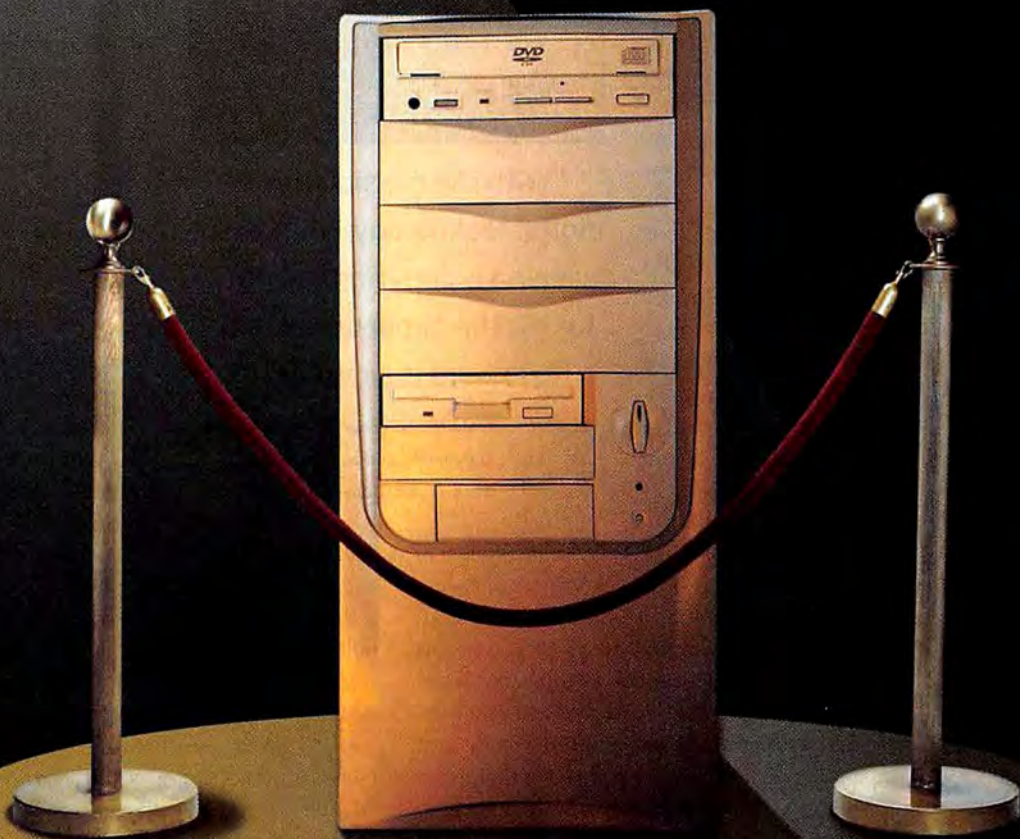
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HOLLYWOOD VS. YOUR PC

Movie and music moguls are hopping mad over the new technologies that are transforming digital entertainment. Washington is listening. What's at risk? Your ability to enjoy DVDs and CDs you've bought, your privacy—even your control over your PC. **BY DYLAN F. TWENEY**



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CHRONICLES

1709



ANNE GUARDS THE BOOKS: Publishers are up in arms and hint at author strikes. The problem: fast (well, sort of) and loose replication and sale of books without proper compensation to the owner. To remedy that, England's Queen Anne accepts the first Parliamentary copyright law, the Statute of Anne. It gives copyright holders (defined as authors or another authority with proprietary rights to a written work) exclusive rights to distribution and copying for a period of 20 years.



Some PCs crashed. Macs locked up and were impossible to reboot, in some cases requiring dealer repairs, according to Apple.

A nefarious new virus? Guess again. The culprit was the European release of the latest Celine Dion CD, which used copy protection to render the disc unplayable on anything but a stereo.

Meanwhile, stateside PC users who like a little background music have been stymied by recent CDs from Charley Pride, 'NSync, and others. Few PCs crashed, but the copy protection on the discs sometimes prevented CD players or car stereos from playing them, as well.

And Hollywood's recent campaign against digital copyright infringement is not limited to music CDs; it affects the way you use your PC as well as the devices that talk to it.

Videotapes, DVDs, and many set-top cable boxes already have copy protection. New bills backed by the \$68 billion movie and music industry would extend that and put copy protection hardware on all new PCs and consumer electronics devices, such as stereos and personal video recorders like TiVo (see "Following the Money Trail," page 132). Also in the works: new laws targeting peer-to-peer file sharing networks like Kazaa, and possible prosecution of individual file sharers.

"All we're trying to do is protect our investment in the digital landscape," says Jack Valenti, president and CEO of the Motion Picture Association of America. "This is the first time we've faced this landscape, where a 12-year-old can copy a movie and send it around the world with a click of the mouse."

But consumers may not be interested in new, high-tech products that do less than the equipment they already own. That fear partially fuels the \$150 billion tech industry's opposition to legislated copy controls. It has just gained a powerful ally in the fight: the \$350 billion telecommunications industry, which should get lots of broadband business

when digital content on the Net is mainstream.

Few people advocate rampant piracy, or dispute content owners' right to fair payment for their works. Still, "The industries that own content need to shift their perspective from viewing consumers as potential pirates to dealing with consumers as potential customers," says Alex Alben, vice president of public policy for streaming media pioneer RealNetworks. He believes most users will opt for legitimate digital content if services offer a big, reasonably priced selection with sufficiently flexible distribution controls to make buying more convenient than illegal copying.

But few such services exist today, and some new ones have been scrapped.

The stakes are high all around: your ability to make copies of (and to use freely) the music, movies, and hardware you've paid for, and tens of billions of dollars in revenue for each industry—not to mention the future direction of digital media and PC and Internet technologies. (See "What Can You Do With Digital Media?" page 129, for a rundown on what's allowed today.)



"With the possibilities of digital technology, what we're seeing is copyright owners taking the opportunity to try to extend their control."

JESSICA LITMAN, professor of law at Wayne State University and author of the book *Digital Copyright*

FAREWELL, NAPSTER

FOR THE entertainment industry, Napster was a loud wake-up call. The online file-sharing service demonstrated that people using readily available equipment

could easily download and distribute digital music and movies en masse, regardless of copyright.

Not surprisingly, that sent the entertainment industry into a panic. After all, one theory goes, if you can get digital files for free, why would you ever pay for a movie ticket or a CD?

A lawsuit led by the Recording Industry Association of America shut down Napster, stranding its 70 million users. But other peer-to-peer (P2P) networks, such as Kazaa and Gnutella, quickly took its place. Kazaa alone has been downloaded over 113 million times, according to CNet's Download.com.

The RIAA blames 5.3 and 7 percent drops in the

number of CDs sold in 2001 and 2002, respectively, in part on online file trading. To guard its content and avoid further losses, the entertainment industry has hastened to employ copy protection and digital rights management (DRM) technology.

Unfortunately, such technology doesn't affect only pirated distribution on P2P networks—it can prevent users from making any copies at all, even ones that formerly would have qualified as fair use. ("Fair use" allows consumers to make copies for personal or scholarly use as long as the copying doesn't affect the work's commercial value.)

"With the possibilities of digital technology, what we're seeing is copyright owners taking the opportunity to try to extend their control," says Jessica Litman, professor of law at Wayne State University and author of the book *Digital Copyright*.

One of the most powerful weapons in the entertainment industry's arsenal is 1998's Digital Millennium Copyright Act, which makes circumventing copy-protection technologies placed on digital media a federal crime, punishable by up to five years in prison plus a \$500,000 fine. "In the old days, the law said you have a fair use to what you've bought—go ahead and do it," says attorney Jonathan Bick, author of *101 Things You Need to Know About Internet Law*. "Now it says you have a fair use as long as you don't employ certain technologies."

After its Napster experience, though, the entertainment industry has concluded it needs more than the DMCA to battle digital copyright violations.

The Consumer Broadband and Digital Television Promotion Act, sponsored by Senator Ernest Hollings (D-South Carolina) could strengthen its arsenal. This bill would require vendors to put copy-protection chips in all future PCs and consumer electronics devices. By preventing copying through hardware, it could keep files from getting onto P2P networks in the first place. Combined with the DMCA, it would give companies a nearly ironclad legal and technological defense of their content—but could also let them restrict fair use further.

The tech industry thinks such requirements are too broad and would hobble innovation by tying it to government specifications. "For the government to mandate how the IT industry designs and develops chips—or to try and force agreement for design features—would be ludicrous," Intel executive vice president Leslie Vadasz said in congressional testimony earlier this year. "Irreparable economic damage would result" from such intervention, he added.

Intel has its own solution, code-named La- ►

FAQ

WHAT CAN YOU DO WITH DIGITAL MEDIA?



IN THE DAYS OF vinyl records and cassette tapes, you could copy your albums to your heart's content. Same with videotape, VCRs, and TV shows today. But digital media imposes new restrictions—some technical, and some legal—on what you can do with blank discs and digital content.

What you want to do:	Can you do it?
Make ("rip") MP3 copies of CDs you've bought.	Yes, provided you make those copies for personal use only (no sharing)—unless the material already uses copy protection.
Override copy protection on CDs.	You can, through software (and sometimes with nothing more than a black marker), but doing so violates the DMCA and is punishable by up to five years in prison and a \$500,000 fine. The music industry says it will not press charges against individual offenders, however.
Participate in file-sharing networks such as Kazaa, Morpheus, and Gnutella.	Yes, but you can't legally trade copyrighted files. If you do trade such files, you may find yourself subject to legal action, your ISP may cancel your account, and—if the Berman bill passes—the music industry may try to impede your file-sharing (see pages 130 and 132). Few of these consequences have come to pass for individual consumers so far.
Record TV shows for later viewing ("time-shifting").	Yes, using VCRs, DVD recorders, or personal video recorders like TiVo or ReplayTV; this is not disputed, but in the future, a proposed "broadcast flag" for digital TV may limit sharing of such copies.
Skip the commercials in recorded TV shows.	Yes, with VHS or personal video recorders, but TV networks have sued Sonicblue, the maker of ReplayTV, arguing that its commercial-skipping button is not legal. The court case is pending.
Share a tape of a recorded TV show with some friends or family members.	Today, this is permitted under fair use, provided that you limit it to a small group and don't charge a fee. ReplayTV sets' "send to a friend" feature, however, is being challenged in court.
Play DVDs bought in Europe or Asia on a U.S. DVD player.	Sorry—copy protection makes DVDs and standard DVD players from different parts of the world incompatible.

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CHRONICLES

1908



PLAY IT AGAIN, SAM: Player pianos are all the rage, and publishers of player-piano rolls are making a killing selling these recordings of popular tunes—without paying composers a dime. (Sound familiar, Napster fans?) Sheet music publishers file suit, claiming copyright infringement. The Supreme Court rejects their claim, reasoning that the law doesn't cover player-piano rolls. The next year, Congress amends the law to include licensing fees for player-piano rolls, phonograph records, and public performances. Decades later, composers get over \$500 million in royalties from recordings and performances of their music.

Grande, due in Pentium chips in 2003. Both it and Microsoft's Palladium security scheme, intended for future Windows versions, are meant to protect PCs against threats like viruses and to make tasks like online banking more secure. But they can also work with DRM to restrict copying or playback.

The entertainment industry is also targeting P2P networks via lawsuits and "spoofing": posting corrupt or misleading files to discredit P2P network files. A bill proposed by Representative Howard L. Berman (D-California) would legalize spoofing and other P2P network attacks and would shield attackers from liability for resulting network damage.

The telecom industry opposes both pending bills. "We're against any kind of government-mandated standards," says Verizon's vice president and associate general counsel Sarah Deutsch. Furthermore, she says, both of the bills run roughshod over carefully constructed compromises in the DMCA that balance content owners' and service providers' responsibilities. The next congressional session's bills need to be negotiated with all stakeholders present, she adds.

Finally, prosecution of P2P file-traders may be in the works. The 1997 No Electronic Theft Act lets copyright holders press charges against those who share copyrighted products valued at over \$1000—even if the sharing is done only with family and friends. Guilty parties face a maximum of one year in prison—five years if the traded files are worth more than \$2500. Prosecutions have yet to occur, but the Justice Department has said it will use this law against file traders.

While acknowledging that piracy is a serious problem, some vendors feel that the entertainment industry's legal approach is misguided. "Hollywood is focusing all its efforts on complaining to Washington instead of making a sincere effort to compete," says Chris Gorog, CEO of Roxio, maker of the popular Easy CD Creator recording software.

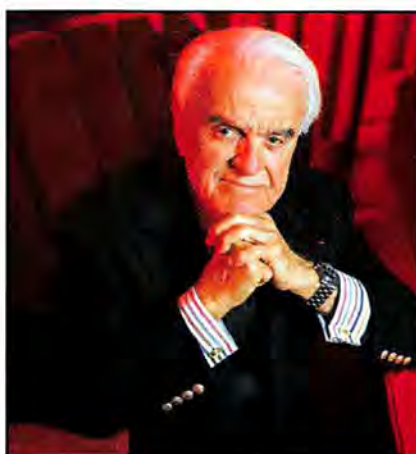
Though legitimate sites with major-release movies are scarce, several fee-based sites—such as

MusicNet, Pressplay, and Listen.com—offer music. But these services have flopped commercially, hobbled by much smaller selections than P2P networks offer, and by restrictions on the number of songs users can download and whether users can burn them to a CD. Only in 2006 will paid music services begin to take off, predicts the Yankee Group.

TRACKING YOUR HABITS?

EVEN IF LEGITIMATE digital media becomes available, the technology has a downside that worries some consumer advocates: It lets vendors track what you watch and listen to.

DRM technologies must be able to identify devices such as PCs and portable players that comply with its rules, and must ensure that you don't misuse the content you've purchased. Does this raise privacy issues? If content owners keep track of their customers' devices and viewing habits, then yes. Most do not, but "there's no magical limit to what could be put into a DRM system," says Steve Canepa, vice president of IBM's global media and entertainment group. (IBM's DRM system tracks keys used to unlock content, not content itself or customers' habits, he says.)



"All we're trying to do is protect our investment in the digital landscape."

JACK VALENTI, president and CEO of the Motion Picture Association of America

DRM aside, digital media's connected nature makes consumer tracking possible to a degree unmatched in the analog world. Take the case of Sonicblue, maker of the networkable ReplayTV personal video recorder. As part of a suit over ReplayTV's "send to a friend" feature (which lets users send stored TV shows to other local or Internet-connected ReplayTV sets), a magistrate ordered Sonicblue to monitor its users' viewing habits. (This is possible because Sonicblue remains connected to ReplayTV sets to update TV listings or software, and more.) A U.S. District judge overturned that order after consumers and privacy advocates complained. What you watch is your business—for now.

Total control over digital media isn't the only option for content owners. And no copy-protection scheme will be perfect, as even the MPAA's ►



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CHRONICLES

1984



VIDEO SAVES THE MOVIE STAR: The U.S. Supreme Court rejects Universal Studios' lawsuit against Sony, which had contended that Sony's VCRs allow rampant copyright infringement by giving ordinary Joes and Janes the ability to make copies of their own movies. The ruling upholds citizens' fair-use right to make home recordings, and it supports Sony's right to make and sell VCRs. (Sony's Beta-max format loses the VCR war to rival VHS anyway.) Two decades later, while box office receipts add up to about \$8.4 billion, video sales and rentals are a \$16.9 billion market for the movie studios—not bad for the lawsuit's losers.

Valenti acknowledges. The content industry's best option may be to compete with P2P networks on their own terms, offering for-fee services with comparable selection but consistent, high quality.

According to Electronic Frontier Foundation (EFF) attorney Fred von Lohmann, the movie industry is already starting to do that by lowering DVD prices. "Why spend hours downloading a crappy version of a movie when you can buy the full version for \$9.99 at the supermarket?" he says.

Copyright holders might also have to learn to tolerate some file sharing. Already, some independent labels (and many up-and-coming bands) distribute MP3 files online as a marketing tool. Folk icon Janis Ian credits the availability of MP3s online for her recent comeback tour's success.

And it might even be good for the entertainment

industry. "Over 100 years, every single new technology that copyright owners have protested has turned out to make them more money, not less," says von Lohmann. (See *Up Front*, page 15, for *PC World's* take on one possible compromise.)

But that outcome is far from assured. Groups like the EFF and DigitalConsumer.org have lobbied for fair-use rights, but with limited success.

Ultimately, it's up to content publishers to decide what restrictions they want DRM schemes to enforce, and up to consumers to decide whether they will buy content with those restrictions. One thing is clear: PC users must speak up or risk losing control over their PCs and the media they buy. ■

Dylan F. Tweney is a freelance writer and editor in San Mateo, California.

CONGRESS

FOLLOWING THE MONEY TRAIL

THE ENTERTAINMENT INDUSTRY has contributed \$25 million to congressional campaigns this year, according to Opensecrets.org, and it shows: Some key players in recent and pending copyright laws have strong ties to entertainment groups; one opponent does not. (The tech industry has only recently become a serious player in Washington, moving from 53rd in contributions in 1990, to 8th this year with \$16 million donated.)



Sen. Ernest Hollings (D-SC): He proposed the Consumer Broadband and Digital Television Promotion Act, a bill to outlaw the sale of PCs or consumer electronics devices lacking copy protection. Bill text: find.pcworld.com/30968
Money trail: \$282,534 from TV/music/movie contributors since 1997—his second-biggest supporting industry (after lawyers and law firms, who gave \$1,213,475).



Rep. Howard L. Berman (D-CA): The Berman P2P bill gives copyright holders legal immunity to attack P2P networks to hinder file-sharing, if the U.S. Attorney General has been notified. Files on users' PCs can't be damaged. Bill text: find.pcworld.com/30971
Money trail: \$570,000 from TV/music/movie donors since 1993. He is the leading recipient of entertainment industry money in the House.



Rep. Howard Coble (R-NC): Coble was the original sponsor of the 1998 DMCA and is cosponsoring Berman's proposed P2P bill. DMCA text: find.pcworld.com/30977
Money trail: \$151,021 from TV/movie/music donors since 1993. Since 2000, law firms are his top contributors, with the entertainment industry a close second. He is the number two recipient of music industry funds in the House.



Rep. Rick Boucher (D-VA): Boucher has been an outspoken critic of the DMCA since its passage in 1998. He has been trying to rally support within Congress to amend the DMCA to explicitly affirm fair use.
Money trail: \$26,125 from computer industry donors in the current election cycle. Even bigger contributors to his war chest, however, are utilities (\$57,902) and law firms (\$31,250).

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SYS Performance 2000 +
January 2002
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\$896.00 Best Value

SYS TaskMaster C1700 Desktop

- CPU** • Intel Celeron, 1.7GHz (Pentium 4 core)
- RAM** • 256MB, PC2100, DDR SDRAM
- Hard Drive** • 40GB, 7200 rpm, ATA/133
- Video** • ATI RADEON 128 Pro, 32MB
- Monitor** • SYS 15" [13.7" v.i.s.]
- CD/DVD** • 40x12x48 CD-RW
- Sound** • Integrated AC97 audio
- Speakers** • Altec Lansing speakers, 2 pc.
- Modem** • 56K/v.92, PCI modem
- NIC** • Integrated 10/100 NIC
- Chassis/PS** • MicroATX tower, 250W p/s
- OS** • Microsoft Windows XP/Home
- Keybd, mouse** • SYS keyboard and mouse

\$1,060.00 Home/Office System

SYS Performance 2000+ Desktop

- AMD Athlon XP 2000+
- 256MB, PC2700, DDR SDRAM
- 60GB, 7200 rpm, ATA/133
- ATI RADEON 7500 LE, 64MB
- Optique Q71 17" [16" v.i.s.]
- 40x12x48 CD-RW
- Integrated AC97 audio
- Altec Lansing speakers, 3 pc.
- 56K/v.92, PCI modem
- 10/100 PCI NIC
- ATX tower, 300W p/s
- Microsoft Windows XP/Home
- SYS keyboard and mouse

\$1,877.00 Gaming AMD System

SYS Performance 2200+ Desktop

- AMD Athlon XP 2200+
- 512MB, PC2700, DDR SDRAM
- 80GB, 7200 rpm, ATA/133
- LEADTEK A170 DDDR [GF4], 64 MB
- SYS 152L 15" LCD [15" v.i.s.]
- 40x12x48 CD-RW; 16X DVD
- Creative Labs Sound Blaster Audigy [OEM]
- Logitech Z-560 speakers, 6 pc.
- Integrated 10/100 NIC
- ATX tower, 300W p/s
- Microsoft Windows XP/Professional
- SYS keyboard and mouse
- Corel WordPerfect Office 2002 [OEM]

\$2,068.00 Gaming Intel System

SYS Performance 2400 Desktop

- CPU** • Intel Pentium 4, 2.4GHz [533MHz FSB]
- RAM** • 512MB, PC2100, DDR SDRAM
- Hard Drive** • 80GB, 7200 rpm, ATA/133
- Video** • LEADTEK A170 DDDR [GF4], 64 MB
- Monitor** • SYS 152L 15" LCD [15" v.i.s.]
- CD/DVD** • 40x12x48 CD-RW; 16X DVD
- Sound** • Creative Labs Sound Blaster Audigy [OEM]
- Speakers** • Logitech Z-560 speakers, 6 pc.
- NIC** • Integrated 10/100 NIC
- Chassis/PS** • ATX tower, 300W p/s
- OS** • Microsoft Windows XP/Professional
- Keybd, mouse** • SYS keyboard and mouse
- Other** • Corel WordPerfect Office 2002 [OEM]

\$4,218.00 Auto CAD/Graphic

SYS PowerHouse D2400 Workstation

- Dual Intel Xeon, 2.4GHz
- 512MB, PC800 RDRAM
- 80GB, 7200 rpm, ATA/133
- NVIDIA Quadro4 900 XGL, 128MB
- Optique Q95 19" [18" v.i.s.]
- 40x12x48 CD-RW
- Integrated AC97 audio
- Altec Lansing speakers, 3 pc.
- Integrated 10/100 NIC
- EATX tower, 430W P/S
- Microsoft Windows XP/Professional
- SYS keyboard and mouse
- Corel WordPerfect Office 2002 [OEM]

\$2,572.00 Best Rackmount

SYS PowerNet D1266RM Server

- CPU** • Dual Intel Pentium III-5, 1.265GHz
- RAM** • 256MB, PC133, Reg ECC SDRAM
- Hard Drive** • Dual, hot-swap, 40GB, 7200 rpm, ATA/133
- Video** • ATI RADEON XL, 8MB
- Monitor** • Monitor optional
- CD/DVD** • 24X slim CD-ROM
- NIC** • Dual integrated 10/100 NICs
- Chassis/PS** • 1U rack mount, 250W p/s
- OS** • Microsoft Windows 2000 Server w/ 5 clients
- Keybd, mouse** • SYS keyboard and mouse

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PROJECTORS

THAT LET YOU BE THE STAR

Corbin Ball (pictured at right) has suffered "death by PowerPoint" more than a dozen times and is still alive to talk about it.

The Bellingham, Wash.-based speaker and consultant teaches his clients how to use technology to save time and improve their productivity. And Ball's Web site, corbinball.com, is a comprehensive resource for news, information, and advice about meetings technologies.

Perhaps that's why Ball has so much to say about PowerPoint presentations, which are the bane of so many audiences. "The problem isn't the PowerPoint," he explains. "It's the people using it."

KEEPING IT SIMPLE

Speakers tend to forget that *they* are the show, says Ball, and that their graphics only play a supporting role. Too many "special effects" can have the effect of nauseating an audience rather than impressing it. This is especially true for PowerPoint's transition effects, which is why Ball limits himself to dissolves. "They're the least jarring transition," he explains.

Ball will use an Uncover Right-Up effect to introduce new topics and a Wipe Right to reinforce the directions of line graphs and other infographics in a new slide. But he goes easy on the technological fireworks.

That's not to say that Ball is anti-technology. On the contrary, he believes that technology is just as important as technique in making presentations effective. Some devices—wired remote controls, for example—force speakers to limit their movement to the immediate area of the computers beside them.

Ball prefers to use a small, wireless radio-frequency remote. It has just two buttons—forward and reverse—and it doesn't require any software. It's so small that he can attach it to his palm with a lightweight rubber band. The audience can't see the remote, and Ball can gesture with both hands as he speaks. Best of all, the remote has a range of more than 100 feet, allowing Ball to keep his mobility.

"I never have to think about walking over to the computer, and I never need to have someone else advance the slides," he says. "It frees me to concentrate on my audience."



PROJECTORS SHOULD BE LIGHT AND LIVELY TOO

Presentation experts prefer their projectors to be easy to use and out of the way. Cumbersome and noisy projectors are simply a liability for speakers who want to appear light on their feet.

Both Sony and Canon recently released projectors light enough to travel and smart enough to adapt quietly and quickly to virtually any environment.

Sony's sleek and stylish SuperLite projectors, the VPL-CS5 and VPL-CX5, are the company's most feature-packed and brightest micro-portable models yet.

The VPL-CS5 and VPL-CX5 combine high mobility and first-class, conference-room-quality performance. They boast whisper-quiet operation, a high-aperture

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Introducing the newly designed Sony SuperLite™ LCD Projector Series VPL-CS5 (and its SuperLite Series partner, the VPL-CX5). It's so light, compact and powerful, you can take it to a sales call or to the boardroom at the drop of a hat. In fact, it may be the only projector you need.

Either model is so intuitive, it adjusts the picture, corrects keystone, adjusts its legs, and retracts its lens cover... all automatically! The VPL-CX5 even has a Memory Stick® slot for PC-less presentations, so you can leave your laptop at home.

These new SuperLite™ models both employ Sony LCD technology delivering SVGA resolution (1800 ANSI lumens*) in the VPL-CS5, and true XGA resolution (2000 ANSI lumens) in the VPL-CX5. Best of all, they're amazingly affordable.

The VPL-CS5/CX5. If you're going to have only one projector, you'll be glad you chose a Sony.

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adjustment

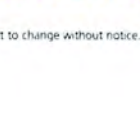
AUTO

Keystone
adjustment

AUTO

Leg
adjustment

AUTO

Lens cover
retraction

AUTO

Auto input
search

Call **1-800-472-SONY ext.CS5** today to get the Sony projector you've always wanted at a price you never imagined. Or visit **www.sony.com/projectors**

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*ANSI Lumen is a measuring method of the American National Standards Institute IT7.228

0.7-inch TFT LCD panel, and a 165-watt UHP lamp. They can even be controlled with a wireless mouse.

Sony VPL-CX5 users can leave their PCs at home—the projector accepts Memory Stick removable media cards. The VPL-CX5 also includes Projector Station software to easily transfer files or Power-Point presentations to Memory Stick media. With Memory Stick capability, users can display their media without using a PC. And both projectors work with wireless remote controls, so presenters can enjoy freedom of movement in any type of environment.

Speakers will also find the Sony VPL-CS5 and VPL-CX5 extremely easy to configure. Both projectors use an intelligent auto setup that goes to work when they are switched on. With Sony's auto setup, the projectors' lenses and heights adjust automatically to pre-set levels. Digital keystone correction and pixel alignment are also automatic when either model is switched on.

Sony's projectors are lightweight—the CX5 weighs just 5.7 pounds. Yet Sony's new optical design doubles the brightness of the CX5's resolution to 2,000 ANSI lumens.

Both Sony projectors also accept signals from composite video, S-Video analog RGB/component, and SYNC/HD.



▲ **SONY's SuperLite projectors, the VPL-CS5 and VPL-CX5, are sleek, stylish, and feature-packed.**

FREEDOM AND VERSATILITY IN A COMPACT PACKAGE

Canon's ultra-compact projectors, the LV-7355 and the LV-7350, are beautifully designed and highly versatile. Horizontal and vertical keystone correction keeps images perfectly proportioned, and 12-setting image adjustment ensures brilliant overall picture quality.

Both projectors can also instantly add image brightness to accommodate any situation. Canon's exclusive one-button Turbo Bright System boosts the LV-7355 to 2,200 ANSI lumens and the LV-7350 to 1,800 ANSI lumens, without increasing power consumption or sacrificing lamp life.

Users of the LV-7355 and LV-7350 can also squeeze into tighter

spaces than many presenters would think possible. The new projectors can deliver a 100-inch image from 9.2 feet, about 4 feet closer than for Canon's previous model. This makes the LV-7355 and LV-7350 models great choices for office, classroom, and home-theater applications.

But Canon's projectors are also stars on stage: their industry-first 1.5X motorized ultra-wide zoom lens, and wireless and media card options, help the Canon LV-7355 and LV-7350 add freedom and convenience to complex presentations in large venues.

The Canon LV-7355 and LV-7350



▲ **CANON's ultra-compact projectors: beautifully designed and highly versatile.**

have DVI-I interfaces for either digital or analog RGB input, and both models can hook up to two computers simultaneously. Component, S-Video, and RCA terminals allow users the freedom to connect to virtually any input device.

Canon's exclusive optional Wireless Imager, meanwhile, makes wireless transfer of screen images from PC to projector easy. And Canon's optional Media Card Imager, the LV-MC01, lets users present without any PC at all.

For use in more-permanent settings, both the Canon and the Sony projectors can be ceiling-mounted. ■

Travel Tips

■ On the road, Ball recommends taking precautions, even if you have a reliable projector. He carries backup advance mechanisms and laser-pointer batteries in his briefcase. He also carries his PowerPoint presentations on a CD that he keeps in another location (in case he loses his briefcase), and posts the program to a password-protected section of his Web site. "In the past two years, I've had occasion to use both of these options," says Ball. "If I hadn't, it would have been a disaster."

LV-7545



3700 ANSI Lumens, XGA
Portable/Interchangeable Lenses.

LV-7345



2100 ANSI Lumens, XGA
Portable

LV-X1



1100 ANSI Lumens, XGA
Microportable

LV-S1



1000 ANSI Lumens, SVGA
Microportable

THE IMAGE QUALITY YOU WANT. THE PROJECTOR YOU NEED.



Now, there's a Canon projector that looks as good to your audience, as it does on your budget. That's because Canon, the world leader in optics, understands that image quality is essential

to holding an audience's attention, and value is critical to your purchasing decision. From our highest quality LV-7545 with 3700 ANSI Lumens and interchangeable lens design; to our versatile LV-7345 with 2100 ANSI Lumens and PC-Free option; to our portable

LV-X1 with 1100 ANSI Lumens and Native XGA resolution, to our economical LV-S1 with 1000 ANSI and new optical block for enhanced image quality; Canon has the right projector for you.



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Plus when you buy a Canon projector you can use it with our full line of digital cameras, camcorders, video visualizers and other image capture tools to create powerful multimedia presentations with graphics and video, as well as text.

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TOP 100

EDITED BY THE REVIEWS STAFF

INSIDE

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Entertainment PCs

A peekaboo side-panel window and a snappy-looking chassis with matching keyboard and mouse highlight Voodoo Computers' Egad Obsidian Black. This pricey model lands in the fifth spot on our new, recurring *Top 5 Entertainment PCs* chart.

Entertainment PCs Take Center Stage

Increasingly, the line separating office PCs from home PCs has become blurred. That's why, starting this month, we've revised our desktops coverage to focus on one Top 15 chart—split into power and value sections—for all mainstream desktop computers. In addition, each month we will feature a supplemental Top 5; this second chart will rotate among entertainment, corporate, and budget systems.

The Voodoo Egad Obsidian Black, with its eye-catching case and fluorescent blue light, is one of the flashier models to make our first *Top 5 Entertainment PCs* chart. But at nearly \$6000, it is also the costliest.

Freelance writers Dan Littman, Mick Lockey, and Carla Thornton, and PC World reviews editors Richard Baguley, Tracey Capen, Seán Captain, Lisa Cekan, Rebecca Freed, Alexandra Krasne, Kalpana Narayanamurthi, and Melissa J. Perenson contributed to the Top 100 section this month. Ulrike Diehlmann, Julio Gianobile, Elliott Kirschling, Jeff Kuta, Tony K. Leung, and Thomas Luong of the PC World Test Center performed testing on the products reviewed in this section, with logistical support provided by Julian Weatherby.



151

19-Inch Monitors

Great text and graphics quality help propel our new Best Buy, the 19-inch Samsung SyncMaster 957mb, to first place on our *Top 10 Monitors* chart.

149



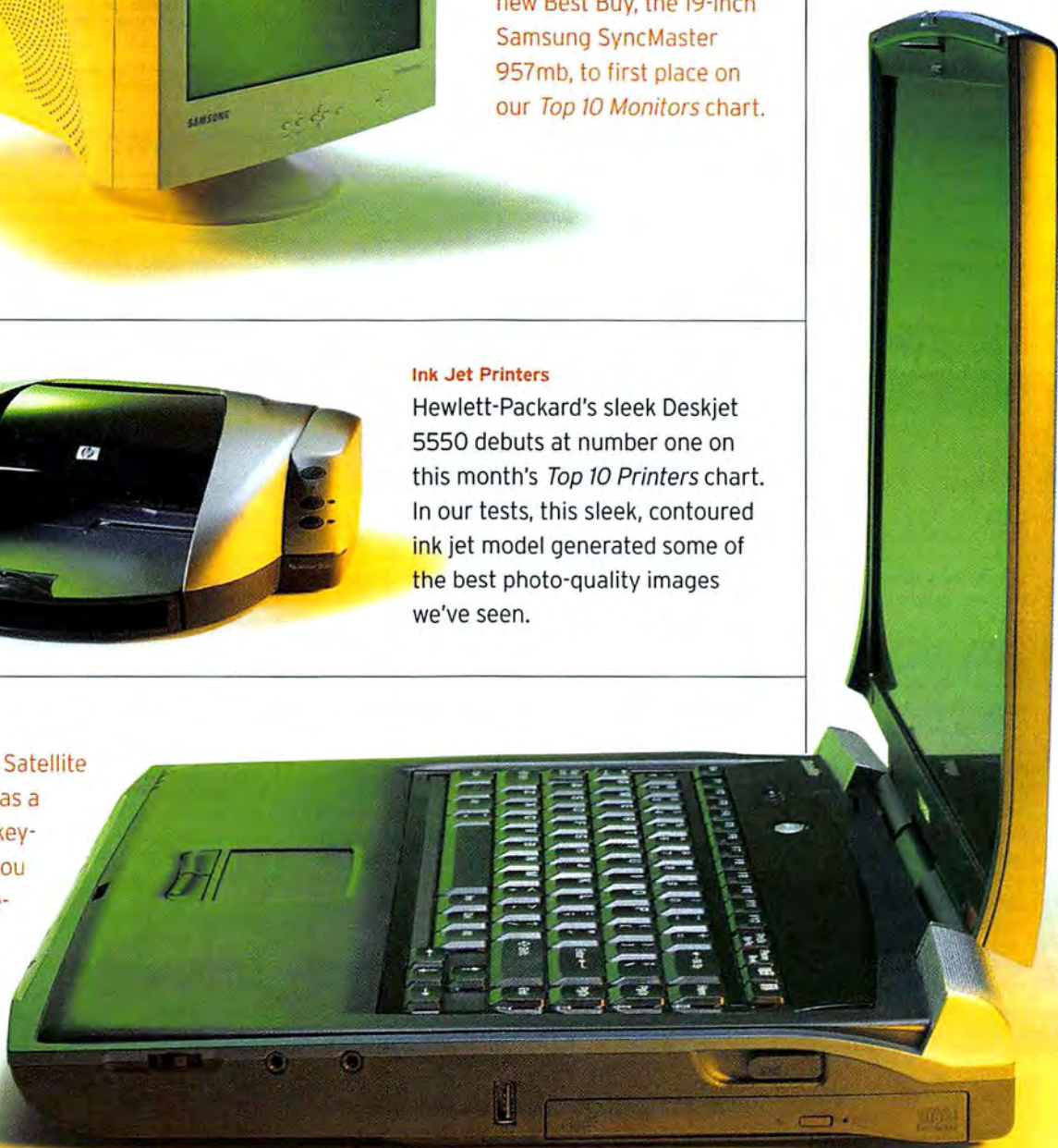
Ink Jet Printers

Hewlett-Packard's sleek Deskjet 5550 debuts at number one on this month's *Top 10 Printers* chart. In our tests, this sleek, contoured ink jet model generated some of the best photo-quality images we've seen.

144

Notebooks

The Toshiba Satellite 1955-S801 has a detachable keyboard that you can use wirelessly.



YOUR GUIDE TO THE TOP 100

EACH MONTH WE TEST a large number of PCs, printers, monitors, and other products. Only the best products land on the charts, which are refreshed monthly.


System configurations are shown as tested. The overall rating for each product is calculated on a 100-point scale and reflects results from our hands-on evaluations


and performance tests. A 90-point score is exceptional, while one in the 70s is above average.

The PC WorldBench 4 score is a measure of how fast a PC can run a mix of common business applications as compared with our baseline machine, a Gateway Select 1200 with a 1.2-GHz Athlon processor, 128MB of PC133

SDRAM, and a 20GB hard drive. For example, a PC that scores 120 is 20 percent faster than the baseline system. The policies score is based on vendor support policies (not shown on charts). Please see find.pcworld.com/15720 for additional details on how we compile charts for the *Top 100*.

TOP 15 DESKTOP PCs

	POWER SYSTEM	Overall rating	Street price (8/23/02)	PC WorldBench 4 performance score ¹ 	Comments
1	Best BUY MicronPC Millennia XP+ Xtreme find.pcworld.com/25103	89	Inexpensive \$2249	Windows XP Home Very good 123	Fast system handles games with aplomb. Has a top-notch monitor and an extensive system manual. Price drops \$170. (★★★★★ June 02)
2	Gateway 500XL find.pcworld.com/30770 NEW	86	Very inexpensive \$1999	Windows XP Home Good 117	Snappy silver-and-black system has the speed and storage for movie-making. LCD monitor showed good colors but smudgy text. (★★★★☆)
3	Sys Technology Performance 2800 find.pcworld.com/30758 NEW	86	Expensive \$2995	Windows XP Professional Outstanding 129	The fastest Windows XP system we've tested comes with a sharp-looking LCD monitor but a mismatched color scheme. (★★★★★)
4	Polywell Poly 883VR-2200 find.pcworld.com/29939	84	Inexpensive \$2250	Windows XP Professional Very good 124	This well-equipped, solid performer becomes more appealing with a \$245 price drop. (★★★★☆ Sept 02)
5	Xi Computer 4240 MTower SP Home find.pcworld.com/29675	83	Inexpensive \$2172	Windows XP Home Very good 123	In cool black, with a wireless keyboard and mouse, this PC performs well for its CPU class. Game images appeared dark. (★★★★★ Aug 02)
6	ABS Conquest SP find.pcworld.com/30734 NEW	82	Inexpensive \$2299	Windows XP Professional Good 121	Basic-looking system combines strong performance and many high-end features at a reasonable price. (★★★★★)
7	Tangent Medallion 4000D find.pcworld.com/30773 NEW	81	Inexpensive \$2495	Windows XP Professional Good 118	Low-cost video-editing machine includes a great sound system but only a middling-quality monitor. (★★★★☆)
Percent of overall rating ▶			10 percent	25 percent	

	VALUE SYSTEM	Overall rating	Street price (8/23/02)	PC WorldBench 4 performance score ¹ 	Comments
1	Best BUY ABS Bravado 2300 find.pcworld.com/30275	86	Inexpensive \$1199	Windows XP Home Good 115	Reasonably fast PC offers sharp text but muted colors. Six-speaker set delivers beautiful sound. (★★★★☆ Oct 02)
2	Micro Express MicroFlex 1800B find.pcworld.com/26981	86	Very inexpensive \$999	Windows XP Professional Very good 122	System achieves its speed in part by using a motherboard with an overclocked CPU as a default setting. (★★★★☆ July 02)
3	Polywell Poly 883VF-2000 find.pcworld.com/30287	83	Average \$1275	Windows XP Home Good 117	Offers zippy performance and a hefty hard drive at an affordable price. Monitor is unexceptional, however. (★★★★☆ Oct 02)
4	NuTrend Centra 2 find.pcworld.com/30749 NEW	83	Inexpensive \$1170	Windows XP Home Good 117	Low-cost, bare-bones machine wrings impressive performance from a 2.26-GHz processor. (★★★★☆)
5	Gateway 300S find.pcworld.com/30281	82	Very inexpensive \$899	Windows XP Home Poor 84	Bargain, compact system is fine for basics, but anemic performance and weak graphics rule out high-end use. (★★★☆☆ Oct 02)
6	Freeway Velocity 135 find.pcworld.com/30782 NEW	81	Inexpensive \$1099	Windows XP Home Good 112	Inexpensive newcomer provides plentiful ports, including S/PDIF for attaching digital audio components. (★★★★☆)
7	Tangent Valera DDR 2000+ find.pcworld.com/25281	81	Average \$1499	Windows XP Professional Good 117	A strong performer with video capture and editing software—but no FireWire ports. Drops \$150 this month. (★★★★☆ June 02)
8	Sys Technology Performance 1800+ find.pcworld.com/29936	80	Average \$1405	Windows XP Professional Good 116	A reasonably good LCD pushes up the price of this basic system. (★★★★☆ Sept 02)
Percent of overall rating ▶			20 percent	20 percent	

Go to find.pcworld.com/10860 for details on PC World's Star Ratings.

¹ Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. For more details, see "Your Guide to the Top 100" on page 139.

² In gigabytes.

³ Vertical cases are towers (over 20 inches), midsize towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches). All-in-one PCs integrate a system and a monitor.

NEW CPUs SEEM TO EMERGE faster than doughnuts from a Krispy Kreme shop. This month we tested several systems based on Intel's new 2.8-GHz Pentium 4, and two are especially hot and tasty. The fastest of the group, the Sys Technology Performance 2800, earned a PC WorldBench 4 score of 129—a new record—and captured third place on the

power side of our new Top 15 Desktop PCs chart; the Xi Computer 4286 MTower finished close behind with a score of 128, helping it take second place on our new Top 5 Entertainment PCs roster.

Most of the new 2.8-GHz systems get some help from 1.066-GHz RDRAM

Visit find.pcworld.com/31007 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION						Extra features	Graphics quality	Setup and ease of use	Vendor's reliability/service
CPU	RAM (MB/type)	Hard drive ¹	Monitor (inches)	Graphics	Case type ²				
1.67-GHz Athlon XP 2000+	512/DDR266 SDRAM	120	19	128MB GeForce4 Ti 4600	Midsize tower	Fair: DVD+RW/+R/CD-RW drive, V.90 modem, network adapter, Pinnacle Studio 7	4	Outstanding	Fair/Fair
2.53-GHz Pentium 4	512/DDR266 SDRAM	120	17 (LCD)	128MB GeForce4 Ti 4200	Midsize tower	Outstanding: DVD-RAM/-R drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Works 2002, Pinnacle Studio 7, Quicken 2002	Good	Fair	Fair/Fair
2.8-GHz Pentium 4	512/PC1066 RDRAM	80	18 (LCD)	64MB Leadtek WinFast A170 DDR T	Midsize tower	Good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, memory card reader, Corel WordPerfect Office 2002	Fair	Fair	3/3
1.8-GHz Athlon XP 2200+	512/DDR333 SDRAM	80	18 (LCD)	128MB Asus V8460UL	Midsize tower	Fair: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Lotus SmartSuite Millennium Edition	4	Good	3/3
2.4-GHz Pentium 4	512/DDR333 SDRAM	40	15 (LCD)	128MB Leadtek WinFast Titanium 200	Midsize tower	Good: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, V.90 modem, network adapter, Intuit Quicken 2001, Sun StarOffice, McAfee VirusScan	4	Good	3/3
2.53-GHz Pentium 4	512/DDR266 SDRAM	120	15 (LCD)	128MB EVGA E-GeForce4 Ti 4400	Midsize tower	Very good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Office XP SBE, CyberLink Power Director	Fair	Outstanding	3/3
2.53-GHz Pentium 4	512/DDR266 SDRAM	160	19	128MB MSI G4Ti4600-VTD	Midsize tower	Good: DVD-RW/-R/CD-RW drive, network adapter, Corel WordPerfect Office 2002, three games	Outstanding	Very good	3/3
10 percent						10 percent	15 percent	5 percent	25 percent

BASE CONFIGURATION						Extra features	Graphics/sound quality	Setup and ease of use	Vendor's reliability/service
CPU	RAM (MB/type)	Hard drive ¹	Monitor (inches)	Graphics	Case type ²				
1.6-GHz Athlon XP 1900+	256/DDR333 SDRAM	60	17	64MB GeForce4 MX 460	Midsize tower	Good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Corel WordPerfect Office 2002	4	Very good	3/3
1.53-GHz Athlon XP 1800+	256/DDR266 SDRAM	62	17	64MB Leadtek WinFast GeForce2 Ultra	Midsize tower	Fair: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter	4	Fair	3/3
1.67-GHz Athlon XP 2000+	256/DDR333 SDRAM	120	19	64MB GeForce4 MX 420	Midsize tower	Fair: 16X DVD-ROM drive, 32X/12X/40X CD-RW drive, V.90 modem, network adapter, Lotus SmartSuite Millennium Edition	4	Good	3/3
2.26-GHz Pentium 4	256/PC1066 RDRAM	80	17	64MB Leadtek WinFast A170 DDR T	Midsize tower	Fair: 16X DVD-ROM drive, V.92 modem, network adapter, Corel WordPerfect Office 2002	Fair	Very good	3/3
1.8-GHz Celeron	256/DDR266 SDRAM	40	17	Integrated Intel 845GL using main memory	Desktop	Good: 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Works Suite 2002, The Sims game	4	Good	Fair/Fair
2A-GHz Pentium 4	512/DDR266 SDRAM	60	17	64MB MSI G4MX440-T	Midsize tower	Good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, network adapter, three games	Fair	Fair	3/3
1.67-GHz Athlon XP 2000+	256/DDR266 SDRAM	80	19	64MB MSI MS-8850	Midsize tower	Fair: 16X DVD-ROM drive, 32X/12X/48X CD-RW drive, network adapter, tool-less drive-bay carriers	4	Fair	3/3
1.53-GHz Athlon XP 1800+	256/DDR333 SDRAM	40	15 (LCD)	32MB Matrox Millennium G450	Midsize tower	Fair: 40X/12X/48X CD-RW drive, network adapter, Corel WordPerfect Office 2002	4	Fair	3/3
10 percent						10 percent	10 percent	5 percent	25 percent

¹ Based on new testing starting in this issue. Insufficient data for systems tested in previous months.

² Insufficient data to give a rating.

memory, known as PC1066, which transfers data 33 percent faster than PC800 RDRAM. Our tests suggest that PC1066 provides a minor overall system performance boost—about 5 percent—over the older RAM type, but it is also more expensive. In addition, early test results indicate

that the Pentium 4 performs just fine with DDR SDRAM, which costs significantly less than either type of RDRAM.

Systems with slightly older processors capture the top two spots on our power chart. Equipped with a 1.67-GHz Athlon XP 2000+ processor, MicronPC's Mil-



THE MICRONPC Millennia XP+ Xtreme commands our new power desktop chart.

TOP 5 ENTERTAINMENT PCs

	SYSTEM		Overall rating	Street price (8/23/02)	PC WorldBench 4 performance score ¹	Faster	Comments
1	Best Buy Gateway 700XL find.pcworld.com/30746	NEW	91	Average \$2999	Windows XP Home	Good 121	Slick-looking system combines solid gaming performance with a great monitor and plentiful storage. (★★★★☆)
2	Best Buy Xi Computer 4286 MTower find.pcworld.com/30779	NEW	84	Inexpensive \$2699	Windows XP Home	Outstanding 128	With the lowest price and highest performance on our chart, this Xi is a good choice for gamers on a budget. (★★★★☆)
3	Alienware Aurora DDR find.pcworld.com/30278		83	Average \$3125	Windows XP Home	Very good 123	The lone Athlon-powered PC here holds its own with good speed, solid graphics scores, and great sound. (★★★★☆ Oct 02)
4	Falcon Northwest Mach V find.pcworld.com/30764	NEW	79	Very expensive \$4018	Windows XP Home	Outstanding 126	This fast, pricey system comes in a spiffy aluminum case. Three-speaker sound is weak compared to competitors'. (★★★★☆)
5	Voodoo Computers Egad Obsidian Black find.pcworld.com/30776	NEW	74	Very expensive \$5997	Windows XP Home	Good 119	This handsome system has the lowest performance score and the highest price on our chart. (★★★★☆)
Percent of overall rating ▶				10 percent	20 percent		

Go to find.pcworld.com/10860 for details on PC World's Star Ratings.

¹ Performance word scores reflect comparisons of entertainment PCs running the same operating system. For more details, see "Your Guide to the Top 100" on page 139.

² Total capacity in gigabytes.

lennia XP+ Xtreme has been going strong since our June issue, and it earns the power Best Buy this month. Its PC WorldBench 4 score of 123 closely matches that of systems with the newer Athlon XP 2200+ processor, such as the number four Polywell Poly 883VR-2200 and the Alienware Aurora DDR (number three on our *Top 5 Entertainment PCs* chart).

Number two on the power side, the new

Gateway 500XL supplies the speed and hard-drive capacity needed for editing digital video. Two FireWire ports (including one on the front panel) let you import video from a camcorder, and a DVD-RAM/-R drive helps you create finished movies for DVD players. Unfortunately, though the included 17-inch LCD monitor is large, its text quality disappointed us.

On the value chart, the top-rated ABS

Bravado 2300 is a bargain-priced model with a premium 5.1-channel sound system and a reasonably good 17-inch CRT monitor. The third-place Micro Express MicroFlex 1800B posted an unusually high PC WorldBench 4 score of 122, thanks to a slightly overclocked processor.

Some noteworthy new systems miss the chart. The well-constructed, silver-and-black 253R from Best Buy subsidiary

TECH TREND

Hard Drive Sizes Climb, but Prices Don't

HARD DRIVE CAPACITIES have been going up almost as fast as high-tech stock prices did during the Internet bubble. For the past several years, areal density—the amount of data that can fit onto a single hard-disk platter—has been doubling about every year. Last summer, the growth slowed just a bit, to 50 percent (from 40GB to just over 60GB). With four platters and 250GB of storage, Maxtor's 5400-rpm Retail Drive 250MB (number nine on this month's *Top 10 Hard Drives* chart) is the biggest desktop model, for now. At press time, Maxtor announced 80GB hard drive platters.

While drive capacities have soared, drive prices have plummeted. The biggest model in our October 1999 hard drive roundup—a whopping 27.2GB Maxtor DiamondMax 6800—cost \$399. Today, Maxtor's 250GB model sells for \$299; that's nearly ten times

the storage for 25 percent less money.

It's true that software requires a bit more space than in the past. For example, Windows XP Professional needs as much as 1.5GB, whereas the Windows 98 SE that came loaded on most systems three years

ago required no more than 255MB. But even that now-puny-sounding 27.2GB hard drive would have had plenty of room to accommodate Microsoft's latest OS, a full complement of applications, and a fair amount of digital music or photographs.

HARD DRIVES

Gigabyte Growth spurts

DATE	Maximum hard drive size (GB)	Average cost per GB
Oct 99	27.2	\$14.67
Mar 01	75.1	\$7.06
Mar 02	160	\$1.88
Sept 02	160	\$1.88
Nov 02	250	\$1.20

Visit find.pcworld.com/31025 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION						Extra features	Graphics/ sound quality	Setup and ease of use	Vendor's reliability/ service
CPU	RAM (MB/ type)	Hard drive (GB) ¹	Monitor (inches)	Graphics	Case type ¹				
2.8-GHz Pentium 4	1024/ PC800 RDRAM	120	18 (LCD)	128MB GeForce4 Ti 4600	Tower	Outstanding: DVD-RAM/-R drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Office XP SBE, Pinnacle Studio 7, Project IGI, Sacrifice	Very good/ Very good	Very good	Fair/Fair
2.8-GHz Pentium 4	512/ PC1066 RDRAM	80	19	128MB Albatron Ti4600	Midsize tower	Good: Combo 12X DVD-ROM/16X/12X/40X CD-RW drive, V.90 modem, network adapter, Corel WordPerfect Office 2002, Deus Ex, MDK2, Motocross Mania	Outstanding/ Very good	Good	1/4
1.8-GHz Athlon XP 2200+	1024/ DDR266 SDRAM	120	19	128MB PNY GFY-Ti 4600	Tower	Good: DVD-RW/-R/CD-RW drive, 16X DVD-ROM drive, V.90 modem, network adapter, Ulead VideoStudio 6	Outstanding/ Outstanding	Outstanding	1/4
2.8-GHz Pentium 4	1024/ PC1066 RDRAM	80	19	128MB EVGA E-GeForce4 Ti 4600	Midsize tower	Fair: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, network adapter, Cyberlink PowerDirector Pro 2.0 ME	Outstanding/ Outstanding	Good	1/4
2.8-GHz Pentium 4	1024/ PC1066 RDRAM	160	22	128MB ATI Radeon 9700	Tower	Good: Combo 12X DVD-ROM/20X/10X/40X CD-RW drive, network adapter, wireless mouse and keyboard, memory card reader, Deus Ex	Outstanding/ Outstanding	Very good	1/4
5 percent						5 percent	8 percent	8 percent	30 percent

¹ Vertical cases are towers (over 20 inches), midsize towers (15.5 to 20 inches), or minitowers (under 15.5 inches).

¹ Insufficient data to give a rating.

Vpr Matrix earned a PC WorldBench 4 score of 119 with its 2.53-GHz Pentium 4 processor and 512MB of 333-MHz DDR SDRAM. The biggest monitor Vpr Matrix offers is a 17-inch CRT, however, and the two tiny speakers that accompanied our test system put out some of the poorest-quality sound we've heard.

Another interesting desktop contender, the Amax Microplex ICube, packs a full system—including a 2.2-GHz Pentium 4 processor and a GeForce4 MX440-based graphics card—into a petite 11.5-by-7.8-by-7.3-inch case that has a convenient handle on top. The package might appeal to gamers who like to tote their PCs to LAN parties, but the ICube managed only fair frame rates in our performance tests.

TOP 5 ENTERTAINMENT PCs

BECAUSE MOST vendors' office and home PCs exhibit fewer and fewer differences these days, we've decided to merge our

Top 15 Office PCs



GATEWAY'S LATEST 700XL tops the entertainment PCs chart.

and *Top 15 Home PCs* charts to create a unified *Top 15 Desktop PCs* chart. Most of the systems appearing on the new chart are general-purpose home-office or small-office models. At the same time, though, we've created three new charts for specialized systems: *Top 5 Entertainment PCs*, *Top 5 Corporate PCs*, and *Top 5 Under-\$900 PCs*; these new charts will rotate monthly.

Like contenders in a drag race, a flashy lineup of supercharged PCs vied for positions on our first entertainment PCs chart. But glamour does not guarantee a winner. Top honors go to the comparatively sedate-looking Gateway 700XL—the latest iteration of a model that has been at or near the top of our Office PCs and Home PCs charts in previous months. One of its finest points is an 18-inch LCD monitor that displayed photographs, DVD movies, and even games beautifully. Though most gamers still favor CRT monitors, this flat-panel contender held its own against the tube-based competition. In second place, the Xi Computer 4286 MTower is the least-expensive system on the chart, but it matched the competition in graphics performance and came very close in sound quality.

Entrants from Alienware, Falcon Northwest, and Voodoo Computers—big names in the game PC business—finished behind the two frontrunners, mainly because of their high price tags. Alienware's \$3125 Auro-




THE ABS BRAVADO 2300, though not flashy, is the best all-around value system.

ra DDR, the sole Athlon-based system, is the most affordable of the three. Originally reviewed in our October issue, it fended off a challenge from Falcon Northwest's new Mach V, which comes in a cool-looking aluminum case. An updated Alienware Area 51 with a 2.8-GHz Pentium 4 processor also vied for a place on the chart; however, at nearly \$1000 less, the Aurora DDR is a better deal.

The most striking system is the Voodoo Egid Obsidian Black, whose glossy metal case features a window into the meticulously ordered interior, illuminated by a fluorescent blue light. It also had the highest frame rates in nearly all our tests. But these positives don't justify spending nearly \$6000. For that much money, you could buy both our number one and number two entertainment models (each of which has a higher PC WorldBench 4 score) and still have enough left over for a discount cross-country plane ticket. ►

TOP 15 NOTEBOOK PCs

POWER NOTEBOOK		Overall rating	Street price (8/16/02)	PC WorldBench 4 performance score ¹ 	Comments
1	Best BUY Dell Inspiron 8200 find.pcworld.com/28021	89	Inexpensive \$2197	Windows XP Home Very good 100	The Inspiron 8200 has lots of features, but guzzles power—its battery lasted just under 2.5 hours. Price drops by \$82 this month. (★★★★☆ Aug 02)
2	IBM ThinkPad T30 find.pcworld.com/29898	86	Expensive \$3099	Windows XP Professional Good 95	Lightweight two-spindle machine is IBM's first with dual pointing devices. It also has Bluetooth and Wi-Fi (802.11b) built in. (★★★★☆ Sept 02)
3	MicronPC TransPort GX3 find.pcworld.com/29897	85	Average \$2619	Windows XP Professional Good 94	A fingerprint reader and an impressive keyboard highlight this stylish laptop, but it has a battery life of only 2.5 hours. (★★★★☆ Sept 02)
4	HP Pavilion ZT1000 Series find.pcworld.com/30248	85	Average \$2499	Windows XP Home Good 98	This wireless-ready consumer notebook offers a plethora of multimedia ports. It will soon be available with a 2-GHz CPU. (★★★★☆ Oct 02)
5	Gateway 450XL find.pcworld.com/30251	85	Inexpensive \$2037	Windows XP Professional Good 91	Features a single-bay design. It's slightly smaller than Gateway's 600XL, and lacks that model's audio-player controls on the front. (★★★★☆ Oct 02)
6	Gateway 600XL find.pcworld.com/30254	84	Average \$2758	Windows XP Professional Very good 100	A generous screen distinguishes this wireless-ready model. Holds two optical drives, three batteries, or three hard drives. (★★★★☆ Oct 02)
7	Toshiba Satellite 1955-S801 find.pcworld.com/30803 NEW	84	Average \$2499	Windows XP Home Outstanding 109	Detachable wireless keyboard lets you work well back from the 16-inch notebook screen; a wireless mouse is also included. (★★★★☆)
Percent of overall rating ▶			15 percent	20 percent	

VALUE NOTEBOOK		Overall rating	Street price (8/16/02)	PC WorldBench 4 performance score ¹ 	Comments
1	Best BUY Dell Latitude C610 find.pcworld.com/21183	82	Expensive \$2208	Windows XP Professional Very good 99	Revamp of older model allows both wireless and standard networking connections to be built in, eliminating the need for PC Cards. (★★★★☆ Apr 02)
2	Fujitsu LifeBook S Series find.pcworld.com/30263	81	Average \$1929	Windows XP Professional Good 94	Wireless-ready ultraportable includes a DVD-ROM/CD-RW combination drive; has the lightest weight and smallest screen on the chart. (★★★★☆ Oct 02)
3	Dell Inspiron 2650 find.pcworld.com/28201	80	Average \$1746	Windows XP Home Very good 98	A basic all-in-one notebook with a DVD-ROM/CD-RW combination drive, but only average battery life and price, even after \$83 drop. (★★★★☆ Aug 02)
4	Compaq Presario 2801CL find.pcworld.com/30806 NEW	80	Average \$1699	Windows XP Home Good 94	Stylish, neat-as-a-pin case features a specialized USB 1.1 connection on the lid for adding a Wi-Fi wireless module. (★★★★☆)
5	Fujitsu LifeBook A Series find.pcworld.com/30269	80	Inexpensive \$1499	Windows XP Professional Good 87	All-in-one is nicely priced for a model with a wireless antenna, but it suffers from awful-sounding speakers. (★★★☆☆ Oct 02)
6	Acer TravelMate 62XCi-D find.pcworld.com/30266	79	Average \$1799	Windows XP Professional Good 94	Wireless-ready, single-bay design includes a DVD-ROM/CD-RW combination drive and a Smart Card reader. (★★★★☆ Oct 02)
7	Compaq Evo N600c find.pcworld.com/25401	79	Expensive \$2478	Windows XP Professional Very good 97	Dual pointing devices and an optional funky, silver wireless module in the lid highlight this square black laptop. (★★★★☆ June 02)
8	Amax Elite 6400W find.pcworld.com/30800 NEW	78	Average \$1999	Windows XP Professional Very good 101	Sleek-looking one-bay notebook comes with a SmartMedia slot and an optical drive conveniently located on the front. (★★★★☆)
Percent of overall rating ▶			20 percent	15 percent	

Go to find.pcworld.com/10860 for details on PC World's Star Ratings.

¹ Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. For more details, see "Your Guide to the Top 100" on page 139.

² Except where noted, all Intel CPUs are SpeedStep chips, which run at a slower speed on battery power.
³ In gigabytes.

COMPAQ'S FLOP, THE CONCERTO notebook, had one. So do a lot of "lunchbox" portable workstations. But only one mainstream notebook vendor—Toshiba—is sticking its neck out again to offer a laptop with a detachable keyboard, and we like it. The \$2499 Toshiba Satellite 1955-S801 slipped onto the power chart this month, landing in seventh place.

A decked-out desktop replacement, the Satellite 1955-S801 has a unique keyboard that pops off for wireless use up to 4 feet away. We found the keyboard easy to type on, whether it was in our laps or on a desk, using its fold-out feet for a tilt. The keyboard's battery, which Toshiba claims

Visit find.pcworld.com/30929 for reviews of all products tested this month and ranked in this chart.

	BASE CONFIGURATION						Extra features ^a	Overall design	Battery life (hours:min) ^b	Average weight (pounds) ^c	Vendor's reliability/ service
	CPU ^d	Screen (inches)	RAM (MB)	Hard drive ^e	Pointing device	Multi-purpose bays					
	1.7-GHz Pentium 4-M	15.1	256	40	Touchpad, eraserhead	1	Very good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office XP Small Business Edition 2002	Outstanding	Average 2:28	Very heavy 9.4	Good/ Fair
	1.8-GHz Pentium 4-M	14.1	256	40	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Bluetooth support	Outstanding	Average 2:30	Light 6.7	Good/ Fair
	1.8-GHz Pentium 4-M	15	256	40	Touchpad	1	Very good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office XP Small Business Edition 2002	Outstanding	Average 2:36	Average 8.0	Fair/ ^f
	1.9-GHz Pentium 4-M	15	512	40	Touchpad	1	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Bluetooth support	Very good	Average 2:20	Average 7.6	Good/ Fair
	1.8-GHz Pentium 4-M	15	256	20	Touchpad	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Works 2002	Very good	Average 2:40	Average 7.5	Fair/ Fair
	2-GHz Pentium 4-M	15.7	512	40	Touchpad	2	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2002	Outstanding	Average 2:33	Very heavy 9.9	Fair/ Fair
	2.2-GHz Pentium 4 ^g	16	512	40	Touchpad	0	Very good: 8X DVD-ROM and 16X/10X/24X CD-RW combination drive, built-in modem and network adapter, Lotus SmartSuite	Average	Average 2:14	Extremely heavy 11.3	Good/ Fair
	5 percent						10 percent	10 percent	5 percent	10 percent	25 percent

	BASE CONFIGURATION						Extra features ^a	Overall design	Battery life (hours:min) ^b	Average weight (pounds) ^c	Vendor's reliability/ service
	CPU ^d	Screen (inches)	RAM (MB)	Hard drive ^e	Pointing device	Multi-purpose bays					
	1-GHz Pentium III-M	14.1	256	20	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Very good 3:56	Average 7.8	Good/ Fair
	1-GHz Pentium III-M	13.3	256	40	Touchpad	1	Very good: 8X DVD-ROM and 16X/10X/24X CD-RW combination drive, built-in modem and network adapter	Average	Average 2:43	Very light 5.7	Good/ ^f
	1.6-GHz Pentium 4-M	14.1	256	30	Touchpad	0	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2002	Average	Average 2:18	Heavy 8.3	Good/ Fair
	1.4-GHz Pentium 4-M	15	384	30	Touchpad	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Average	Average 2:54	Average 7.4	Fair/ Poor
	1.2-GHz Athlon 4	14.1	256	40	Touchpad	0	Good: 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter	Average	Average 2:48	Average 7.6	Good/ ^f
	1.6-GHz Pentium 4-M	14.1	256	20	Touchpad	1	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Average 2:47	Average 7.2	'/'
	1.2-GHz Pentium III-M	14.1	256	30	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Good 3:05	Light 6.7	Fair/ Poor
	2-GHz Pentium 4-M	14.1	256	30	Touchpad	1	Good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Works 2002	Very good	Average 2:25	Average 7.3	'/'
	5 percent						10 percent	10 percent	5 percent	10 percent	25 percent

^a Word score reflects both listed and unlisted features.

^b Unless otherwise noted, all notebooks come with a lithium ion battery.

^c Includes computer, AC adapter, power cord, floppy drive, and optical drive.

^d Insufficient data to give a rating.

^e Single-speed desktop CPU.

is good for 20 days of "normal use," recharges when you reseal the keyboard.

Two new value notebooks made the list this month as well. The fourth-place Compaq Presario 2801CL—a nonconfigurable retail model that you can also buy online—is a good deal for \$1699. It has a

15-inch screen, a combination optical drive, and near-3-hour battery life.

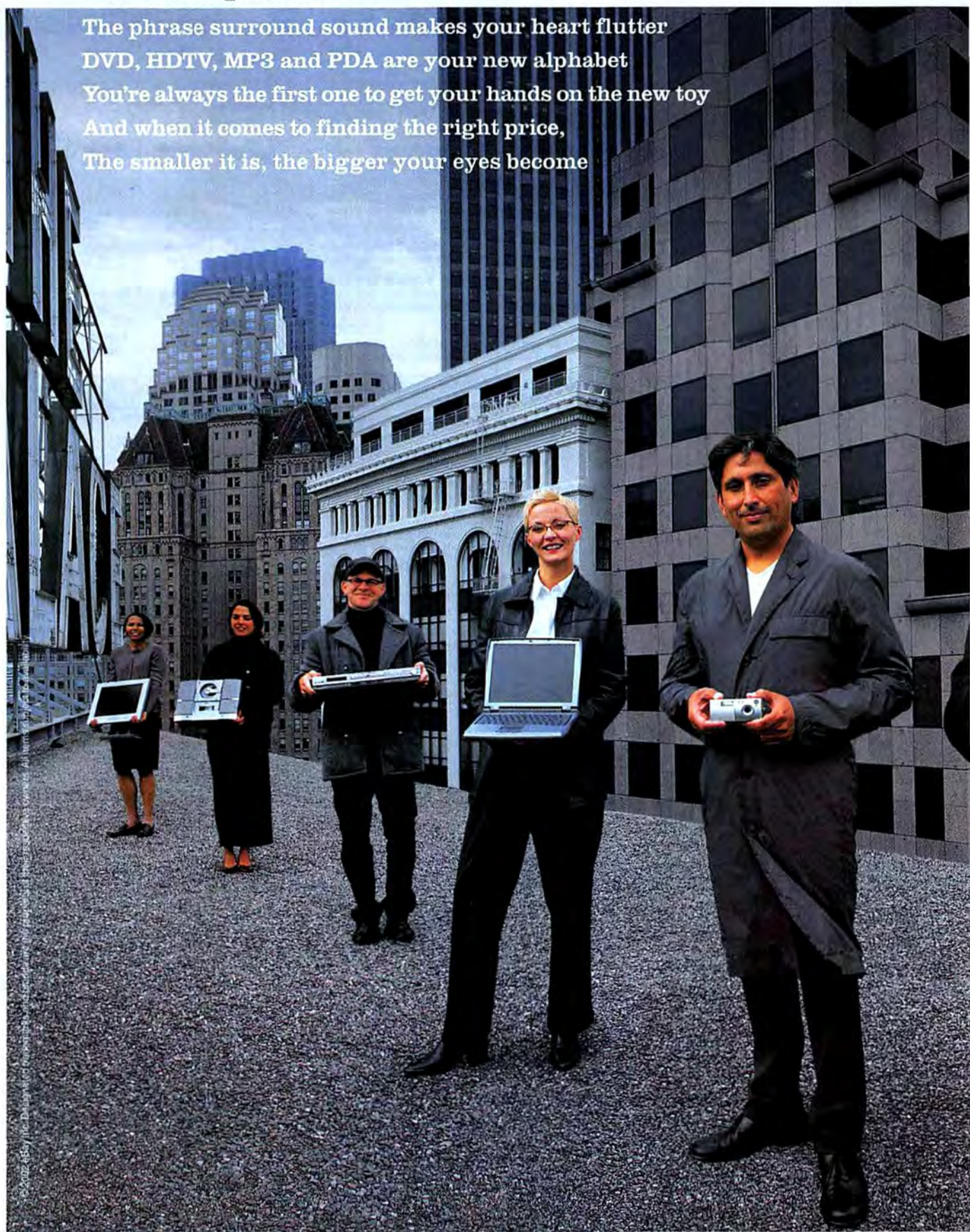
The Amax Elite 6400W grabbed eighth place among value laptops. The \$1999 Elite 6400W is a handsome, black-and-bluish-silver portable with one internal bay and a SmartMedia slot. ▶

COMPAQ'S Presario 2801CL has a USB 1.1 connection on its lid.



The word plasma excites you


The phrase surround sound makes your heart flutter
DVD, HDTV, MP3 and PDA are your new alphabet
You're always the first one to get your hands on the new toy
And when it comes to finding the right price,
The smaller it is, the bigger your eyes become





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Things to know when you do it eBay

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PROVEN SOLUTIONS FOR STORAGE MANAGEMENT

TOP 10 PRINTERS

Visit find.pcworld.com/30995 for reviews of all products tested this month and ranked in this chart.

NEW MODELS TAKE OVER FIVE spots this month. Leading the pack are two HP printers that earned top scores in our photo printing tests; both are priced within reach of frugal buyers. Epson's affordable C62 and C82 printers supplant its high-scoring C60 and C80 models, but their photo printing

quality lags a bit behind that of the debuting HP units. Finally, a new Lexmark that produced some of the best-looking text we've seen from an ink jet earns a place on the chart. Canon has discontinued its top-scoring S520 and S750, but we expect new models to be announced after we go to press. ►

	INK JET PRINTER	Street price (8/23/02)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/graphics	Cost per page monochrome/color (cents)	Comments
1	Best Buy HP Deskjet 5550 NEW find.pcworld.com/30818	\$152	84	4.6/0.9	Good/ Very good	4.4/13.1	FEATURES: Rated 6 ppm monochrome/4 ppm color. 4800-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Prints beautifully clean and detailed photos on glossy paper—among the best we've seen. Text appeared a bit faded and somewhat feathered, however. (★★★★☆)
2	Best Buy HP Deskjet 3820 Color Inkjet NEW find.pcworld.com/30821	\$99	81	4.4/1.0	Good/ Very good	7.2/12.9	FEATURES: Rated 6 ppm monochrome/4.5 ppm color. 4800-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Like its more expensive, top-ranked sibling, the Deskjet 3820 offers crisp, detailed photos; its text in our tests was grayish and washed out. (★★★★☆)
3	Epson Stylus Photo 820 find.pcworld.com/29816	\$99	80	1.9/1.3	Fair/ Good	7.3/17.3	FEATURES: Rated 12 ppm monochrome/not rated for color. 2880-by-720-dpi maximum resolution, 100 sheets input, 30 output. SUMMARY: Optimized specifically for printing photos, this model has slow text speeds but produces beautiful, vivid photos on glossy paper. (★★★★☆ Sept 02)
4	Epson Stylus C82 NEW find.pcworld.com/30824	\$149	80	7.4/1.6	Fair/ Good	2.4/11.1	FEATURES: Rated 22 ppm monochrome/11 ppm color. 5760-by-1440-dpi maximum resolution, 150 sheets input, 30 output. SUMMARY: The fastest printer on the chart also prints nicely detailed photos, though they seemed a tad washed out in our tests. Produced feathering on small fonts. (★★★★☆)
5	HP Deskjet 920c Color Inkjet Printer find.pcworld.com/19264	\$99	79	4.2/0.7	Good/ Very good	6.0/13.8	FEATURES: Rated 5.2 ppm monochrome/2.2 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Gray-scale and color graphics were attractive. Limited 90-day warranty is unimpressive—many other HP printers offer a full year. (★★★★☆ Mar 02)
6	Lexmark Z55se Color Jetprinter NEW find.pcworld.com/30830	\$129	75	7.0/1.1	Very good/ Good	5.0/12.8	FEATURES: Rated 17 ppm monochrome/13 ppm color. 4800-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: The Z55se's dark, black, crisp text is outstanding; photos showed great detail, though images were slightly fuzzy. (★★★★☆)
7	Canon S820 Photo Printer find.pcworld.com/27461	\$249	75	2.4/0.6	Fair/ Very good	1.9/14.3	FEATURES: Rated 2 ppm for photographs; text and graphics not rated. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: The S820 captures a striking level of detail and gives photos lifelike lighting and color. (★★★★☆ July 02)
8	HP Color Inkjet Cpl160 find.pcworld.com/30833	\$300	74	5.7/1.3	Very good/ Outstanding	3.0/6.7	FEATURES: Rated 8 ppm monochrome/7 ppm color. 2400-by-1200-dpi maximum resolution, 150 sheets input, 30 output. SUMMARY: We marveled at the crisp detail and vibrant color in this model's photo samples; color graphics quality was top-notch, with lively hues and great detail. (★★★★☆ Jan 02)
9	Lexmark Z65 Color Jetprinter find.pcworld.com/27441	\$170	74	6.6/1.2	Good/ Good	5.0/12.8	FEATURES: Rated 21 ppm monochrome/15 ppm color. 4800-by-1200-dpi maximum resolution, 250 sheets input, 150 output. SUMMARY: The Z65 is fairly fast and has two input trays for switching media quickly. Print quality was acceptable, but images looked a bit fuzzy and dotted. (★★★★☆ July 02)
10	Epson Stylus C62 NEW find.pcworld.com/30827	\$74	70	6.1/1.5	Fair/ Fair	7.1/17.1	FEATURES: Rated 14 ppm monochrome/10 ppm color. 5760-by-720-dpi maximum resolution, 100 sheets input, 30 output. SUMMARY: Photos printed beautifully on glossy paper and showed natural colors and skin tones. Text was a little washed out, and gray-scale images were brownish. (★★★★☆)

HOW WE TEST: The overall rating for color ink jet printers is based on price (25 percent), print quality (20 percent), features (15 percent), ease of use (15 percent), speed (10 percent), service and support (10 percent), and cost of consumables (5 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings.

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TOP 10 MONITORS

TOP 100

TEST
Center

Visit find.pcworld.com/30935 for reviews of all products tested this month and ranked in this chart.

WE TESTED SIX NEW 19-inch CRT monitors this month, and three landed on the chart—including our new number one Best Buy, Samsung's SyncMaster 957mb. This reasonably priced unit delivered terrific image quality on both our text and graphics tests. We were also impressed by the image

quality and features of the Eizo Nanao FlexScan T766 (which includes a four-port, powered USB 1.1 hub); but this model's high price relegates it to tenth place. Three other 19-inch monitors missed the chart: BenQ's P992, LG Electronics' StudioWorks 900B, and Envision's EN-985e. ►

	19-INCH MONITOR	Street price (8/23/02)	Overall rating	Quality of text/graphics	Comments
1	Best Buy Samsung SyncMaster 957mb find.pcworld.com/30926 NEW	\$370	93	Outstanding/Outstanding	FEATURES: 17.8-inch viewable area, .24mm shadow mask tube, up to 89-Hz refresh rate, ¹ up to 1756 by 1317 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: Great choice for sharp text or brilliant graphics. Navigating this flat-screen monitor's menu controls is intuitive; MagicBright technology enhances images with fixed color-temperature settings. (★★★★☆)
2	Best Buy ViewSonic GS790 find.pcworld.com/10573	\$280	92	Very good/Very good	FEATURES: 18-inch viewable area, .26mm shadow mask tube, up to 95-Hz refresh rate, ¹ up to 1600 by 1200 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: Vibrant, realistic colors make this model a good choice for graphics pros, and sharp text makes it appropriate for word processing, too. Short case depth would suit cramped spaces. (★★★★☆ Sept 01)
3	Dell M992 find.pcworld.com/30914 NEW	\$250	91	Very good/Outstanding	FEATURES: 17.8-inch viewable area, .24mm shadow mask tube, up to 85-Hz refresh rate, ¹ up to 1600 by 1200 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: This attractively contoured, midnight-gray monitor delivers solid text and graphics on a flat screen. The unit's on-screen menu is sometimes hard to understand, however. (★★★★☆)
4	Optiquest 095 find.pcworld.com/10800	\$200	90	Very good/Very good	FEATURES: 18-inch viewable area, .27mm shadow mask tube, up to 80-Hz refresh rate, ¹ up to 1600 by 1200 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: The cheapest monitor on the chart (but not TCO '99 compliant), this is a fine choice if you don't need extras such as USB ports or built-in speakers. Text looked sharp and colors appeared bright. (★★★★☆ Sept 01)
5	IBM P97 find.pcworld.com/18803	\$429	89	Very good/Very good	FEATURES: 18-inch viewable area, .24-.25mm FD Trinitron aperture grille tube, ¹ up to 85-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO '95-compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Display renders sharp lettering and delicately detailed photos—it's a solid choice for heavy text work or video editing. Black case is handsome. Price drops \$70 this month. (★★★★☆ Feb 02)
6	Sony CPD-G420S find.pcworld.com/10577	\$430	89	Very good/Very good	FEATURES: 17.9-inch viewable area, .24-.25mm FD Trinitron aperture grille tube, ¹ up to 85-Hz refresh rate, ² up to 1800 by 1400 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: Well suited for heavy word processing or professional graphics work, but other monitors on our chart cost less and provide comparable image quality. Includes built-in speakers. (★★★★☆ Sept 01)
7	NEC MultiSync FP955 find.pcworld.com/27824	\$350	89	Very good/Good	FEATURES: 17.9-inch viewable area, .24mm Diamondtron NF aperture grille tube, ¹ up to 101-Hz refresh rate, ² up to 1920 by 1440 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: High-end display delivers stronger text than graphics. For \$1019 you can purchase it with a hardware color-calibrator. Five-port USB 1.1 hub comes standard. (★★★★☆ July 02)
8	CTX PR960FL find.pcworld.com/27822	\$340	88	Very good/Very good	FEATURES: 18-inch viewable area, .24-.25mm FD Trinitron aperture grille tube, ¹ up to 102-Hz refresh rate, ² up to 1800 by 1440 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: Unit offers crisp text and vibrant colors for a reasonable price. Complies with the widely used MPRII specification but not with the more stringent TCO standard. Tech support now 24 hours, daily. (★★★★☆ July 02)
9	Compaq MV9500 find.pcworld.com/27823	\$399	88	Very good/Very good	FEATURES: 18.1-inch viewable area, .26mm shadow mask tube, up to 85-Hz refresh rate, ¹ up to 1600 by 1200 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: Sharp text and pretty colors make this flat-screen model ideal for heavy text or graphics use. Has detachable external speakers. Eschews beige in favor of a black bezel with silver accents. A USB hub is optional. (★★★★☆ July 02)
10	Eizo Nanao FlexScan T766 find.pcworld.com/30917 NEW	\$649	88	Outstanding/Outstanding	FEATURES: 17.8-inch viewable area, .24mm shadow mask tube, up to 107-Hz refresh rate, ¹ up to 1920 by 1440 resolution at 70 Hz, three-year warranty, 8-hour weekday toll-free support. SUMMARY: Model delivers bright, detailed images and clear text; has four-port powered USB 1.1 hub. Display quality improves with preset image modes. On-screen display buttons are well-organized and simple to navigate. (★★★★☆)

HOW WE TEST: Twelve judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays screens of typical letters, spreadsheets, Web pages, and photos. Overall rating is based on text and graphics quality (25 percent each), price (25 percent), features and ease of use (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings. All monitors are TCO '99-compliant unless otherwise indicated. ¹ Represents diagonal dot pitch for shadow mask and stripe pitch or varying stripe pitch for aperture grille monitors. ² Maximum refresh rate at 1280 by 1024 resolution (as tested on this size monitor). ³ Uses aperture grille in which parallel wires near the sides of the screen are strung farther apart than those in the middle.



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TOP 10 CD-RW DRIVES

TOP 100

TEST
Center

Visit find.pcworld.com/31073 for reviews of all products tested this month and ranked in this chart.

FOR THE SECOND MONTH IN A ROW, five new drives debut on our chart. Among these are the first three models we've tested that can write to CD-RW at 24X. In our tests copying 100MB of data, writing to 24X CD-RW media at 24X was 14 percent faster than our average time for the same procedure

using 12X media and 12X drives. Of the three, Lite-On's drive stands out as a bargain at only \$100, while Yamaha's \$165 CRW-F1 is the first unit we've seen that can etch a label directly on the unused data portion of a CD-R disc; unfortunately, the label-creation process is inelegant. ▶

	CD-RW DRIVE	Street price (8/30/02)	Overall rating	Performance/support policies	CD-R write speed for 650MB/CD-RW write speed for 100MB (min:sec)	Comments
1	Best Buy CenDyne Lightning IV 48x12x48 CD-RW CDI 00118 find.pcworld.com/30524	\$85	87	Very good/ Fair	2:37/1:08	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 12-hour weekday and 4-hour Saturday support (calls are not toll-free). SUMMARY: This high-flying performer includes a well-illustrated manual. A \$15 price drop lifts it to the top spot. (★★★★☆ Oct 02)
2	Best Buy Sony CRX210A1 find.pcworld.com/31064 NEW	\$100	87	Very good/ Very good	2:38/1:08	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, B's Recorder Gold 3.29 and B's Clip 3.31, one-year warranty, 12-hour weekday and 12-hour Saturday toll-free support. SUMMARY: Fast drive comes with weak documentation; like its 40X predecessor, this drive takes top honors for digital audio extraction. (★★★★☆)
3	Universal Buslink CD-RW 48x12x48 find.pcworld.com/30530	\$80	86	Very good/ Fair	2:36/1:08	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 9.5-hour weekday support (calls are not toll-free). SUMMARY: This drive tied for second-fastest on our CD-R write and audio extraction tests, but documentation is limited. Price falls \$15. (★★★★☆ Oct 02)
4	Pacific Digital Mach 48 CD-RW find.pcworld.com/29906	\$100	86	Very good/ Fair	2:36/1:06	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 12-hour weekday toll-free support. SUMMARY: This model's CD-ROM read performance lags behind that of the fastest drives. A former Best Buy, it drops three spots due to reduced tech support. (★★★★☆ Sept 02)
5	Asus CRW-4012A find.pcworld.com/29561	\$65	86	Good/ Fair	3:27/1:07	FEATURES: 40X/12X/40X, IDE, internal, 2MB buffer, Ahead Nero Burning ROM 5.5 and InCD 3.23, one-year warranty, 11.5-hour weekday support (calls are not toll-free). SUMMARY: Bargain-priced drive achieved fast times on our CD-RW packet-writing tests. Features play, fast-forward, and stop buttons. Price drops by \$10. (★★★★☆ Aug 02)
6	Memorex 48X CD ReWritable Drive find.pcworld.com/31052 NEW	\$85	86	Very good/ Fair	2:36/1:08	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 9-hour weekday support (calls are not toll-free). SUMMARY: Excellent performance and a competitive price make for a respectable showing on our chart; however, tech support is stingy. (★★★★☆)
7	Lite-On 48x24x48 CD-RW LTR-48246S find.pcworld.com/31055 NEW	\$100	85	Outstanding/ Fair	2:32/0:57	FEATURES: 48X/24X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.31, one-year warranty, 9-hour weekday support (calls are not toll-free). SUMMARY: The fastest drive on the chart, this model's 24X CD-RW speed lopped 14 percent off the average time on our rewrite tests. (★★★★☆)
8	Plextor PlexWriter 48/24/48A find.pcworld.com/31061 NEW	\$140	84	Very good/ Fair	2:42/0:59	FEATURES: 48X/24X/48X, IDE, internal, 4MB buffer, Mt. Rainier support, Roxio Easy CD Creator 5.3 and DirectCD 5.3, one-year warranty, 11-hour weekday toll-free support. SUMMARY: An excellent all-around performer, this model logged the second-fastest CD-RW write performance on the chart. Bundle also includes Oak SimpliCD. (★★★★☆)
9	Yamaha CRW-F1 find.pcworld.com/31058 NEW	\$165	84	Very good/ Good	2:58/0:57	FEATURES: 44X/24X/40X, IDE, internal, 8MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.32, one-year warranty, 8.5-hour weekday and 7-hour Saturday toll-free support. SUMMARY: This drive's laser can also etch label images on the underside of a CD-R disc. Software includes Dantz Retrospect Express. (★★★★☆)
10	Samsung SW-240 find.pcworld.com/30539	\$90	83	Good/ Good	3:32/1:14	FEATURES: 40X/12X/40X, IDE, internal, 8MB buffer, Roxio Easy CD Creator 5.1 and DirectCD 5.1, one-year warranty, 12-hour weekday toll-free support. SUMMARY: An 8MB buffer theoretically helps minimize use of the buffer underrun protection, but the drive was a lackluster performer in our CD-RW write and CD-ROM read tests. (★★★★☆ Oct 02)

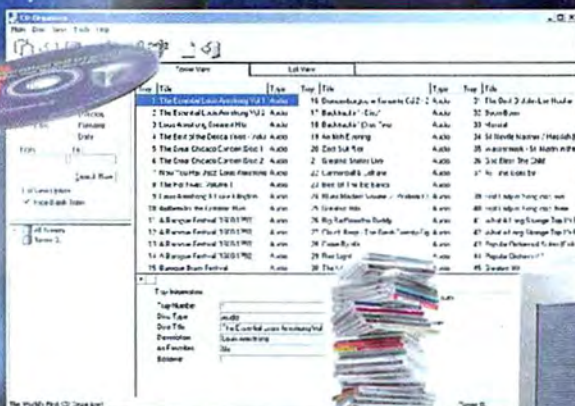
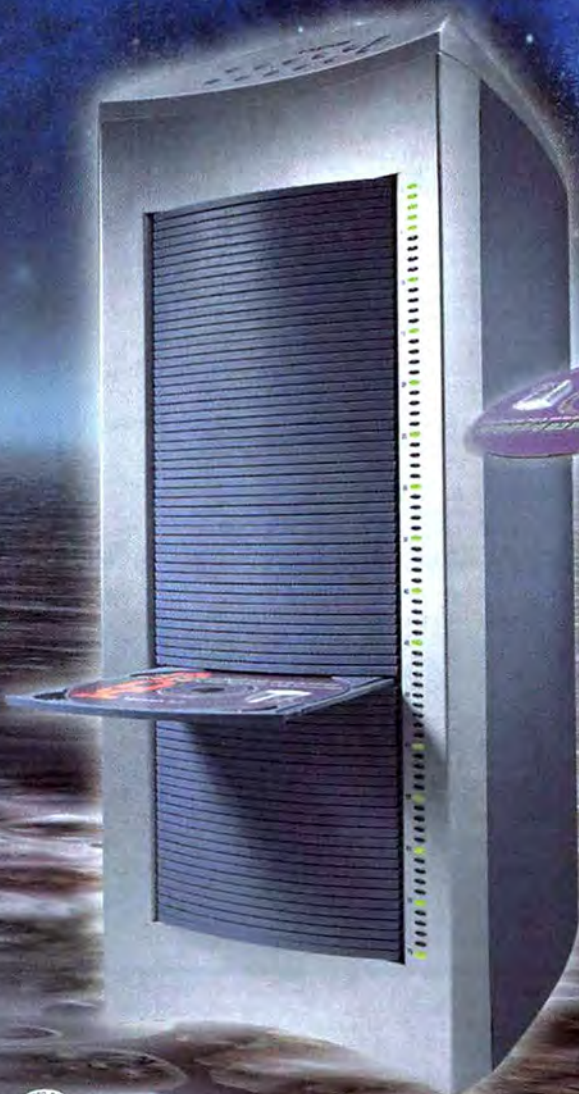
HOW WE TEST: To determine CD-R write performance, we burn data to CD-R discs from an image file and on the fly. We measure CD-RW performance by copying 100MB of files to a CD-RW disc, and then rewriting the same data to the same disc. To gauge CD-ROM read performance, we time how long the drive takes to install Microsoft Office 2000 SBE (disc one); we also evaluate the drive's digital audio extraction speed by extracting 320MB of musical tracks from an audio CD to our hard drive. Overall ratings are based on performance (35 percent), price (25 percent), features (20 percent), tech support policies (10 percent), and ease of installation (10 percent). See find.pcworld.com/10860 for details on PC World's Star Ratings. ¹ Vendor's speed ratings, listed in order: CD-R write/CD-RW write/CD-ROM read. ² Except where noted, all drives use buffer underrun protection.

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TOP 10 HARD DRIVES

TOP 100

TEST
Center

Visit find.pcworld.com/31112 for reviews of all products tested this month and ranked in this chart.

TWO NEW HARD DRIVES from Maxtor demonstrate that performance can be as important as size: The speedy Retail Drive 200GB comes in first place, while the voluminous Retail Drive 250GB costs the same but just makes it onto the chart in ninth place. Meanwhile, Maxtor has reduced its war-

ranty from three years to one year on all of its hard drives.

Note that we report the prices for retail drive kits, which include the mounting hardware, the IDE cable, and screws. Many vendors quote prices for bare drives (without the kit), so make sure you know which you are buying. ➤

	HARD DRIVE	Street price (8/26/02)	Overall rating	Unformatted capacity (GB)	Performance	Comments
1	Best BUY Maxtor Retail Drive 200GB NEW find.pcworld.com/30980	\$299	87	200	Outstanding	FEATURES: 7200 rpm, ATA/133 interface, 8MB buffer, 9-ms average seek time (vendor spec), installation kit, one-year warranty, 12-hour weekday toll-free telephone support. SUMMARY: This speedy drive achieved top scores in all of our performance tests. The cost per gigabyte is reasonable, but the price of admission is high. (★★★★★)
2	Best BUY Western Digital WD800JB find.pcworld.com/29796	\$160	87	80	Very good	FEATURES: 7200 rpm, ATA/100 interface, 8MB buffer, 8.9-ms average seek time (vendor spec), installation kit, three-year warranty, 10-hour weekday and 8-hour Saturday toll-free telephone support. SUMMARY: Thanks to its extralarge buffer, this drive posted high scores in all of our tests. It's a good choice for people who want top performance. (★★★★★ Sept 02)
3	Western Digital WD1200JB find.pcworld.com/29795	\$280	85	120	Very good	FEATURES: 7200 rpm, ATA/100 interface, 8MB buffer, 8.9-ms average seek time (vendor spec), installation kit, three-year warranty, 10-hour weekday and 8-hour Saturday toll-free telephone support. SUMMARY: This drive was one of the top overall performers in our tests, offering a good combination of speed and high capacity. (★★★★★ Sept 02)
4	Maxtor DiamondMax D540X find.pcworld.com/19521	\$180	84	120	Good	FEATURES: 5400 rpm, ATA/133 interface, 2MB buffer, 9.6-ms average seek time (vendor spec), installation kit, one-year warranty, 12-hour weekday toll-free telephone support. SUMMARY: Though a bit slower than other drives, this D540X compensates by offering plentiful capacity at a good price. Maxtor has recently reduced the warranty to one year. (★★★★★ Sept 02)
5	IBM Deskstar 120GXP find.pcworld.com/29783	\$225	83	120	Good	FEATURES: 7200 rpm, ATA/100 interface, 2MB buffer, 8.5-ms average seek time (vendor spec), installation kit, three-year warranty, 13-hour weekday toll-free telephone support. SUMMARY: A fast drive at a reasonable price, this model scored at or near the top in most of our tests. IBM's software could be confusing for a novice user, however. (★★★★★ Sept 02)
6	Maxtor DiamondMax D540X find.pcworld.com/29785	\$250	82	160	Good	FEATURES: 5400 rpm, ATA/133 interface, 2MB buffer, 9.6-ms average seek time (vendor spec), installation kit, one-year warranty, 12-hour weekday toll-free telephone support. SUMMARY: This large drive delivers good performance but doesn't come cheap. You can buy two 80GB Maxtor drives for less than the price of this model. (★★★★★ Sept 02)
7	Maxtor DiamondMax D540X find.pcworld.com/29789	\$110	81	80	Good	FEATURES: 5400 rpm, ATA/100 interface, 2MB buffer, 9.6-ms average seek time (vendor spec), installation kit, one-year warranty, 12-hour weekday toll-free telephone support. SUMMARY: With one of the lowest cost-per-gigabyte figures of the drives tested, this Maxtor is an economical choice for buyers looking for extra storage space at a good price. (★★★★★ Sept 02)
8	Maxtor DiamondMax D740X find.pcworld.com/29787	\$150	80	80	Good	FEATURES: 7200 rpm, ATA/133 interface, 2MB buffer, 8.5-ms average seek time (vendor spec), installation kit, one-year warranty, 12-hour weekday toll-free telephone support. SUMMARY: While a respectable performer, this 7200-rpm drive was slower than several 5400-rpm models in some of our tests, so you don't get much more for the money. (★★★★★ Sept 02)
9	Maxtor Retail Drive 250GB NEW find.pcworld.com/30986	\$299	79	250	Good	FEATURES: 5400 rpm, ATA/133 interface, 2MB buffer, 12-ms average seek time (vendor spec), installation kit, one-year warranty, 12-hour weekday toll-free telephone support. SUMMARY: The largest drive we've seen is expensive, but it has an excellent cost per gigabyte. Though it is slower than many cheaper drives, it is fast enough for general use. (★★★★★)
10	Seagate Barracuda ATA IV find.pcworld.com/29804	\$110	75	80	Fair	FEATURES: 7200 rpm, ATA/100 interface, 2MB buffer, 9.5-ms average seek time (vendor spec), installation kit, three-year warranty, 10-hour weekday toll-call telephone support. SUMMARY: This Barracuda is one of the quietest drives we've tested. Seagate provides an excellent kit with thorough documentation and utilities, but tech support is skimpy. (★★★★★ Sept 02)

HOW WE TEST: Each drive's overall rating is based on price (25 percent), performance (35 percent), features (30 percent), and tech support policies (10 percent). To test performance, we copy 1.3GB of data (first as one large file and then as a number of folders and files) from one location on the drive to another, time how long it takes to open a 105MB file in Adobe Photoshop 6 and perform a number of operations, and time how long it takes to do a find-file operation in Windows. All tests are carried out on a Dell Dimension 8200 with a 2-GHz Pentium 4 CPU, running Windows XP and using the integrated Ultra ATA/100 interface. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings.



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NVIDIA® GeForce4™ MX 440 w/64MB Video Card
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TOP 100

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MISSED AN ISSUE OF *PC World* or passed your copy along to a friend? Here's a recap of other *Top 100* topics from previous issues, or from PCWorld.com. To read reviews of the products ranked on these *Top 10* charts, go online and type in the

PC World Find-It URL at the top of each chart (for example, find.pcworld.com/30293 for products on the *Top 10 17-inch Monitors* chart). Next month we'll look at color laser printers, LCD monitors, and digital cameras over \$500. ■



THE VISIONEER OneTouch 9000 USB is the fastest small-office scanner that we've tested so far. On the other hand, photo image quality could be better.

BROTHER'S HL-1850 is a very fast laser printer with clean image and text quality, and it even includes an internal duplexer—but it's a bit expensive for a nonnetworked printer.



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From the October 2002 Issue	From the October 2002 Issue	From the October 2002 Issue	From PCWorld.com



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"Think of it this way," said my Introduction to Computers professor (whose name is lost to antiquity): "The CPU controls how big a bite your computer takes of a data sandwich, and the RAM determines how fast it can chew it."



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your hardware's manufacturer. Next, you pick the specific model. In an instant you'll see the available upgrade modules, as well as simple installation illustrations to further assist you in selecting the correct component. You can further refine your search by memory type, manufacturer model or, if you know it, the part number. If you're still stuck, click on "I'm not sure," and a Kingston rep will promptly contact you. Sound simple? It is.



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More is often better when you need to transform streams of one and zeros into images. Whether it's an image of a new family member, a house for sale, or Tomb Raider's Lara Croft, you need RAM to make it happen.

Achieving a higher level of performance and extending the life of your system are the two primary reasons why you should look at increasing the amount and speed of your system's RAM. A RAM upgrade is cost-effective and convenient, and best of all, it delivers immediate results.

Savvy users also know they can get improved performance by increasing video-specific RAM. While a video card's components must smoothly integrate to deliver top-shelf 3D performance, the amount and type of RAM is most important. For people who work with digital photos, PC games, and other intense graphic-processing applications, Crucial Technology has just released the Crucial® Radeon™ 8500LE video card.

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128MB of six-nanosecond precision DDR SDRAM doubles the amount of RAM most other cards offer, and gives this card its performance. The card's RAM is manufactured by Micron, Crucial's parent company, and that means you're getting some of the world's highest-quality RAM. And because you're buying from Crucial, you're also getting superior customer service and support and a limited lifetime guarantee.

Also onboard the card is ATI's Graphics Processor Unit to provide you with advanced 2D, 3D, and multimedia graphics performance designed to accelerate Microsoft's DirectX API



and OpenGL graphics. Regular retail price of the card is \$149.99. It is currently available online, at www.crucial.com, for \$134.99, including free second-day shipping within the contiguous U.S.

While that's an attractive price for a high-performing video card, Crucial wants to do more than save you money. They want to assure you that you have received the best value in video cards. Try your new video card for 30 days. If you aren't happy with it, return it to Crucial for a refund. It's that easy.

THE NEED FOR SPEED

Exactly how do you know if you would benefit from a video card upgrade? Well, it's a good bet that if you run multimedia, especially graphics, you're a candidate. Graphics place the biggest processing demands on your system. Whether you work with images from a digital camera, video images from a camcorder, or custom graphics created with Adobe Photoshop or AutoCAD, you need a video card that can handle the demand.

One telltale sign that it's time for an upgrade is reduced performance—for example, hesitation in animated scenes. Other examples occur when you're forced to use a lower resolution, reduce desired background effects, limit the number of colors, or scale back details. Avoid all of these performance-inhibitors with the Crucial Radeon 8500LE video card.





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While many motorists in Dimondale, Mich. say the family-owned Windmill Truck Stop is a home away from home, its controller, Kevin Edelmann, says it's been more like a house of accounting horrors. Besides monitoring retail fuel sales in the truck stop's "truckers only" area, he also has to keep an eye on commuters' and travelers' purchases in the king-sized complex's convenience store, family restaurant, motel, and auto service center. "Keeping track of all of that inventory has been a nightmare," Edelmann says.

The Point of Sale (POS) system that the Windmill had been using since 1982 did a fine job of ringing up sales, but it couldn't tell store managers anything about what was on the shelf. "The system only broke sales down by department," Edelmann says. "So it couldn't tell the difference between a tube of toothpaste and a bottle of shampoo."

Edelmann found only a few POS solutions that were easy to use, Microsoft Windows-based, and able to support multiple input devices. And none of them could manage the 20,000-plus items in the Windmill's convenience store and restaurant. "We desperately needed a solution that could bring all of these components of our business together," he says.



PC AMERICA

Things finally turned around at the Windmill once Edelmann deployed PC America's Cash Register Express (CRE 2000), a Windows-based POS program that works with ordinary PCs and peripherals, as well as barcode scanners, receipt printers, and pole displays (which show charges at the checkout counter). Now all of the Windmill's cashiers can use touch screens and barcode scanners to enter orders and update inventory. And setting up CRE 2000 could not be easier, says Edelmann. "PC America did



The home page for PC America speeds you to the point-of-sale products you need.

an excellent job pulling all of the hardware together initially. But the great thing about their software is that I can grab any component I want off the shelf and throw it together in no time. This is one slick program."

The Windmill has processed more than half a million transactions with CRE 2000 and PC America's Restaurant Pro Express (RPE 2000) since October 1999. And Edelmann predicts that PC America will continue to develop the software he needs to keep things running smoothly. "PC America is constantly improving upon their products," he says.

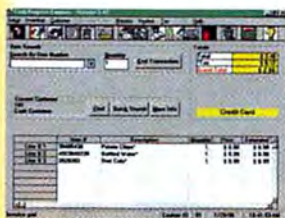
Now PC America is helping retailers like the Windmill to move beyond the sale itself to increase revenues. A new feature in CRE 2000 gives businesses the ability to print coupons on the bottom of sales receipts on an Epson TM-T88II receipt printer. They can use the coupons to advertise specials on slow business days (e.g., "10 Percent Off All Purchases Every Tuesday"), or to give their customers discounts on overstock items (e.g., "Get a Free Six-Pack of Pepsi on Your Next Visit").

CRE 2000's couponing feature promises retailers an excellent route to a crucial dimension in retail sales. "Repeat business is the most important aspect of any business," says PC America's president, Howard Gosman. "With this addition to our POS package, we are giving our customers a quick and easy-to-use method for creating it."



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

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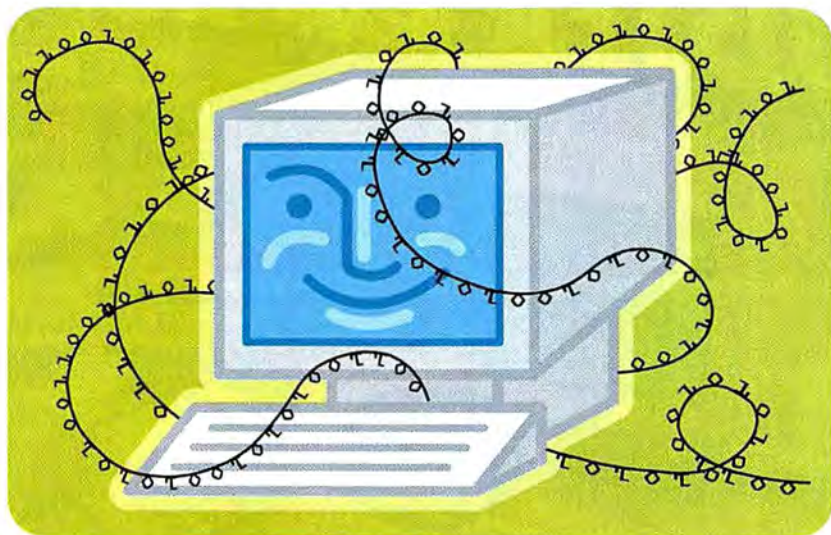
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HERE'S HOW

EDITED BY MICHAEL S. LASKY AND DENNIS O'REILLY



INTERNET TIPS

SCOTT SPANBAUER

Lock Out Internet Pests, Lock In Network Security

TECHNOLOGIES THAT provide us with the greatest benefits often also expose us to great risks. In the case of the Internet, the risk is to your privacy, your files, your identity, and your precious bandwidth. This month an expanded *Internet Tips* digs a little deeper into two security areas that are becoming bigger issues to all users: wireless networks and file sharing.

The main drawback to a home or small-business network is the wiring. That's why wireless networking is the greatest

advance since, well, the Internet. Just buy a wireless access point or router (using either the 802.11b or the faster 802.11a wireless protocol, also known as Wi-Fi and Wi-Fi5, respectively) and a few wireless client cards, install them, and boom—you can check your e-mail at the kitchen table, in bed, or just about anywhere else within a one- or two-block radius.

But therein lies the problem: Unless you've enabled the wireless router's security features, you may be sharing your Net

connection with anybody who cruises slowly by, carrying a wireless-enabled notebook PC or PDA and a copy of NetStumbler.com's NetStumbler software for detecting networks. (Wireless-network infiltrators are known as *war drivers*; see this month's *Privacy Watch*, page 48, to learn more about war driving.) If your network has been insecure for a while, it may even show up in NetStumbler.com's nationwide database of wide-open wireless networks (go to find.pcworld.com/30317 to check—and look out front for parked cars filled with notebook users).

Bandwidth theft isn't the worst part of leaving your wireless network insecure, however. A knowledgeable person can easily capture and view the contents of your wireless-network traffic, including e-mail messages and log-in passwords, or hijack your online identity for nefarious purposes, such as using your network and computers to attack other systems.

Security in the current Wi-Fi versions is inherently flawed. Until the more secure 802.11i version of Wi-Fi is approved, you can't fully secure your network against war drivers. But by employing multiple security techniques, you *can* make cracking into your Wi-Fi LAN difficult enough that access thieves will simply move on to another, less secure network.

Your unsecured home or office network isn't your only vulnerability, however. If the public Wi-Fi network you connect to at an airport, hotel, or coffee shop is unsecured, your passwords, e-mail, and other data are at risk. The person sitting next to you may be there for the cracking, not for the coffee. Here's how to stay safe:

Enable WEP: The 802.11b and 802.11a protocols each include an optional security element called Wireless Equivalent Private

164 INTERNET TIPS

Keep your wireless network and file sharing safe by creating several layers of protection; an Outlook spam killer.

168 WINDOWS TIPS

Fine-tune your Windows installation; show only risky file extensions; <Alt> key shortcuts; DirectX diagnostics.

170 STEP-BY-STEP

A graphics-card upgrade is a fast and simple way to give games and other image-intensive apps a boost.

172 HARDWARE TIPS

Holiday time is a good time to tune up your ink jet printer; a bus comparison; make deleted files truly unrecoverable.

174 ANSWER LINE

How to know which programs can safely access the Internet; put your PC into hibernation; reassociate your file types; save disk space by compressing old files; a cure for bad text pasting.



FIGURE 1: AVOID WEP pass-phrase woes by entering a hexadecimal key in your software.

cy (WEP) that authenticates anyone who wants to access the wireless network, and encrypts all traffic. WEP is flawed in a number of ways that must drive the average cryptography expert right up the wall (University of Maryland computer science professor William A. Arbaugh gathers the damning evidence at find.pcworld.com/30332). Still, some security is better than no security. Your Wi-Fi hardware manuals will tell you how to enable WEP.

Use 128-bit WEP: Wi-Fi equipment supports WEP encryption of either 40 bits or 128 bits. The weaker 40-bit WEP cipher, combined with WEP's other documented flaws, makes a system easy to crack. Note bene: To use 128-bit WEP, you must first make sure that *all* wireless devices on the network support it. Enabling 128-bit WEP on your entire network might justify the expense of replacing your cards that don't support this higher-level security.

Choose good pass-phrases, or go hexadecimal: Part of the process of enabling WEP is to choose a pass-phrase. Unfortunately,

an easily guessed pass-phrase makes WEP even simpler to bypass. Mix upper- and lowercase letters with nonalphanumeric characters, don't use real words (including foreign ones), and avoid transparent tricks such as shifting your hands a key to the side, up, or down before typing an obvious password (like *password*), or making predictable character substitutions (such as *pa55word* in place of *paSSwOrd*). Seasoned war drivers have dictionaries and other tools that run through all these tricks and permutations in no time.

Luckily, the pass-phrase is a convenience you can skip if you want—just make up your own hexadecimal WEP key (a series of two-digit hex numbers) and type it into the setup screens of your wireless router and card (see **FIGURE 1**). Hexadecimal (base 16) numbers start with zero and use the letters A through F as single-digit equivalents of the decimal (base 10) numbers 10 through 15, yielding two-digit quantities like 0B (decimal 11) and FF (decimal 255). Avoid building memorable keys using hex homonyms like A1, 3D, 4F, 2B, B4—the crackers have already thought of that, and they're looking for it.

Encrypt your e-mail log-in: One way to prevent snoops from snatching your mail server password is to use one of several secure log-in methods that encrypt the password before it travels across the network to your ISP's or company's server. Ask tech support which method, if any, is supported; then enable it in your e-mail program. Most support both Secure Password Authentication (SPA) and Secure Sockets Layer (SSL) log-ins (see **FIGURE 2**).

Use IPSec or a VPN: You can replace WEP altogether with one of two better-designed encryption and authentication protocols, although doing so is not for the tech-

timid, and it's not cheap. IPSec is a secure version of the Internet Protocol (IP) networking protocol—the *IP* in *TCP/IP*. As long as both your computer and the wireless router or access point that it communicates with support IPSec, you can skip WEP. Windows XP supports IPSec (for instructions on enabling it, choose *Start • Help and Support* and search for *IPSec* to view a list of articles on the topic). Though wireless routers that support IPSec also exist, that \$150 unit you picked up at CompUSA probably doesn't.

Virtual private networks are a different technology; a VPN creates a secure, encrypted tunnel running between your PC and a remote device (such as a router or your firm's mail server). Again, your operating system and router each need to support VPN connections (most versions of Windows do, but some routers do not). VPNs also provide an excellent solution to the insecurity of public wireless access.

Use 802.1x: Not content to wait around ▶



FIGURE 2: THE SPA OPTION in Outlook Express protects log-in passwords from wireless snoops.

for the more secure 802.11i, several network product vendors support an ad hoc preliminary version called 802.1x that avoids most of WEP's weaknesses. As with IPSec and VPNs, both your wireless access point or router and the PC that communicates with it must speak 802.1x. Windows XP supports this protocol.

Install a firewall on every computer: Since the wireless network is essentially insecure, every computer on your LAN is basically unsafe. Installing one of the free firewalls mentioned earlier and setting it to allow access only to specific known machines on your network as needed (to share a printer, for example) will add an extra dollop of protection to keep Internet pests at bay and security at hand.

SHARE FILES SECURELY

PROGRAMS LIKE Kazaa, Morpheus, and BearShare seem too good to be true. Free files, forever! The legal and moral issues surrounding file sharing are complex, and not all file sharing is criminal. (For

project found that a surprising number of Kazaa users were unknowingly sharing e-mail in-boxes, browser cookies, financial data, and other personal files (for details, see find.pcworld.com/30311). To reduce your vulnerability but still search for those images and sounds, follow these steps:

Skip the spyware: Most commercial file-sharing tools install spyware, adware, or other bandwidth-eating, intrusive utilities you don't want. You can usually choose to block them just by paying attention during installation. However, you can also safely remove unwanted spyware using Lavasoft's Ad-aware (find.pcworld.com/28401). Someone found a way to remove the unwanted applications from Kazaa, creating an underground version called Kazaa Lite. Naturally, Kazaa's owners are doing their best to shut him down, but you can still find and download Kazaa Lite by searching the Zeropa.com file-sharing site. Better yet, use a noncommercial file-sharing tool that doesn't foist unwanted wares on you at all. My current favorite is

Gnucleus (find.pcworld.com/30314), the open-source program that the current version of Morpheus is based on.

Shut the barn door: Make sure you use firewall and antivirus software. Sygate's Personal Firewall Pro and Zone Labs' ZoneAlarm, PC World's top-ranked commercial antivirus and firewall software, respectively, are both free (for reviews, see July's "Protect Your PC" at find.pcworld.com/27361).

Don't share private files: Your file-sharing program creates default upload and download directories. If you dislike the default file-sharing folder location, make another one, but keep it separate from your personal data files (see **FIGURE 3**). And remember: You're sharing not just the shared folder, but every subfolder it contains as well. Those who are truly paranoid (a good thing, in my opinion) can disable file uploads completely.

Don't download viruses: In general, you won't receive a virus from sharing a file if you stick to downloading standard text,

DOWNLOAD OF THE MONTH

SpamNet: The Napster of Outlook Spam Blocking

WHEN IT COMES to eradicating spam, no one tool or technique is best. PC World recently recommended McAfee's Spam-Killer (find.pcworld.com/27424) as the best all-around antispam utility, in part because it works with a variety of e-mail programs. Nick Bolton's MailWasher (\$20 donation requested; find.pcworld.com/30335) helps you nuke spam from your mail server before you even download it. Both are excellent tools, but I sometimes long for a spam eater that does its job without requiring my personal attention. Cloudmark's free SpamNet (find.pcworld.com/30336) may be the answer. The program works exclusively with Microsoft Outlook 2000 and XP (the company says Outlook Express compatibility is on the way). It requires that you first download mail to fry spam, but it managed to find nearly every unsolicited commercial e-mail message that I received over the course of a few days. When it occasionally misses one, I select the message and then click the Block button that SpamNet places in Outlook's toolbar. Conversely, to move back to my in-box the few nonspam messages that SpamNet mistakenly adds to my Spam folder, I simply click the Unblock button. Blocked and unblocked spam is fed back into Cloudmark's database of known spam messages, improving the overall detection accuracy for everyone using the program. It's the anti-spam equivalent of Napster.

image, audio, and video file formats. Your file-sharing program may include filtering to block the download of dangerous types, including .exe, .vbs, and .scr. Archive files—those ending with the .zip, .rar, .sit, or .arj extension, for example—aren't inherently unsafe but still can contain just about anything, including a virus- or Trojan horse-laden file. ■

Send your questions and tips to nettips@spanbauer.com. We pay \$50 for published items. Scott Spanbauer is a contributing editor for PC World.

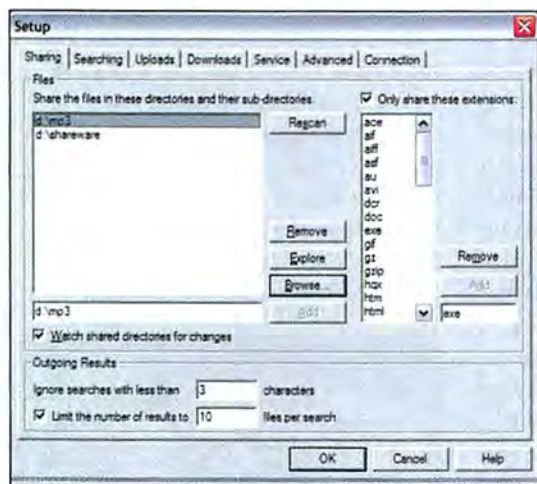


FIGURE 3: CONFIGURE YOUR file-sharing program to serve only folders containing the files you want to share.

more on this issue, see "Hollywood vs. Your PC" on page 127.) Still, you could inadvertently get into serious trouble using one of these programs.

As with Web browsing, e-mail, or any other technology that downloads files to your computer, you could contract a virus or Trojan horse that may destroy data or let someone else control your computer remotely. A recent Hewlett-Packard Labs

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WINDOWS TIPS

SCOTT DUNN

**IDENTIFY YOUR
DIRECTX VERSION**
**SHOW ONLY RISKY
FILE EXTENSIONS**
**GET THERE FAST
WITH THE ALT KEY**

Remove the Clutter Left by Your Windows Installation

Windows XP WINDOWS XP and 2000 add a lot of optional utilities, services, and other baggage to your hard drive when you install each operating system. You can remove some of these nonessentials via Control Panel, but getting rid of others requires a little tinkering with one of your system files.

First, the Control Panel method: In Windows 2000, log on as an administrator, choose *Start•Settings•Control Panel*, and click or double-click *Add/Remove Programs*. In XP, click *Start•Control Panel* and double-click *Add or Remove Programs* (or choose it from your Control Panel menu). Now click the *Add/Remove Windows Components* icon on the left to open the Windows Components Wizard. Check or uncheck items to install or remove them,

respectively. In some cases, you can fine-tune your choices by selecting an item, such as *Accessories and Utilities*, and clicking *Details*. To tune even finer, select a component in the resulting dialog box and click *Details* again (if the button is available). When you've selected or deselected all the components you would like to add or remove, click *OK* until you return to the Windows Components Wizard. Click *Next* and follow the remaining prompts to finish the process. (Go to find.pcworld.com/30218 to read about other ways to clean up your hard disk.)

Unfortunately, Windows XP and 2000 install a number of components that are not listed in these dialog boxes. For example, in XP you see no options for removing Windows Media Player and other multimedia components, Hyperterminal and other communications utilities, or even some games, such as Pinball. Windows 2000 is even worse, providing no options for removing any games at all or for uninstalling accessories such as Calculator and Character Map.

The good news is that reader Eric Roth of West Hurley, New York, has figured out how to force Windows to give up its secrets. Launch Windows Explorer, choose *Tools•Folder Options*, and then click the *View* tab. In the Advanced Settings list, make sure that *Show hidden files and folders* is checked, and click *OK*. Now navigate to the *Inf* subfolder in your Windows or Winnt folder (usually it's in the C: root directory). Inside *Inf*, look for a

file called *sysoc.inf*, which may appear simply as 'sysoc' if you have file extensions hidden. Save a copy of this file to your desktop or to some other easy-to-find location in case you want to return things to the way they are now.

Double-click *sysoc.inf* to open it in Notepad. You'll see several lines under the '[Components]' heading that include the word 'hide'. To make all possible components visible, choose *Edit•Replace*, type *hide* in the 'Find what' box, and leave the 'Replace with' box empty. Click *Replace All* and then the *Cancel* button to close the dialog box. Choose *File•Exit* and click *Yes* when prompted to save the file.

Once the file is saved, return to Control Panel, click or double-click *Add or Remove Programs* (*Add/Remove Programs* in Windows 2000), and select *Add/Remove Windows Components*. This list and the nested lists within some items, such as 'Accessories and Utilities', should have more items than they had before (see **FIGURE 1**). Happy housekeeping!

WHICH DIRECTX VERSION?

MANY GRAPHICS-intensive applications require that you have a recent version of Microsoft's DirectX installed. DirectX enhances your PC's video and audio output to display so-called 3D graphics and produce enhanced sound. To find out which version of DirectX is installed on a Windows 98 PC, search the C: drive for the file *dxttool.exe*. When you find the file, double-click it to see the version displayed at the top of the dialog box. If you don't find *dxttool.exe*, either DirectX is not installed on your PC or your version uses the DirectX Diagnostic Tool.

In that case—or if you have a later Windows version—choose *Start•Run*, type *dxdiag*, and press *<Enter>* to launch the utility. On the first tab (System), you'll see your DirectX version listed near the bottom of the window (see **FIGURE 3**). Satisfied with that version? Make a note of the number and click *Exit*. Not satisfied? Go to find.pcworld.com/30222 to download a more recent version, or click the *Help* button at the bottom of the window to get more information.

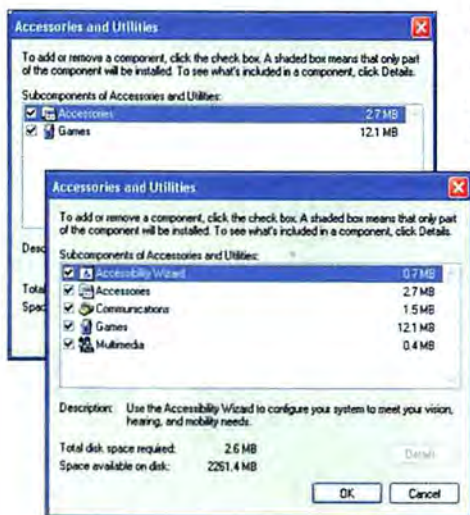


FIGURE 1: MAKE WINDOWS SHOW more components to uninstall by editing sysoc.inf.

MAKE RISKY FILE EXTENSIONS OBVIOUS

ALL Versions

SOME READERS were confused by my June *Windows Tips* column, which advised leaving file extensions hidden (for creating on-screen sticky notes), while the same month's *Internet Tips* column recommended making file extensions visible (to identify potentially dangerous files masquerading as harmless file types).

Both approaches have their merits: Having file extensions visible can make certain malicious programs in your e-mail in-box more obvious—for example, showing a file attachment such as picture.jpg.exe, which would otherwise have the harmless-looking name picture.jpg. On the other hand, displaying all file extensions all the time looks ugly, makes file names more difficult to read, and increases your likelihood of changing a file's extension accidentally when renaming it.

Fortunately, you can have it both ways. With a little editing of the Windows Registry, you can make Windows display only the file extensions of executable files, which you're less likely to rename or interact with directly. First, back up your Registry in case something goes wrong. Head over to find.pcworld.com/30227 for step-by-step instructions. Now choose

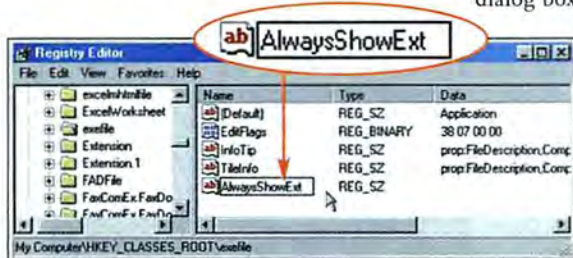


FIGURE 2: ADD THE MAGIC WORD to your Windows Registry to reveal the extension for any file type you want to display.

Start+Run, type `regedit`, and press <Enter>. Double-click `HKEY_CLASSES_ROOT` to expand the list of folders (which are called keys in Registry lingo). Within the `HKEY_CLASSES_ROOT` key, scan the list for a key named `exefile` (not .exe). With `exefile` selected in the left (tree) pane, right-click in the right pane and choose `New>String Value`. Type `AlwaysShowExt` (all one word)

and press <Enter>. The right pane should now have an icon named `AlwaysShowExt`. Exit the Registry Editor (see **FIGURE 2**).

You may need to restart Windows to see the effect, but from now on, all application files will have their .exe extensions visible in folder windows and other programs that display file names, even when 'Hide extensions for known file types' is selected. If you change your mind, you can reverse the effect by deleting the `AlwaysShowExt` icon from the `exefile` key.

For maximum security, repeat the previous steps for the following Registry keys in `HKEY_CLASSES_ROOT`: `cmdfile`, `comfile` (in Windows 2000 and XP only), `batfile`, and `scrfile`. If you're concerned about people sending you harmful script files, add the `AlwaysShowExt` icon to the following Registry keys: `JSFile`, `JSEFile`, `VBEFile`, `VBSFile`, and `WSFFile`.

SPEEDY SHORTCUT ALT-ERNATIVES

ALL Versions

IN THE JUNE 2000 issue, I listed a handful of double-click tricks for getting around your system faster (go to find.pcworld.com/30230 to read about them). You can get even faster access to your Properties dialog boxes by adding the <Alt> key to your repertoire of clicks and double-clicks. Note that Windows XP users who have selected 'Single-click to open an item' in Explorer's `Tools>Folder Options` dialog box should congratulate themselves for already knowing about one of the simplest ways to speed up their work. But

be sure to substitute "single-click" for "double-click" in the following tips.

System, Network, and Recycle Bin Properties: <Alt>—double-click `My Computer` on the desktop to open the System Properties dialog box, and <Alt>—double-click the desktop's `My Network Places` or `Network Neighborhood` (depending on your version of Windows) to open your Network, Net-

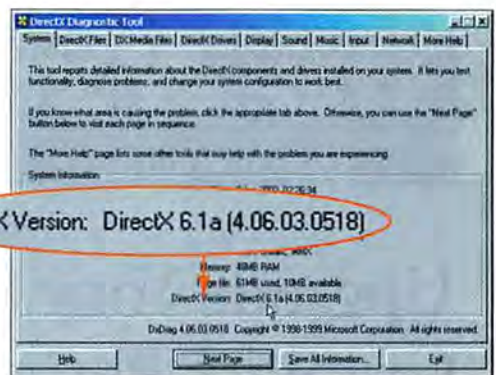


FIGURE 3: USE THIS HIDDEN diagnostic tool to find out what version of DirectX is installed on your system.

work Connections, or Network and Dial-up Connections properties dialog box. Note that in some versions of Windows, these dialog boxes may open in the background (that is, behind any other windows that you currently have open). Finally, <Alt>—double-click `Recycle Bin` to open the Recycle Bin Properties dialog box and check or adjust its settings.

Quick Launch Properties: By <Alt>—single-clicking an icon in the Quick Launch area of your taskbar, you can see its Properties dialog box. And that goes for Desktop, Links, and custom toolbar icons, too (if you've made any of your own).

Launch in back: In some versions of Windows, <Alt>—double-clicking the speaker icon and the clock in the taskbar tray will open the Volume Control and Date/Time Properties (Date and Time Properties in Windows XP) dialog boxes, respectively, in back of any currently open windows. This is a good thing to do whenever you want to be reminded to check your clock or calendar, or to change your speaker volume, after you close the windows that you currently have open.

Other properties: <Alt>—double-clicking most drive, folder, file, and shortcut icons opens their Properties dialog boxes. This is handy if you want to change an item's file attributes or network sharing settings, or you want to give a shortcut a custom icon, among other options. ■

Send your Windows-related questions and tips to scott_dunn@pcworld.com. Windows Tips pays \$50 for published items. Scott Dunn is a PC World contributing editor.

STEP BY STEP

STAN MIASTKOWSKI

Upgrade Your PC's Graphics Performance

OVER THE PAST YEAR, a new generation of PC graphics cards has been exploiting cutting-edge video processors and fast memory to provide eye-popping performance, especially in 3D games and other graphics-intensive applications. In addition, many graphics boards now provide special features such as multiple-monitor setups—the Matrox Parhelia-512, for example, supports up to three monitors. For a complete rundown of the latest cards,

consult October's "High-Flying Graphics Cards" (find.pcworld.com/30716).

While swapping graphics cards is a relatively easy upgrade project, make sure you match your new card to the abilities of your PC and to the applications that you frequently use. Spending \$400 on a new graphics card doesn't make much sense if your PC is more than two or three years old, or if you use your system mainly to surf the Web or work in Excel.

THE TOP DOWN

Benefits: Faster, clearer, high-resolution graphics, especially for games and video.

Cost: Value card, \$100 to \$150; power card, \$250 to \$400

Expertise level: Intermediate

Time required: 15 to 30 minutes

Tools required: Phillips screwdriver, anti-static wrist strap (recommended)

Vendors: ATI (www.ati.com), Gainward (www.gainward.com), Hercules (www.hercules.com), Leadtek (www.leadtek.com), Matrox (www.matrox.com/mga), MSI (www.msicomputer.com), PNY (www.pny.com), VisionTek (www.visiontek.com)

As always, before you begin, make sure that you do a complete backup of your system. (See "Ultimate Backup Guide" at find.pcworld.com/30719 for tips.) ■

Stan Miastkowski is a contributing editor for PC World. Send questions and comments to him at stan_miastkowski@pcworld.com.



1 Get the latest drivers. No matter how new your graphics card is, the manufacturer likely has updated drivers already. Download them from the support section of your card maker's Web site before you begin.



4 Connect the monitor(s). If your new graphics board doesn't have an analog monitor connector, it should come with an adapter for one of the DVI ports. Since many new cards have multiple connectors, read the manual to make sure that you connect your primary monitor to the correct connector.

2 Uninstall the old software. The best way to ensure a trouble-free installation of your new card is to uninstall your current card's utilities and drivers. Go to *Start>Programs*, and see if there's an uninstall entry for your graphics card software. If not, check your current card maker's Web site for information on uninstalling software. Still no luck? Go to Windows' Device Manager, double-click *Display Adapters*, select your existing card, and click *Remove*.

If your PC has integrated graphics on the motherboard (there's no separate graphics card), you'll likely have to disable it before installing a new card. Check your PC manual for details.



3 Swap the boards. Turn off your PC and unplug it from the wall. Disconnect the monitor cable. To avoid static problems, use an antistatic wrist strap according to manufacturer directions. Open the case, remove the screw that holds your existing graphics card, and carefully pull out the card. (Some AGP slots have a clip that holds the front of the card; you may need to release it. Check your manual.) Insert your new card, making sure it's firmly in the slot—many graphics card problems can be traced to an incompletely seated card. Secure it with the screw that you removed earlier.



Insert your new card, making sure it's firmly in the slot—many graphics card problems can be traced to an incompletely seated card. Secure it with the screw that you removed earlier.

5 Install the drivers and software. Reconnect your PC's power cord and turn the power on. Windows should detect the new card and start the Found New Hardware Wizard. Check your card's manual for any special procedures and then follow the on-screen directions. After completing the basic installation, follow the manufacturer's directions to install any software for special features. The final step is to adjust the settings to your preferences.



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HARDWARE TIPS

KIRK STEERS

Make Your Ink Jet Printer Output Sparkle and Shine

IT'S ALMOST TIME FOR holiday greetings. Whether you're reaching out to customers, colleagues, or cousins, be sure that your ink jet printer is ready. These tips will help keep your ink jet running smoothly and its output looking great.

Settle on settings: Get to know your printer's settings by exploring its Properties menu. Click *Start•Settings•Printers* or *Start•Printers and Faxes*, depending on your version of Windows. Right-click your printer and select *Properties*. You should see a selection labeled 'Device Options' or 'Printing Preferences'. Click it to find your printer's Print Quality setting. You'll usually see three modes: Normal, Fast, and Presentation (or High Speed, Normal, and High Quality). The Fast or High Speed setting not only saves time but also stretches the life of your ink cartridge. Use it when quality isn't important.

If you have a color printer, you can speed printing drafts by disabling color matching, or by disabling color printing altogether. For many ink jets, you do so

by clicking the *Color* button under the Graphics tab and changing a setting in the 'Color control' box. Other printers include a gray-scale print option.

For better-quality color printing, check the 'Color rendering intent' setting under the Color button. Verify your color profile under the Color Management tab as well. Windows usually selects the best color profile for your printer, but check with your manufacturer for alternative profiles that are better suited to certain types of paper and other printing situations.

Nudge your nozzles: Ink jets form letters and images by blowing droplets of ink through tiny nozzles onto the paper. Even a slight clog in a nozzle can lead to faint output, blurred text, or unprinted lines running across the page. Many printers have a nozzle-clearing function that blows ink through the nozzles. Use it regularly, especially after long idle periods.

If that doesn't clear out your clogged nozzles, clean them by hand. Dampen a lint-free swab with distilled water and gently wipe the nozzles to remove dried ink. Isopropyl alcohol is a better solvent, but apply it very carefully to avoid damaging other parts of the printhead.

Always shut down your ink jet with its own power switch—not the switch on the surge protector. Many ink jets have a printhead parking function that helps keep nozzles from clogging and is triggered only by the printer's power switch.

Want more information? Scott Dunn tells you how to get the most out of your Windows printer settings at find.pcworld.com/30725, and Steve Bass shows you how to stretch your printer dollars at find.pcworld.com/30728.

ERADICATE DELETED FILES

HARD DRIVES HAVE long memories: Just because you deleted a file doesn't mean it's gone for good. To keep your sensitive data from prying eyes, you need to overwrite it with random data at least once—and if those eyes have access to a supercomputer, up to seven times. So before you give away that old PC or hard disk, make sure its files are unrecoverable by running BCWipe, a free utility that terminates files with extreme prejudice. Go to find.pcworld.com/30731 to download your copy.

BEWILDERING BUSES



I MOVE LARGE PowerPoint files between my laptop, my work desktop, and my home PC. I'm confused by the transfer speeds of various connectors. Which data buses move large files quickest?

Henry Austin, Cambridge, Massachusetts

THERE ARE SO MANY different connectors to choose from that figuring out the best one for a specific application can be a challenge. For starters, some transfer rates are commonly measured in megabytes per second (MBps), and others are measured in megabits per second (mbps); 1 megabyte equals 8 megabits.

Even worse, some of these technologies have more than one name. FireWire is also known as IEEE 1394, Wi-Fi is often

BUS SPEED COMPARISON

CONNECTION TYPE	Maximum bandwidth	
	MBps	mbps
ATA/133	133	1064
ATA/100	100	800
Wide Ultra2 SCSI	80	640
ATA/66	66	528
USB 2.0	60	480
Wi-Fi5 (802.11a)	54	432
FireWire (IEEE 1394)	50	400
Ultra2 SCSI	40	320
Fast ethernet	12.5	100
Parallel port (ECP/EPP)	3	24
USB 1.1	1.5	12
Wi-Fi (802.11b)	1.375	11
Standard ethernet	1.25	10
Bluetooth	0.125	1

FIGURE 1: FIND THE INTERNAL and external buses that offer the speed you need.

referred to as 802.11b, and you could fill a small phone book with all the different names for EIDE and SCSI connectors.

FIGURE 1 lists the theoretical maximum speed at which common connections move data into and out of your PC. Of course, real-world data transfer rates are always slower than these maximums. ■

Send your hardware-related questions and tips to kirk_steers@pcworld.com. We pay \$50 for published items. Kirk Steers is a PC World contributing editor.



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ANSWER LINE

LINCOLN SPECTOR

HIBERNATE YOUR
PC TO SAVE ENERGYADD DISK SPACE
VIA COMPRESSIONCLEAN UP AFTER
PASTING INTO WORD

Which Programs Should I Let Access the Internet?

? I USE ZONE LABS' ZoneAlarm firewall software to protect my system from Net intruders. Sometimes ZoneAlarm asks me if a particular program should be given access to the Internet. How do I decide whether I should grant such access to a program that I've never heard of?

John Piering, Marietta, Georgia

WHEN YOUR FIREWALL asks if a program you're not familiar with should be allowed access to the Internet, just say no. But before you click that No button, make sure you have not checked the option to

memory program access. If not, you can instruct your firewall to remember your "no" answer so it will stop asking.

Search for the program's name on the Web. If something unsavory is going on, there's a good chance that someone has posted a message about it.

One program you're likely to receive alerts about is Svchost.exe, also known as the generic host process. It's a standard part of Windows 2000 and XP, but it's not a program users generally have to worry about or to interact with directly—other programs use svchost to carry out specific tasks, such as accessing the Internet. If svchost can't access the Net, neither can Internet Explorer. Granting such access to svchost is probably safe, although I can't give you a 100 percent guarantee.

Svchost runs processes that other programs give it, and figuring out what those other programs are is nearly impossible. If a new program uses svchost to access the Internet, your firewall should ask if the program is okay, without mentioning svchost. But if a Trojan horse program replaces an existing program or .dll file that accesses svchost, it could gain Net access without getting caught. I've never heard of this happening, but it could.

Is there a defense? Fortunately, yes. Some firewalls, including ZoneAlarm Pro 3, come with component controls. If a change occurs in a program to which you've granted permission—or to a .dll or other component of that program—the firewall will alert you the next time that

program tries to access the Internet. If ZoneAlarm tells you that a program has changed (see **FIGURE 1**), and you haven't updated the program recently, click No.

ENABLE HIBERNATION

? I'VE HEARD THAT hibernation is a great way to reduce the amount of energy my PC uses when it's on but idle. How do I make my computer hibernate?

David Woodard, Dorchester, Wisconsin

HIBERNATION is a cool feature—if your PC supports it. This state differs from sleep or standby mode in that it copies everything in RAM to your hard drive and then completely shuts down your computer so that it uses little or no electricity (modern PCs keep a small trickle going via the front power switch, even when shut off). When you switch it back on, it copies everything back into RAM so you can swiftly return to where you left off.

Not all computers support hibernation. Some can't wake up from it; others seem to wake up completely, but certain peripherals fail to reactivate when the PC does. (On the other hand, many computers will hibernate and wake up just fine.) If you encounter trouble of this sort, try updating the hardware's drivers.

To enable hibernation, first select *Start>Settings>Control Panel*. (In Windows XP, select *Start>Control Panel*; if you see *Switch to Classic View* at the top of the Explorer bar, click it.) Next, double-click the *Power Options* icon. In the *Power Options Properties* dialog box, click the *Hibernate* tab. (If there is no *Hibernate* tab, your system doesn't support hibernation.) Check



FIGURE 1: A CHANGED PROGRAM alert in ZoneAlarm may indicate a Trojan horse.

remember the answer—for the time being, you want to be notified each time the program tries to get through.

If it turns out that declining to grant the access request prevents you from doing something you want to do, give the mys-

PASTE MINUS FORMATTING

IF YOU'RE TIRED of changing the fonts and indentation of text you're pasting, there's an easy solution—and it costs only \$5. Clip Strip, a shareware program by Innovative Software Creations, easily removes all formatting from whatever text is in the Clipboard. All you do is copy your formatted text, click the Clip Strip icon (I keep mine in my Quick Launch toolbar), and then paste the plain text. Go to find.pcworld.com/30302 to download a trial version of the program.

Enable hibernation or Enable hibernate support, depending on the version of Windows you're using, and click OK.

Once you've enabled hibernation, you can make your computer hibernate via its shutdown options. In Windows 98, Me, or 2000, select **Start>Shut Down**. Choose **Hibernate** and then click OK. In Windows XP, select **Start>Turn Off Computer**. While the 'Turn off computer' dialog box is open, either hold down the **<Shift>** key to see the **Hibernate** button or just press **H**.

Windows 98, Me, or 2000, **<Shift>**-right-click a file of the associated type and then select **Open With** (or **Open With>Choose Program**). Once there, select the program you want that file type to be associated with, check **Always use this program to open this kind of file**, and click OK.

You can restore all of your associations at one time by using a backup of the Windows Registry—though this will affect more than your associations. Just in case you haven't made a backup, Windows

automatically backs up your Registry at regular intervals. For instructions on restoring your Registry, see Kirk Steers's "Fix PC Woes by Going Back in Time" (find.pcworld.com/30299). Kirk's instructions for Windows Me apply to Windows XP as well.

In any case, it's best to make a separate backup of all your associations before disaster strikes. To do this, select **Start>Run**, type **regedit**, and press **<Enter>**. Navigate the Registry Editor's left pane to **My Computer\HKEY_LOCAL_**

MACHINE\SOFTWARE\Classes. Choose **Registry>Export Registry File (File>Export in Windows XP)**. Name the file **associations**, and save it to My Documents.

If a program should happen to claim the wrong associations, simply open My Documents, double-click the associations file, and click **Yes**. Your associations will return to their earlier state as of the backup. Best of all, only file types that were associated with something at the time of the backup will be affected. If you've added a new file type and association since the backup, they won't change.

COMPRESS OLD FILES

WINDOWS XP's Disk Cleanup utility tells me that I can regain more than 1.5GB of space by selecting 'Compress old files.' Will I regret doing this?

Scott Ferguson, Indianapolis

THIS FEATURE IS available in Windows 2000 and XP, but exclusively on NTFS-formatted drives. To find it in XP, select **Start>All Programs>Accessories>System Tools>Disk Cleanup (Start>Programs>Accessories>System Tools>Disk Cleanup in Win-**

dows 2000). It compresses files older than 50 days. If you need the extra disk space, compressing old files is a good idea.

The compressed files are still accessible—Windows decompresses them on the fly when you open them—but they may take a little longer to open. You can tell a file is compressed because its file name is blue in Windows Explorer.

Is compressing files safe? The technology has been around for about a decade now, and it's well supported by utilities, so yes, it's probably safe.

Whenever you want to return a compressed file to its uncompressed state, right-click it and select **Properties**. Click the **Advanced** button, uncheck **Compress contents to save disk space**, and click OK.

CLEAN UP PASTED TEXT

WHEN I PASTE text from Outlook Express into Microsoft Word, I often get symbols that look like little bent arrows at the end of lines or paragraphs. How do I get rid of them?

Richard G. Schultz, Marietta, Georgia
I'LL NEVER CEASE to be amazed by the many little incompatibilities that crop up between different Microsoft applications.

Word calls those bent arrow thingies "manual line breaks." They mean "End this line here, but don't consider the next line a new paragraph."

If you want to replace them all with real returns, press **<Ctrl>+H** to bring up Word's Find and Replace dialog box. In the 'Find what' field, enter **^l** (that's a caret followed by a lowercase L, Word's search code for manual line breaks). In the 'Replace with' field, enter **^p** (Word's search code for hard returns). Click **Replace All**.

You may also get manual line breaks at the end of each line, and two breaks at the end of each paragraph. In that case, do two searches. First, replace **^l^l** with **^p** (see FIGURE 2). Next, replace **^l** with a space. For more on cleaning up pasted text, see "Paste Minus Formatting," page 174. ■

Send your questions to answer@pcworld.com. Answer Line pays \$50 for published items. You'll find Contributing Editor Lincoln Spector's humorous writings collected at www.thelinkspector.com.

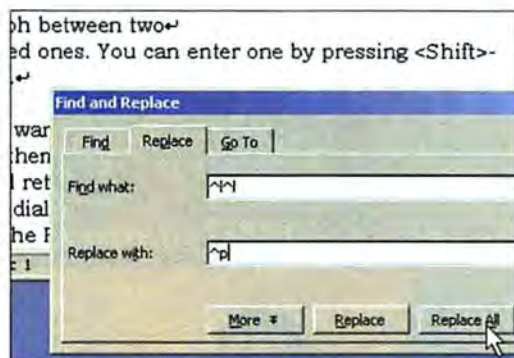


FIGURE 2: ELIMINATE LINE BREAKS pasted into a Word document by using the Find and Replace feature.

Want an even easier way to make your system hibernate? Return to the Power Options Properties dialog box and click the **Advanced** tab. In either the 'When I press the power button on my computer' or 'When I press the sleep button on my computer' drop-down menus, select the **Hibernate** option and click OK.

RESTORE FILE ASSOCIATIONS

MY PC HAS BEEN hijacked by a program that associated itself with more than half the file types on my system. Uninstalling the malefactor didn't help. Is there a way out of this dilemma?

Steven Gerner, Chandler, Arizona

THAT DEPENDS ON how well prepared you are. I'll offer some fixes in case you're not protected, and tell you how to prepare for the next time this happens.

You can restore individual associations pretty easily from the Open With dialog box. To get there in Windows XP, right-click a file of the associated type and select **Properties**, click the **Change** button across from 'Opens with', and then, if necessary, choose **Select the program from a list**. In

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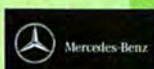


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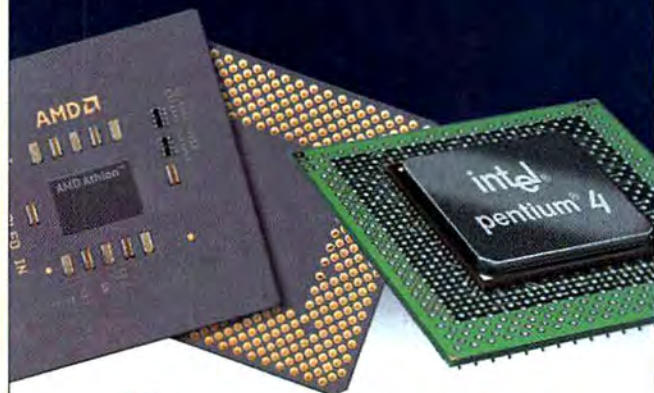
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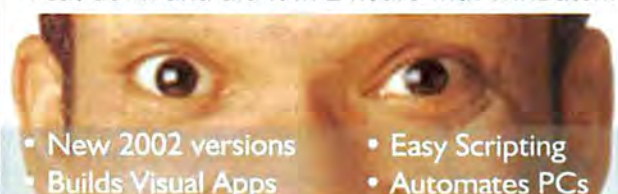
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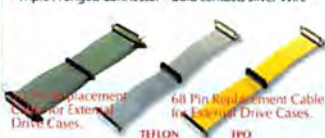
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Trust: Technology's No-Way Street

WHATEVER HAPPENED TO TRUST? Here's Microsoft CEO Steve Ballmer talking to analysts and reporters on July 25, after the company had signed an SEC consent order prohibiting it from misrepresenting its financial results: "Our values: Integrity and honesty is number one, full stop."

Oops! Two weeks later, the company agreed to another consent order, forbidding outright misrepresentations the Federal Trade Commission found in Microsoft's claims about security, privacy, and parental controls in its Passport service.

Where Microsoft leads, the industry follows. In an era in which corporate balance sheets arouse derision, it's tough to trust the titans of technology. Instead of inspiring confidence, their corner-cutting practices—in everything from quality to support—provoke suspicion and resentment.

Take the cell phone industry. It knows where your handset will work and where calls will die. It just won't tell you. Among the always-overoptimistic coverage maps, my favorite is the Verizon site's rendition of the United States in an uninterrupted bright red labeled "National SingleRate Rate Area"; below the map is tiny type stating that "the mapped territory contains areas with no service." Right: like the majority of them.

When Hewlett-Packard got caught misstating the number of colors some of its PDAs could display, the company quickly offered refunds. But when Palm recently had the same problem with its Palm

forcing you to download and install dozens of megabytes of fixes. Too bad if you thought you were getting the newest bits and you have only dial-up access.

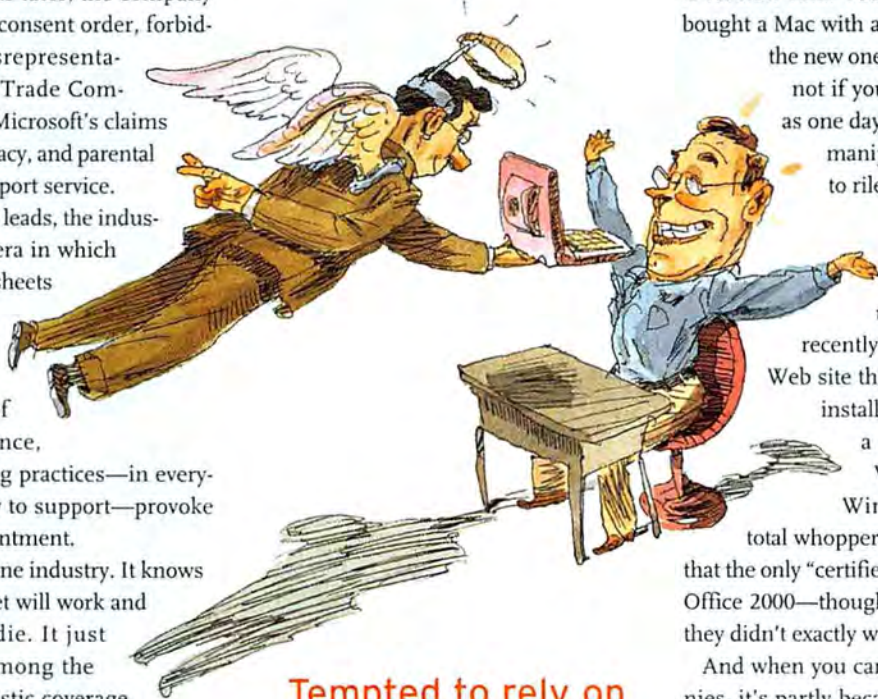
Mac users are hardly immune. Apple charges a stiff \$129 to upgrade to Mac OS X version 10.2. You get \$110 off if you bought a Mac with an older version after the new one was announced, but not if you bought it so much as one day before. This kind of manipulation never seems to rile the Mac faithful.

Do smaller companies compete on integrity? Linux upstart Lindows.com recently claimed flatly on its Web site that "With LindowsOS installed, you will not need a copy of Microsoft Windows to run Windows software"—a total whopper. Later, Lindows said that the only "certified" apps were parts of Office 2000—though when I tried them, they didn't exactly work well.

And when you can't trust tech companies, it's partly because they don't trust you. A perfect example: the user-hostile "activation" software built into the latest versions of Office and Windows to thwart piracy. Microsoft treats all its customers as if they were rotten apples.

Depressing: In the tech world, trust has become a no-way street. ■

Contributing Editor Stephen Manes has written about PCs for nearly two decades and was cohost of the public television series Digital Duo.



Tempted to rely on the integrity of tech vendors? Good luck!

M130, it initially offered merely excuses. Only after a class-action lawsuit arose did the company do the right thing.

I've written elsewhere about Microsoft's outrageous policy of selling products with bugs long after they've been patched; as I write, the Windows XP that you get with a PC or buy in a box is still the original,



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- 17" (16.0" v.i.s., 25dp) M782 Flat Screen Monitor
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- 16x Max DVD-ROM Drive
- 40x/10x/40x CD-RW Drive with Roxio's Easy CD Creator® (2nd bay)
- SB Live! 1024V Digital Sound Card
- Harman Kardon HK-395 Speakers with Subwoofer
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