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Mark Frauenfelder
Freelance writer and illustrator

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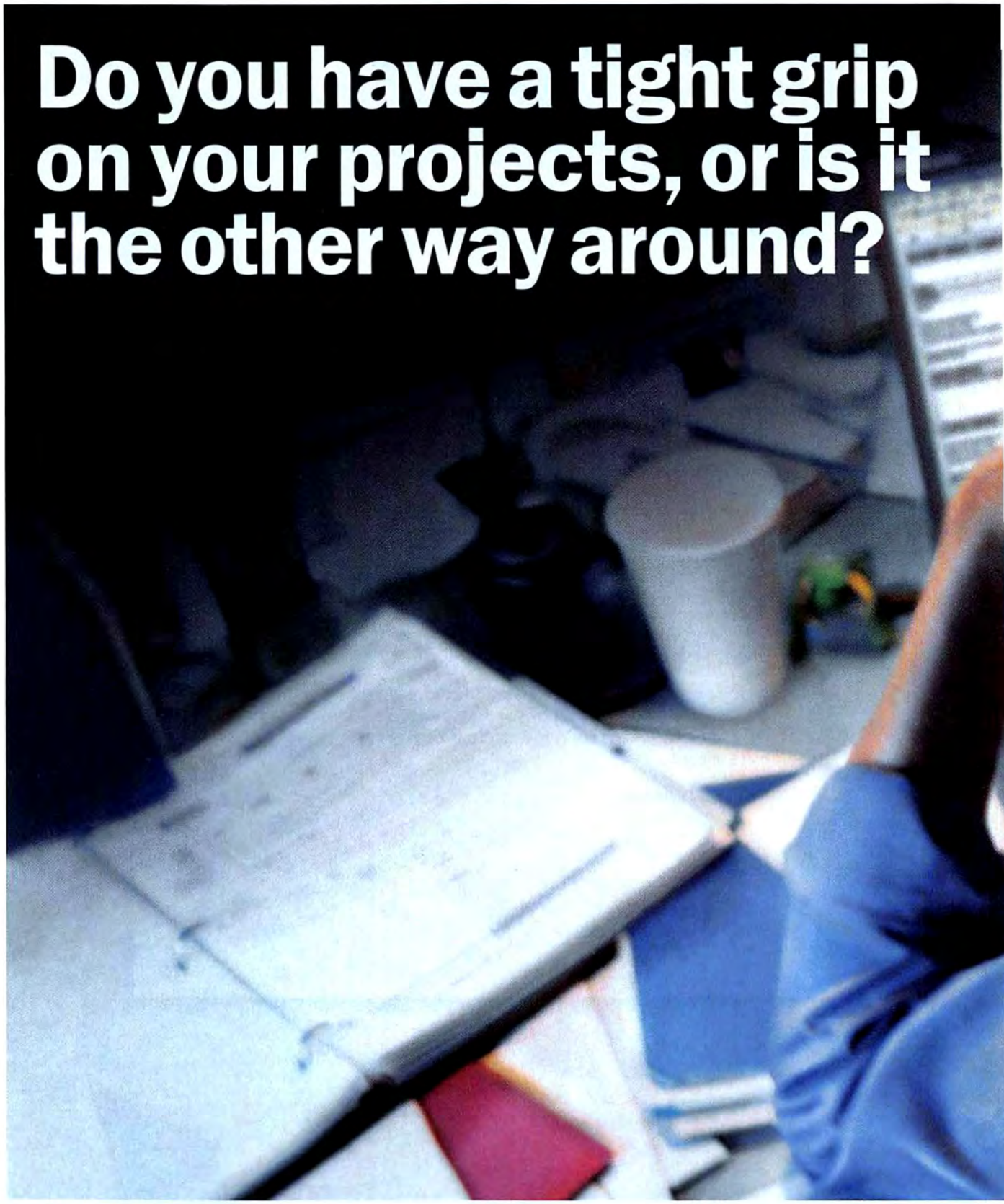
Mark Frauenfelder ended his "bad relationship" with a PC last year and bought a Mac. Learn how easy it is for you to make the switch at apple.com/switch.



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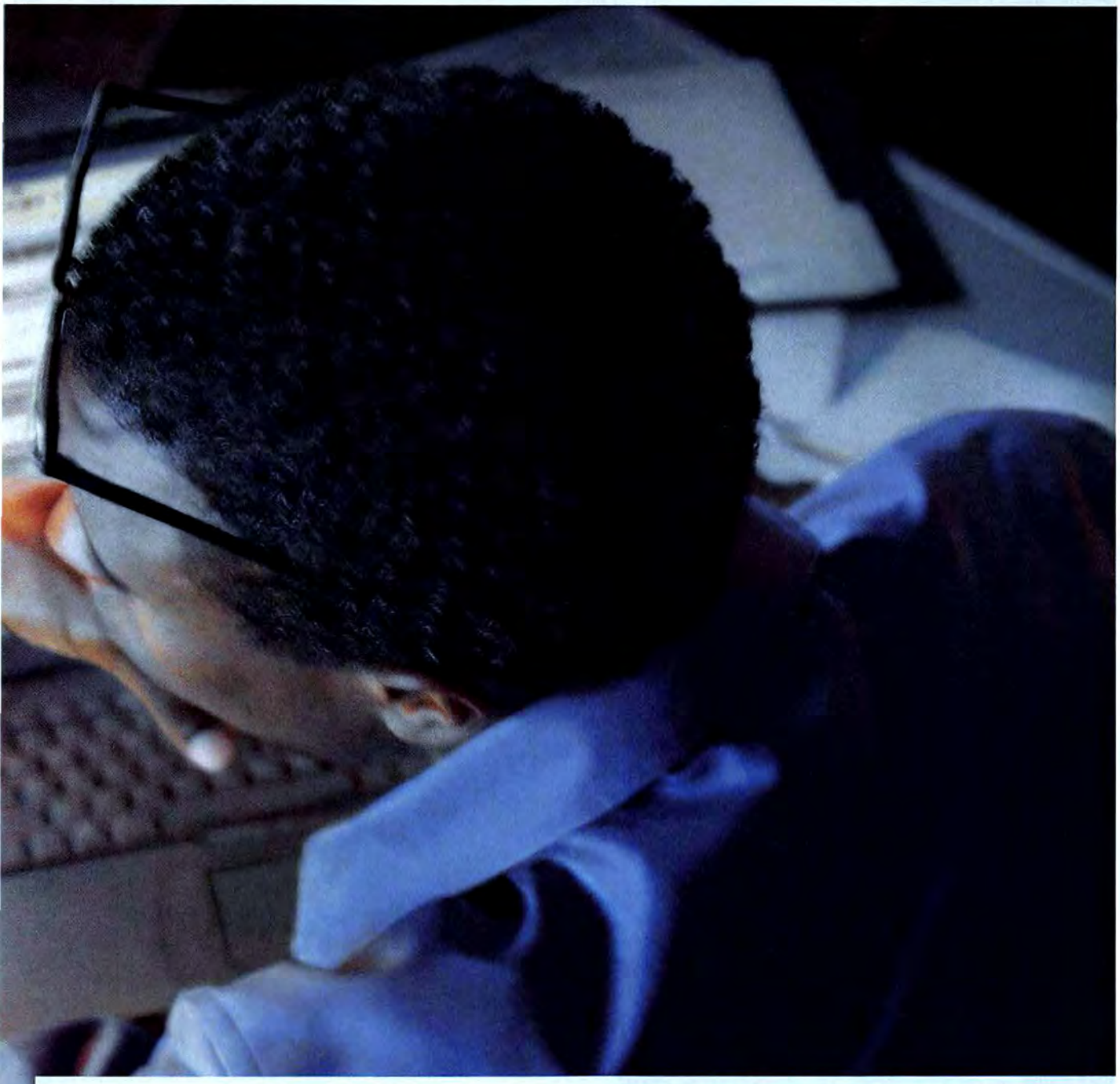

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BACKUP

84 Data Saviors

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99 Souped-Up Scanners

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68 Best of Today's Web: Greatest Hits, Hidden Gems

The dot-com shakeout hasn't left the Net bereft of useful, fun, and informative sites. After scrutinizing thousands of Web pages, we've collected a treasure trove of more than 50 outstanding free and fee-charging sites, ample proof that the Web is better than ever. Some of these sites are obscure, and some that you already know about have great new features. All are superb.

Cover Illustration by Steve Lyons

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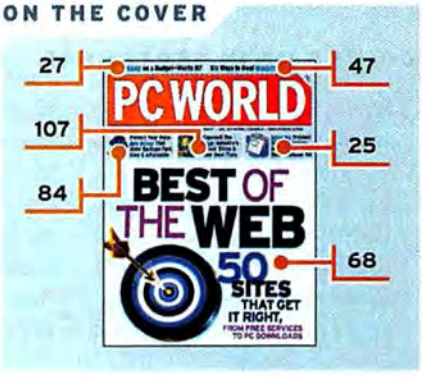

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COMING UP IN SEPTEMBER

Buying Guide Special Issue: We tap the wisdom of our editors and contributors to help you make well-informed decisions when you purchase PC equipment. Whether you're in the market for an upgraded component, a better peripheral, or a whole new system, find out which features you need, which specs are most important, and where your money is best spent. **Mail-Order Shopping:** We uncover the best and worst vendors online. Learn how to pick a site you can trust, evaluate bottom-line prices, and avoid getting ripped off.

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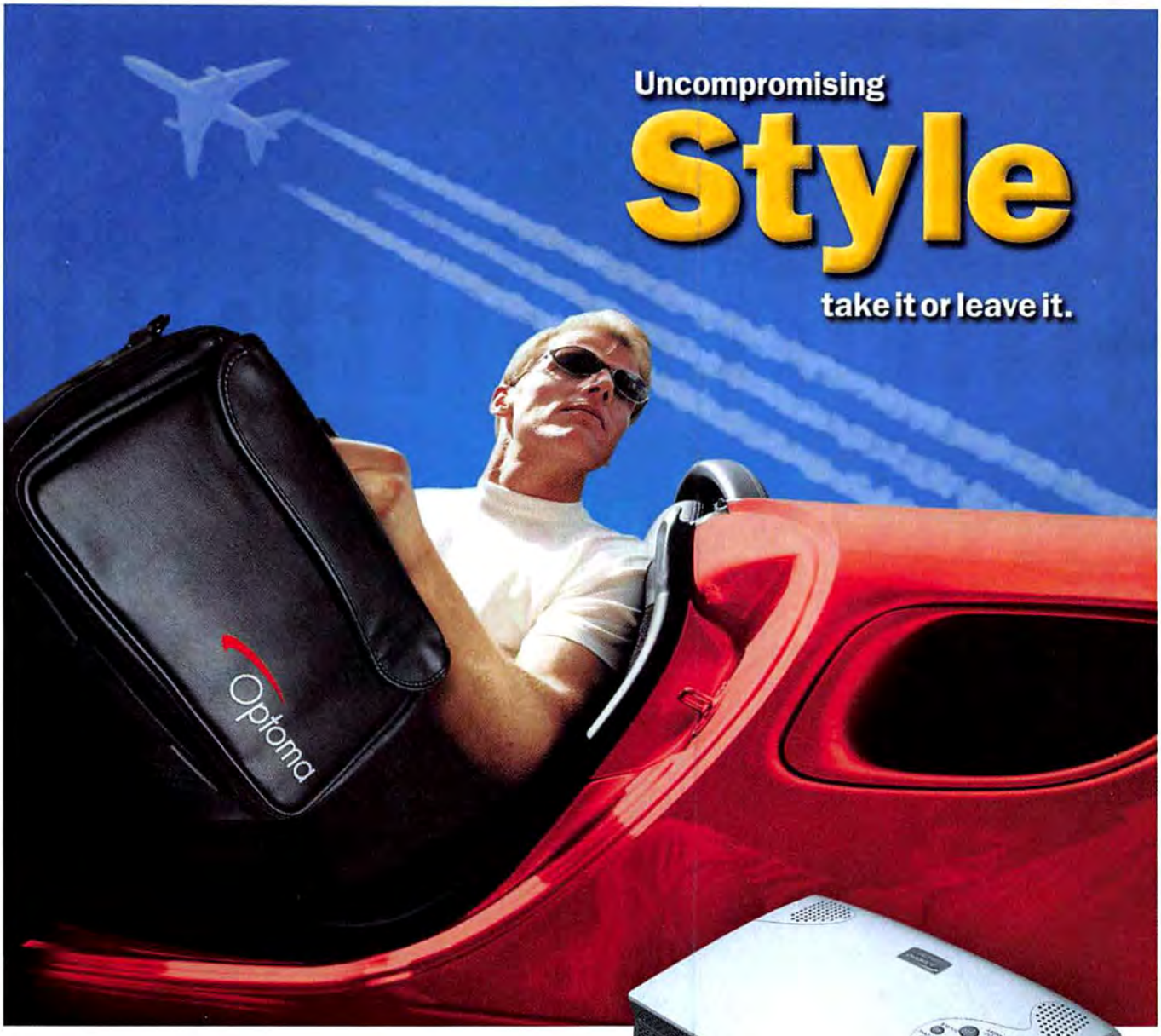

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UP FRONT

KEVIN McKEAN

The Secret War for Your In-Box

WHAT DO YOU DO when you get an e-mail with "Make $1000 a Day in Your Spare Time!!" in the subject line? You probably hit the Delete key before you get to that second exclamation mark. Not *PC World* Contributing Editor Daniel Tynan—and thank goodness he doesn't.

For the past couple of years, Tynan has been stockpiling junk e-mail, trying to determine who's sending it and why. "Everybody hates spam, but everybody is getting more of it," by some estimates 50 percent more than in 2000, says Tynan. "So clearly spam works for the senders. I thought it would be interesting to take a look at how the money is made."

The result is the intriguing story that begins on page 107, "Spam Inc." Tynan, a former executive editor at this magazine, interviewed bulk e-mailers and their enemies to shed light on the war for your in-box. "Many of the antispammers run ISPs," he says. "They're trying to figure out a way to keep spam off their servers, since it costs them so much to handle all that unsolicited mail."

One tactic is to set up "spam traps"—e-mail addresses that exist solely to catch unsolicited messages. Services such as Brightmail (www.brightmail.com) monitor spam traps and then employ information from the trapped messages to block similar mailings to their clients.

SPAMMERS FIGHT BACK

BULK E-MAILERS, in turn, compile lists of antispammers to avoid being spotted. Some have even set up spam traps of their own: One spammer whom Tynan befriended maintains mailboxes on AOL to find out whether the e-mail he sends to its members gets through. If AOL blocks a mailing, he simply changes the message wording or his Internet address. (For the latest PCWorld.com news about spam, see find.pcworld.com/29633.)

DANIEL TYNAN exposes spammers' ploys.

Legally, spam falls into a gray area. Some 24 states regulate it; Delaware bans it entirely, though the state has yet to bring any enforcement actions. Congress is considering several antispam laws, including one that would permit fines of up to $500,000 for using a phony subject line or return address. And many trade and advocacy groups have weighed in, among them the Direct Marketing Association (see find.pcworld.com/29684) and the Coalition Against Unsolicited Commercial E-Mail (www.cauce.org).

Some spam opponents are against half-measures. "You either ought to ban unsolicited bulk e-mail outright or not legislate it at all. A compromise approach will just legitimize spam," says Professor David E. Sorkin of the John Marshall Law School in Chicago. Sorkin runs a Web site (www.spamlaws.com) on the subject.

SHOULD IT BE BANNED?

IN MY MIND, though, outlawing spam poses problems. What if an unsolicited message is the modern-day equivalent of Paul Revere warning that the British are coming? More prosaically, what if I really do want to Make $1000 a Day in My Spare Time? It's hard to write laws protecting people from their own stupidity without bumping into free-speech issues. That may be why the Federal Trade Commission has mainly attacked spam in which the message itself is allegedly fraudulent.

In the meantime, your best solution lies with outfits like Brightmail, SpamKiller (find.pcworld.com/27424), and Postini (www.postini.com). Postini, for example, applies rules to each message that calculate the likelihood of its being spam. "You can set the level of protection you want," Tynan explains. "At maximum protection you'll see little or no spam—but you might miss a real message or two that the system misidentifies. With minimal protection you'll get more bulk mail, but you probably won't miss much." At least that gives you some degree of control. ■

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

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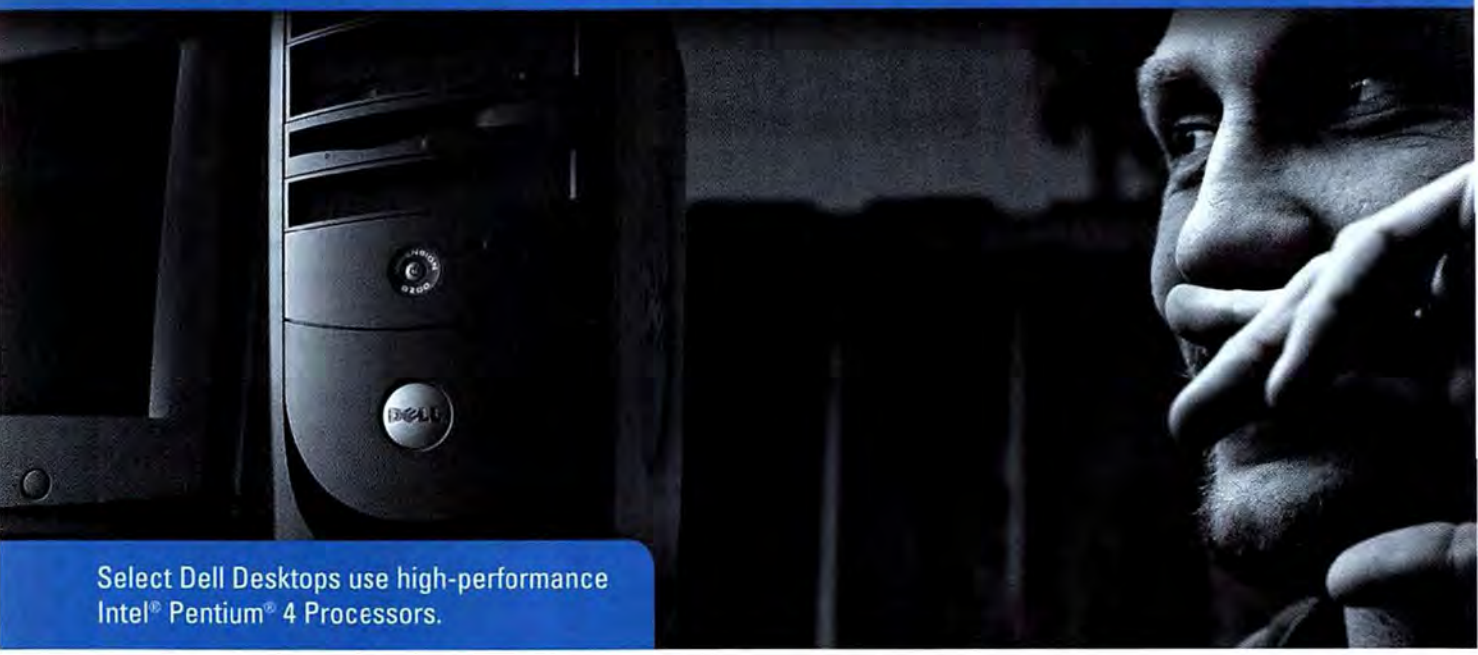

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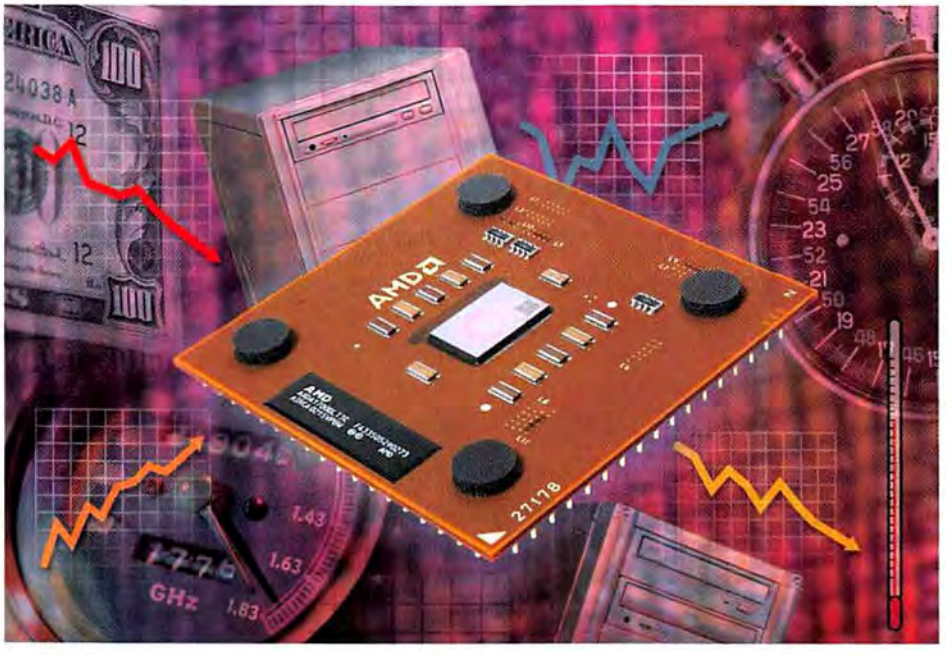
ATHLON RECHARGED

NEW ATHLON XP GETS FASTER AND MORE POWER-EFFICIENT—BUT WILL IT DELIVER ON PERFORMANCE?

BY LAURIANNE McLAUGHLIN

LAST YEAR, AMD was the Tiger Woods of the microprocessor world, repeatedly whipping veteran Intel in many performance tests. But this year, Intel has chipped away at AMD's advantage. As reported here last month, the most recent top Pentium 4 systems finally showed that they could beat the best Athlon XP PCs in PC WorldBench 4 speed tests.

That victory seems short-lived, however, as AMD has bounced back with its 1.8-GHz Athlon XP 2200+ chip. Our first WorldBench tests of four new AMD-based PCs found that the best Athlon XP units match high-end P4 systems in office productivity, though P4 models are solidifying their lead in audio and video tasks.



Nevertheless, AMD Athlon XP–based machines still win the value trophy—they usually cost $200 to $300 less than similar P4 models.

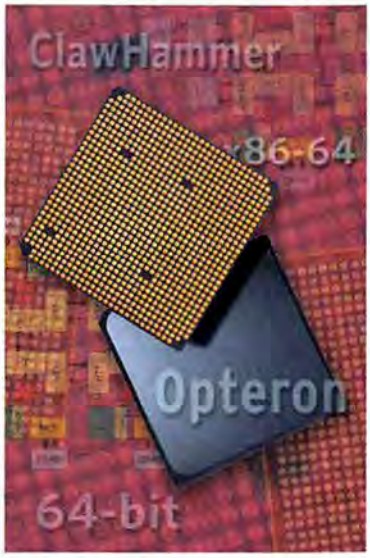
As you might expect, both Intel and AMD have surprises planned for later this year, so power fiends may want to wait a few months before buying. (See "Will AMD's Hammer Nail It?" for more on AMD's next-generation chips.)

TALE OF TESTS

PC WORLD TESTS show that these days, choosing between top AMD and Intel-based PCs is almost all about money, not speed. Consider the two top-of-the-line, nearly-identical Polywell systems we tested: the $2150 Poly 883VF-2200, with an Athlon XP 2200+, and the $2480 Poly 850E-2530,

WILL AMD'S HAMMER NAIL IT?

AMD PLANS to unveil its eighth-generation CPUs in late 2002. The chips will sport entirely new designs and will debut in desktop PCs with an Athlon processor code-named ClawHammer. AMD Opteron, a chip designed for workstations and servers and offering support for multiple CPUs, should follow by mid-2003. Both CPUs will require new chip sets and motherboards; they won't use AMD's current Socket A scheme.



Opteron and ClawHammer will work with today's 32-bit applications and will also support 64-bit software through AMD's *x*86-64 instructions. AMD is hoping to use ClawHammer's 64-bit capability as an "in" to corporations, which have been fiercely loyal to Intel. Despite hype about 64-bit computing, consumers will be most interested in ClawHammer for its ability to maximize the use of fast system memory. Unlike today's Athlon XP, which communicates with main memory through the frontside bus, ClawHammer will talk directly with main memory using a memory controller that's integrated with the CPU, thereby eliminating some bottlenecks and improving performance. ClawHammer PCs are expected to support AGP 8X graphics cards, too.

As for the 64-bit capability, it will primarily be of use to programs that perform calculations in huge chunks or to those that must address very large amounts of memory, such as large enterprise databases, where a great deal of information needs to be processed and moved with no interruption, explains IDC analyst Shane Rau.

On the workstation and server side, the biggest question surrounding AMD Opteron machines is how many vendors will make them. Intel has an impressive customer base for its Itanium, says Kevin Krewell, general manager at MicroDesign Resources; meanwhile, AMD finds itself boxed out of most top-tier workstation and server companies.

For most of us, the transition to 64-bit computing is still years away. The vast majority of users simply don't work with the CAD, professional 3D, scientific modeling, and high-end database tools that will get the biggest boost from 64-bit technology.

with a 2.53-GHz Pentium 4.

The P4-based Poly earned a 122 score on PC WorldBench 4, a smidgen better than the Athlon-based Poly's score of 120. The $2099 ABS Awesome 3300 edged the rest of field with a 123 mark, indicating performance indistinguishable from that of the tested P4.

The two other Athlon XP 2200+ units' scores were in the same tight cluster: The $2996 Compaq Presario 8000Z earned a 122 mark; the $3485 Falcon Northwest Mach V Athlon XP 2200+, a 120. (All five PCs had at least 512MB of memory, NVidia GeForce4–based graphics with 128MB of RAM, and Windows XP Home.)

Results on multimedia and graphics tests were more variable. As we've often seen with Pentium 4 systems, the Poly 850E-2530 noticeably outperformed the four Athlon PCs on our audio and video encoding tests, doing particularly well on the Musicmatch Jukebox test. It also bested all but one of the Athlon units in Unreal game play (see the Test Report results on page 24).

However, the ABS system won the AutoCAD test by 25 seconds over the Pentium 4 Poly. That's notable, since this is the only test where the P4's 533-MHz frontside bus has distinguished itself in the past. All four Athlon PCs excelled on the two Photoshop tests.

CACHE QUESTIONS

THE ATHLON XP 2200+ is manufactured using a .13-micron process instead of the .18-micron process used with prior Athlons. The new process is more cost-effective, and it produces cooler, more power-efficient chips, thus enabling faster successors ▶

ILLUSTRATIONS: JEFF BERLIN

IN BRIEF

TidByte

TRILLIAN RISING: Instant messaging fans want interoperability, and they're willing to forgo a brand name to get it. Cerulean Studios' Trillian lets you connect to multiple instant messaging services—including America Online's Instant Messenger—and its popularity is growing rapidly, according to a recent study from Jupiter Media Metrix. The service leapt from 344,000 users in February to about 610,000 by April—a jump of 77 percent. Trillian's success is also notable because users must endure occasional outages

caused when major services cut off its unlicensed access to their networks (see find.pcworld.com/29696).

Did You Know?

THE persistent Klez.H worm has overtaken the SirCam virus as the most prolific PC virus of all time, according to antivirus firm MessageLabs; it says it spotted 825,000 copies between April 15 and May 30. By late May it was finding the worm in 1 of 300 e-mail messages scanned, or about 20,000 copies a day. Klez.H is a variant of Klez, which first appeared late last year.

ONE IN 300

TEST REPORT

ATHLON XP 2200+ VS. 2.53-GHZ P4 UNITS: A PHOTO FINISH

SYSTEM	Processor	Memory	Level 2 cache (KB)	PC WorldBench 4 (Faster)	AutoCAD (seconds)	Adobe Photoshop 6.0.1: Lighting effects (seconds)	Adobe Photoshop 6.0.1: Multiple filters (seconds)	Musicmatch Jukebox 7 (seconds)	Windows Media Encoder 7.1: Audio file conversion (seconds)	Windows Media Encoder 7.1: Video file conversion (seconds)	Unreal Tournament (frames per second)
ABS Awesome 3300	1.8-GHz Athlon XP 2200+	512 MB DDR333 SDRAM	256	123	**280**	**45**	**58**	20	59	59	**111**
Falcon Northwest Mach V	1.8-GHz Athlon XP 2200+	1GB DDR333 SDRAM	256	120	295	47	59	21	60	62	102
Compaq Presario 8000Z	1.8-GHz Athlon XP 2200+	512MB DDR266 SDRAM	256	122	302	47	60	21	67	65	94
Polywell Poly 883VF-2200	1.8-GHz Athlon XP 2200+	512 MB DDR333 SDRAM	256	120	297	47	60	21	61	63	101
Polywell Poly 850E-2530	2.53-GHz Pentium 4	512MB PC800 RDRAM	512	122	305	53	68	**18**	**56**	**55**	109
Average of 3 systems	1.73-GHz Athlon XP 2100+	512MB of RAM	256	119	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Average of 6 systems	2.4-GHz Pentium 4	512MB of RAM	512	120	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Average of 5 systems	2.2-GHz Pentium 4	512MB of RAM	256	114	n/a	n/a	n/a	n/a	n/a	n/a	n/a

TEST Center

HOW WE TEST: All systems were tested with PC WorldBench 4, *PC World*'s applications-based benchmark. Go to www.pcworld.com/benchmark for more details on PC WorldBench 4. In the Photoshop 6.0.1 lighting effects test, we time the running of a macro that applies a series of lighting effects to a 1.6MB image file; in the multiple filters test, we time the running of a macro that applies a series of other filters to the same image file. In the AutoCAD test, we time AutoDesk Group International's AUGI Gauge benchmark, which runs CAD tests. In the Musicmatch encoding test, we time the conversion of a raw 14.3MB .wav file into an .mp3 file using Musicmatch Jukebox 7. Using Windows Media Encoder 7.1 (which uses Windows Media 8 format), we time the conversion of an 8.9MB .mp3 audio file to .wma format; in a separate test, we time the conversion of an 11.2MB .avi file to .wmv format. In the Unreal Tournament test, we run our own demo and report its results. Higher scores on PC WorldBench 4 and Unreal Tournament are better; in all other cases, lower is better. All rights reserved. n/a = Not available; we did not perform this test on these systems.

without Texas-size heat sinks.

When Intel moved to the .13-micron process earlier this year, it raised the level 2 cache in its P4 chips from 256KB to 512KB. But AMD has chosen to make its new Athlon XPs with the same 256KB of L2 cache as the older chips. This helps explain why our Athlon XP 2200+ systems remain in rough parity with the tested P4 machine, rather than being well ahead. (As reported last month, Intel opted to release its recent 1.7-GHz Celeron with only 128KB of L2 cache to hit a lower price; the first PC we tested with this CPU was a mediocre performer.)

Cache isn't the only issue. The new Athlon has the same 266-MHz frontside bus as its predecessors; it's slower than the new DDR-333 memory and half the speed of the 533-MHz bus that the latest P4s use. Analysts say the slower bus hurts performance.

AMD says that a new Athlon XP chip, code-named Barton, shipping this fall, will have a 512KB L2 cache. But the company says it will not increase Barton's frontside bus speed, so it's unclear whether this chip will pull ahead of the P4. Meanwhile, predictably, Intel will hardly be standing still. The chip giant should be capable of shipping 3-GHz or even faster chips by that time, says IDC analyst Shane Rau.

But AMD won't stop with Barton. Hot on Barton's heels is AMD's eighth-generation family of chips, code-named Hammer, which will debut in late 2002. The first of these, a desktop chip code-named ClawHammer, will bear the Athlon brand name with an extension. Once the Hammer chips arrive, Athlon XPs will replace Duron chips in AMD bargain-level systems. Some Duron PCs will remain on the market in 2003, however.

YOUR STRATEGY

FOR NOW, your buying decision should be straightforward. Athlon XP 2200+ PCs like the ABS and Polywell units we tested save you a few hundred dollars over their P4 peers and offer loads of power for most standard tasks. (For more on the ABS unit, see this month's *Top 15 Home PCs* chart.)

The Falcon Northwest unit, stuffed with every goody that a power addict could covet—from 400-watt Klipsch speakers to two RAID-configured 40GB hard drives—may be overkill for most people, but you can scale down the package. For instance, a configuration with 512MB of memory, less fancy speakers, and no RAID storage costs roughly $2800, about $600 less than the tested unit. Similarly, the loaded $2996 Presario system costs $2607 with a 17-inch CRT monitor instead of our unit's 17-inch LCD screen.

And if you're an Intel fan, you need fret no longer that Athlon XP PCs leave P4s in the dust. In fact, the P4 retains its edge on multimedia tasks.

But as for who'll be atop the leaderboard at year's end, it's much too soon to guess.

Awesome 3300
★★★★☆
ABS
Street: $2099
find.pcworld.com/29735

Presario 8000Z
★★★★☆
Compaq
Street: $2996
find.pcworld.com/29729

Mach V Athlon XP 2200+
(Preproduction unit, not yet rated)
Falcon Northwest
Street: $3485
find.pcworld.com/29732

Poly 883VF-2200
(Preproduction unit, not yet rated)
Polywell
Street: $2150
find.pcworld.com/29736

TABLET PC: A SNEAK PEEK

MICROSOFT'S PEN-BASED WINDOWS XP VARIANT HAS COOL DIGITAL INK, BUT SO-SO HANDWRITING RECOGNITION AND CONFUSING DESIGN.

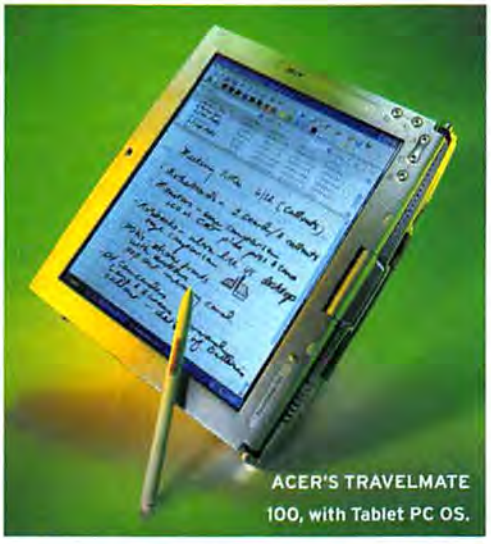
HAVING SUPPLANTED the typewriter, can the PC now replace pen and paper as well? Microsoft tests those waters with its Windows XP Tablet PC Edition. But after trying out a beta version, we would recommend that you not toss out your notepad just yet.

Windows XP Tablet PC Edition is essentially Windows XP Professional with extensions for PCs that include a touch screen and a stylus. When it ships this fall, the OS will appear only on PCs that have the necessary hardware; Microsoft won't sell it separately. So far, Acer, Fujitsu, Hewlett-Packard, NEC, Toshiba, and ViewSonic—as well as newcomers Paceblade and Motion Computing—plan to offer such tablet PCs.

You shouldn't take the term *tablet* too literally: Designs we saw previewed at a reviewers workshop ranged from Etch-A-Sketch look-alikes to slates that slip into a desktop-style docking station. All tablets either include a keyboard or offer one as an option.

For example, the preproduction Acer TravelMate 100 we tested is a subnotebook that can be converted into a slate by swiveling its 10.4-inch LCD touch screen 180 degrees and folding it back over the keyboard. The display operates in either landscape or portrait mode, and you can adjust it for right- or left-handed use.

Tablet PC Edition has two linchpins: the Tablet PC Input Panel, which allows text entry with a stylus via either handwriting or a touch-screen keyboard; and the Journal utility, which allows you to create and manage handwritten notes.



ACER'S TRAVELMATE 100, with Tablet PC OS.

PHOTOGRAPH: MARC SIMON

SCRIBBLE OR TYPE

THE INPUT PANEL is a pop-up rectangle that sits at the bottom of the screen and has tabs for selecting Keyboard mode or Writing Pad mode (which converts handwriting into editable text on the fly). You navigate through it by pointing and tapping the stylus, much as you would on a Palm or a Pocket PC. When you need to input text—say, a URL in Internet Explorer or a memo in Word (using a free Office XP Pack for Tablet PC download)—you work with the Input Panel. If its rectangle feels a bit cramped, you can use the Write Anywhere option, which lets you write within a rectangle that covers most of the screen. Unfortunately, we found the handwriting recognition accuracy to be spotty, but Alexandra Loeb, Microsoft's vice president for Tablet PC, says that good handwriting recognition is only the "icing on the cake" of an OS primarily designed for handwritten note-taking.

That's the function of the Journal. When you launch the application, you see what looks like a blank sheet of lined notepaper. You can start writing on the touch screen with the default black ink pen, change pens or ink colors, or even switch to a highlighter. The Journal's selection tool lets you cut and paste your writing, change its appearance, or even convert it to text (though no better than the Input Panel does). But unlike the Input Panel, the Journal won't convert handwriting to text on the fly.

The Journal's digital ink impressively mimicked the look and feel of handwriting. The app could attract people who take notes, and then can't find them weeks later, or anybody who wants to mix drawings with their handwriting.

The technologies in this new Windows hybrid hold promise. But we won't be able to truly gauge their usefulness until we spend some time with a tablet PC. Price will matter, too: If the extra cost for a convertible subnotebook such as Acer's isn't high, the tablet features might be worthwhile—if only for organizing your valuable meeting notes.

—Yardena Arar

IN BRIEF

Product Pipeline

GIMME FIVE: Forget the mouse—Essential Reality's P5 glove controller promises a true grip on PC games. The glove communicates with an infrared USB-connected base that tracks your hand movements in six directions. The $150 device should hit stores later this month along with three P5-optimized PC games (see find.pcworld.com/29705).

TidByte

PRIVACY CONCERNS: Now Microsoft Hotmail's estimated 110 million active users can more easily check their Microsoft and .Net passport privacy settings, thanks to a recent upgrade that more prominently displays their checked options. Some users, however, claim that the settings don't reflect what they agreed to at sign-up. Concerned Hotmail users can check their settings under the Personal Profile heading.

CONSUMER ALERT

SLASH INK JET PRINTING COSTS

INKSAVER IMPROVES CARTRIDGE PAGE YIELDS—WITH SOME QUALITY COMPROMISES.

FADE OUT: With InkSaver set to 25 percent ink savings, HP's Deskjet 995c produced good-quality color prints. But with InkSaver set to 50 percent savings, quality was unacceptable.

INK JET owners know that their printers consume cartridges like an SUV gobbles gas. Strydent Software's new InkSaver software promises to boost pages per dollar by cutting ink use—without severely degrading image quality.

I tested InkSaver by comparing ink consumption and output quality, both with and without the software, on three top-quality ink jet printers: Canon's S750 Color Bubble Jet, Epson's Stylus C80, and Hewlett-Packard's Deskjet 995c. (InkSaver works only with recent ink jets from those three vendors.) My conclusion: InkSaver is convenient and works well enough to justify its $35 purchase price, with some caveats.

PAGES BY THE PENNY

A SET OF INK cartridges for the Deskjet 995c costs $65—$30 for a black cartridge that HP says should print about 833 pages, and $35 for a color cartridge that should print about 450 pages. This works out to about 3.6 cents per page of text and about 11.4 cents per page of color (7.7 cents for the color inks and 3.6 cents for the black ink used to control shading; see "How to Figure Ink Costs" at find.pcworld.com/29822 for details).

IMPACT ON OUTPUT

IN TESTS without InkSaver, the page yield was slightly lower than HP's spec for black text and much lower for color, so actual costs were about 3.7 cents for text and 15.3 cents for color. With InkSaver set for 50 percent ink savings, I more than doubled black text pages and nearly tripled color output, so suddenly the black text page cost only 1.7 cents, and color cost 6.1 cents. InkSaver reduced page costs for the Epson and Canon printers too, but those savings varied (see chart below). And the software had no noticeable impact on printing speed.

There were, however, two catches. First, not all documents look great painted with a partial bucket of ink. With InkSaver set to 50 percent savings, none of the three test printers yielded color graphics I found acceptable, though black text appeared fair on the S750 and almost tolerable on the 995c. At 25 percent, text looked fine on all three printers; and for color graphics, the HP 995c gets a full endorsement, while the Canon gets a maybe (see chart).

The second catch is that InkSaver may not always save as much ink as you would expect. When set for 50 percent savings, it boosted yield by half virtually across the board. Set at 25 percent, it boosted the color yield on all three printers; but on text, only the Epson C80 showed significant improvement.

InkSaver makes it easy to switch back and forth between settings via separate sliders for black and color (a degree of control you don't get with the economy/draft setting available on most printers). InkSaver can pay for itself after just a few cartridges. But since quality trade-offs vary by printer, your best bet is to download the free trial version and see how it works for you.

—Dan Littman

InkSaver
Strydent Software
★★★★☆
Street: $35
find.pcworld.com/29738

FEATURES COMPARISON

INKSAVER: SAVINGS VS. PRINT QUALITY

PRINTER	TEXT					GRAPHICS[1]				
	Without InkSaver	With InkSaver (25 percent reduction)		With InkSaver (50 percent reduction)		Without InkSaver	With InkSaver (25 percent reduction)		With InkSaver (50 percent reduction)	
	Cost[2]	Cost[2]	Quality	Cost[2]	Quality	Cost[2]	Cost[2]	Quality	Cost[2]	Quality
Canon S750 Color Bubble Jet	2.2	2.1	Good	1	Fair	10.3	6.9	Marginal	4.4	Unacceptable
Epson Stylus C80	3	2.3	Good	1.8	Unacceptable	9.1	6.8	Unacceptable	4.7	Unacceptable
HP Deskjet 995c	3.7	3.3	Good	1.7	Marginal	15.3	10.1	Good	6.1	Unacceptable

[1] Light graphics, not full-coverage photos.
[2] Cost per page (cents). See find.pcworld.com/29822 for details on how we calculate ink costs per page.

BUYER ALERT

BROADBAND GETS CHEAP

TIERED BROADBAND PRICING GIVES NEW USERS INEXPENSIVE OPTIONS, BUT OTHERS COMPLAIN THEY'RE PAYING MORE FOR LESS.

IN AN ATTEMPT to win cost-conscious consumers, cable broadband service providers are beginning to offer tiered pricing plans with faster-than-dial-up connections for as little as $25 a month.

But while cheaper service for people who have never had broadband sounds appealing, some longtime cable customers who are used to surfing at extremely high speeds complain that the move means slower connections at higher prices. They're not happy.

Cable companies are following in the footsteps of DSL providers, which have successfully offered tiered pricing for some time. Cable vendors hope their new services will lure skeptics and drive up demand for broadband, which has been weaker than many in the industry had expected.

LURING CHEAPSKATES

"WE WANT TO make that first step to broadband much easier," says David Pugliese, cable provider Cox Communications' vice president of sales and new-product marketing.

Today, Cox offers its standard cable Internet service—with 3-mbps downloads and 256-kbps uploads—for about $35 a month. The company is now testing a $26-a-month service that offers scaled-back performance: 256-kbps downloads and 64-kbps uploads.

The test service is selling well, Pugliese says, likely in part because it costs just $2 more than standard 56-kbps dial-up service from America Online and many others.

Not every cable company will offer 256-kbps downloads for $26—providers are still working out their plans, and prices will vary widely by area. For example, Canadian broadband provider Rogers Cable took the tiered plunge earlier this year. Its High Speed Light service runs $25 a month, but with 128-kbps downloads and 64-kbps uploads. (See chart below for a comparison of current plans and speeds.)

BANDWIDTH HOGS

THOSE PRICES may attract newcomers, but when a service alters its speeds, it risks aggravating current users—as Comcast and AT&T Broadband learned earlier this year.

The millions of orphaned Excite@Home users who were shifted to the two companies' networks found their download speeds, which were up to 3 mbps, reduced to 1.5 mbps. A vocal minority cried foul. Soon after, the companies also raised rates by several dollars per month.

AT&T says the bandwidth cut impacted about 850,000 former Excite users. Speeds were dropped to match services offered in other markets, as well as to help AT&T better manage its network and ready itself for tiered services, ▶

FEATURES COMPARISON

A LOOK AT YOUR PRICING OPTIONS

	PROVIDER	Pricing tier [1]			Modem fee
		Entry-level, download/upload speed	Midrange, download/upload speed	High-end, download/upload speed	
Cable	AT&T Broadband	$43, 1.5 mbps/256 kbps	Not offered	Not offered	$3/month
Cable	Charter Communications [2]	$25–$35, 384 kbps/256 kbps	$35–$40, 768 kbps/512 kbps	$55–$80, 1.5 mbps/128 kbps	$4–$5/month
Cable	Comcast	$35, 1.5 mbps/128 kbps	Not offered	$95 (modem rental included), 3.5 mbps/384 kbps	$5/month
Cable	Cox Communications [2]	$24–$27,[3] 256 kbps/64 kbps	Not offered	$35–$40, 3 mbps/256 kbps	$10–$15/month
Cable	EarthLink	$42, 2 mbps/238 kbps	Not offered	Not offered	Free
Cable	Rogers Cable	$25, 128 kbps/64 kbps	Not offered	$45, 1.5 mbps/192 kbps	Free
Cable	Time Warner Cable	$45,[2] 1.5 mbps/384 kbps	Not offered	Not offered	Free
DSL	Qwest	$40, 256 kbps/256 kbps	$50, 640 kbps/256 kbps	$121,[4] 640 kbps/640 kbps	Free, with MSN
DSL	SBC	$50, 1.5 mbps/128 kbps	Not offered	$180, 1.5–6 mbps/384 kbps	$100
DSL	Verizon	$40[5]–$50, 768 kbps/128 kbps	$60, 1.5 mbps/128 kbps	$80, 1.5 mbps/384 kbps	Free

Chart has sampling of available services. Where a company offers only two tiers, they are listed as entry-level and high-end.

[1] All prices are per month; all service subject to regional availability.
[2] Pricing varies by region.
[3] Available only in certain areas.
[4] Qwest business-class service.
[5] Offer valid only with $130 self-installation kits available at retail partners; kit has $30 rebate; modem purchase necessary.

ILLUSTRATION: JEFF BERLIN

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Gateway® E-4000 Special limited time only
Packed with plenty of power, the E-4000 makes multitasking and running today's demanding business software easy. Intel® Pentium® 4 Processor 1.80GHz • 128MB DDR-SDRAM • 20GB Hard Drive • 48X CD-ROM • Integrated 10/100 Ethernet • Microsoft® Windows®XP Professional
Add a 15" Flat-Panel Display for $440 (pictured)
$799 (without monitor) Shown with 6-bay midtower case option

intel inside
pentium 4

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Upgrade to a 17" Flat-Panel Display for $380 (pictured)

$1399

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Ideal for running a variety of standard networked applications, the E-2000 offers tremendous power and value for your money. Intel® Celeron® Processor 1.70GHz • 15" Color Monitor (13.8" viewable) • 128MB DDR-SDRAM • 20GB Hard Drive • 48X CD-ROM Integrated 10/100 Ethernet • Microsoft® Windows® XP Professional

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processors, the new E-Series computers are easy to maintain, easy to upgrade and even easy on the budget. To recruit one for your business, just call us at **1-800-846-2572.**

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according to Sarah Eder, a spokesperson for AT&T.

For now, AT&T users can't get 3-mbps downloads. But the company plans to roll out tiered services as soon as this summer, Eder says.

Comcast customers have an ultrafast option—with speeds of 3.5 mbps down and 384 kbps up—for $95 a month.

GOTCHAS

TIERED PRICING doesn't offer a wholly rosy picture, even for new users. Some providers introduce additional costs for those choosing a lower broadband tier, by charging for modem rental or for a mandatory subscription to cable TV.

Cable companies will probably try to lure users into paying more by adding new services, just as DSL providers have done. If they follow the DSL model, they may push subscription-based antivirus and firewall protection, special gaming packages, and other deals that could add $10 or more to the monthly bill.

In any case, tiered pricing is here to stay. As early as this fall, one-size-fits-all pricing may become the exception rather than the rule, according to Dylan Brooks, senior broadband analyst at Jupiter Media Metrix. In fact, Time Warner Cable is the only major broadband cable company that says it has no immediate plans to offer tiered pricing.

Areas with competition in broadband service should have the best prices. If you don't live in such an area, shop wisely and look out for hidden costs before taking the plunge.

—Tom Spring

HANDHELD

MORE POWER FOR PDAs

NEW CPU FOR HANDHELDS UPS POWER AND MULTIMEDIA OOMPH.

DO YOU like to use your PDA for wireless communications, videos, music, or games? If so, then you'll want to check out new devices with Intel's latest processor for handhelds.

Structured on Intel's new XScale core, the PXA250 chip offers a leap in PDA processing power—without a commensurate sacrifice in battery life. We were impressed by Hewlett-Packard's preproduction IPaq Pocket PC 3950, the first PXA250-based PDA.

Intel designed the PXA250 to handle such demanding tasks as multimedia playback or voice and handwriting recognition. Its top 400-MHz clock speed doubles the 206 MHz of the StrongARM SA-1110 (the PXA250's predecessor); the new chip also incorporates some functionality that formerly required separate chips, such as LCD and USB controllers and interfaces to audio codecs. And the PXA250 will improve performance with XScale-optimized applications—media players, games, and the like—due in the next few months.

HP'S IPAQ 3950 features Intel's new CPU, the PXA250.

The PXA250 does this without using more battery power than the StrongARM, in part because its XScale core lowers its clock speed when performing tasks that don't need much CPU muscle. The PXA250's little sibling, the 200-MHz PXA210, will go in smaller devices such as cell phones.

We looked at a $649 IPaq 3950, which is similar to the StrongARM-powered 3850 ($600) but with an improved transflective screen and a universal remote-control application. We noticed that the 3950's screen was much brighter than the 3850's (with each set to maximum brightness). It also appears that the 3850's LCD does not power down as far as the 3950's.

Acer, Fujitsu, and Toshiba plan to ship XScale units by fall. PalmSource, the Palm subsidiary responsible for the operating system, has demonstrated the upcoming OS 5 on an XScale board, though no devices are announced yet. In the handheld world, it appears XScale will mark the spot.

—Yardena Arar

IPaq Pocket PC 3950
Hewlett-Packard
(Preproduction unit, not rated)
List: $649
find.pcworld.com/29723

IN BRIEF

Product Pipeline

PC IN YOUR POCKET: Some devices may brandish the Pocket PC label, but Tiqit Computers' Eightythree is the real deal. Just 5.9 inches tall by 4 inches wide and 1.1 inches thick, the 20-ounce

device is an honest-to-goodness PC with Microsoft's Windows XP, a 300-MHz CPU, 256MB of RAM, and a 10GB hard drive. Tiqit executives hope to find a hardware maker that will put units in stores by the holidays. Estimated price: $1000 (see find.pcworld.com/29702).

Downloads

Head to find.pcworld.com/29630 to find these files.

TOP 5

1 **Clean System Directory** 70KB
Remove all those stray DLLs from your system.

2 **Bill's Pie Toss Screen Saver** 1384KB
Toss pies at the wealthiest man in the world.

3 **Netscape 7** 30872KB
Netscape's latest browser features multiple windows, tabs, and AOL Instant Messenger.

4 **Kazaa** 2000KB
Download MP3s and videos with this tool, but be aware of its advertising component.

5 **Hmonitor** 670KB
Monitor your CPU temperature, voltage, and fan speed.

PHOTOGRAPHS: MARC SIMON

THE ROAD NEVER TRAVELED.

INTRODUCING THE WORLD'S FIRST 4800 DPI/5.8 MEGAPIXEL PRINTER. THE Z65 PHOTO PRINTER FROM LEXMARK.

At twice the resolution of the nearest competitor, the Z65 photo printer doesn't just break the rules, it changes the game altogether. The Z65 offers 4800 dpi* (5.8 megapixels) of resolution, dual paper trays, plus Lexmark's legendary speed – all this for less than $200. Available from Best Buy, Circuit City, CompUSA, Dell, Office Depot and Staples. Visit us at www.lexmark.com/road4/ for more information about Lexmark products.

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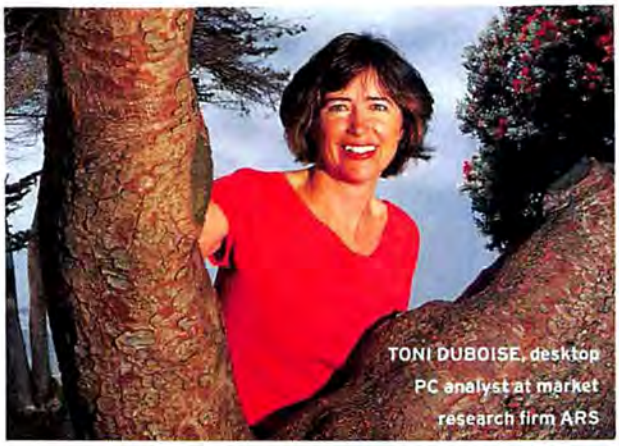
HP-COMPAQ MERGER

THE NEW HP: AFTER THE WEDDING

BUSINESSES WILL HAVE LESS CHOICE, BUT CONSUMERS WON'T SEE MUCH CHANGE—YET.



TONI DUBOISE, desktop PC analyst at market research firm ARS

WITH THE DUST now settling on the Hewlett-Packard and Compaq merger, it's clear that business-system buyers and PDA shoppers will have fewer choices than other consumers will—at least for now.

The business-oriented HP Vectra line and Omnibook notebook product lines will be phased out over the next 12 to 18 months in favor of Compaq's Evo desktop and notebook lines. The HP Jornada handheld brand, meanwhile, is being discontinued in favor of Compaq's stronger IPaq.

Jornada owners are promised technical support and parts repair or replacement under the terms of their warranties (typically one year). Users should call the same tech support numbers as usual, says Mike Larson, an HP senior vice president.

HP has also decided to shelve consumer entertainment devices, including HP's Digital Entertainment Center (find.pcworld.com/29708), a digital receiver and MP3 player introduced last fall. HP officials say the company may reenter that market, perhaps with partners. Service will be available for current owners.

As for consumer desktops, HP plans to maintain both its Pavilion and the former Compaq Presario lines—at least partly because one or the other dominates in overseas markets. Retailers also don't want to lose a good name.

Toni Duboise, desktop PC analyst at market research firm ARS, says she's already observed differences between the Compaq and HP retail lines. HP, she says, has recently expanded its offerings to cater to more budgets than ever before, while Compaq has focused on its build-to-order business via the Web and in-store kiosks. "They're actually more complementary to each other than they've ever been," Duboise says.

But some potential customers, like Jim Dunbar of Colorado Springs, remain wary about the new HP's commitment to provide real choices and support for products after the sale.

"When you buy a PC, you're looking for a company that's relatively stable, that's going to be around, that's going to support the thing," says Dunbar, a computer salesperson who recently decided not to buy an HP system because of his doubts about the merged company's plans. "There's just a lot of things in the press that make you wonder what they're going to do."

—*Peggy Watt* ■

HP'S PLANS

WHAT'S STAYING:

- HP Pavilion desktop and notebook PCs
- Compaq Presario desktop and notebook PCs
- Compaq IPaq handhelds

WHAT'S GOING:

- HP Jornada handheld (immediate)
- HP Vectra desktop PCs (12–18 months)
- HP Omnibook notebooks (12–18 months)
- HP Digital Entertainment Center (immediate)

WHAT'S NEW:

- Evo D510 Ultra Slim desktop PC
- Evo D310 desktop PC
- Evo N800 notebook

RETAILERS

ONE COMPANY, TWO BRANDS

WHILE PC shoppers may not immediately see fewer Hewlett-Packards and Compaqs in stores following the merger of the two computer giants, choice is definitely a casualty of vendor struggles for a shrinking desktop market.

"A lot of the retailers right now will typically only carry one or two brands," says Steve Baker, director of research for NPD Techworld. "People are not buying PCs at the same rate they were in the past [and] manufacturers are reacting."

And so are some retailers. For example, Best Buy has announced that it will market its own brand of PCs, at least partly because of worry about lack of consumer choices. Published reports contend that other major retailers are also considering their own lines.

HP executives maintain that consumer choice will not be sacrificed as a result of the merger. Sam Szteinbaum, general manager of consumer products in HP's personal systems group for North America, says that the new HP will turn orders around faster, helping retailers offer a range of price points efficiently. As for maintaining multiple brands, HP execs cite the business model of Procter & Gamble, which owns nearly every soap bar on the shelf.

PHOTOGRAPH: JAMES ARONOVSKY

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* Growth figures represent a ten-year period ending 2008. Source: *National Industry-Occupation Employment Matrix*, a publication of The U.S. Bureau of Labor Statistics.

** All salary information is based on the *Occupational Outlook Handbook*, a publication of the U.S. Department of Labor. Individual student earnings vary.

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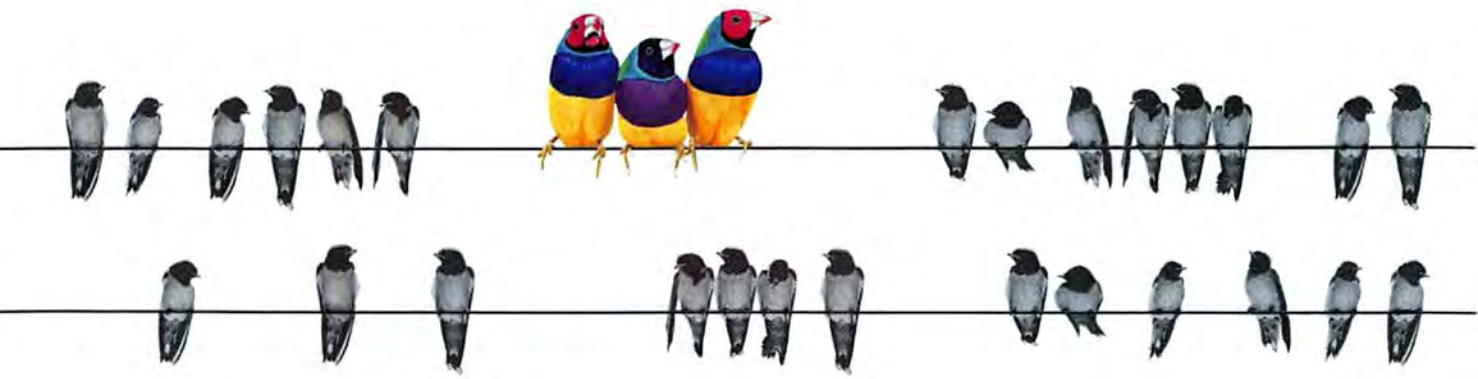

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LETTERS

LETTERS@PCWORLD.COM

STICKY NOTES VS. FILE EXTENSIONS
THUMBS-DOWN ON ADS IN SOFTWARE
READERS' SAFETY TIPS

THE TIPS ISSUE

THE JUNE ISSUE of *PC World* is the *PC World* that I've grown to love over the past few years. Those 220 tips are the real reason I subscribe—to learn how to do more with my computer. These are the kinds of issues that we readers wait for.

Herb Czerwon, Muskegon, Michigan

HERE'S A TIP: Please stop rehashing the same Windows troubleshooting techniques and mind-numbingly simple subjects in every issue. You are reducing the intellectual quality of *PC World*.

Ryan West, White Rock, British Columbia

THANKS TO June's "How to Solve the Weirdest PC Mysteries," I was able to fix a frightening grinding noise that my PC had been making for more than a year. I did the checks suggested in the section "Noises Hard Drives Make," and a quick fan replacement made my machine run like new—for less than $10!

Ed Kavanagh, Durham, North Carolina

THE TIP ON PAGE 86 about making sure to turn the PC off before going inside its case is on target except for one thing: The new ATX power supplies are always on, supplying power (5V) to the motherboard on pin 14 for the power-on signal. With such power supplies, therefore, you must unplug your computer as well.

Stuart Rabinowitz, via the Internet

E-MAIL: HANDLE WITH CARE

IT'S OFTEN SAID you should not open e-mail attachments from people you don't know—a rule echoed in June's "How to Take Back Your Privacy." It has been my experience that the vast majority of viruses come from people you *do* know.

If I had only one tip to give users, regardless of how Internet savvy they are, it's this: If an e-mail contains an attachment, do *not* open the attachment unless your name and the sender's name appear in the body of the e-mail.

By my calculations, this rule, if faithfully followed, would have prevented at least 80 percent to 90 percent of all virus infections on the network that I support (about 700 users working in a sensitive corporate environment).

Dave Lund, New York City

NO INTERFERENCE

THE PROBLEM described by Michael Cole ["Electrical Interference," *Letters*, June], responding to an April article on HomePlug, should not be an issue for our users, as HomePlug's frequency band is different from what utilities use.

HomePlug transmits in a band from 4 to 21 MHz with special filtering for amateur radio frequencies. Utility systems for control and monitoring operate below the AM band—that is, at less than 550 kHz.

The two technologies are designed to do very different things: HomePlug, to deliver networking performance over relatively short distances inside a home; utility power-line carrier systems, to operate over medium voltage grids, covering much longer distances and therefore using lower frequencies. Their bandwidth is also much lower, but adequate, since the amount of data transmitted is small.

Tom Reed, President
HomePlug Powerline Alliance

CONTRADICTORY ADVICE?

JUNE'S *Windows Tips* says, "Make sure that your system is set to hide file extensions of known types." Then *Internet Tips* says that "most versions of Windows hide file name extensions, allowing a potentially lethal script file named 'picture.jpg.vbs', for example, to appear in your ▶

LETTER OF THE MONTH

Beware of Ad-Heavy Software

YOUR DOWNLOADS PAGE for the Spam Buster utility (find.pcworld.com/29693) states: "Though this free version of Spam Buster does not expire, you will see banner advertisements on the main screen. These ads do not communicate with any outside agency or third-party ad server. If you want to get rid of the ads, you can register the program for $19.95."

I've seen other products like this that are free but overload your eyeballs with ads. Perhaps a new software category is called for—"Adware: license is free but requires payment of a fee to eliminate built-in advertisements."

It's not really free if the author requires a $20 fee to eliminate built-in ads.

Joseph Anderson, via the Internet

Editor's note: Downloads has other anti-spam utilities—go to find.pcworld.com/22861. For more on spam, see "Spam, Inc." elsewhere in this issue.

PHOTOGRAPH: RICK RIZNER

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e-mail program...[so you should] uncheck *Hide file extensions for known file types.*" Which is it? Check it or uncheck it?

Clark Kenyon, Iowa City, Iowa

Editor's response: I edited both columns and was aware of the conflict. The *Windows Tips* section on creating sticky notes should have pointed out the potential security risk of hiding file extensions. But file extensions are hidden by default in Windows, and we figured that some people would prefer the ability to create sticky notes (which requires that file extensions be hidden) over the security of viewing all file extensions. **–Dennis O'Reilly**

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

CORRECTIONS

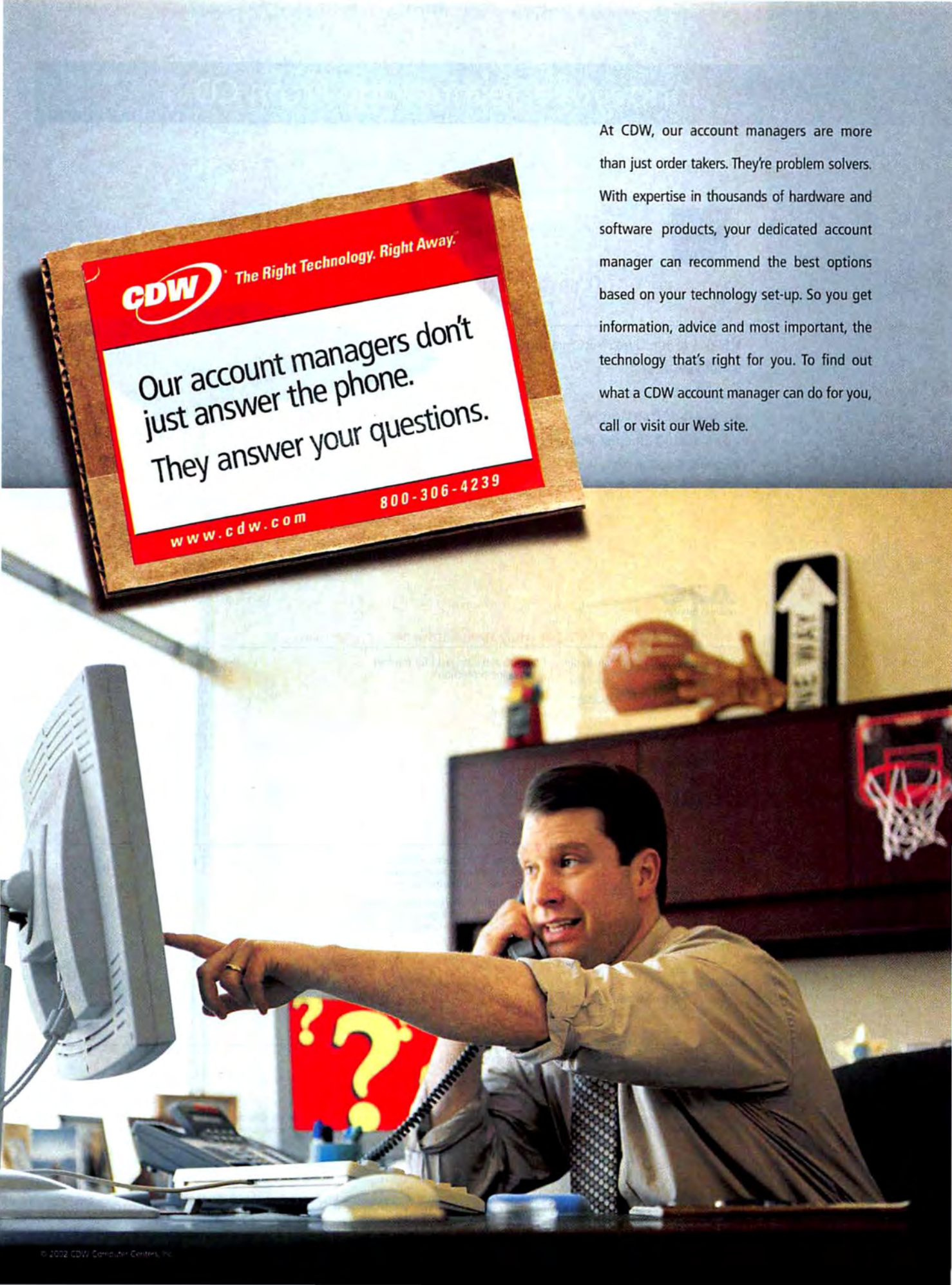
IN JULY'S "Protect Your PC," a sentence on page 101 should have read, "For application control, all the non-Microsoft firewalls let you drill down to control settings and specify whether a program may initiate outgoing communications...or receive incoming connections initiated remotely...."

In our July *New Products* story "DVD Burners: The Right Time to Buy?" a default on the preshipping software we used to create our test discs resulted in discs not filled out to the mark required for maximum compatibility (520.9MB of data is needed). After we created discs that reached the correct mark, DVD+R proved fully compatible with all the players we originally tested. Hence, we've upped our rating for the Sony DRU-120A and HP Dvd200i +RW/+R drives to four stars each.

In July's "World Class Awards," three URLs should have been listed as follows: Lavasoft Ad-aware, www.lavasoftusa.com; Sygate Personal Firewall Pro 5, soho.sygate.com; and Zone Labs ZoneAlarm Pro 3, www.zonelabs.com.

In June's *Windows Tips*, Windows XP requires one change in the procedure described in the item "Create Your Own Stickies": In XP, follow the tip as given, but type **FileName** instead of NullFile.

PC World regrets the errors.



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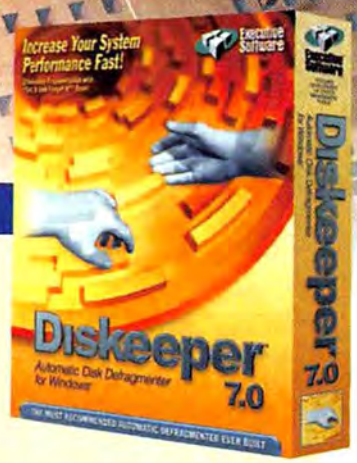

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CONSUMER WATCH

ANNE KANDRA

TAKING CUSTOMER DISPUTES TO A JUDGE

PRIVACY WATCH: WHAT DIGITAL DETECTIVES FIND

ON YOUR SIDE: MISSING DRIVERS CRIPPLE PC

Solve Big Hassles in Small-Claims Court

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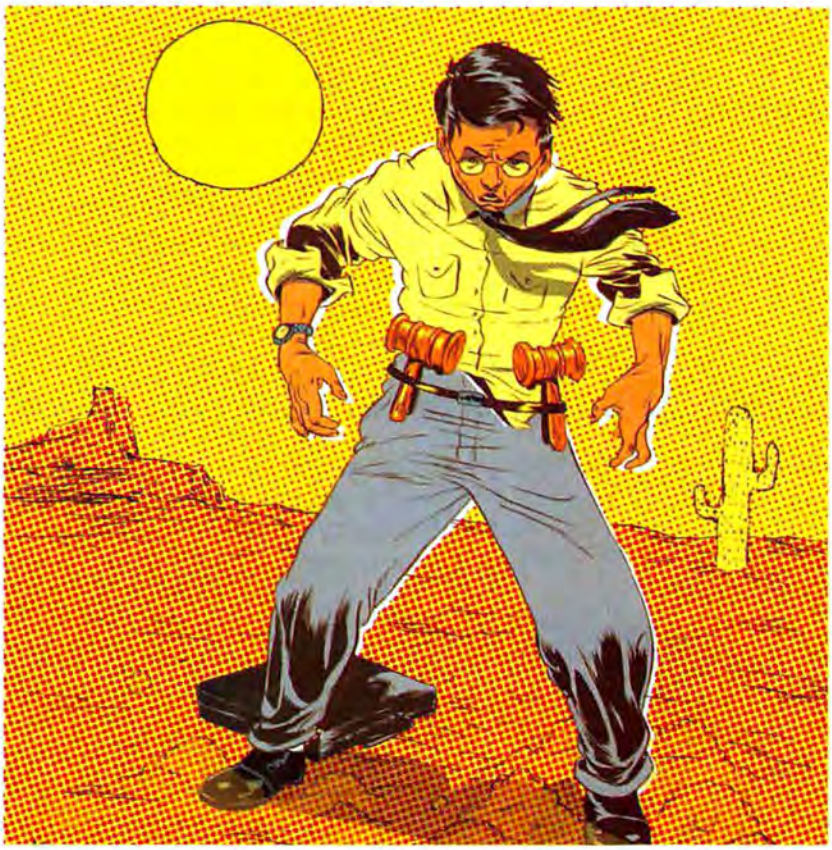


ILLUSTRATION: TOMAR HANUKA

SINCE YOU'RE A PC user and Web denizen, you've probably had at least one run-in with a company that left you feeling ripped off. I don't mean a mild flash of annoyance. I'm talking about going face-to-face with corporate indifference, incompetence, or arrogance so egregious that you find yourself analyzing 60s-era *Batman* reruns for revenge strategies.

But as satisfying as it may be to imagine a particularly vile customer service rep strapped to slow-turning rotisseries or set upon by throngs of carnivorous rodents, these gruesome scenarios won't solve your problem. Reader Rick Cunnington, a mechanical engineer from Oro Valley, Arizona, tried a more civilized approach: He filed a small-claims action.

Cunnington's beef was with the credit company Experian, which had failed to correct erroneous information in his credit file. "I was getting nowhere fast," says Cunnington. "So when I filed the suit, I demanded a thousand bucks for my time, plus costs. [At the hearing] I told the judge and the Experian representative that all I really wanted was to have the misinformation removed from my file. The rep took care of it, and I was happy."

Since his trip to small-claims court, Cunnington has managed to solve disputes with Microsoft, Symantec, and Intuit with strongly worded letters. But he likes knowing that he has the option of going back to court. "I would have no compunction with doing it again."

NOT ALWAYS EASY

IT WOULD BE NICE if all conflicts had such tidy endings. And the attractive thing about going to small-claims court is that you don't need a lawyer; in fact, most areas forbid legal representation at the proceedings. Unfortunately, getting your just deserts through legal channels usually isn't easy. The legal process involves time, expense, and aggravation, so you should use it only as a last resort. If all else fails, though, a trip to small-claims court can be the one thing that will get a negligent company's attention.

Filing a small-claims action has a number of drawbacks. For one thing, if you're butting heads with a company based in another state, filing a small-claims suit may not be worth the trouble. You must file your suit in the court that holds jurisdiction—and typically that's the court where the offending company is located.

The good news: There are plenty of exceptions to this rule. Many large companies register—that is, establish a legal presence—in states where they advertise or do a significant amount of business; and most mail-order companies are subject to small-claims actions filed in any state in which they sell merchandise.

You should consider whether a small-claims action will enable you to collect ▶

enough money to make the hassle worthwhile. On average, small-claims courts cap judgment awards at about $5000, but the figure varies. In Delaware and Georgia, you can pursue up to $15,000, while Virginians are limited to a paltry $1000. And if you're out only a hundred bucks, is it worth taking a day off from work to go to court? Visit find.pcworld.com/28441 for more information about and links to small-claims courts for most states.

Also ask yourself this question before you proceed: How likely are you to be able to collect what you're owed if you win your case? If you're dealing with a disappearing dot com or a villainous vendor, you might never see the cash or goods owed you—even if the law is on your side.

And finally, if your dispute involves a product under warranty, read the fine print. Some companies include clauses that restrict your freedom to file a lawsuit. For example, by accepting Gateway's warranty on its consumer PCs, you waive your right to go to court and must instead seek redress through a neutral arbitrator.

FIRST THINGS FIRST

THE DRAWBACKS OF going to court may be daunting, but fortunately most disputes with reputable companies can be resolved by simpler means. Often, sending a clear, concise letter that details the situation to someone authorized to take action will help resolve your problem. So before you head to court, make every possible effort to settle the matter through the company's customer support channels. In fact, many states require documented evidence that you've tried to work things out with the defendant before you can file a small-claims action.

Let's say you've played by the rules—contacted a customer support representative, talked to that person's supervisor, and finally sent a letter to the CEO—and it's gotten you nowhere. You're ready to go to court. Now you file the proper forms (which often can be downloaded from the court's Web site), pay the fees (usually around $20), and gather your evidence.

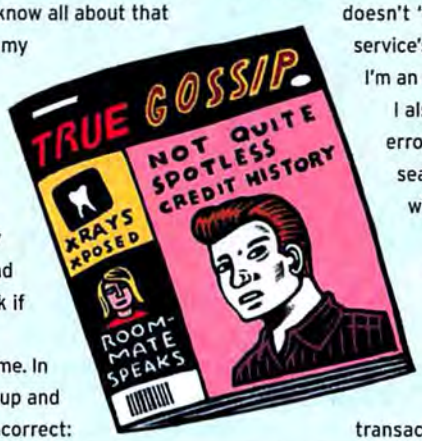
The amount of time it takes to complete the small-claims process, from the initial filing to the judge's decision, can range from two weeks to two months, depending on the court and its caseload, the complexity of the case, and other factors. Plan on spending at least a day writing letters, gathering documents, and otherwise preparing your case. Your hearing itself will likely be brief, but waiting for it to commence could take all day.

At some point, you'll probably be asked to meet with a mediator—an impartial third party whose job is to help you and the defendant agree on a solution. Many states insist on mediation before a judge will hear a case, and most courts provide inexpensive mediation services.

PRIVACY WATCH

Online Investigators Know All About You

FOR THREE MISERABLE months in 1993, I shared a house in Oakland, California, with a bunch of college dropouts and recent graduates who were in an awful band. Since then, I've tried to forget everything about the place, including the address. But I found out that a host of online investigation services know all about that dark period—and lots of other details about my personal life. And they can probably dig up lots of information about you, too.



The Web is rife with spam and banner ads that promise to "get the scoop on anybody." And the background check business has been booming since September 11. Many employers run checks on job applicants, and some landlords demand a background check if you want to rent an apartment or house.

I hired some online gumshoes to research me. In the end, a lot of the personal data they dug up and reported was either misleading or simply incorrect: One set of digital detectives indicated that I might have been convicted of a felony in Texas (sorry, wrong guy). That kind of mistake can cost you a job, a home, or a significant other.

I hired three services: ChoicePoint.net, USSearch.com, and WhoisHe.com. The sites' prices range from $20 to $100, depending on how much information you want them to unearth.

All three services found my previous addresses, some going back ten years. USSearch's query also turned up the names of the owners of buildings where I lived, and the names, addresses, and phone numbers of former neighbors (most of whom I had never met).

ChoicePoint found a hit for "Drew Brandt" on a Texas database of felony convicts, but it thoughtfully noted that the possible ID doesn't "match all necessary criteria"—that is, the service's investigators couldn't say for sure whether I'm an ex-con (which, by the way, I'm not).

I also discovered that, in several cases, clerical errors introduced mistakes into my history. One search associated my Social Security number with someone named Bobby Williams.

How can you ensure that your personal information isn't up for sale? In some cases, unfortunately, you can't do much. Marriages, mortgages, and other public records will always be accessible. You have a little more control over private transactions. Request that the three major credit reporting agencies (Equifax, www.equifax.com; Experian, www.experian.com; and TransUnion, www.tuc.com) restrict access to your credit report to companies you do business with, and check their reports for errors. Contact your bank, your insurance company, and your investment company, and ask them not to share your data with third parties, partners, or subsidiaries. Protecting your data today could save you a mountain of trouble tomorrow.

–Andrew Brandt

ILLUSTRATION: GEOFFREY GRAHN

Whether you're headed toward mediation or to court, Bill Tanner, directing attorney of the Legal Aid Society of Orange County, California, recommends that you prepare thoroughly. Organize your evidence, prepare a concise explanation of the conflict, and decide on a concrete proposal for a settlement. "It's important to anticipate what the other side might say," he points out. "You'd be surprised at how many plaintiffs haven't really thought through the opposing viewpoint."

With a little luck, you'll never have to go to court to get a company to treat you properly. But when things go wrong—and don't get fixed—small-claims court can be just the ally you need. Make sure you know how to use it. ■

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.*

ON YOUR SIDE

In Search of Missing Laptop Drivers

I BOUGHT A Sony VAIO PCG-R505DS SuperSlim Pro notebook on EBay. On the advice of a friend, I reformatted the hard drive. Oops! The seller had not included a recovery disc, so I had no drivers for the graphics chip, modem, NIC, or other hardware. I expected to be able to download the latest drivers from Sony's Web site. No such luck. I called tech support to buy the drivers and was told to call the parts department. The rep there asked me for the product registration number, which I didn't have since I'm not the original owner. He said he couldn't help me. The component manufacturers' Web sites have drivers, but they don't work with my XP-equipped notebook. Do you know where I can obtain the drivers I need?

Bill Park, Pittsburgh

***On Your Side* responds:** According to a Sony spokesperson, users can purchase System Recovery CDs with all the necessary drivers online at servicesales.sel.sony.com/service. If you're not the original owner, you'll need to provide proof of the sale (a letter from the original owner to the new one will suffice) and register the computer in Sony's Customer Information Services Center database by calling 888/476-6972.

When you buy a PC or any other piece of hardware from an auction site, ask for a bill of sale and confirm that software, cables, manuals, and other necessary items are included. Make sure that you have the seller's contact information in case something goes wrong.

–Grace Aquino

NEC

Remote diagnostics, control and asset tracking

Space-saving design with <13mm ultra-thin frame

Industry's widest viewing angles with less off-angle color shift

Low heat emission for cooler environments

Automatic long cable compensation

Ultimate analog and digital compatibility

Array of intelligent power management features

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Maintain a new level of IT control with the NEC MultiSync® LCD1880SX. New from the leading brand of flat-panel monitors. Yes, its ultra-thin frame gives users maximum edge-to-edge clarity. Yes, it offers a remarkably crisp and clear picture. But there's more to this revolutionary LCD than meets the eye.

Its integrated DDC/CI function with NaViSet™ software, for example, enables easy LAN-based remote diagnostics and control of users' monitor settings. And CableComp™ safeguards picture quality at cable lengths up to 100 meters (328 feet). We've added Ambix+™ analog/digital compatibility and AutoBright to ensure the best possible picture in all viewing conditions. In fact, with so many intelligent features, the new MultiSync LCD1880SX doesn't just keep the data looking good. It also reflects well on you.

For more information, call 888-NEC-MITS or visit www.necmitsubishi.com/1880SX.

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NEC ranked as the #1 overall LCD monitor in end-user sales for 2001 in the Stanford Resource – iSuppli Flat Panel Monitrak® Quarterly Report, Q4 '01. MultiSync is a registered trademark, and Ambix+, CableComp and NaViSet are trademarks of NEC-Mitsubishi Electronics Display of America, Inc.

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NEC/MITSUBISHI
NEC-MITSUBISHI ELECTRONICS DISPLAY

WEB SAVVY

BRAD GRIMES

The Best Unfree Stuff Online

These great sites and services will lighten your wallet—and that's okay.

RECENTLY I'VE NOTICED a minitrend in the letters that I receive from readers. People have always shared their favorite sites, services, and online utilities, but over the past several months, a good chunk of their notes have included something to the effect of, "It costs a little money, but...."

But what? Maybe it was inevitable. Maybe people have gotten used to a Web in which companies must charge to stay in business. Maybe the cream has risen to the top. Whatever the case, many no longer scoff at paying a little something online. And neither do I. Here are some sites, services, and downloadable shareware I've found to be worth the investment. (For more, see our editors' picks in "Best of Today's Web" on page 68.)

ConsumerReports.org: This should be the very next thing you pay for online. I plunked down $24 for a one-year online subscription and have used the site to research TVs, cars, lawn mowers, and more. I figure the site has saved me far more than $24 in bad purchases.

SpamStalker: In a nutshell, this antispam shareware replies to junk mail with messages telling the sender that your e-mail address is no longer valid. The idea is to fool spammers into removing your address from their lists. Try SpamStalker for free, but pay $39 if you intend to keep it. www.spamstalker.com

Pop-Up Ad Filter: After I'd tried various free ad filters with mixed results, several readers turned me on to this $25 ad blocker. It works only with Internet Explorer, but it does so effortlessly and exceptionally well. A free trial version blocks about 40 ads—which should last you roughly one day. www.meaya.com

Mailshell: I mentioned this online service

last month (see find.pcworld.com/29581). For $35 a year, you get your own domain name and the ability to control spam by creating an unlimited number of e-mail addresses. www.mailshell.com

The Wall Street Journal Online: Free financial news can be had just about anywhere, but if you're still feeding a prerecession jones for everything business- and stock market–related, WSJ.com provides the best combination of news, information, special reports, and analysis. An annual subscription to the site costs $59.

And there are others. For $10 a month, an EFax Plus account gives you a local fax number and the ability to send faxes online (www.efax.com). I'm even weighing the cost of PaperlessPOBox.com, a service that offers to receive my snail mail (tossing out the junk), scan it, and send it to me via e-mail for $30 a month and up (www.paperlesspobox.com). That's probably too steep, but I'm intrigued.

Caveat surfer: The stuff worth paying for is still the exception, not the rule. Even if everything online were as good as gold, I wouldn't plunk down my credit card willy-nilly. Still, I'll be content as long as my total monthly expenses for Web services are lower than my cable bill—which means I still have money left to burn on Web goodies. So drop me a note and tell me what you pay for online. ■

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

GIMME FIVE

Online Photo Services

THESE SITES WILL process your film and store your images online. You can also upload image files from a digital camera and get prints. Photo services make terrific use of the Web, and they're cheaper than traditional photo shops.

1. **Ofoto:** It's a Kodak company, so you can assume it will survive a shakeout. Nice photo editing software. www.ofoto.com
2. **PhotoWorks:** Great deal on a "Year in Photos" CD. PhotoWorks isn't just a Web company—it also has retail stores in the Pacific Northwest. www.photoworks.com
3. **Shutterfly:** This is one of the pricier photo sites, but it comes with good online photo advice. www.shutterfly.com
4. **Snapfish:** Your first three rolls are developed for free, and developing costs ($3 for a 36-exposure roll) include prints. A great deal. www.snapfish.com
5. **Yahoo Photos:** Quick-loading site, with film processing done by PhotoWorks, but the online storage space (30MB) is a bit skimpy. photos.yahoo.com

ILLUSTRATION: AD MCCAULEY

"Stunning, jet-black system wowed us with its speed and sound quality..."

-PC World

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Allows CD Play While System is On or Off
One Type II PCMCIA Slot
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Infrared Wireless Fast IR Interface
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Dimensions: (H) x (W) x (D) : 1.7" x 13" x 11.4"
Weight: 7.6lbs. without battery
Exclusive 120-Watt A/C Adapter
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AlienAutopsy: Automated Technical Support
Personalized Owner's Manual
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STEVE BASS

Software Rx for a Healthier Windows

Sputtering Explorer? Anemic apps? These half-dozen utilities can help.

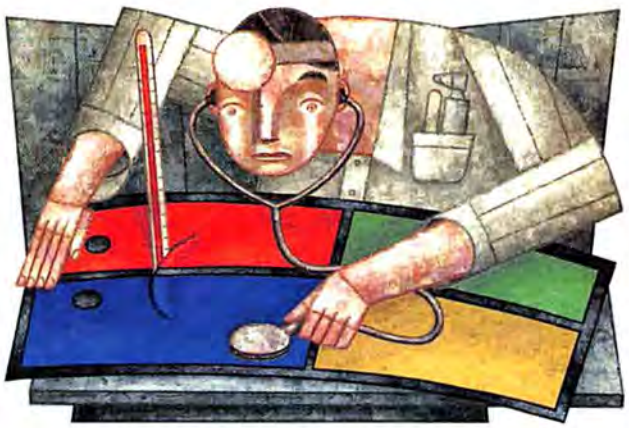
FORGET TENNIS. Don't bother me with golf. I spend my spare time troubleshooting Windows problems. You laugh, sure, but when you need a special tool for some obscure Windows glitch, you'll be grateful for the late nights I spend at Steve Bass's PC Testing Laboratory and Grill.

Fresh out of the Bass Test Center are six utilities that allow you to shine a light into Windows and see exactly what it's doing. Some of these beauties are strictly diagnostic; others are designed to let you make changes to your system safely. Go to find.pcworld.com/12287 for all six.

Filemon and Regmon: You install a new program only to find that every time you launch it, some other program freezes. Regmon can help. This crafty freeware from Sysinternals monitors the activity in your Registry (the place where Windows manages your apps and itself, and the source of many system problems) in real time to reveal what the new program is doing. Click any line in Regmon's log to pop open Windows' Registry Editor and view specific Registry changes. You can filter out nonrelevant Registry activity or capture and save all Registry logs (ideal reading for insomniacs).

Sysinternals' free Filemon utility keeps a log of all the processes that have run on your system. This log can be a real time-saver when you're trying to figure out which programs are the source of your machine's problems. Filemon is also a terrific way to find MPEG and AVI files that are temporarily stored on your system when you view a streaming video.

Registry Drill: How's your Registry doing? Mine is squeaky-clean: no out-of-date entries, missing file pointers, damaged keys, or caraway seeds from yesterday's lunch. The reason is Easy Desk Software's $40 Registry Drill, which scrupulously analyzes my Registry. Registry Drill finds errors other programs miss, and its explanations help me troubleshoot. The program works with all versions of Windows and comes with a ten-day trial.



Bugtoaster: Getting an accurate reading on a system problem is sometimes crazy-making. My most recent headache: The e-mail program I use, Qualcomm's Eudora, often crashed when I opened a message with embedded images. I tracked down the problem using Bugtoaster, a free monitoring tool that accurately diagnosed the snafu as Eudora's incorrect (and dumb) handling of a basic Windows function. Bugtoaster may not fix anything, but at least it let me report the bug. Visit www.bugtoaster.com to see if your problem—and its solution—are already in the site's extensive crash database.

X-Setup: I've tried dozens of Windows-tweaking programs, but none of them comes close to providing the peephole that Xteq Systems' X-Setup gives me into hundreds of my PC's hidden settings. The free program's insight lets me stop my CD drive from automatically playing music CDs, hide all drives in Windows Explorer, and restrict the ability to delete printers, among other functions. X-Setup includes more than 300 options—some user-written plug-ins, and some unique tweaks, such as those for disabling portions of Internet Explorer's toolbar and fiddling with NVidia and 3dfx Voodoo graphics hardware settings. The new X-Setup 6.2 works with all versions of Windows.

CommView: There's a sneaky new breed of program that phones home regularly, sending missives about your PC habits to its servers without your knowledge. TamoSoft's $99 CommView watches every bit of Internet activity on your system—incoming and outgoing (a firewall usually alerts you only to the activity, not the content). The tool shows you which programs are sending things back to their servers, what they're sending, and the port that's being used. Believe me, you'll be astonished—and glad you paid the utility's relatively high price. ■

CommView 3.3
★★★★½
$99
TamoSoft
www.tamos.com

Registry Drill
★★★★☆
$40
Easy Desk Software
www.easydesksoftware.com

Contributing Editor Steve Bass can be contacted at homeoffice@pcworld.com. Visit find.pcworld.com/25821 to sign up for his online newsletter.

ILLUSTRATION: RICHARD DOWNS

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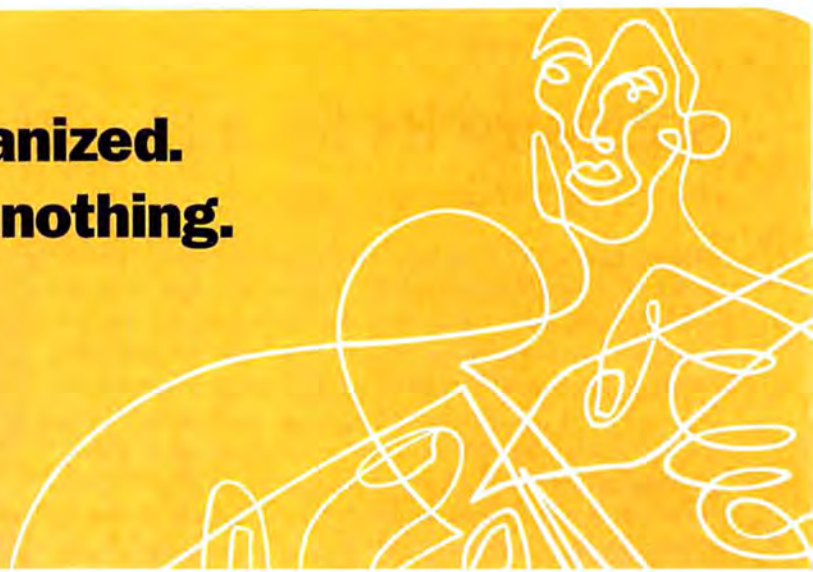

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BUGS & FIXES

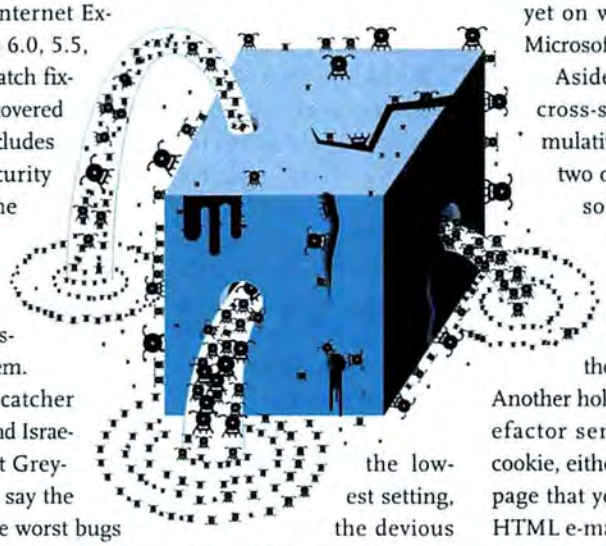
STUART J. JOHNSTON

Serious Security Holes in Internet Explorer

Microsoft says it has fixed six problems—but one wasn't repaired completely.

THANK YOU, Microsoft. Some months I worry that I won't have much to write about. But the bug factory in Redmond almost assures me of permanent employment.

This month, Microsoft released its most recent cumulative patch for Internet Explorer versions 6.0, 5.5, and 5.01. The patch fixes six newly discovered holes, and it includes all previous security patches. But the patch had been out for less than a day before bug trackers discovered a problem.



Danish bug catcher Thor Larholm and Israeli researchers at GreyMagic Software say the fix for one of the worst bugs works only with IE 6—not with versions 5.5 or 5.01. The bad bug is called a cross-site scripting vulnerability. A hacker could craft a Web page or send an HTML e-mail message that ran as if it were in IE's Local Computer zone. Typically, this zone has lower security settings than IE's Internet zone.

If the Web link or e-mail contained nefarious code, and if you had IE's security set to the lowest setting, the devious code could take over your PC.

Microsoft claims the patch blocks all attacks, but the bug experts say that it stops such attacks only on IE 6. "We have an investigation under way and will respond appropriately," says Christopher Budd, a program manager with Microsoft's Security Response Center. That answer is Microsoftese for "We will issue more patches if necessary." No word yet on when or whether Microsoft will do so.

Aside from the fix for cross-scripting, the cumulative patch contains two others that Microsoft calls "critical." One flaw would allow someone to read (but not change or delete) the files on your PC. Another hole would let a malefactor send you a special cookie, either through a Web page that you click or via an HTML e-mail that you open; this evil cookie could read the contents of other cookies.

Your system is protected from e-mail attack through all three holes if you've installed the Outlook E-Mail Security Update or if you're running Outlook 2002 with the "Read as plain text" option enabled.

Jump to find.pcworld.com/29161 for a link to the cumulative patch. While you're on this Web page, click the *Technical Details* link for the Outlook update download and for more details about the update.

Microsoft promises that all of these fixes will be included in the upcoming Service Pack 1 for IE 6.0, but the company hasn't said when the service pack will be available. ■

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

IN BRIEF

E-Mail Editor Flaw

IF YOU USE Microsoft Outlook 2000 or 2002 *and* have set up Microsoft Word to be your default e-mail editor, you're open to attack while editing in either Rich Text Format or HTML format. If you reply to or forward an e-mail sent by an attacker, the code could commandeer your PC. Go to find.pcworld.com/29183 for the patch.

Messenger Hole

FANS OF MSN Messenger or Exchange Instant Messenger 4.5 and 4.6 need to know about a flaw involving the MSN Chat control. The problem also affects anyone who installed the control before May 8 of this year. The hole could allow a cracker to take over your system completely. Visit find.pcworld.com/29182 to get Microsoft's fix.

BUGGED?

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

FAULTY POWER ADAPTERS WITH HP SPEAKERS

IT'S ANOTHER recall notice from HP. In June, I wrote about faulty power cords with Deskjet and Photosmart printers (find.pcworld.com/29624). This time, the recall involves Philips Electronics' adapters for the P1534A External Amplified Speaker sets. Between October 2000 and April 2002, HP sold about 90,000 defective adapters, either as part of speaker systems shipped with HP Vectra PCs or as separate units. No one has been injured, says the Consumer Product Safety Commission, but the adapters pose a shock hazard. Go to find.pcworld.com/29181 to find out how to identify the faulty adapter and get a free replacement.

ILLUSTRATION: JOHN HERSEY

NEW PRODUCTS

EDITED BY ANNE B. MCDONALD

Colorful Calls and Contacts

HANDSPRING Treo 270 (left), Audiovox Thera.

HANDHELDS COLOR, KEYBOARD, and cell-phone integration: These latest trends in handhelds distinguish a trio of new personal digital assistants. The Audiovox Thera Pocket PC and two Handspring models—the Treo 90 and the Treo 270—all boast attractive color screens, but otherwise offer differing arrays of innovative new features for people seeking the latest in mobile technology.

At the high end of the scale sits Audiovox's Thera, the first Pocket PC equipped with a built-in high-speed wireless data modem and a dual-band (CDMA 800 MHz and PCS 1900 MHz) cell phone. It requires some deep pockets: Verizon Wireless is introducing the device for $730, plus the cost of a service plan for its CDMA 2000 1x Express Network. The Thera's price tag is understandable, given that its high-speed wireless modem—when sold as a separate PC Card—goes for $300 and a regular Pocket PC can cost from $400 to $600. But don't go for the Thera if you want more phone than PDA in a converged device: Except for the one-inch, pencil-like antenna on the top left, it looks like a typical Pocket PC; it also weighs substantially more than most cell phones.

The 65,536-color, 240-by-320 active-matrix screen on my shipping unit looked fine indoors and was usable outdoors. You can add memory or functions via the Secure Digital/MultiMediaCard (SD/MMC) expansion slot. To supplement the Thera's built-in 32MB of RAM, Audiovox bundles a 32MB SD Card with the device. You get the customary Pocket PC 2002 software assortment, too, including handheld versions of Microsoft Office applications. Verizon Wireless rates the life of the rechargeable battery at 1.5 hours of talk time and 8 hours of standby time.

If you like using a PDA as a digital music player, you can either play MP3 files on Windows Media Player or plug a supplied audio remote controller (which can also take phone calls) into the handheld's universal jack.

The Thera's crown jewel, of course, is its ability to access the Internet at the speed of a 56-kbps modem via its easy-to-use Watcher app. That's hardly lightning fast, but it beats the 14.4-kbps top speed of the previous CDMA network—useful if you plan on doing heavy Web browsing or downloading large files such as MP3s or databases. But with service running between $35 and $300 a month, the Thera is best left to corporate folks who need the fastest Internet possible on a PDA and whose employers will foot the bill.

COLOR TREOS

A MORE BALANCED combination of PDA and GSM (and GPRS-ready) cell phone, the Palm-based Treo 270 sells for $499 plus the cost of a service plan available from several providers. Basically a color

PHOTOGRAPHS: MARC SIMON

Thera
Audiovox
(Preproduction unit, not rated)
Expensive PDA/phone combo best suited for corporate users.
Street: $730 (Verizon Wireless service plan required)
find.pcworld.com/29653

Treo 270
Handspring
★★★½☆
Well-designed PDA/phone combo sports a great color screen.
Street: $499 (GSM phone service plan required)
find.pcworld.com/29651

50 **PDAs AND PDA/CELL PHONE COMBINATIONS**
Audiovox Thera, Handspring Treo 270 and Treo 90

52 **MONITORS**
NEC MultiSync FE771SB, Samsung SyncMaster 765mb

ACCOUNTING SOFTWARE
Simply Accounting 9

DIGITAL CAMERA
Logitech Pocket Digital

56 **WEB DEVELOPMENT SOFTWARE**
Adobe GoLive 6, Macromedia Dreamweaver MX, Macromedia Flash MX

58 **LINUX OPERATING SYSTEM**
Lycoris Desktop/LX Amethyst Update 2

PC COMBINATION DRIVE
Plextor PlexCombo 20/10/40-12A

62 **UTILITIES**
PowerQuest Drive Image 2002, Acronis True Image Deluxe

MP3 PLAYER
IRiver America IMP-150 ChromeX

64 **PRINTER**
Xerox Phaser 8200N

65 **PC PERIPHERALS**
Atek Tote-Remote, Logitech Cordless Presenter

GLOSSARY

WIRELESS PHONE STANDARDS

DIGITAL STANDARD	Description
CDMA	Code-Division Multiple Access. Used by carriers including Sprint and Verizon, among others. Capable of moving data at up to 14.4 kbps.
CDMA 2000 1x	The successor to CDMA. Supports burst speeds up to 144 kbps; average throughput is about the same as or slightly faster than 56-kbps modems.
GPRS	General Packet Radio Service. Designed to work with GSM. Runs at up to 114 kbps; average throughput is slightly slower than that of 56-kbps modems.
GSM	Global System for Mobile Communications. Used in Europe and in North America. Transmits data at 9.6 kbps.
PCS	Personal Communications Service. A generic term for wireless services (such as CDMA or GSM) that run in the 1.9-GHz band.

version of Handspring's pioneering Treo 180, the Treo 270 uses Handspring's version of Palm OS 3.5, sports an exceptionally bright passive-matrix screen of 4000-plus colors, and at 0.8 inches thick and 5.4 ounces, is about the same size as its monochrome sibling. This Treo has no expansion capabilities, however.

As cell phones go, the Treo 270 is bulky and wide, but its flip-up cover with a clear plastic window cradles against your face comfortably. Or you can attach its included earbud microphone and then hold the device in your hand. Handspring says the rechargeable lithium ion battery supports up to 3 hours of talk time with 150 hours of standby.

If you like to dial telephone numbers on a BlackBerry-esque thumb keyboard, you'll appreciate the keyboard backlighting that comes on when you flip open the cover. My only major gripe: In bright sunlight the passive-matrix screen on my preproduction unit became unreadable.

The Treo 270 comes with an application for sending and retrieving POP3 e-mail. Alternatively, you can pay an annual fee for the recently introduced Treo Mail service, which automatically relays POP3 or Outlook Exchange e-mail at periodic intervals (or on demand). To use Treo Mail with Outlook Exchange, you must install a desktop application and keep your computer on. Exchange mail service is $100 a year; it's $50 a year for POP3.

A jog wheel on the left side of the Treo 270 permits one-handed dialing (with practice). Note: Handspring won't make a color version of the Graffiti-based Treo 180g due to the popularity of the keyboard-equipped model.

Treo 90
Handspring
★★★★☆
Featherweight color Palm PDA comes with a keyboard; screen is hard to read outdoors.
Street: $299
find.pcworld.com/29652

NO-PHONE TREO

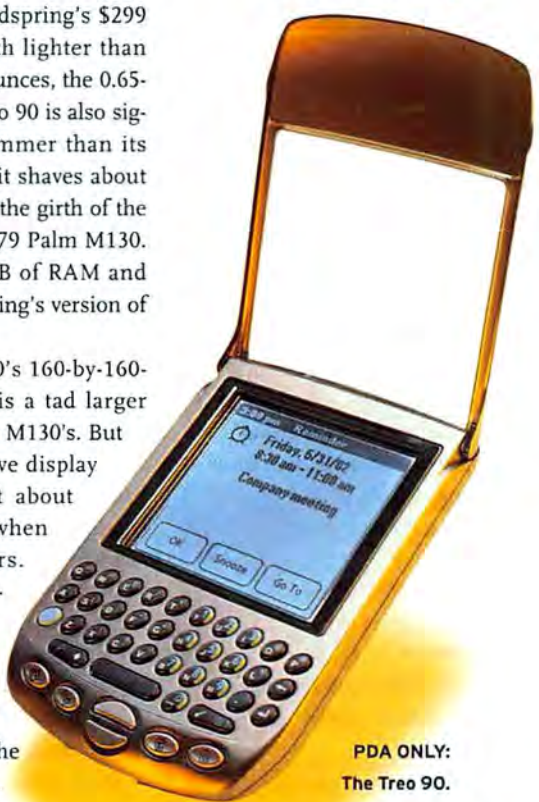
IF YOU LIKE the looks of the Treo 270 but don't need a phone (or are on a budget), consider Handspring's $299 Treo 90. Much lighter than the 270 at 4 ounces, the 0.65-inch-thick Treo 90 is also significantly slimmer than its siblings; and it shaves about 0.2 inches off the girth of the competing $279 Palm M130. It packs 16MB of RAM and runs Handspring's version of Palm OS 4.1.

The Treo 90's 160-by-160-pixel screen is a tad larger than the Palm M130's. But its transflective display becomes just about unreadable when used outdoors. The rechargeable lithium ion battery should last for 10 days of normal use, the company says.

New features include a combination SD/MMC slot for adding storage or apps, and a keyboard-locking capability to avoid turning the device on unintentionally. However, it lacks the Treo 270's keyboard backlight and jog dial. Overall, though, the Treo 90 is one of the best midrange Palm-based devices we've seen.

Of the two cell-phone/PDA hybrids we looked at, the Treo 270 is much more appealing than the Thera Pocket PC, which seems clunky and overblown by comparison.

—*Yardena Arar* ▶



PDA ONLY: The Treo 90.

Brighter CRT Monitors Really Shine

THE NEC MultiSync FE771SB (left), and the SyncMaster 765mb.

MONITORS

TODAY'S CRT monitors are smaller, save more energy, and are easier on the eyes thanks to their tubes' flatter faces. Now, they're brighter.

What makes bright right? A better viewing experience with everything from streamed multimedia to PC games and DVD movies, according to the makers of two new, extremely bright, 17-inch flat CRT displays: NEC-Mitsubishi's $209 NEC MultiSync FE771SB and Samsung's $229 SyncMaster 765mb. Brighter images are also able to provide sharper, crisper detail in business graphics and presentations.

In my tests, I found that the brightness effect goes beyond what you might get if you just crank up an older display's settings. On each monitor, you can switch the brightness-enhancing technology on or off with the press of a button. When I enabled the super-bright setting, the NEC's text got noticeably fuzzier, but not as much as on the Samsung.

The capabilities of both of these shipping units exceeded my expectations, but the Samsung offers some extras: It can direct a 'brightness zone' to any part of the screen, in a resizable rectangle. That helps a user spotlight a small area—a dark game graphic, for example. The NEC MultiSync FE771SB toggles only between full-screen normal and bright settings.

In a darkened room, the striking brightness can hurt your eyes. But for activities where you must squint to see detail, enhanced brightness makes a world of difference.

—Andrew Brandt

NEC MultiSync FE771SB
NEC-Mitsubishi
★★★★☆
Adjustable brightness; fewer controls than Samsung's model.
Street: $209
find.pcworld.com/29657

SyncMaster 765mb
Samsung
★★★★½
Better brightness controls make this great for multiple uses.
Street: $229
find.pcworld.com/29660

QUICK TAKES

Card-Size Camera

THE BRUSHED silver finish and wafer-thin design of Logitech's cool $130 Pocket Digital gives it the feel of a business card holder. Slide the left panel, look through the tiny viewfinder, press the shutter button, and the camera will store the photo in its internal 16MB memory in one of two resolutions: 640 by 480 or 1280 by 960. My pictures looked bright overall, but some colors were off. You can't view photos until you download them to a PC using the supplied USB cable and software. Think of it as a slick, digital version of Kodak's Brownie. Logitech, find.pcworld.com/29669

–Grace Aquino

Good Low-Cost Accounting

ACCOUNTING

ALTHOUGH Intuit's QuickBooks dominates the small-business accounting market, ACCPAC International offers a viable alternative to the leader with its inexpensive Simply Accounting package.

I looked at a $39 shipping copy of Simply Accounting 9, the newest update of a program introduced almost 20 years ago. No warmed-over software from the eighties, version 9 has an up-to-date user interface and the latest electronic business capabilities, allowing you to e-mail forms, download bank statements, and (optionally) tap into electronic funds transfer. It comes with a new Daily Business Manager that enables you to keep track of key financial tasks and to-dos. A training CD has clickable links for added help and FAQs, and you can quickly switch back to the program to practice skills learned in each section.

The single-user Basic Simply Accounting program has the general accounting capabilities most small businesses need, such as general ledger and financial statements, sales and accounts receivable, payments and accounts payable, job costing, and payroll. If you require more, you can get a single-user package of Simply Accounting Pro for $89, or pay $269 for a five-user package. For service businesses, Pro adds new capabilities in time tracking and related billing; it also supports an unlimited number of foreign currencies.

If you make a mistake in an accounting entry, Simply Accounting lets you correct it, but it retains a record of your original, which gives you an additional trail if needed. In contrast, QuickBooks allows you to eliminate a first entry.

Overall, Simply Accounting 9 offers business accounting capabilities comparable to those of the industry leader at one-third or less of the cost.

—Richard Morochove

Simply Accounting 9
ACCPAC International
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WEB AUTHORING

YOU DON'T NEED a sledgehammer to hang a picture on the wall, and you don't need a $400 software package in order to create and post a simple Web site: Many HTML editors and FTP clients are available, some at no charge.

But if you're ready to take your Web authoring to the next level, some new software is worth the higher price: Macromedia's Dreamweaver MX and Adobe's GoLive 6. Both strive to make data movement simple within their own suite of products and to allow Web development team members to swap tasks with one another more easily.

MORE INTEGRATION

MACROMEDIA has an irritating history of placing new interfaces on new versions of its products, and it has done it again with Dreamweaver MX. But at least this $399 Web design package (upgrade, $199) gives you the option of using the old version 4 workspace. (Users of versions 4 and 5 of Macromedia's Flash Web-animation software have no such choice: They must deal with yet another interface revamp in the new Flash MX version of the popular vector-graphics program.)

The previous versions of Dreamweaver were separate, unintegrated programs. This iteration takes a solid step toward suite-ification with panels that now function in the same way as the panels in Flash and in Macromedia's Fireworks image editing program. In the new look, panels are docked instead of floating on the screen, reducing clutter. In addition, a new row of tabs along the top of the screen places layout, table, text, form, and other common functions a single click away.

TWO VIEWS IN ONE: Dreamweaver MX's code view lets you see the effects of HTML changes on your page as you make them.

A FAMILY AFFAIR

EVEN MORE than Macromedia, Adobe focuses on making the lives of Web development team members easier. Its GoLive 6 is designed to integrate seamlessly with other Adobe software: Photoshop, Illustrator, After Effects, and LiveMotion. This allows you to convert artwork from these programs into animation-ready objects while retaining the ability to edit them in their native application.

The $399 GoLive 6 (upgrade, $99) includes the WebDAV-based Web Workgroup Server, which facilitates file sharing. Also new: a view that can show code and layout simultaneously in two windows; and full support for Photoshop source files, text, and vector layers. Among other things, the latter feature conveniently allows you to resize a sliced Photoshop (.psd) file directly, rather than having to work on it in Photoshop.

TOE TO TOE

DREAMWEAVER MX and GoLive 6 are high-quality tools that mesh well with their manufacturers' other development software. Dreamweaver's edge over GoLive 6 rests in its integration with Macromedia's ColdFusion server scripting environment—including Microsoft's ASP.net, which GoLive doesn't support. On the other hand, if the ability to share .psd and other Adobe file formats between development applications is paramount to a smooth workflow, then go with GoLive 6.

—Dennis O'Reilly

GoLive 6
Adobe
★★★★☆
Simplifies sharing files among development team members and across other Adobe apps. Buy this if you use Photoshop and other Adobe products.
List: $399, upgrade $99.
find.pcworld.com/29664

Dreamweaver MX
Macromedia
★★★★☆
This Swiss Army knife of Web developers integrates with the company's other development tools, but the new interface takes some getting used to.
List: $399, upgrade $199.
find.pcworld.com/29663

QUICK TAKES

MX No Flash in the Pan

IF YOUR only encounters with Macromedia Flash—used primarily to create Web navigation and other interface elements—have been via gratuitous Web animations, get ready for a change. The features added to the new $499 Macromedia Flash MX move this software from the periphery to the heart of your Web-design tool kit. The company introduced its new integrated development environment with this version of Flash, which, for instance, adds Property Inspector, a popular Dreamweaver tool that provides context-sensitive information about tools or objects you select. And Flash MX can now import and stream .avi, .mov, .mpg, and other popular Web video formats via Sorenson Media's Spark technology. You also can embed video in movie clips to let viewers start, stop, pause, and otherwise interact with them. This Flash looks like it has staying power. Macromedia, find.pcworld.com/25801

–Dennis O'Reilly

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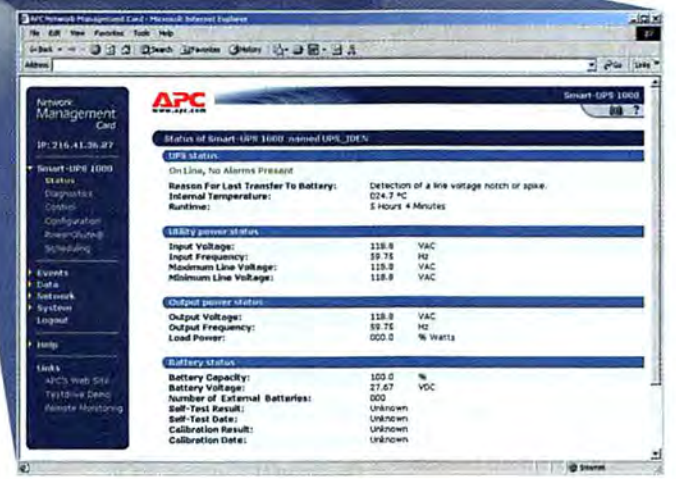

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Friendly Linux Alternative to Windows

OPERATING SYSTEM

TEST Center

LOOKING FOR an inexpensive, simple-to-use alternative to the Windows operating system? Linux may leap to mind, but since Corel abandoned its effort, no vendor has concentrated strictly on making Linux friendly enough for newbies. Now, the $30 Desktop/LX distribution from upstart Lycoris demonstrates that Microsoft's monopoly on friendly operating systems for the PC could be coming to a close.

I looked at a late beta version of **Desktop/LX Amethyst Update 2**, which is directed at people who mainly use their PCs for office work and Internet access. Installing a shipping copy on my 500-MHz Pentium III PC (with 128MB of RAM and Windows XP already in place) was easy, with on-screen help available each step of the way. As the installer copies files to your hard drive, it asks you a few questions about your hardware. If you finish answering before the copying is completed, you can kill time with an on-screen game of solitaire. When everything is ready, your PC starts Desktop/LX without rebooting. One catch: You'll need 700MB of unpartitioned space on your hard drive if you plan to install it alongside an existing Windows installation.

Desktop/LX Amethyst Update 2
Lycoris
(Beta software, not rated)
Friendly OS alternative, but not as full-featured as Windows.
List: $30
find.pcworld.com/29321

LINUX-BASED Desktop/LX from Lycoris includes an office suite, a Web browser, CD writing software, and two instant messaging clients.

Desktop/LX is built atop the K Desktop Environment, one of two major competing interfaces for Linux. This incarnation, with its rolling-hill and cloudy-sky background, looks a bit like Windows XP. Icons represent your PC, network, and documents; and the start menu is smartly organized into sections—Pictures and Photos, Music and Movies, and Productivity Software.

ADDED ATTRACTIONS

DESKTOP/LX OFFERS Mozilla and KDE's Konqueror for Web browsing, both configured to support Flash, Java, and RealVideo. The default e-mail client is Mozilla's—odd, when you consider the strength of KDE's native e-mail client, KMail, which is available on the Desktop/LX installation CD-ROM. Instant messaging clients compatible with AIM and ICQ are also included.

For office work, Lycoris has KOffice. Its apps can import Microsoft Office files but can't export them. I would rather have gotten Sun's StarOffice (see find.pcworld.com/29341) or its free sibling, OpenOffice.org; both of these suites closely match Microsoft Office in features and read and write Microsoft formats. Also included are Acrobat Reader, the Gimp (a Photoshop-like image editor), CD writing software, and a solid update utility.

Unfortunately, Desktop/LX lacks some important functions. Linux-based computers can sync with Palm PDAs, but Desktop/LX-based PCs can't. And if your digital camera is less than a year or two old, Desktop/LX may not talk to it, either. I tried using two USB peripherals that work with my Mandrake Linux–based PC; Desktop/LX ignored them. All of these problems can be solved, but unless you're Linux-savvy, you won't know where to begin. And that severely undercuts the basic concept of a no-hassle Linux package.

The bottom line? Desktop/LX is a stable, friendly, and inexpensive environment for browsing the Web, sending e-mail, and working with office documents. But if your needs are more complex than that, you're better off trying another distribution or waiting to see what Lycoris does with the next Desktop/LX release.

—Matthew Newton

QUICK TAKES

PC Combo Drive

TEST Center

COMBINATION CD-RW and DVD-ROM drives are all the rage in notebook PCs, but they are not as common in desktops because of their limited CD-R write speeds. Plextor's PlexCombo 20/10/40-12A aims to change that situation.

The $200 PlexCombo's speeds certainly don't match those of the zippy 40X/12X/48X drives that dominate our current *Top 10 CD-RW Drives* chart, but they're not bad—in our tests, the shipping Plextor took 4 minutes, 36 seconds to write 650MB of files on the fly. That's 1 minute, 21 seconds slower than the fastest 40X CD-RW drive we've tested, the TDK VeloCD 40/12/48. The combination drive advantage is clearest for users upgrading a PC with limited expansion room: You need only one drive bay for both a CD burner and DVD reader. Plextor, find.pcworld.com/29501.

-Melissa J. Perenson

PHOTOGRAPH: RICK RIZNER

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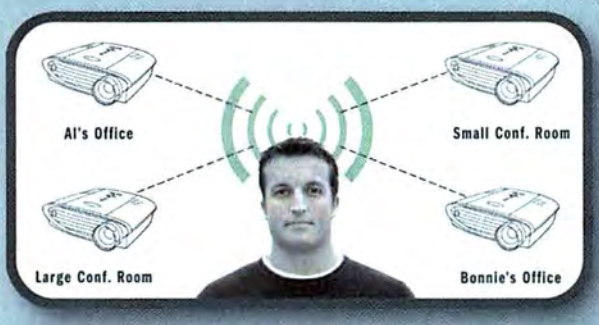

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Copy, Back Up Your PC's Drive With Ease

UTILITIES

DRIVE IMAGING, the best way to back up your entire hard drive for disaster recovery, used to require rebooting to DOS. New software now allows you to do much of the chore in Windows. I looked at shipping versions of **Drive Image 2002**, from longtime contender PowerQuest, and **True Image Deluxe**, a new entrant in the field from Acronis.

IMPROVED: Drive Image 2002 now works in Windows...sort of. In some cases, it may still need to exit Windows and reboot to perform.

For Drive Image 2002 ($70), PowerQuest substantially overhauled its predecessor, version 5, though the new version remains backward-compatible. New features include LAN support and a scheduler with a great new option. After scheduling an image creation, you may tell the scheduler to wait until you shut Windows down to run Drive Image. When you instruct your PC to shut down, a small program that monitors Windows then proceeds to launch Drive Image.

Best of all, Drive Image has partitioning capabilities. This is important because the easiest place to put an image of your hard drive is onto the hard drive itself—but that requires a second partition. In contrast, True Image Deluxe, $50, doesn't include this.

Though less versatile than Drive Image, True Image is a cheaper, easier-to-use imaging tool. Both programs support CD-R, CD-RW, Iomega's Zip and Jaz, and other storage devices; both run in Windows; and both come with a bootable, non-Windows environment for situations where running in Windows isn't practical.

You can interact completely with Drive Image from inside Windows (version 5 offered limited Windows usability). But if you tell it to back up or restore the system partition (the one containing your Windows folder, probably your C:\ partition), the program will have to exit Windows, reboot, do the backup (or restore), and then reboot your system. For other partitions, Drive Image can do its backup and restoration from inside Windows.

For its part, True Image can back up the system partition while Windows is running, but it must exit Windows if you ever need to restore the C:\ partition.

Neither program is hard to use, but True Image is slightly easier—both because it relies more completely on wizards and because it offers fewer options. Unfortunately, one missing option is quite important: True Image can't verify the quality of a backup. As a result, you may not know that a backup is bad until you try to restore it. This drawback alone should make you think twice about buying this software.

True Image isn't so simple to use when you try to restore an image from multiple discs. It's not clear which CD you should put in first. And when it's time to insert another CD, you're told: 'The drive is not ready. A possible reason may be poor media quality'. That's not a comforting message to receive if you're recovering from a disaster. Acronis may correct True Image Deluxe's problems in some future version, but until then the $20 extra for Drive Image 2002 is clearly money well spent.

—Lincoln Spector

SMOOTH: True Image Deluxe will back up your system without exiting Windows.

Drive Image 2002

PowerQuest

★★★★½

The best drive-imaging tool now has an improved Windows interface.

List: $70

find.pcworld.com/29261

True Image Deluxe

Acronis

★★½☆☆

New, cheaper imaging program is even easier to use than Drive Image 2002 but has major flaws.

List: $50

find.pcworld.com/29241

QUICK TAKES

ChromeX Rocks

IRIVER AMERICA dazzled us with its slick CD/MP3 player, the $180 IMP-350 SlimX, our 2002 World Class award winner for MP3 player (see find.pcworld.com/29777). A new budget unit, the $99 IMP-150 ChromeX, despite being bulkier and less refined, retains all

the SlimX's major features. An LCD permits you to navigate song lists once you master a tricky remote. And the firmware is upgradable. I'd rank my preproduction unit among the best MP3 players at this price. IRiver America, find.pcworld.com/29281.

–Tom Mainelli

PHOTOGRAPH: RICK RIZNER

See the new Aluminum Mid-Tower Case, Turbo-Cool® 475, and SleekLine® 2400 P4 System at pcpowercooling.com

Cool Computer Upgrades.

POWER SUPPLIES

"If you're building a machine you need to trust, go with PC Power & Cooling products. Get its case, power supply (the best, period), and CPU fan."

John Dvorak

ECONOMICAL

Save on quality UL recognized power supplies.
STANDARD 145 SFX-L (eMach., HP67XX, more)
STANDARD 250 ATX

ULTRA-QUIET

Unrattle your nerves with a **Silencer®** power supply. Its high-efficiency fan and low-turbulence circuitry reduce noise by up to 90%. **You'll wonder if it's on!**
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SILENCER 275 ATX
SILENCER 400 ATX (PFC option)

HIGH-PERFORMANCE (STD & DUAL CPU M/Bs)

For power that won't skip a beat during drive access or utility sags, upgrade your PC with a premium **Turbo-Cool®** unit. You'll get **50%-100% more power**, built-in line conditioning, tight regulation, ultra-clean output, enhanced cooling, UL/ULC, and 3-5 year warranty!
TURBO-COOL 180 SFX
TURBO-COOL 300 1U- PFC
TURBO-COOL 300 SLIM
TURBO-COOL 300 ATX (PFC option)
TURBO-COOL 350 ATX
TURBO-COOL 425 ATX (PFC option)
TURBO-COOL 475 ATX-PFC
TURBO-COOL 475 A4-PFC (Tyan 2462, 2468, more)
TURBO-COOL 475 XE-PFC (SuperMicro P4DC6, more)
TURBO-COOL 600 PFC (Tower, ATX, or Sun)

REDUNDANT POWER

For *mission-critical* reliability (2 million hrs.), get our high-capacity **DualPower 840 System**. Shown with Tower Case.

DUAL-POWER™ 840 PFC (ATX, A4, or XE)

ENCLOSURES

ECONOMICAL MID-TOWER

Build your own PC! It's easy with this popular case.
PERSONAL MID-TOWER CASE

HIGH-END MID-TOWER

This handsome, precision-built **all-aluminum** case has it all: 12 bays, 3 aux. fans, 4 front USBs, 5-in-1 M/B cable, removable M/B tray, and *toolless* access! Holds single or **dual CPU M/Bs.**
ALUMINUM MID-TOWER CASE

HEAVY-DUTY FULL-TOWER

Distinctive style, heavy-duty construction, full-size M/B compatible, 10 bays, extra cooling and EMI suppression. You can't beat our **all-steel, USA-made** full-tower cases! Std. beige or deluxe version with casters, bold black finish, and a **bright chrome** bezel.
SOLID-STEEL TOWER CASE
DELUXE CHROME TOWER CASE

SLEEKLINE® SYSTEMS

The feature-rich **SleekLine® 2.4GHz Pentium 4** System packs **more power** in **less space** than any other desktop computer. Beats PC World's Top 15 PCs!

PERFORMANCE COMPARISON

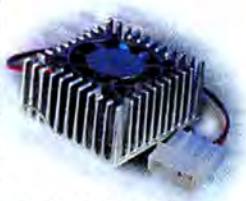
COMPUTER	SIZE (cu. in.)	PERFORMANCE[1]
SleekLine® 2400	565	129
Dell™ 8200 (2GHz)	2087	119

[1] PC WorldBench 4 score running Windows 2000 (higher no. is better).

The SleekLine 2400 comes with 256MB RAM, 120GB HD, DVD/CD-RW combo, 10/100 E-net, high-res. 3D video, and **versatile, space-saving,** USA-made case that can be desk-bottom mounted, stacked, or carried!
SLEEKLINE 1000 (1GHz Pentium III)
SLEEKLINE 2400 (2.4GHz Pentium 4)

CPU COOLERS

INTEL®



Processors run hot, often over 230°F! Cool'em by 90°F-140°F with genuine **CPU-Cool™** coolers. Their long-life, ball-bearing fans are *integrated* into patented, die-cast heat sinks. **Last 10 times longer** than cheap imitations! USA-made. 5-year warranty.
CPU-COOL 1.9W (150-200 Pentium)
CPU-COOL M1 (Pentium II, III, SECC2)
CPU-COOL Z1-C (Celeron, PGA 370)
CPU-COOL Z1-HF (Pentium III, FC-PGA)
CPU-COOL 1U (Pentium III, FC-PGA,1U)
CPU-COOL 478 (Pentium 4, Skt 478)
DUAL CPU-COOL X2 (Xeon, Slot 2, redundant)
DUAL CPU-COOl P4 (P4, Skt 423, redundant)

AMD®

CPU-COOL Z1-H (K6-2, K6-3)
CPU-COOL AG (Athlon/XP/MP)

HARD DRIVE COOLERS

Heat *distorts* hard disk platters! Cool your drives by 20°F-40°F with our reliable, solid-steel **Bay-Cool.**
BAY-COOL DRIVE COOLER (1 drive)
BAY-COOL III DRIVE COOLER (1-3 drives)

ACCESSORIES

ATX-to-AT CONVERSION CABLE
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TURBO-COOL® 2X AIR PROPULSION SYSTEM
BUSS-COOL DUAL-FAN CARD COOLER
VIDEO-COOL GRAPHICS CARD COOLER
SILENCER® AUXILLARY BALL-BEARING FANS
110 ALERT® OVERTEMPERATURE ALARM
SLEEKLINE DESKBOTTOM MOUNTING BRACKET
SLEEKLINE 19" RACKMOUNT BRACKETS
SLEEKLINE DRIVE AND PCI CARD OPTIONS

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Hours: 7 a.m.-5 p.m. (PT) Mon.-Fri. Terms: Visa, MC, AE, COD, or PO. Warranty: 5 years for Turbo-Cool (400-600), CPU-Cool, and Bay-Cool; 3 years for Turbo-Cool (180-350), DualPower, and SleekLine; 2 years for all others.
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A Workhorse Color Printer

PRINTER TEST Center

XEROX IS aiming its freshest group of printers—the Phaser 8200s—at small to medium-size businesses. I looked at a shipping **Phaser 8200N**, an affordable choice for workgroups that need a full-featured, networkable color printer. This solid-ink printer ships with software that detects IP addresses automatically—a time-saver for businesses with small (or harried) IT staffs.

Phaser 8200N
Xerox
★★★½☆
Offers helpful features and prints graphics speedily, but slow text printing and less-than-precise image detail undermine this business printer's overall performance.
Street: $1899
find.pcworld.com/29421

The $1899 Phaser 8200N uses blocks of waxy ink that taper to a V at one end to ease insertion and removal. Hot waxy ink has been known to emit pungent odors during large print jobs, but that didn't happen in our tests with the 8200N. Xerox's inking technology involves spraying melted ink onto a drum once before transferring it to the page. Theoretically, this process is faster than the one that four-pass color laser printers use.

In our speed tests, the Phaser 8200N produced text documents a bit pokily, at only 7.5 pages per minute. On the other hand, graphics zipped out at 2.9 ppm—faster than some pricier color laser printers we've tested, such as the $2069 Lexmark C720n, which prints graphics at 2.0 ppm. Unfortunately, the 8200 didn't produce consistently high-grade text. In some cases, it wasn't a lot crisper than a good-quality ink jet's output. The 8200N did deliver vivid colors in its prints, but it missed a few details, such as a strawberry's tiny speckles in a cropped close-up photo. Still, it printed without smears, even after producing a series of pages containing lots of color.

THE PHASER 8200N cranks out color graphics at 2.9 ppm.

This printer is not for businesses that print large quantities of text-heavy documents or for those that need excellent color prints. But if you print a lot of color drafts with both text and graphics, take a look at the Xerox 8200N.

—*Mick Lockey*

PHOTOGRAPHS: MARC SIMION

Good news: Great deals on toys.
Bad news: Having to share.

Video Cameras

MP3 Players

Cordless PC Presenters

PC PERIPHERALS

IF YOU often present PowerPoint slides, you've probably yearned to be untethered from your laptop. Atek Electronics' **Tote-Remote** and Logitech's versatile **Cordless Presenter** give you the freedom to conduct a presentation without touching a keyboard—leaving you less remote and more in control.

CORDLESS presenters from Logitech (left) and Atek.

About the size of a small TV remote, the $200 Cordless Presenter can use either USB or Bluetooth wireless technology to provide full scroll-wheel mouse capabilities; the unit can also function as a laser pointer. The somewhat simpler $80 Tote-Remote doesn't double as a mouse, but it does have three buttons for navigating remotely through presentations and for laser pointing. After I connected each of their key-size USB transmitters, both performed nicely up to 30 feet away from my notebook.

Of the two shipping units, I instantly preferred the Logitech. Though it requires software installation (the Atek doesn't), the Cordless Presenter is handy and comfortable to use either as a wireless optical mouse or as a remote control. A switch on its underside allows you to toggle quickly from mouse to presentation functionality, and an off switch lets you conserve the two included AA batteries.

Powered by an included button lithium battery, the Atek seems pricey for a laser pointer with one button to mimic the principal control keys for PowerPoint slide shows. It did work as soon as I plugged in its USB RF receiver, though, and it fits snugly in one hand.

Either of these devices will give you more control. But the Logitech Cordless Presenter, while expensive, keeps working for you even after your presentation is done.

—Michael S. Lasky ■

Tote-Remote
Atek Electronics
★★★☆☆
Useful but overpriced USB remote-control pointer.
List: $80
find.pcworld.com/29481

Cordless Presenter
Logitech
★★★★☆
Uses USB or Bluetooth to splendidly drive a combo remote-control pointer/optical mouse.
List: $200
find.pcworld.com/29461

For great deals on more equipment than you can possibly imagine, check out eBay.com. AOL Keyword: eBay

ebay
happy hunting™

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The Show Must Go On

Overcoming anxiety, equipment glitches, and other presentation challenges

If Murphy's Law is ever in effect, it's when you stand up to begin a slide presentation. So much can go wrong—and often does. But a short list of common-sense tips can ease your anxiety about delivering your message, and may even keep Murphy's Law at bay.

- Assume the worst, and have a back-up plan. Practice your presentation without the aid of any electronic devices, as though you were in a power outage. This will build your confidence for a lights-on presentation.
- Understand how color influences mood. Red conveys excitement or alert; yellow, confidence and wisdom; black, authority; green, growth; white, professionalism; purple, dignity and sophistication.
- Be judicious with the type fonts you use. The huge variety of fonts available in preparing slides is both a blessing and a curse. As with color, fonts convey subtle messages. In general, use few rather than many fonts, and stick with sans serif type, because serif fonts can lose their sharpness and look blurry when projected on a screen.
- Use high-quality projection equipment. This is almost a no-brainer, but it may be the most important of all these tips. And one more thing to think about: high quality is not necessarily synonymous with high price.

That being the case, the announcement of a pair of feature-rich projectors from Mitsubishi Digital Electronics America is welcome news—for professionals and home-theater enthusiasts alike.

The XL2 and SL2 ColorView™ projectors have the advanced features for which users are clamoring, at an entry-level price. These include Mitsubishi Digital's exclusive ColorView Natural Color Matrix, sRGB color compliance, an Intelligent Room Illumination Sensor or IRIS control, digital keystone adjustment, and 3D CineView™, which makes digital video images sharp and smooth. The XL2 ColorView also offers longer lamp life—up to 2500 hours in conservation mode.

SPONSORED BY:

Mitsubishi Digital Electronics America
www.mitsubishi-presentations.com

Mitsubishi's XL2 ColorView projector: many advanced features at an entry-level price.

The XL2 and SL2 ColorView carry Mitsubishi's industry-leading three-year warranty, which includes next-day replacement for three years on the XL2 and two years on the SL2.

TRUE COLORS

The XL2 ColorView projects 1500 ANSI lumens in native XGA resolution of 1024 x 768, while the SL2 ColorView projects 1200 ANSI lumens in native SVGA resolution of 800 x 600. Both projectors offer ultimate color control and reproduction with ColorView Natural Color Matrix, a six-axis color control function. Both display and print color palettes can be independently adjusted as if with a graphic equalizer, giving users great flexibility to create more accurate colors and true-to-life images.

Moreover, both projectors are compatible with Mitsubishi Digital's new ProjectorView networking system, which connects LCD projectors by way of an external serial-to-Ethernet translator. As a result, these projectors are connected to a local area network and can be controlled and monitored with a Web browser from a node on the LAN or via the Internet. Authorized users can then remotely monitor lamp life, internal projector temperature, and other important parameters.

COLOR

YOUR LIFE DEPENDS ON IT

MITSUBISHI ELECTRIC
PRESENTATION PRODUCTS
REVOLUTIONIZINGCOLOR™

EXTENSIVE PROJECTOR LINE

AWARD-WINNING COLORVIEW™ TECHNOLOGY

sRGB COLOR COMPLIANT

EMMY® AWARD-WINNING DCDi™ VIDEO TECHNOLOGY

NETWORKING VERSATILITY

ColorView
NATURAL COLOR MATRIX™

sRGB

In any presentation, color accuracy makes a huge difference. And nothing equals the image quality and sharp, bright colors of a Mitsubishi ColorView Projector. Whether you're one-on-one, in a crowded room, or in a large auditorium, there is a Mitsubishi ColorView Projector that will help you communicate with greater impact and better impression. Projection performance has grown beyond brightness and weight, so let Mitsubishi's unique color abilities advance you to the higher level with bold and brilliantly projected images. Plus, you're also assured of overall product quality, reliability and networking versatility. Let Mitsubishi ColorView Projectors give life to your next presentation. Call 888-307-0349; In Canada, call 905-475-7728.

WWW.MITSUBISHI-PRESENTATIONS.COM

Best of Today's Web

greatest hits & hidden gems

We do the digging so you don't have to: **50-plus Web winners,** from new and little-known sites to powerful features buried in your everyday bookmarks.

BY KIM ZETTER

ILLUSTRATIONS BY STEVE LYONS

"You're not getting older, you're getting better."

While this ad slogan from decades ago may represent the height of insincere flattery, it aptly describes the World Wide Web today. Daunting economic conditions may have actually improved the overall state of the Web. Sites that have always been good are getting better (see Google and Amazon), and great new sites such as Safari Tech Books Online and the Qualys Browser Checkup add to the Net's value. Our annual look at the Web's best destinations highlights innovative and lesser-known features that make the tried-and-true sites such consistent standouts, and it introduces you to some fresh Web stars. The biggest change since last year is the increase in fee-based Web services. We gave three *PC World* editors $50 to spend on their favorite pay sites. They report back on whether they found the services worthwhile. Finally, to see Web technology used to great effect, check out our three Web Wonders. ▶

greatest hits

IT'S EASY TO TAKE the perennial powerhouses for granted, but not all of the Web's enduring workhorses are household names. These are the trustworthy sites we return to time and again.

THE E-COMMERCE TEMPLATE
Amazon (www.amazon.com)

A LIST OF the best Web sites must include Amazon. The site's continual improvement is the result of listening to customers' needs. Amazon's used marketplace is one of its best features. You can sometimes purchase used titles for less than half the price of new ones, though the Authors Guild objects to Amazon selling used books alongside new copies of the same title. Want to get rid of some old tomes? Amazon makes listing your goods and tracking sales easy. You get an e-mail once a book sells, and Amazon deducts a small commission before transferring the funds (including shipping costs) to your bank account. Beginning in November, Amazon shoppers can save time and shipping costs by picking up orders and returning items at Borders bookstores. And the company offers free shipping on orders over $99. This site does everything but turn the pages for you.

THE WEB'S WAYBACK MACHINE
The Internet Archive (www.archive.org)

ACCORDING TO THE founder of the Internet Archive, the average life span of a Web page is 100 days. But not here. The archive's Wayback Machine lets you surf through Web history for pages dating to the frontier days of 1996. Forget irritating "File not found" messages. The Wayback Machine has archived over 10 billion Web pages that otherwise would have been lost, encompassing the largest database in the world at 100 terabytes. (By comparison, the Library of Congress contains only about 20 terabytes of data.) The site's real gems are its special collections, such as the September 11 archive—a virtual time capsule containing hundreds of pages and television broadcasts—and the Prelinger Archives, which feature more than 900 digitized industrial, educational, and government films dating to 1903, including amateur films of the Golden Gate Bridge's construction and of the New York World's Fair of 1939. You can either view them (using Windows Media Player) or recode them for copying to a DVD recorder. Peabody and Sherman would be proud!

THIS SITE DOES WINDOWS
Annoyances.org (www.annoyances.org)

READERS OF DAVID A. KARP'S technical books (published by O'Reilly & Associates) will recognize the Annoyances.org name as a trusted source for Windows information. The site has a dull mariner-gray look, but its singular focus on Windows makes it highly useful. It identifies which version of the operating system your PC uses, and lets you filter articles that aren't relevant. Most of the information is geared toward experienced users, but beginners will appreciate the site's glossary and Windows Roadmap, which summarizes Windows' capabilities and examines the differences between versions. Discussion forums are conveniently linked to articles, letting you jump to stories related to the topics mentioned. There are also links to Microsoft patches, as well as to freeware and shareware utilities that will add new luster to your Windows.

KEEP IT TO YOURSELF
Electronic Privacy Information Center (www.epic.org)

SUPERHEROES MAY NOT exist in real life, but the Electronic Privacy Information Center does its part to fight for truth, justice, and your right to privacy. EPIC's site compiles news about recent privacy-related court cases and offers a Bill-Track feature that keeps you in the loop about legislation wending its way through Congress that could affect your privacy. Links

PAY TO PLAY THAT FUNKY DIGITAL MUSIC

MUSICMATCH AND REAL NETWORKS (www.musicmatch.com) (www.real.com)

I LISTEN TO music at work, at home, on the bus, anywhere. Heck, if I'm at a bar or restaurant with a jukebox, I might drop a few quarters in to hear some tunes. But when it comes to paying for music that streams over the Internet, I'm less likely to splurge because I can either listen to the songs for free on the radio or buy the CD and play it whenever I want. Nevertheless, MusicMatch's $5-a-month Radio MX service is beginning to change my mind. I get access to songs by a range of artists in such genres as classic rock, jazz, hip-hop, and country. Unfortunately, I can't choose a specific song from an album. It's like listening to the radio: I have to take what I get.

I passed on RealNetworks' $10-a-month RealOne MusicPass, though. The service lists radio stations from around the world in a nice directory format, but I can find most of those stations on the Internet for free. MusicPass gives you 100 streams of music, news, and sports, as well as up to 100 music downloads. I'd rather buy CDs.

–Grace Aquino

PHOTOGRAPH: ROBERT CARDIN

give you access to downloads of popular privacy and security tools, such as cookie eliminators, snoop-proof e-mail, HTML filters, encryption programs, and firewalls. You can view a database of once-secret documents released under the Freedom of Information Act. Included are some recently released FBI files on the bureau's Carnivore initiative describing the plan for a keystroke-logging program known as Magic Lantern. Forewarned is forearmed.

WEB WONDERS

STAY ON TOP OF THE ACTION with ESPN.com's live game updates. Summaries can be refreshed as often as every 30 seconds. (www.espn.com)

"WHAT AM I BID?"
EBay (www.ebay.com)

THE EBAY COMMUNITY may have hit a cynical low when HP shareholders put their Compaq merger votes up for bid, but the auction service still has no peer in popularity—46 million users—or content, which ranges from Sony Pictures' *Spider-Man* movie props to sports cars. What's that you say? You'd never buy a car on EBay? Well, the site was the largest independent automobile seller in the United States last year, moving $1 billion worth of cars and parts. And EBay now offers a one-month/1000-mile limited warranty on used autos. Two great new features on the site are the Buy It Now button (available on some 40 percent of auctions), which lets you bypass the bidding process and purchase items straightaway at a price preset by the seller, and the revised Sell Your Item form, which makes posting listings easier. If you can't find it here, it's probably not for sale.

LOOKING FOR SOMETHING?
Google (www.google.com)

THERE HAVE LONG been many reasons to love Google: the site's easy-on-the-eyes interface, the spot-on search results, the absence of pop-up and banner advertisements, and the Usenet archives. Why are we gaga for Google? If you follow a link to a page that is gone from the Internet, clicking the Cached button next to each URL will let you view archived material you would have missed otherwise. The Catalog Search link on Google's advanced-search page allows you to view scanned pages from hundreds of mail-order catalogs, from Dell Home Systems to J.Crew. (You still have to call to purchase items, though.) Google's Phone Book feature lists addresses and phone numbers for businesses and individuals. The search engine extends its reach by including Adobe Acrobat PDF files as well as Microsoft Office, PostScript, and Lotus 1-2-3 files, all of which you can view in HTML format if you don't happen to have the correct application on your computer.

YAHOO'S GOT MAIL, TOO
Yahoo (www.yahoo.com)

THE BRAND THAT for many people is synonymous with the Web hasn't been resting on its laurels. For example, Yahoo's free Web-based e-mail program now lets you remark read messages as unread or flag them for follow-up action. This feature contributes to Yahoo Mail's advantage over Microsoft's competing Hotmail service. Yahoo also gives you 4MB of storage space (that's less than in the past, but you can get more by paying a small fee); Hotmail provides only a stingy 2MB. Another useful service on the site is the Yahoo Briefcase, which you can use to share up to 30MB of files with friends over the Internet, or to provide yourself with access to the files when you're away from your home or office computer. This is an e-mail service worth shouting about.

LITERARY LISTENING
Audible.com
(www.audible.com/adbl/store/welcome.jsp)

BOOKS ON TAPE are a great way to catch up on your reading while doing other things. Audible.com converts such audiotapes into digital files for listening on MP3 players and other handheld devices. The site has more than 20,000 selections, including David McCollough's *John Adams*, Stephen Hawkings's *The Universe in a Nutshell*, John Grisham's *The Summons*, and articles from such publications as the *New York Times*, *Scientific American*, and *Forbes*. Also offered are speeches by Joseph Campbell, Sojourner Truth, Winston Churchill, Franklin D. Roosevelt, and others. A monthly subscription of $13 buys you one book a month, plus access to an audible newspaper, magazine, or radio program from the site's list. For $16, you get two books a month. Compare these prices with the $25 you would have to pay for Grisham's book at Amazon, or the $6 to $50 that the site itself charges nonsubscribers for the title. The message is loud and clear: Bookworms are sure to love Audible.com.

CHANGE THE STATUS of the messages in your Yahoo Mail in-box by selecting one of the options listed in the service's new drop-down menu (right).

hidden gems

EVERY YEAR WE'RE pleasantly surprised to discover sites that solve a problem, meet a need, or tickle the funnybone in some new way. These are the best sites you've probably never seen.

TECH TALK

WebTalkGuys (www.webtalkguys.com)

THEY'RE NOT as witty as Click and Clack, NPR's Car Talk guys, but the WebTalkGuys—actually two guys and a gal—put on a good low-key show with interesting guests and lots of useful advice. Past shows, archived on the site, include tips for online stock trading and car buying, developing a community on your Web site, and photo trading. Issue-oriented discussions cover finding a tech job in tough times, navigating the domain name wars, using file-swapping services, and dealing with spam. When it comes to the Web, there's a lot to talk about.

"LOOK! UP IN THE SKY!"

NASA Human Space Flight (www.spaceflight.nasa.gov)

EVER FEEL LIKE SHOUTING, "Stop the planet; I want to get off!"? (Who hasn't at some point in the past year?) NASA's Human Space Flight will give you the lift(off) you need. The site uses real-time data to plot an image moving across a world map that pinpoints the location of the International Space Station, traveling at 17,000 mph. It makes beautiful use of Flash to depict the people and events of the most recent space shuttle mission. There's a list of spacecraft-sighting opportunities in cities from Houston to Hanoi, and the Skywatch Web-based Java applet lets you predict when an orbiting spacecraft will be visible from your backyard; the information is presented in graphical form so you can see how the craft will look against the stars in your location.

WEB WONDERS

MSN'S MONEY CENTRAL MAKES it easy to get the lowdown on a company, with one-click access to annual reports, SEC filings, and analyst ratings. (www.msn.com/moneycentral)

YOUR OWN PRIVATE SEARCH ENGINE

Atomz Express Search (www.atomz.com)

LOTS OF PERSONAL and small-business sites are a little like the Internet at large: They're bursting with useful information that's nearly impossible to find. If that sounds like your site, sign up for Atomz Express Search, a remarkably potent free service that allows even the most impecunious Webmaster to add Google-style search tools for finding content within a site. Chameleon-like customization features let you mold the Atomz interface to match your site's design, and you get reports of the terms that visitors search for (be prepared for some surprises). The catch? Express Search is available only for sites with fewer than 500 pages. But big-time operators can opt for the site's fee-based service, which offers even-more-powerful tools starting at $15,000.

"AN INFORMED DEMOCRACY..."

Thomas (thomas.loc.gov)

THE PATRIOT ACT, passed swiftly in the wake of the September 11 attacks, granted new powers to government agencies, disturbing many privacy groups. Numerous amendments to the act have followed, not all of which have been reported in the news. The Thomas site, named for Thomas Jefferson and run by the Library of Congress, helps you track congressional activity and stay on top of what your representatives are doing. The site's simple design makes it easy to find and read House and Senate committee reports, view roll-call votes to see how each representative voted on a bill, and search for bills based on bill number or on keywords. A link for legislation related to September 11 gives you a rundown on resolutions tied to that day's events.

MAKE SOME NOISE

FindSounds.com (www.findsounds.com)

YOU MAY BE hearing less about the Web since the dot-com crash, but the Internet can still make plenty of noise. This search engine locates sound files in .wav, .aiff, and .au formats, ranging from splashing water to crying babies. You can use the files to liven up e-mail messages or Web pages. The site's directory divides sounds into 16 categories, including nature sounds (an earthquake, a waterfall, thunder), musical instruments, and a host of household noises (aerosol spray, a toaster, a lawn mower). A free audio player shows you a color graph of sounds as they play. Drag your mouse over any portion of the graph, and you can instruct the engine to find a similar sound.

PICTURE PERFECT

DotPhoto (www.dotphoto.com)

ONLINE PHOTO-STORAGE sites have come and gone, but DotPhoto is still standing. The free service lets you create online albums, with sound clips (using your computer's microphone) and captions to personalize your photo collections. Upload your digital prints, or send a film roll to DotPhoto and let its staff

process and upload the pictures. The service's free editing tools let you arrange and crop pictures and add text and sound. A one-year nonpaid subscription gets you 30 free prints. Thereafter, 4-by-6 prints cost 19 cents each, and poster-size photos are $7. A $5 monthly subscription lowers your printing costs.

WEB WONDERS

THE NEXRAD RADAR LOOPS and stills available on the Weather Underground site let you predict your own weather. (www.wunderground.com)

ADVENTURE BY PROXY
AdventureTV.com
(www.adventuretv.com)

THE COLLAPSE OF the sports site Quokka.com left a dry riverbed in the streaming-video space, especially for adventure seekers looking to conquer the world. But AdventureTV.com steps in to fill the void with its own brand of high-quality streaming video that's more suited to virtual voyagers desiring a quieter, gentler pace. The site offers documentaries and travelogs of television quality from independent producers and tourism organizations. The seven categories of videos include mountains, desert, and safari. The videos are best viewed over a broadband link, but watching a Namibian bush healer slice the backside of photographer Peter Beard and suck the blood out of his elephant wound is enthralling even over dial-up.

(OVER)CLOCK WATCHERS
HardOCP (www.hardocp.com)

IF YOU'RE A hard-core PC enthusiast and you like to push your computer to its limits—and beyond—then HardOCP is the site for you. The OCP (Overclockers Comparison Page) is operated by Kyle Bennett, who runs popular seminars on overclocking CPUs. Bennett's good relationships with chip manufacturers mean that his site is usually among the first to overclock new generations of processors and to test new motherboards. The well-organized site includes helpful forums as well as a few cool tools, such as WCPUID, which tests how fast your machine is really running.

THAT 70s GAME
Rubik's Cube
(www.rubikscube.com)

THIS BRAINTEASER was an international obsession in the seventies and eighties (one German woman even cited the boxy toy in divorce proceedings). And now the fixation has taken to the Net, which has been co-respondent in some divorce cases itself. The site is immensely simple, but refreshingly well done with great graphics and smooth motion. Simply drag your mouse over the background to view the cube from any angle, then click and drag sections of the cube to move them left or right, up or down, until you manage to make every side of the cube a solid color. There's no danger of getting Cubist's thumb or Rubik's wrist with this version of the game—though carpal tunnel damage remains a risk.

INFORMATION IN THE CROSSHAIRS
Safari Tech Books Online
(safari.oreilly.com/mainhom.asp?home)

HUNTING FOR TECH information just got easier with Safari Tech Books Online, a subscription site with the digital versions of more than 600 books from publishers such as O'Reilly & Associates and Addison-Wesley. The books are fully searchable, and you can annotate pages as you read them. Server-based bookmarks give you quick access to pages from any PC connected to the Net. You can run multibook searches with keywords and preview sections of any book before subscribing to it. You can save books to disk or print them out (though you can't download ▶

AN ONLINE ENCYCLOPEDIA WORTH PAYING FOR

PHOTOGRAPH: ROBERT CARDIN

BRITANNICA ONLINE
(www.britannica.com/premium)

THIS SITE IS the closest thing I've seen to a real-world version of Douglas Adams's *Hitchhiker's Guide to the Galaxy*. Britannica switched to a pay site in late 2001, and now it provides only a small portion of its extensive online encyclopedia for free. I was able to subscribe and remain within my $50 budget (the cost is just $10 a month or $70 a year, with a free three-day trial). My subscription gives me ad-free access to the full Encyclopedia Britannica, the Concise Britannica, the Student Britannica, and the exhaustively researched Britannica Atlas. I'm also able to peruse the Merriam-Webster Collegiate Dictionary and Thesaurus (a much thinner version of the company's Unabridged dictionary), and a searchable index of historical video and audio recordings. For instance, you can download and listen to Dr. Martin Luther King Jr.'s stirring "I Have a Dream" speech.

–Andrew Brandt

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Fast forward your success with one desktop decision. A multimedia monitor from Samsung's sleek MP Series. Their space-saving designs say professional from any angle. And picture-in-picture provides simultaneous PC plus TV or video viewing.

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RUBIK'S CUBE returns with the Web version of the popular 1970s brainteaser.

PATENT PENDING
Delphion (www.delphion.com)

AFTER YEARS OF toiling unrewarded in a dark lab, you've finally developed an ingenious method for defying gravity—shoes that let you lean forward 45 degrees without falling over. Quick, get thee to a patent office! Oops—Michael Jackson beat you to it. Before wasting energy on R&D, search the patents database at Delphion. The free service covers patents filed in the United States, Japan, and Europe, and it lets you find patents that are available for licensing. A corporate subscription gives you the ability to trace the genealogy of a patent and to determine the companies and technologies connected to it. While you're there, be sure to check out the Gallery of Historic Patents and the Gallery of Obscure Patents. The latter includes a patent for pants that separate at the crotch, allowing you to mix and match pant legs.

DRIVERS, HE SAID
DriverGuide (www.driverguide.com)

YOU UPGRADE FROM Windows 98 to Windows XP, and some of your peripherals go AWOL. It's likely that your new operating system doesn't contain an updated driver for your Rockwell modem or OPTi sound card. So where do you find the driver that will set everything right? DriverGuide saves your old peripherals and parts from obsolescence by providing nearly 70,000 downloadable driver files, including hard-to-find ones from vendors gone belly-up. The site has drivers for printers, scanners, digital cameras, and network adapters, among other devices. And if you can't find the driver you need, post a message to the request board. Just don't forget: Back up your system before installing any new device driver. Unless you like running in Windows' Safe Mode, that is.

best of the rest

IF YOU HAVEN'T overworked your browser yet, head over to these sites for a look at what else is great about the Web.

♦ **1st Headlines:** Breaking news from dozens of online sources around the world on a single page. (www.1stheadlines.com)

♦ **BlogSpot:** Use your browser to establish a minisite (or "blog") for an online journal. (www.blogspot.com)

♦ **ESPN.com:** Scores, irreverent commentary, and the GameTrack real-time scorecard (shown on page 71). (msn.espn.go.com/main.html)

♦ **FreedomList:** Up-to-date list of free and cheap ISPs around the globe, along with pros and cons. (www.freedomlist.com)

♦ **HowStuffWorks:** Satisfy the curious kid in you with descriptions, photos, and diagrams of you name it. (www.howstuffworks.com)

♦ **Handango:** Want to make a Palm or Pocket PC more powerful? Load it with software from this PDA mecca. (www.handango.com)

♦ **Monster:** Over 1 million job listings and advice for job hunters. (www.monster.com)

♦ **MSN:** Thought-provoking articles on Slate and cool financial tools on Money Central (see page 72) are two of the site's draws. (www.msn.com)

♦ **The Onion:** R-rated satire that makes us laugh about current events, even when we know we shouldn't. (www.onion.com)

♦ **PC Pitstop:** *PC World* partner offers Web-based tools that give your PC a master tune-up. (www.pcpitstop.com)

♦ **PCWorld.com Downloads:** We think our cache of cool free and shareware downloads is super. (www.pcworld.com/downloads)

♦ **Personable.com:** Software-rental site gives you online access to more than 300 titles for a monthly fee. (www.personable.com)

♦ **Quicken:** Helps you pay bills, get a loan, plan your retirement, reduce your debt, and generate stock quotes. (www.quicken.com)

♦ **Scot's Newsletter:** PC tips, reviews, and news from technology journalist Scot Finnie. (www.scotsnewsletter.com)

♦ **Slashdot:** News for nerds (and the rest of us) gleaned from recent tech reports from around the Web. (www.slashdot.com)

♦ **Security Check:** Trace an attack or the source of spam, and test your PC's security. (www.symantec.com/securitycheck)

♦ **Tom's Hardware Guide:** Reliable hardware information and in-depth tests on CPUs and graphics boards. (www.tomshardware.com)

♦ **TV Barn:** TV critic Aaron Barnhart presides over a surprisingly thoughtful, continuously updated site of small-screen news and commentary. (www.tvbarn.com)

♦ **WebMuseum:** How can a site that was last updated in 1996 be considered one of the best on the Web? By showing full-screen images of thousands of paintings by hundreds of artists. (www.ibiblio.org/wm)

SUPER DAVE TO THE RESCUE!

DaveCentral

(www.davecentral.com)

ACCORDING TO DAVE, his small band of hunter-gatherers scours the Web wilderness in search of food for your PC. The result is a compendium of freeware, shareware, and commercial downloads for file utilities, FTP programs, office apps, games, and system tools, among other categories. The well-organized site lets you filter listings by program language, Windows platform, license type (freeware, shareware, demo, or commercial product), and price. A reviews archive gives you Dave's opinions on dozens of downloads, including each app's special features.

"THE PLAY'S THE THING..."

Boxerjam

(www.boxerjam.com)

THE NEXT TIME you find yourself stymied, take a break and clear your head at Boxerjam, one of the oldest game sites on the Net. The site contains game shows, word games, and puzzles at various levels of difficulty. For instance, Know It All lets you match wits against other players in a fast-moving, real-time quiz show that covers art, politics, and culture. And Crossword Plus is a well-designed puzzle that lets you enter answers easily from your keyboard and click for help letters and words when you get stuck. The site has plans to begin charging a small monthly fee (perhaps $3 to $5), but when the charges will take effect is uncertain. Boxerjam reminds us not to take the Net *too* seriously.

DO-IT-YOURSELF PDFs

Adobe Create PDF (find.pcworld.com/29711)

WANT TO CREATE a professional-looking report or portfolio with pictures that anyone can view no matter what programs they own? Adobe's Create PDF site lets you convert up to five files to Adobe's Portable Document Format for free. You can make PDFs from files in Microsoft Word, Office, PowerPoint, Photoshop, and other popular formats. The files can be no larger than 100MB, and they must be processed in fewer than 10 minutes, but the conversion is easy to complete after a simple registration. You're sent a confirmation e-mail once the conversion is done. For $10 a month (compared with $250 for purchasing the Adobe Acrobat 5 software), you can create unlimited PDFs, tag your files, and transfer hyperlinks from your original file.

GET A MOVE ON

Animation Factory (www.animfactory.net)

DO YOU FEEL THAT your online communication is a little lifeless? Then perk things up with the Animation Factory's colorful wares. A one-year, $60 membership gives you access to more than 150,000 animations, as well as to 3000 animated GIFs for use on personal Web pages or in e-mail messages. Your membership also entitles you to use any of the 150,000 designs in online newsletters or for other commercial purposes, and the site's 50,000 Media Builder designs to create Web page buttons and navigation panels. A $100 membership adds access to extralarge GIF designs suitable for PowerPoint presentations. The site's templates help you drop your animations into place.

BROWSE SAFELY

Qualys Browser Checkup

(browsercheck.qualys.com)

SO MANY software security warnings are published that keeping abreast of all the fixes and patches you're sup- ▶

IS IT SAFE? The Qualys Browser Checkup helps you determine whether your browser is as secure as it needs to be.

PHOTOGRAPH: RICK FRIEDMAN

PC SECURITY ON THE INSTALLMENT PLAN

McAfee.com Subscription Security

(www.mcafee.com)

BUYING ANTIVIRUS protection in installments feels like making a monthly payment to Tony Soprano and family for protection. But extortion the subscription security services are not. I tried the company's VirusScan Online and Personal Firewall services, each of which costs $30 a year. I'll stick with VirusScan Online, which uses real-time distributed computing techniques to provide dynamic security alerts. If a Klez worm is on the loose in Bonn, Germany, for example, a pop-up message alerts me and updates my virus definitions before the worm ever wiggles past the German border. I canceled Personal Firewall, though. I felt strong-armed when McAfee.com said both my work and home computers were "highly vulnerable to being attacked" despite my having a corporate firewall to protect the former and a router firewall to guard the latter.

–Tom Spring

FIND YOUR PLACE in the cosmos, or maybe just some cool wallpaper, at the Space Telescope Science Institute's HubbleSite.

posed to install is difficult. Internet Explorer has been especially rife with dangerous holes. Qualys, a network security firm, offers a comprehensive and free Web-based browser test that tells you whether your IE setup is making you vulnerable. The tests disclose cookie, clipboard, and hard-drive snooping; malicious executable programs; and Web spoofing (whereby hackers send you to what appears to be a legitimate site but is actually a front for collecting credit card numbers and other personal data stored on your PC). In cases where a patch will fix the problem, Qualys directs you to the latest cumulative download from Microsoft; if the software giant hasn't yet released a patch, the site provides a workaround solution until a formal fix is available.

BIG ON SITE BUILDING
Reallybig.com (reallybig.com/default.shtml)

THIS SITE FOR site builders isn't particularly attractive, but then warehouses are rarely beautiful. And that's what Reallybig.com really is: a warehouse of tools for building Web sites. With luck the site will have jettisoned its green wallpaper by the time you read this, and the current layout of elements on Reallybig.com's home page will make you want to call a building inspector. But you'll find loads of CGI scripts, JavaScripts, Web graphics tools, HTML editors, site search engines, calendars, and guest books to create a site you can be proud of. Most of the offerings are free. Sometimes "really useful" is more important than "really pretty."

STAR GAZE WITH DR. HUBBLE
HubbleSite (hubble.stsci.edu)

IF YOU WERE stunned by those magnificent pictures of gaseous, glowing nebulae and colliding galaxies that the Hubble Space Telescope recently captured, you'll want to check out the encore presentation appearing at the Space Telescope Science Institute's HubbleSite. "Nearly four hundred years after Galileo first observed the heavens through a telescope," we're still searching for meaning in the cosmos. This site takes you closer to the source than you've ever been before. You can view an animated simulation of the merging of the Mice Galaxies, take a close look at the Eagle Nebula, or choose from eight Hubble photos for your PC wallpaper. There's also a behind-the-scenes look at how the Hubble telescope works.

TOON TOWN
Cartoonbank.com (www.cartoonbank.com)

THE NEW YORKER MAGAZINE is known for its witty cartoons and cover art. The Cartoon Bank offers for purchase 20,000 original, signed, pen-and-ink *New Yorker* drawings, as well as 60,000 illustrations from other publications; it also has a few free drawings for sending in e-mail. You can frame original cartoons for your wall or buy imaging rights to reproduce illustrations on your Web site or in presentations, newsletters, or ad campaigns. Permissions cost between $50 and $800, depending on your intended use. Of course, you can view the works even if you're not buying. Most of the covers for sale were published before 1993, but you can buy lithographic prints of other colorful covers.

I STREAM, YOU STREAM
Streaming Media World (www.streamingmediaworld.com)

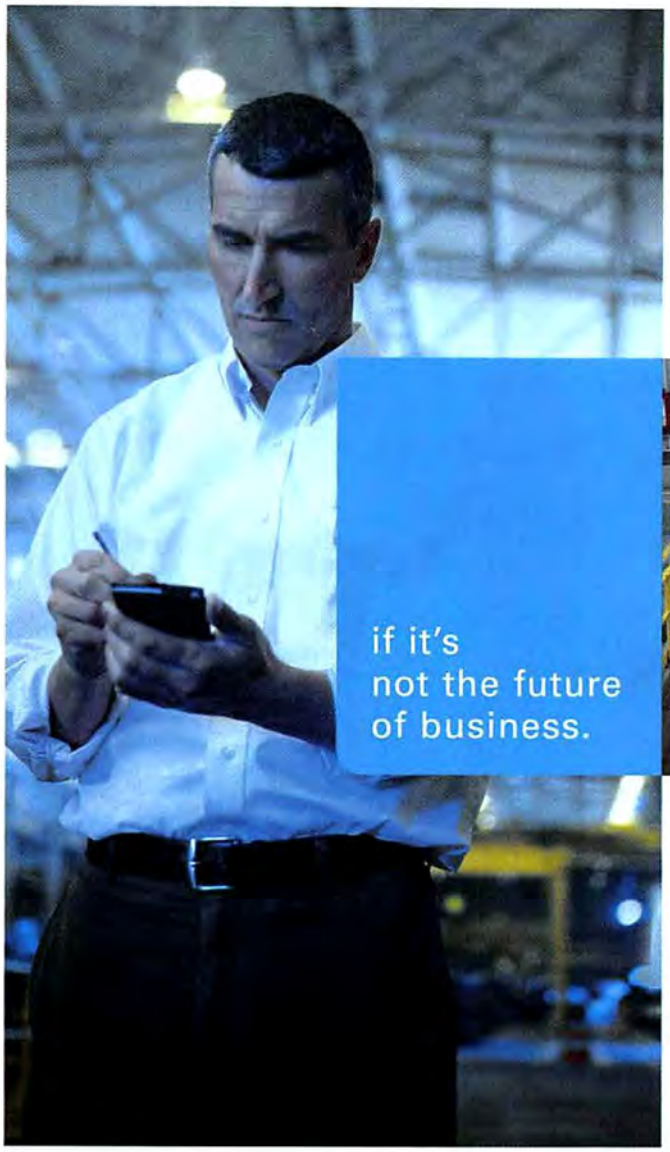
IF YOU'RE MORE interested in creating streaming media than in watching it, Streaming Media World is your place. The site offers tips and tools for making animations, as well as tutorials on compressing files and shooting and editing video for streaming media. Also featured on the site are news reports and interviews with top creators and executives in the streaming-media field.

GOT KETCHUP?
Condiment Packet Museum (www.clearfour.com/condiment)

IF THE INTERNET ARCHIVE is preserving our Web history for posterity (see page 70), it seems only appropriate that someone capture our condiment legacy for future generations. Thank goodness the Condiment Packet Museum has us covered. The site is a Warholesque tribute to the culinary equivalent of the fashion accessory. Over 500 individual condiment packets are on display, from Lucky "Year of the Sheep" Soy Sauce to Bojangles' Cajun Hot Sauce. The pages load slowly, but as they say at Heinz, the best things come to those who wait. ■

CLASSY COVERS: Browse the collection of New Yorker magazine art at the Cartoon Bank.

Kim Zetter is a contributing editor for PC World.



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not the future
of business.

it's a fiscally
sensible
present.

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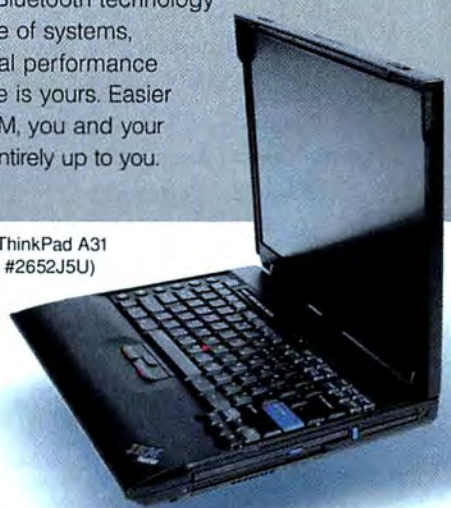

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ThinkPad Port Replicator	(#02K8667)	$179
Targus DEFCON Authenticator PC Card Fingerprint Reader	(#31P6763)	$180
HP DeskJet 350c Color Portable Printer	(#31P7612)	$280
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This test was performed without independent verification by eTesting Labs, Inc. eTesting Labs, Inc. makes no representations or warranties as to these test results. BatteryMark is a trademark of Ziff Davis Publishing Holdings Inc., an affiliate of eTesting Labs, Inc., in the US and other countries. A description of the environment under which the test was performed is available at **ibm.com**/pc/ww/thinkpad/batterylife.html. [6]Includes battery and optional travel bezel instead of standard optical drive in Ultrabay bay if applicable; weight may vary due to vendor components, manufacturing process and options. Thinness may vary at certain points on the system. [7]Telephone support may be subject to additional charges. For onsite labor, IBM will attempt to diagnose and resolve the problem remotely before sending a technician. [8]Certain Microsoft software product(s) included with this computer may use technological measures for copy protection. 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A service technician is scheduled to arrive at your location within two or four business hours or the next business day (depending on service) after remote problem determination is completed. For the 9x5x4-hour service, calls dispatched after 1:00 p.m. local time, you can expect the service technician to arrive by the morning of the next business day. For noncritical service requests, a service technician will arrive by the end of the following business day. If the machine problem turns out to be a Customer Replaceable Unit (CRU), IBM will express ship the part to you for quick replacement. Onsite 24x7x2-hour service is not available in all locations. External peripherals, such as racks, tape drives and channel controllers, require their own separate service coverage; they are not covered under the attached Machine. Service activation is required immediately following purchase. For ThinkPad notebooks requiring LCD or other component replacement, IBM may choose to perform service at the depot repair center. For failing non-IBM components, customer must provide replacement part unless IBM has a Technical Support Agreement with the manufacturer. Service does not cover accessories, supply items and certain parts such as batteries, frames and covers. [10]With Intel SpeedStep, processor speed may be reduced to conserve battery power. [11]Based on IEEE 802.11b. This wireless LAN product has been designed to permit legal operation worldwide in regions in which it is approved. Operation on channels 12-14 is not permitted in all regulatory regions of the world. Consequently the wireless LAN feature is limited to operate on channels 1-11 and will not support channels 12, 13 and 14. This product has been tested and certified to be interoperable by the Wireless Ethernet Compatibility Alliance and is authorized to carry the Wi-Fi™ logo. 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- Microsoft® Windows® XP Professional[4]
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- CD-ROM
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IBM UPS 675 External USB	(#33L3478)	$159
Iomega Zip 250 External USB Powered Drive	(#22P5787)	$180

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Quantum
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1100
CMS

Data Saviors

These storage devices make backing up so fast, easy, and affordable, you'll actually do it.

YOU'RE AS NERVOUS AS a diamond cutter on a roller coaster. Your precious gem—your PC's hard disk—has started to make a disturbing chattering sound. That's when it hits you: Your data is probably toast, and your backups are laughably out of date. Never mind how long it will take to reinstall your applications—you also face weeks of laboriously scanning paper documents, reentering your worksheets, rebuilding your customer database, and extracting all of those MP3s from your CDs.

For many people, backing up is an unpleasant chore. We make lots of excuses not to do it: It takes too much time, it's too much hassle, it costs too much. But we at ▶

BY ROBERT LUHN
PHOTOGRAPHS BY PIERRE-YVES GOAVEC

PC World uncovered several inexpensive backup options that are surprisingly fast and easy to use: portable external hard drives; rewritable DVD drives; and network-attached storage (NAS) devices, which are useful for backing up a PC or a small network via an ethernet connection.

Back when hard drives were measured in megabytes, savvy users and businesses relied on the only automated backup option of the time: a tape drive. Everyone else used the humble floppy disk; prayed that they wouldn't accidentally corrupt or delete essential files; or hoped against hope that their hard drives wouldn't die.

Today's jumbo hard drives can store many gigabytes of data that you'll want to back up. For this review we ran ten storage devices through a series of tests overseen by the PC World Test Center. The drives we looked at represent a wide range of technologies both new (like rewritable DVD) and established (like tape)—and all of them are suitable for backup tasks.

The drives we looked at represent a wide range of technologies...and all are suitable for backup tasks.

We grouped products according to the size and type of backup that users normally need to perform: smaller backups of under 2GB; medium-size backups of 2GB to 20GB; and complete backups that often exceed 20GB and reproduce the entire contents of the hard drive, including its OS, applications, and data.

In the under-2GB category, we examined three drives, none of which are designed for backing up huge data sets: the Fujitsu DynaMO 1300U2 ($299), a 1.3GB magneto-optical USB 2.0 drive; the Iomega Zip 250MB USB-Powered Drive ($149); and the Plextor PlexWriter 40/12/40A internal CD-RW drive ($140).

For the 2GB-to-20GB category, we tested several types of rewritable DVD drives:

FEATURES COMPARISON

Building Blocks: Hard Drives Soar

	PRODUCT	Street price (5/10/02)	Tested capacity [1]	Media cost	Pieces of media required for 10GB backup	Cost of full 10GB backup [2]	Internal or external drive/interface	Bootable drive	OS supported
Task: Back up under 2GB	Fujitsu DynaMO 1300U2 find.pcworld.com/29648	$299	1.3GB	$20	8	$459	External/USB 2.0	No	Windows 98, Me, 2000, XP
	Iomega Zip 250MB USB-Powered Drive find.pcworld.com/29649	$149	250MB	250MB Zip, $15	[5]	n/a [5]	External/USB 1.1	No	Windows 9x, Me, NT, 2000, XP
	Plextor PlexWriter 40/12/40A find.pcworld.com/26281	$140	700MB (CD-R)	700MB CD-R, $0.50; 700MB CD-RW, $0.80	13	$147	Internal/IDE	Yes	Windows 98, Me, 2000, XP
Task: Back up 2GB to 20GB	HP Dvd200i find.pcworld.com/29644	$500	4.7GB (DVD+RW)	4.7GB DVD+R, $6; 4.7GB DVD+RW, $10	3	$530	Internal/IDE	Yes	Windows 98, Me, NT, 2000, XP
	Iomega HDD 20GB Portable Hard Drive find.pcworld.com/29643	$229	20GB	n/a	n/a	$229	External/FireWire	Yes	Windows 98 SE, Me, 2000, XP
	Pioneer DVR-A04 find.pcworld.com/29645	$460	4.7GB (DVD-RW)	DVD-R, $6; DVD-RW, $10	2	$480	Internal/IDE	Yes	Windows 98, Me, NT, 2000, XP
	OPS DVDBurner find.pcworld.com/29646	$380	9.4GB (DVD-RAM)	9.4GB DVD-RAM, $25; 4.7GB DVD-RAM, $15; 4.7GB DVD-R, $6	2	$422	Internal/IDE	No	Windows 98, Me, NT, 2000, XP
Task: Back up over 20GB	CMS Peripherals ABSplus for Desktops find.pcworld.com/29636	$399	80GB	n/a	n/a	$399	External/USB 2.0	Yes	Windows 98, Me, 2000, XP
	Exabyte VXA-1 Tape Drive find.pcworld.com/29639	$798 [4]	33GB	33GB VXA-1 tape, $67	1	$798	External/Ultra2 SCSI	No	Depends on backup software
	Interactive Media 80GB KanguruDisk find.pcworld.com/29640	$290 [7]	80GB	80GB hard drive cartridge, $210	n/a	$290	Internal/IDE	Yes	Windows 9x, Me, NT, 2000, XP
	Quantum Snap Server 1100 find.pcworld.com/29641	$849	80GB	n/a	n/a	$849	External/ethernet 10Base-T/100Base-TX	Yes	Windows 9x, Me, NT, 2000, XP

n/a = Not applicable.

[1] Capacity of fixed media (not using compression) or of one piece of removable media.

[2] Based on price of drive and media (not using compression) to do full 10GB backup.

[3] Total time to complete 10GB backup using the default settings of the software noted in chart. Actual backup size varied, depending on what software was used. Time includes 15 seconds per disc to account for disc swapping.

the $500 Hewlett-Packard Dvd200i DVD+RW drive, the $460 Pioneer DVR-A04 DVD-RW drive, and the $380 QPS DVD-Burner DVD-RAM/R drive. In addition, we evaluated Iomega's $229 HDD 20GB Portable Hard Drive, an external FireWire (IEEE 1394) hard disk drive.

The final category covers backups exceeding 20GB. Here we focused on big drives that are great for handling fully automated backups: CMS Peripherals' $399 ABSplus for Desktops, an 80GB external hard drive with built-in software that automatically backs up your system; Interactive Media's $290 80GB KanguruDisk, a removable hard drive that docks in a desktop's internal drive bay; Quantum's $849 Snap Server 1100, a NAS device for small networks; and Exabyte's $798 VXA-1 Tape Drive. VXA tape has a very high capacity and works extremely well for full-system, automated backups.

GET YOUR BACKUP

THESE DRIVES DIFFER substantially in technology, but it's useful to compare them on measures of speed and usability. The chores: doing a full backup of 10GB, performing an incremental backup (in which we backed up only the 500MB of new files previously added to our system's hard disk), and copying 500MB of files from a PC to a backup drive (the exception here was the tape drive, which does not work with software that lets you copy files via a drag-and-drop interface).

We tested CMS's ABSplus, Interactive Media's KanguruDisk, Iomega's HDD Portable Hard Drive, and Quantum's Snap Server using the default settings of their bundled backup software; for all of the remaining drives, we used Stomp's $79 BackUp MyPC, which has data verification enabled by default. (Visit find.pcworld.com/29672 to read reviews of this Best Buy program and other backup packages.) Hewlett-Packard includes a basic backup package, Simple Backup, with its Dvd200i, but this program can't do incremental backups; for consistency, we used BackUp MyPC in both of our tests with this drive.

The results didn't surprise us: Backup hard drives zoomed, tape storage dragged, and optical storage generally ranged ▶

	Bundled software	Time to back up 10GB (hours:min) [3]	MB per minute (full backup)	Time to back up 500MB (min:sec) [4]	Service and support	Comments
	None	3:06	49	10:31	Lifetime toll-free phone support for 14 hours on weekdays and 8 hours on Saturdays; 1-year warranty	One of the slower drives reviewed; media is considered reliable and archivable, but it can be read only in a 3.5-inch magneto-optical drive. (★★★☆☆)
	Iomega QuikSync LE	n/a [5]	n/a [5]	n/a [5]	1-year toll-free support for 13 hours on weekdays; 1-year warranty	Has limited capacity and is very slow compared to other drives reviewed here; adequate for backing up a limited number of files. (★★☆☆☆)
	Roxio Easy CD Creator 5.1 and DirectCD 5.1, Plextor Manager 2000	1:43	89	6:54	Unlimited toll-free support for 11 hours on weekdays; 1-year warranty	A fast, affordable drive that's best for smaller data backups with inexpensive media. (★★★★☆)
	Stomp RecordNow Max and DLA, HP Simple Backup	2:16	67	6:15	1-year support for 12 hours on weekdays (calls are not toll-free); 1-year warranty	Best choice for moderate backup tasks—it's fast and affordable, and the documentation is clearly written. (★★★★☆)
	Iomega Backup and QuikSync 3	1:23	111	1:03	1-year toll-free support for 13 hours on weekdays; 1-year warranty	Speedy portable drive backs up in the background or at scheduled times; can be used with USB 2.0 with optional module. (★★★★☆)
	Stomp RecordNow DX and DLA, Sonic MyDVD 3, CyberLink PowerDVD XP 4	4:37	33	93:03	Lifetime toll-free support for 10.5 hours on weekdays; 1-year warranty	Depending on the software used, takes an hour or more to format media; however, it's the best drive for creating DVD-Video discs. (★★★★☆)
	PowerDVD XP 4.0, MedioStream NeoDVD 3.0, VOB InstantWrite 2.5	3:06	49	7:32	1-year support for 8 hours on weekdays (calls are not toll-free); 1-year warranty	Uses 9.4GB DVD-RAM discs that other DVD-ROM-compatible drives can't read; can write to DVD-R and read CD-R and -RW media, but can't write CDs. (★★★☆☆)
	CMS Automatic Backup System	0:18	510	0:46	Lifetime support for 11 hours on weekdays (calls are not toll-free); 3-year warranty	Fastest product reviewed; preconfigured software automatically backs up PC; best for users who can't afford downtime. (★★★★☆)
	None	3:31	43	n/a	Lifetime toll-free support for 11 hours on weekdays; 3-year warranty	Solid and reliable, but also pricey and slow; good for regular large-scale automated backups. (★★★½☆)
	NovaStor Disk-to-Disk Backup	0:42	225	1:25	Lifetime support for 8 hours on weekdays (calls are not toll-free); 3-year warranty	Ungainly, but this removable hard disk cartridge is flexible: It can also be used as a portable external drive via optional connectors. (★★★★☆)
	PowerQuest DataKeeper	2:51	46	2:41	Lifetime toll-free support for 12 hours on weekdays; 2-year warranty	Compact enough to carry with you, this server easily backs up multiple PCs on a small network; it can work remotely over a wide-area network. (★★★½☆)

[3] Time includes disc formatting, where necessary, to copy folder via Windows Explorer (rewritable DVD drives used Stomp's DLA drive-letter access software; CD-RW drive used Roxio's DirectCD 5.1).

[4] Requires purchase of separate backup package to use the drive.

[5] Not tested by PC World Test Center.

[7] Includes NovaStor backup software and internal dock for PC.

between those extremes. As you might expect, low-capacity removable media drives demand a lot of babysitting during large backups. In our tests, we had to use 13 discs with the Plextor CD-RW drive to complete a full backup, and we had to insert each disc twice—once for the backup and once for data verification.

Still, for smaller backups, the affordable CD-RW drive gets our nod. For medium-size backups of 20GB or less, a DVD+RW drive will serve you well. And for very large volumes of data, you'll appreciate the convenience of an external hard drive.

Of course, no single backup solution fits every environment. A CD-RW drive isn't viable for backing up several systems over a network; NAS is overkill for a single desktop. Our evaluations take speed and cost into account, but you should also consider the drive's portability (a must for backing up systems at multiple work sites); the media's capacity (which determines how many passes it will take to complete your backup); and the suitability of the media for off-site storage.

2 UNDER 2GB: SMALLER BACKUPS

Best bet: CD-RW drive

YOU HAVE ONE or several folders that need backing up—but you don't need to protect every byte on your hard drive (for example, applications, which you can reinstall easily). The three drives in this category—Zip, CD-RW, and magneto-optical—have maximum storage capacities of 250MB, 700MB, or 1.3GB per disc, so you can back up less than 2GB of data without having to swap an inordinate number of discs. But CD-RW drives make the most sense, thanks to their low cost, their speed, and their use of inexpensive, portable media.

The stylish blue, external Iomega Zip 250MB USB-Powered Drive handles limited amounts of data but does it well. Installation is a snap: You can connect this USB 1.1 device to a PC without powering down; and because the drive doesn't require an external power supply, it's very portable. But when it comes to speed and capacity, the Zip 250MB cannot match competing technologies—which is why we didn't subject it to the same battery of lab tests as the other drives in this review. In our informal tests, copying 247MB with Windows Explorer took more than 9 minutes—just about three times as long as a comparably priced CD-RW drive. Furthermore, a 2GB backup could require as many as eight 250MB Zip cartridges (at a cost of roughly $15 per cartridge). The drive includes QuikSync LE, a scaled-down version of Iomega's software for doing scheduled and on-the-fly backups.

UNDER 2GB: (From top) Iomega Zip 250MB USB-Powered Drive, Fujitsu DynaMO 1300U2, and Plextor PlexWriter 40/12/40A CD-RW.

Plextor's PlexWriter 40/12/40A is only slightly cheaper than the Iomega Zip 250MB drive, but the 700MB CD-R and CD-RW media that it uses holds more data and costs far less (50 cents for a CD-R, 80 cents for a CD-RW). The drive was fast, too, taking 1 hour, 43 minutes to back up 10GB of data in our tests.

The illustrated setup guide for our test drive was out of date, but installation was still easy—and typical for an internal drive. We slid the drive into a free bay and connected the power and data cables; upon rebooting, Windows XP recognized the drive on the spot.

The 40/12/40A's biggest selling point is the compatibility of its media: Burn your files to CD-R, and just about any computer-based CD- or DVD-media drive around should be able to read them.

The same can't be said for the media that Fujitsu's external 1.3GB DynaMO 1300U2 uses. The drive is one of a handful of magneto-optical drives on the market, and only other 1.3GB magneto-optical drives can read the $20 discs.

MO has one benefit: Its 3.5-inch media is ensconced in a rugged cartridge that

SUITABILITY CHART

Choose Your Backup

USE THIS CHART to figure out at a glance which technology is right for your backups.

GOOD
FAIR
POOR

STORAGE TECHNOLOGY	Media capacity	Off-site storage	Speed	Cost to back up 10GB[1]	Ease of automation[2]
Iomega Zip	POOR	GOOD	POOR	POOR	POOR
Magneto-optical	POOR	GOOD	FAIR	FAIR	POOR
CD-RW	POOR	GOOD	GOOD	GOOD	POOR
DVD-RW	FAIR	GOOD	POOR	FAIR	FAIR
DVD-RAM	FAIR	GOOD	FAIR	FAIR	FAIR
DVD+RW	FAIR	GOOD	GOOD	FAIR	FAIR
Internal hard drive	GOOD	POOR	GOOD	GOOD	GOOD
External hard drive	GOOD	FAIR	GOOD	GOOD	GOOD
Network-attached storage	GOOD	POOR	FAIR	FAIR	GOOD
Tape drive[3]	GOOD	GOOD	POOR	FAIR	GOOD

[1] As determined in tests of the products covered in this review. [2] Reflects the amount of disc swapping necessary to complete a 10GB backup. [3] Comprises all high-capacity tape formats.

protects the disc from damage and makes it suitable for long-term storage. The discs are small, easy to transport and store, and have a high enough capacity that MO uses two-thirds as many discs as CD-RW to complete the same full backup. Plus, the media's reputation is sound (see "The Foibles and Fortitude of Media," page 92).

The model that we tested had a USB 2.0 interface, which permits hot-swapping of the drive among multiple PCs. And if you already use a 3.5-inch MO drive, you'll appreciate the DynaMO 1300U2's compatibility with earlier generations of ISO 3.5-inch MO discs. But at $299, the drive itself costs more than twice as much as the Plextor CD-RW drive. Furthermore, in our tests, it's slower than the CD-RW drive for full backups and folder copying.

You certainly can use a rewritable DVD drive or an external hard drive for similar backup tasks. For small backups, however, an inexpensive, low-capacity drive with removable media costs far less. ▶

BACKUP TIPS

Strategies for Foolproof Backup

ADVICE IS EASY TO GIVE, but hard to take—especially if the advice is "Back up your computer!" The nine tips below will help keep your data safe, and keep you calm in the face of a disaster.

♦ **Establish the list of files you want to back up:** If you need to protect just your data files—documents, databases, address books, Internet bookmarks, and Microsoft Office style sheets, for example—your backups may require a lot less space than you expect. Also back up software updates, patches, downloads, and service packs, too: If your hard disk crashes, having these files available will make getting your system back up-to-date much faster.

♦ **Decide how often to back up:** Measure your potential angst over lost data, and modify your backup schedule accordingly. If most of the data on your system is important and you use it every day, daily backups are crucial. Work out a schedule for rotating your media; this can allow you to recover data you may not have realized was lost or corrupted.

♦ **Verify your data at the end of each backup:** Don't take a chance that you're saving a bad backup. For maximum safety, you shouldn't just depend on what the software tells you: Run a test restore to make sure that everything is there and working.

♦ **Create multiple backups in different locations:** For must-have data, make two backups and store them in separate locations. Having a local backup is important for quick access to your data, but it won't help you recover from a fire or a flood. Redundant backups also protect against media failure.

♦ **Don't rely on just one technology:** Making redundant backups is a good idea; an even better notion is to make them using a different backup method. If you run backups to a hard disk, for example, save duplicates of essential files on some form of removable storage, such as CD-R or DVD+RW. This approach provides an additional hedge against disaster or hardware failure.

♦ **Pick a backup program:** Drag-and-drop works fine for backing up a folder here and there, but a backup program gives you several advantages, including compression, automation, and the ability to span a large backup over multiple pieces of media. Backup software can also perform incremental backups—backing up only new or modified files—which saves time and space. Alternatively, drive-imaging software such as PowerQuest's Drive Image or Symantec's Norton Ghost captures an exact replica of your drive, including your operating system. Before buying, though, check to see whether the software supports your hardware; some backup packages, for example, won't work with the latest CD-RW drives.

♦ **Make a dry run:** Backup applications almost always have logs that tell you what did—and what didn't—get backed up. We recommend making a dry run of the backup and restore processes with your software, so you can identify and fix any existing configuration issues while you still can—and so you won't need to fumble with the software's manual in the midst of a crisis.

♦ **Mirror your hard disk for real-time recovery:** If you can't afford even brief periods of downtime, put a second hard drive in your PC and have it "mirror" your primary drive. (You'll need a RAID controller card to do so.) The distinction between disk mirroring and formal backing up is that in mirroring, all changes on your primary hard disk—both deletions and additions—appear in an identical fashion on your mirrored drive. This approach can help you get up and running after a disk crash, but it won't help you retrieve a file you overwrote two days ago.

♦ **Baby your backup media:** After you perform a backup, store the media or drive in a secure place (away from moisture, heat, and dust). And don't neglect to test the backups periodically, particularly as they evolve from backups into archives. *—Robert Luhn*

2GB TO 20GB: MEDIUM BACKUPS

Best bet: DVD+RW drive

YOU HAVE A LOT of data to back up—too much to fit on a couple of CD-Rs—and you also want to move around some big files. That's where the four drives in this category—three variations of rewritable DVD and a portable hard drive—come into play. All four of these drives have a large enough capacity to store all the data on a typical business user's hard disk, or to transport a slew of medium-length video files; and all of them use removable media well suited for off-site storage. Of the four rewritable DVD units we looked at, the DVD+RW drive was the fastest.

Currently, there are three competing, incompatible rewritable DVD formats: DVD-RAM, DVD-RW, and DVD+RW. When the dust settles on the standards battle, two of these formats may die, and you could be stuck with the losing format.

The oldest of the three, DVD-RAM, is also the least compatible. Current DVD-RAM drives can write to $15 single-sided 4.7GB DVD-RAM cartridge media as well as to $25 double-sided 9.4GB cartridge media. (The drive also writes to bare DVD-RAM discs, but one of DVD-RAM's main advantages is the cartridge's protection for the disc.) Unfortunately, only a DVD-RAM drive can read cartridge media, and even bare discs are incompatible with most DVD-ROM readers. The latest generation of DVD-RAM drives, such as the one we tested, can also record to write-once DVD-R media, which is compatible with most current DVD-ROM drives. Finally, unlike their competitors, DVD-RAM drives can't double as a CD-RW drive.

DVD-RW and DVD+RW drives have a bit more in common. Both use 4.7GB write-once or rewritable discs—about $6 apiece for DVD-R and DVD+R, and about $10 for DVD-RW and DVD+RW. And both formats can act as CD-RW drives. DVD discs written in either drive will play back in many—but not all—DVD-ROM readers; however, the write-once media is generally more compatible with existing DVD-ROM drives.

Though the actual write speeds between the two formats are largely comparable (DVD+RW is slightly faster than DVD-RW in this regard), the most prominent difference between the two involves the formatting times (preformatted media isn't available). With DVD+RW drives such as the HP Dvd200i, formatting is independent of the software you're using; the drive itself formats a disc as you write to it. With DVD-RW drives such as the Pioneer DVR-A04, though, formatting is more a function of the software than of the hardware (at this time, only software maker VOB offers a package that supports DVD-RW's Quick Format); the software we used in testing does only a full format, which accounts in large part for the Pioneer's slower performance in our tests. Whereas the HP took just a minute to initiate its format and start writing a 4.7GB DVD+RW, the Pioneer required over an hour just to format a DVD-RW.

2GB TO 20GB: (From top) Iomega's Portable Hard Drive, Hewlett-Packard's Dvd200i, Pioneer's DVR-A04, and QPS's DVDBurner.

Aside from offering superior performance, HP's Dvd200i DVD+RW drive distinguishes itself with its lucid manuals and smooth software setup. Of the three rewritable DVD drives we tested, it's the only one whose manual provides useful information (such as instructions for creating a DVD movie). HP also includes a basic backup package, HP Simple Backup, that can perform full backups but not incremental ones. The one thing that irked us: Deleting files on a DVD+RW disc can take a long time.

In our backup tests, both the QPS DVDBurner DVD-RAM/R drive and the Pioneer DVR-A04 DVD-RW drive—in that order—lagged behind the HP DVD+RW. Even the Plextor CD-RW drive beat these products on our three backup tasks. Installation for both the Pioneer drive and the QPS drive was standard-issue for an internal drive, but neither's documentation could come close to the HP's. For instance, the Pioneer's short hardware manual complicates some tasks (such as explaining setting the jumpers, which you may need to do during installation).

The sleek HDD 20GB Portable Hard Drive from Iomega wins out as the fastest drive in this category and is a close runner-up to the HP Dvd200i. Among all drives, it came in second on our 500MB folder copy test, and third on our full 10GB backup test.

But the Iomega uses a 4200-rpm 2.5-inch hard drive, which helps explain why it finished last among the hard-disk–based products in this review—behind the ABS-plus and the KanguruDisk, which use faster, 3.5-inch hard drives. Iomega's HDD External Drive line uses higher-capacity 3.5-inch hard drives, too, but those models are physically larger and bulkier than the Portable Hard Drive units.

The HDD 20GB Portable Hard Drive is one of the easiest products in this review to install: Just snap on the included mod-

ule, and connect it to a FireWire port (assuming your PC has one) without powering down your system. If you want to use the drive with USB 2.0, you can remove the FireWire module and add a USB 2.0 one for under $50; or you can buy the USB 2.0 version of the drive for $30 less. The lightweight drive is easy to take with you, since there's no bulky power adapter (power is drawn from the FireWire port).

The software bundle includes Iomega's Backup—a capable program for doing full and incremental backups—and QuikSync, which lets you select the folders that you want to back up and monitor, and automatically keeps your backups up-to-date. QuikSync also preserves multiple versions of files, so you can recoup if you later mistakenly overwrite a specific file.

OVER 20GB: THE COMPLETE BACKUP

Best bet: External hard drive

IF YOU CAN'T AFFORD DOWNTIME, and everything on your PC—from data to programs to custom settings—is vital, you need a big, fast, dedicated backup drive to safeguard your PC's content and get you up and running as quickly as possible. Speed is a major consideration here, as are capacity and removability. We looked at external hard drives, a tape drive, and a NAS device in this group—and our nod goes to external hard drives, which deliver the best performance at a very attractive price. But hard disks make storing critical data off-site difficult. In circumstances where time isn't an issue, you can opt instead for a tape drive that uses compact, high-capacity media large enough to hold the entire contents of your hard drive. A tape drive's two advantages—easy automation and its use of removable media (allowing for the storage of redundant backups off-site)—generally make up for the shortcomings inherent in its pedestrian performance.

Exabyte's VXA-1 Tape Drive, an external SCSI model, stores 33GB of data per tape cartridge (and up to 66GB of compressed data, depending on the type of files involved); a single tape costs about $67. The VXA-1 stores data in packets rather than as a continuous stream; according to Exabyte, this makes for ▶

INTERNET

Online Backup: Convenient but Slow

WE TRANSFER every conceivable type of data over the Internet on a daily basis—so why not our backups, too? Online backup services let you do just that: For a monthly or annual fee, you can upload your data to their servers.

Generally, online backups make the most sense for small and medium-size companies with high-speed Internet connections. Online backups can be a practical way to address the compelling need for redundant, off-site storage, and the needs of companies with users (either in a single location, or scattered across different locations) who have data—spreadsheets, databases, and more—that should be backed up. Companies such as Amerivault (www.amerivault.com) and Connected TLM Small Business (www.connected.com) mostly target business customers, while IBackup (www.ibackup.com), SwapDrive (www.swapdrive.com), and @backup (www.backup.com) hope to appeal to home and small-office users.

THAT'S CONNECTED: It took us nearly 9 hours to back up 600MB of data with Connected TLM.

Online backup services have some advantages over the hardware featured in this review. If you store your data off-site and a fire destroys your office, you can retrieve your data almost immediately via an Internet connection from any location. Another advantage: You don't necessarily have to purchase, maintain, or store a backup drive and media—thereby saving space—or keep track of details like which disc you used for your last full backup, and which one you specified for an incremental backup. (Of course, you'll want to keep redundant, local backups of your most essential data, too.)

All of these services provide client software that you use to schedule your backups, and then compress and upload data. They also feature data encryption: Connected and Amerivault use Triple DES encryption; IBackup uses 128-bit SSL encryption; SwapDrive uses both.

Pricing varies depending upon the company, the number of users, and the types of services involved (such as data backup; disaster recovery, including backing up your Registry; and online file storage). IBackup's pricing is $595 a year for 1GB of space, or $50 for 50MB; SwapDrive's corporate pricing starts at $30 per gigabyte per month, or $7.50 per 100MB for individual users. Maximum storage space varies by service; Amerivault, for example, can back up as much as 100GB for its customers.

The biggest drawback to online backups is the time required to perform an initial backup: It took us nearly 9 hours to transfer 600MB using Connected's service over a residential-class DSL line. Subsequent, incremental backups should take less time—but not if you add large multimedia files to the fray. *—Melissa J. Perenson*

greater reliability of the data on the tape.

Setting up the drive can be difficult, however. The documentation is slim, and the VXA-1 comes without a SCSI cable or adapter. Unlike the other drives in this review, the Exabyte includes only software drivers, and it can't be used without a third-party backup package like the one we tested with. If you don't already have backup software, you'll need to buy it separately in order to use this drive. (A FireWire version includes Dantz Retrospect Desktop Backup, but it costs $848, $50 more than the SCSI drive.)

Like most tape drives, the Exabyte drive is relatively slow: In our tests, it required 3.5 hours to complete a 10GB backup. But tape offers reliability and simplicity (see "The Foibles and Fortitude of Media," below). For a full backup, just start the application, pop in a tape, and that's it—no further intervention is necessary.

While external hard drives as a whole are common and are generally fast for ▶

BACKUP MEDIA

The Foibles and Fortitude of Media

HOW SAFE IS YOUR DATA? That question has been posed since the Babylonians first scribbled on clay tablets. If your backup disc, tape, or hard drive fails, your data goes with it. And unlike clay tablets, digital data can't be glued back together.

How long your data remains intact depends on the type of media you use and how the data is written. For short-term storage, most of the technologies reviewed in this piece are reasonably reliable. Long-term storage is something else altogether.

"Hard drives have incredible, provable reliability," says John Monroe, an analyst with Gartner Research. However, the risks may be greater with higher-capacity drives, according to IDC analyst Dave Reinsel.

The venerable tape drive has long been a backup mainstay. Robert Raymond, manager of tape research and advanced technology at Storage Technology, an enterprise storage systems company, notes that although tape can have a 30-year shelf life, "Tape should be kept in an environmentally controlled area—cool temperatures, moderate humidity, and low particulates," cautions Raymond.

Rewritable magneto-optical media, too, has a history of service in corporate backup. "MO is a good choice if long-term reliability is important. It's a stable medium that can be rewritten almost endlessly," says Wolfgang Schlichting, research manager for removable storage at IDC. Compatibility is a problem though; only MO drives can read the media. And, he says, "DVD and CD technologies are very competitive for desktop backup. They also show good reliability if you get good media and store the discs properly."

For affordable and removable long-term backup, most experts lean toward write-once media—specifically, CD-R. That's because CD-R has a longer track record than DVD media, the media is inexpensive, and drives that can read it are ubiquitous.

"CD-R lasts at least 10 years—and probably a lot longer—if the media is good quality, and you store it with reasonable care," says Katherine Cochrane, founder of CD-Info, a CD technology consulting firm. Cochrane warns, however, that there's no such thing as an error-free disc. A CD's error-correction technology can compensate for errors, but it can't overcome severely scratched media.

Though rewritable DVD is a newer technology, Cochrane says that both write-once DVD-R and DVD+R media are attractive options for backups and archiving. Both rewritable and write-once DVD media feature error correction. In fact, notes Ralph LaBarge, author of *DVD Authoring & Production*, "DVD-R and +R (and the rewritable DVD-RW, +RW, and -RAM) use stronger error detection and correction [than CD-RW]. There are almost as many error correction bits on the disc as there are data bits."

In the case of DVD-RAM, says IDC's Schlichting, the media was designed with data storage in mind; a cartridge protects the media from dust and scratches, and has a lock to keep you from inadvertently overwriting data.

All varieties of rewritable optical media—CD-RW, DVD-RW, DVD+RW, and DVD-RAM—rely on a phase-change technology to allow data to be rewritten to the disc. DVD-RAM can be rewritten up to 100,000 times; CD-RW, DVD-RW, and DVD+RW are rated at 1000 rewrites. Ultimately, however, the disc may give out from repeated erasures; and Cochrane points out that when it does, it will give no warning. As you would with any rewritable media designed for backup use and reuse, you'll have to establish a reasonable retirement schedule for it.

In short, no backup solution is bulletproof. Play it safe and back up your backups, the experts say—preferably with drives that use different technologies. And while you're at it, you might want to stock up on clay tablets, too.

—Robert Luhn

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backing up data, backups don't get any faster or more automatic than with CMS Peripherals' ABSplus for Desktops. The ABSplus is an 80GB external, 7200-rpm hard-disk drive that connects via USB 2.0 (a FireWire version costs the same; and a pricier, more portable version is also available). What sets the ABSplus apart from other hard drives is its preconfigured backup software: At first use, the software executes a full system backup; it then performs incremental backups every time you turn the drive on. (You can use an applet installed in Windows' System Tray to run an incremental backup or restore manually.)

The ABSplus was the fastest drive in this roundup, by far. It needed just 18 minutes to complete a full 10GB backup—less than half the time of its nearest competitor, the KanguruDisk. The ABSplus also came in first in the folder copy test, finishing ahead of the Iomega HDD 20GB Portable Hard Drive by 17 seconds. Note, however, that the ABS's times don't include data verification; we tested each unit with its default settings, and on the ABS, you must configure data verification manually.

Speed aside, the ABSplus makes it easy to recover from data disaster: Thanks to the included rescue floppy or CD to boot off the ABSplus, you can access Windows and all your applications and data in the event your PC's hard drive fails. Once you install a new primary hard drive, a one-step restore gets your system back to normal in a flash.

Unfortunately, CMS's manuals make installation harder than it should be, by providing scant illustrations and few port and drive part descriptions. In addition, this relatively heavy, chunky device isn't particularly well suited for transporting.

The other hard drive in this category—Interactive Media's 80MB KanguruDisk—combines some of the benefits and drawbacks of both tape and external hard drives. In our speed tests, the KanguruDisk ranked second in our full backup and incremental backup tests. The internal KanguruDisk consists of a 5400-rpm 80GB hard drive inside an ungainly, beige cartridge the size of a VCR tape, plus a KanguruDock drive bay installation kit for mounting (and locking) the IDE drive in an open 5.25-inch drive bay.

The KanguruDisk's design is interesting, because it couples the portability of removable media with the ability to keep one less item on your computer desk. In addition, it allows you to use the cartridge as an external drive, if you purchase the appropriate interface connectors (including USB 2.0, FireWire, parallel-port, and PC Card). This range of connectivity makes the KanguruDisk very flexible. However, a power adapter (required in order to use the drive externally) costs $60, and additional interface cables and adapters run from $40 to $60 apiece.

Nonetheless, at $290 (which includes the drive, the KanguruDock, and the NovaStor Disk-to-Disk Backup software), this device is a bargain: The drive's cost works out to $3.62 cents per gigabyte, compared with $4.99 per GB for the CMS ABSplus and a hefty $11.45 per GB for Iomega's HDD Portable Hard Drive.

Small businesses looking to back up multiple PCs should consider Quantum's compact, 3.5-pound Snap Server 1100. The Snap Server is an 80GB headless server that you connect to your network via a 100Base-T/10Base-T ethernet port. (You configure headless servers over your network using a Web browser, rather than controlling them via a keyboard and monitor.) Another approach is to base the Snap Server off-site and back up multiple systems over a wide area network (the Snap Server supports SSL version 3 encryption and can work with your network's existing virtual private network or firewall). The Snap Server supports various network protocols and client operating systems, including Microsoft Windows 9*x*, Macintosh System 7.5 and later, Unix, and Linux.

In our 10GB backup test, the Snap Server was the second slowest drive in this category, and it ranks fifth overall at this task. It took 2 hours, 51 minutes to complete a full backup—only 40 minutes faster than the tape drive.

As with other jumbo-capacity backup drives, the Snap Server doesn't require much attention while it runs. The backups are handled by the unit's bundled PowerQuest DataKeeper software, which executes an initial full backup of Windows clients, and then performs constant incremental backups thereafter (it even saves file versions). The Snap Server administrator can issue read and write permissions for data on the server, so (for example) each user on the network can view his or her backup files and not the CEO's. If sharing backup storage among multiple PCs is your goal, the Snap Server is a worthy contender. ■

OVER 20GB: (From top) Quantum's Snap Server, Interactive Media's KanguruDisk, CMS's ABSplus, and Exabyte's VXA-1.

Robert Luhn is a California-based freelance writer. Melissa J. Perenson is an associate editor for PC World.

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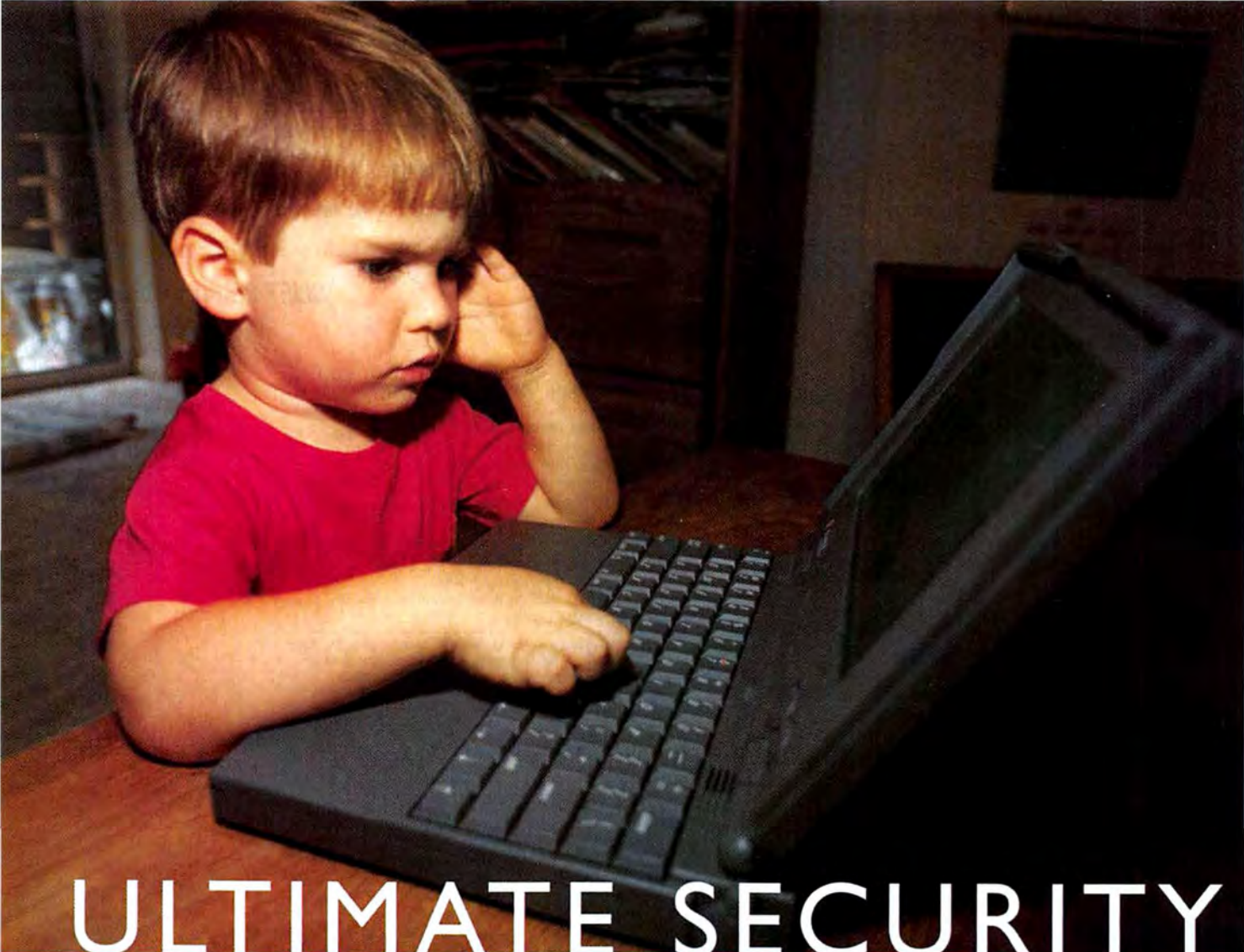

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Best BUY

MICROTEK'S SCANMAKER 6700 (above left), $400, is the speediest model on our chart. The $150, small-office **SCANMAKER 4900** is fast, too, and comes with a filmstrip-size transparency adapter.

COMPARED WITH TRENDY digital cameras, scanners may seem a little past their prime. In a digital office, who needs to convert paper to bits anymore? Actually, paper has proliferated in the digital office, and we all have shoeboxes full of photos and slides that predate those pricey digital cameras. With their relatively low cost and their ability to quickly digitize documents, images, and even small objects, it's not surprising that scanners remain popular.

For this roundup we tested 16 models, ranging in price from $79 for a simple, home-oriented unit to $1000 for a heavy-duty corporate box suitable for high-volume graphics work. We evaluated each scanner on image quality, performance, features, ease of use, and price. Our battery of tests has several new elements, ▶

BY RICHARD JANTZ

PHOTOGRAPHY BY KEVIN CANDLAND

including a close-up look at line art, which we scanned at each model's maximum resolution and then viewed at 100 percent size on a monitor. Though this test doesn't reflect typical real-world use, it really showed our judging panel what these scanners can do. Point your browser to find.pcworld.com/29621 to learn more about our revised test suite for scanners.

Both our small-office and our corporate Best Buy selections are new models from the same vendor: Microtek. On the small-office side of the chart, the $150 ScanMaker 4900's robust features, well-designed driver, and great user experience come at a compelling price. For corporate settings, the $400 ScanMaker 6700's attractive image quality, solid overall performance, and versatility give it the edge over the competition.

WHAT'S NEW

THE COLOR DEPTH and resolution formerly available only in relatively expensive scanners can now be had in many small-office models; transparency adapters, which let you scan slides and film, are also more common at lower prices. Today you can buy a 2400-dpi, 48-bit unit such as the Microtek ScanMaker 4900 for

FEATURES COMPARISON

TOP 10 FLATBED SCANNERS

SMALL-OFFICE SCANNER	Street price (5/14/02)	Overall rating	Scan quality (color/ monochrome)	Scan speed (color [1]/ monochrome, [2] in seconds)	Comments	Connection interface(s)	Maximum optical resolution
Best Buy Microtek ScanMaker 4900 find.pcworld.com/29124	$150	81	Very good/ Very good	39/42	Solidly constructed model was easy to install; robust driver, removable lid, and transparency adapter increase value. (★★★★☆)	USB 1.1	2400 by 4800
Canon CanoScan N670U find.pcworld.com/29061	$79	79	Very good/ Good	60/37	Compact, older CIS unit powered via USB 1.1 holds its own in speed. Low-resolution scans showed true color and looked clean. (★★★☆☆)	USB 1.1	600 by 1200
HP Scanjet 5400c find.pcworld.com/29122	$199	78	Good/ Very good	96/25	Monochrome line art from the 5400c looked better than color scans; video clips make installation foolproof. (★★★½☆)	Parallel, USB 1.1 [4]	2400 by 2400
Canon CanoScan D1250U2F find.pcworld.com/29081	$199	77	Good/ Fair	50/41	Canon's new CCD entry outran predecessors and includes generous software bundle, but lagged in image quality. (★★★☆☆)	USB 1.1, USB 2.0 [5]	1200 by 2400
Visioneer OneTouch 8920USB find.pcworld.com/16180	$130	76	Fair/ Very good	107/21	This inexpensive scanner features 48-bit color and high resolution but ranks as slowest small-office model here for color scans. (★★★☆☆)	USB 1.1	1200 by 4800
Epson Perfection 1650 Photo find.pcworld.com/15842	$249	76	Very good/ Very good	56/18	Sturdy, versatile model makes zippy black-and-white scans and crisp, colorful images, but its price keeps it out of the top ranks. (★★★½☆)	USB 1.1	1600 by 3200
Microtek ScanMaker 5700 find.pcworld.com/15844	$300 [6]	76	Very good/ Very good	37/27	The only FireWire small-office scanner posts great speed scores and shows strong image quality; includes interface card. (★★★★☆)	FireWire, USB 1.1 [7]	1200 by 2400
CORPORATE SCANNER							
Best Buy Microtek ScanMaker 6700 find.pcworld.com/29123	$400 [6]	84	Very good/ Very good	36/39	Color photo prints showed the best on this model; it also did well with high-resolution line art. Includes 4-by-5-inch transparency template. (★★★★½)	FireWire, USB 1.1 [7]	2400 by 4800
Epson Perfection 2450 Photo find.pcworld.com/16181	$399	81	Very good/ Good	78/17	Tested using FireWire, this USB 2.0-compatible model had average speed but provided standout gray-scale and color image quality. (★★★½☆)	FireWire, USB 2.0 [7]	2400 by 4800
HP Scanjet 5490c find.pcworld.com/29121	$399	77	Good/ Fair	95/25	This unit showed outstanding detail on maximum-resolution line art but was slowest corporate model we tested. (★★★★☆)	Parallel, USB 1.1 [4]	2400 by 2400

HOW WE TEST: All scanners are tested at default settings under Windows XP Home on a Dell Dimension 2800 (2-GHz Pentium 4) PC with 512MB of RAM, using each scanner's bundled software. Overall rating is based on image quality (SOHO 22 percent, corporate 25 percent), speed (SOHO 18 percent, corporate 25 percent), ease of use (SOHO 15 percent, corporate 10 percent), features (SOHO 12 percent, corporate 15 percent), support (SOHO 13 percent, corporate 10 percent), and price (SOHO 20 percent, corporate 15 percent). Speeds are timed from the start of prescanning until cursor control is regained. Data based on tests designed by the PC World Test Center. See find.pcworld.com/10860 for details on *PC World*'s Star Ratings.

Visit find.pcworld.com/29621 for reviews of all scanners tested this month, and for details on how we test.

$150, whereas in September 2001 a 1200-dpi model cost $269.

This year marks the arrival of the first scanners supporting USB 2.0; the interface is billed as performing up to 40 times faster than USB 1.1, depending on the type of device. For this comparison, we tested only one scanner using USB 2.0—Canon's CanoScan D1250U2F—but Microtek, Visioneer, and other vendors will soon release their USB 2.0 models. On the whole, the D1250U2F didn't show a speed increase over USB 1.1 models we tested. Until we can test more scanners that support it, we reserve judgment on USB 2.0's performance.

In the professional sphere, FireWire (aka IEEE 1394 and ILink) is outpacing SCSI-2 as the high-speed interface of choice. These days you're more likely to find FireWire built into PCs, and FireWire has a rated throughput of up to 50MB per second versus SCSI-2's maximum throughput of 10 MBps. In our informal comparisons of speed using USB 1.1, USB 2.0, and FireWire, we didn't see differences that would affect real-world use. Again, testing more USB 2.0 scanners may produce different results.

Other recent developments include the introduction of a scan-to-CD feature: HP's Scanjet 5400c lets you scan directly to a ▶

Maximum color depth (captured/saved, in bits) [3]	Transparency adapter	Automatic document feeder	Bundled software
48/48	Yes	No	ABBYY FineReader Sprint OCR, Adobe PhotoDeluxe 4, Microtek ScanWizard 5, Ulead DVD Picture Show, Ulead PhotoExplorer
48/24	No	No	ScanSoft OmniPage Pro OCR, ArcSoft PhotoStudio, ScanGear CSU, ScanGear Toolbox, ArcSoft PhotoBase
48/48	Optional, $80	Optional, $249	Corel PrintOffice 2000, HP Precisionscan Pro, Trellix Web Express, EFax.com, ACDSee
48/24	Yes	No	ScanSoft OmniPage Pro OCR, Adobe Photoshop Elements, ScanGear CSU, ScanGear Toolbox 3.1, ArcSoft PhotoImpression, Canon PhotoRecord
48/48	Yes	No	ScanSoft TextBridge Pro 9, Adobe Photoshop Elements, ScanSoft PaperPort Deluxe 7, Visioneer ScanManager Pro
48/48	Yes	No	Adobe Photoshop Elements, Epson TWAIN, ArcSoft PhotoImpression, Epson Film Factory, Epson Smart Panel
42/42	Yes	No	ABBYY FineReader Sprint OCR, Adobe Photoshop Elements, Microtek ScanWizard 5, Adobe Acrobat Reader, Ulead PhotoExplorer, Kodak Digital Science Color Management
48/48	Yes	Optional, $200	ABBYY FineReader Sprint OCR, Adobe Photoshop Elements, Microtek ScanWizard 5, Ulead PhotoExplorer, Kodak Digital Science Color Management
48/48	Yes	No	Adobe Photoshop Elements, Epson TWAIN, LaserSoft Imaging SilverFast LE, Epson Film Factory, Epson Smart Panel
48/48	Yes	Yes	Corel PrintOffice 2000, HP Precisionscan Pro, ACDSee, SmithMicro FaxSFT

[1] 2-by-2-inch color photo, scanned at 1200 dpi.
[2] Black-and-white line art, scanned at 300 dpi.
[3] The maximum bit depth a scanner's hardware can capture is commonly referred to as its *internal* bit depth. The maximum bit depth a scanner's driver can save is commonly referred to as its *external* bit depth.
[4] Tested via USB 1.1 interface.
[5] Tested via USB 2.0 interface.
[6] Priced with FireWire interface card.
[7] Tested via FireWire interface.

SCAN SAMPLES

PRINTOUT QUALITY

THE BEST 100-DPI COLOR printout accurately reproduced our photo's tones and exposure and had a tolerable amount of jagginess. The worst-scoring scanner on this test produced a much darker image. The best line art earned a score more than twice as high as the worst, and looked noticeably cleaner and more detailed. Both line-art samples are from 1200-dpi scanners.

ORIGINAL SAMPLES

Color photo | Black-and-white line art

BEST SAMPLES

Microtek ScanMaker 6700 | Visioneer OneTouch 8920USB

WORST SAMPLES

Compaq S200 | Umax Astra 4450

Epson's driver can scan slides at different resolutions in one batch.

THE EPSON PERFECTION 2450 Photo's transparency adapter is built into its lid, and it comes with two large, sturdy templates for holding transparencies in place.

disc in a CD-RW drive; Canon and Microtek provide software for archiving photos and delivering slide shows on CD. Canon also offers automatic film retouching and enhancement software with its CanoScan D2400UF, which fell short of our small-office top seven because of its high price. Some dedicated film scanners, including models from Nikon and Minolta, use a similar image repair technology from Applied Science Fiction called Digital ICE (Image Correction and Enhancement).

WHAT YOU'LL WANT

IF YOU WANT to scan slides or film as well as reflective materials such as documents and photos, you'll want a flatbed scanner with a good transparency adapter. To scan transparent materials accurately, a scanner needs a uniform light source to shine through the film, and a frame to position it properly on the glass and hold it still. Though half of the scanners we looked at for this review come with some type of transparency adapter, the adapters vary widely in design and construction. Some have templates that accommodate only one 35mm slide or negative strip at a time. The template accompanying Visioneer's OneTouch 8920USB, for example, has a cutout big enough for a single slide, and HP's Scanjet 5400c comes with a 1.5-by-6-inch transparency adapter that handles three slides or one negative. Others (such as Epson's Perfection 2450 Photo, with a 4-by-9-inch template) let you place several slides or a larger transparency on the glass. Better still, some models, including all five Microtek and Epson scanners on our chart, have drivers that support batch scanning, so you can specify parameters such as size and resolution for each slide in a group and then scan the entire set. Microtek's $1000 ScanMaker Pro Design has a separate drawer for transparencies and comes with templates for a full tray of slides, plus a couple of large-format transparency templates.

Higher-resolution scanners can produce better output, but few applications require the highest resolutions. A scanner with 1200-dpi resolution lets you enlarge 35mm slides to produce acceptable 5-by-7-inch prints; a 2400-dpi scanner can produce good 8-by-10-inch prints. If you primarily scan documents for OCR or scan images for low-resolution reproduction on the Web, a 600-dpi unit like the CanoScan N670U can do the job nicely.

Color depth (also called *bit depth*) is another important factor in scanning film or photos. It describes a scanner's ability to record subtle distinctions in color and tone. All the scanners in this roundup have either 42-bit color depth (14 bits each for the red, green, and blue color channels that compose each pixel) or 48-bit color depth (16 bits per color channel). Models with 48-bit color offer the best potential image quality because they can capture the most color or gray-scale information.

Not all scanners can save images at their maximum color depth. For example, though a unit may make a high-bit scan, its driver may resample the data and automatically convert the image into a smaller, 24-bit file for saving and editing. A 24-bit file provides enough data for all but the most exacting color ▶

GET RESULTS

Tips for Better Scanning

SURE, MOST SCANNERS let you digitize a photo or document at the push of a button. But if you know a few tricks, you can produce exceptional-looking images.

Prescan the image and adjust: Do any needed cropping in prescan mode (aka preview mode). This is also the best stage for adjusting brightness, contrast, and color. Especially when scanning film, you may need to tweak color balance or saturation, since most flatbed scanners are optimized by default to scan reflective materials.

Pick the best resolution: Most drivers supply preset resolutions for various kinds of output, such as images for the Web or for printouts, and scanning at resolutions higher than recommended usually takes up disk space without boosting image quality. For on-screen images, at least 72-dpi (but no more than 100-dpi) scans should be fine. For faxing or OCR, use 200-dpi or 300-dpi scans, respectively. A rule of thumb for printing photos on ink jets: Use 240 dpi for matte paper and 360 dpi for glossy paper. Use higher resolutions for enlargements.

Choose color depth with care: Capturing images at 24-bit color or 8-bit gray-scale works fine for most purposes, but to capture the best possible tones—especially if you want to make tonal adjustments before the final scan—select the highest bit depth available, even if you're saving the file at 24 bits.

Keep it clean: Your images and scanner glass should be completely clean. This is especially critical when you scan film, such as a slide, that you intend to enlarge significantly. A dust mote that's barely noticeable when viewed on a light box can become glaringly visible in an enlargement.

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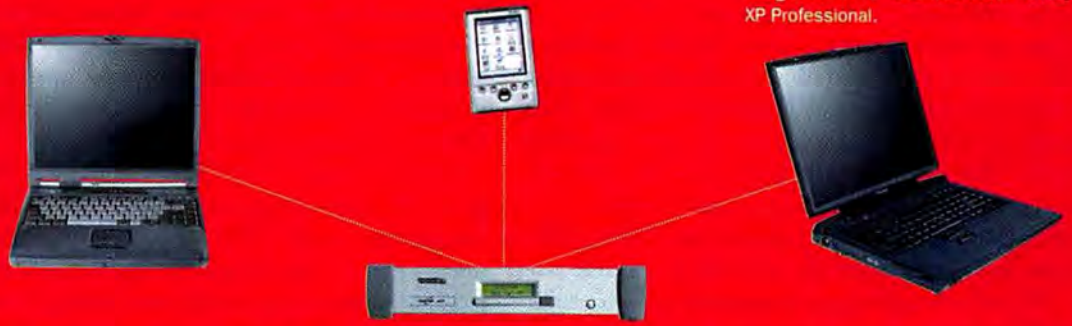

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Microtek's ScanWizard 5 is one of the best-organized drivers we've seen.

MICROTEK'S SCANMAKER 5700 has a light-up lid that lets you examine slides before placing them on the glass.

correction or highest-quality output. But if you want to work with all the color or gray-scale data a scanner can process, make sure its TWAIN driver can save images at its maximum bit depth. The terms *internal* and *external bit depth* refer to how much data the scanner can capture and can save, respectively.

If you're interested in scanning small 3D objects (such as a baseball), choose a model that uses a charge-coupled device (CCD) rather than one with a contact image sensor (CIS). A CCD scanner does a better job than a CIS unit of scanning objects with depth of field. Note that CIS scanners won't work with transparency adapters and automatic document feeders.

CIS scanners' strong suit is their compact size: CIS technology requires fewer parts, which can be placed in a smaller case than a CCD, so if saving desk space is important to you, consider a CIS model like the Canon CanoScan N670U or N1240U.

WHAT YOU REALLY NEED

EVEN IF YOU'RE on a tight budget, certain features make the difference between a useful, no-frills tool and a penny-wise, pound-foolish purchase. At the least, your scanner should come with a cable, a power supply, and driver software that lets you easily adjust the scanner's settings. A few scanners forgo the power cord, drawing power instead from their USB connection to the PC. But like other USB-powered devices, these tend to perform more sluggishly than comparable self-powered units.

The software that drives your scanner affects how easy it is to use and how much you can do with it. The best scanner drivers offer different modes for beginners and advanced users. Most drivers provide similar task-oriented choices (such as "scan photo" or "scan text") in their simple modes; the differences show up in the advanced options. Microtek's ScanWizard 5 driver provides some of the best-organized and easiest-to-use advanced features; the drivers for the Compaq and Umax models we tested for this review are geared more to novice users.

Scanners usually come with an assortment of applications software in addition to the driver, and the intended audience and quality of these bundles can vary greatly. You should expect an image editor: Adobe's Photoshop Elements, a full-featured editor, comes with many scanners and is a good one to look for. To turn paper documents into editable files, you'll need an optical character recognition program such as ScanSoft OmniPage Pro or, at a minimum, OCR functions built into the scanner driver (the HP models on the chart include Iris OCR features in their driver). Less common but extremely useful, especially if you scan frequently, are document managers such as ScanSoft PaperPort Deluxe and image managers such as ACDSee.

PC gear makers have been known to play fast and loose with specs, and scanner vendors are no exception. Pay attention to the numbers for a scanner's resolution. Of the two figures that represent a scanner's resolving power—2400 by 4800 dpi, for example—the lower number identifies the scanner's horizontal (or true) optical resolution, and the higher number refers to the distance the scanner's carriage moves between the rows of dots. Some vendors list the higher rate first. When shopping, use the lower number to compare optical resolutions.

One last dpi caveat: Don't confuse optical resolution with interpolated resolution. Interpolation uses software to increase an image's effective resolution by estimating and inserting additional pixels. You can use it to make bigger enlargements, but in doing so you may lose fine details from the original images.

Iris's OCR capability is incorporated into HP's Precisionscan Pro driver.

HP'S SCANJET 5490C has an automatic document feeder built into its lid. You place its separate transparency adapter directly on the glass.

WHAT'S COMING

WAITING FOR THE NEXT LEAP forward in scanner technology? We have mixed news: Though several vendors will release a slew of new scanners in coming months, including plenty of USB 2.0 models, these units won't have more color depth or optical resolution. Instead, new features coming from Epson, HP, Microtek, and others promise to make scanning less frustrating. Epson will soon bring out USB 2.0 models with its Print Image Matching technology, which is designed to make color calibration among peripherals easier. And Microtek will soon introduce the first flatbed scanner to incorporate ASF's Digital ICE. ■

Richard Jantz is a San Francisco Bay Area–based writer.

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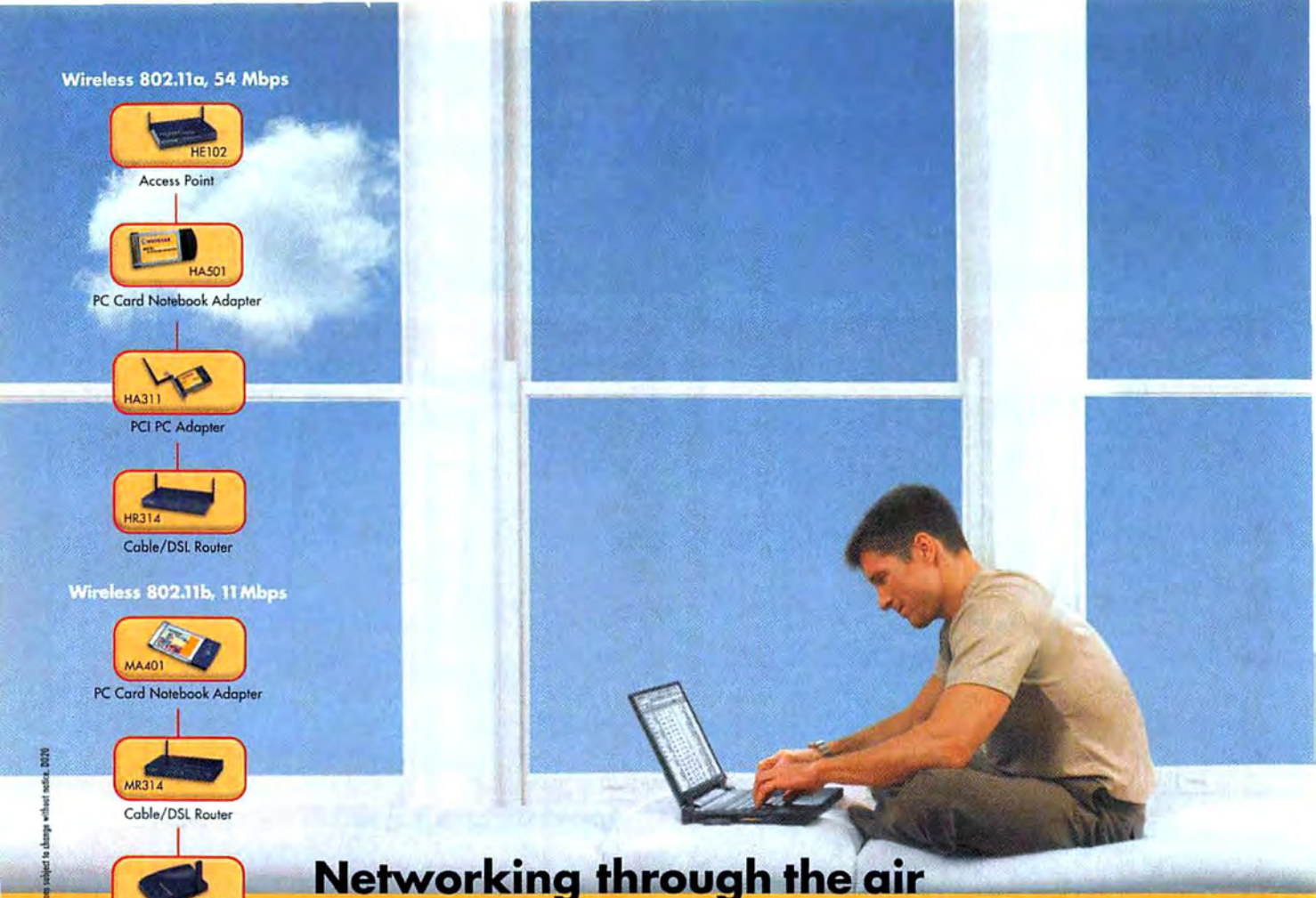

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SpamInc.

In 2002, spam is not just a scourge, it's big business. Our investigator reveals **who's behind the assault on your in-box** and why stemming the tide won't be easy.

BY DANIEL TYNAN
ILLUSTRATIONS BY OWEN SMITH

RYAN DONG DIDN'T SET OUT TO BECOME A SPAMMER.

The 23-year-old college student from Pontiac, Michigan, started his professional life working for a dot com. When the Web bubble burst, he found himself out of work and out of prospects. The computer science undergrad decided to start his own business, a recruiting site called Havoc Jobs. He began to promote the site using e-mail. And then he had an inspiration—why not make e-mail the business instead?

So in May 2001, he and a partner set up a bulk e-mail service called Havoc Systems, offering server space and bandwidth to mass e-mailers. He posted an ad on a bulk mailer's forum; within days he had more business than he could handle.

In December, he started sending e-mail himself, charging $300 to $400 per million messages. Soon, he says, Havoc was sending 50 million pieces of spam a week. To buy time before Havoc's ISP shut him down, Dong split the mailings between his personal ISP accounts. When they got shuttered, he just signed up for new ones.

Dong began selling e-mail addresses (15 million names for $129) and set up a site where other spammers could swap targeted address lists. Now Havoc sells its own spamware, software tools that harvest addresses and manage lists.

In good times, Dong says, "I can pull in $100K a year or more." But he adds, "when the ISP pulls my connections, I make nothing." On the phone, he sounds tired of switching ISPs and trying to stay one step ahead of the antispammers; he insists, "We're not there to bother [spam recipients]. All they have to do is hit delete."

Dong's story illustrates how virtually anyone can get started in the spam trade. And that's why, though spam costs us billions of dollars each year, we can do little to cut off e-mail spam at its source.

BULKERS BANQUET

WE ARE IN the midst of a spam epidemic. Depending on which survey you read, anywhere from 15 to 50 percent of e-mail messages consist of advertisements for miracle cures, financial scams, porn site come-ons, and other unsolicited commercial messages. According to e-mail filter vendor Brightmail, the number of spam attacks has risen by more than 500 percent since March 2001.

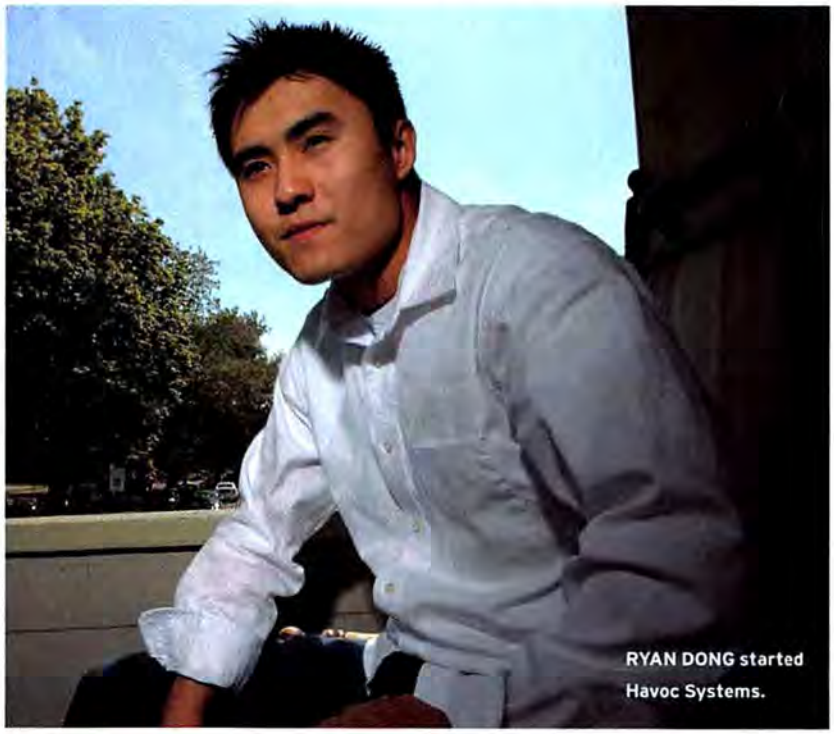
And in the next few years, the situation is going to get much, much worse. A study released last fall by Jupiter Media Metrix predicts that by 2006 a typical consumer can expect to receive nearly 1500 servings of spam annually—double the number that the average user gets today.

The time and data involved take an economic toll. Spam costs businesses worldwide some $8 billion to $10 billion per year in bandwidth charges alone, according to estimates by the European Union.

So why does spam remain a thriving business? I decided to find out—and I discovered that the only things you need to get started are a credit card, a computer, and an Internet connection.

My experience as a spammer started on the Web, searching for spamware—the software that spammers use to ply their trade. For about $50 a month, I joined two private online clubs for bulk e-mailers: Bulk Barn and Bulkers Club. Though neither site officially condones spam, both traffic in the tools that make it possible.

Once I was a member, I could buy all the tools I needed. First on my list was a bulk mailer, which sends a single e-mail message to thousands of people each minute. Etoyi Technology's Email Sender Express ($40) let me send a simple text



RYAN DONG started Havoc Systems.

PHOTOGRAPH: JON MURESAN

"WE'RE NOT THERE TO BOTHER [SPAM RECIPIENTS]. ALL THEY HAVE TO DO IS HIT DELETE."

message to a list of addresses—and falsify the return address. I also wanted a tool that stores any e-mail address it finds on the Web in a database. Beijing Express E-mail Address Extractor ($98) produced 1000 e-mail addresses in just 5 minutes. To get a list of open relay servers—insecurely configured machines that anyone can use to send e-mail messages anonymously—I subscribed to InfinityMailer ($75) and found free lists of open relays, most of them located in Asia, propagating terabytes of spam to the rest of the world.

Of course, spamware doesn't come with any guarantees. The software I used often crashed or failed to perform as advertised. And open relays and bulk hosts (servers that send massive amounts of e-mail) can vanish overnight. Sending mail in larger volumes than the few dozen I sent to willing colleagues requires a bigger investment and more technical know-how.

THINK PINK

WHILE BULK BARN claims to have more than a thousand active members, significantly fewer spammers are probably responsible for clogging your in-box.

Antispam activist Steve Linford oversees the Register of Known Spam Operations (ROKSO) on his Web site, Spamhaus.org. ROKSO offers visitors a detailed database that covers the biggest bulk mailers; the information was culled from such public sources as domain name registrations and court records. Linford estimates that 90 percent of all spam comes from about a hundred big-time operations. "The typical operation has five to ten stealth servers pumping spam all day long through Chinese and Korean relays," says Linford. "There's almost no way to stop them."

Sometimes ISPs turn a blind eye to spammers, according to both Linford and the spammers we spoke with. In the past, AT&T and PSInet have signed what antispammers call pink contracts (named for the canned meat) that permit particular individuals to spam, despite policies prohibiting most other users from doing the same. Both companies blamed rogue employees, and canceled the agreements.

SPAM TIPS

THE **SEVEN** SIGNS OF **SPAM**

IT'S EASY TO SPOT SPAM, but hard to automate a system to deal with it. Our suggestions may help you deal with some of the more common tricks spammers use—but for other tricks, there is no good solution.

Phony subject line: Random characters can fool filtering software. Other spam just tries to fool you—"re: your order" is especially modish. **Partial solution:** Don't filter on exact subject line text; pick a few keywords instead.

Dictionary spam: If a message's "To:" field is crowded with e-mail addresses containing names similar to yours, you've got dictionary spam, where spammers send messages to every address that looks like yours at several different e-mail domains. **Solution:** Add a couple of extraneous alphanumeric characters, hyphens, or underscores (like dant_47@hotmail.com instead of just dant@hotmail.com) to the normal e-mail address you use. See find.pcworld.com/29717 for more details.

Spurious content: If an e-mail says you can get rich working from home while enlarging your breasts, it's spam. **Solution:** You could create new filters for spam topics as they emerge, or just use spam filtering tools (go to find.pcworld.com/22861 for a list).

Bogus unsubscribe links: Legitimate marketers honor unsubscribe requests. Spammers (at worst) use them to verify your address and send more spam. **Partial solution:** only unsubscribe from sales mail that comes from companies you know and trust, and forward the rest to the FTC at uce@ftc.gov.

Secret scripts: Some HTML spam contains JavaScript that launches your browser and loads a page, often with ads from porn sites. **Partial solution:** If you use Eudora or Pegasus Mail, you can disable your e-mail reader's ability to view HTML e-mail messages. Outlook and Outlook Express users, however, can't disable that feature.

Fake return address: Most bulk e-mailers can generate random false return addresses—sometimes even using your own e-mail address. **Solution:** Filter e-mail that appears to have been sent from your address into a "from myself" folder, and then manually delete all the ones that you didn't actually send.

Forged headers: Spammers falsify routing headers—the breadcrumb trail left by mail servers as e-mail passes through—to hide their location. **Solution:** Sorry, there isn't one.

Ronnie Scelson, a self-described spammer who signed such a contract with PSInet, tells me that backbone providers are more than happy to do business with bulk e-mailers. "I've signed up with the biggest 50 carriers two or three times," says Scelson in a thick Bayou accent. The Louisiana-based spammer claims to send 84 million commercial e-mail messages a day over his three 45-megabit-per-second DS3 circuits. "If you were getting $40,000 a month for each circuit," Scelson asks, "would you want to shut me down?"

One of Linford's tactics is to put pressure on ISPs to shut down spamware sites. "If you eliminate spamware, a lot of the problem goes away," he says.

Of the major backbone vendors, WorldCom is the lone holdout in refusing to prohibit spamware operations—even ▶

SPAM-FIGHTER Steve Linford runs Spamhaus.org.

"IF YOU ELIMINATE SPAMWARE, A LOT OF THE PROBLEM GOES AWAY."

though selling spamware is illegal in WorldCom's home state of Virginia. Linford says the reason is simple: For backbone ISPs, data traffic equals revenue, and nothing produces traffic like spam.

"We don't tolerate transmission of spam on our network," says WorldCom spokesperson Peter Lucht. "But spamware is content, and we're not in the business of policing Internet content. If something illegal on our network is brought to our attention, we'll contact legal authorities and deal with it appropriately."

WHO'S SPAMMING WHOM?

DEFINING WHAT E-MAIL IS SPAM isn't as easy as you might think (see our sidebar, "The Seven Signs of Spam," page 109, for more details). And as larger, better-established businesses turn to e-mail as a sales tool, distinctions between legitimate marketing and "pure" spam get fuzzy.

Take, for example, the case of MonsterHut, an e-mail marketing firm based in Niagara Falls, New York.

MonsterHut, which sent 440 million e-mail messages last year "is not a spam house," asserts CEO Todd Pelow. "We are a 100 percent permission-based e-mailing organization." But when it comes to commercial e-mail, precisely what constitutes permission is not entirely clear.

Pelow admits that MonsterHut provided hosting services to a spammer last fall, but he says it quickly terminated the account once the spammer's intentions became known. When MonsterHut's ISP, PaeTec Communications, received more than 40,000 complaints, it tried to cut off MonsterHut's service. However, MonsterHut then sued, convinced the court that it didn't violate a send-no-spam clause of its contract with PaeTec, and won an injunction preventing a shutdown. Finally, in May, PaeTec won its appeal and immediately took down the site.

"Despite the court's decision and PaeTec's utter disregard for a legal contract, MonsterHut maintains that we never spammed anyone," Pelow said in a statement following the ruling.

Pelow claims that the PaeTec lawsuit effectively shut down MonsterHut's operations, but New York's Attorney General Eliot Spitzer isn't taking his word for it. In late May, the state sued to "prevent MonsterHut from continuing its fraudulent, deceptive, and illegal practices...over any ISP in New York," Spitzer said.

In court filings, the state said it considers the term "permission based" synonymous with "opt-in," where consumers have to ask for it before they get spam. The lawsuit states, in part, that "MonsterHut's promises that its lists are 100 percent permission based...are plainly false."

Yet according to the Direct Marketing Association, a trade group representing marketers, simply sending unsolicited commercial e-mail is not spamming. Pat Faley, the DMA's vice president of ethics and consumer affairs, says marketers may rely on assurances from list vendors that you've consented to receive mail.

If a marketer sends you mail and you don't unsubscribe, the DMA's guidelines consider you to have opted in. That's not a problem if you're dealing with a well-known business, since legitimate companies unsubscribe anyone who asks. But spammers aren't sending ads for well-known companies, and the DMA's position places users in a nasty catch-22 that goes against the usual advice not to respond to spam messages for fear of confirming your e-mail address to the spammer. For consumers, such rules could herald a tsunami of "legitimate" spam, as companies flood in-boxes with ads.

Organizations that follow such guidelines are heading down a dangerous path, however, warns senior analyst Dan

PHOTOGRAPH: GILL FLETT/GETTY IMAGES

O'Brien of Forrester Research, an Internet research firm. "Almost every company we've talked to is incorporating e-mail in its marketing plans," he says. "But we're in an age of overflowing in-boxes. If you're a corporation sending out unwanted messages, you're a spammer, too."

IT'S RAINING SPAM

MAJOR INTERNET SERVICE providers feel the cost of spam most keenly. All have suffered spam floods that overloaded their servers and shut down subscribers' e-mail service. ISPs, in turn, pass the cost of fighting spam to consumers in the form of higher access fees.

EarthLink's Steve Dougherty works with a team of techs blocking around-the-clock "spam storms" before they hit customer in-boxes. Dougherty says that EarthLink spends at least "seven figures" per year fighting spam, and even then manages to filter out just 60 to 90 percent of it.

Other ISPs subscribe to "blackhole lists" of the IP addresses of known spammers, such as the lists maintained by the Mail Abuse Prevention System (MAPS). When MAPS receives a complaint about mail abuse, it adds the spammer's IP address to its list after an investigation; ISPs can set their mail servers to reject messages coming from these addresses.

Yet these efforts resemble a huge game of whack-a-mole: Knock the spammers down in one place, and they pop up elsewhere. Smart spammers mask their real addresses by routing mail through open relays and won't use the same IP twice.

Even when one ISP shuts them down, spammers can usually find another that's friendlier to bulk mail services. Sometimes, says Linford, the larger spam cartels act as each other's ISPs, ignoring any complaints that might come in.

Brightmail's Francois Lavaste suggests that antispam efforts may worsen the problem. As ISPs block spam and response rates go down, he says, spammers simply send out more messages to make up the difference. "The only way for spammers to maintain revenue is to increase the volume of spam," he says. When one of his high-speed connections gets shut down, Scelson says, he sends five times the spam through his backups.

Here's the ugly truth: Spam may be annoying, offensive, expensive, and a waste of resources, but it's generally not illegal. There's no federal statute regulating bulk e-mail, and while 24 states have some form of antispam legislation, only Delaware bans spam outright.

If we had federal laws to stop inexperienced but legitimate marketers from spamming, claims Linford, antispam organizations would be able to drive the hard core underground and filter them.

Meanwhile, the FTC has prosecuted approximately 30 cases involving spam, says staff attorney Jennifer Brannan, but only where the spam involved deceptive marketing practices, which falls under the commission's purview.

In the absence of aggressive government action, angry Netizens on antispamming crusades hunt down those responsible and try to get ISPs to cut them off. ISPs themselves have been suing spammers for clogging servers with mail or violating antispam contract provisions.

Others believe that the best hope for eradicating spam is to educate the public to ignore it. "No one will admit to ordering Viagra or getting a diploma via spam," notes Jupiter Media Metrix analyst Jared Blank. "But spam wouldn't exist if it weren't so successful."

With the barrier to entry for new spammers so low, and with the potential profits sky-high, the spam problem is likely to get worse before it improves. After all, as Jason Catlett, president of the antispam organization Junkbusters, explains, "it only takes one sucker in 10,000 to make a spam operation economical." ■

PC World Contributing Editor Daniel Tynan eats spam for breakfast, lunch, and dinner.

WANT MORE SPAM?

ALL THE SPAM YOU CAN EAT

YOU SAY YOU LOVE SPAM and can't get enough? Want a full plate of it every day? If you do, don't use spam-filtering software (find.pcworld.com/22861) or set up mail filters (find.pcworld.com/29699). Follow these instructions instead.

Be generous with your address: Always post your primary e-mail address to newsgroups, online forums, and every page of your Web site. That makes it much easier for e-mail extractors to harvest your address. It's like picking low-hanging fruit.

Don't read the fine print when you sign up: So they say they'll give you a free Web hosting account *and* spam you? It doesn't get any better than this.

Make it obvious: Use a simple name combo for your e-mail handle (like Bob123@yourisp.com). Dictionary spammers will fill your in-box in no time.

Support your local spammer: Send that check or money order for herbal Viagra or the home wealth-building kit today. You may never see any products, but you'll keep the spam industry strong and vibrant.

Go ahead, open it: HTML mail can run JavaScript, launch your browser (especially handy for porn spam), or send a "Found a live one" message back to the spammer.

Use a domain registrar that has poor privacy policies: Spammers love guaranteed-to-work e-mail addresses, and some registrars would love to sell you out.

Share your friends' addresses: When a site asks for names or e-mail addresses of your friends and family, do them a favor and sign all of them up. They'll be glad you did.

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THE MEMORY EXPERTS

www.shop.kingston.com

Are you feeling a bit lost in your own digital universe? Do you know where to go when you've tapped your handheld PC's memory, or when you've run out of space on your digital camera?

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As the world's largest third-party memory manufacturer, Kingston Technology Company Inc. has for years been helping PC enthusiasts upgrade the RAM in their PCs with demonstrations and system-specific memory guides at its retail Web site, www.Shop.Kingston.com.

Now many mobile users, from digital shutterbugs to PDA-wielding business travelers, are turning to Shop.Kingston.com for advice on their Flash and other memory upgrades.

Shop.Kingston.com's extensive searchable database takes the guesswork out of finding the right upgrade for digital devices, as well as PCs, Macs, and printers. A customer can use the site's unique and powerful Memory Configurator to find his system, and choose from a list of matching available upgrades.

Kingston TECHNOLOGY

"If you're looking to get more digital music on your MP3 player, the Memory Configurator at Shop.Kingston.com can lead you to a 258MB CompactFlash upgrade that stores up to 100 songs," says Jason Jacobi, a Kingston spokesman.

"Or let's say you're looking for an SD upgrade card to store more photos on your new JVC MiniDV camera," Jacobi adds. "Shop.Kingston.com is going to have the 128MB SecureDigital Card you're looking for."

And shoppers can trust the Memory Selector to direct them only to those memory modules that are compatible with their systems. (Kingston actually guarantees the compatibility of all memory found through the Memory Selector.)

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And Kingston supports even novice upgraders with free tutorials and installation guides for Flash memory and any other type of module the company sells. Shop.Kingston.com also provides detailed Adobe Acrobat PDF-formatted installation guides from leading PC manufacturers.

Kingston's Jacobi says first-time memory buyers will have no trouble learning to install their upgrades.

"At Shop.Kingston.com," Kingston says, "we provide an animated installation guide that takes the anxiety out of the installation process for users at any level. It makes upgrading quick and easy."

Even if a customer has trouble with his upgrade, he can always call Kingston at 800-435-0640 and consult with a live Kingston memory expert, 24 x 7.

With its extensive support for first-time upgraders and 24-hour customer service, Kingston is bringing its memory products and high-level support to users of nearly every kind of mobile device or desktop PC. As a leading manufacturer, Kingston can provide upgrades for printers, iMacs, digital cameras, and the latest PDAs.

"Our size, reputation, and knowledge base," Jacobi says, "has helped make Shop.Kingston.com the de facto Internet Memory Center for all of the devices in your digital universe."

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PC AMERICA:
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www.pcamerica.com

The home page for PC America speeds you to the point-of-sale products you need.

While many motorists in Dimondale, Mich. say the family-owned Windmill Truck Stop is a home away from home, its controller, Kevin Edelmann, says it's been more like a house of accounting horrors. Besides monitoring retail fuel sales in the truck stop's "truckers only" area, he also has to keep an eye on commuters' and travelers' purchases in the king-sized complex's convenience store, family restaurant, motel, and auto service center. "Keeping track of all of that inventory has been a nightmare," Edelmann says.

The Point of Sale (POS) system that the Windmill had been using since 1982 did a fine job of ringing up sales, but it couldn't tell store managers anything about what was on the shelf. "The system only broke sales down by department," Edelmann says. "So it couldn't tell the difference between a tube of toothpaste and a bottle of shampoo."

Edelmann found only a few POS solutions that were easy to use, Microsoft Windows-based, and able to support multiple input devices. And none of them could manage the 20,000-plus items in the Windmill's convenience store and restaurant. "We desperately needed a solution that could bring all of these components of our business together," he says.

PC AMERICA

Things finally turned around at the Windmill once Edelmann deployed PC America's Cash Register Express (CRE 2000), a Windows-based POS program that works with ordinary PCs and peripherals, as well as barcode scanners, receipt printers, and pole displays (which show charges at the checkout counter). Now all of the Windmill's cashiers can use touch screens and barcode scanners to enter orders and update inventory. And setting up CRE 2000 could not be easier, says Edelmann. "PC America did an excellent job pulling all of the hardware together initially. But the great thing about their software is that I can grab any component I want off the shelf and throw it together in no time. This is one slick program."

The Windmill has processed more than half a million transactions with CRE 2000 and PC America's Restaurant Pro Express (RPE 2000) since October 1999. And Edelmann predicts that PC America will continue to develop the software he needs to keep things running smoothly. "PC America is constantly improving upon their products," he says.

Now PC America is helping retailers like the Windmill to move beyond the sale itself to increase revenues. A new feature in CRE 2000 gives businesses the ability to print coupons on the bottom of sales receipts on an Epson TM-T88II receipt printer. They can use the coupons to advertise specials on slow business days (e.g., "10 Percent Off All Purchases Every Tuesday"), or to give their customers discounts on overstock items (e.g., "Get a Free Six-Pack of Pepsi on Your Next Visit").

CRE 2000's couponing feature promises retailers an excellent route to a crucial dimension in retail sales. "Repeat business is the most important aspect of any business," says PC America's president, Howard Gosman. "With this addition to our POS package, we are giving our customers a quick and easy-to-use method for creating it."

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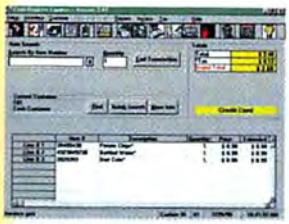

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Few online vendors, however, are leading flash memory buyers to the exact memory cards they require. They often force their customers to sift through long and confusing lists of memory cards, sometimes from unnamed manufacturers.

Crucial.com is an exception. As a division of Micron, one of the world's leading memory manufacturers, Crucial.com's reputation for quality is now making it a go-to site for flash memory purchases. Crucial.com's search tools, articles about flash memory, and glossary of terms help make buying flash memory easy and affordable.

And Crucial recently expanded its flash memory line to include higher-density CompactFlash cards and a wide range of MultiMediaCards, which are commonly found in digital still and video cameras, PDAs, and cell phones.

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And all of Crucial.com's memory products are mechanically and electronically compliant with stringent industry standards.

DESIGNED WITH THE CUSTOMER IN MIND

For shoppers unsure about using flash memory upgrades, or those who simply want to know more about how their devices work, Crucial.com has posted articles about flash memory upgrades and their benefits. The site also includes a glossary of terms for buyers of all types of memory.

"Our customers know they're getting the best flash memory available, at great prices," says Cynthia Gibson, product marketing manager at Crucial.com.

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Crucial.com already sells over 94,000 memory upgrades for more than 15,000 computers, peripherals, and handheld devices. And the site, according to Crucial.com's Gibson, is expanding its flash memory offerings to meet its customers' growing demands.

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TOP 100

EDITED BY THE REVIEWS STAFF

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21-Inch Monitors

ViewSonic's P225f lands in the second spot on the chart on the strength of its fine graphics.

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Color Laser Printers

The Brother HL-4000CN, the most expensive newcomer on the color laser chart, delivers sharp text. This model also includes an automatic duplexer.

Pentium 4 Processors Turn It Up a Notch

AMD has had bragging rights to the fastest PC processor for months, but now Intel's latest Pentium 4 draws into a virtual performance tie with AMD's best. Intel's 2.53-GHz Pentium 4 with a 533-MHz system bus is featured in the Dell Dimension 8200, which is ranked first on our *Top 15 Home PCs* chart. It earned a PC WorldBench 4 score nearly on a par with those registered by systems built around AMD's 1.73-GHz Athlon XP 2100+ processor or its new 1.8-GHz Athlon XP 2200+ (you'll find the latter in the ABS Awesome 3300, also on the Home chart). And don't forget to check out our roundup of the best new scanners on page 99.

Freelance writers Dan Littman, Joel Strauch, and Carla Thornton, and PC World editors Richard Baguley, Tracey Capen, Seán Captain, Lisa Cekan, Rebecca Freed, Alexandra Krasne, Kalpana Narayanamurthi, and Alan Stafford contributed to this month's Top 100 *section. Ulrike Diehlmann, Elliott Kirschling, Jeff Kuta, Tony K. Leung, and Thomas Luong of the PC World Test Center performed testing on the products reviewed here, with logistical support from Julio Giannobile and Julian Weatherby.*

PHOTOGRAPHS: WENDY NORDECK

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Home PCs

The ABS Awesome 3300 (left) and the Dell Dimension 8200, both new to the chart, use different processors to achieve nearly identical PC WorldBench 4 scores.

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Digital Cameras

The $199 Olympus Camedia D-380 is an inexpensive but basic point-and-shoot camera with unexceptional photo quality.

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 OFFICE PCs

	POWER SYSTEM	Overall rating	Street price (5/17/02)	PC WorldBench 4 performance score [1] (Faster ▶)	Comments
1	Best Buy Gateway 700X find.pcworld.com/26921	81	Very expensive $3098	Windows XP Professional: Very good 119	Pricey high-end system packs a powerful punch and includes a crisp 18-inch LCD; the DVD-RAM/R drive is good for data archiving. (★★★★½ July 02)
2	Micro Express MicroFlex 2100A NEW find.pcworld.com/28761	79	Very inexpensive $1499	Windows XP Professional: Outstanding 128	Bargain PC offers high-speed performance using a motherboard with an overclocked CPU as a default setting. Monitor is top-notch. (★★★½☆)
3	ABS Conquest G4 find.pcworld.com/27041	79	Average $1999	Windows XP Professional: Outstanding 125	Powerful model has four USB 1.1 and four FireWire ports conveniently placed on the front; small text looked fuzzy on monitor. (★★★★☆ July 02)
4	Dell Dimension 8200 find.pcworld.com/25061	78	Expensive $2679	Windows XP Professional: Good 116	A solid performer; the chassis features a case lock and tool-free access to drives and slots. (★★★★½ June 02)
5	Polywell Poly 880NF-2100 find.pcworld.com/27021	78	Expensive $2650	Windows XP Professional: Outstanding 125	Fast CPU and memory help this unit achieve its high performance scores; the chassis has an exceptional number of drive bays. (★★★★☆ July 02)
6	Tangent Valera DDR 2000+ find.pcworld.com/25281	77	Inexpensive $1745	Windows XP Professional: Very good 117	An excellent performer; includes video capture and editing software—but no FireWire ports. Price falls $254 this month. (★★★½☆ June 02)
7	Xi Computer 2100+ MTower SP NEW find.pcworld.com/29141	75	Inexpensive $1919	Windows XP Professional: Very good 121	Swift machine comes with speedy 333-MHz DDR SDRAM but has a small-ish hard drive for a power system. (★★★½☆)
	VALUE SYSTEM — Percent of overall rating ▶		15 percent	20 percent	
1	Best Buy Gateway 500S find.pcworld.com/26961	83	Average $1249	Windows XP Professional: Very good 108	PC features a stylish silver-and-black chassis that's easy to open; a matching 15-inch LCD monitor displays crisp text. (★★★½☆ July 02)
2	Micro Express MicroFlex 1800B find.pcworld.com/26981	83	Inexpensive $999	Windows XP Professional: Outstanding 122	System achieves its speed in part by using a motherboard with a slightly overclocked CPU as a default setting. (★★★☆☆ July 02)
3	Gateway E-1800 find.pcworld.com/22201	80	Average $1269	Windows XP Professional: Fair 89	Budget offering includes management features for corporate networks and provides easy, tool-less upgrade access. (★★★½☆ May 02)
4	Dell Dimension 2200 find.pcworld.com/27101	79	Average $1329	Windows XP Professional: Fair 92	Expensive for its configuration, this machine has limited expansion room but includes an adequate 15-inch LCD monitor. (★★½☆☆ July 02)
5	Sys Performance 1700+ find.pcworld.com/25241	78	Average $1322	Windows XP Professional: Very good 111	Beige-box unit provides strong performance and comes with an impressive monitor. (★★★½☆ June 02)
6	IBM NetVista A22p find.pcworld.com/19341	78	Inexpensive $1020	Windows XP Home: Fair 91	This model features a pop-off front cover for easy drive-bay access; remote management software can be downloaded. (★★★☆☆ Mar 02)
7	MicronPC ClientPro CR find.pcworld.com/25161	77	Expensive $1344	Windows XP Professional: Average 95	Though this system targets business environments, MicronPC doesn't bundle any client management software with it. (★★★½☆ June 02)
8	Dell OptiPlex GX240 find.pcworld.com/18761	75	Expensive $1471	Windows XP Professional: Fair 91	Corporate model offers high security and network manageability but little room for expansion. Price drops by $70. (★★★½☆ Mar 02)
	Percent of overall rating ▶		25 percent	15 percent	

All systems tested or retested under our PC WorldBench 4 test suite. See 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. See "Your Guide to the Top 100" on page 119 for more details.
[2] Total capacity in gigabytes.

NEITHER OF THE TWO NEW POWER SYSTEMS this month is strong enough to knock the reigning Gateway 700X from the Best Buy position, where it sits for the second month in a row. Of the newcomers, the Micro Express MicroFlex 2100A climbs higher, to the second spot.

The 2100A is a general-purpose PC that uses a motherboard with a slightly overclocked CPU, bumped from 1.73 GHz to 1.76 GHz. (Its sibling on the value chart, the MicroFlex 1800B, is also overclocked.) It had no difficulty running our benchmark tests; the overclocking did seem to give it a solid performance boost, helping it achieve the highest PC WorldBench 4 score we've recorded so far from a system running Windows XP Professional.

The other new entry, Xi Computer's 2100+ MTower SP, squeaks into the seventh spot. It has some high-end components, such as its graphics card and its

PHOTOGRAPH: RICK RIZNER

Visit find.pcworld.com/28763 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION							Extra features	Design/ documentation	Vendor's reliability/ service
CPU	RAM (MB/type)	Hard drive [2]	Monitor size (diagonal inches)	Graphics	Case type [3]	Open bays/slots			
2.4-GHz Pentium 4	1024/ RDRAM	120	18 (LCD)	128MB GeForce4 Ti 4600	Midsize tower	3/3	**Outstanding:** DVD-RAM/R drive,[4] 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Office XP Small Business Ed.	Good/ Good	Good/ Fair
1.73-GHz Athlon XP 2100+	512/ DDR SDRAM	100	17	64MB Gainward GeForce3	Midsize tower	3/3	**Very good:** DVD-RAM/R drive,[4] 32X/10X/40X CD-RW drive, V.90 modem, network adapter	Fair/ Poor	[5]
1.73-GHz Athlon XP 2100+	512/ DDR SDRAM	120	19	128MB PNY GeForce4 Ti 4600	Midsize tower	3/1	**Very good:** 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, network adapter, Microsoft Office XP Small Business Edition	Good/ Good	[5]
2.4-GHz Pentium 4	256/ RDRAM	80	17 (LCD)	64MB GeForce3 Ti 200	Midsize tower	3/2	**Fair:** 24X/10X/40X CD-RW drive, network adapter, case lock, Microsoft Office XP Small Business Edition, Norton AntiVirus 2002	Good/ Good	Outstanding/ Fair
1.73-GHz Athlon XP 2100+	512/ DDR SDRAM	80	18 (LCD)	128MB VisionTek GeForce4 Ti 4400	Midsize tower	7/1	**Very good:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, Lotus SmartSuite	Good/ Good	[5]
1.67-GHz Athlon XP 2000+	256/ DDR SDRAM	80	19	64MB MSI MS-8850	Midsize tower	6/4	**Very good:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, network adapter, tool-less drive bay carriers	Good/ Fair	[5]
1.73-GHz Athlon XP 2100+	512/ DDR SDRAM	40	19	128MB Leadtek WinFast Ti 200	Midsize tower	4/3	**Fair:** 40X/12X/40X CD-RW drive, network adapter	Good/ Good	[5]
10 percent							15 percent	15 percent	25 percent
2A-GHz Pentium 4	256/ DDR SDRAM	40	15 (LCD)	32MB GeForce2 MX200	Midsize tower	2/2	**Outstanding:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter	Good/ Good	Good/ Fair
1.53-GHz Athlon XP 1800+	256/ DDR SDRAM	62	17	64MB Leadtek WinFast GeForce2 Ultra	Midsize tower	3/4	**Very good:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter	Fair/ Fair	[5]
1.2-GHz Celeron	256/ SDRAM	40	17	Integrated Intel 815E	Desktop	1/2	**Outstanding:** 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Office XP Small Business Ed.	Good/ Fair	Good/ Fair
1.3-GHz Celeron	256/ SDRAM	20	15 (LCD)	Integrated Intel 810E using main memory	Minitower	1/2	**Good:** 24X/10X/40X CD-RW drive, V.92 modem, network adapter, case lock, Microsoft Office XP Small Business Edition	Fair/ Good	Outstanding/ Fair
1.47-GHz Athlon XP 1700+	256/ DDR SDRAM	41	19	64MB Gigabyte AV64S-T Radeon 7000	Midsize tower	4/4	**Very good:** 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, network adapter, Norton AntiVirus 2002	Good/ Fair	[5]
1.6-GHz Pentium 4	256/ SDRAM	41	15	32MB VisionTek GeForce2 MX	Midsize tower	2/3	**Good:** 16X/10X/40X CD-RW drive, network adapter, chassis-intrusion detection, client management software, Wake-on-LAN	Good/ Fair	Good/ Fair
1.7-GHz Pentium 4	256/ SDRAM	40	17	32MB GeForce2 MX200	Midsize tower	5/3	**Very good:** 24X/10X/40X CD-RW drive, network adapter, Wake-on-LAN, Microsoft Office XP Small Business Edition	Good/ Fair	Good/[5]
1.8-GHz Pentium 4	256/ SDRAM	20	17	32MB ATI Rage Ultra 32	Desktop	0/2	**Fair:** 8X/4X/32X CD-RW drive, network adapter, chassis-intrusion detection, client management software, Wake-on-LAN	Good/ Fair	Outstanding/ Fair
10 percent							15 percent	10 percent	25 percent

[3] We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

[4] DVD-RW and DVD+RW drives can handle CD-RW functions; DVD-RAM/R drives cannot. DVD-RW drives can also write to DVD-R, but first-generation DVD+RW drives cannot (upcoming next-generation DVD+RW drives will write to DVD+R, a new write-once format).

[5] Insufficient data to give a rating.

impressive monitor, but it skimps on storage, with just a 40GB hard drive.

Two other systems we evaluated this month fell short of the chart. Another Xi Computer model, equipped with a 2.4-GHz Pentium 4, performed well but costs too much for its configuration. Meanwhile, the Premio Athena 845D performed respectably but came with an unappealing 15-inch LCD monitor.

On another note, the HP/Compaq merger has had an immediate effect on our chart. Although we tested two HP Vectra systems this month, neither was finally able to be a contender, as HP has halted the Vectra line of PCs. Both would have scored well on our chart. HP has confirmed that Compaq's Evo line will replace the Vectras in the merged company's business-desktop line.

A STRONG PERFORMER: Xi Computer's 2100+ MTower SP uses 333-MHz SDRAM.

COMPUTER SCREEN GRAPHICS: JOHN GODDARD

TEST Center

TOP 15 NOTEBOOK PCs

	POWER NOTEBOOK	Overall rating	Street price (5/14/02)	PC WorldBench 4 performance score [1] (Faster)	Comments
1	Best BUY Dell Inspiron 4100 find.pcworld.com/16400	89	Average $2149	Windows 2000 — Very good 107	Portable accommodates lots of add-ins and has dual pointing devices. Optional color palm rests and screen backs cost $20. (★★★★☆ Jan 02)
2	Dell Inspiron 8200 NEW find.pcworld.com/28021	88	Average $2379	Windows XP Home — Very good 100	Unit provides good performance and a large, high-resolution screen, but it's one of the heaviest notebooks on the chart. (★★★☆☆)
3	Dell Latitude C810 find.pcworld.com/21182	87	Average $2625	Windows XP Professional — Very good 101	All-in-one has a dual-optical-drive design but is unavailable with both wireless and standard network connectors built in. (★★★½☆ Apr 02)
4	HP Omnibook 6100 find.pcworld.com/16402	87	Average $2745	Windows 2000 — Very good 106	Corporate speedster has wireless-ready design and a handsome, thin case with a modular bay. (★★★★½ Jan 02)
5	IBM ThinkPad A31 find.pcworld.com/27181	85	Average $2674	Windows XP Professional — Good 90	Dual modular bays are a plus, but lackluster performance keeps this desktop replacement from the top of the chart. (★★★½☆ July 02)
6	Toshiba Satellite 5105-S607 find.pcworld.com/27162	84	Average $2499	Windows XP Home — Good 98	This heavyweight notebook has plenty of connections (including a FireWire port) and great sound, but its battery life is limited. (★★★½☆ July 02)
7	Compaq Evo N600c find.pcworld.com/25401	84	Average $2799	Windows XP Professional — Good 97	Dual pointing devices and an optional funky, silver wireless module on the lid highlight this square black laptop. (★★★½☆ June 02)
	VALUE NOTEBOOK — Percent of overall rating ▶	15 percent		20 percent	
1	Best BUY MicronPC TransPort XT2 find.pcworld.com/25402	83	Average $1999	Windows XP Home — Very good 96	This reasonably lightweight machine is flush with every feature you could want, including a good keyboard and extra audio controls. (★★★★☆ June 02)
2	Dell Latitude C610 find.pcworld.com/21183	82	Expensive $2286	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. (★★★½☆ Apr 02)
3	HP Omnibook XT6050 find.pcworld.com/27261	82	Average $2099	Windows XP Professional — Very good 96	Relatively thin and light unit has most features that corporate users want (including management software) and a built-in 802.11b antenna. (★★★½☆ July 02)
4	Toshiba Satellite Pro 6000 find.pcworld.com/25404	81	Expensive $2199	Windows 2000 — Very good 99	Conservative all-black box includes built-in wireless capability; the modular bay can hold an optical drive or a second battery. (★★½☆☆ June 02)
5	Compaq Presario 1720 find.pcworld.com/19482	81	Average $1599	Windows XP Home — Very good 95	Lightweight, well-equipped consumer laptop comes with a DVD/CD-RW combination drive and a FireWire port. (★★★½☆ Mar 02)
6	Toshiba Satellite 5005-S504 find.pcworld.com/19484	80	Average $1799	Windows XP Home — Very good 95	Fantastic sound and dedicated audio controls will delight music lovers; also includes SD and SmartMedia slots. (★★★★☆ Mar 02)
7	Dell Inspiron 2650 NEW find.pcworld.com/28201	80	Average $1947	Windows XP Home — Very good 98	A basic all-in-one notebook with a combination DVD and CD-RW drive, but only average battery life and price. (★★½☆☆)
8	Compaq Presario 2701 find.pcworld.com/19483	79	Average $1999	Windows XP Home — Very good 97	Dual-optical-drive design lets you use DVD-ROM and CD-RW drive simultaneously. Price includes $99 optional second battery. (★★★½☆ Mar 02)
	Percent of overall rating ▶	20 percent		15 percent	

See 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. See "Your Guide to the Top 100" on page 119 for more details.

[2] Except where noted, all CPUs are SpeedStep chips, which run at a slower speed when on battery power.

[3] In gigabytes.

DELL CLAIMS THE TOP THREE POSITIONS in the power section of our notebooks chart this month with three very different models. The vendor's Inspiron 4100 ascends to the number one spot thanks to a combination of good performance and a low price.

Notebook battery life can take a hit when manufacturers start using a faster, more power-hungry mobile processor. Sure enough, Intel's mobile Pentium 4-M seems to have reduced notebooks' battery life by as much as 20 percent while achieving only indifferent PC WorldBench 4 scores.

For instance, Dell's 1.7-GHz/1.2-GHz P4-M–powered Inspiron 8200, our new power number two, turned in a battery life of about 2.5 hours—30 minutes less than the 1-GHz/733-MHz PIII-M Inspiron 8100 we tested last year. On the value chart, the Dell Inspiron 2650 lasted just 2 hours, 18 minutes on one charge.

PHOTOGRAPH: RICK RIZNER

Visit find.pcworld.com/28821 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION										
CPU [2]	Screen (inches)	RAM (MB)	Hard drive [3]	Pointing device	Multi-purpose bays	Extra features [4]	Overall design	Battery life (hours:min) [5]	Average weight (pounds) [6]	Vendor's reliability/ service
1.2-GHz Pentium III-M	14.1	256	20	Touchpad, eraserhead	2	**Very good:** 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Office XP SBE 2002	Very good	Average/ 2:58	Heavy/ 8.1	Good/Fair
1.7-GHz Pentium 4-M	15.1	256	40	Touchpad, eraserhead	1	**Good:** 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office XP SBE 2002	Outstanding	Average/ 2:28	Very heavy/ 9.4	Good/Fair
1.13-GHz Pentium III-M	15	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/ 3:00	Heavy/ 9.1	Good/Fair
1.13-GHz Pentium III-M	15	256	30	Touchpad, eraserhead	1	**Good:** 8X DVD-ROM drive, built-in modem and network adapter	Outstanding	Very good/ 3:58	Average/ 7.8	Good/Fair
1.6-GHz Pentium 4-M	15	256	40	Eraserhead	2	**Good:** 8X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in network adapter, Lotus SmartSuite	Outstanding	Average/ 2:33	Heavy/ 8.2	Good/Fair
1.7-GHz Pentium 4-M	15	512	40	Touchpad	0	**Good:** 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Lotus SmartSuite	Outstanding	Poor/ 1:31	Heavy/ 8.9	Good/Fair
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
5 percent						10 percent	10 percent	5 percent	10 percent	25 percent
1-GHz Pentium III-M	14.1	256	20	Touchpad	1	**Very good:** 8X DVD-ROM and 8X/4X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Office XP SBE 2002	Outstanding	Good/ 3:05	Average/ 7.4	Fair/ [7]
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
1.13-GHz Pentium III-M	14.1	256	30	Touchpad	1	**Average:** 8X DVD-ROM drive, built-in modem and network adapter	Outstanding	Very good/ 4:29	Light/ 6.5	Good/Fair
1.2-GHz Pentium III-M	15	256	40	Eraserhead	1	**Good:** 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Good/ 3:04	Average/ 7.7	Good/Fair
1-GHz Pentium III-M	14.1	256	20	Touchpad	1	**Good:** 6X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in modem and network adapter	Average	Good/ 3:13	Average/ 6.8	Fair/Poor
1.1-GHz Pentium III [8]	15	512	30	Touchpad	0	**Good:** 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter, Lotus SmartSuite	Very good	Poor/ 1:47	Heavy/ 8.7	Good/Fair
1.6-GHz Pentium 4-M	14.1	256	30	Touchpad	0	**Good:** 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Works 2002	Average	Average/ 2:18	Heavy/ 8.3	Good/Fair
1-GHz Pentium III-M	15	512	30	Touchpad	1	**Good:** 8X DVD-ROM drive, 8X/4X/24X CD-RW drive, built-in modem and network adapter	Very good	Good/ 3:19	Very heavy/ 10.1	Fair/Poor
5 percent						10 percent	10 percent	5 percent	10 percent	25 percent

[4] Word score reflects both listed and unlisted features.
[5] Unless otherwise noted, all notebooks come with a lithium ion battery.
[6] Includes computer, AC adapter, power cord, floppy drive, and optical drive.
[7] Insufficient data to give a rating.
[8] Single-speed desktop CPU.

The four Pentium 4-M–equipped notebooks on our chart this month posted an average battery life of 2 hours, 13 minutes. The Pentium III–based notebooks averaged 3 hours, 16 minutes.

We tested two other new notebooks—from WinBook and Toshiba—but they failed to make the chart. WinBook's N4 1.8 looks like a two-tone, slightly beefier twin of Dell's basic Inspiron 2650. It suffers from similarly mediocre battery life: just 2 hours, 10 minutes in our tests. Toshiba's 933-MHz/733-MHz PIII-M Portégé 4010 ultralight ran 3 hours, 15 minutes in our tests—not bad until you consider that the 750-MHz/550-MHz PIII-M–based Portégé 4000 lasted over 4 hours.

IBM discontinued its ThinkPad A30p, while Gateway discontinued the power Solo 9550xl and the value Solo 5350ls.

THE HEAVYWEIGHT DELL INSPIRON 8200 includes a big screen and plenty of features.

COMPUTER SCREEN GRAPHICS: JOHN GODDARD

TOP 100 TEST Center

TOP 15 HOME PCs

	POWER SYSTEM	Overall rating	Street price (5/31/02)	PC WorldBench 4 performance score [1] (Faster ▶)	Comments
1	Best Buy Dell Dimension 8200 find.pcworld.com/28921 NEW	95	Very expensive $4416	Windows XP Home: Very good 121	This pricey system delivers top-tier performance. It boasts a beautiful LCD monitor and a thundering sound system. (★★★★½)
2	MicronPC Millennia XP+ Xtreme find.pcworld.com/25103	92	Average $2589	Windows XP Home: Very good 123	Fast system handles games with aplomb. Comes with a top-notch monitor and an extensive system manual. (★★★★½ June 02)
3	ABS Awesome 3300 find.pcworld.com/28901 NEW	86	Inexpensive $2099	Windows XP Home: Very good 123	This zippy PC boasts AMD's latest processor and a powerful six-speaker sound system. Colors on the monitor looked a bit dark. (★★★★☆)
4	Alienware Aurora DDR find.pcworld.com/23061	84	Average $3137	Windows XP Home: Outstanding 124	Still one of the swiftest PCs we've tested, this system includes a large display, rich sound, and loads of storage space. (★★★★½ May 02)
5	Polywell Poly 880XP-2100 find.pcworld.com/28981 NEW	83	Inexpensive $2100	Windows XP Home: Very good 122	Good performance from a reasonably priced power machine. Monitor quality was disappointing for text, however. (★★★½☆)
6	HP Pavilion 552 [4] find.pcworld.com/23062	83	Average $2883	Windows XP Home: Good 116	Multimedia workhorse includes a second-generation DVD+RW drive. Front panel sports four ports, including FireWire. (★★★★☆ May 02)
7	Falcon Northwest Mach V find.pcworld.com/26462	82	Expensive $3249	Windows XP Home: Outstanding 125	Still the fastest home PC, the Mach V includes a great Klipsch 4.1 speaker set. (★★★★½ June 02)
	VALUE SYSTEM — Percent of overall rating ▶		10 percent	25 percent	
1	Best Buy ABS Bravado 2400 find.pcworld.com/17321	93	Average $1570	Windows XP Home: Outstanding 117	Former power Best Buy migrates to the top of our value chart. Offers smooth game play and powerful sound. (★★★★☆ Feb 02)
2	Dell Dimension 2200 find.pcworld.com/25101	92	Very inexpensive $829	Windows XP Home: Fair 92	This entry-level Dell system is sufficiently powerful and comes with a reasonably quick CD-RW drive. (★★★☆☆ June 02)
3	Polywell Poly 880NF-1900 find.pcworld.com/27683	89	Average $1375	Windows XP Home: Outstanding 117	Excellent set of features for the price; but monitor had blurry text, and test games looked washed out. (★★½☆☆ July 02)
4	NuTrend Intrepid SE find.pcworld.com/17301	84	Inexpensive $1099	Windows XP Home: Good 103	Low-cost, high-performance value PC has nice extra features. Monitor quality is unimpressive, however. (★★★½☆ Feb 02)
5	Systemax Ascent A17 find.pcworld.com/27682	80	Expensive $2070	Windows XP Home: Outstanding 116	Great for small- and home-office work. Generous software bundle includes personal finance and mapping programs. (★★★½☆ July 02)
6	EMachines T4170 find.pcworld.com/28941 NEW	78	Inexpensive $1033	Windows XP Home: Good 95	Offers good performance for a budget PC, but quality of its monitor and speaker was very disappointing. (★★½☆☆)
7	Gateway 300SE Special [4] find.pcworld.com/23043	76	Very inexpensive $679	Windows XP Home: Fair 87	Two front USB 1.1 ports and adequate Celeron performance at a bargain price, but 15-inch CRT monitor's images are poor. (★★★☆☆ May 02)
8	Polywell Poly 1000DU find.pcworld.com/15114	69	Average $1250	Windows XP Home: Fair 93	System delivers impressive performance from its low-cost processor and includes a variety of extras. (★★★☆☆ Dec 01)
	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 119.

[2] Total capacity 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).

POWER SYSTEMS WITH THE NEWEST AMD and Intel processors duke it out on our chart, but the contest ends in a virtual draw. The third-place ABS Awesome 3300, running AMD's 1.8-GHz Athlon XP 2200+, scored a 123 on PC WorldBench 4—a negligible two points ahead of the Best Buy Dell Dimension 8200 and its 2.53-GHz Intel Pentium 4 processor, and one point ahead of a 2.53-GHz P4–bearing Falcon Northwest Mach V that missed the chart. (For more new Athlon and P4 test results, see *News and Trends* on page 22.) An earlier Mach V, with an Athlon XP 2100+ processor, still holds the speed title with a score of 125; it's seventh on the power side.

The Dimension 8200 carries a stratospheric price along with its high performance numbers. Some of that expense goes to cover a powerful speaker set, a 17-inch LCD monitor that produced great images—even during high-action game

PHOTOGRAPH: RICK RIZNER

Visit find.pcworld.com/29301 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 [2]	Monitor (inches)	Graphics	Case type [3]				
	2.53-GHz Pentium 4	1024/ RDRAM	120	17 (LCD)	128MB GeForce4 Ti 4600	Midsize tower	**Good:** DVD+RW drive,[4] 24X-40X CD-ROM drive, V.90 modem, network adapter, Microsoft Office XP Small Business Edition	Very good/ Outstanding	Very good	Outstanding/ Good
	1.67-GHz Athlon XP 2000+	512/ DDR SDRAM	120	19	128MB GeForce4 Ti 4600	Midsize tower	**Good:** DVD-RW drive,[4] V.90 modem, network adapter, Pinnacle Studio 7	Very good/ Very good	Outstanding	Fair/ Fair
	1.8-GHz Athlon XP 2200+	512/ DDR SDRAM	120	15 (LCD)	128MB Leadtek Win-Fast A250 Ultra	Midsize tower	**Very good:** 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, V.90 modem, network adapter, Corel WordPerfect Office 2002, five games	Good/ Outstanding	Very good	[5]/[5]
	1.67-GHz Athlon XP 2000+	512/ DDR SDRAM	100	19	64MB PNY Verto GeForce3 Ti 500	Tower	**Good:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, Plantronics LS-1 headphones, game pad, joystick, Works Suite 2002	Very good/ Outstanding	Very good	[5]/[5]
	1.73-GHz Athlon XP 2100+	512/ DDR SDRAM	120	19	128MB GeForce4 Ti 4600	Midsize tower	**Good:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, three games	Very good/ Good	Good	[5]/[5]
	1.67-GHz Athlon XP 2000+	1024/ DDR SDRAM	80	15 (LCD)	128MB GeForce4 Ti 4600	Midsize tower	**Very good:** DVD+RW drive,[4] 16X DVD-ROM drive, V.92 modem, network adapter, Microsoft Works 6, ArcSoft ShowBiz	Good/ Very good	Good	Fair/ Poor
	1.73-GHz Athlon XP 2100+	512/ DDR SDRAM	80	19	128MB EVGA Ti 4600	Midsize tower	**Fair:** 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, network adapter, two video games	Very good/ Very good	Very good	[5]/[5]
	10 percent						10 percent	15 percent	5 percent	25 percent
	1.53-GHz Athlon XP 1800+	256/ DDR SDRAM	60	19	64MB PNY Verto Ti 500 TD	Tower	**Outstanding:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, WordPerfect Office 2002	Very good/ Outstanding	Very good	[5]/[5]
	1.3-GHz Celeron	256/ SDRAM	20	17	Integrated Intel 810E [7]	Minitower	**Good:** 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Works Suite 2001	Poor/ Fair	Good	Outstanding/ Good
	1.6-GHz Athlon XP 1900+	256/ DDR SDRAM	100	19	32MB integrated NVidia NForce	Midsize tower	**Very good:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter	Good/ Fair	Good	[5]/[5]
	1.7-GHz Pentium 4	256/ DDR SDRAM	40	17	32MB VisionTek Xtasy 5332	Midsize tower	**Very good:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Corel WordPerfect Office 2002	Good/ Very good	Good	[5]/[5]
	1.73-GHz Athlon XP 2100+	512/ DDR SDRAM	80	15 (LCD)	64MB GeForce3 Ti 200	Midsize tower	**Outstanding:** 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, Microsoft Works Suite 2002	Good/ Good	Very good	[5]/[5]
	1.6-GHz Pentium 4	256/ DDR SDRAM	60	17	Integrated Sis Real 256 [7]	Minitower	**Good:** 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Works 6	Poor/ Unacceptable	Good	Good/ Unacceptable
	1.3-GHz Celeron	128/ SDRAM	20	15	Integrated Intel 815EP [7]	Minitower	**Good:** 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Works Suite 2002	Poor/ Fair	Very good	Fair/ Fair
	1-GHz Duron	128/ DDR SDRAM	40	19	32MB Matrox Millennium G450	Midsize tower	**Very good:** 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, network adapter, Lexmark Z53 Color Jetprinter, Logitech Webcam	Good/ Very good	Fair	[5]/[5]
	10 percent						10 percent	10 percent	5 percent	25 percent

[4] DVD-RW and DVD+RW drives can handle CD-RW functions; DVD-RAM/R drives cannot. DVD-RW drives can also write to DVD-R, but DVD+RW drives cannot (upcoming next-generation DVD+RW drives will write to DVD+R, a new write-once format).

[5] Insufficient data to give a rating.
[6] Similar to June's HP Pavilion 950, which was tested with a 64MB GeForce3 Ti 500-based graphics board.
[7] Uses main memory.
[8] Same configuration as last month's Gateway 300S.

play—and a DVD+RW drive. Another newcomer, the Polywell Poly 880XP-2100 at number five, offers great performance at a low price; the monitor's quality fell short, however. Besides the new Falcon, power contenders from Systemax and Xi Computer narrowly missed the chart. See find.pcworld.com/29301 for full reviews.

The ABS Bravado 2400, a power Best Buy in February and March under the name Performance Ti 500, now more closely matches our value systems. It replaces the discontinued Gateway 500S as the value Best Buy. Debuting in the sixth spot, EMachines' T4170 sports a smart-looking gray-and-silver case. It wrings adequate performance from a 1.6-GHz Pentium 4 processor, but we were disappointed in its fuzzy-looking monitor and unpleasantly tinny-sounding speakers.

DELL'S LOADED, PRICEY Dimension 8200 has a great monitor and sound system.

COMPUTER SCREEN GRAPHICS: JOHN GODDARD

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TOP 10 PRINTERS

Visit find.pcworld.com/29221 for reviews of all products tested this month and ranked in this chart.

THIS MONTH THREE NEW COLOR laser printers based on the same design and engine take over the middle of our chart. At number four, Minolta-QMS's Magicolor 3100 DN—the lowest priced of the three, at $2199—prints fairly quickly but produces somewhat grainy images. Placing fifth, the Brother HL-4000CN delivered very good image quality, printing all our test images well. It's the most expensive of the three, at $3199. Finally, Xerox's $2399 Phaser 6200 takes sixth place. It printed graphics faster than the other two, but an automatic duplexer, standard on the others, costs $399 extra.

	COLOR LASER PRINTER	Street price (5/17/02)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/ graphics	Comments
1	Best Buy Lexmark C720n find.pcworld.com/14941	$2069	87	12.0/2.0	Excellent/ Excellent	**FEATURES:** Rated 24 ppm monochrome/6 ppm color. Standard 64MB of RAM, 2400-by-1200-dpi maximum resolution, 250 sheets input and output. **SUMMARY:** Lexmark's speedy color laser creates beautiful images. Text appears sharp and fine, and color graphics show rich colors, shading, and detail. A $400 price drop since April lifts it to the top spot this month, despite its limited paper-handling features.
2	Best Buy Oki Data Oki C7200n find.pcworld.com/14942	$2164	87	11.9/2.3	Excellent/ Good	**FEATURES:** Rated 20 ppm monochrome/12 ppm color. Standard 64MB of RAM, 1200-by-600-dpi maximum resolution, 530 sheets input, 500 output. **SUMMARY:** This LED model ranks among the faster printers on the chart, especially for graphics. Text quality is impressive too, with thick, dark letters, though colors appear too bright. Price has dropped by $46 since April.
3	Minolta-QMS Magicolor 2200 DeskLaser find.pcworld.com/21661	$999	83	6.4/0.7	Excellent/ Good	**FEATURES:** Rated 20 ppm monochrome/5 ppm color. Standard 32MB of RAM, 1200-by-600-dpi maximum resolution, 650 sheets input, 500 output. **SUMMARY:** The Magicolor 2200 DeskLaser remains the lowest-cost color laser printer we've seen, and it turns out perfectly crisp black text. The trade-off: Its print speeds are the slowest in this month's Top 10.
4	Minolta-QMS Magicolor 3100 DN NEW find.pcworld.com/29202	$2199	82	9.0/2.1	Very good/ Good	**FEATURES:** Rated 16 ppm monochrome/16 ppm color. Standard 256MB of RAM, 1200-by-1200-dpi maximum resolution, 600 sheets input, 250 output. **SUMMARY:** Based on the same engine as the Brother HL-4000CN's, this printer delivers comparable performance for $1000 less. But text looked slightly jagged, and gray-scale and color images had pronounced cross-hatching. (★★★½☆)
5	Brother HL-4000CN NEW find.pcworld.com/29201	$3199	82	9.4/2.1	Excellent/ Very good	**FEATURES:** Rated 16 ppm monochrome/16 ppm color. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 600 sheets input, 250 output. **SUMMARY:** The HL-4000CN prints clean text, and color images—though slightly garish—show good detail. Brother omits a printed manual, but its online documentation is superior. Includes an automatic duplexer. (★★★½☆)
6	Xerox Phaser 6200 NEW find.pcworld.com/29203	$2399	82	9.4/2.8	Excellent/ Good	**FEATURES:** Rated 16 ppm monochrome/16 ppm color. Standard 128MB of RAM, 2400-by-600-dpi maximum resolution, 600 sheets input, 250 output. **SUMMARY:** One of the fastest printers on the chart for graphics, the Phaser 6200 produces crisp text and perfectly straight narrow lines. Color graphics look somewhat dark and fuzzy, however. (★★★☆☆)
7	Minolta-QMS Magicolor 2210 GN find.pcworld.com/20541	$1799	81	10.0/1.3	Excellent/ Good	**FEATURES:** Rated 20 ppm monochrome/5 ppm color. Standard 128MB of RAM, 1200-by-1200-dpi maximum resolution, 650 sheets input, 500 output. **SUMMARY:** A good choice for small offices, the Magicolor 2210 GN has many upgrade options but no USB connection. Text prints crisply with no jaggedness, but color graphics look washed out and fuzzy. Price has fallen by $200 since April. (★★★★☆ Apr 02)
8	Brother HL-2600CN find.pcworld.com/20542	$1999	80	12.1/1.8	Very good/ Adequate	**FEATURES:** Rated 24 ppm monochrome/6 ppm color. Standard 64MB of RAM, 2400-by-600-dpi maximum resolution, 250 sheets input and output. **SUMMARY:** The HL-2600CN is easy to install and quite affordable for a color laser printer, but add-on options will cost you. Its speedy text printing counterbalances the merely adequate graphics quality. (★★★½☆ Apr 02)
9	Oki Data Oki C9200n find.pcworld.com/14947	$5186	80	12.8/2.5	Excellent/ Very good	**FEATURES:** Rated 26 ppm monochrome/21 ppm color. Standard 128MB of RAM, 1200-by-600-dpi maximum resolution, 650 sheets input, 600 output. **SUMMARY:** Most expensive unit here prints text and graphics extremely quickly, on sheets as large as 12 by 18 inches. Text looks sharp and narrow lines appear distinct; color images, though detailed, look too orange.
10	Lexmark C910n find.pcworld.com/20822	$4849	80	12.8/3.0	Very good/ Good	**FEATURES:** Rated 28 ppm monochrome/28 ppm color. Standard 64MB of RAM, 600-by-600-dpi maximum resolution, 1200 sheets input, 1650 output. **SUMMARY:** This swift printer with high-volume capabilities turned in the fastest graphics speed on the chart and tied for fastest text. Gray-scale graphics have good range, and black text is solid. User manuals are online only. (★★★★☆ Apr 02)

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.

TOP 100 TEST Center

TOP 10 MONITORS

Visit find.pcworld.com/29714 for reviews of all products tested this month and ranked on this chart.

EXCEPTIONAL IMAGE QUALITY PUTS Compaq and ViewSonic models at the top of our chart of 21-inch CRT monitors. Compaq's P1220 delivered the best overall image quality of any contender. Though expensive, it has a long list of features, including dual video inputs and three downstream USB 1.1 ports. The ViewSonic P225f parlays a solid set of features and a modest price into a Best Buy rating. The Sony CPD-E540 takes third place on the strength of high scores for both text and graphics and an extremely reasonable price for a 21-inch monitor, though it is a no-frills product. ▶

	21-INCH MONITOR	Street price (5/17/02)	Overall rating	Quality of text/ graphics	Comments
1	Best BUY Compaq P1220 find.pcworld.com/28842 NEW	$909	86	Outstanding/ Outstanding	**FEATURES:** 19.9-inch viewable area, .24mm[1] Diamondtron NF aperture grille tube,[2] up to 103-Hz refresh rate,[3] up to 2048 by 1536 resolution at 70 Hz; three-year warranty, 24-hour daily toll-free support. **SUMMARY:** This model is one of the most expensive monitors we've seen, but it rendered both text and graphics screens extremely well, with sharp text and bright, vivid colors. (★★★★½)
2	Best BUY ViewSonic P225f find.pcworld.com/28882 NEW	$679	86	Very good/ Outstanding	**FEATURES:** 19.9-inch viewable area, .25-.27mm[1] Diamondtron NF aperture grille tube,[2] up to 99-Hz refresh rate,[3] up to 2048 by 1536 resolution at 70 Hz; three-year warranty, 24-hour daily toll-free support. **SUMMARY:** The very reasonably priced P225f achieved the highest scores in our graphics screen tests and performed well in our text screen tests. (★★★★☆)
3	Sony CPD-E540 find.pcworld.com/28865 NEW	$520	85	Very good/ Very good	**FEATURES:** 19.8-inch viewable area, .24-.25mm[1] FD Trinitron aperture grille tube,[2] up to 88-Hz refresh rate,[3] up to 1920 by 1440 resolution at 70 Hz; three-year warranty, 24-hour daily toll-free support. **SUMMARY:** Strong image quality on both text and graphics and an appealing price for this no-frills model; you don't get any software or other extras that many other monitors come with. (★★★★☆)
4	Samsung SyncMaster 1200NF find.pcworld.com/28861 NEW	$699	84	Good/ Outstanding	**FEATURES:** 19.9-inch viewable area, .24mm[1] Diamondtron NF aperture grille tube,[2] up to 85-Hz refresh rate,[3] up to 2048 by 1536 resolution at 70 Hz; three-year warranty, 24-hour daily toll-free support. **SUMMARY:** Renders subtle, accurate color and very legible text, but small font sizes were a little difficult to read. The smart-looking case includes a rear-mounted USB 1.1 hub. (★★★½☆)
5	Sampo AlphaScan 912ST find.pcworld.com/10801	$589	83	Very good/ Very good	**FEATURES:** 19.9-inch viewable area, .25mm[1] shadow mask tube, up to 85-Hz refresh rate,[3] up to 1600 by 1200 resolution at 70 Hz; three-year warranty, 10-hour weekday toll-free support. **SUMMARY:** This attractively priced model provides above-average overall performance. Documentation thoroughly explains each control and covers troubleshooting. (★★★☆☆ Sept 01)
6	NEC AccuSync 125F find.pcworld.com/28843 NEW	$520	82	Very good/ Good	**FEATURES:** 19.9-inch viewable area, .24mm[1] Diamondtron NF aperture grille tube,[2] up to 76-Hz refresh rate,[3] up to 1600 by 1200 resolution at 70 Hz; three-year warranty, 24-hour daily toll-free support. **SUMMARY:** Well suited for spreadsheet and word processing use, at a pleasing price. Has a comprehensive set of controls, including separate horizontal and vertical convergence controls. (★★★½☆)
7	Iiyama Vision Master Pro 511 find.pcworld.com/11381	$729	81	Very good/ Very good	**FEATURES:** 19.9-inch viewable area, .25-.27mm[1] Diamondtron NF aperture grille tube,[2] up to 100-Hz refresh rate,[3] up to 1800 by 1440 resolution at 70 Hz; three-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Showed good contrast and excellent detail and color in image tests; offers user-friendly controls and an excellent on-screen menu. (★★★★☆ Oct 01)
8	Cornerstone Peripherals P1650 find.pcworld.com/11380	$745	80	Good/ Very good	**FEATURES:** 19.9-inch viewable area, .25mm[1] shadow mask tube, up to 113-Hz refresh rate,[3] up to 2048 by 1536 resolution at 70 Hz; five-year warranty, 18-hour weekday toll-free support. **SUMMARY:** Performed well in our graphics tests, producing strong, bright colors. Small fonts were slightly blurry and out of focus in our Word document test. (★★★☆☆ Oct 01)
9	LG Electronics StudioWorks N2200P find.pcworld.com/28863 NEW	$960	79	Very good/ Very good	**FEATURES:** 19.7-inch viewable area, .24mm[1] Diamondtron NF aperture grille tube,[2] up to 85-Hz refresh rate,[3] up to 2048 by 1536 resolution at 70 Hz; three-year warranty, 13-hour weekday and 8-hour Saturday toll-free support. **SUMMARY:** Easy to set up with one-button auto-adjust, but USB 1.1 ports are rather awkward to reach on the side of the case; expensive. (★★★☆☆)
10	Hitachi CM827 find.pcworld.com/28864 NEW	$719	79	Good/ Good	**FEATURES:** 19.9-inch viewable area, .25mm[1] shadow mask tube, up to 90-Hz refresh rate,[3] up to 1856 by 1392 resolution at 70 Hz; five-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Offers dual video inputs, as well as the longest warranty of the models on the chart; image quality was merely average, however, and disappointing for the price. (★★★☆☆)

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 scanned 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 or varying stripe pitch for aperture grille monitors. [2] Uses aperture grille in which parallel wires near the sides of the screen are strung farther apart than those at the middle. [3] Maximum refresh rate at 1600 by 1200 resolution (as tested on this size monitor).

TOP 10 CD-RW DRIVES

Visit find.pcworld.com/29601 for reviews of all products tested this month and ranked in this chart.

IT'S A FINE TIME TO BUY A CD-RW drive, as prices have taken yet another tumble. The least-expensive entries on our Top 10 chart cost less than $100—and what's better, not a single drive listed costs more than a moderate $135.

Three affordable new drives—the $99 Pacific Digital Mach 32 CD-ReWriter, the $105 Teac 40x12x48 CD-RW, and the $105 Asus CRW-4012A—earn spots on this month's chart. Expect the prices of existing drives to fall even farther as models rated for 48X CD-R write speed hit the marketplace. Look for reviews of these faster drives next month.

	CD-RW DRIVE	Street price (5/23/02)	Overall rating	Performance/ support policies	CD-R write speed for 650MB/ CD-RW write speed for 100MB (min:sec)	Comments
1	Best Buy TDK VeloCD 40/12/48 find.pcworld.com/28284	$135	90	Outstanding/ Very good	3:15/1:08	**FEATURES:** 40X/12X/48X,[1] IDE, internal, 2MB buffer,[2] Ahead Nero Burning ROM 5.5 and InCD 3.24, one-year warranty, 10.5-hour daily toll-free support. **SUMMARY:** This drive offers topflight performance—it produced the best write-speed results we've seen on our CD-R tests. (We tested the Sanyo drive mechanism.) (★★★★☆ July 02)
2	Best Buy Sony CRX195A1 find.pcworld.com/28281	$110	88	Outstanding/ Very good	3:16/1:06	**FEATURES:** 40X/12X/48X,[1] IDE, internal, 2MB buffer,[2] B's Recorder Gold 3.23 and Clip Wizard 3.24, one-year warranty, 12-hour weekday and 12-hour Saturday toll-free support. **SUMMARY:** Speedy performer on both our CD mastering and packet-writing tests; achieved fastest time on our digital audio extraction test. Price drops $40. (★★★½☆ July 02)
3	LG Electronics GCE-8320B find.pcworld.com/25444	$110	85	Very good/ Very good	3:39/1:21	**FEATURES:** 32X/10X/40X,[1] IDE, internal, 8MB buffer,[2] Roxio Easy CD Creator 5.1 and DirectCD 5.1, one-year warranty, 13-hour weekday and 8-hour Saturday toll-free support. **SUMMARY:** Offers excellent technical support hours, plus thorough documentation, including manuals for both drive and software. (★★★★☆ June 02)
4	Pacific Digital Mach 32 CD-ReWriter NEW find.pcworld.com/29541	$99	85	Very good/ Good	3:28/1:05	**FEATURES:** 32X/12X/48X,[1] IDE, internal, 2MB buffer,[2] Ahead Nero Burning ROM 5.5 and InCD 3.18, one-year warranty, 12-hour weekday toll-free support. **SUMMARY:** Earned the fastest time on our tests of packet writing to CD-RW. A bonus CD-ROM includes Nero Wave Editor, Cover Design, and Drive Speed software. (★★★★½)
5	Teac 40x12x48 CD-RW NEW find.pcworld.com/29521	$105	84	Very good/ Fair	3:18/1:15	**FEATURES:** 40X/12X/48X,[1] IDE, internal, 8MB buffer,[2] Roxio Easy CD Creator 5.2 and DirectCD 5.2, one-year warranty, 9-hour weekday support (calls are not toll-free). **SUMMARY:** One of the fastest performers on our CD-R write tests. Package includes Arcsoft PhotoImpression and Musicmatch Jukebox software. (★★★★☆)
6	Lite-On 40x12x48 CD-RW find.pcworld.com/25442	$95	84	Very good/ Fair	3:25/1:09	**FEATURES:** 40X/12X/48X,[1] IDE, internal, 2MB buffer,[2] Ahead Nero Burning ROM 5.5 and InCD 3.2, one-year warranty, 9-hour weekday support (calls are not toll-free). **SUMMARY:** The only sub-$100 40X-rated drive on the chart comes with skinny documentation and a slim software bundle. (★★★½☆ June 02)
7	CenDyne Lightning III LTR-40125S find.pcworld.com/28283	$130	84	Outstanding/ Fair	3:23/1:06	**FEATURES:** 40X/12X/48X,[1] IDE, internal, 2MB buffer,[2] Ahead Nero Burning ROM 5.5 and InCD 3.2, one-year warranty, 9-hour weekday and 4-hour Saturday support (calls are not toll-free). **SUMMARY:** Not the fastest 40X CD-R performer we've seen, but it nearly ties for first place at packet writing to CD-RW. (★★★★☆ July 02)
8	Benq 3210 CD-RW find.pcworld.com/28282	$110	81	Very good/ Fair	3:41/1:15	**FEATURES:** 32X/10X/40X,[1] IDE, internal, 2MB buffer,[2] Ahead Nero Burning ROM 5.5 and InCD 3.22, one-year warranty, 12-hour weekday toll-free support. **SUMMARY:** The first model from the company formerly known as Acer, this drive offers middle-of-the-pack price and performance. (★★★☆☆ July 02)
9	Asus CRW-4012A NEW find.pcworld.com/29561	$105	80	Very good/ Fair	3:27/1:07	**FEATURES:** 40X/12X/48X,[1] IDE, internal, 2MB buffer,[2] Ahead Nero Burning ROM 5.5, and InCD 3.23, one-year warranty, 11.5-hour weekday support (calls are not toll-free). **SUMMARY:** Low-priced drive achieved very good times on our CD-RW packet writing tests. Drive features play, fast-forward, and stop buttons. (★★★★☆)
10	Buslink CD-RW 40x12x48 find.pcworld.com/26141	$130	78	Outstanding/ Fair	3:25/1:08	**FEATURES:** 40X/12X/48X,[1] IDE, internal, 2MB buffer,[2] Ahead Nero Burning ROM 5.5 and InCD 3.2, one-year warranty, 9.5-hour weekday support (calls are not toll-free). **SUMMARY:** Ties Lite-On's inexpensive 40X drive in CD-R performance, but costs more. Documentation is thin, as is Buslink's technical support. (★★★½☆ June 02)

HOW WE TEST: To gauge CD-ROM read performance, we time how long the drive takes to install Microsoft Office 2000 SBE (disc one). To determine CD-R write performance, we burn data to CD-R discs from an image file and on the fly. We evaluate digital audio extraction speed by extracting 320MB of musical tracks from an audio CD to our hard drive. 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. 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.

TOP 100

TEST Center

TOP 10 DIGITAL CAMERAS

Visit find.pcworld.com/29404 for reviews of all products tested this month and ranked in this chart.

OF FIVE NEW CAMERAS, three make the Top 10 this month. Olympus's Camedia D-380 lands in fourth, thanks to long battery life and a price of $199; this bare-bones camera is intended to handle only the basics. In ninth, the tiny, 2-megapixel Canon PowerShot S200 records long movies with sound. At number ten, the Kodak DX4900 Zoom takes good photos, but its controls are slow and jerky. Missing the chart, Olympus's Camedia D-520 Zoom has a 3X optical zoom but costs $100 more than the similar D-380, and HP's 4-megapixel Photosmart 812 takes sharp photos but has short battery life. ▶

	CAMERA: UNDER $500	Street price (5/17/02)	Overall rating	Image quality	Ease of use	Battery life/ shots	Comments [1]
1	Best BUY Toshiba PDR-M71 find.pcworld.com/17961	$399	80	Good	Good	Good/ 329	**FEATURES:** 3.1-megapixel resolution, 8MB SmartMedia card, 35-98mm focal range; USB and video output; 12.1 ounces. **SUMMARY:** The PDR-M71 offers long battery life and more versatility than most sub-$500 cameras, but it underexposed some of our test shots. (★★★½☆ Feb 02)
2	Best BUY Nikon Coolpix 2500 find.pcworld.com/25761	$349	78	Good	Good	Good/ 284	**FEATURES:** 2-megapixel resolution, 16MB CompactFlash media, 37-111mm focal range; USB output; 7.5 ounces. **SUMMARY:** Great-looking, compact point-and-shoot has a novel design that protects the lens during storage; it captures video but not sound, and has no optical viewfinder. (★★★½☆ June 02)
3	Olympus Camedia C-3020 Zoom find.pcworld.com/25702	$499	78	Very good	Good	Fair/ 270	**FEATURES:** 3.2-megapixel resolution, 16MB SmartMedia card, 32-96mm focal range; USB output; 14.2 ounces. **SUMMARY:** Bulky camera has a fast lens and many controls that photo hobbyists desire, but you'll have to be content with making silent movies. (★★★½☆ June 02)
4	Olympus Camedia D-380 NEW find.pcworld.com/29381	$199	77	Fair	Good	Outstanding/ 541	**FEATURES:** 2-megapixel resolution, 8MB SmartMedia card, 35mm focal length; USB output; 9.5 ounces. **SUMMARY:** This point-and-shoot has simple controls, as well as the lowest price and the longest battery life in the Top 10; but with mediocre photo quality and few extras, it's as basic as digital cameras come. (★★★☆☆)
5	Toshiba PDR-M25 find.pcworld.com/20862	$249	77	Good	Good	Fair/ 220	**FEATURES:** 2.2-megapixel resolution, 8MB SmartMedia card, 38-114mm focal range; USB and video output; 12 ounces. **SUMMARY:** This inexpensive model has a sturdy body and is simple to use, but it provides only the most basic controls. It takes sharp photographs with accurate colors. (★★★☆☆ Apr 02)
6	Sony Cyber-shot DSC-P71 find.pcworld.com/25701	$399	76	Good	Good	Very good/ 334	**FEATURES:** 3.2-megapixel resolution, 16MB Memory Stick media, 39-117mm focal range; USB and video output; 10 ounces. **SUMMARY:** A relatively compact and easy-to-use point-and-shoot camera, the Cyber-shot DSC-P71 includes rechargeable AA batteries for flexible power options. (★★★½☆ June 02)
7	Fujifilm FinePix 2600 Zoom find.pcworld.com/17965	$279	76	Fair	Fair	Good/ 286	**FEATURES:** 2-megapixel resolution, 16MB SmartMedia card, 38-114mm focal range; USB and video output; 9 ounces. **SUMMARY:** This simple point-and-shoot model comes with a relatively large storage card, but its controls are rudimentary and its photos looked unimpressive in our tests. (★★★☆☆ Feb 02)
8	Nikon Coolpix 885 find.pcworld.com/19142	$499	76	Fair	Fair	Very good/ 373	**FEATURES:** 3.2-megapixel resolution, 16MB CompactFlash media, 38-114mm focal range; USB and video output; 10 ounces. **SUMMARY:** You get a wealth of exposure and navigation controls with the Coolpix 885, but image quality is a mixed bag and the menus are daunting at first. (★★★☆☆ Mar 02)
9	Canon PowerShot S200 NEW find.pcworld.com/29361	$349	75	Good	Fair	Fair/ 180	**FEATURES:** 2-megapixel resolution, 8MB CompactFlash media, 35-70mm focal range; USB and video output; 7.7 ounces. **SUMMARY:** Style tweaks, reworked menus, and new navigation buttons are the only ways the S200 updates its predecessor, the S110. Has an attractive stainless-steel body and a tiny travel charger. (★★★½☆)
10	Kodak DX4900 Zoom NEW find.pcworld.com/29402	$399	74	Good	Fair	Good/ 315	**FEATURES:** 4-megapixel resolution, 16MB CompactFlash media, 35-70mm focal range; USB and video output; 10.4 ounces. **SUMMARY:** This 4-megapixel camera offers high resolution for a great price and includes a docking station for easy photo uploads. However, its controls are jerky and slow to react. (★★½☆☆)

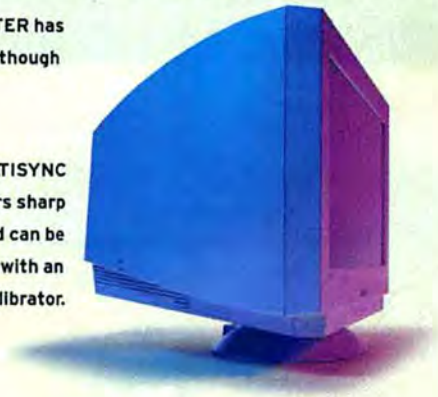
HOW WE TEST: Overall rating is based on price (30 percent), picture quality (20 percent), ease of use (15 percent), features (15 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. To gauge picture quality, we take a series of shots, with and without flash, at 640 by 480 resolution and at the camera's highest resolution. We photograph a complex still life and a mannequin to see how well each camera captures details and subtle colorings such as skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores, which we average. Camera weights include batteries. 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. [1] Resolutions are expressed in effective pixels; focal range is identified as 35mm equivalent.

MORE REVIEWS

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. To read reviews of the products ranked on these charts, go online and type in the *PC World* Find-It URL at the top of each chart (for example, find.pcworld.com/27825 for products listed on the *Top 10 19-Inch Monitors* chart). Next month, look for our special Buying Guide issue, which will cover how to buy many computer-related products. ■

CANON'S S520 COLOR BUBBLE JET PRINTER has good text speed and delivers bright images, though some colors look slightly oversaturated.

THE NEC MULTISYNC FP955 renders sharp text and can be purchased with an optional color calibrator.



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2	Best BUY Canon S750 Color Bubble Jet Printer find.pcworld.com/22841
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8	HP Deskjet 920c Color Inkjet Printer find.pcworld.com/19264
9	Lexmark Z65 Color Jetprinter find.pcworld.com/27441
10	Epson Stylus C60 find.pcworld.com/16647

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3	Sony CPD-G420S find.pcworld.com/10577
4	CTX PR960FL find.pcworld.com/27822
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POWER	4	Hercules 3D Prophet FDX 8500 LE find.pcworld.com/28381
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VALUE	1	Best BUY VisionTek Xtasy GeForce4 MX 440 find.pcworld.com/28561
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VALUE	5	Gainward GeForce2 Ti/500 XP VIVO Golden Sample find.pcworld.com/17721

DIGITAL CAMERAS

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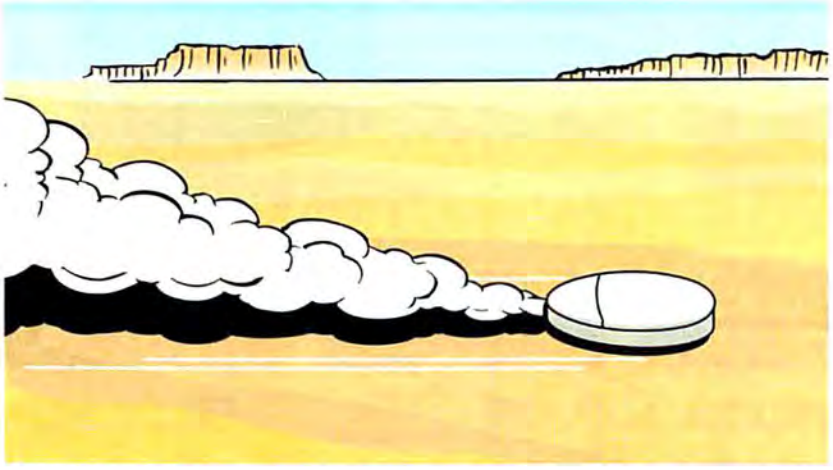
2	Best BUY Nikon Coolpix 995 find.pcworld.com/14801
3	Sony Cyber-shot DSC-F707 find.pcworld.com/23902
4	Nikon Coolpix 5000 find.pcworld.com/23881
5	Sony Cyber-shot DSC-S85 find.pcworld.com/14803
6	Olympus Camedia E-20N find.pcworld.com/23901
7	Olympus D-40 Zoom find.pcworld.com/19143
8	Canon PowerShot S40 find.pcworld.com/19141
9	Olympus Camedia C-4040 Zoom find.pcworld.com/16264
10	Sony CD Mavica MVC-CD400 find.pcworld.com/28121

PHOTOGRAPHS: RICK RIZNER

HERE'S HOW

EDITED BY MICHAEL S. LASKY AND DENNIS O'REILLY



WINDOWS TIPS

SCOTT DUNN

Eight Simple Tweaks That Make a Mightier Mouse

ALL Versions

ONE OF THE MOST underappreciated PC accessories is the humble mouse. Imagine using a PC without one! But the only time you pay any attention to your mouse is when it stops working. You can enhance the performance of your mouse's pointers and cursors with a few quick changes to the critter's Control Panel settings.

First, open Control Panel and double-click the *Mouse* icon (it's under 'Printers and other hardware' in XP's Control Panel Category View). **Note:** The items available in the Mouse Properties dialog box vary depending on your mouse software; the steps we describe in the following tips may be slightly different on your system. In some cases your mouse drivers may not have a given feature, or your mouse utilities may include options not listed here. Dig through your Mouse Properties and check out all your options.

Fine-tune your double-clicks. Double-click too slowly, and you may inadvertently change the name of your file, folder, or shortcut instead of opening the item you need. To match your mouse's double-click sensitivity to your finger's pace, open Control Panel and double-click (carefully!) the *Mouse* icon, or choose *Mouse* from your Control Panel menu. Click the *Buttons* tab (in some versions of Windows, this setting is under the 'Basics' or 'Activities' tab) and adjust the slider in the double-click speed box to make the double-click setting faster or slower (see **FIGURE 1**). Test your click speed on the accompanying icon until you find the rate that's juuuuust right. Click *Apply*.

If you simply don't like to double-click, period, you can greatly reduce your index finger's double duties. In any folder window, choose *View•Folder Options* or *Tools•Folder Options*, depending on your version of Windows. Select the *General* tab, and in Windows 9*x*, click the *Settings* button. Under 'Click items as follows', select *Single-click to open an item (point to select)*. (On some systems you can change this setting under the Mouse control panel's 'Buttons' or 'StepSavers' tab without changing Explorer's folder options.) You can underline all folder icons or only the folder icon currently under your pointer. When you click *OK*, your desktop and folders will act more like Web pages: A click will open a document, a folder, or an application. To select an icon, just move the pointer to it without clicking.

Drag the easy way. An exhaustive scientific study of myself and two friends finds that computer users are getting older every day. If you're one of the growing number of people who find it painful, annoying, or just plain bothersome to hold the mouse button down as you select blocks of text or other objects, or as you move selected items, your mouse drivers may provide you with an easy alternative. In the Mouse Properties dialog box, click the *Buttons* or *Activities* tab (depending on

ILLUSTRATION: MARK MATCHO

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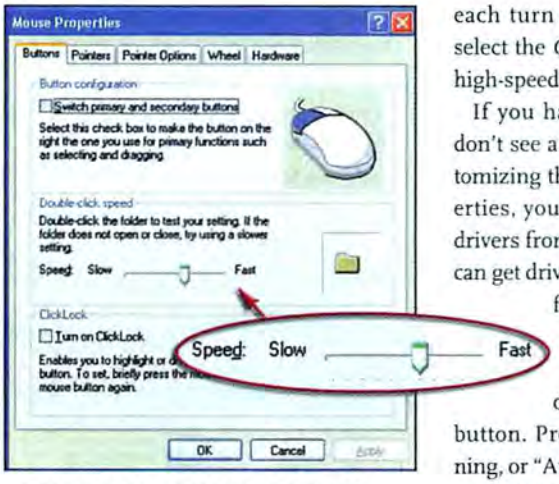


FIGURE 1: SET YOUR MOUSE click rate yourself with Control Panel's Mouse applet.

your software). If there's an option labeled *Turn on ClickLock*, check it and click *Apply*.

Now click and hold the mouse button for a few moments before you begin to drag, then release the button and move the mouse. Voilà! The click stays "locked," just as if you were dragging with the mouse button held down. Figuring out how long to hold the mouse button before the lock engages may take some practice. If you don't like the default hold time, return to Mouse Properties and click *Settings* in the ClickLock section. Set the slider at different positions until you have the hold time you find most comfortable.

Let the good times scroll. If your mouse has a scroll wheel, you may find that your scrolling requires too many spins to be useful. Or it may scroll too far with each turn. To fine-tune your scrolling, open Mouse Properties and click the *Wheel* tab. (You may also need to click a *Settings* button, or your scroll settings may be listed under the Buttons tab.) Enter a number from 1 to 99 to set the number of lines each turn of the wheel will scroll. Or select the *One screen at a time* option for high-speed scrolling. Click *Apply* or *OK*.

If you have a wheel mouse and you don't see a Wheel tab or options for customizing the wheel in your Mouse Properties, you may need to download new drivers from your vendor's Web site. You can get drivers for Microsoft's wheel mice from its site: www.microsoft.com/downloads.

Bonus tip: The scroll wheel on some mice also acts as a button. Pressing it may activate a panning, or "AutoScroll," feature that lets you scroll the current window up, down, left, or right by moving the mouse in that direction. Press the wheel again to turn the panning feature off.

Change your mouse's pace. If your mouse pointer takes too long to move around the screen, or if you have to lift the mouse entirely off its pad to reposition it, you may need to adjust the mouse's speed. Go back to your Mouse Properties dialog box and click the *Pointer Options* tab in Windows 2000 and XP, or the *Motion* tab in Windows 9*x* and Me (the *Basics* tab on some systems). Adjust the slider under 'Speed', 'Pointer Speed', or 'Select a pointer speed', depending on your mouse software. This setting changes how far the pointer travels each time you nudge your mouse. Experiment until you find the speed that works for you.

With many mice, you can make the pointer travel farther as the mouse moves faster. This lets you set the pointer speed relatively fast yet still be precise when you move the mouse slowly. To enable this feature, look for a setting in Mouse Properties labeled 'Acceleration'; you may have to click an *Advanced* or *Accelerate* button to see it. For some mouse drivers, this feature is named 'Enhance pointer precision'. Check this option (if applicable), and/or select a sensitivity level. Click *Apply* (or *OK* and then *Apply*).

Snap to it. To make the pointer appear poised over the default option when you open a dialog box, click the *Pointer Options* or *Motion* tab in Mouse Properties and check the box under 'Snap To' or 'Snap to Default' (in Windows 2000 and XP) or 'Smart Move' (in Windows Me). Then click *Apply*. Note that this may not work for every dialog box in every application.

Unhide your mouse pointer. Many applications automatically hide the pointer when you type so it's not blocking your view. You may just have to move the mouse slightly to make the pointer reappear, but if that doesn't work, or if your pointer is still lost in all the on-screen distractions, try this: Reopen the Mouse Properties dialog box and click the *Pointer Options*, *Visibility*, or *Motion* tab, depending on your mouse software (see **FIGURE 2**). Under ▶

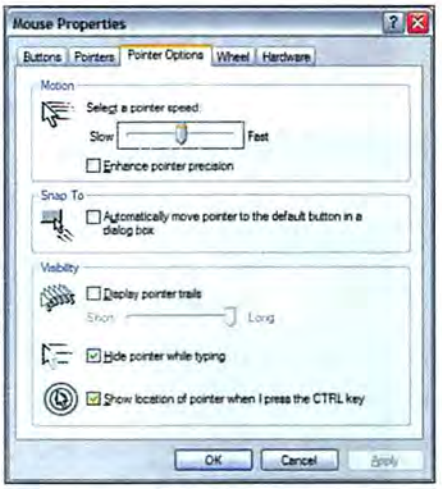


FIGURE 2: MAKE YOUR POINTER stand out by changing your Pointer Options settings.

'Visibility' or 'Sonar', click *Show location of pointer when I press the CTRL key* (or words to that effect) and then *Apply* or *OK*. Now when your pointer gets lost, press **<Ctrl>** to see animated concentric circles (like reverse pond ripples) that show the location of your pointer. I like to use this setting even though I seldom lose sight of my pointer—it just adds a little pizzazz to my screen.

If you have trouble spotting your mouse even when you know where it is (a problem more likely to occur on LCDs with limited refresh rates), check *Display pointer trails* or *Show pointer trails* and use the slider (you may need to click *Settings* first) to decide how many 'ghosts' follow your pointer each time you move your mouse. Click *Apply* to test your new setting.

Pick the perfect pointer. Another solution to lost pointers is to change your pointer's appearance. Click the *Pointers* tab in the Mouse Properties dialog box and choose a predefined scheme from the Scheme drop-down list, or select the pointer you want to change from the list at the bottom and click *Browse*. The dialog box should open to the Cursors subfolder in your Windows folder, where most of your alternate pointers and cursors are installed. You'll also find pointers on the Web; just enter **mouse pointers** or **mouse cursors** in your favorite search engine to find sites with free pointer downloads.

Windows 2000 and XP put a shadow under your pointer. If you prefer the 2D look, uncheck *Enable pointer shadow* under Pointers and click *Apply*.

Mouse with the keyboard. If you'd rather not mouse at all, tell Windows to control the pointer from the keyboard (the numeric keypad on desktops): Open Control Panel's *Accessibility Options*, click the *Mouse* tab, and check *Use MouseKeys*. You'll probably also want to click *Settings* and experiment with the pointer speed. And while you're in the 'Settings for MouseKeys' dialog box, be sure that *Hold down Ctrl to speed up and Shift to slow down* is checked. This option gives you an easy way to adjust the speed of the pointer from the keyboard, a lifesaver if your mouse ever suffers a major malfunction.

For tips on mouse maintenance, see this month's *Hardware Tips* on page 142.

RENAME MULTIPLE FILES OR FOLDERS AT ONCE

Windows XP

SOMETIMES YOU have a bunch of files or folders that you want to sequence with the same name followed by a number. For example, I organize my projects in folders named for the year (2002, 2003, and so on), and within each of these I have folders for each month, numbered 1 through 12. Or perhaps you have a batch of digital photos that you want to group and name for a date or an occasion. Windows XP lets you rename those files in a flash.

First, open the folder holding the files you want to rename, right-click an empty area of the folder pane, click *Arrange Icons By*, and make sure Auto Arrange is unchecked. Put the files you want to rename in one column. Now select the files to be renamed (press **<Ctrl>-A** to select all the files). Right-click the first selected file and type a name followed by a number in parentheses—**Junior's 2002 Birthday party (1)**, for example (see **FIGURE 3**). Press **<Enter>**, and presto! All the files are renamed at once, with a number (in parentheses) appended to the end of each. You can specify any number at the end of the first file's name (not just *1*), and the names of the other files will be numbered sequentially higher. You can rename a group of files to number them from 1 through 20, for example, and later rename another group to number them from 21 onward.

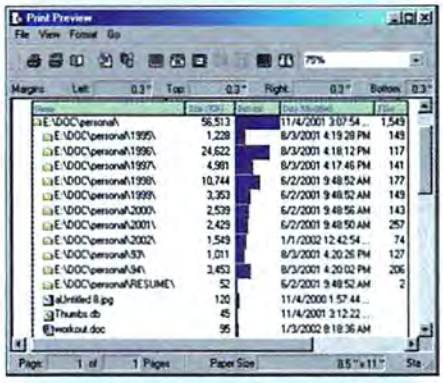
If you rename too many files, press **<Ctrl>-Z** to undo the renaming of the final item. Unfortunately, undo reverses the effect only on the last ten files in the list when you press **<Ctrl>-Z** repeatedly. ■

FIGURE 3: AUTOMATICALLY rename multiple files in Windows XP by adding a number in parentheses to the first file name.

WINDOWS TOOLBOX

Print Directory Listings Instantly

FOR YEARS READERS have been asking how to print Windows Explorer's file lists. Our solutions are usually a variation of some DOS batch file or ugly parameters entered in a command-prompt window. Thanks to Luiz Marques, those days may be over. His $15 product, STG FolderPrint Plus, makes short work of printing directory listings and folder trees, including as much or as little detail as you want. You can even print the extra details for MP3 files. STG FolderPrint Plus can filter the list by the date the file was created, modified, or last accessed. It can also sort by file size or type. The program gives you complete control over fonts and printing



format, and it provides a bar chart that lets you know which folders are taking up the most space on your hard disk. Go to find.pcworld.com/26881 to download your copy of STG FolderPrint Plus.

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.*

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INTERNET TIPS

SCOTT SPANBAUER

USE YOUR BROWSER TO CRUSH COOKIES
REVIVE DEAD NET CONNECTIONS
CATCH UP WITH REVISION CONTROL

Listen to a World of Radio Stations on the Internet

BACK WHEN I had more hair, there was a great independent radio station called KFAT in Gilroy, California, that played western swing, blues, and other genres of music that you rarely heard on other stations. KFAT went off the air 20 years ago (the call letters now belong to a Top 40 station in Anchorage, Alaska), but a bunch of KFAT on-air personalities started up a new station—KPIG—that broadcasts exclusively over the Internet from kpig.com. Now I can still get my heapin' helpin' of "fat" tunes even though I dwell in far-off Colorado.

Lots of AM and FM radio broadcasts can be heard on the Internet, many providing programming from the quirky to the sublime to listeners who are beyond the reach of the stations' local transmitters. Some stations broadcast *only* on the Net, pumping out great jazz, the latest trance and techno mixes, and news and talk in just about every language. To hear them, all you have to do is tune in using a streaming audio player.

My favorite is Nullsoft's Winamp, but others—Microsoft's Windows Media Player, Musicmatch's Musicmatch Jukebox, Apple's QuickTime, and RealNetworks' RealOne—will also do the job. You can download these players from find.pcworld.com/12287.

SO MANY STATIONS

EACH OF THESE audio players lets you browse Internet radio stations (see **FIGURE 1**), though most promote broadcasters that feature the player manufacturer's technology. For example, Winamp's minibrowser lets you browse Nullsoft's Shoutcast directory—a list of stations that broadcast using the company's Shoutcast Server streaming audio software. Windows Media Player's Media Guide lets you peruse stations broadcasting in Microsoft's Windows Media Audio format; QuickTime and RealOne offer similar indexes that spotlight QuickTime and Real Audio formats, respectively.

Luckily, you're not limited to one format or another—having all these players installed simultaneously is no problem. What you really need is a directory that lists every station regardless of format. Radio-Locator (find.pcworld.com/26661) is a good place to start, especially if you want to search for foreign broadcasts by country. The site lists thousands of Internet stations, as well as AM and FM broadcasters, but it doesn't show which formats the stations broadcast in. BRS Web-Radio (find.pcworld.com/26662) includes the digital audio format information for many stations, and it lets you search for stations by location, call letters, or programming. RadioTower.com (find.pcworld.com/26663) is similar, but it also lets you rate stations on quality and posts those ratings in its listings.

CONNECT INSTANTLY

ONCE YOU FIND a station you like, you need a way to find it again without having to search an online directory. Like Web browsers, most streaming audio players let you save station bookmarks that connect to the audio stream instantly.

To bookmark a station in Winamp 2.79, click the *Control* menu in the program's upper-left corner and then choose *Bookmarks•Add current as bookmark*. In RealOne, choose *View•Favorites•Add To Favorites*. In Windows Media Player, click *Radio Tuner* on the left side of the player, then click *Recently Played Stations*, select the station you want to remember, and choose *Add to My Stations*.

FIGURE 1: NULLSOFT'S WINAMP media player lets you browse for Internet radio stations by music genre, among other options, or follow the link near the top to a random channel.

The best-sounding Internet radio stations broadcast their audio in near-CD quality, usually at 128 kbps. That's too much data for a telephone connection, but that doesn't mean streaming audio is only for broadband users. Most stations offer lower-bit-rate streams for dial-up users and for specific media types. Most 28-kbps MP3 streams sound like AM

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REVIVE DEAD CONNECTIONS

HAS YOUR Internet connection's heartbeat ever suddenly flat-lined in midbrowse? This can happen when your Internet Connection Sharing server or hardware router reboots, or when your ISP changes the address of the DHCP server that hands out IP addresses. Your computer may need a new IP address to venture onto the Net in this situation. To help it get one in Windows XP and 2000, choose *Start•Run*, then enter **ipconfig /renew** in the Open field (note the space before the forward slash) and click *OK*. In Windows 98 SE and Me, the command is **ipconfig /renew_all** (with a space before the slash and an underline before *all*).

radio—not that great, but perfectly fine for news and other speech broadcasts. Interestingly, the Windows Media Audio format sounds noticeably better at lower bit rates. For example, London's Jazz-FM.com Windows Media stream sounds great at only 20 kbps, though not as rich as a local stereo FM broadcast.

CRUSH YOUR OWN COOKIES

YOU DON'T NEED Betty Crocker to bake a cake, and you don't need a third-party cookie-blocking utility to take control of who can and can't leave cookies on your PC. Cookies are small text files that Web sites save on your hard disk to customize your browsing experience. Though mostly benign and often helpful (they bookmark your ID for easy return to the site), cookies can be a threat to your privacy (some track your every move on the Net). Fortunately, the latest versions of the Internet Explorer, Netscape, and Opera browsers include cookie-crushing tools that are nearly as powerful as those offered by third-party utilities.

FIGURE 2: BLOCK OR ALLOW cookies from select Web sites using IE's custom privacy controls.

Internet Explorer 6: Choose *Tools•Internet Options* and click the *Privacy* tab. IE's privacy-level presets may be good enough for most of us, but you can also configure IE to accept or reject cookies site by site. Click the *Edit* button, enter the URL of the site you want to always—or never—prevent from writing cookies to your hard disk, and then click either *Block* or *Allow* (see **FIGURE 2**). When you're done entering URLs, click *OK* to save the setting.

In addition to managing cookies site by site, you can set IE to accept, block, or prompt before accepting all cookies from first parties (which are the sites you visit) and/or third parties (often the site's advertisers tracking your browsing habits). Click the *Advanced* button under the Privacy tab, check *Override automatic cookie handling*, select your desired settings under 'First-party Cookies' and 'Third-party Cookies', and click *OK*.

Netscape 6.2: Choose *Edit•Preferences*, click the arrow next to 'Privacy & Security', and then select *Cookies*. To block all third-party cookies, click *Enable cookies for the originating web site only*. For more-detailed cookie control, choose *View Stored Cookies*. To banish an individual site's cookies from Netscape in perpetuity, check *Don't allow removed cookies to be reaccepted later*, then select the unwanted cookie from the list and click *Remove Cookie*.

The Cookie Sites sheet indicates that Netscape is planning to add the ability to block cookies site by site in a future version; currently, the feature is disabled.

Opera 6.x: Opera is the cookie wrangler's browser of choice, offering tremendous control over cookie behavior—probably more than most of us care to have and certainly more than IE and Netscape. Choose *File•Preferences*, then select *Privacy* in the settings list. You can create a list of sites (Opera calls them "servers") whose cookies you want to treat individually. Click *Edit server filters*, choose the action you want to take on the server's cookies (such as *Refuse from server*), enter the server URL in the field at the bottom of the dialog box, and click *Add*. When you're done specifying what to do with whose cookies, click *OK*. On the other hand, to accept only cookies from the servers you defined as safe in the server list, choose *Accept only cookies from selected servers* from the first drop-down list in your Privacy Preferences. To block third-party cookies, choose *Do not accept third-party cookies* from the second drop-down list. ■

Send your questions and tips to nettips@spanbauer.com. We pay $50 for published items. Scott Spanbauer is a PC World *contributing editor.*

REVISION CONTROL

Latest Software Tweaks

ZoneAlarm Pro 3.0.118; 3.4MB; find.pcworld.com/28411. According to Zone Labs, this fee-based version is faster and more stable than the initial 3.0.081 release. The company also says it works more smoothly than previous versions with Internet Connection Sharing in Windows 98 SE and Me, and it fixes an HTML rendering glitch that can strike when you use the firewall's new advertisement-blocking feature.

Agent 1.92; 2MB; find.pcworld.com/26681. Version 1.92 of Forté's Usenet newsreader adds a trash folder, improves some existing features, and takes care of various bugs; but more important than the fixes and enhancements is the application's added support for the YEnc binary encoding algorithm.

Opera 6.03; 11MB with Java, 3.26MB without Java; find.pcworld.com/10698. The latest version of the little-browser-that-could cleans up many minor interface glitches that were in the initial 6.0 release, plus a file upload security hole.

STEP BY STEP

STAN MIASTKOWSKI

Turn Your PC Into a Personal Video Recorder

IT'S EASY TO GET "gizmo envy" if you've seen the latest generation of personal video recorders (PVRs) from ReplayTV or TiVo. These boxes act as sophisticated automated video recorders that use a hard drive instead of tape for storing video, and they have a raft of unique features.

But these stand-alone boxes are expensive and often hard to find because they're so popular. There is a lower-cost option: Assuming your PC has a decent-sized hard drive, you can turn it into a PVR by installing an add-in card and software.

PC PVRs let you easily browse and choose which TV shows to record on your PC's hard drive using an on-screen program guide. Also, they can pause a live show when you get interrupted and can then continue from where you stopped watching. PC PVRs can create transcripts from closed-captioning, or watch for certain phrases in the captioning and automatically start a recording. That's just the beginning. If you have a CD-RW drive or a recordable-DVD drive, you can even create your own classic TV show collection. You can also play back shows you've digitized and record them on a standard VCR.

The PC-based PVR arena hosts a wide variety of product choices, but we used a PVR-ready graphics card (the $195 ATI All-In-Wonder Radeon 7500) as our example here. Matrox, VisionTek, and many others have similar products.

Two caveats: First, despite large differences in hardware requirements among different makes, figure on a minimum of a 750-MHz Pentium III, 256 MB of RAM, and a large hard drive (40GB to 80GB) if you want to turn your PC into a PVR. Second, you might prefer an all-in-one solution that includes a TV-out jack so you can hook up a standard TV for viewing. Some TV-tuner cards lack that output. ■

Stan Miastkowski is a contributing editor at PC World. *Send questions and comments to him at stan_miastkowski@pcworld.com.*

THE TOP DOWN

Benefits: Record TV programs on your hard drive for playback later; write to DVD or to VCR; use time shifting to pause program and watch later.

Costs: Complete add-in kits, $100-$250; DVD writer, $500-$600

Expertise level: Intermediate

Time required: 30-60 minutes

Tools required: Phillips screwdriver, antistatic wrist strap (recommended)

Vendors: ATI (www.ati.com), AVerMedia Technologies (www.avermedia.com), Creative Technology (www.creative.com), Hauppauge Computer Works (www.hauppauge.com), Leadtek Systems (www.leadtek.com), Matrox (www.matrox.com), Pinnacle Systems (www.pinnacle-sys.com), VisionTek (www.visiontek.com)

GOING THE PARTS-AND-PIECES ROUTE

IF YOU DON'T want to replace your PC's existing graphics card, you can buy a TV tuner (for $50 to $100) from many of the manufacturers listed in "The Top Down" (above). If you have a free PCI slot, get a TV tuner built on an add-in card. If you have no free PCI slots (or if you don't want to open your PC), get a USB TV tuner that you can simply cable to your PC.

PROGRAM LISTING SERVICES such as TitanTV offer an easy way to select programs to record on your PC-based PVR.

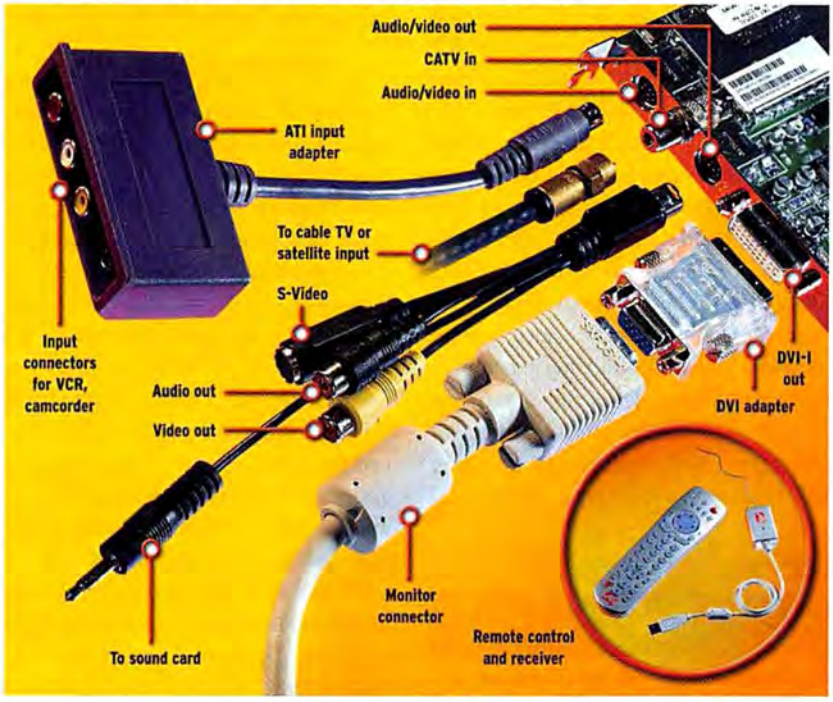
Many TV-tuner cards, such as the $100 Video Blaster Digital VCR from Creative Technology, come bundled with PVR software. If your PC already has a TV tuner, several video-recording software packages can work with it, most of them priced at around $50. These include CyberLink PowerVCR II (www.gocyberlink.com), InterVideo WinDVR (www.intervideo.com), ShowShifter (www.showshifter.com), and SnapStream PVS (www.snapstream.com). Most PVR software makers offer customers a 30-day free trial.

The final piece of the puzzle involves deciding what to record, and with many cable systems offering 50 to 100 channels or more, you need an expeditious way to see what's on. Most all-in-one PVR products and some PVR software packages include program guides accessible via the Internet. If they don't, TitanTV (www.titantv.com) is the obvious choice. This free service provides customized program listings for your area and integrates with most PVR hardware and software, allowing you to choose what to record with a click of your mouse.

BEFORE YOU START Installing the hardware and software for a PVR significantly alters your PC's configuration. Do a complete backup first. Then check your PVR maker's Web site for the latest drivers; these are crucial, especially if you use Windows XP. The steps shown here are typical, but different products require different steps. For example, some boards require that you uninstall existing graphics drivers before you begin. Read your manual or installation poster carefully.

1 Install the add-in card. Turn off your PC, unplug it, and open the case. Use an antistatic wrist strap to avoid static damage. If you're replacing your graphics card, unhook the monitor cable, remove the screw holding the card, and carefully remove it. Then gently insert the PVR card and fasten it down with the screw. Reconnect your monitor cable. When you restart your PC, Windows should detect the new card. Install the drivers for the new card.

2 Hook up the equipment. Follow the manufacturer's directions to hook up your cable TV or satellite input, television, and VCR, as well as any other accessories you'll be using.



3 Install the PVR software. Follow the manufacturer's directions. Usually, several steps and decisions are involved. If you have any doubts, refer to your manual.

4 Start watching and recording. Most PC-based PVR products offer a wide range of options. Expect a challenging learning curve as you familiarize yourself with them. But on-screen program guides customized for your area usually simplify the process of picking programs to record.

5 Make a DVD. If you have a DVD-RW or DVD+RW drive, you can create DVDs (for personal use only) from your TV recordings, and you can use the discs in any DVD player. Procedures vary by drive and by authoring software. DVDs require that video be stored in MPEG-2 format. Most PC-based PVR products can record in MPEG-2 or can convert stored video to it for DVD writing.

PHOTOGRAPHS: KEVIN CANDLAND

HARDWARE TIPS

KIRK STEERS

Will Overclocking Give an Old CPU New Pep?

A FRIEND OF MINE recently suggested I could squeeze more speed out of my aging Pentium III system by "overclocking" the CPU. He says it's easy to push my CPU speed past its factory settings. But I wonder why Intel wouldn't run a chip at its fastest setting. Is overclocking really as safe and simple as my friend says?

Glen Raven, Jackson, Mississippi

SOMETIMES IT'S SIMPLE, sometimes it's safe. But sometimes it's neither.

Overclocking means running a CPU faster than the clock speed it's certified for. With many PCs, you just need to change one or two settings in their CMOS setup program. Increasing the frontside bus speed and/or CPU multiplier will make your processor run faster.

So why isn't your CPU already running at its fastest speed? Processors are made in sheets called wafers; only a few CPUs on each wafer are tested to determine the top speed rating for the whole batch. Proponents of overclocking say many of the untested CPUs are capable of running at higher speeds. Overclockers' success indicates that this is true. But that's no guarantee you can successfully overclock your CPU. Should you try? If you're a typical PC user, probably not. Here's why:

You can fry your CPU. It happens, though not often. Running faster means running hotter. Excessive heat accelerates chip deterioration and can cause processing errors or even circuit failures. Adding another fan or heat sink may dissipate the extra heat, but your performance increase may not justify the effort and expense.

It's a hassle. Along with cooling, you have to consider other technical matters. For example, Intel's Pentium III and later CPUs allow you to increase the speed of your frontside bus, but not the CPU, so only RAM and PCI bus speeds go up.

You'll find the information you need to overclock your PC at www.sysopt.com and www.overclockers.com. But before spending a good part of your weekend in pursuit of faster CPU cycles, ask yourself if you wouldn't rather be cleaning the grill or refinishing your hardwood floors. In other words, is it worth the trouble?

You may not benefit much. Your CPU's performance boost from overclocking will likely be more of a nudge than a launch. Today's PCs rely on the graphics card and other components for speedy processing. Unless you play graphics-intensive games or regularly crunch *really* big spreadsheets, you probably won't see a truly useful increase in performance.

GOOD MOUSEKEEPING

IT'S NOT MUCH to look at, it gets pushed around, and it's named after a rodent. Sometimes you forget that your mouse is one of your PC's most important devices. But is your mouse all that it can be?

As described in this month's *Windows Tips* (page 134), your mouse driver software gives you a world of options. They vary depending on the type of mouse you use, but you should at least be able to adjust the quickness of your double-clicks and the speed of your pointer. You may get more options by downloading an updated driver. Windows installs a barebones driver if it can't find any software more specific to your mouse's make and model. **FIGURE 1** lists utilities that will give your mouse more maneuverability.

If you have a mechanical mouse, it may require cleaning. (Optical mice have no such need.) Just turn the mouse upside down and remove the cover that holds the ball inside. Take out the ball, clean it with soap and water, and thoroughly dry it before putting it back in place. Use the end of a paper clip to gently scrape the debris off the two hard plastic rollers inside the mouse's case. ■

UTILITIES TO TEACH YOUR OLD MOUSE NEW TRICKS

UTILITY	List price	Description
Cool Mouse 97 find.pcworld.com/26901	Free	Assigns functions to your middle mouse button or (if you have a two-button mouse) enhances your secondary mouse button.
IntelliPointer find.pcworld.com/26905	$25; free trial	Cuts down mouse movement to save you from wrist strain.
Mouse Lock find.pcworld.com/26907	$15; free trial	Keeps interlopers off your PC while you're away from your desk.
Mouse Odometer find.pcworld.com/26903	$10; free trial	Tracks a vital computing statistic: how far your mouse pointer has traveled across your screen.
MouseTool 3.1 find.pcworld.com/26904	Free	Clicks your mouse for you to reduce wear and tear on your wrists.
Slippery Mouse find.pcworld.com/26906	Free	Drives unsuspecting victims nuts—but be sure they have a sense of humor.
ToggleMouse find.pcworld.com/26902	$20; free trial	A complete mouse control center. Changes pointers, adjusts buttons and wheels, and much more. Definitely worth a look.

FIGURE 1: THESE UTILITIES ADD functions and fun to any plain-vanilla mouse.

Kirk Steers is a PC World *contributing editor. You can reach him at kirk_steers@pcworld.com.* Hardware Tips *welcomes your tips and questions and pays $50 for published items.*

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Remove Apps That Don't Uninstall Themselves

WHAT CAN YOU do when you can't find uninstall utilities for programs you want to uninstall?

Elizabeth Saraceno, Cortland, New York

I CAN'T GUARANTEE that these instructions will wipe out *every* trace of every program you want to remove from your PC—I'm cautious and delete only the files I'm sure aren't necessary—but in most cases they'll get almost all of them.

FIGURE 1: CHECK ALL AUDIO FILE types that you want Windows Media Player to run by default.

Find the program path and file name. Right-click the program's shortcut on your Start menu and select *Properties*. Everything in the Target field to the last backslash is the program's path, and everything after that backslash is its file name. For instance, if the Target field says 'C:\My Programs\Bug Multiplier\Bug.exe', the path is C:\My Programs\Bug Multiplier, and the program file name is Bug.exe. Keep the Properties box open. You'll need to refer to the path and file name throughout.

Make sure nothing from the program loads automatically. Select *Start•Run*, type **msconfig**, and press **<Enter>** (if you get an error message rather than a program, see "Msconfig for Windows 2000 and 95" at find.pcworld.com/26941). Click the *Startup* tab. In the Name or Startup Items column, look for anything related to the program that you want to uninstall. In the Command column, look for anything resembling the program path. Uncheck all the items that meet either criterion, then click *OK*.

Eliminate associations. In Windows Explorer, select *View•Folder Options* (*Tools•Folder Options* in Windows 98) and click the *File Types* tab. Look for any file types that are associated with the program you want to uninstall. When you find one, you have two options. If you'd like to associate the file type with another program, click *Change* and select the other program; otherwise click *Delete*, then *Yes*. Click *Close* when you're done.

Clean the Registry. Select *Start•Run*, type **regedit**, and press **<Enter>**. In the left pane of the Registry Editor, navigate to the key HKEY_CLASSES_ROOT\Applications. Click the plus sign next to this key, then right-click the subkey matching your program's file name. Select *Delete*, then *Yes*.

Navigate to HKEY_CURRENT_USER\Software and look for a subkey named for the vendor of the program. Click the plus sign by the vendor name to view the subkeys beneath it. If you see subkeys for programs you wish to keep, delete only the subkey for the program you're uninstalling. Otherwise, delete the vendor key entirely. Do the same in the HKEY_LOCAL_MACHINE\SOFTWARE key.

Press **<Home>** to return to the top of the Registry Editor's left pane, with *My Computer* selected. Press **<Ctrl>-F** to open the Find dialog box. Enter the program path in the 'Find what' field, make sure all of the options under 'Look at' are checked, and click *Next* or *Find Next*, depending on your version of Windows. If a match turns up, delete the key containing it, then press **<F3>** to search again. When it's done, close the Registry Editor. Finally, delete the program's folder and shortcuts.

CHANGE YOUR PLAYER

I'VE GOT multiple media players on my system. How do I control which launches when I play an audio file?

Bruce Kamikubo, Torrance, California

YOU CAN SET file associations in your players, but I suggest you deselect the file type in the program it currently launches before selecting it in the one you want. In Windows Media Player 8, for instance, select *Tools•Options* and click the *File Types* tab, where you can uncheck (if you don't want Media Player) or check (if you do) such options as MP3 Format Sound (see **FIGURE 1**). See find.pcworld.com/29774 for details about other media programs. ■

Send questions to answer@pcworld.com. We pay $50 for published items. You'll find Contributing Editor Lincoln Spector's humorous writing at www.thelinkinspector.com.

MORE ON BLOCKED PAGES

READER DONALD BREGMAN responded to May's "Why Won't That Web Page Open?" tip (find.pcworld.com/27301) with another possible fix for recalcitrant Web pages. A file in your Windows folder called 'hosts' (no extension) may have an incorrect IP address for the page. To find out, open Windows Explorer, select your C:\Windows folder, and look in the right pane for a hosts file. If you can't find it in your Windows folder, this isn't your problem. If you do find a hosts file, open it in Notepad and look for a line referring to the page that's giving you trouble. If it's there, enter # at the beginning of the line. Save and exit the file.

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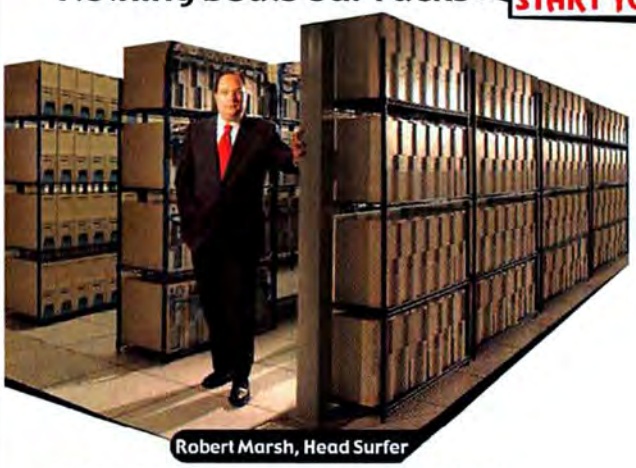

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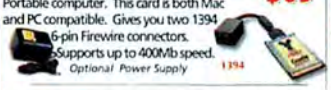

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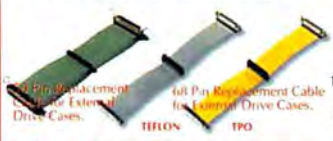

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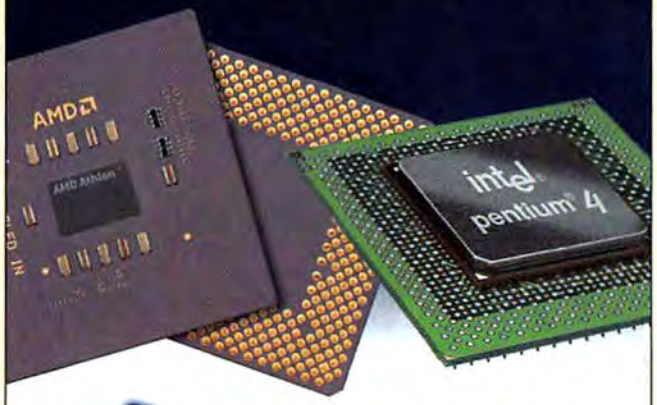

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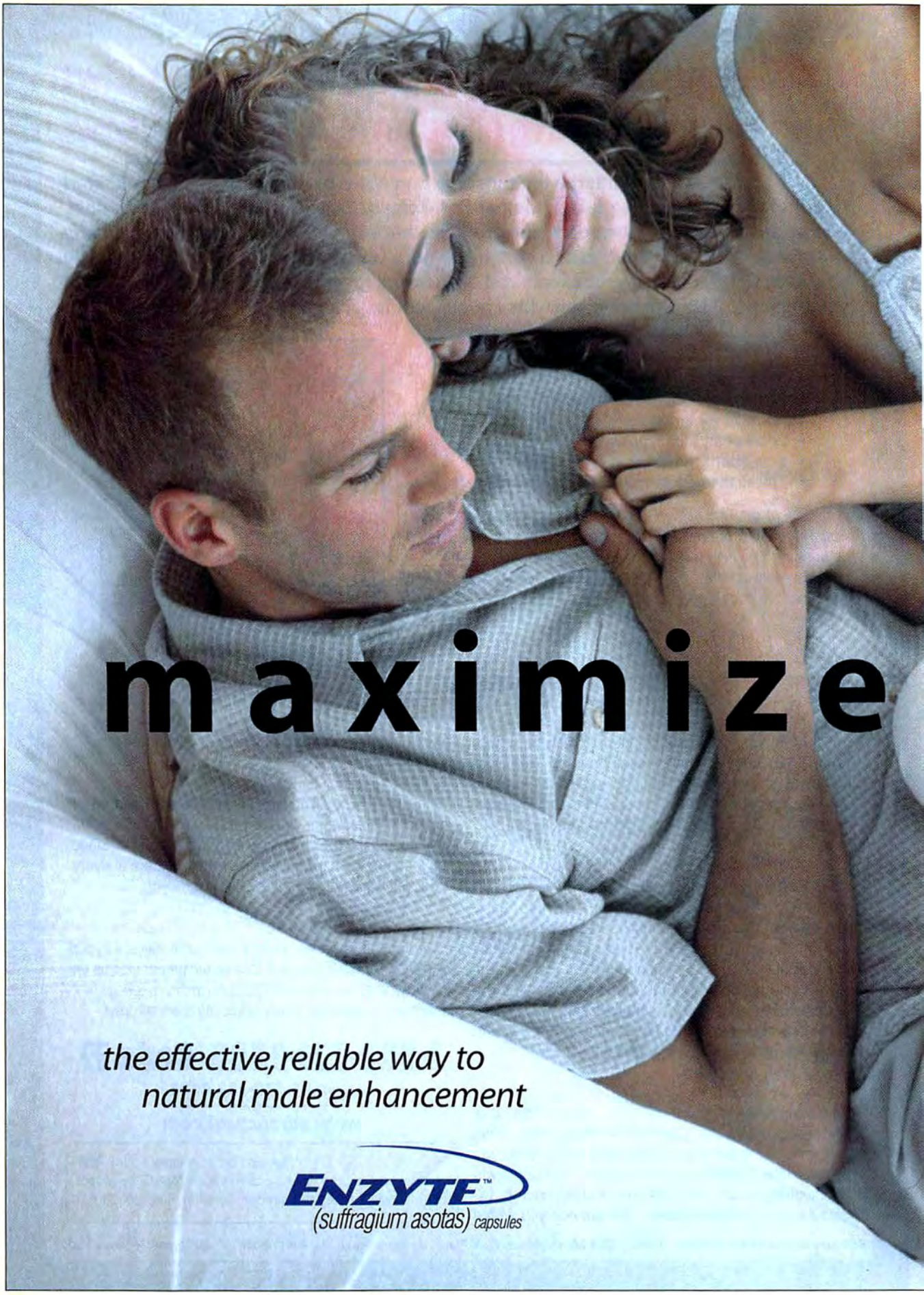
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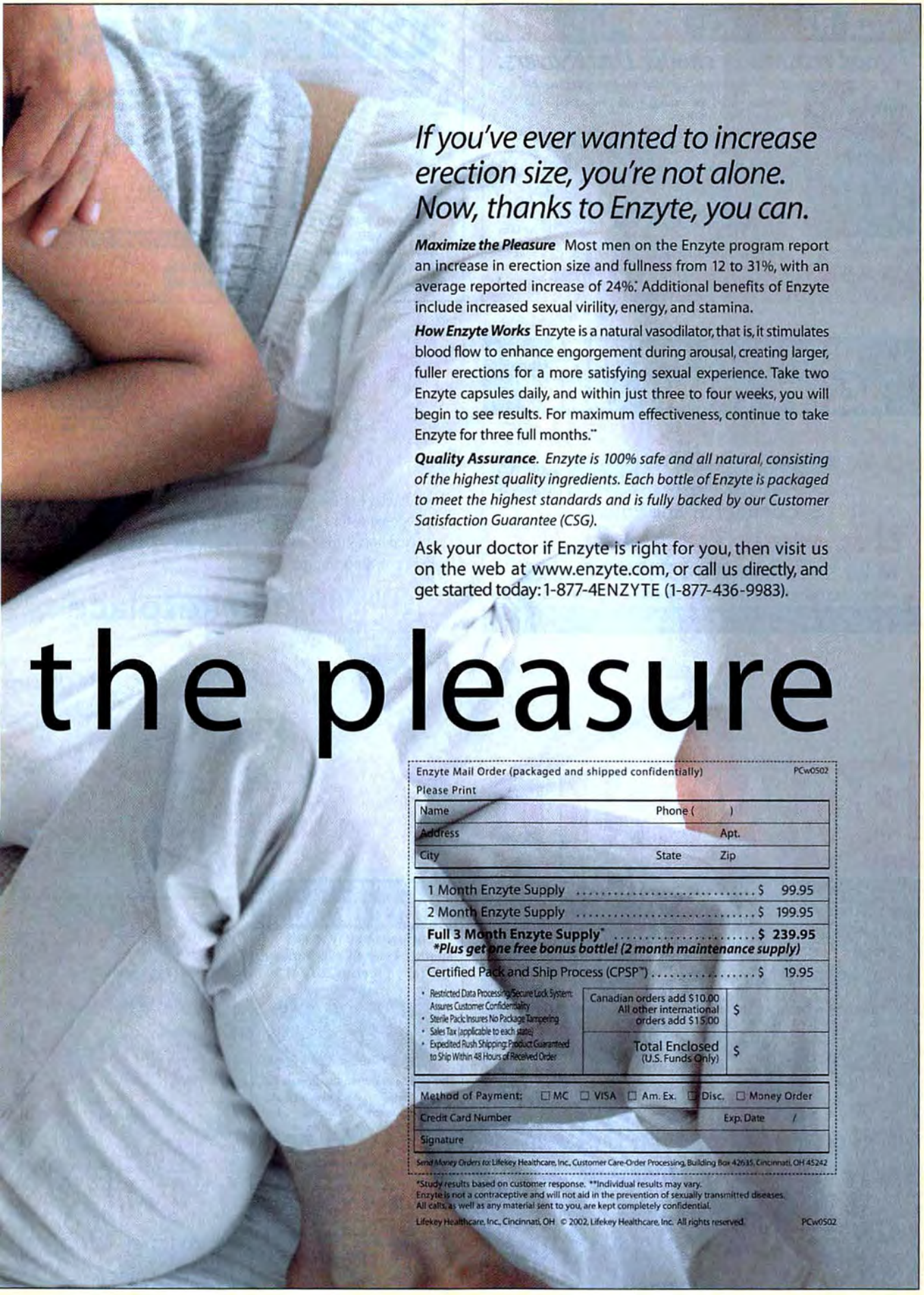

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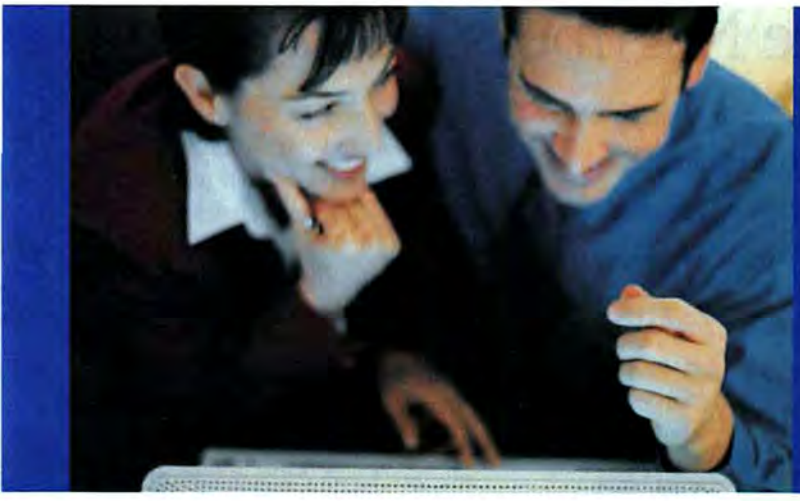

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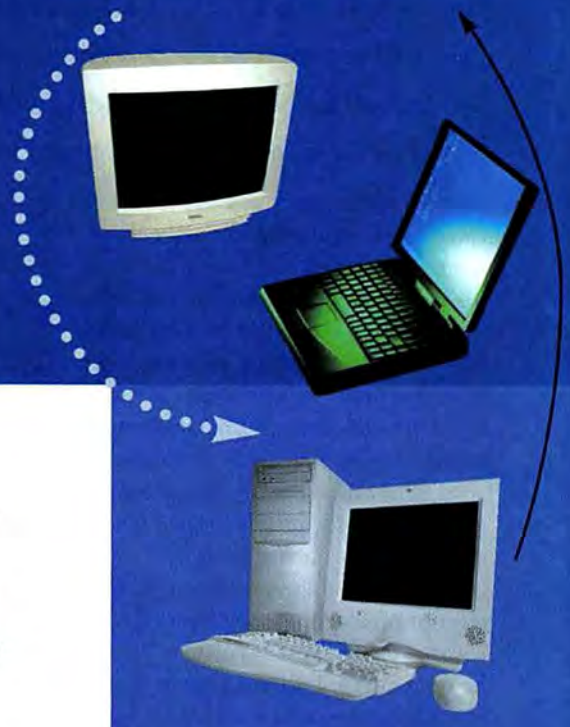

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STEPHEN MANES

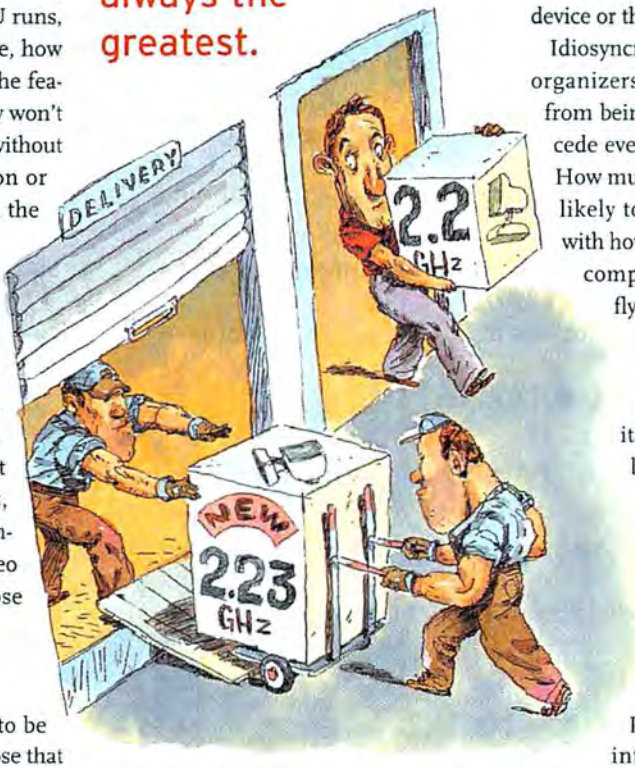
Specsmanship: The Numbers Do Lie

THE SHAME! YOU BOUGHT A 2.2-GIGAHERTZ computer the day before the 2.4-GHz model came out—with a 10 percent faster graphics card and a 20 percent faster hard drive! The humiliation! Or not. Take comfort in this axiom, a bit of deep philosophical wisdom that I've gained from years of experience: Product features that can easily be expressed in numbers are rarely as important as those that can't.

Vendors like to compete on quantifiable things; they note how fast the CPU runs, how many USB ports are available, how much hard drive space you get. The feature tables may look good, but they won't say whether the system will ship without a shred of printed documentation or whether you'll be unable to open the case without the Jaws of Life.

True, a few numbers are worth worrying about, but they almost always express capacity, such as how big the hard drive is or how much RAM the machine includes. The others are largely irrelevant. Humorless geeks may fret about the speeds of their CPUs, buses, graphics cards, and drives, but unless you're into high-powered video editing or heavy-duty games, those specs just don't matter much.

Take heart, tech fans: The latest isn't always the greatest.



LOOK-AND TOUCH

THE IMPORTANT features tend to be those you can't easily measure, those that interface with your senses. More important than the difference between the innards of an optical mouse and a mechanical mouse is the way either one feels in your hand. More important than a monitor's official resolution is the sharpness of its images. If you have to take a printer apart whenever you feed it an envelope, you may not care how many dots it can put on a square inch of paper. If a PC's roaring fan drives you nuts, it'll be a bigger drain on your productivity than a 50 percent reduction in processor speed.

The more portable and integrated a device gets, the more subjectivity comes into play. A desktop PC is basically a box of interchangeable, replaceable parts; if you don't like the monitor it comes with, you can go get another. A notebook is a different story, because its configuration is far more difficult to change without compromising its essential integration. No spec sheet can explain such fundamental matters as the smoothness of the pointing device or the clarity of the screen.

Idiosyncratic personal devices such as organizers and MP3 players are so far from being commodities that specs recede even further into insignificance. How much memory a PDA includes is likely to be unimportant compared with how easy it makes syncing with a computer or entering data on the fly. The size of the pictures a digital camera can produce may not matter if it gets five shots per battery charge. A tiny digital camcorder may be done in by a lousy microphone. And who cares how fashionable a cell phone is if your fingers slip off the miniature keys?

So trust your senses and your research—and the next time somebody brags about a barn-burning new PC, stay calm. Windows and internal hardware bottlenecks will slow it down enough that it won't get much more work done than yours does, and its mouse may just be a rat. ■

Contributing Editor Stephen Manes, cohost of the public television series Digital Duo, *has written about PCs for nearly two decades.*

ILLUSTRATION: JOHN CUNEO

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