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Sony VAIO® Desktop PCs with Intel® Processors are designed to fulfill all of your entertainment passions. With all the features you crave—and nothing you don't. From the sleek V series to the ultra-functional RS and RZ series. Whatever you're into—DVD burning, downloading music, even recording TV content—Sony can help you do it all.



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- Built-in voice recorder
- Built-in QWERTY-layout keyboard
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- Palm OS™ v5.2 software††
- FREE leather case (\$30 value).† While supplies last.
- FREE shipping**

\$649⁹⁹ As low as \$17 per month for qualified customers.*



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- 512MB DDR at 333MHz
- CD-RW/DVD-ROM Combo Drive†
- 15" LCD display
- Wireless keyboard, wireless mouse & remote control
- Built-in stereo speakers
- Giga Pocket® Personal Video Recorder
- 1-Year Limited Warranty†
- Free wireless LAN PC card** when purchased from www.sonymstyle.com††. While supplies last.

\$1,599⁹⁹ As low as \$40 per month for qualified customers.*



RZ Series

The Ultimate Entertainment PC

PCV-RZ40CG—Display sold separately

- Intel® Pentium® 4 Processor with HT Technology at 2.60GHz†
- Microsoft® Windows® XP Media Center Edition
- 160GB Hard Drive* (7200 rpm)
- 1GB DDR at 400MHz
- DVD±RW/DVD-ROM Drives†
- 128MB nVIDIA® GeForce™ FX5600 Graphics Card
- Creative® Inspire™ 5.1 5200 Speaker System with Sound Blaster™ Sound Card
- Multi-Media Card Reader
- Personal Video Recorder powered by Giga Pocket® Engine with remote control
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DVD Handycam®
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- 3.5" SwivelScreen™ LCD display
- Digital Still Memory Mode
- Carl Zeiss® Vario-Sonnar™ lens
- Super NightShot™ Infrared System and Color Slow Shutter
- Super SteadyShot™ Picture Stabilization System

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- 3 transmission channels
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Elegance and Mobility

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 - Integrated Wireless LAN: Intel® PRO/Wireless Network Connection 802.11b¹
 - Intel® 855 Chipset
- Microsoft® Windows® XP Home Edition
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- 14" SXGA+ TFT display
- 512MB DDR SDRAM
- Integrated CD-RW/DVD Combo Drive³
- Amazing battery life up to 6.5 hours⁴
- Integrated Bluetooth™ Wireless Technology⁵
- USB 2.0
- Stylish and sophisticated design in a 4.7-lb.-light⁶ and 0.9–1.5" thin body
- Included software: PictureGear Studio,⁷ SonicStage,⁸ DVgate Plus⁹
- 1-Year Limited Warranty¹

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mail-in rebate

~~\$2,299.99~~
\$2,199.99

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UPGRADES

- Sony VAIO® Port Replicator for \$199.99
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Now Your Memory
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Memory Stick PRO Duo™ Media¹

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MSX-M256A Memory Stick PRO Duo™ Media

\$124.99

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Powerful. Mobile. Slim Design

- Featuring Intel® Centrino™ mobile technology
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 - Integrated Wireless LAN: Intel® PRO/Wireless Network Connection 802.11b²
 - Intel® 855 Chipset
- Microsoft® Windows® XP Home Edition
- 40GB Hard Drive³
- 12.1" XGA TFT display
- 256MB RAM
- Integrated CD-RW/DVD Combo Drive⁴
- Sony VAIO® Creation Suite Standard software package
- 1-Year Limited Warranty⁵

\$1,799.99

As low as \$45 per month for qualified customers.⁶

UPGRADES

- Upgrade to a 60GB Hard Drive³ for \$50
- Sony VAIO® Double-Capacity Lithium Ion Battery⁷ for \$200



GRT Series

Transportable TV Entertainment Center

PCG-GRT240G

- Intel® Pentium® 4 Processor 2.66GHz¹
- Microsoft® Windows® XP Home Edition
- 60GB Hard Drive²
- 15.0" XGA (1024x768) with XBRITE™ technology
- 512MB RAM
- DVD=RW/CD-RW drive³
- Record and watch your favorite TV programs with Sony's Giga Pocket® Personal Video Recorder and remote control
- Convert your old analog videos to digital and record to DVD
- Integrated 802.11g wireless LAN⁴
- 1-Year Limited Warranty⁵

\$2,099.99

As low as \$53 per month for qualified customers.⁶

UPGRADES

- Sony VAIO® Port Replicator for \$199.99
- Sony VAIO® Standard Lithium Ion Battery⁷ for \$249.99

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Sony's Smallest PC. Packed with Features

PCG-TR2A

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 - Intel® 855 Chipset
- Microsoft® Windows® XP Home Edition
- 40GB Hard Drive³
- 10.6" widescreen XBRITE™ LCD display
- 512MB RAM
- Integrated CD-RW/DVD Combo Drive⁴
- Amazing battery life up to 7.0 hours⁵
- Integrated swivel camera
- Sony VAIO® Creation Suite Standard software package
- 1-Year Limited Warranty⁶

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UPGRADES

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Sony recommends Microsoft® Windows® XP Professional for Mobile Computing.



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PC Magazine 16th Annual Service and Reliability Readers' Survey—August 5, 2003

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- Accessory items
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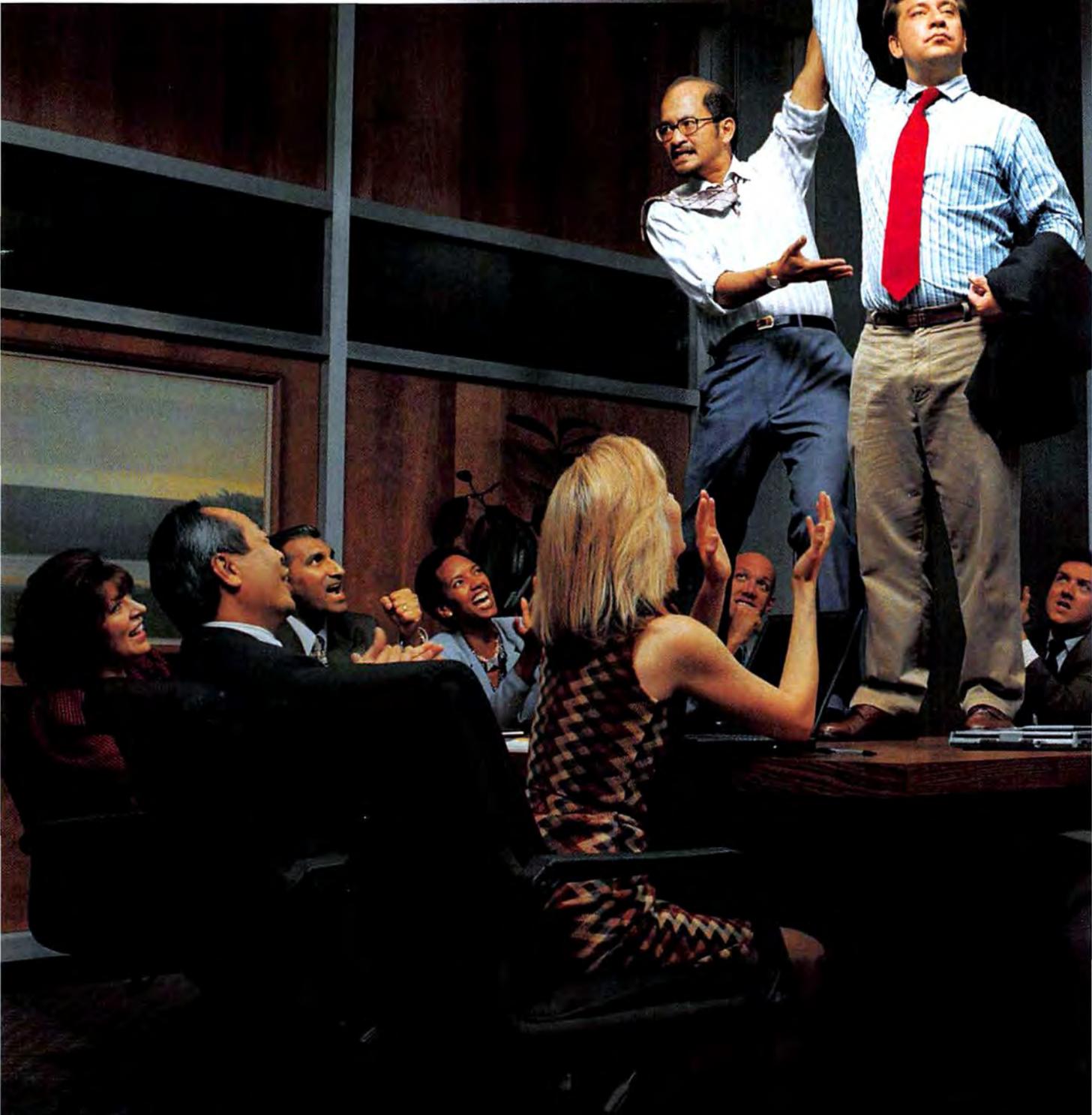
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GB means one billion bytes when referring to hard drive capacity. Accessible capacity may vary. A portion of hard disk space is reserved as a recovery partition. 3. From date of purchase with registration. Certain restrictions apply. 4. DVD compatibility is not universal. 5. With supplied battery. 7. Free ground shipping with purchase of eligible PC. Offer expires 3/31/04. 8. After \$49 mail-in rebate. Printer model may vary. Offer valid only when purchased from www.sonystyle.com. Offer expires 3/31/04. For rebate mail-in coupon and Terms and Conditions, please visit www.sonystyle.com. 9. Actual battery life may vary upon usage. 10. Requires compatible 802.11b wireless access point, some of which require a fee. Use of the Bluetooth-enabled device may vary as not all Bluetooth devices are compatible. If used with a Bluetooth-enabled mobile phone, ISP service fees apply. 11. Memory Stick PRO Duo media features vary and are dependent on the host hardware. 12. Some third party software and devices may currently have limited functionality or not be compatible with this model. Please confirm with third party vendor or manufacturer for compatibility. 13. On your Sony Financial Services Card, subject to credit approval. A minimum purchase of \$299.99 is required. This is a same-as-cash promotion. If balance on these purchases is paid in full before the expiration of the promotional period indicated on your billing statement and your Account of Record, Annual Finance Charges will not be imposed on these purchases. If balance on these purchases is not paid in full, Finance Charges will be assessed from the purchase date at the Standard Rate APR of 21.99% for Accounts not kept current, and the Default Rate of 24.99% APR will be applied to all balances on your Account. Minimum payments are required. The maximum monthly payment processed is based on the product and purchase price shown. The minimum payment is 2.5% of the "New Balance" in \$10, whichever is greater. The number of months you will pay and the amount of your total minimum monthly payments will depend on additional purchases and your Account balance. Minimum Finance Charge: \$2.00. Certain rules apply to the allocation of payments and Finance Charges on your promotional purchase if you make more than one purchase on your Sony Card. Call 1-888-257-4310 or review your cardholder agreement for information. 14. Purchase must be made by 3/31/04. For rebate mail-in coupon and Terms and Conditions, please visit www.sonystyle.com. 15. After purchase of eligible Sony digital camera, receive a coupon for 100 4x6" prints from Sony's ImageStation online service. Customers must provide valid e-mail address to receive this offer. Coupon valid for 100 days after issuance. Shipping charges may apply. Please visit www.sonystyle.com for details. 16. 227MB of actual usable capacity. 17. Requires compatible 802.11b or 802.11g wireless access point, some of which may require a fee and/or ISP. 18. Offer valid with purchase of DCP DV0300 direct from www.sonystyle.com. While supplies last. 20. Standard ground shipping. Offer expires 3/31/04. 21. Offer valid with purchase of PCV-V100G direct from www.sonystyle.com. While supplies last.

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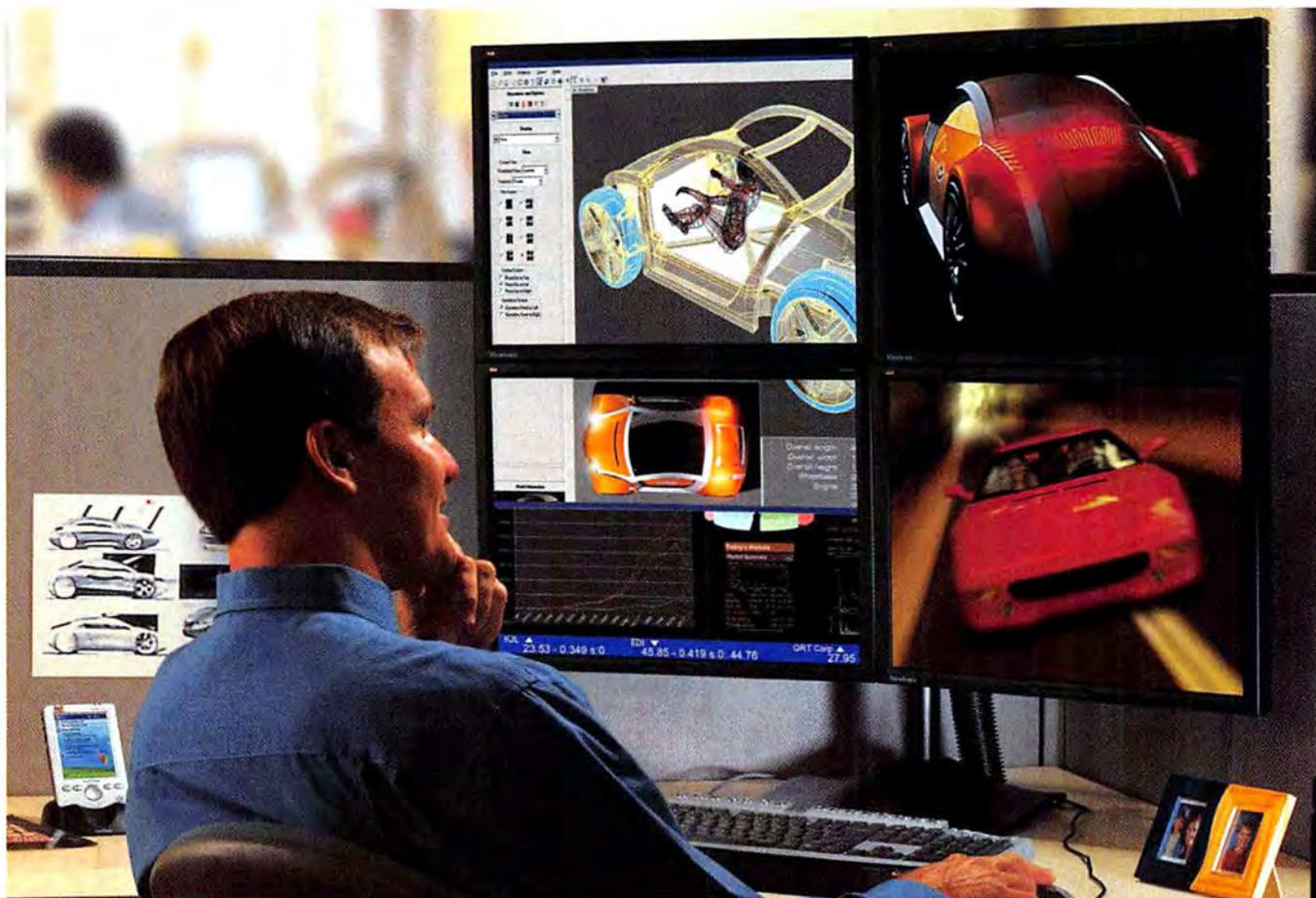
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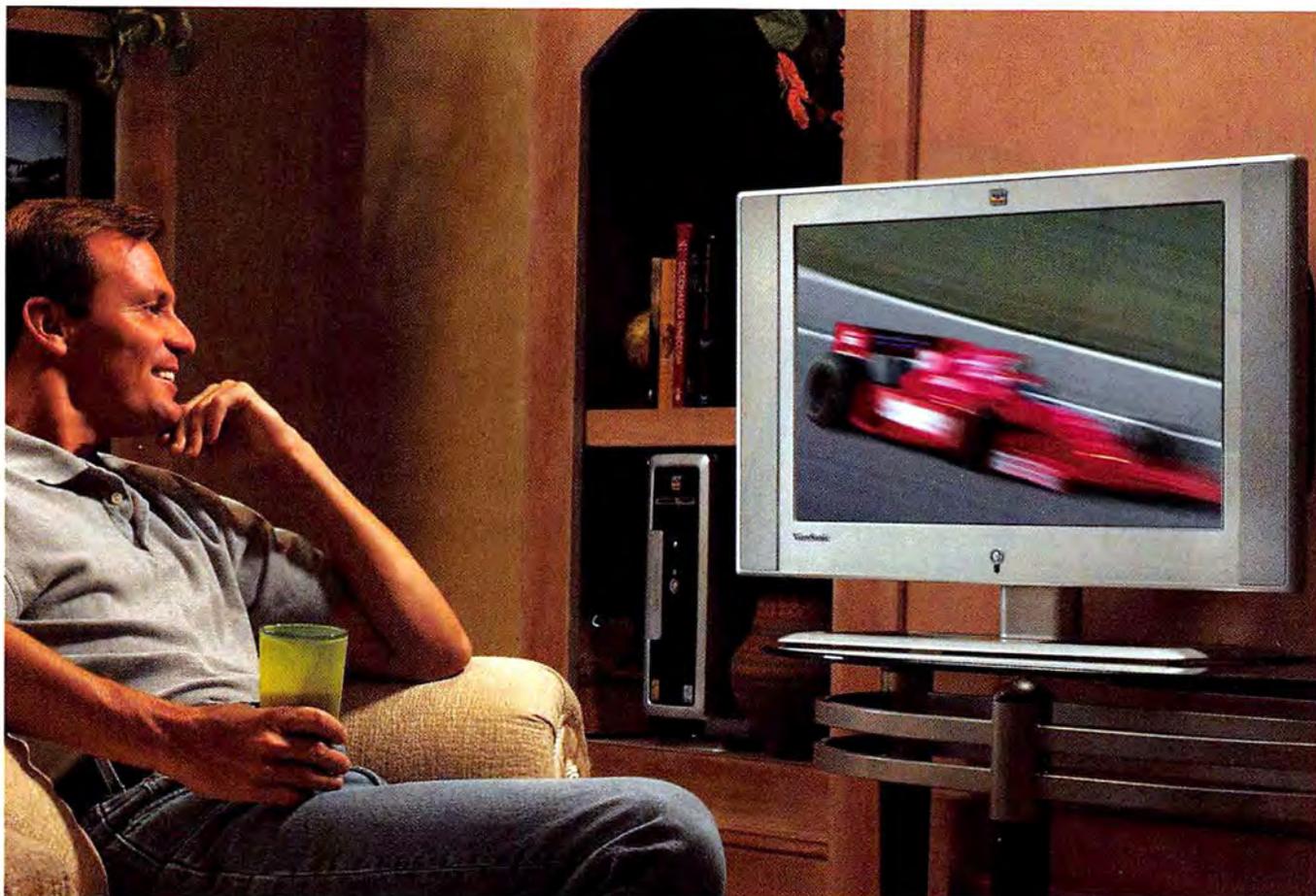
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i500 PDA Phone i600 Smartphone i700 Pocket PC Phone



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SHOPPING SECRETS

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Whether you're hunting online or in the brick-and-mortar world, being a smart buyer can save you a lot of money. Our expert adviser offers dozens of tips to help you find deals that aren't quite too good to be true.

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A photo editing program not only cleans up your pictures, it can help you achieve great images and free your imagination to soar. We looked at nine affordable editing products (and four organizers) for a Best Buy.

WEB BUILDING

123 Instant Web Sites

Have you dreamed of setting up your own spot on the Web but never tried designing it, thinking the task would be difficult? With our downloadable templates and simple instructions, you can create an attractive online home for yourself or your business in no time flat.



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94 What's in Store for 2004—And Beyond

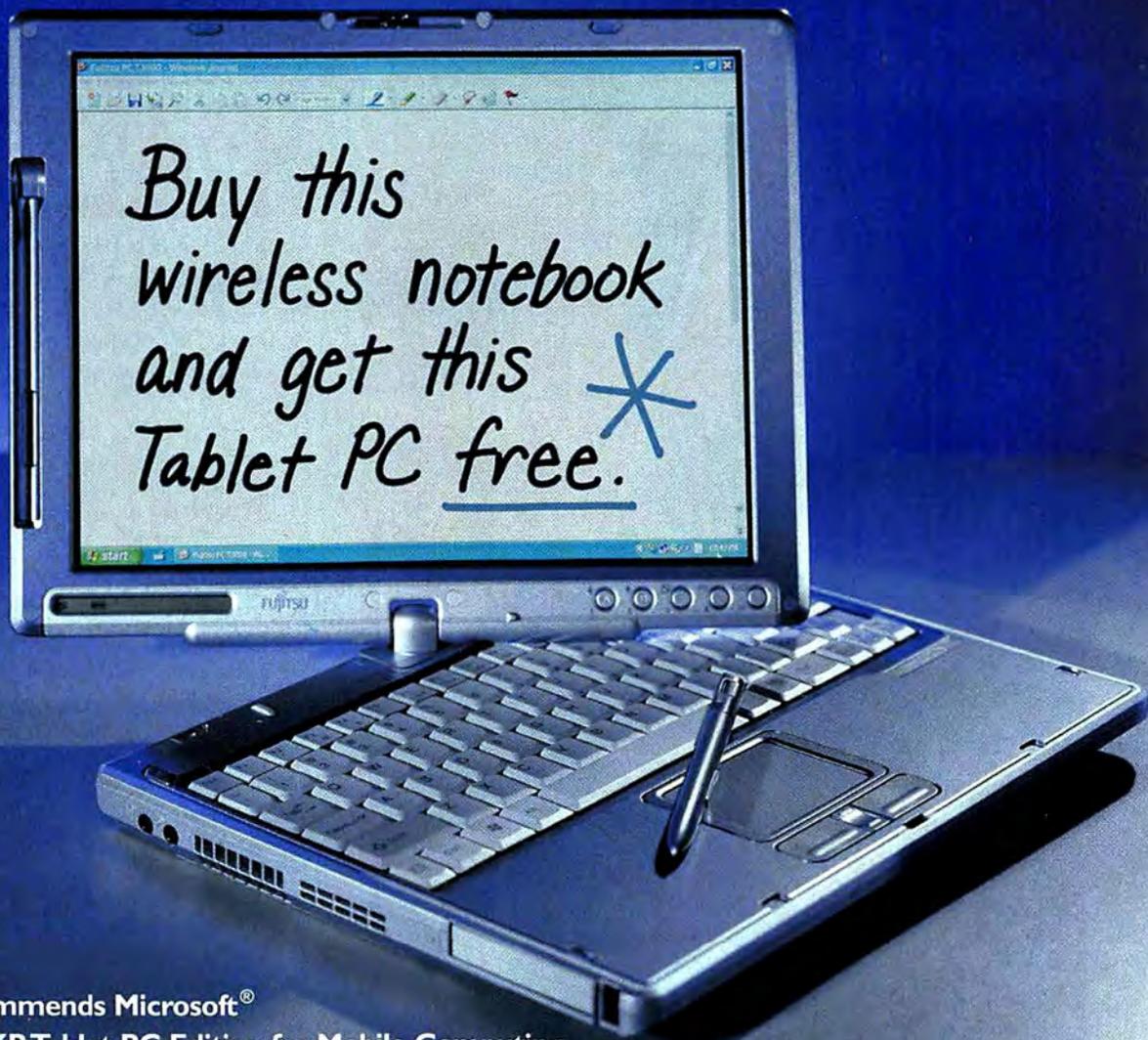
We start the new year with a look ahead at products and technologies that will have an impact on our lives in 2004—and farther in the future. We tell you what you can expect in the areas of graphics, processors, storage, communications, security, and entertainment. What will the shape of computing be in a few years? And whatever happened to once-hot technologies like DataPlay discs?



Cover photography by Kevin Candland

ON THE COVER





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Visit www.pcworld.com/pcwinput and rate this issue—you could win a Panasonic DMR E60S DVD recorder, which currently sells for approximately \$550. You'll need the subscriber number from your mailing label to take this survey online. The site explains the official rules and also how to participate in the drawing if you're not a subscriber. You can enter from December 9, 2003, through January 7, 2004.

COMING UP IN FEBRUARY

The Trouble-Free PC: We review the products you need to keep your system running smoothly.

The Road Warrior: Essential gear for people on the go—and tips on how to make it all work for you.

Best of the Web: We compare some intriguing upstarts with their Goliath competition.

So Long, Microsoft; Hello, Linux? Our editors live in Linux-land for a few weeks, and report back.

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HERE'S HOW

- 162 **Windows Tips**
Get terrific free add-ons to fill Windows' gaps.
- 165 **Hardware Tips**
Upgrade your system with the right type of RAM.
- 166 **Step-By-Step**
Burn your own DVDs for backups or playback.
- 168 **Internet Tips**
Free antivirus programs pass some big tests.
- 170 **Answer Line**
Rid your PC of unwanted, self-renewing apps.



Computer Associates BrightStor ARCserve Backup v9 for Windows

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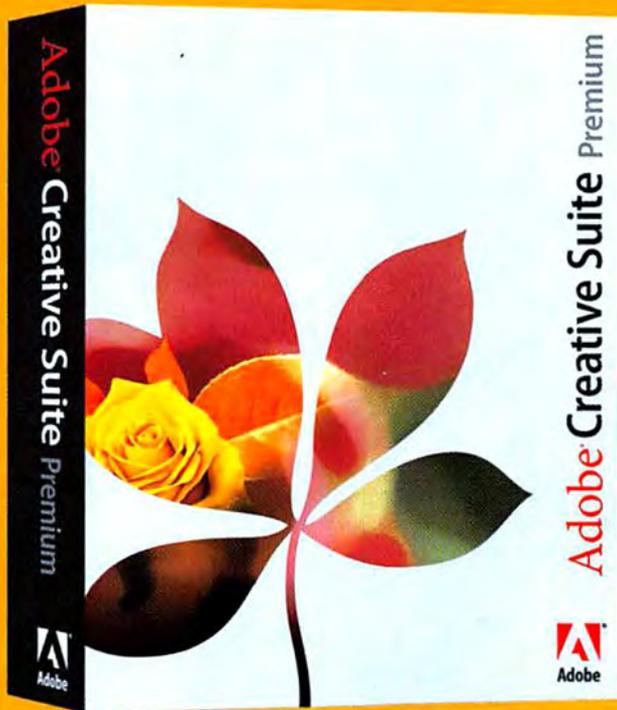
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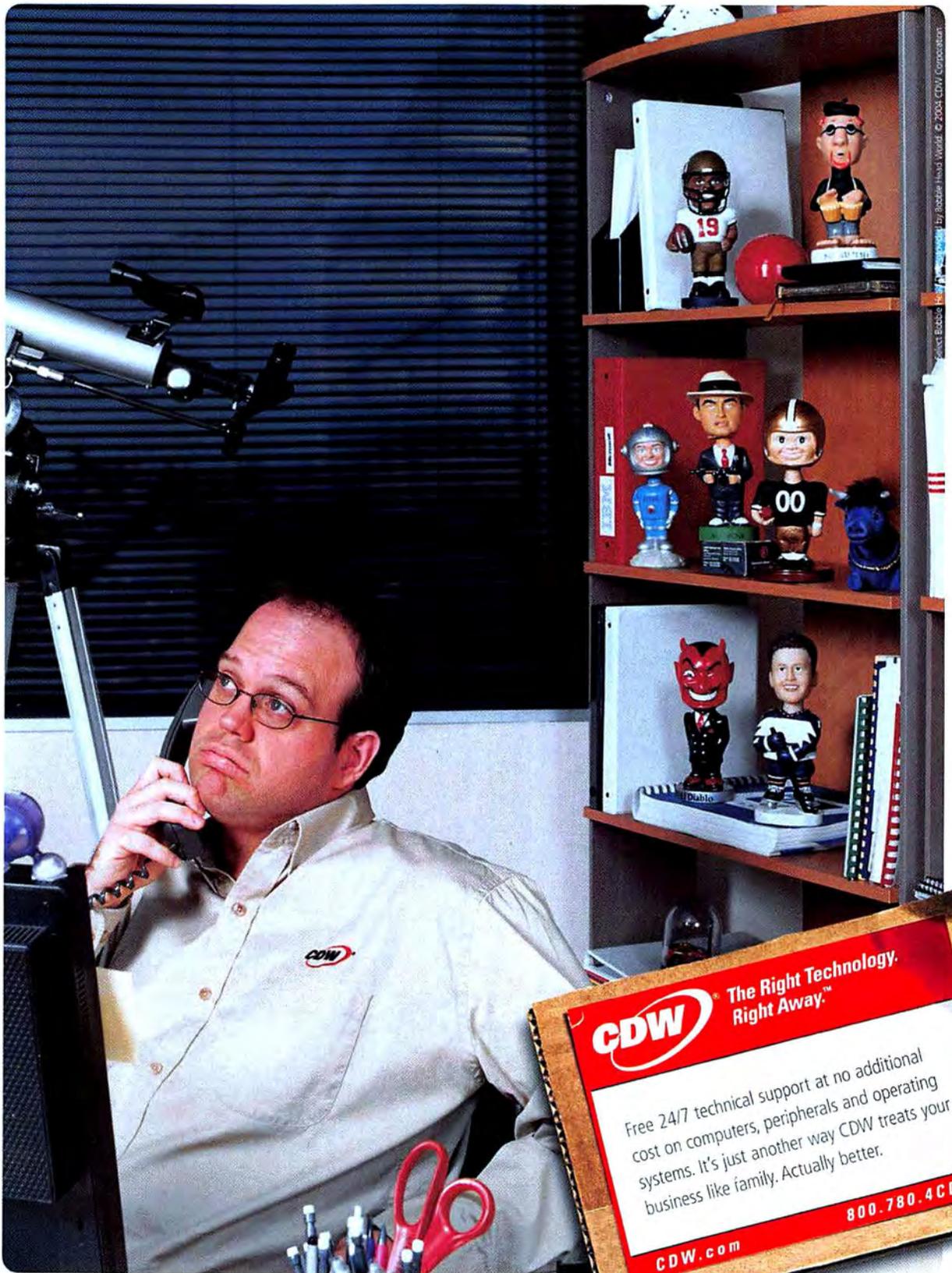
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Snap It, Clean It Up, and Admire It on Your Screen

FROM DIGITAL SLR CAMERAS to photo editing software to chips for heavy-duty graphics boards, we have your visuals covered this month, as we scope out the best products in each category. In addition, our

Next Gear section takes an extended look at stand-alone DVD recorders and surveys Global Positioning System devices. You'll find complete coverage of each product on the pages listed below.



146 Digital SLR Cameras

This month our *Top 100 Spotlight* shines on digital single-lens reflex cameras, such as the Olympus E-1 (left) and Canon EOS Digital Rebel.

115 Photo Editing Software

Outstanding new editions of programs from Adobe, Jasc (above), Microsoft, and Ulead give a professional gloss to your photo finishing.

74 Latest Graphics Chips

We look at ATI's Radeon 9800 XT and NVidia's GeForce FX 5950 Ultra, two new top-of-the-line chips for task-intensive graphics boards.

THIS MONTH'S CROP OF TOP PRODUCTS

DESKTOP PCs

- 150 ABS Awesome 6300 ★★★★★
- 150 Polywell Poly 900NF3- FX1 ★★★★★

NOTEBOOK PC

- 154 Toshiba Portégé M100 ★★★★★

15-INCH LCD MONITORS

- 157 BenQ America FP591 ★★★★★
- 157 Hewlett-Packard L1530 ★★★★★

DIGITAL CAMERAS

- 148 Canon EOS 1-Ds ★★★★★
- 148 Canon EOS 10D ★★★★★
- 148 Canon EOS Digital Rebel ★★★★★
- 160 Canon PowerShot SD100 Digital Elph ★★★★★
- 160 Kodak EasyShare DX6440 ★★★★★
- 148 Olympus E-1 ★★★★★
- 148 Pentax ist D ★★★★★
- 160 Pentax Optio 555 ★★★★★

REWRITABLE DVD DRIVE

- 158 TDK External Indi DVD 4X Multiformat ★★★★★

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- 80 Microtek ScanMaker i300 ★★★★★

HARD DRIVES

- 159 Maxtor 250GB SATA Ultra Series Kit ★★★★★
- 159 Samsung SpinPoint SP1614N ★★★★★

MP3 PLAYER

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- 138 DeLorme Earthmate GPS Receiver ★★★★★
- 138 Garmin Rino 120 ★★★★★
- 138 Thales Navigation Magellan RoadMate 700 ★★★★★
- 138 Timex Ironman Triathlon Speed + Distance System ★★★★★

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- 136 Pioneer DVR-810H-S ★★★★★
- 136 Sony RDR-GX7 ★★★★★

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- 76 HP IPaq H4350 ★★★★★

GRAPHICS CHIPS

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- 74 NVidia GeForce FX 5950 Ultra

PHOTO EDITING SOFTWARE

- 116 Adobe Photoshop Elements 2 ★★★★★
- 116 Jasc Paint Shop Pro 8 ★★★★★
- 116 Microsoft Digital Image Pro 9 ★★★★★
- 116 Ulead PhotoImpact 8 ★★★★★

BUSINESS SOFTWARE

- 84 PayCycle Plus ★★★★★

PHOTO SHARING SOFTWARE

- 84 Picasa Hello ★★★★★

THE HIGHEST-RANKING new products reviewed in this issue of *PC World* are listed above, together with the page number where

each product is reviewed and the star rating it received. See find.pcworld.com/10860 for more about *PC World's* Star Ratings.

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ZT GAMER's ENTRY PRO X6182

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- 1.44MB Floppy Drive & 7 in 1 Universal Media Reader
- 16X DVD-ROM
- Sony DRU510A DVD±RW & CD-RW Universal Combo Drive
- 128MB ATI RADEON™ 9600XT w/ TV Out & DVI
- FREE Valve® Half-Life® 2 Full Version Game**
- Creative® Labs Sound Blaster® Audigy™ ES
- Integrated Intel® PRO 10/100 LAN
- U.S. Robotics® 56K V.92 Fax Modem
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Great Gadgets for the Holidays

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Here are some highlights of this year's shopping season, including the newest smart phones, MP3 players, handhelds, and digital cameras.

FEATURED COLUMN



Spam Slayer

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In Spam Slayer, part of the new Spam Watch page, columnist Tom Spring offers news from the front lines of the spam wars, and tips for firing back.

NEWSLETTERS

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Weekly Brief

Best stories of the week.

Daily Product Review

Expert reviews, sneak previews.

Steve Bass's Home Office

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HIGHLIGHTS

Everything About Products

Our new Product Guide tabs take you to places on PCWorld.com where you'll find critical information about products, including our latest charts, news, buying guides, and handy how-to articles.



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Head to find.pcworld.com/39251 to locate and download these popular files.

1. **Pop-Up Stopper Free 3.1** 477KB
2. **Spybot Search and Destroy 1.2** 3510KB
3. **ZoneAlarm 3.7.202** 3666KB
4. **Browser Hijack Blaster** 394KB
5. **MyUninstaller 1.0** 24KB

MOST POPULAR PRODUCTS

At press time, these were the top sellers, by category, at *PC World's* Product Finder.

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find.pcworld.com/39215
- **Scanner**
Canon CanoScan 5000F
find.pcworld.com/39224
- **Wireless Router**
Linksys WRT54G
find.pcworld.com/39218
- **PDA**
Palm Tungsten T3
find.pcworld.com/38780
- **LCD TV**
Sony KF-42WE610
find.pcworld.com/39221



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Get demonstrations and straightforward how-to advice from *PC World* editors.

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find.pcworld.com/38270
- **How to Install a Hard Drive**
find.pcworld.com/38273
- **How to Burn a DVD**
find.pcworld.com/38762

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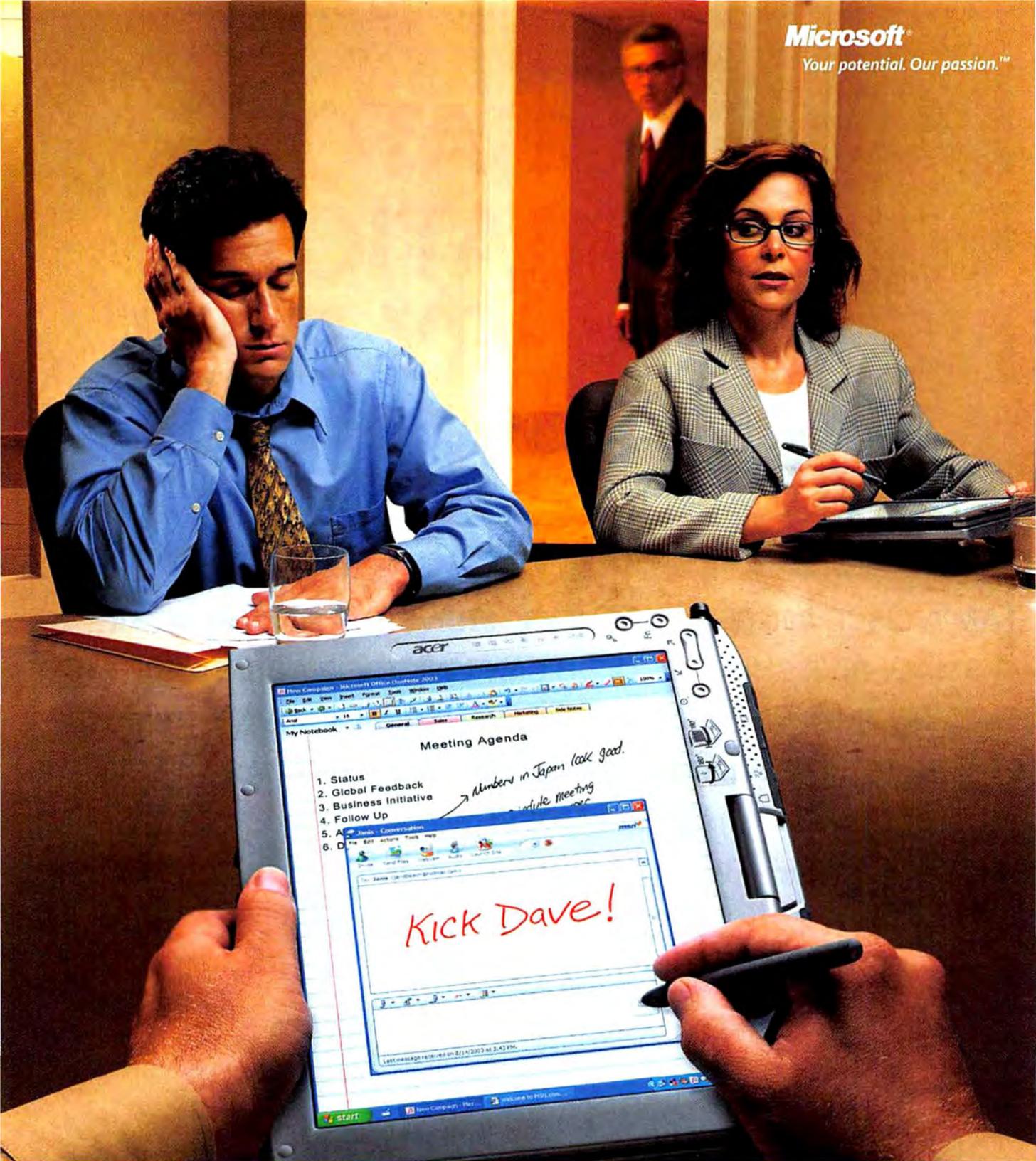
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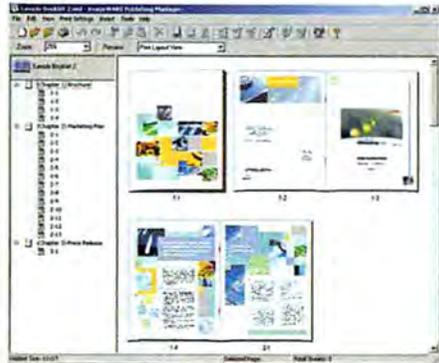




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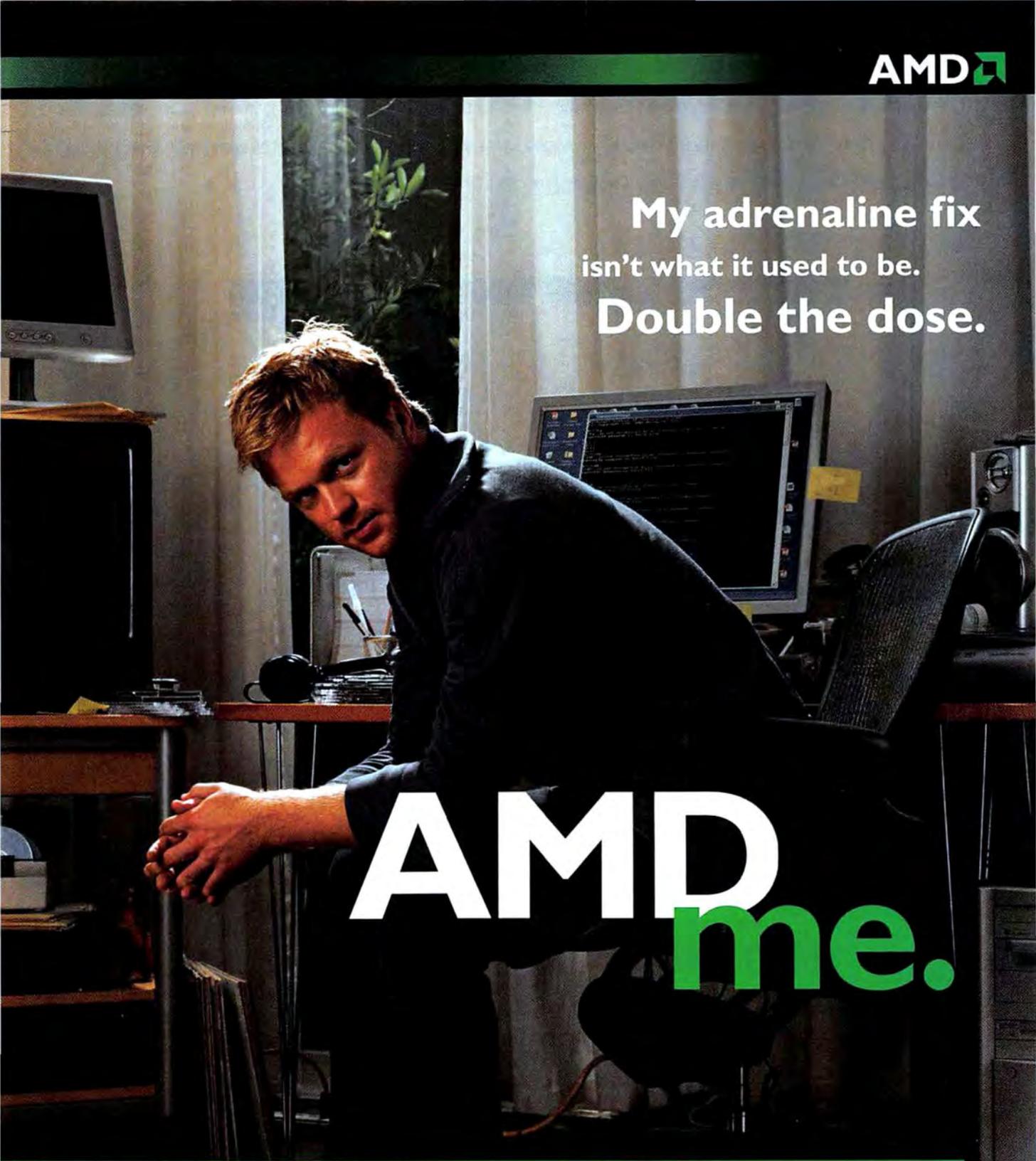
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Microsoft's Security Problem—and Ours

Glitchy software turns us all into unpaid, overworked chief security officers.

"YOUR POTENTIAL. OUR PASSION." That's the slogan Microsoft has been using to tout its products. Lately, though, I've spent so much time patching its wares—and undoing damage inflicted by its "fixes"—that I'd sum up my sentiments as "Microsoft's products. My problem."

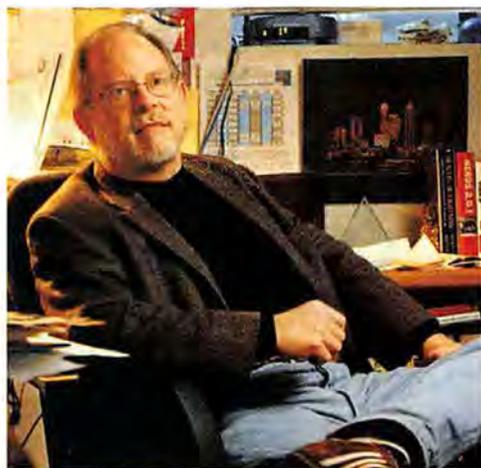
Judging from Stuart J. Johnston's "Patch Backlash" (page 28), I'm not alone. When we heard that a Los Angeles user had taken Microsoft to court over Windows vulnerabilities, we asked PCWorld.com visitors whether they felt the company was adequately protecting its customers. The aggravation in some of their feedback boils right off the page.

Johnston began covering Microsoft when Bill Gates was a mere multimillionaire; he's been our *Bugs and Fixes* columnist since 2000, chronicling a parade of Redmondian glitches so interminable that he jokingly calls the company's products his "permanent employment act."

Of course, Microsoft products aren't the only ones plagued by leaks. But the company's market share—north of 90 percent in operating systems, browsers, and office suites—makes it (and its customers) the fattest target a hacker could hope for.

Often, what rankles is not so much the security problem itself as Microsoft's response. In September 2002, it unleashed Windows XP Service Pack 1, an uber-patch designed to fix leaks and other bugs—which it did. But many readers told us that installing SP1 rendered zippy PCs almost unbearably sluggish.

At first, Microsoft said it had patched the patch; later, it backedpedaled and said it had no plans to do so. Months later, Johnston laments, he's still getting daily reader e-mail asking, "Is there any hope?"



SEATTLE-BASED Contributing Editor Stuart J. Johnston, a 16-year veteran of the Microsoft beat.

I feel those users' pain—because my own notebook went from sprightly to arthritic after I installed SP1. Then there's my desktop. Not long ago, a firewall-evading piece of spyware used an Internet Explorer technology called the Browser Helper Object to lob X-rated ads onto my screen, even when IE wasn't open.

When I sought help on Microsoft.com, troubleshooting tips were scarce. I did, however, find a page in which Microsoft genially describes the BHO as "a spy we send to infiltrate the browser's land." Given that the BHO really is used by no-goodniks, the metaphor is both appropriate and unfortunate.

As Microsoft tackles the security mess in the months and years ahead, here's some advice I wish it would take to heart:

Make security the default: Historically, Microsoft has stuffed products with features that were easy for hackers to abuse. The company says that it now errs on the side of safety. At the moment, though, it's still playing catch-up: Windows XP Service Pack 2, due in mid-2004, will ratchet settings up a notch.

Give us help we can use: Microsoft, says Johnston, "has two types of security alerts. One reads like it's designed for people with a degree in computer science. The other is so dumbed-down it's worthless." Most users aren't newbies or geeks: Windows Update and other resources need more advice for the rest of us.

Build fixes that work: Auto-patching via Windows Update is a cornerstone of Microsoft's current security-assistance strategy. Yet it takes only one fix gone awry—such as the SP1 fiasco—to leave you wondering whether it's better to shut off Windows Update and take your chances.

Move beyond patches: Right now, security is an afterthought that's being meted out fix by fix. What we need is a Windows that's built for reliable computing from the ground up—which Microsoft says it will deliver in Longhorn, its next major upgrade (see our preview on page 34). But Longhorn isn't due until 2006.

As Microsoft enters new markets—from enterprise software to cell phones—it will ask millions of customers to entrust even more of their productivity to it. Earning that trust won't be a cakewalk. But step one is a no-brainer: It must fix the products it has already sold us. ■

Contact PC World editor Harry McCracken at mageditor@pcworld.com.

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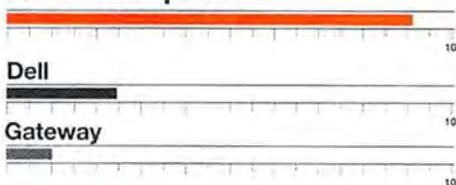
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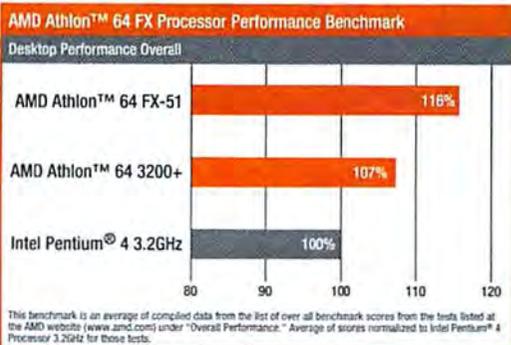
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NEWS & TRENDS

EDITED BY RAMON G. McLEOD

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PATCH BACKLASH

IS MICROSOFT DOING ENOUGH TO FIX ITS SECURITY MESS? WE ASKED ITS USERS, WHO WONDER HOW THINGS GOT THIS BAD IN THE FIRST PLACE. **BY STUART J. JOHNSTON**

"IT'S LIKE HAVING a car where the locks don't work."

"Patches ad nauseam!"

"I would join any class-action suit against Microsoft and feel [such a lawsuit] is completely warranted."

Angry, frustrated, fed up: That's how many PCWorld.com visitors feel about the seemingly endless revelations of security holes in Windows and the cavalcade of patches Microsoft issues to fix them. How do we know? We asked.

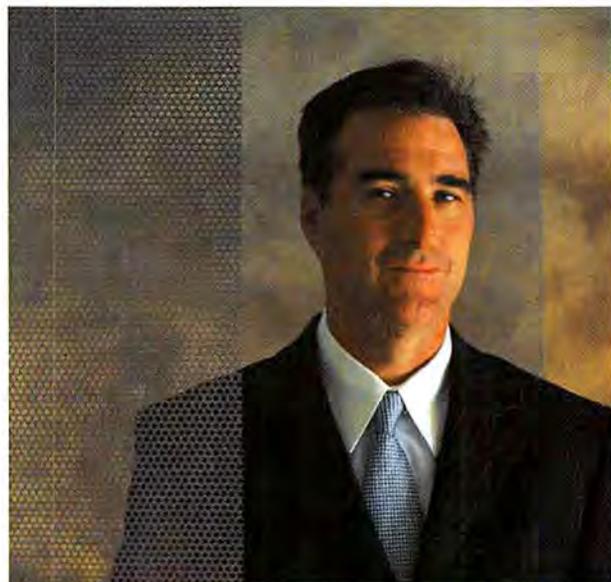
We invited PCWorld.com visitors to tell us what they thought about Microsoft's security muddle—and whether they believed the company was meeting its obligations to the millions of people who use its products. The overwhelming majority of those who replied said that they're

sick of constantly having to fix software they paid good money for. And more than a few said that Microsoft should be held accountable for the damage resulting from weaknesses in its software—a point of view that has prompted at least one angry customer to sue the company.

LAWSUIT FILED

FILING IN PART under a new California privacy law, Los Angeles film editor Marcy Levitas Hamilton alleges that because of Windows security vulnerabilities that were exploited by last summer's SoBig worm, thieves were able to steal her Social Security number and bank details. She is seeking to represent all Windows users in her suit.

If successful, the lawsuit



Newport Beach, California, attorney Dana Taschner says that since he filed suit against Microsoft in late September 2003, he has received nearly 3000 phone calls and e-mail messages.

would achieve something unprecedented by holding Microsoft legally liable for damages linked to flaws in its products—even though the company's customers surren-

der this right under the terms of Microsoft's end-user license agreements.

"We've had [PC] software for two decades, but only now are we getting to the question

of, are developers liable for their products?" says Dana Taschner, Hamilton's attorney, of Newport Beach, California. In the case of Microsoft, the question is especially critical because the company controls more than 90 percent of the market for operating systems, the lawsuit notes.

Taschner says that since he filed the suit in late September, he has received nearly 3000 calls and e-mail messages, many from users who want to join the suit.

Regardless of what happens in Hamilton's case, it's clear from our readers' responses—not to mention the barrage of headlines about security flaws since last summer's devastating Blaster and SoBig attacks—that Microsoft may have already lost this round in the court of public opinion.

"Microsoft is not even coming close to meeting its obligations to consumers," observes Jim Rochelle, a long-time PC user in Thompson Falls, Montana. "They rush products into production too quickly and do not take enough time to better ensure the security of the products they are putting out."

MICROSOFT'S RESPONSE

MICROSOFT officials, from cofounder and chair Bill Gates on down, have promised to fix security problems before. But attacks have only grown in number and severity, and the company appears to realize that it has a public relations



Amy Carroll, director of Microsoft's Security Business Unit, attributes the apparent explosion in number and severity of virus and worm attacks at least in part to the proliferation of broadband.

mess of major proportions on its hands. Its responses thus far have ranged from a Protect Your PC awareness campaign promoting basic security measures to a recent offer of \$250,000 rewards for information leading to the arrest and conviction of the creators of Blaster and SoBig.

Microsoft has also established a fund with an additional \$4.5 million for use as reward money to help catch the originators of future destructive worms and viruses. And speeches by Microsoft executives routinely include ardent reaffirmations of the company's commitment to its Trustworthy Computing Initiative, an ambitious plan to improve the security and reliability of its software.

"We've talked to hundreds of customers [in order to] really understand what their issues are, [so the fact] that users are angry is not a surprise," says Amy Carroll, director of Microsoft's Security Business Unit.

She says one lesson Microsoft learned from this summer's attacks was that it can't expect users to understand how to proactively secure their PCs by changing default settings or installing patches that in many cases would have ward off invasions. As a result, Microsoft recently announced plans for a security-focused Windows XP Service Pack 2 (see "The Empire Strikes Back: Win XP SP2" on page 30) that, among other things, will turn the built-in Internet Connection Firewall on by default, stopping many attacks before they reach users' computers. Microsoft has also said that it will make automatic updates easier to find and easier to enable from the get-go on new PCs (see "Microsoft's Patch Policy Pickle," find.pcworld.com/39098).

Why weren't such measures taken before? "Part of it goes back to features that customers were asking for," says Neil Charney, director of product management for Microsoft's Windows Client Group, who cites as an example printer sharing, which is blocked when the firewall is enabled. This constant trade-off between features that PC users want and the levels of security that they also want is a complex one, Charney says. ▶

IN BRIEF

Product Pipeline

TRULY TINY: Sony has squeezed 5 megapixels of image quality into a camera that's smaller than a deck of cards. The Cyber-shot DSC-T1, which will retail for about \$550 when it hits stores in January, also has a 2.5-inch LCD viewfinder, a Memory Stick Pro slot, a USB port, and A/V-out and DC jacks.



Tidbytes

SPAM Watch What would get you to accept spam? If you said money, you're not alone. Many Internet users say they would accept unsolicited commercial e-mail messages if they are offered a discount on their monthly ISP bill, according to a recent study. Those users who pay the highest rates for their Internet access are more willing to take spam in exchange for financial savings, according to the study. The research was conducted by the Missouri School of Journalism at the University of Missouri at Columbia.

BYE-BYE BROWSER? Who says you need a browser to search the Web? Google's Deskbar utility allows you to conduct searches from your desktop. With the free program, which appears as a small inset in the Windows taskbar, you can use keyboard shortcuts to search from within an application. find.pcworld.com/39095

Carroll attributes the apparent explosion in number and severity of virus and worm attacks at least in part to the proliferation of broadband, which has made unprecedented numbers of computers accessible to intrusions. Microsoft also believes that detailed Web postings about vulnerabilities by "exploit writers" is making it easier than ever for hackers who rely on public knowledge—so-called script kiddies—to create the software that takes advantage of weaknesses.

Meanwhile, Microsoft says it has already begun to respond to users' angst, pointing to a recent update called Update Rollup 1 (see *Bugs and Fixes*, page 69), which basically serves as an interim cumulative patch to the core of Windows XP before it releases SP2. The company has also begun issuing monthly summaries of new security patches so that users can find the information more easily.

UPDATE

THE EMPIRE STRIKES BACK: WIN XP SP2

MICROSOFT MAY HAVE been planning a second Windows XP Service Pack before the massive virus and worm invasions of last summer, but it's clear the attacks gave a new urgency to fixing the major weaknesses that made them possible.

"Some of the events may have been a catalyst for bringing SP2 out at this time," says Amy Carroll, director of Microsoft's Security Business Unit.

SP2 will address security on several fronts. First and foremost, the update will turn the OS's built-in firewall on by default—while making it compatible with functions that users expect to work regardless of firewall settings, such as file and printer sharing (which currently don't work with



Wilbur Pan, a pediatric oncologist at the Cancer Institute of New Jersey in New Brunswick, switched his personal work computer over from Microsoft Windows to Linux.

USER RAGE

MANY PEOPLE wonder why Microsoft has been taking so long to get its security act together. In early 2002 the company declared that it was halting software development

for a month so that its developer teams could focus on one issue—security. Two years later, with no visible improvement, that unfulfilled promise leaves many users doubly frustrated. And many fume that Microsoft's security bul-

letins are so technical as to be incomprehensible to non-geeks, while its consumer alerts are too overly simplified to be useful to anyone.

"[The company has] all of these computer geniuses who should be able to figure out that there are flaws when they are developing the software," says Rita Baker of Trenton, Missouri. "We, the customers, should not have to spend so much time getting updates and being subjected to viruses, worms, and especially hackers," she adds.

In the meantime, other users have simply run out of patience and jumped ship to other operating systems. Wilbur Pan, a pediatric oncologist at the Cancer Institute of New Jersey in New Brunswick, is among them.

"We got hit hard by the rash of viruses that came along back in August—both in the medical school system and in the university hospital system," Pan says. Ultimately, ►

the firewall on). Two technologies that enable communication between networked PCs and that were exploited by worms—RPC (the remote procedure call) and DCOM (the Distributed Component Object Model)—will be reworked to make them less easily accessible by outsiders.

Microsoft is revamping core Windows components to prevent so-called buffer overruns—attacks that cripple PCs by writing too much data into software-allocated areas of memory. Also, the company is working with CPU vendors to enable Windows to support no-execute (NX) technology, in which the CPU prevents execution of code that a worm or virus has inserted in a memory area assigned for data only.

SP2 will change default settings for Outlook Express and Windows Messenger to make them more secure. It will also isolate e-mail and instant message attachments to keep them from damaging other parts of the system. Finally, SP2 will shore up IE's defenses against malicious Web content—for example, giving users better controls to keep ActiveX and other software from running on their PCs without their consent.

SP2 should be in limited beta as you read this and should ship by mid-2004. When it does, it could be a very big download: Microsoft says it will include all of SP1 (a 145MB download) plus all updates issued since SP1's release over a year ago.

—Yardena Arar

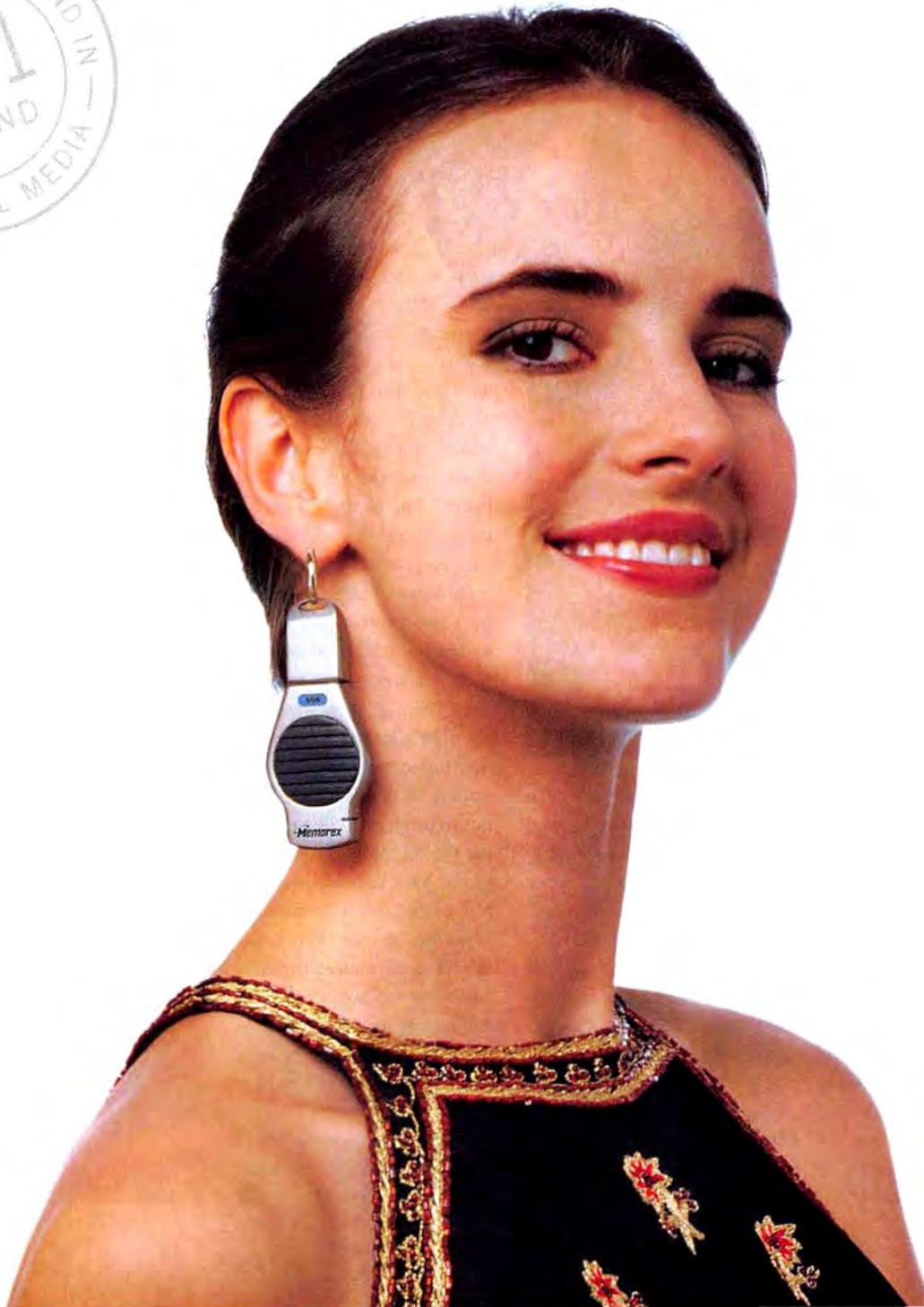
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he switched his personal work system over to Linux. "The lack of accountability is one reason I switched away from using Microsoft products."

Other consumers are taking the constant updating in stride, doing what Microsoft and Internet security firms recommend: keeping up with patches, staying on top of antivirus software updates, and running an Internet firewall to block assorted invasions from the Web, among other things.

"I have always used antivirus [software], and I tend to check frequently for updates," comments T. E. Burch in Northern California. "I've also got Internet security programs on my computers," she continues.

But repairing vulnerabilities with patches can create problems in and of itself: In some instances Windows XP SP1 slowed or crashed PCs (see *Bugs and Fixes*, August 2003, find.pcworld.com/39101).

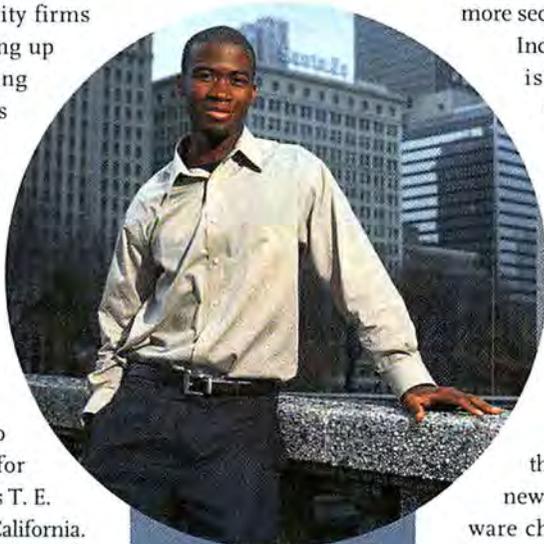
GIVING CREDIT

STILL, MICROSOFT'S efforts haven't gone totally unappreciated by the readers who responded to our questions.

Rich Levin, host of the radio show *PC Talk* in Philadelphia and coauthor of the *KISS Guide to Microsoft Windows*, argues that people should give Microsoft some credit. "Microsoft pioneered the use of automated update services, and they have aggressively issued security patches as holes are discovered, in most cases," he says. "They could do better by 'fessing up to all threats im-

mediately, but in most cases, their responsiveness ranks in the top 10 percent of major software vendors."

Levin and others say that while Microsoft may be at fault for developing flawed



"The real problem is... user ineptitude and ignorance," observes Jonathan Ofori-Amoah, a technical analyst at a large Chicago investment firm. "Microsoft cannot and should not be blamed for that."

software, users must also take some responsibility for the safety of their own systems.

"The real problem is...user ineptitude and ignorance," observes Jonathan Ofori-Amoah, a technical analyst at a large investment firm in Chicago. "I do not truly expect that users be fully knowledgeable about their computers, but a little more education may help. Microsoft cannot and should not be blamed for that," he concludes.

Microsoft officials point out that software is extremely complex to write, and that even within a specific family of security holes it can be difficult to find and fix every one. The company has long-term plans to make its products more secure, Carroll adds.

Included in those plans is Microsoft's Next Generation Secure Computing Base, which will be a part of Longhorn. Formerly known by the code name Palladium, NGSCB technology is designed to provide security functions that take advantage of

new hardware and software changes in PCs. But with 600 million computers already in use around the world, many of them older machines, "there is no silver bullet," Microsoft Chief Executive Officer Steve Ballmer cautioned in a recent speech.

Battle-weary users don't expect the protect-patch-and-update routine to end anytime soon. As a resigned-sounding Fred Tivin, a retired research chemist and head of a math tutoring service in Cincinnati, puts it: "These hot fixes are not maintenance like changing the oil in my car. I would go on, but I have to check my Microsoft Critical Updates for Windows, Media Player, Office XP, and Internet Explorer and then run my Pest Patrol, Ad-aware, and Spybot programs and update my Norton AntiVirus, Moosoft Cleaner, and Anti-Trojan data files... and oh, yes...check to see if there are any upgrades to my ZoneAlarm firewall." ■

IN BRIEF

Product Pipeline



SEEING DOUBLE: Get more out of your monitor with the DoubleSight DS-1500, which packages two 15-inch LCDs in one. The \$799 display features two flat panels in a side-by-side configuration, enabling you to view multiple applications simultaneously. Alternatively, you can have one program stretch across both monitors to see more information at one time. find.pcworld.com/39089



HIGH-TECH ENTERTAINMENT: Looking for an all-in-one entertainment device? You can't buy it yet, but Sony's forthcoming PSX bundles a DVD player and recorder, a hard drive, and a game console into a single unit. You can record music or data onto the hard drive or to an optical disc, play DVDs or CDs, and enjoy PlayStation and PlayStation 2 games with the device. But all that functionality doesn't come cheap: The PSX is expected to cost about \$720 upon its release in Japan (around the time you read this). The company has not said whether it will release the PSX in the United States.

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OPERATING SYSTEM

YOUR NEXT OS: WINDOWS 2006?

PREVIEW SPORTS NEW FILE SYSTEM, GEE-WHIZ GRAPHICS, AND SOME SECURITY FIXES.

THE NEXT VERSION of Windows, code-named Longhorn, is still in the early stages of its journey to the retail corral, but our hands-on look at a preview reveals features we'd love to have now—while raising some intriguing questions.

In addition to the interface revisions, including the new Sidebar, that we saw in our first glimpse of Longhorn (see "Sneak Peek: Windows XP's Successor," find.pcworld.com/39080), Microsoft has altered Windows Explorer, the program that controls the desktop and its computer- and file-browsing windows.

In our preview code (the official beta isn't due until the second half of 2004, and rumor has it that the upgrade

may not ship until 2006), Windows Explorer routinely displayed much more information about files and computer resources than it does in Windows XP. New links in Explorer panels let users and/or applications associate search keywords, comments, and categories with files, data within files, or objects stored on other devices, computers, or networks. This is the first evidence of Longhorn's new WinFS file system, which lets you find related resources regardless of their physical location or object type.

Explorer's attractive displays of files and properties come courtesy of Longhorn's new graphics subsystem, code-named Avalon, which will



LONGHORN'S GRAPHICS subsystem, code-named Avalon, harnesses the power of today's graphics processors to display file data visually.

hand much of its work to the PC's graphics subsystem. Minimum requirements for the preview call for an 800-MHz Pentium III processor, 256MB of memory, and a graphics card with 32MB of video RAM. Such specs are beefier than XP requires, but Longhorn-capable systems should be commonplace by the time the OS ships.

FIXING XP SECURITY

LONGHORN addresses some long-languishing Windows XP problems. The Internet

Connection Firewall is on by default and has been upgraded to be bidirectional, stopping both incoming threats and any outgoing connections attempted by worms and Trojan horses. Internet Explorer, meanwhile, at last includes a pop-up blocker just as every other Web browser in the world does, as well as plug-in and download managers and a convenient tracks-covering feature that clears all cache, cookie, history, and personal data. But Palladium security technology—now known as Next Generation Secure Computing Base (NGSCB)—isn't yet visible in the new OS.

Also new: Speech, a Windows XP Control Panel applet with no apparent purpose, in Longhorn contains an actual speech-recognition engine complete with training text. And a new User Accounts setting allows each user's appointments to display in the Login screen—but Longhorn so far lacks any bundled calendar software. This may simply be evidence of Longhorn's tighter linking with another upcoming Microsoft product: the next version of Office.

—Scott Spanbauer ■

TABLET PC OS GETS FREE UPDATE

LONGHORN MAY be a couple of years off, but Tablet PC users won't have to wait that long for an update. Microsoft plans to release a free upgrade, Windows XP Tablet PC Edition 2004, by mid-2004.

Code-named Lonestar, the upgrade focuses primarily on improving handwritten input. For example, when you place the pointer in a location that can take text (a document, browser address window, and so forth), the Text Input Panel—the window in which handwriting recognition takes place—will automatically appear as a small bubble that, when activated, will grow to its full size and appear close to the chosen text field



instead of at the bottom of the display, as it does now. Microsoft has also given the TIP context-recognition capabilities—for example, if you're filling in a browser address window, the TIP will be more likely to recognize a URL as such. You'll also be able to catch and fix mistakes in the TIP before sending text to an application.

New development tools will allow creators of third-party applications to incorporate some of the operating system's new functionality into their software. Meanwhile, the beta of the upgrade is due in early 2004, with final code to follow sometime this spring.

—Yardena Arar

Get music anywhere.



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Download your
CD collection



Get music directly
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tape collection



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songs on the Internet



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...and your home stereo



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The YP-910GS is about to change the way you get and play music. Now you can download directly from the new Napster 2.0, or almost anywhere else, for that matter. And once you've recorded up to 5,000 of your favorite songs, you can play them anywhere thanks to the built-in FM transmitter. The YP-910GS digital audio player. Nothing covers the ins and outs of music quite like it.



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PRIVACY

NEW PHONES RAISE PRIVACY FEARS

CELL PHONES WITH CAMERAS LET ANYONE CAPTURE—AND SHARE—CANDID SHOTS OF YOU.

YOU'VE JUST flipped the bird at a driver who splashed you with mud. A rude moment soon forgotten by anyone who saw it, right? Maybe not, if one of those witnesses has a cell phone with a digital camera.

Long a staple overseas, "cam phones" arrived here in 2002, promising sleek and cheap—under \$100—fun with a voyeuristic twist. And they're taking off: 7 million of 72 million cell phones shipped in the U.S. have cameras; by 2007, 51 million out of over 110 million will have them, predicts research firm IDC.

The same size as regular cell phones, cam phones can snap photos while users appear to make calls. Candid shots can be e-mailed to friends or sent to sites that have automated "moblogging" (mobile blogging) such as Buzznet.com, Fotolog.net, and Textamerica.com, and there viewed worldwide in seconds. That means every faux pas, and even more private moments (in locker rooms or store dressing areas, say), can become fodder for public consumption.

PRIVACY VIOLATION OR HARMLESS FUN?

GARY DANN had no plans to become a poster child for privacy battles. However, after he used his cam phone to capture a fellow shopper yelling at a cashier and posted the snap on the Net, the *New York Times* called to ask if he thought what he did was wrong.

Dann, who has since been



interviewed by other media, says he did not invade anyone's privacy. If a person acts like a jerk in public, "what's the difference if you have a camera phone or a regular camera to take a picture?"

For now, the law agrees. By

Other cam phone uses are clearly illegal. In Japan, people have been arrested for taking photos up women's skirts (which is also illegal in parts of the U.S.), and shopkeepers are cracking down on digital shoplifting—photographing pages

Camera phones promise sleek and cheap fun with a voyeuristic twist.

going out in public, people surrender some privacy; a cam phone's immediacy alone does not violate privacy laws, says Daniel Solove, a law professor specializing in privacy law. So users are unlikely to be sued for taking shots like Dann's. But there are limits.

Some courts recognize an invasion of privacy if one's reputation is hurt or a photo causes severe embarrassment, says Solove, but such shots must be very offensive and not legitimate news—someone in an adult bookstore, for example.

from books and magazines without paying for them.

Chicago is now considering laws to ban cam phones from certain places, such as locker rooms. If serious problems arise, other cities may also.

For now, most rules are ad hoc. Government offices (particularly courtrooms), some corporations, and health clubs like 24-Hour Fitness have instituted their own bans, while moblogging communities self-police, with owners responding to user complaints if something extreme shows up.

Eventually, cam phones may be automatically disabled when owners enter sensitive places, like hospitals or banks. Iceberg Systems' Safe Haven, a hardware/software product due late in 2004, can do just that, if cell phone makers and concerned companies use it.

REAL BENEFITS

NOT SURPRISINGLY, cam phone carriers prefer to focus on the devices' benefits, such as their crime-fighting potential: One user's shot led to the arrest of a suspected pedophile last summer, for example.

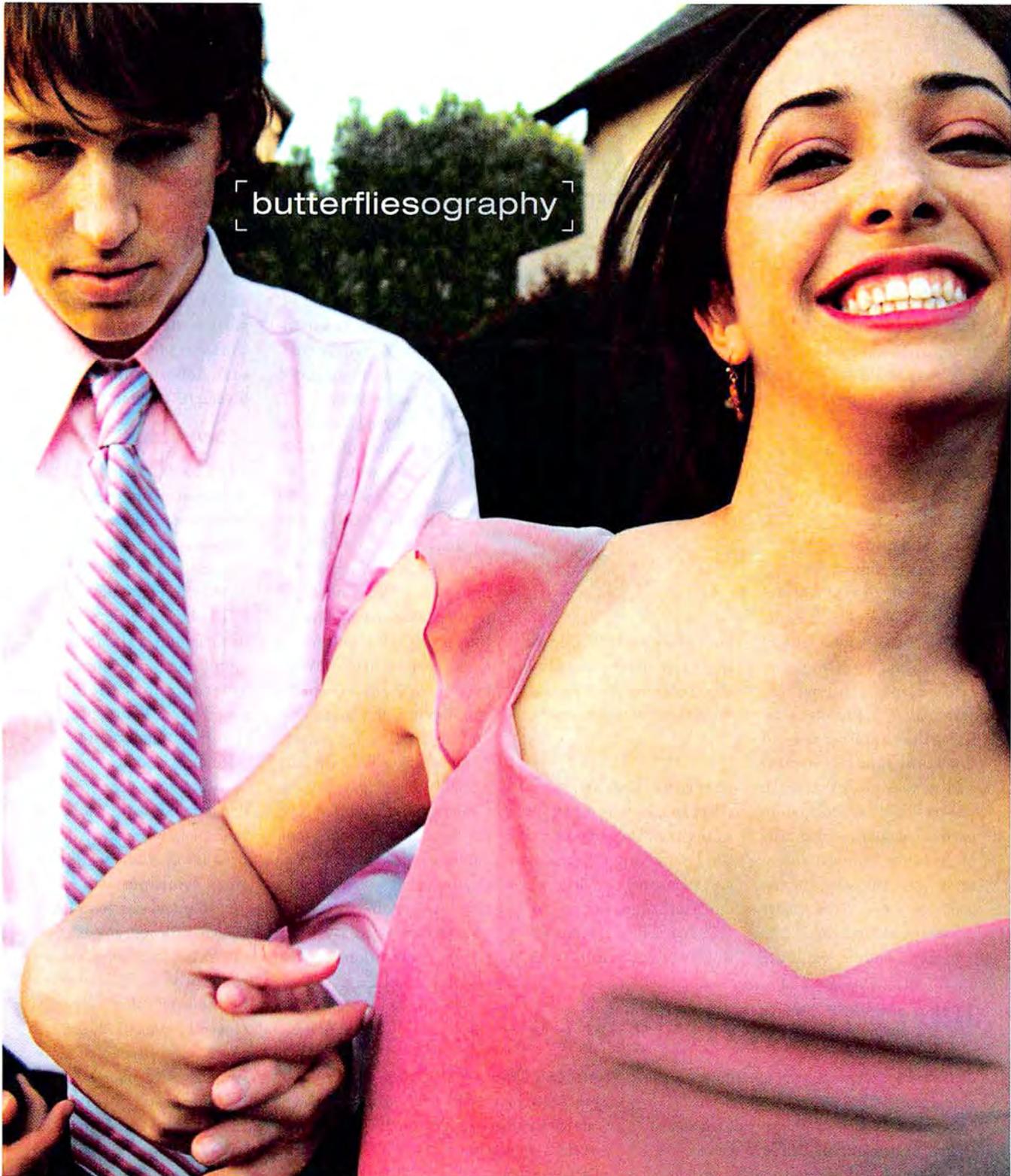
At Textamerica.com, cam phone users have become reporters, says founder Chris Hoar. In October his site received numerous shots of California's wildfires that the traditional media missed.

BBC Online has used cam phones to cover news events also. Professional use should grow, especially as quality rises: Carriers have 1.1-megapixel units now, and this fall a 2-megapixel Sharp will ship.

No matter what camera is used, it's never good form "to take anyone's picture without his or her knowledge or permission," says Dan Wilinsky, Sprint's director of media relations. (Sprint offers six cam phones, and its ads show people captured at unflattering moments; Wilinsky says the people shown in the ads know they're being photographed.)

Today, however, discretion is left to individual judgment.

—Carla Thornton ■



[butterfliesography]



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E-MAIL

SPAM LAWS: BARK OR BITE?

NEW ANTISPAM EFFORTS AREN'T EXPECTED TO END THE SCOURGE.

SPAM Watch IF YOU'RE CHEERING about the recent progress toward antispam laws and a proposed national do-not-spam list, you should hold your applause: Neither is expected to vanquish spam, and they both might block e-mail you *want* to get.

California has adopted an antispam law, and Congress is still considering the federal CAN-SPAM Act (see highlights of each in the sidebar below). The federal bill is a good first effort, says Jared Blank, a Jupiter Research analyst. But Blank believes the California law will hurt thousands of honest businesses, and that both efforts will ultimately fail to curb most spam—primarily because the slimiest spammers won't follow the law and will likely move offshore to try to stay beyond its reach.

In the meantime, legitimate



businesses are nervously parsing their marketing lists, afraid of being fined for communicating with customers.

GETTING TOUGH

CALIFORNIA'S LAW, taking effect January 1, is the stricter of the two. Companies that send marketing information and sponsored newsletters by e-mail are concerned.

They warn of a cottage industry for "spambulance"

chasers—lawyers who pursue well-heeled newsletter advertisers. (Editor's note: *PC World* produces a number of e-mail newsletters that are supported by advertising.)

Michael Mayor, the president of NetCreations, which builds double opt-in e-mail lists for businesses, says that he's dropping all California e-mail addresses from the database. New York-based retailer Silberman's Army & Navy fears the law will prevent e-mail promotion of its Working Gear Web site. "There is a strong probability that someone on any list we acquire could be a lawsuit," says Dave Zabell, a consultant.

Microsoft, several ISPs, and the Electronic Frontier Foundation support the law. "The California law will for the first time give us some recourse to go after these guys," says Craig Newmark, founder of the

popular Craigslist Web site.

The CAN-SPAM (Controlling the Assault of Non-Solicited Pornography and Marketing) Act has U.S. Senate approval and is now under consideration in the House, where it could pass by the time you read this.

"This legislation is an important step toward giving consumers more control," says Senate sponsor Ron Wyden (D-Oregon).

DIVERSE SUPPORT

SUPPORTERS include the Telecommunications Research and Action Center, an advocacy group, as well as the National Consumers League and Consumer Action.

"I believe the potential of this medium is at stake," says Sam Simon, who chairs the Telecommunications Research and Action Center. "[Spam] is out of control."

Businesses' key concern with the act's proposed national do-not-spam list is that spammers won't abide by the list anyway, while legitimate small companies will face a huge burden, says John Rizzi, CEO of E-Dialog, an e-marketing firm. "Spammers are not people who pay a lot of attention to legal rules," agrees J. Howard Beales III, director of the FTC's Bureau of Consumer Protection.

"There is still no silver bullet for spam," says Louis Mastria, director of public and international affairs for the Direct Marketing Association, an industry group that includes both e-mail and traditional mail marketers.

For the foreseeable future, update your spam filters and keep hitting <Delete>.

—Tom Spring ■

WHAT THE ANTISPAM LAWS DO

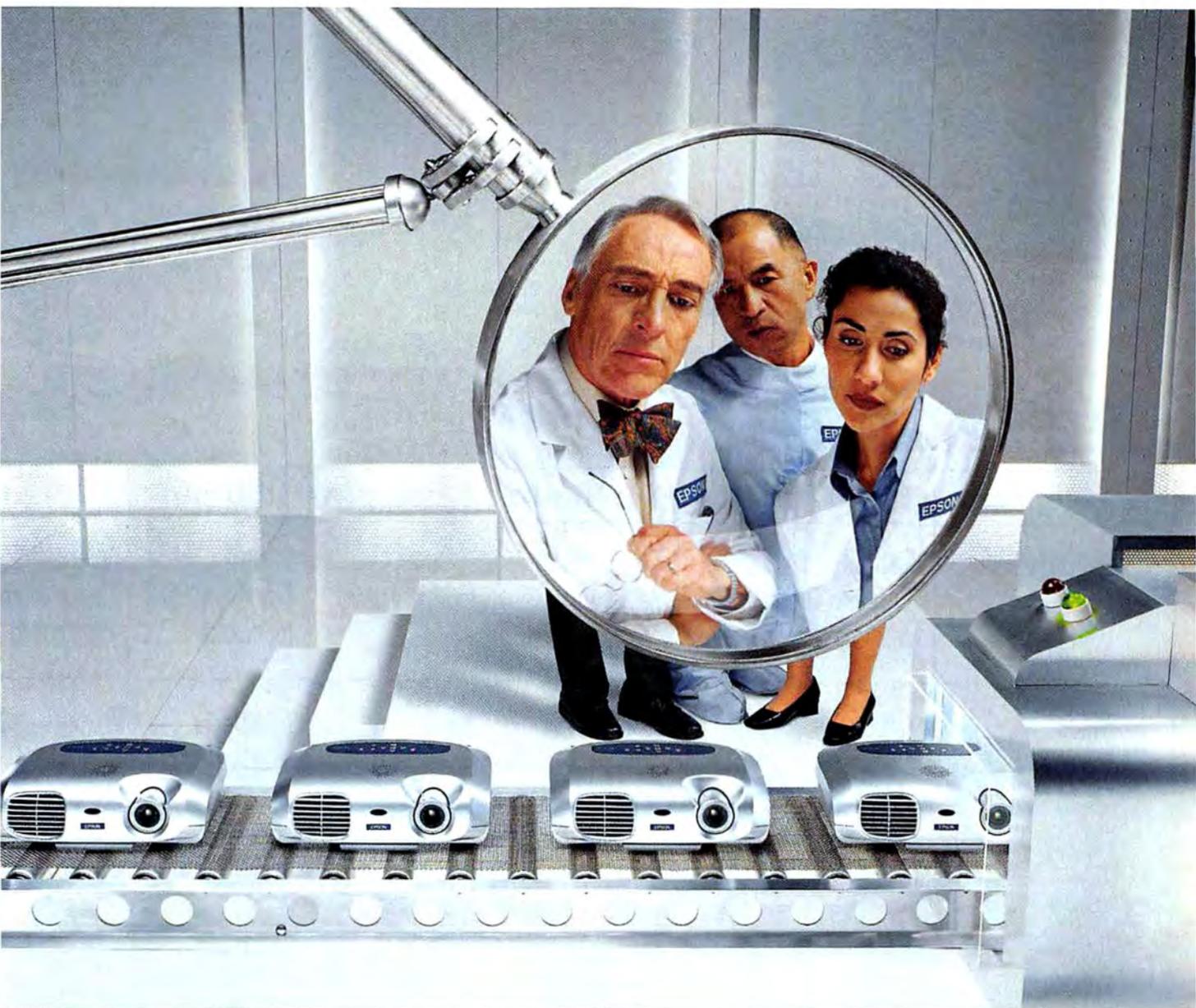
California Spam Law (formerly SB 186; full text at find.pcworld.com/39254)

- Unsolicited commercial e-mail may not be sent from California or to a California address.
- The law applies to senders as well as to advertisers on whose behalf messages are sent.
- Damages may be up to \$1000 for each message sent to an individual, and up to \$1 million per incident.
- Exempted are companies that you (the e-mail recipient) have done business with, as well as companies whose commercial messages you have opted to receive.

Federal CAN-SPAM Act of 2003 (S. 877)

- Unsolicited commercial e-mail must be labeled, and must include opt-out instructions and the sender's physical address.
- Deceptive subject lines and false headers are prohibited.
- Violators face jail sentences of up to a year and fines of up to \$1 million. Repeat offenders face jail terms of up to five years.
- Federal law preempts any state laws that prohibit unsolicited commercial e-mail outright.
- The FTC is authorized to establish a "do-not-e-mail" registry.

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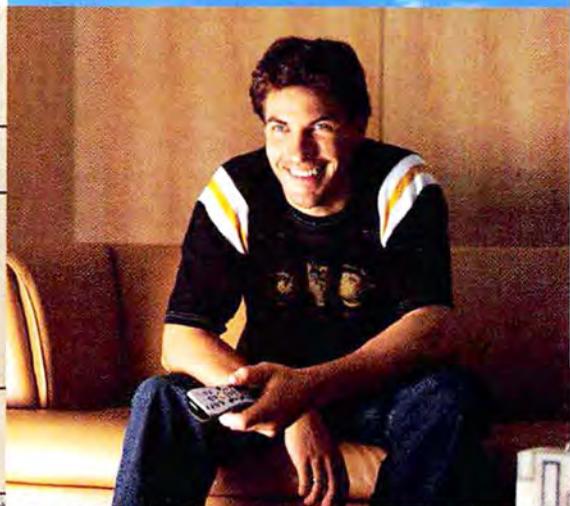
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10:30 am	11:00 am	11:30 am	12:00 pm	1:00 pm	1:30 pm
Digital Photos Upload football game pics	Radio Tune into 'Football Talk' with Coach B	TV Review last week's football victory		E-mail Ask Billy in Philly for tickets	Web Check football chat board
News	Talk Show	Talk Show	News	Soap Opera	

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DIGITAL MUSIC

BIG-TIME MUSIC SERVICES ARRIVE

NEW STORES FROM APPLE, MUSICMATCH, AND NAPSTER OFFER LEGAL, AFFORDABLE TUNES.

WINDOWS USERS finally have a variety of reasonably priced sources for digital music: iTunes is at last on Windows, Napster is back, and Musicmatch has been up and selling since fall. These services may not yet lure devotees of free peer-to-peer file sharing, but each is worth a listen.

Look for even more options soon: MTV, Microsoft, and Wal-Mart, among others, should launch similar stores.

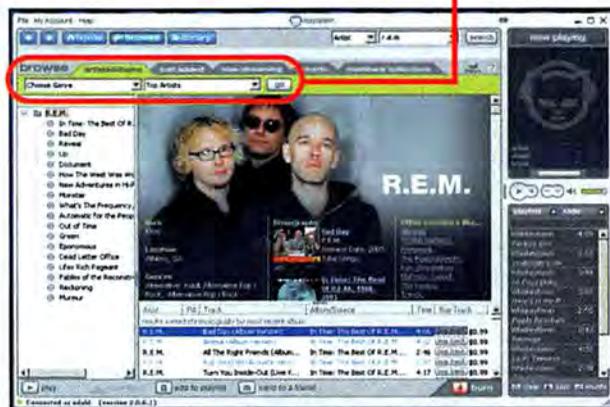
SWEET AND SOUR

ALL THREE STORES share the same basics: Tracks cost 99 cents, and most albums cost \$10. Songs can be played on up to three PCs, transferred to an unlimited number of port-

able players, and burned to CD as often as you like, provided you occasionally change the playlist. They have comparable mainstream collections despite a disparity in total number of songs (more than 250,000, 400,000, and 500,000 for Musicmatch, iTunes, and Napster, respectively).

Apple's iTunes Music Store is by far the best designed, and it lets you stream songs from the shared collections of other users (PC or Mac). However, Apple lets you download tunes to iPods only—leading many observers to conclude iTunes' real purpose is to sell iPods.

Integration with the powerful Musicmatch media player (which still gets raves) gives



NAPSTER 2.0 offers ways to find new music beyond artist and genre, such as *Billboard* charts, recent additions, and streamed stations.

the Musicmatch Downloads store an edge, despite occasionally sluggish response times. Like iTunes, Musicmatch shows the benefits of combining all tasks—buying, organizing, and listening—into one app. Also, for \$5 per month it lets you stream tunes and custom stations (Napster's version is \$10 per month).

The reformed Napster will make a splash, too. It has lots of ways to find music, such as an archive of *Billboard* charts from 1955 onward, and unlike

the others it lets you download purchased tracks to another PC easily. Its interface takes getting used to, however, and its portable player lacks some features (see *New Products*, page 86, for more).

Each store is good for occasional buys and should convert users who sometimes got tracks off Kazaa. But none has nailed it. For now, if you want a song you may try online first, but you'll probably end up at your local store to buy it.

—Eric Dahl ■

CONSUMER ALERT

15-INCH LCD PRICES RISING

CONSTRAINED PANEL SUPPLY FORCES VENDORS TO RAISE PRICES.

IF YOU'VE BEEN holding off on that 15-inch flat-panel in hopes of a better deal, you may have waited too long. After years of falling prices, high demand is driving the costs of 15-inch LCDs up, and analysts say they're unlikely to drop anytime soon.

For much of 2003 you could find no-frills 15-inch LCDs for as low as \$250 and brand-name units for about \$300, says Rhoda Alexander, direc-

tor of monitor research at the ISuppli/Stanford Resources research firm. But by year's end, low-end generic models were selling for about \$300, while many branded models pushed toward \$350, she says.

Why? Supply and demand. Though panel costs have been going up since the end of 2002, until now LCD vendors had absorbed those costs to keep sales booming, she explains. But the popularity of

notebooks and LCD TVs has further strained the supply of 15-inch panels and forced vendors to pass along higher prices to customers.

NEC-Mitsubishi, for example, recently pushed the street price of its 1560NX from \$350 to \$365, while LG Electronics' L1515S went up \$30 to \$380.

Other vendors may discontinue rebates, plentiful in the past, instead of technically raising the price of their LCDs.



Alexander says there is some good news: 17-inch LCDs remain a good deal. Although rebates have slowed here, too, prices have continued to fall, with the average price for such units now around \$400, down from \$545 at the end of 2002.

—Tom Mainelli ■

SONY

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PICTURES

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- Microsoft® Windows® XP Home Edition
- 80GB Hard Drive³
- 512MB DDR at 333MHz
- CD-RW/DVD-ROM Combo Drive²
- Built-in 17.5" widescreen LCD display
- Memory Stick® Media Slot
- Built-in stereo speakers featuring SRS™ WOW™ technology
- Giga Pocket™ Personal Video Recorder
- 1-Year Limited Warranty⁴

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PCV-V100G

- Intel® Pentium® 4 Processor 2.40GHz¹
- Microsoft® Windows® XP Home Edition
- 80GB Hard Drive³
- 512MB DDR at 333MHz
- CD-RW/DVD-ROM Combo Drive²
- 15" LCD display
- Wireless keyboard, wireless mouse & remote control
- Built-in stereo speakers
- Giga Pocket™ Personal Video Recorder
- 1-Year Limited Warranty⁴
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- Microsoft® Windows® XP Home Edition
- 80GB Hard Drive³ (7200 rpm)
- 256MB DDR at 266MHz
- DVD±RW Drive²
- 64MB Intel® 845GV Integrated Graphics
- Stereo speakers
- Sony VAIO™ Creation Suite Standard software package
- 1-Year Limited Warranty⁴

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UPGRADES

- Upgrade to a 120GB Hard Drive³ for \$40
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- Intel® Pentium® 4 Processor with HT Technology at 2.60GHz¹
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- 160GB Hard Drive³ (7200 rpm)
- 1GB DDR at 400MHz
- DVD±RW/DVD-ROM Drives²
- 64MB ATI® RADEON 9200 Graphics Card
- Giga Pocket™ Personal Video Recorder with remote control
- Multimedia Card Reader
- Stereo speakers
- Sony VAIO™ Creation Suite PLUS software package
- 1-Year Limited Warranty⁴

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- 512MB DDR at 266MHz
- DVD±RW/DVD-ROM Drives³
- 128MB nVIDIA® GeForce™ FX5200 Graphics Card
- Sony VAIO® Creation Suite PLUS software package
- Creative® Inspire™ 5.1 5200 Speaker System with Sound Blaster™ Sound Card
- Multimedia Card Reader
- 1-Year Limited Warranty⁴

\$1,589⁹⁹ As low as \$40 per month for qualified customers.¹¹

UPGRADES

- Upgrade to a 160GB Hard Drive² for \$20
- 3-Year Limited Warranty⁴ for \$199

Build-to-order RZ40CG

- Intel® Pentium® 4 Processor with HT Technology at 2.60GHz¹
- Microsoft® Windows® XP Media Center Edition
- 160GB Hard Drive² (7200 rpm)
- 1GB DDR at 400MHz
- DVD±RW/DVD-ROM Drives³
- 128MB nVIDIA® GeForce™ FX5600 Graphics Card
- Creative® Inspire™ 5.1 5200 Speaker System with Sound Blaster™ Sound Card
- Multimedia Card Reader
- Personal Video Recorder powered by Giga Pocket™ Engine with remote control
- 1-Year Limited Warranty⁴

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- Upgrade to a 200GB Hard Drive² for \$80
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The PEG-TJ35 CLIE® handheld provides everything you need to stay organized and entertained. Listen to your favorite tunes on the road with the integrated MP3 audio player. Compact and lightweight, you can take your CLIE® handheld wherever you go.

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- Palm OS® v5.2 software³
- FREE carrying case (\$30 value). While supplies last.
- FREE shipping¹¹

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carrying case¹¹



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- SwivelScreen™ design
- Palm OS® v5.2 software³
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- FREE shipping¹¹

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- Microsoft® Windows® XP Media Center Edition
- 160GB Hard Drive²
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\$1,599⁹⁹

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VMC-IL4415
i.LINK® Digital Interface Cable



Provides a high-speed, bi-directional digital link between your camcorder and computer with i.LINK® DV in/out interface (IEEE-1394)¹ (1.5 meters, 4-pin to 4-pin)

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**THE SCOOP ON
GRAPHICS BOARDS**



64 BITS AND MACS

AFTER READING your article "64-Bit Takes Off," and specifically the sidebar "64-Bit Computing According to Apple" [*News and Trends*, November], I feel you and your sister publication *Macworld* designed a test that the new Apple Power Mac G5s were doomed to fail. The only application you tested that has been optimized for the G5 processor is Photoshop, where the G5s performed quite well. Even

LETTER OF THE MONTH

No Stop Lights on the Info Highway

I TEACH COMPUTERS to visually impaired and blind veterans at a VA Blind Rehabilitation Center. If Stephen Manes thinks his 85-year-old father is a challenge ["Rules of the Tech Road: Drivers Beware!" *Full Disclosure*, November], he should try a blind veteran of the same age who must rely on a screen-reading program that speaks the content of the screen!

Television ads beckon people to come to a company's Web site and do amazing things, and then the technicians design the pages in such a way as to make them confusing for a sighted person and impossible for someone who is visually im-

paired. Computer prices are dropping, and the temptation to get online is everywhere; yet with Microsoft continuing to design software that is as full of holes as a sieve, getting online is the electronic equivalent of walking alone down a dark street at night. And that's if PC users successfully configure their Internet program to get online at all.

Until things work easier and better, the Internet and most computer programs are going to remain beyond the capability of many people to use.

the single-processor 1.8-GHz G5 is on a par with the higher-clocked machines. Comparing any Mac running OS X to a PC using Microsoft Word is ridiculous. Office for Mac is a poorly written program and has always been slow on OS X. Finally, comparing Premiere, which Adobe has dropped from the Mac platform, is even more ridiculous. All this test shows is why Adobe's Mac sales have been killed by Apple's Final Cut Pro.

Your article only validates once again the difficulties in comparing computers across system architectures and platforms. More important than pure speed in any computer is usability and owner satisfaction. I think you will find Mac users much more satisfied than PC users.

Chris Waldron, Blacksburg, Virginia

Author's response: As the reader observes, comparing PC and Mac system performance is a difficult job. You can pick popular applications from each platform and make generic comparisons about performance on similar tasks, or you can pick apps common to

both platforms and make specific comparisons. We chose the latter course and worked with our sibling publication *Macworld* to select common programs that might offer real-world results. We chose Microsoft Word and Adobe Photoshop because they're important programs on both platforms, Id's Quake III because it's a useful gaming benchmark, and Adobe Premiere because it let us perform encoding and rendering tests.

—Tom Mainelli

PC FRUSTRATIONS

WHEN BUYING a system, I ask tech support for recovery CDs—and I used to get them at no charge, after a little hassle.

But recently, tech support directed me to a Web site where I could "request" the CDs. It was HP's parts-ordering Web site. Twenty-four dollars later on my credit card, they were on their way (\$11 for the CDs and \$13 for shipping). What's next?

Dave Severson, Coralville, Iowa

RECOMMENDING automatic virus updates and virus protection programs—as you often do—is all very well, but there is another problem: the refusal of virus protection companies to make programs for older platforms such as Windows 95 or to provide technical support for their older products. Why should we have to buy new computers every few years just so we can have virus protection?

H. M. White, Independence, Missouri

ANTI-SPYWARE software identifies and deletes or quarantines spyware, and the user can see a report describing any spyware found. In my opinion, that is a job only half done.

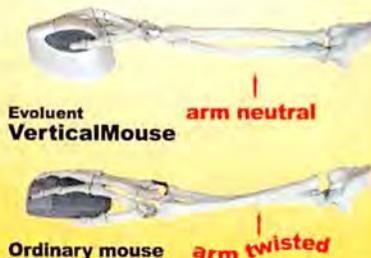
The software should also capture the name of the Web site or the source of the e-mail I was looking at when the spyware slunk into my computer. ▶

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WALL STREET JOURNAL
"surprisingly comfortable"
Oct. 30, 2002

techv
"great innovation"
January 29, 2003

Australian
NetGuide
"Best of Test"
(compared to Microsoft® and Logitech® mice)
May 2003

PCWORLD
★★★★★
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October 2002

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LETTERS

Such knowledge would empower users: They would know what sites to stay away from, they could distribute that information, and if the culprit were a site they felt they must use, they could complain to the site owners—who might get the message.

*Granville Craddock
Washington, North Carolina*

WIRELESS WORLD

THE INCREASING number of wireless devices also means that they interfere with each other ["Warp-Speed Wireless," November]. When I started to have trouble with my combination wireless keyboard and mouse, I was told it resulted either from my cordless phone nearby or from our ham radio. I tried many solutions, and even considered buying a corded phone (almost impossible today).

Then I realized that I have five wireless weather senders on top of the boat we live on, and the receiver is right across from the keyboard. It's becoming a wireless world. Perhaps devices will have to use a variety of frequencies to help with these problems, which I'm sure will increase.

Dave Wheeler

Contributing Editor for Southern Boating

SCORING THE PRIVACY SURVEY

IN NOVEMBER'S "The Great American Privacy Makeover," the section of the privacy survey on handling passwords did not cover all the available choices or fairly score the ones listed.

I use simple passwords for sites that have no direct monetary exposure—for example, online newspaper or magazine subscriptions. But you score that with a negative grade. I give financial institu-

CORRECTIONS

IN OUR *New Products* coverage of data projectors in the October and November issues, we should have referred to Texas Instruments' DLP technology as Digital Light Processing.

In November's graphics boards chart (page 166), we should have listed the Crucial Technology Radeon 9800 Pro as offering a lifetime warranty.

PC World regrets the errors.

tions and accounts with an open line of credit much stricter treatment. It all depends on the content of the site.

Charlie Bress, North Port, Florida

A BETTER TIME-SAVER

I HAVE ANOTHER PC time-saver for *PC World*: "Don't use the PC when something else is simpler and faster."

In November's "Time-Saving Tips From the Pros," Michael Desmond ("Hurry-Up Hardware") writes, regarding scanners: "I refinanced my house recently and found myself scanning scores of pages to fax to the lender. Feeding every page into the scanner was a tiresome process that took me most of the afternoon."

For much less money than the cost of a scanner with an automatic document feeder, buy a stand-alone fax machine. I found an entry-level unit with a 20-page ADF for \$120 and a laser unit with a 50-page ADF for \$500.

Rick Tuttle, Katy, Texas

GRAPHICS BOARD VALUES

REGARDING "Cinematic Graphics on Your PC" (*Top 100 Spotlight*, November): How could you award a Best Buy and the number two position to boards that cost \$130 and \$200 more than the number three card? By your own account, these two cards perform worse than the number three and four cards, and each takes up two interface slots in a computer!

Scott Morgan, Annapolis, Maryland

Editor's response: Our Best Buy awards encompass more than performance (60 percent weighting) and price (5 percent). While those are important considerations, we also factor in vendor service and support hours (10 percent) and extra features (25 percent), which encompasses hardware and bundled software. The top card offers generous 24-hour support, and the second-place card comes with three games and has composite-in and -out. We couldn't list all the hardware and software in print, but our online chart at find.pcworld.com/39110 provides all the relevant data. —Alexandra Krasne ■

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



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NEC



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NEC/MITSUBISHI
NEC-MITSUBISHI ELECTRONICS DISPLAY



STEVE FOX

Hollywood Locks Down Digital Video

Plus: Rising LCD costs, PCs with flair, and Net phones that work.



Hoisting the Antipirate Flag

The Buzz: The FCC has adopted the controversial "broadcast flag," a snippet of code to be embedded in all digital TV signals. New TV sets and digital recording devices will be required to include flag-decoding software, though older equipment will still be able to pick up and record encoded broadcasts. The flag won't block copying, but it will prevent consumers from distributing recordings, via computer, over the Internet. Copies made on a new flag-enabled device, however, will be unreadable on older DVD players,

thus rendering some hardware obsolete. **Bottom Line:** How nice of the FCC to think up a project for hackers. Disabling the broadcast flag should be loads of fun.

Flat Panels, Flat Prices

The Buzz: Waiting until after the holidays to nab that LCD panel you've been eyeing? Don't. Strong demand has created a shortage of panels. "Customers may want to take advantage of holiday pricing, since we don't expect to see further price reduction on notebooks or monitors in the first quarter of 2004," says Ross Young of research firm DisplaySearch. If anything, prices on 15-inch models have already begun inching upward (see page 42).

Bottom Line: If you're reading this item in December, check the Christmas sales carefully; they might be your best shot at a good deal on an LCD.

Here Comes the Mod Squad

The Buzz: The modder underground—the world of computer users who modify their PCs to make them into personalized works of art—is suddenly mainstream. Memorex has just intro-



duced the Modz line—LED-festooned fans, colorful cables, and cold-cathode lights designed to dress up the drabest system. Though the products focus on aesthetics, they provide other benefits as well. The see-through fans, for instance, vary speed depending on the heat emanating from the PC, while the rounded, multihued cables help promote airflow.

Bottom Line: What's coming next—Isaac Mizrahi's line of high-style PCs at Target?

Phone Calls for Free

The Buzz: For years it's been possible to make free phone calls over the Net, assuming you have plenty of patience, tech chops, and a tolerance for garbled sound. But now a peer-to-peer application from the developers of Kazaa is raising the ante. An instant messaging app look-alike, Skype (skype.com) requires Windows XP or 2000, a sound card, a microphone, speakers, and an

Internet connection. The sound quality is close to that of POTS (plain old telephone service), dropped connections are rare, the service works through firewalls, and it's free (though a for-pay version is coming). There is one catch, though: It connects you only to other Skype users, still a limited audience.

Bottom Line: After 2 million downloads in the first two months, Skype hype is ripe. Once Skype can hook into the POTS system (sometime in 2004, we hear), the Baby Bells should start sweating. ■

NAGGING QUESTION

Why Is the Control Key Called That?

THE <CTRL> KEY is a keyboard mainstay, used in combination with other keys to issue commands and, far too often, to give your computer the three-finger salute (<Ctrl>-<Alt>-<Delete>). Turns out, the key is a holdover from the old teletype terminal days. Back then, pressing a "control



code" initiated some physical operation that didn't involve printing characters. <Ctrl>-G would ring a bell, for example, while <Ctrl>-M would kick off a carriage return. When teletype gave way to computers, the Control key name stuck. Good thing, too. Who would want a PC that was out of control?

Contributing Editor Steve Fox covers buzz-worthy products, ideas, and trends. Contact him at steve_fox@pcworld.com. Visit find.pcworld.com/31643 for more Plugged In.

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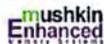
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Micron 64x64 DDR RAM
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Memory Module - Retail



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Memory Speed Series
32Mx8 DDR SDRAMs
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for Intel Pentium 4 or
Celeron Processors
800MHz FSB - Retail



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P4 ATX - Retail



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Processors 400MHz FSB
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Dual Channel DDR
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Foxconn



PCW11154021 **\$42.00**

X-Dreamer II 350 Watt Power Supply ATX Mid-Tower Case - Retail
Case



PCW11144026 **\$70.00**

Life Style Series Sonata Piano Black True 380 Watt Power Supply - Retail
Antec



PCW11129127 **\$95.00**

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PCW11133116 **\$103.99**

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E70F+SB 17" Perfect Flat CRT 3x UltraBrite Technology - Retail
ViewSonic



PCW24116254 **\$144.00**

LCD1760V-BK MultiSync 17" LCD 16 Million Colors 1280x1024 - Retail
NEC



PCW24002078 **\$420.00**

SDM-S73/B 17" LCD 1280x1024 0.26mm Pixel Pitch - Retail
SONY



PCW24006067 **\$410.00**

191T-Black 19" LCD 1280x1024 16.7 Million Colors - Retail
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PCW24001030 **\$630.00**

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**ON YOUR SIDE: LAPTOP
TOO HOT AND TOO SLOW**

Should Parents Become Big Brother?

New software allows parents to control virtually everything children do online.



WHEN CAROLYN Gordon (not her real name), an administrative assistant from Tucson, Arizona, decided to install a program called EBlaster (www.spectorsoft.com) that let her secretly observe her 14-year-old daughter's instant messaging sessions, she didn't expect to learn anything alarming. She was surprised.

"It was a rude awakening," the 42-year-old single mom says. "I found out she was drinking and smoking pot—which I never would have suspected." Gordon, who never told her daughter she had in-

stalled the monitoring software, says she was able to intervene early enough to curtail the problem and turn the eighth grader's behavior around. She also informed the parents of two of her daughter's online friends of their children's potential involvement so they could also address the problem before it escalated.

A parent in Illinois reports that Internet monitoring software helped her stop some drinking parties and other illegal and potentially dangerous activities her teenage sons were planning with their

friends. Perhaps most disturbing, a Tennessee father who monitored his 13-year-old daughter's online chat activity discovered that the girl was having a sexual relationship with her 37-year-old middle school teacher. Using records of chat sessions, he was able to gather enough evidence to convict the teacher of statutory rape, according to news reports.

PARENTING OR PARANOIA?

IT'S STORIES LIKE these, of course, that fuel the sales of parental control software. But as the technology of parental oversight has improved, parents face tougher questions about when responsible supervision turns into paranoia or an invasion of children's privacy. Five years ago, most parental control software was used only to filter the Web, blocking children from pornographic or violent sites. Now, parents can have godlike powers over their children's online lives—viewing everything the kids do as they surf or chat, and immediately stopping any activity that the parents disapprove of.

Naturally, every parent wants their child to be safe, whether the child is online or on the school bus. And certainly if you suspect your child is involved in drugs, inappropriate relationships, or other dangerous situations, it's your responsibility to step in and intervene using whatever tools are necessary. On the other hand, if, like Gordon, you have no particular reason to suspect trouble, should you be reading their digital diaries?

Psychologists and child safety experts I spoke with say yes, under two conditions: First, establish a set of ground rules and standards for going online that both ▶

you and your child can agree on, and second, let your kids know you'll be checking in on them. Dr. David Walsh, a psychologist and president of the National Institute on Media and the Family (www.mediafamily.org), explains: "Parents have

a responsibility to monitor the whereabouts of their kids, whether it's in the real world or the cyberworld."

At the same time, Walsh says that it's important to keep a balance between looking over your child's shoulder every sec-

ond and putting your head in the sand. "Somewhere between the two extremes is the prudent parent," says Walsh. "For example, a parent shouldn't go off the deep end if their 15-year-old son visits a porn site," he explains. "But if he starts spending hours at porn sites and chat rooms, they need to know about it."

What about old-fashioned trust? Many parents—even those who know the perils that exist online—are confident that their kids will make good decisions and feel that monitoring their online activity would send a damaging message that they're not trusted to behave responsibly.

"Given the right situation, any kid can make a poor set of choices," Walsh says. "If we think that our children are immune to temptation, we're kidding ourselves. If there's no accountability, the chance of [a child breaking the rules] increases."

While discussions of online hazards and Internet monitoring often focus on blocking porn sites, the greatest danger may lurk in chat rooms and e-mail inboxes. Many experts say that concerned parents should focus their attention on their kids' online communications. This is especially true for older kids who spend time instant-messaging and hanging around in chat rooms, where none of the usual social controls are in place and it's easy to hide behind a false identity.

In fact, if your child spends time in chat rooms, there's a good chance that he or she has already been propositioned by a stranger. The Youth Internet Safety Survey, done by the U.S. Department of Justice and the Crimes against Children Research Center at the University of New Hampshire, shows that almost one in five Web users aged 10 through 17 has gotten an unwanted sexual solicitation online.

"Online predators are a real issue," Walsh says. "That's why it's so important for parents to know how their kids are spending their time and who they're communicating with—just like they would in the real world."

There's certainly no lack of software tools to help concerned parents keep an eye on their kids' cybertravels. Actiontec's KidDefender (\$40 for the software plus one year of real-time monitoring; ▶

PRIVACY WATCH

Subpoenas Can Unlock Your Privacy

WHEN THE RECORDING Industry Association of America started issuing subpoenas to Internet service providers last summer, the move unnerved computer users who had downloaded hundreds of tunes to their hard drives. But if you don't use music file-sharing sites, you have nothing to worry about, right? Wrong.

The same law that allows the RIAA to find out who is illegally sharing Johnny Cash tunes also lets anyone—including abusive spouses, online stalkers, and blackmailers—find out personal information (perfectly legally in many cases) about people that they've corresponded with on the Internet.

The Digital Millennium Copyright Act (DMCA) allows copyright holders to seek damages from anyone who steals copyrighted material. But

the RIAA by itself can't get the names of the file-sharers. The organization only knows the file sharer's IP address at the time of the alleged violation.

Using those two pieces of information, however, the RIAA can file a form with a federal court clerk, and have the clerk issue a subpoena—a legal demand for information from the suspected music pirate's ISP—to find out the name, mailing address, phone number, and e-mail address of the copyright violator.

The problem is that you can do the same thing. Thanks to section 512(h) of the DMCA, literally anyone can walk into a federal courthouse, fill out a form alleging that they're the victim of a copyright violation, and walk out with a legal document

in hand that gives them the right to ask an ISP for a customer's contact information.

The law requires only that you have a "good faith belief that someone violated your copyright," says Sarah Deutsch, vice president and associate general counsel for Verizon, one of the ISPs fighting the RIAA's subpoenas against Internet users. No judge reviews the request, and the clerk issues the subpoena on the spot.

And in fact someone could technically argue that an online acquaintance has violated their copyright. "Every e-mail you

write is copyrighted automatically," says Wendy Seltzer, staff attorney for the Electronic Frontier Foundation. "As soon as you fix something in a tangible medium of expression, including when you type it into a computer, it's copyrighted." So an enemy

could claim that you forwarded their e-mail message without their permission and thus violated their copyright.

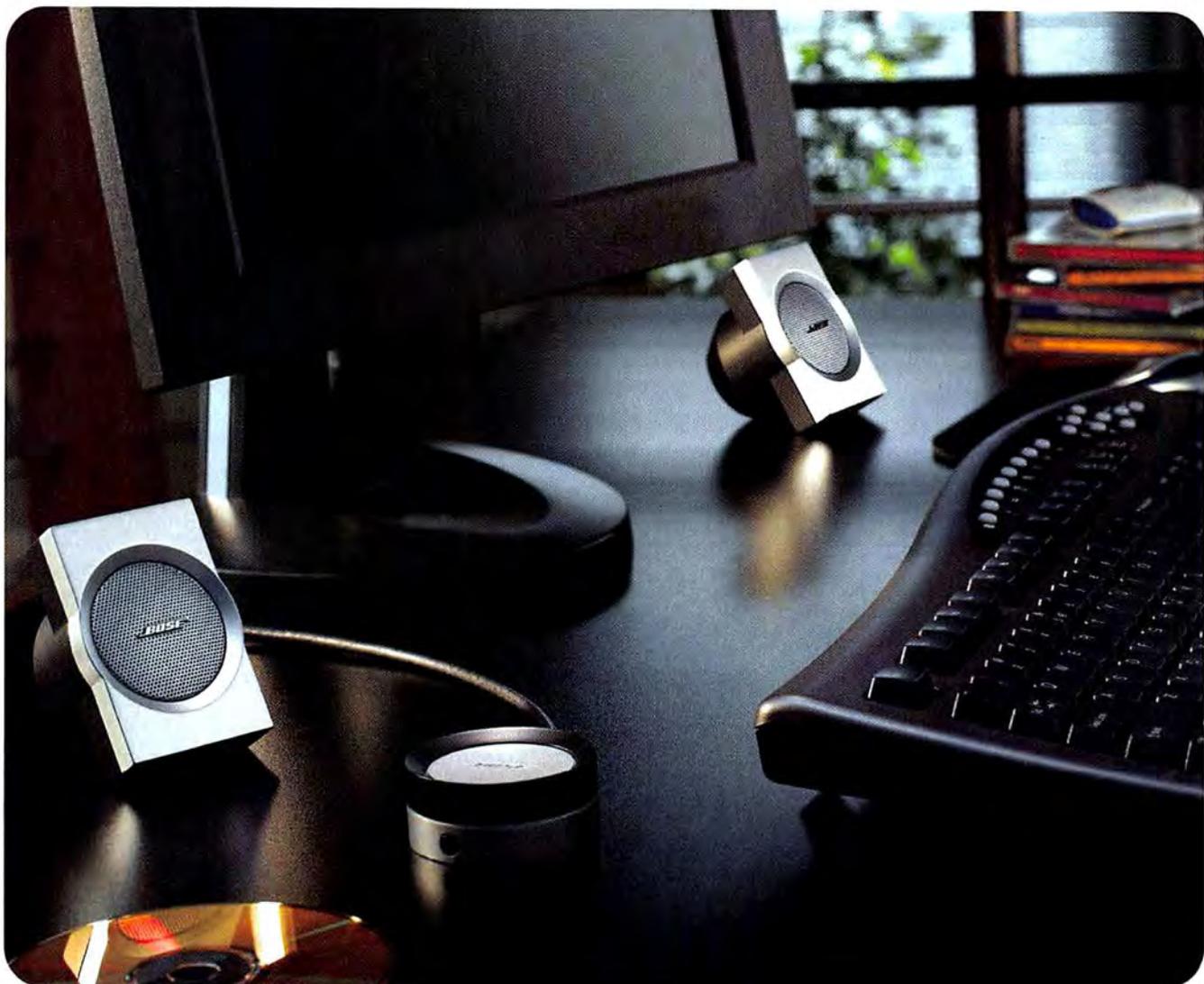
"Until recently, you had to file a lawsuit and go before a judge [to get a subpoena], so it was much less likely the process would be abused," Deutsch said, adding that, even under the USA Patriot Act, law enforcement has to jump through more hoops to get the same data about a suspected terrorist than the RIAA does to find out about a file swapper.

No matter which side of the file-sharing debate you find yourself on, there's no denying that the ease with which anyone can get a subpoena without judicial scrutiny creates alarming potential for abuse.

—Andrew Brandt



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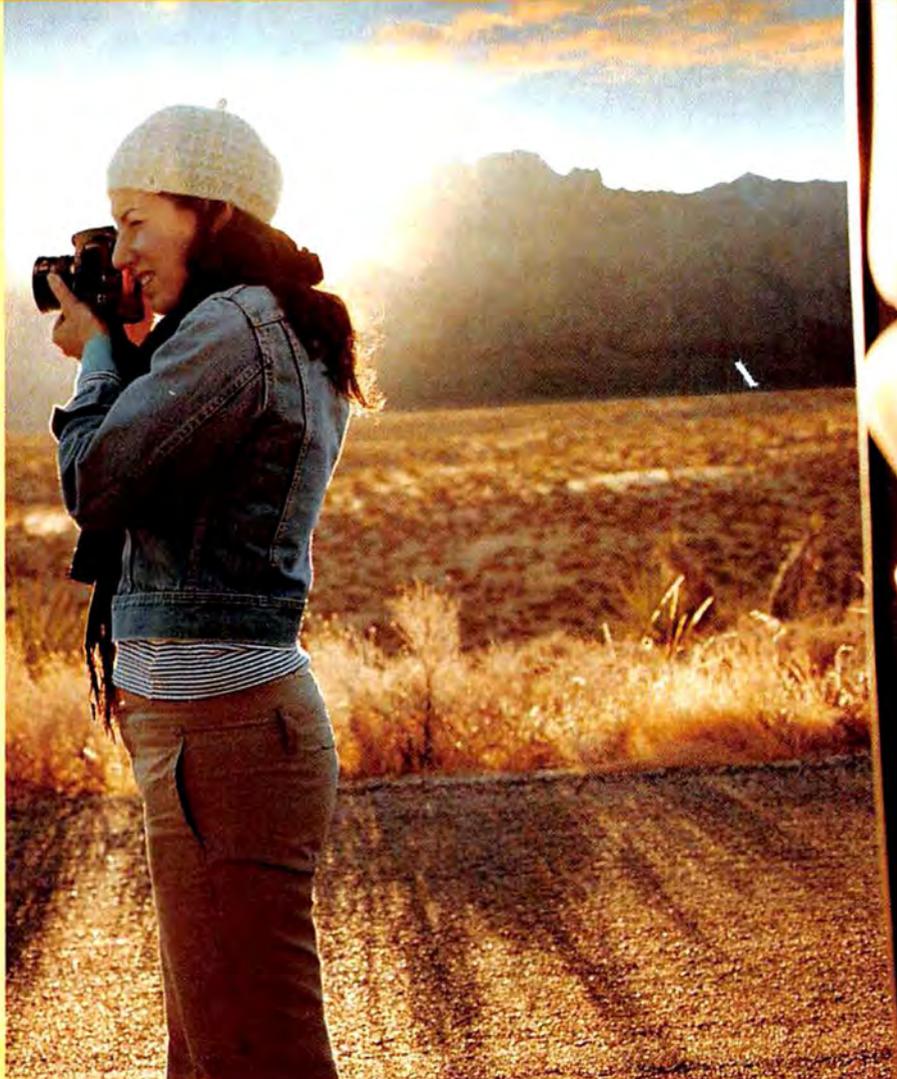


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ON YOUR SIDE

Notebook CPU Is Too Darn Slow

I RAN THE INTEL Chipset Identification Utility [a utility that identifies an Intel processor and, in some cases, determines whether the CPU is operating at the frequency intended by Intel] on my three-year-old Dell Inspiron 5000e notebook. The program identified my laptop as having a 600-MHz chip, even though I paid for a 750-MHz processor. When I talked to a Dell rep, he said Dell had overclocked my chip, adding that if I ran five programs simultaneously, the 600-MHz chip would run at 750 MHz. I've had serious heat problems with this laptop. I can't help but think that this overclocking is part of the problem.

Patrick Douce, Big Sur, California

On Your Side responds: Dell spokesperson Jennifer Davis says the company's tech support representative was misinformed. The company doesn't sell overclocked PCs, she says. In fact, Douce was simply sent a system with a 600-MHz processor by mistake. Dell gave him a full refund. Davis says there are a number of possible causes of overheating. Dell's Web site has specific advice on avoiding overheating problems at find.pcworld.com/38756.

When you receive a new PC, always check the components to make sure that they are the ones you ordered. Browse to find.pcworld.com/39107 to download the Intel Chipset Identification Utility.

—Grace Aquino

www.actiontec.com) is a monitoring tool that runs the gamut in features. At its most invasive, it lets parents watch their kids' online activity from any computer in real time, so that parents can tap into after-school online chat sessions or Web browsing, for example, even if they're still at the office. The program, which must be installed on both the parents' and the child's computer, also allows parents to instantly block Web sites, end chat sessions, or stop other activity remotely.

Another application, Spector Pro (\$100, www.spectorsoft.com), records all keystrokes, e-mail, and instant-message and chat sessions; it also takes "snapshots" of these activities at given intervals and sends a report to the parent.

Whether or not you decide to use full-fledged monitoring software, there are ways you can help your children stay safe online. Consider using filters that can help block inappropriate sites or allow access to only approved sites, especially for younger users. Two good ones are CyberPatrol (\$39, www.cyberpatrol.com) and Cybersitter (\$40, www.cybersitter.com); also, many ISPs, including AOL and MSN, provide their own parental controls. (For older kids, Web filters can be less effective since they can block sites—such as medical information sites—that

they might legitimately want to access.)

Keep the family PC in an accessible part of the house where you can easily keep an eye on your children's activity, and limit the amount of time your kids spend online. Discuss some of the dangers of the Internet with older children, and make sure they understand that they should not provide personal information such as their name, address, or school to people they meet online, and they should never agree to meet an online acquaintance face-to-face without your permission.

If your kids get involved in any situation online that makes them uncomfortable, encourage them to stop the communication immediately and tell you. And finally, don't be afraid to check in regularly—whether that means monitoring from the office or pulling up a chair in the family room. After all, if you don't know what your kids are doing online, how can you know if they're safe? ■

Anne Kandra is a contributing editor and Grace Aquino and Andrew Brandt are senior associate editors for PC World. E-mail them at consumerwatch@pcworld.com. To read more Consumer Watch, Privacy Watch, or On Your Side columns, go to find.pcworld.com/31703, find.pcworld.com/31706, or find.pcworld.com/31709, respectively.

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ACCESSID: PCW0104SA1

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Alienware has overcome the technology barrier that mobile users have been faced with for years: graphics upgradeability. The innovative Area-51™ now features a true solution with Do-It-Yourself User-Upgradeable Mobile Video Cards, allowing users to extend the life of their mobile gaming system. This new technology works very much like desktop video cards, giving Alienware owners the ability to stay updated with the latest mobile video cards available.



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HOME OFFICE

STEVE BASS

Hot Products for a Cool Home Office

Get a load of these six geek-tested gizmos that make my PC work a breeze.

WHY IS MY HOME office cooler than yours? Mine's got six super products that make going to work pure joy (well, most mornings). Don't believe me? Visit find.pcworld.com/38582 to view images of my office, taken by yours truly. (And no, I haven't cleaned up the place; the mess you see is authentic Bass.)

The first thing you'll notice (after the crime-scene tape) is that at only 10 by 10 feet, my office is small. With two or more PCs running, it would soon heat up to sauna-like conditions, even in the winter. What saves me is APC's **NetworkAir Portable** air conditioner. This sweetie cools down my office (and me) in 5 minutes. It costs about \$800 (street), and at 12 by 16 by 30 inches, it's not small. But it's on coasters, so I can roll it out of the way when I don't need it. Go to find.pcworld.com/38588 for more details.

As you gaze around my office, try to count the number of battery-hungry items. In one quick glance, I register at least a dozen. Instead of buying old-fashioned, nonrechargeable batteries, I use Rayovac's **15-Minute Rechargeable System** (www.rayovac.com). For roughly \$20, the gizmo charges two rechargeable AA or AAA batteries in a quarter hour (the \$30 model handles four batteries at a time). The batteries are said to last up to 1000 charges, and they cost about \$9 a pair, so not only are rechargeables environmentally friendly, they're bottom-line cheaper than buying throwaways.

Take a look under my desk, near my PC and assorted dust balls, and you'll find

something you need if you're feeling clueless about backups yet suspect it's something you ought to do (often and early). Maxtor's \$180 (street) **OneTouch** is an external 120GB drive that runs at a fast 7200 rpm, connects via USB 2.0, and includes the backup software I've used for years—



HOME-OFFICE HELPERS (clockwise from top): Maxtor OneTouch, Kingston PCMCIA 4-in-1 Adapter, Pocketec DataStor, Rayovac recharger.

Dantz Retrospect. The OneTouch is also great for offsite backups: When I'm on the road, the backup comes with me. Visit find.pcworld.com/38597 for details.

Right next to my backup box is another nifty external drive: the Pocketec **DataStor**, a 20GB device that's small enough to fit into a shirt pocket. It looks like a thin handheld, measuring about 3 by 5 by 0.5 inches. The DataStor costs about \$160 and includes its own cables. Because it's a USB 2.0 device, it doesn't need drivers on Windows XP systems. I use mine to share photo and video files with friends and family. Browse to find.pcworld.com/38594 for more information.

Next, check out my notebook computer, down there on the floor. It has a **Kingston PCMCIA 4-in-1 Adapter** (find.pcworld.com/38603)—the perfect gizmo for connecting my notebook and digital camera—and a puny 8MB memory card. I just pop the memory card into the \$25 adapter, down-

load the images from my camera to the notebook, and I'm oh, so very ready to take more pictures. The PC Card adapter reads five varieties of memory devices, including Memory Stick, Multi-MediaCard, SD (Secure Digital), and SmartMedia.

Now step across the dogs and over to the bookcase to see Epson's double-duty **Stylius Photo 900**; it prints photos and also "label-prints" directly onto special CD-R and DVD-R discs, so there's no paper and glue to peel off the disc and gum up your player. The Photo 900 is reasonably priced at about \$170

(street), and its high-resolution photos look great. The 4- and 8-inch rolls of photo paper are easy to use. The downside? The special CDs the printer requires are roughly 50 cents more expensive than regular discs, and its DVDs cost about \$4 more. Go to find.pcworld.com/38606 to check out our full review.

And if you're shocked by my untidy office, just be grateful I didn't post any pictures of the garage. ■

Contributing Editor Steve Bass is the author of PC Annoyances, published by O'Reilly (ISBN: 0-596-00593-8). Contact him at homeoffice@pcworld.com.

Immaculate Reception

The 802.11g USB 2.0 adapter with twist-and-shout flexibility!



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IOGEAR's ultra fast Wireless-G 802.11g USB 2.0 adapter can help you connect to a wireless network with "higher power." It bends and twists to ensure optimal reception so you can work at up to 54Mbps at home or anywhere a hotspot is available.

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Retire the Wire.



BUGS & FIXES

STUART J. JOHNSTON

Microsoft Patches the Patch Process

The company's new update system may not be the answer to all your prayers.

TIRE D OF constantly plugging security holes in Windows? Sometimes it feels like you're patching more holes than a Montana road crew in the spring. (I should know. I grew up in rural Montana.)

Flawed Microsoft software is an unfortunate fact of life, but fixing the snags shouldn't be such a hassle. (Turn to *News and Trends* this month for a report on readers' complaints about patch headaches.)

Well, apparently, Microsoft officials feel our pain. The company recently made two changes in the way it issues patches. First, for XP users, the company released Update Rollup 1 for Windows XP, which consolidates a bunch of critical patches into a single



patch. Second, Microsoft has begun posting a monthly patch summary, which supplies information on all the new fixes making the rounds.

You might argue that anything is an improvement over the current state of affairs, but I remain skeptical. You will still need to stay on top of all the updates that are not included in the roll-up; plus, the

summary bulletins can often be vague or just difficult to understand.

A SUPER PATCH?

THE PREMIERE roll-up compresses 17 separate security updates into a single download. This bundle of goodies will bring you up-to-date with all XP-specific security patches from the release of service pack 1

(November 21, 2001), up to September 10, 2003. The roll-up also includes some service pack 1 components and other nonsecurity fixes.

To grab the roll-up, visit Windows Update (at find.pcworld.com/19081) and look for a link labeled KB826939 on the list that appears. Or go to find.pcworld.com/38903 for a link to the patch. Remember, the roll-up does not correct flaws in IE, Outlook, Outlook Express, or Office, so you need to keep tabs on alerts related to these other apps.

MONTHLY ALERTS

MICROSOFT thinks that a lot of the drudgery of finding and installing security patches will disappear, thanks to the company's monthly Security Bulletin Summary posting. These summaries give information regarding all of the security fixes released for the month, and they provide links to fixes.

The bulletins also include workaround instructions, if they exist. If you have patch problems, you can now call Microsoft at 866/727-2338 to talk to a technician for free.

Microsoft is raising a lot of dust, but it's hard to tell how much of the innovation is useful and how much is hype.

Will the new patch processes make your life easier? Write to bugs@pcworld.com and let us know. And tell us if the phone support works out as promised, too. ■

Stuart J. Johnston is a contributing editor for PC World. Visit find.pcworld.com/31580 to see more Bugs and Fixes columns.

IN BRIEF

Five Windows Fixes

MICROSOFT has released patches for five critical security holes for Windows XP, Windows 2000, and server versions of its OS. The fixes for these holes are not included in Update Rollup 1 because they were released after September 10. Go to find.pcworld.com/38894 to grab links to the patches.

BUGGED?

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

SHOCK HAZARD PROMPTS SONY RECALL

SONY IS RECALLING 5600 of its VAIO notebooks because they could give users an electrical shock. The affected model numbers are PCG-FRV25 and PCG-FRV27, and the recall affects units sold in June and July of 2003. No one has been injured, but Sony and the U.S. Consumer Product Safety Commission aren't taking any chances. Shocks could occur when the PC runs on AC power while connected online via dial-up modem, and the phone then rings.

If your VAIO model number matches one of the recalled model numbers, you need to download and run Sony's diagnostic program (available at find.pcworld.com/38897). If the program determines that your notebook is defective, disconnect the power adapter immediately and contact Sony at 800/880-9743. If your notebook PC needs repair, Sony will extend the computer's warranty for two more years and cover all shipping costs.

free spirit

guardian angel



MOBILE
TECHNOLOGY

Visit ibm.com/pc/safecomputing periodically for the latest information on safe and effective computing. **Warranty Information:** For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, NC 27709, Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services. *Prices do not include tax or shipping and are subject to change without notice. Reseller prices may vary. †Requires download of client software. ‡Mobile Intel Pentium processors feature Intel SpeedStep™ technology. With Intel SpeedStep, processor speed may be reduced to conserve battery power. ††1a, 11b and 11g wireless is based on IEEE 802.11a, 802.11b and 802.11g, respectively. An adapter with 11a/b, or 11a/b/g can communicate on either or any of these listed formats respectively; the actual connection will be based on the access point to which it connects. ‡Software may differ from its retail version (if available) and may not include user manuals or all program functionality. License agreements may apply. †For hard drive, GB = billion bytes. Accessible capacity is less; up to 4GB is service partition. †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. †Support unrelated to a warranty issue may be subject to additional charges. †These



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- Intel® Centrino® mobile technology
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 - Intel PRO/Wireless Network Connection 802.11b³
- Microsoft® Windows® XP Professional⁴
- 14.1" XGA TFT display (1024x768)
- 256MB DDR SDRAM
- 20GB⁵ hard drive
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- IBM UltraNav™ – TrackPoint® and touch pad
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NavCode 289793U-M549

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- IBM Embedded Security Subsystem 2.0¹ – Strongest security as a standard feature

System Features:

- Intel Centrino mobile technology
 - Intel Pentium M processor 1.40GHz²
 - Intel PRO/Wireless Network Connection 802.11b³
- Microsoft® Windows® XP Professional
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM
- NEW! 40GB hard drive with IBM Hard Drive Active Protection System
- Ultrabay Slim CD-RW/DVD-ROM combo
- Only 1" thin⁴ • 4.5-lb travel weight⁵
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- Intel PRO/Wireless Network Connection 802.11b
- Microsoft® Windows® XP Professional¹
- 15" XGA TFT Display (1024x768)
- 256MB DDR SDRAM² • 40GB³ hard drive
- Integrated Ethernet and modem
- Ultrabay™ Plus CD-RW/DVD-ROM combo
- IBM UltraConnect™ Antenna for increased signal strength
- 1-yr system/battery limited warranty⁴

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#30L9192 *132

IBM ThinkPad R40

Distinctive IBM Innovations:

- Embedded Security Subsystem 2.0 – Strongest security as a standard feature

System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1.50GHz²
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft® Windows® XP Professional
- 15" SXGA+ TFT Display (1400x1050)
- 256MB DDR SDRAM² • 60GB hard drive
- Integrated Ethernet and modem
- Ultrabay Plus CD-RW/DVD-ROM combo
- IBM UltraNav™ TrackPoint™ and touch pad
- 1-yr system/battery limited warranty⁴

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MOBILE
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NEW! IBM ThinkPad T41

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System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1.40GHz²
- Intel PRO/Wireless Network Connection 802.11b¹
- Microsoft® Windows® XP Professional
- 14.1" XGA TFT Display (1024x768)
- 32MB ATI™ Mobility RADEON™ 7500 graphics
- 256MB DDR SDRAM² • 40GB hard drive
- Integrated Gigabit Ethernet and modem
- Ultrabay Slim CD-RW/DVD-ROM combo drive
- IBM UltraConnect Antenna for increased signal strength
- Only 1" thin³ • 4.5-lb travel weight⁴
- 1-yr system/battery limited warranty⁴

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System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1.60GHz²
- Intel PRO/Wireless Network Connection 802.11b¹
- Microsoft® Windows® XP Professional
- 14.1" SXGA+ TFT Display (1400x1050)
- 32MB ATI Mobility RADEON 9000 graphics
- 256MB DDR SDRAM² • 40GB hard drive
- Ultrabay Slim CD-RW/DVD-ROM combo drive
- Integrated Gigabit Ethernet and modem
- IBM UltraConnect Antenna for increased signal strength
- Only 1" thin • 4.5-lb travel weight
- 3-yr system/1-yr battery limited warranty⁴

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5-yr Onsite Repair/9x5/Next Business
Day Response
#69P9200 *449

IBM ThinkPad X31

Distinctive IBM Innovations:

- Rapid Restore™ – Push-of-a-button data backup and recovery

System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1.40GHz²
- Intel PRO/Wireless Network Connection 802.11b¹
- Microsoft® Windows® XP Professional
- 12.1" XGA TFT Display (1024x768)
- 16MB ATI Mobility RADEON graphics
- 256MB DDR SDRAM² • 40GB hard drive
- Integrated Ethernet and modem
- Integrated IEEE 1394 FireWire
- 5.5-hr Li-Ion battery³
- 3.6-lb travel weight
- 1-yr system/battery limited warranty⁴

\$1,599 NavCode 2884CRU-M549

ServicePac® Service Upgrade:
3-yr Depot Repair
#30L9192 *132

IBM ThinkPad X31

Distinctive IBM Innovations:

- Access Connections – Easiest wired and wireless connectivity

System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1.60GHz²
- Intel PRO/Wireless Network Connection 802.11b¹
- Microsoft® Windows® XP Professional
- 12.1" XGA TFT Display (1024x768)
- 16MB ATI Mobility RADEON graphics
- 256MB DDR SDRAM²
- 40GB hard drive
- Integrated Gigabit Ethernet and modem
- Integrated IEEE 1394 FireWire
- 5.5-hr Li-Ion battery
- 3.6-lb travel weight
- 1-yr system/1-yr battery limited warranty⁴

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ServicePac® Service Upgrade:
4-yr Depot Repair
#69P9195 *249

IBM ThinkPad X31 Solution Pack

Distinctive IBM Innovations:

- Access Connections – Easiest wired and wireless connectivity

System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1.40GHz²
- Intel PRO/Wireless Network Connection 802.11b¹
- Microsoft® Windows® XP Professional
- 12.1" XGA TFT Display (1024x768)
- 16MB ATI Mobility RADEON graphics
- 256MB DDR SDRAM² • 20GB hard drive
- 5.5-hr Li-Ion battery
- 1-yr system/battery limited warranty⁴

Accessories Included:

- UltraBase™ X3 media slice
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IBM ThinkPad X31 Solution Pack

Distinctive IBM Innovations:

- Embedded Security Subsystem 2.0 – Strongest security as a standard feature

System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1.60GHz²
- Intel PRO/Wireless Network Connection 802.11b¹
- Microsoft® Windows® XP Professional
- 12.1" XGA TFT Display (1024x768)
- 16MB ATI Mobility RADEON graphics
- 256MB DDR SDRAM² • 40GB hard drive
- Integrated Gigabit Ethernet and modem
- 5.5-hr Li-Ion battery
- 3-yr system/1-yr battery limited warranty⁴

Accessories Included:

- UltraBase X3 media slice
- Ultrabay Plus CD-RW/DVD-ROM combo

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ServicePac® Service Upgrade:
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(Monitor not included)



(Monitor not included)



(Monitor not included)

IBM ThinkCentre™ A50p

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with Hyper-Threading Technology 2.60GHz
- Microsoft® Windows® XP Professional
- 256MB DDR SDRAM¹
- 40GB hard drive • CD-RW
- Intel Extreme Graphics 2
- Integrated 10/100 Ethernet
- Norton AntiVirus 2003 OEM Edition
- Lotus® SmartSuite® Millennium license
- 3-yr parts/1-yr limited onsite service limited warranty²

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ServicePac® Service Upgrade:
3-yr Onsite Repair/9x5/4-hr Response
#41L2732 \$229

IBM ThinkCentre A50p

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 2.80GHz
- Microsoft® Windows® XP Professional
- 256MB DDR SDRAM¹
- 40GB hard drive • CD-RW
- Intel Extreme Graphics 2
- Integrated 10/100 Ethernet
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr parts/1-yr limited onsite service limited warranty²

\$919 ☐ NavCode 843298U-M549

ServicePac® Service Upgrade:
3-yr Onsite Repair/9x5/Next Business Day Response
#30L9199 \$199

IBM ThinkCentre M50

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 2.60GHz
- Microsoft® Windows® XP Professional
- 256MB DDR SDRAM¹
- 40GB hard drive • CD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service²

\$1,079 ☐ NavCode 8187D9U-M549

ServicePac® Service Upgrade:
4-yr Onsite Repair/9x5/Next Business Day
#69P9161 \$89

IBM ThinkCentre M50

Distinctive IBM Innovations:

- Rapid Restore Ultra – Push-of-a-button data backup and recovery

System Features:

- Intel Pentium 4 Processor with HT Technology 2.80GHz
- Microsoft® Windows® XP Professional
- 512MB DDR SDRAM¹
- 40GB hard drive • CD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service²

\$1,199 ☐ NavCode 8187EJU-M549

ServicePac® Service Upgrade:
3-yr Onsite Repair/24x7/4-hr Response
#41L2740 \$159

IBM ThinkCentre S50

Distinctive IBM Innovations:

- The smallest IBM desktop without compromise: 62% smaller than a standard IBM desktop

System Features:

- Intel Pentium 4 Processor with HT Technology 2.60GHz
- Microsoft® Windows® XP Professional
- 256MB DDR SDRAM¹
- 40GB hard drive • CD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service²

\$1,099 ☐ NavCode 818326U-M549

ServicePac® Service Upgrade:
3-yr Onsite/9x5/4-hr Response
#41L2734 \$129

IBM ThinkCentre S50

Distinctive IBM Innovations:

- The smallest IBM desktop without compromise: 62% smaller than a standard IBM desktop

System Features:

- Intel Pentium 4 Processor with HT Technology 2.80GHz
- Microsoft® Windows® XP Professional
- 512MB DDR SDRAM¹
- 40GB hard drive • CD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service²

\$1,259 ☐ NavCode 818336U-M549

ServicePac® Service Upgrade:
4-yr Onsite/9x5/4-hr Response
#69P9162 \$250

IBM recommends Microsoft® Windows® XP Professional for Business.

IBM Think Express Program.

Select and purchase IBM Think Express products, designed and priced for small and medium businesses.

IBM Service Upgrades

Protect your notebook with IBM ThinkPad Protection service. It covers accidental damages like drops, spills or damage to your ThinkPad LCD display. (Not available in all states; ask your sales representative for details.)³

1-yr Depot to 3-yr Onsite + 3-yr ThinkPad Protection	#58P8772	\$389
3-yr Depot to 3-yr Onsite + 3-yr ThinkPad Protection	#58P8774	\$299

IBM ThinkPad Accessories

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NEW PRODUCTS

EDITED BY ANNE B. McDONALD

Big-Ticket Graphics

ATI maintains a small lead in PC World performance tests, but should you buy now?



GRAPHICS boards with NVIDIA's GeForce FX 5950 Ultra chip (left) and ATI's Radeon 9800 XT chip.

GRAPHICS

TEST CENTER IF YOU WANT the best desktop graphics performance money can buy, check out cards based on either of two new graphics chips, ATI's **Radeon 9800 XT** and NVIDIA's **GeForce FX 5950 Ultra**. Both delivered strong performance—and they pack an equally robust \$500 price tag. In our tests of boards using these chips, the production-level 9800 XT outran the 5950 Ultra reference board in *PC World's* new minisuite of gaming benchmarks. Both chips modestly outpaced their immediate predecessors.

But with the release dates for the two biggest reasons to buy these cards—the highly anticipated games *Doom III* and *Half-Life 2*—still indeterminate, even serious graphics aficionados should debate the merits of buying now.

LATEST CONTENDERS

TO CREATE the new 9800 XT, ATI tweaked its existing 9800 Pro graphics chip. The older 9800 Pro ran at 380 MHz and held one of two memory con-

figurations: 128MB of DDR memory running at 340 MHz or 256MB of DDR2 memory running at 350 MHz. For its part, the 9800 XT runs at 412 MHz with 256MB of DDR

Reference board with GeForce FX 5950 Ultra

NVIDIA
Reference board, not rated
Better performance than its predecessor; still can't catch ATI.
Estimated list: \$500
find.pcworld.com/39020

Production-level board with Radeon 9800 XT

ATI
★★★★☆
High price and lack of games detract from its top performance.
List: \$500
find.pcworld.com/39023

memory running at 365 MHz.

ATI both builds its own boards and sells its chips to other board makers. The ATI boards include an updated cooler that permits a new feature called Overdrive, which the company says safely revs the chip past its listed speeds (we did not test this feature).

Like ATI, NVIDIA fine-tuned its most recent top-of-the-line chip—the GeForce FX 5900 Ultra—to create the 5950 Ultra. The new chip has a clock speed and a memory speed of 475 MHz, up from 450 MHz and 425 MHz, respectively. Cards based on the chip will include 256MB of DDR memory. (NVIDIA also offers over-clocking via Registry tweaks, which we did not test.) NVIDIA doesn't sell its own boards, but cards equipped with the 5950 Ultra are now shipping.

THE TESTS

OBVIOUSLY, the biggest draw of these high-end graphics chips is their ability to handle very demanding games, many of which use DirectX 9. DX9 is Microsoft's latest graphics

74 GRAPHICS CHIPS

ATI Radeon 9800 XT, NVidia GeForce FX 5950

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Dell Digital Jukebox, Samsung YP-901GS with Napster software

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LitePC Technologies XPLite



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application programming interface, and games that utilize its capabilities should offer dramatically more detail.

We had hoped to test these boards using Half-Life 2, but with that game delayed (and Id Software's Doom III likely even farther away), the PC World Test Center opted for two DX9 games—Eidos Interactive's Tomb Raider: The Angel of Darkness, and Microsoft's Halo—to get a snapshot of each chip's current abilities.

To gauge each board's performance relative to that of the cards based on its processor's predecessor, we also retested an ATI 9800 Pro board and an MSI 5900 Ultra board. All of the boards included 256MB of memory. We used the latest drivers available at test time from each company: Catalyst 3.8 from ATI and ForceWare 52.16 from NVidia. Our tests evaluated how many frames per second (fps) each chip produced at various resolutions. A higher fps score translates into smoother on-screen action; meanwhile, higher resolution shows more detail but can lower frame rates.

In our Halo tests, the performance differences between the 9800 XT and the 5950 Ultra were minimal, as was the improvement over the previous generation.

At a resolution of 1280 by 1024 and 32 bits, the 9800 XT

board hit 39 fps, an imperceptible 1 fps faster than the competing 5950 Ultra reference board (both previous-generation cards managed 36 fps).

At a higher resolution of 1600 by 1200, frame rates dropped, but the pattern held steady: a virtual dead heat between the two new cards and modest improvement over their older siblings. (See find.pcworld.com/39041 for a detailed test results chart.)

ATI dominated the Tomb Raider tests. At 1280 by 1024 and 32 bits, the 9800 XT managed 44 fps versus the 5950 Ultra's score of 30 fps; ATI's older chip reached 41 fps, while NVidia's notched 29 fps. At 1600 by 1200 and 32 bits, the new and older ATI cards posted 32 fps and 30 fps, respectively, while the new and older NVidias managed 22 fps and 21 fps, respectively.

Our limited number of pre-

liminary tests show ATI's Radeon 9800 XT—and in many cases, the older 9800 Pro—with a small edge over NVidia's GeForce FX 5950 Ultra. The 9800 XT is tops, but in view of its \$500 price tag and the fact that it remains untested with Half-Life 2 and Doom III, it feels like an expensive bet. If you can't wait, look for a deal on a board with the departing ATI Radeon 9800 Pro.

—Tom Mainelli

Vertical Scanner Saves Space

SCANNER

IF YOU like unusual design, do a ton of scanning, and lack desk space for a conventional flatbed scanner, check out the \$200 Hewlett-Packard **Scanjet 4670**. This see-through device props itself vertically on an included stand—much as a photo frame does—and even from that position, it's a breeze to use. But it is expensive.

In my informal tests with a shipping unit, scanned text pages came out crisp, sharp, and bolder than the originals.

Scanjet 4670

Hewlett-Packard

★★★★☆

Decent, skinny SOHO scanner looks great, but it will cost you.

Street: \$200

find.pcworld.com/39002

Photos scanned at 2400-dots-per-inch optical resolution looked okay, though scans made without tweaks to the color settings overemphasized the blues, and detail appeared murky in dark areas.

Despite its dainty appearance, the device's scanning glass side and its polycarbonate window are designed to resist scratching and breaking. And its rubber-trimmed frame absorbs shock—which is good, because although the easel-like stand feels sturdy and secure, the 3.1-pound scanner tips forward slightly when you insert a photo or document. The 4670 scans items up to 8.5 inches by 11.7 inches. An included transparent-materials adapter scans photo slides and negatives.



GREAT PROFILE:
HP Scanjet 4670.

The scanner connects with USB 2.0 and comes bundled with Adobe Acrobat Reader, ArcSoft Panorama Maker (a photo stitching app), HP Photo & Imaging software, and IRIS Readiris Pro optical character recognition software.

The Scanjet 4670 produces decent scans and adorns a desk handsomely—but at a price.

—Laura Blackwell ■

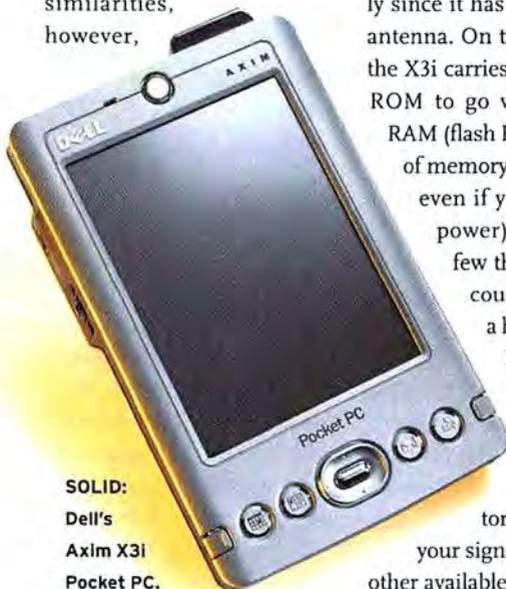
Pocket PCs: The Wi-Fi Generation

HANDHELDS

THINNER, LIGHTER, and as easy as possible to connect: That's the mantra Pocket PC vendors appear to be chanting—and trying to enforce—with mixed success on each new Wi-Fi-enabled handheld they produce. I looked at shipping units of three of the latest examples: two IPaqs from HP and a sturdy Dell Axim.

SPARE POWER

ALL THREE OF these PDAs run Microsoft's Windows Mobile 2003 software for Pocket PC, and all three feature a 400-MHz Intel XScale CPU. Each has removable, rechargeable batteries and a charging cradle with a slot to accommodate a spare battery—a useful feature that Dell pioneered with its first Axim. All three handhelds have brilliant active-matrix touch-screen displays, as well as SD card slots for peripheral devices, memory, or data cards. Despite their similarities, however,



SOLID:
Dell's
Axim X3i
Pocket PC.

the units differ significantly.

HP's \$449 **IPaq H4150** is a mere 0.5-inch thick and has the rounded bottom and general look of two other recent thin-and-light IPaq models, the H1935 and the H1940. The second IPaq I tried, the \$499 **H4350**, is a scant 0.1 inch thicker but practically an inch taller (5.4 inches versus the H4150's 4.5 inches) due to an integrated thumb keyboard that is spacious enough to make using it fairly comfortable. Neither unit has a visible wireless antenna; both have 64MB of RAM and 32MB of flash ROM. The H4350's lithium ion battery is larger and more powerful than its sibling's, but optional extended batteries are available for both.

GOOD MEMORY

DELL'S \$379 **Axim X3i**, while more streamlined than its predecessors, is 0.6-inch thick and looks a bit chunky compared with the IPaqs, especially since it has a stubby radio antenna. On the other hand, the X3i carries 64MB of flash ROM to go with its 64MB RAM (flash ROM is the type of memory that holds data even if your PDA loses power). It also has a few things the IPaqs could use, such as a high-quality Wi-Fi setup utility, and an additional Wi-Fi LAN detector to monitor the strength of your signal and check for other available networks.

On the new IPaqs, a Wireless option on the Start menu



WI-FI-ENABLED
IPaqs: H4350 (left)
and H4150.

turns the device's Wi-Fi radio on and off, which can help conserve battery life. But I could have used some software assistance getting my IPaqs connected to a wireless LAN in the first place. Once you do locate the setup screen, Wi-Fi runs smoothly. The new IPaqs also offer Bluetooth and software extras, including a robust backup utility and a photo/slide-show viewer.

The Axim X3i has a simpler backup utility and no Bluetooth. But its \$379 price tag makes it a good deal if you want a Wi-Fi-enabled PDA and are on a budget. (Dell also offers two X3 units without Wi-Fi—a \$329 version configured the same as the X3i and a \$229 version with a 300-

MHz XScale processor. Both have 32MB each of RAM and flash ROM, as well as a USB syncing cable instead of the charging cradle.)

The IPaqs target well-heeled users willing to pay extra for a skinny yet full-featured handheld. Buy the Dell if you want a solid Wi-Fi-enabled PDA with more memory, an easier interface, and a better price.

—Yardena Arar ■

IPaq H4150

Hewlett-Packard

★★★★☆

Smallest, thinnest Wi-Fi-enabled handheld to date, but pricey; Wi-Fi setup still not easy.

Street: \$449

find.pcworld.com/39011

IPaq H4350

Hewlett-Packard

★★★★☆

Stylish, ultraslim Pocket PC with an integrated keyboard; expensive and suffers from obscure Wi-Fi setup.

Street: \$499

find.pcworld.com/39008

Axim X3i

Dell

★★★★☆

Slightly chunky but capable and nicely priced Wi-Fi-enabled Pocket PC.

Street: \$379

find.pcworld.com/39005



Lighten Up.

It wasn't so long ago that if you wanted to bring your data with you, your hardware had to come too. Well, that's all in the past now thanks to the new SanDisk Cruzer™ Mini. At under half an ounce, the Cruzer Mini goes anywhere, and with up to 256MB of flash memory, it takes a lot with it. Hi-speed USB 2.0 compliant, SanDisk's Cruzer Mini lets you transfer data faster than ever before. And at less than 8mm thick, all it needs is a single USB slot. Just drag, drop, and go. It's all about convenience – no extra hardware, no worries.

So whether you're installing utilities or updating print drivers for the umpteenth time, you can take your files with you wherever you go – and you won't even need your dolly.



For more information on SanDisk Cruzer Mini, visit www.sandisk.com/mini

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Minor Project Revamp

PROJECT MANAGEMENT

MICROSOFT OFFICE Project 2003, like other applications in the Office 2003 family, isn't a radical update. In the latest retooling of this veteran application for project plan production and schedule management, you'll find mostly small improvements, such as better wizards and printing options.

I looked at a shipping copy of **Office Project Standard 2003** (\$599, \$349 to upgrade), which specifically targets managers

Project Standard 2003

Microsoft

★★★★☆

Pricey time-saver; good bet if you use much older programs.

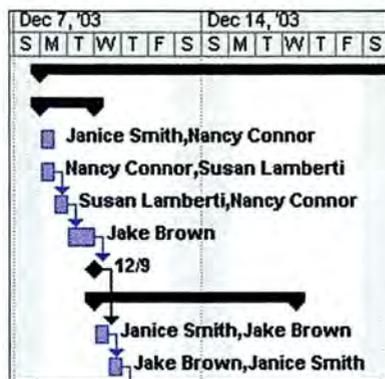
Street: \$599, upgrade \$349

find.pcworld.com/39038

and professionals who work independently. (Large teams interested in using collaboration features should consider Project Professional 2003, which costs \$999 for the full version and \$599 to upgrade.)

Project Standard shares the interface and core features of other Office 2003 apps, including a Getting Started pane that displays recently used files. This version also makes it easier than preceding editions to copy Project schedules into other Office apps like Word. Another bonus: With Office 2003 Professional already installed on my PC's hard drive, Project Standard's typical-install option took up just a modest 61MB more.

Project Standard gives you



PROJECT 2003's overall timeline (the long thick black line) helps you measure a project's progress.

track construction, engineering, and training plans.

Improved options make it simpler to finesse the details

access to clever, time-saving wizards and help features, like the Interactive Project Guide. This wizard pops up when you create a new Project file and covers necessary planning steps; it's a great starting point for people who don't have to do daily project management. You can save additional time in Project by using Microsoft Office online templates—for example, downloading pre-made project templates to

of a printout and quickly create a one-page project schedule handout. In addition, you can view project schedules in calendar format.

If you already own Project 2002, the upgrade cost is steep for the added value. But if you still use Project 98 or some other less-sophisticated project management program, Project 2003 could quickly pay for itself in time savings.

—Laurianne McLaughlin

Inexpensive, Speedy Gigabit Networking

NETWORKING

THE WORLD may desire wireless, but for extreme speed and rock-ribbed reliability, a wired network is still the way to go. Now SMC Networks has come up with an even better reason to pick wired: affordable gigabit networking.

In the past, gigabit networking (1000 megabits per second, or 1 gbps) over copper wiring mainly appeared in very large businesses due to its high costs. Last year, gigabit ethernet controllers started showing up on PC motherboards, but gigabit switches suitable for smaller networks were expensive and hard to find. Now SMC has introduced attractively priced five-port and eight-port 1-gbps net-



ZOOM: Use SMC's 1-gigabit switch for a wired network speed boost.

work adapters and switches.

I tested SMC's **SMC8505TX Auto-Sensing Gigabit Switch**. This \$110 package offers five 10/100/1000-mbps ports on a small-office network with Cat 5e cabling. I also used SMC's EZ Card 1000 SMC9452TX network adapters (\$25).

My informal tests showed average upload speeds of 80 mbps and download speeds of 92 mbps on this same network when I used 100-mbps

network adapters and a compatible switch. With the gigabit network in place, upload speeds increased to 210 mbps and download speeds shot up to to 240 mbps, a truly excellent showing. By comparison, the fastest wireless products that we've tested in the past topped out at 24 mbps. (The gigabit network's impressive speeds fell dramatically when standard Cat 5 network cable was used, however.)

Setup was simple. The only hassle—and it was a small one—involved locating drivers for the network adapters on the included CD and manually installing them (because the automated installation routine refused to work).

I was also a bit displeased with the switch's design. The cable ports are on the same side of the box as the LED indicators. This may be practical for rack-mounted systems, but it's awkward if you're used to desktop-type switches with ports on the rear.

—Ramon G. McLeod ■

SMC8505TX

SMC Networks

★★★★☆

Very high speed and easy to set up; clunky industrial design.

Street: \$110

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New Scanners Give Old Photos New Life

SCANNERS

IF YOU SHOT photographs in a predigital world, you probably have a stack of yellowed or torn pictures that you'd like to rehab. Many new flatbed scanners tout automatic photo-restoration features that promise to return your time-worn snapshots or beat-up slides to near-pristine condition.

I tested shipping versions of Epson's \$199 **Perfection 3170 Photo**, Hewlett-Packard's \$229 **Scanjet 5530**, and Microtek's \$200 **ScanMaker i300**. All three work with prints, slides, and negatives. I discovered, however, that they weren't equally adept at image-fixing magic.

ONE-CLICK PHOTO FIX

FOR MY TESTS, I assembled a group of problem images, including old faded photos, color prints with creases and tears, and 35mm slides with washed-out color and dust spots. Each of the three scanners offers software with an easy one-click option for activating its photo-restoration

features. For example, all three provide automatic color restoration, and each of them did a respectable job of correcting the faded photos and improving the lackluster color of the 35mm slides. Each also has features that the others don't.

For instance, only the Microtek ScanMaker i300 provides Digital ICE technology, a combined hardware-and-software tool for removing surface defects such as tears and creases from prints (but not from slides or negatives). Using this feature slows the process by several extra minutes per scan, but even so it's faster than trying to fix cracks and tears manually with an image editing application.

The Epson Perfection 3170, meanwhile, was the only model that included a dust removal option for film scans; this feature did an excellent job of cleaning up my 35mm slides.

The Perfection 3170 also has the highest optical resolution in this group: 3200 dots per inch versus 2400 dpi for the other two. This feature can be useful for making generous enlargements of small images (such as 35mm slides)

without losing any of their quality or sharpness.

HP's Scanjet 5530 is the only scanner of the three that includes an automatic photo feeder. With the aid of the feeder, the 5530 can scan a stack of up to 24 photos (prints either 4 by 6 inches or 3 by 5 inches in size) at the same time, while applying the scanner's photo-restoration feature to each image. If you have a large pile of pictures to restore, this feature can be a real time-saver.

BEST CHOICE

IF YOU PLAN to scan prints primarily, any of these units will work well. But for scanning slides, the HP and Epson models have a major advantage over Microtek's scanner: They let you scan batches of slides at once; the ScanMaker i300 manages only a single slide at a time. More significantly, the Epson Perfection 3170's ability to remove dust spots when scanning film enabled it to achieve the best image quality results in my tests



HP'S SCANJET 5530 comes with an automatic photo feeder.

of 35mm slides. For those reasons—and because of its high resolution—the Epson earns my vote as the most versatile scanner in this bunch.

—Richard Jantz ■

Perfection 3170 Photo

Epson

★★★★☆

Best photo-restoration scanner for both prints and slides.

Street: \$199

find.pcworld.com/38948

Scanjet 5530

Hewlett-Packard

★★★★☆

This scanner's built-in automatic photo feeder is more impressive than its limited overall photo-restoration feature.

Street: \$229

find.pcworld.com/38945

ScanMaker i300

Microtek

★★★★☆

Photo-restoration scanner is the best for damaged prints, but not as good for rehabilitating slides.

Street: \$200

find.pcworld.com/38939



TWO PHOTO-FIXING SCANNERS:

Epson's Perfection 3170 Photo (upper left) and Microtek's ScanMaker i300.



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wide screen. slim price. wire less.

eMachines recommends Microsoft® Windows® XP

The eMachines M5312

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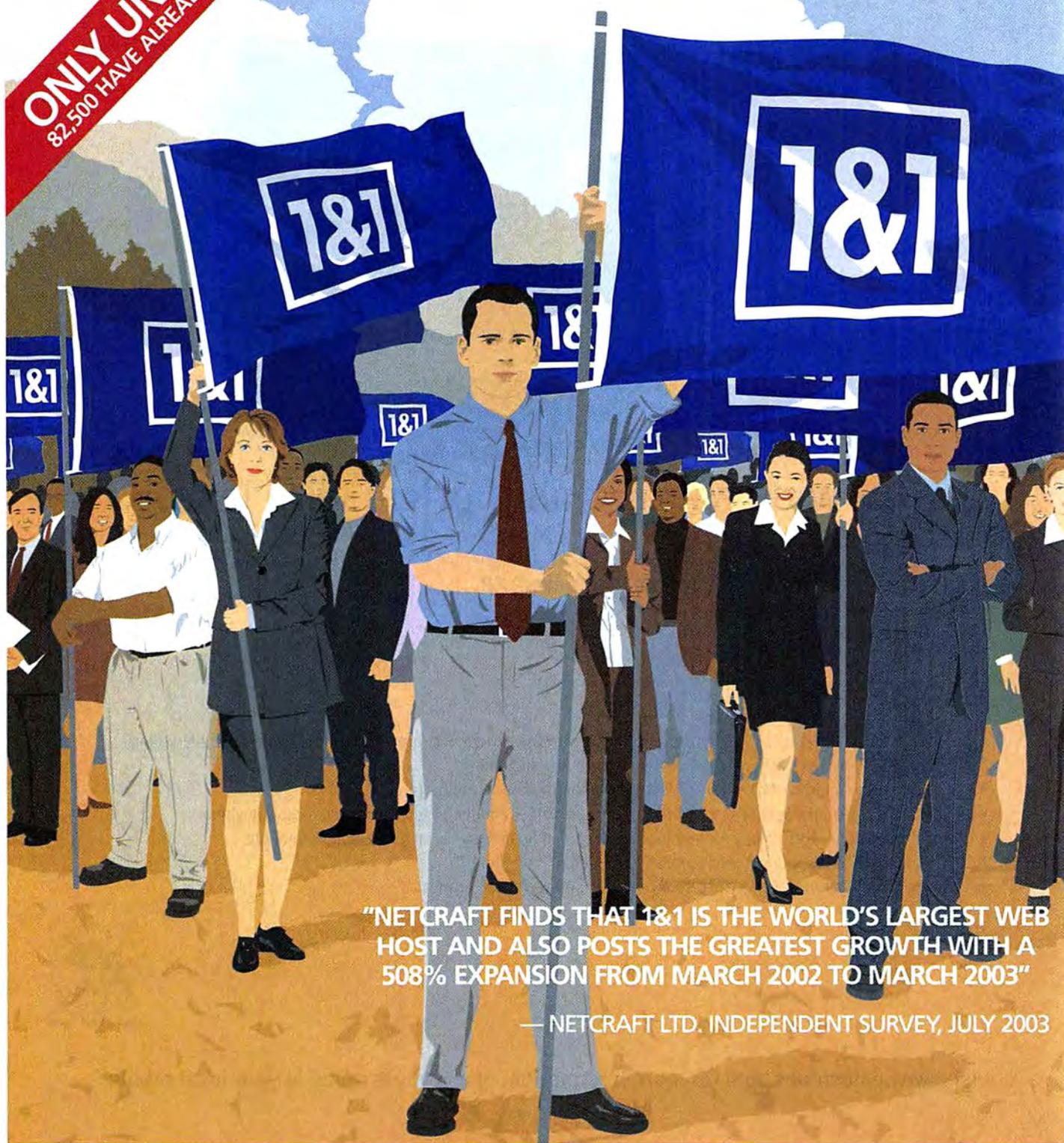
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PayCycle, an online service that automates pay calculations and deductions and pre-

PayCycle Plus

PayCycle

★★★★☆

Cost-effective service makes payroll tasks easy.

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find.pcworld.com/38927

pare paychecks and government forms, could be a reasonably priced alternative.

All you need to access PayCycle's payroll service is an Internet connection and a Web browser, such as Internet Explorer. All data, including employee records, is maintained on PayCycle's server, which uses secure-mode 128-bit SSL, the same level of security used for most online banking. Net pay can be electronically deposited directly into employee bank accounts, or you can print out your own checks.

I looked at PayCycle Plus (\$40 per month), which contains all the features of the



PAYROLL CHANGES, such as overtime and bonuses, are easy to make when you use PayCycle's online service.

company's Basic service but adds preparation of state tax deposits and filings. For as little as \$20 a month, PayCycle's Basic service handles payroll details, including preparation of W-2 and 940/941 tax forms, for up to five employees. Coverage for more than five employees is \$1 per additional person per month, whatever your pay schedule.

You can make common ad-

justments prior to each payroll run and track vacation time and sick allowance. Paycheck data may be exported to several small-business bookkeeping applications: Microsoft Excel or Money, Quicken, QuickBooks, and QuickBooks Online Edition. Other pluses: PayCycle keeps track of to-dos and upcoming deadlines, and can e-mail you reminders.

—Richard Morochove

Chatting in Living Color

PHOTO SHARING

IF YOU HAVE clients or family who want to share digital photos quickly over the Internet and chat about them at the same time, look into **Hello**, a free application from Picasa. Using its peer-to-peer connection, Hello lets you send low-resolution JPEG image files

almost instantly. You simply send an invitation to download Hello, and your invitee joins your private network.

Hello is designed as a companion to Picasa's \$30 photo-management package, and it works best with Picasa 1.6. If you use that version, you'll find it easy to send images to

Hello from Picasa or to click a button within Hello to import images from Picasa's albums. From there, it's only a click or two before your recipients can see the photos on their PC. You don't need Picasa software to use Hello; but without it, photos are imported via a clunkier Browse command.

By clicking and scrolling through Hello's filmstrip, I could control what my friend viewed—in what order, and at what speed—and sending big bundles of images was a snap. The lag time between sending and receiving up to 20 images was at most 15 to 20 seconds.

Hello circumvents the problems with file sharing that can occur on other chat clients when one of the users is behind a router or has a firewall (it won't work through a proxy server, however). If you are using Hello with Picasa, all of the pictures that you share with another Picasa user are

saved in albums automatically, as sorted by the sender.

Other nifty Hello features include the ability to set up a prepaid printing account so that users you designate—for example, grandparents—may, with one click, order prints of sent photos. High-resolution pictures are automatically requested and retrieved when you want to print an image that has been shared with you in low resolution.

Using Hello is a lot of fun, once you get used to viewing photos and chatting at the same time. I predict that a lot of people will be hooked.

—Kathleen Cullen ■



IF YOUR HELLO BUDDY doesn't recognize the photo of an apple with a drop of water hitting it, just explain it in the chat window at right.

Hello

Picasa

★★★★☆

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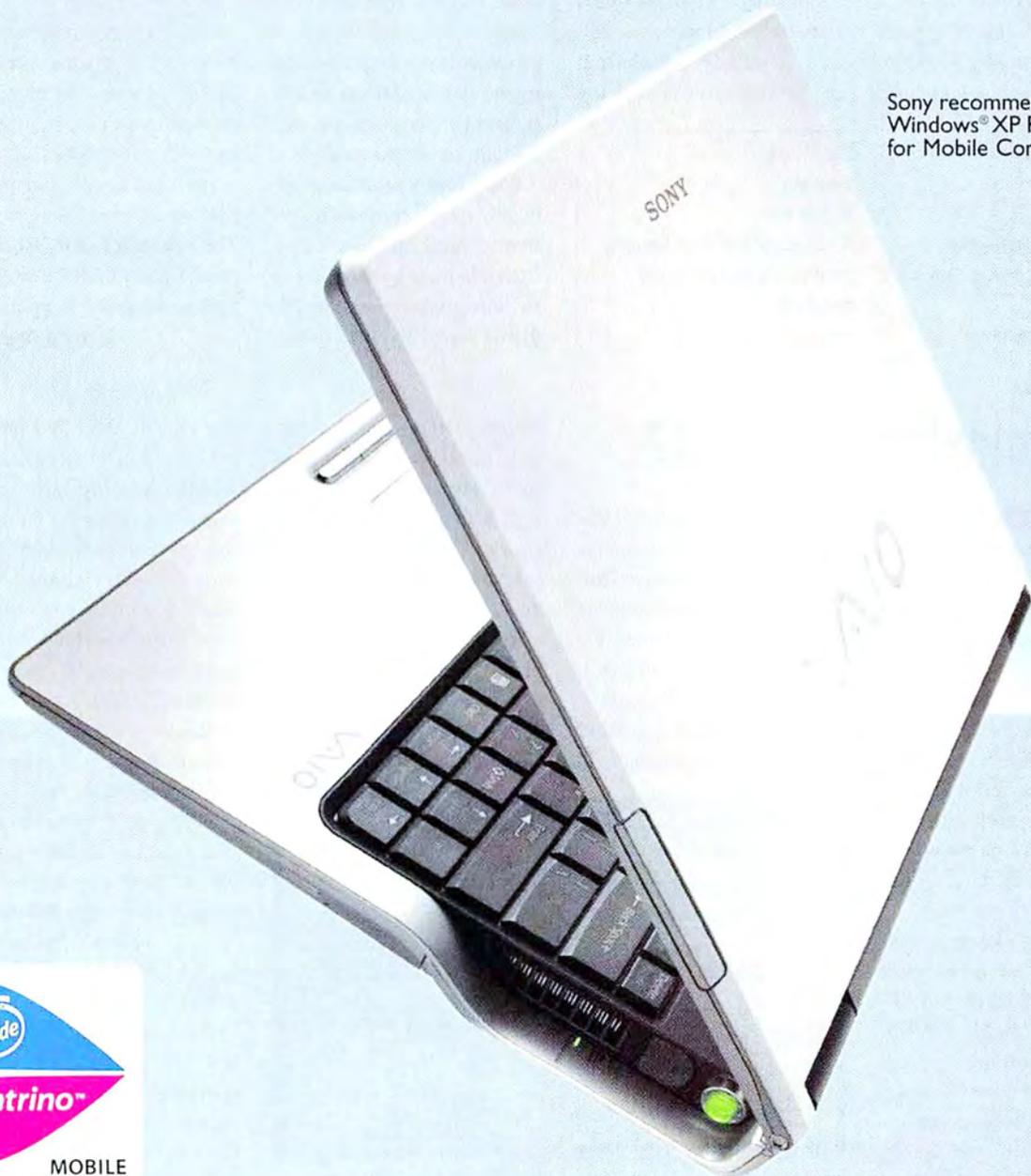
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SONY

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Hard-Drive Music Players

MP3 PLAYERS

IF YOU'RE GOING on a long trip—or if you need to have all your music with you all the time—you'll want a digital music player with lots of storage. New players from Dell and Samsung have 20GB hard drives that hold hundreds of hours of music. I tried shipping models of the \$329 **Dell Digital Jukebox** (aka the DJ—the company's first MP3 player) and Samsung's \$399 **YP-910GS**, designed to work with

the new Napster music service (see page 42). Both units play MP3 and WMA files and accept file transfers from Windows Media Player and from their default applications.

The DJ's default software, Musicmatch's basic version, rips from CD slowly but simplifies syncing the music on the player with that on the PC.

Samsung's YP-910GS uses Napster's cumbersome software to transfer music from the service directly into the



SAMSUNG (upper left) and **Dell** MP3 players.

player, which includes an FM radio, records from either the radio or a line input (the DJ can record only from a built-in microphone), and has an FM transmitter for playing music through car stereo speakers.

Both players produce good-quality sound, come with a remote control, and have more-than-adequate battery life; in my informal testing, the YP-910GS lasted about 13 hours,

and the DJ ran more than 20. You can't access the controls on the DJ when the player is in its slip-on cover, but you can with the YP-910GS.

The DJ is simple, business-like, and attractively priced. The pricier YP-910GS offers more features, and its integration with Napster is a plus.

—Richard Baguley

Dell Digital Jukebox

Dell

★★★★☆

A no-fuss, no-frills hard-drive MP3 player that does the job.

Street: \$329

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YP-910GS

Samsung

★★★★☆

A nice player with extra features, but it's somewhat expensive.

List: \$399

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Control Windows Bloat?

UTILITY

DO YOU KNOW even half the tools included in Windows, or how they affect your PC's performance? LitePC Technologies' \$40 **XPLite** can remove unwanted Windows 2000 or XP features. But so might you, without XPLite's help.

XPLite lists optional Windows features, each with a description and a check box so that you can see what it does and remove it if you wish.

The concept closely resembles that of Windows' own Component Wizard. But XPLite lets you easily remove items—for example, games, DirectX, and the Migration Wizard—that are tricky or impossible to uninstall using Windows' own tools. In other

cases, XPLite does a better job. For instance, the Components Wizard doesn't remove Outlook Express; it just deletes the shortcut. But pull Outlook Express with XPLite, and Outlook Express is really gone.

In theory, removing parts of the OS you don't want should

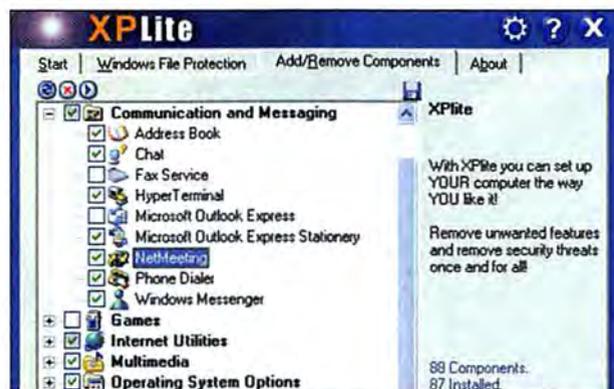
yield a faster, more dependable, more secure environment. My casual hand-timed tests with an XPLite shipping copy did show modest to impressive speed improvements, depending on the task.

But XPLite failed to make either of my test PCs more dependable. Time and again I would remove items, reboot Windows, and find something

else broken. More than once I got caught in an endless loop with a repeating error message. And removing Outlook Express cripples Outlook. Fortunately, every change you make in XPLite is easily fixable: Simply recheck one or more of the items that you unchecked before. As an extra precaution, XPLite creates a System Restore checkpoint before altering anything.

XPLite will probably give you a sleeker Windows. But XP and 2000's own tool can do much the same for \$40 less.

—Lincoln Spector ■



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XPLite

LitePC Technologies

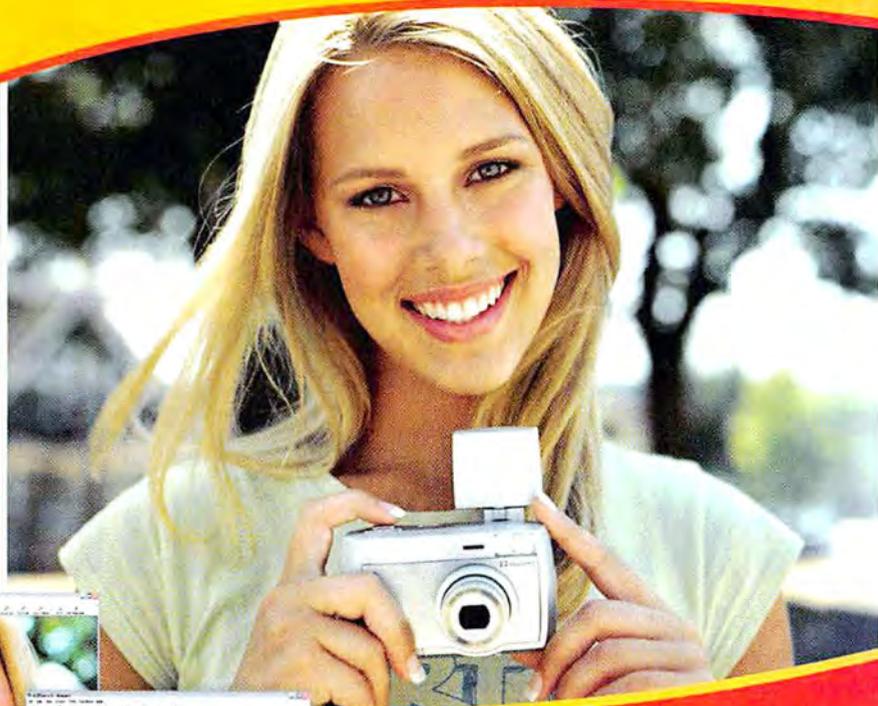
★★★★☆

Feature-removal utility improves slightly on Windows' own tool.

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DIGITAL HOME:

Digital products enlightening and enriching our lives



e-Home Improvement

In your mind's eye, take a snapshot of the way the inside of your home or apartment looked 10 years ago. Now, open your eyes and look around. What's different? If you're like most people, you'll discover your home is well on its way to being remade by digital technology.

There's a digital camcorder on the counter: It replaced that tape-cartridge unit you bought way back when. On the desk is that advanced film camera you haven't used since you bought that digital camera a couple of years ago. Those boxes of videos collecting dust look old and clunky next to your growing DVD movie collection. Through these and so many other products, our homes have been transformed by a friendly invasion of digital technology.

For example, there's television—and then there's high-definition television, or HDTV. And to experience HDTV is to enter a different world—

a world of video excitement and quality that transforms TV viewing into a true sensory experience. At Best Buy (bestbuy.com)—the largest-volume specialty retailer of consumer electronics, personal computers, entertainment software, and appliances—consumers can

choose from a wide variety of makes and models of HDTVs, finding the one that best fits their budgets and viewing habits.

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HDTV: Here To Stay

For starters, HDTV is a digital format. As a result, the picture on the screen is of a much higher resolution, clarity, and sharpness than can be produced on a conventional TV—up to five times the sharpness, in fact. In addition, the super-wide-screen format of HDTV creates a viewing experience that is incredibly theater-like, and you'll find that more and more television broadcasts are updating to accommodate it.

The sound on HDTV is as theater-like as the picture, offering CD-quality surround sound that fills a room with action and excitement never before possible in home entertainment. The sound system consists of five speakers, including a center channel to anchor the sound as well as two front and two rear speakers for a true surround-sound experience.

And most importantly, HDTV is here today, with many prime-time shows of all kinds currently broadcasting in HD. Not only that, but the Federal Communications Commission has mandated a complete broadcasting switch over to HD by 2006.

At Best Buy, HDTV enthusiasts can choose from a variety of HDTVs, backed by the most venerable electronics brand names in the world.



■ Check out all the HDTV excitement now at BestBuy.com®.

Thousands of Possibilities!

Continued on page 3

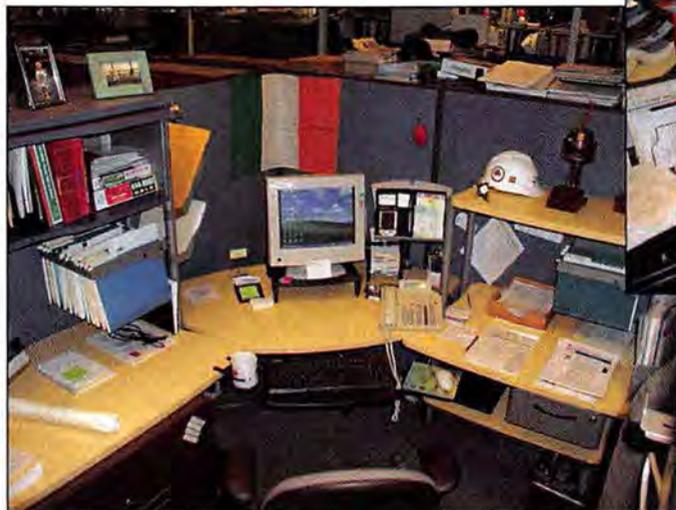
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Thousands of Possibilities



DIGITAL HOME:



ANTHRO's 19th-birthday makeover contest ("before" photo at top; "after" photo at left). The winning workspace belonged to J. Michael Chudik of Columbus, Ohio.

Continued from page 1

Beyond digital televisions, camcorders, DVD equipment, and so on, digital technology in the home has a more serious side. Both amateur and professional musicians have been eager to exploit the music creation and editing capabilities offered by today's digital music systems. Video editing aided by powerful PC technology is a mainstay avocation in a growing number of digital homes.

And, of course, digital office technology has transformed spare rooms and even the corners of living rooms and dens into highly functional work areas, offering mobile workers the kind of flexibility and freedom they like.

But you know the problem. These work areas and hobby environments for some reason soon come to resemble a bedroom at a college fraternity. Every square inch of desk space and work area soon gets covered with everything from manuals and magazines to random papers to folders, the kind of paraphernalia that comedian George Carlin likes to call "stuff."

The fact is, if most people were to step back from their workspace or music play area, they'd probably mutter, "What a mess! It's amazing I get anything done." So it was with an understanding that "junk expands to fill the space" that Anthro (www.anthro.com) celebrated its 19th birthday with a workspace makeover contest. A leading manufacturer of flexible

and modular computer furniture, Anthro set out to prove that its innovative designs and solutions can indeed turn chaos into order, thereby boosting productivity.

Anthro put its solutions on the line by soliciting photos of workspaces in obvious need of help and renewal. From the mass of messy workspaces shown in the photos, Anthro randomly selected several winners, earmarking them for some striking makeovers. Then Anthro helped redo the work spaces using its various products, targeting both work desks as well as musical environments, video editing spaces, graphic design areas, animation labs, and server spaces.

The results are striking, as the before-and-after photos shown here attest. Clutter has given way to order. Items that need to be at arm's length are neatly organized. The overall effect has been to transform a workspace that invites inefficiency to one that promotes productivity.

To be sure, the digital home is fast evolving, driven by the ever-declining cost of digital products, gadgets, and gizmos while their quality and functionality increases, just like the evolution of the PC. With home wireless technology now well within reach of most budgets, clever users are finding ways to link all their digital products together into a fully functioning digital system. At home or on the job, the future is now!

■ *For more information on the modular furniture solutions from Anthro, click on www.anthro.com now.*



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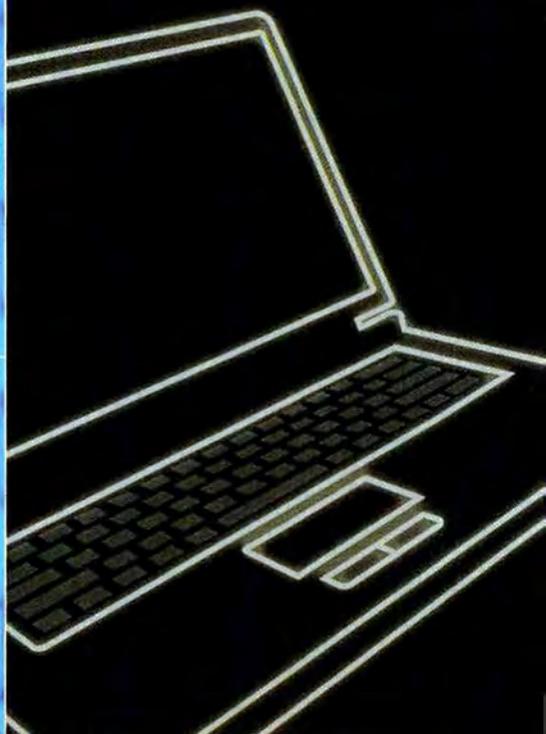
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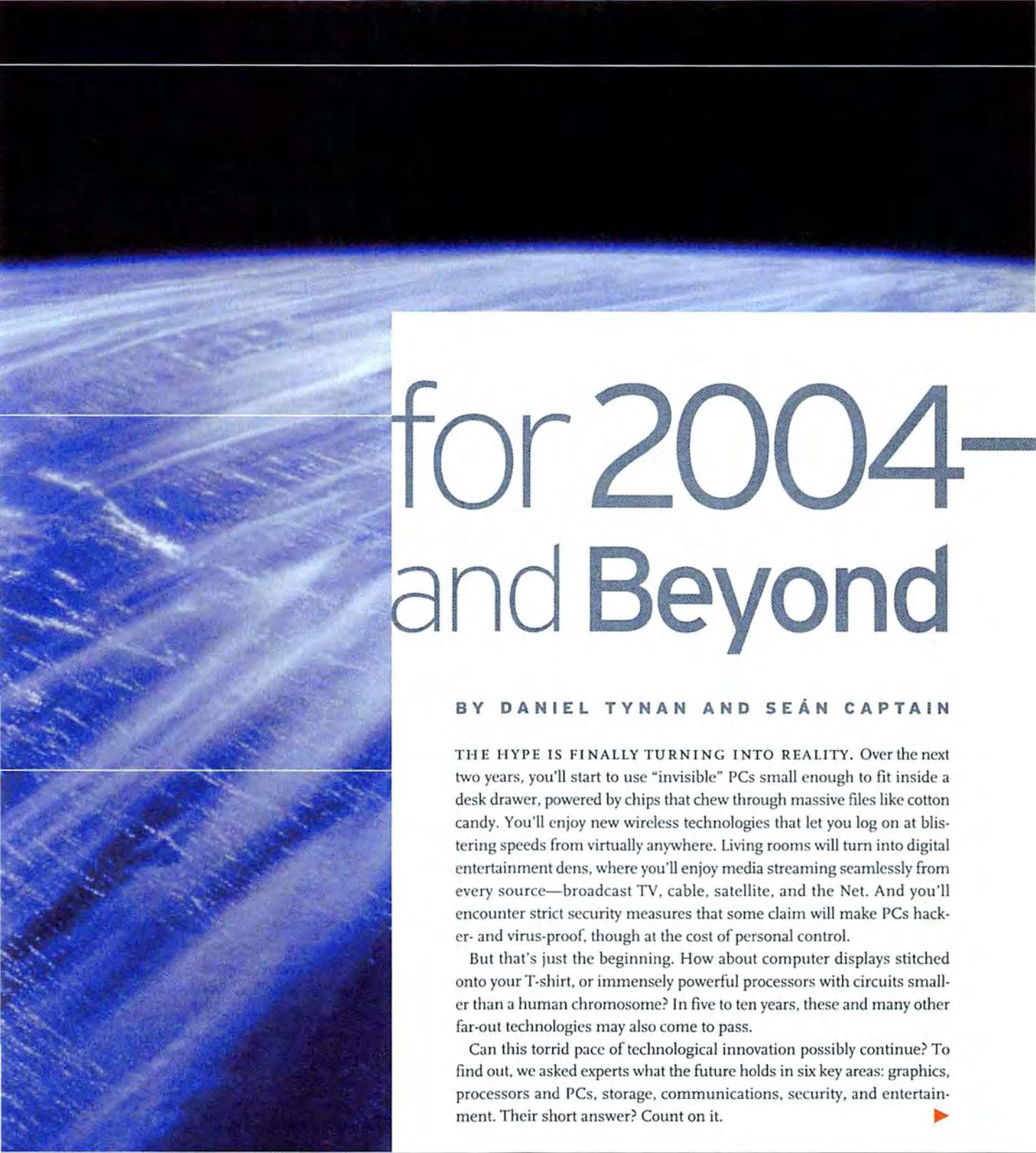


What's in Store



How will the PC change during the coming year? The next five years? We consult the experts and come up with answers.





for 2004— and Beyond

BY DANIEL TYNAN AND SEÁN CAPTAIN

THE HYPE IS FINALLY TURNING INTO REALITY. Over the next two years, you'll start to use "invisible" PCs small enough to fit inside a desk drawer, powered by chips that chew through massive files like cotton candy. You'll enjoy new wireless technologies that let you log on at blistering speeds from virtually anywhere. Living rooms will turn into digital entertainment dens, where you'll enjoy media streaming seamlessly from every source—broadcast TV, cable, satellite, and the Net. And you'll encounter strict security measures that some claim will make PCs hacker- and virus-proof, though at the cost of personal control.

But that's just the beginning. How about computer displays stitched onto your T-shirt, or immensely powerful processors with circuits smaller than a human chromosome? In five to ten years, these and many other far-out technologies may also come to pass.

Can this torrid pace of technological innovation possibly continue? To find out, we asked experts what the future holds in six key areas: graphics, processors and PCs, storage, communications, security, and entertainment. Their short answer? Count on it. ▶



96 DISPLAYS & GRAPHICS



97 INSIDE THE BOX



99 STORAGE



100 COMMUNICATIONS



102 SECURITY



104 ENTERTAINMENT

Display's the Thing

AS MONITOR AND GRAPHICS technologies continue to improve, you'll see increasingly realistic 3D images on flatter and brighter displays. The LCD is here to stay, folks. According to IDC, flat-panel display shipments will surpass those of tubes for the first time in 2004.

For PCs, the 17-inch LCD will be the sweet spot over the next few years, as prices drop below \$300. But don't expect prices to sink much lower, or screens to get much bigger, warns Jon Peddie of Peddie Research. "LCD manufacturers make their lowest margins on desktop monitors," he says, "and the cost of making them will keep the bottom price around \$250."

LCDs With Eye-Popping Color

TODAY'S BEST LCDs produce a depth of color about equal to that displayed by a CRT monitor. In 2004 you may see LCD monitors and TVs capable of achieving about a 45 percent wider color range, called a *gamut*. The result could be a boon for everyone from designers and photographers who demand precision in their work to home viewers who want to see cinematic color on their LCD TVs.

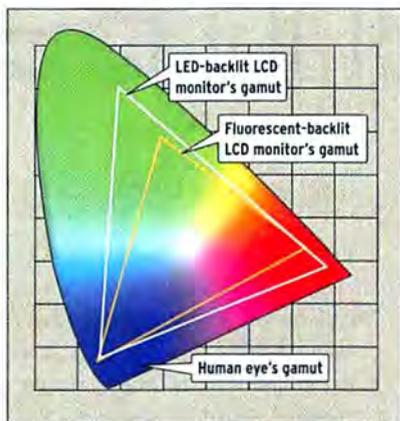
The trick is in replacing fluorescent backlights with light-emitting diodes. Proponents say that mixing the output from red, green, and blue LEDs produces a truer white backlight, which enables a wider color gamut.

NEC-Mitsubishi plans to launch a desktop monitor with LED backlighting in the second half of 2004. And Lumileds, one of the main suppliers of LEDs for backlights, says that you may see enhanced PC monitors from at least one other company and TVs from up to two manufacturers, by the end of 2004.

—Seán Captain



THE SAME MONITOR produces deeper colors with an LED backlight (at right) than with a fluorescent backlight. However, proper calibration will be needed to ensure that the colors are not only more dramatic, but also more accurate.



BIGGER COLOR SWATCH: Boosters say LED-based monitors cover a larger gamut than fluorescent-based LCDs and CRTs.

While there's still some room for innovation, most of the improvements will be internal, notes Peddie. For example, screens will run cooler and consume less power. The real action will be in home entertainment, as large-screen LCDs drop in price to compete with plasma and projection technologies.

GET THE OLED OUT

POTENTIAL RIVALS to the LCD's dominance may come from screens using Organic Light-Emitting Diodes (OLED, pronounced "oh-led"), which employ naturally luminous materials that are brighter and more energy-efficient than LCDs.

"OLED is the one flat-panel competitor that looks like it might challenge LCDs over a range of applications," says Ken Werner, editor of *Information Display* magazine.

Active-matrix OLED displays require complex internal electronics, making them more costly to build. But last May, Samsung SDI and Universal Display unveiled a prototype OLED using existing LCD manufacturing technology that may pave the way for mass production.

"It's very exciting," says Werner. "Down the line, we may be able to make an OLED comparable in price to an LCD."

While OLEDs have already begun to show up on cell phones and digital cameras, Werner believes the first OLED screens for notebooks won't emerge for at least two years.

GRAPHIC JAMS

WHEN IT COMES TO PC GRAPHICS, you'll see two divergent trends, say experts. As integrated graphics chips continue to replace graphics cards in a lot of low-end PCs, many users will experience "good-enough graphics," says Peddie, "which is fine for the majority of people, who use [mainly] Office apps."

Today about 55 percent of desktops use integrated graphics chips, says Peddie, a number unlikely to change in the near future. Most are made by Intel, which now ships more graphics processors than any other company.

"Over time we'll see integrated solutions incorporate more advanced features," says Dean McCarron, principal analyst for Mercury Research in Cave Creek, Arizona, "but they will always be lagging one or two generations behind stand-alone cards." For gamers and graphics professionals, however, a new gener-

ation of graphics processing units will take them into the stratosphere. The latest generation of GPUs will really shine in upcoming games such as Half-Life 2 and Doom 3 that take advantage of pixel- and vertex-shader programs to speed up rendering and create much more natural-looking 3D images.

But even today's fastest GPUs aren't enough. "Right now developers can write complex shaders that could bring your graphics hardware to its knees," says McCarron. "They're holding back the quality of the rendering so the apps are still usable."

In the next five years, you'll see much more complex and flexible GPUs running 16, 32, or 64 parallel graphics pipelines.

"Game developers will be able to get exactly what they want rendered on screen," McCarron adds. "That means a higher degree of realism, with a lot more experimentation and cool effects."

Inside the Box

TECHNOLOGY MARCHES ON, but some things never change. Take the chip wars, for example. Last fall AMD fired a shot across Intel's bow by shipping the first 64-bit computing platform for Windows desktops. (Apple beat AMD to market with its 64-bit G5 Power Macs in September.) The 2-GHz Athlon 64 can boost processor-intensive tasks like data encryption, 3D gaming, CAD, and content creation. But its power won't be truly felt until 64-bit versions of Windows XP and key applications arrive; at press time Microsoft announced

PAGE TURNERS

LOOKING FURTHER OUT, the world of graphics and displays begins to resemble the world of science fiction. Last spring E Ink (www.eink.com) demonstrated "electronic paper" (made on a thin, flexible steel foil) using capsules of black and white pigment that react to electrical charges. Apply a negative current to the capsule, and white particles rise to the surface; add a positive charge, and black particles form words and images.

The sheet, about the size of a PDA display, can be rolled into a 1-inch cylinder, and it sports a 96-pixel-per-inch resolution comparable to that of most handhelds. The first electronic books using such technology should be available by mid-2004, says Darren Bischoff, E Ink senior marketing manager.

that Windows XP 64 would be delayed until late 2004.

In response to AMD's move, Intel announced the Pentium 4 Extreme Edition. The 3.2-GHz chip features a larger memory cache, an 800-MHz frontside bus for faster data transfer, and an additional 2MB of L3 cache. Like the Athlon 64, the Extreme chip is aimed at gamers and other performance junkies.

Later this year Intel will ship a new line of Pentium 4 chips, currently code-named Prescott. They'll be the first CPUs made with a new 90-nanometer fabrication process that creates ▶

UPDATE

WHATEVER HAPPENED TO...?

PROMISING technologies are like showbiz stars. Some make a splash and disappear.

Others fade away for a bit, then recapture the limelight.

DataPlay was a one-hit wonder. The half-dollar-size optical discs—able to hold up to 500MB—looked like the perfect media for MP3 players in 2001. But after the iPod arrived, the future of portable music belonged to mini hard drives. When iRiver launched the first DataPlay-equipped

player in mid-2002, scarcely anyone noticed. But now iRiver is one of several companies selling players using

the Cornice Storage Element, a 1.5GB hard drive about the size of DataPlay's disc. And now some former DataPlay employees are working at Cornice.

Micro fuel cells may finally allow mobile electronics to achieve nirvana. By extract-

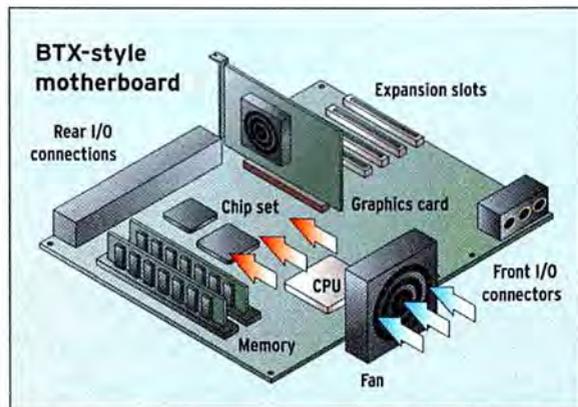
ing electricity from a refillable liquid, likely alcohol, a fuel cell could produce up to 20 times as much power as a battery of the same size. Micro fuel cells still face hurdles, including regulatory approval. (Will the FAA allow flammable liquids in carry-on bags?) But with over a dozen companies, including PC makers, pursuing the technology, you may see some notebook fuel cells by 2005. —Sean Captain

ACTUAL SIZE: Cornice hard drive (left) and DataPlay optical disc.



Cooler and Quieter PCs

EVERYONE WANTS A PC WITH THE POWER OF A JET ENGINE, but not with the noise of one. A new motherboard design called BTX promises to allow continued performance increases while requiring fewer noisy cooling fans. Most of today's desktops have motherboards with the ATX



The BTX design situates the processor at the front of the PC so that it is first in line for the cooling air, which then passes over the system chip set, the RAM, and the graphics card. This setup should cut the minimum number of noisy PC cooling fans in half—from four to two, says Intel. The arrangement also allows shorter wiring paths between key components, an increasingly important feature as memory, system, and peripheral bus speeds increase.

Intel expects to make its first BTX motherboards by mid-2004. Some other motherboard-makers have expressed support for BTX, but they haven't committed to adopting it. —Sean Captain

circuits nearly 50 percent smaller than the ones inside today's P4s. (AMD and Transmeta also have 90nm chips in the works.) As circuits get smaller, chips can run at higher clock speeds and execute more instructions per second.

"The 130nm chips have begun to reach their limit at around 3.2 GHz," notes Nathan Brookwood, principal analyst with research firm Insight 64. "Prescott should be able to get up to 4 GHz." The Prescott processor will also feature a larger on-chip cache, which will speed performance by reducing the CPU's need to access system memory.

Rumors abound that Tejas, Intel's successor to Prescott, will debut near the end of the year with speeds from 5 to 7 GHz, that it will feature laptop-like power-management features, and that it or Prescott will support 64-bit applications.

This year will also see faster memory chips, says Brookwood, as Double Data Rate 2 chips become available. DDR2 memory's data-transfer rate starts at 533 megabits per second (about 4.3 gigabits per second per memory module), 33 percent faster than first-generation DDRs. The chips will also be smaller, requiring less power than first-generation DDR. Hot on their heels will be DDR3, capable of moving data at 1.6 gbps (6.4 gbps per module) and already being tested by makers of high-end graphics cards.

DOWN THE ROAD

MOORE'S LAW—the concept that chip performance will double every 18 months or so—is alive and well. Researchers are just beginning to build chips with circuits only 65nm wide, and IBM and AMD are among those working to develop a 45nm process. Intel envisions paring that to 22nm by the year 2011. But to get much smaller than 45nm, chip makers may have to adopt new methods.

Today's chips are created using ultraviolet lithography, which focuses light through lenses to carve circuit patterns into a silicon wafer. The smaller the wavelength, the smaller the circuit. By around 2009, chip makers will hit a physical limit on wavelength size and will switch to a process called Extreme Ultraviolet Lithography. Using xenon gas molecules and mirrors, EUVL can shrink circuits by a factor of 10.

But by 2013 the ability to improve performance by shrinking silicon will be nearing its end, says Jim Tully, chief of research for Gartner. "Vendors and immediate users of semi-

conductors must plan for the use of next-generation semiconductor technologies such as molecular transistors," he notes.

For example, researchers from UCLA and Hewlett-Packard have created molecules that can be turned "on" or "off" with minute amounts of current. Such molecules could be used as switches inside logic circuits to build infinitesimally small chips.

HOP ON THE PCI EXPRESS

THOUGH CHIPS WILL GROW EVER SMALLER and faster, some of the most compelling developments will take place in the pathways to and from those chips, says Peter Glaskowsky, editor of *Microprocessor Report* in San Jose, California.

The key to these changes is PCI Express, a faster way to shuttle data between system components that's due out later this year. Designed to replace the outdated PCI bus and the hodgepodge of different interconnects within each system, PCI Express is "the most radical redesign of the PC platform since the advent of the PCI bus in the early 1990s," says Glaskowsky.

For example, this new bus would replace AGP 8X slots and double the speed of graphics data flowing to and from system memory, enabling faster 3D gaming and smoother video editing. The high-speed connection would allow users to attach giga-

bit-speed ethernet cards for ultrafast networking, or to easily string together massive hard drives for terabytes of storage. Intel claims PCI Express could ultimately reach transfer rates of up to 80GB per second (AGP 8X cards currently max out around 2GB per second) and could support CPUs running at 10 GHz.

PCI Express will also allow users to connect their high-speed peripherals outside the box, à la USB or FireWire, says Insight 64's Brookwood, making for smaller computers. Coupled with

Intel's new Balanced Technology Extended designs (see "Cooler and Quieter PCs" on page 98), PCI Express could help make your desktop machine invisible—hidden inside a desk or nestled within the LCD housing.

"The PCs we'll buy just three years from now will have features, user interfaces, and expansion options that are radically different from those in the systems we're using today," predicts *Microprocessor Report's* Glaskowsky.

A Drive to Succeed

IN THE FUTURE YOUR HARD DRIVE may not pack a whole lot more data. But it will be faster and easier to use, thanks to Serial ATA drive interfaces that began appearing in systems last year. SATA drives are easier to install, have thinner cables, and boast data-transfer rates up to 50 percent faster than those of the fastest drives built on the parallel ATA standard that has been in use for more than a decade.

SATA drives will make up about 30 percent of desktop drives shipped in 2004 and about 70 percent in 2005, says Dave Reinsel, IDC storage research manager. "For the average PC user, Serial ATA means simplified cabling, a cooler-running PC, and no more worries about bandwidth bottlenecks," he says.

But while the drive technology is new, capacities won't change much right away. Typical desktop PCs will continue to ship with 60GB to 80GB drives next year—plenty for most users.

DRIVE BAY PACKERS

THOUGH MOST CONSUMERS aren't clamoring for more storage, manufacturers continue to seek ways to build bigger drives.

"The two most promising technologies in the labs today are *perpendicular recording* and *heat-assisted magnetic recording*," says longtime storage analyst Jim Porter, principal at Disk/Trend.

Maxtor recently used perpendicular recording to store up to 175GB per hard-disk platter, surpassing today's maximum of 100GB. Instead of storing data by magnetically orienting the particles on the platter's surface longitudinally along a cir-

cular track (like laying bar magnets flat—some oriented north-south, others south-north—in a circle), this scheme magnetically orients the particles perpendicular to the drive's surface (like a circle of bar magnets standing on end). Perpendicular recording can pack data more densely, and could spawn drives of 700GB, or roughly double the current maximum, in two to three years.

Heat-assisted magnetic recording uses a more magnetically stable disk surface, allowing denser packing and increasing data stability. Normally this requires a stronger write head to orient the particles of the disk's surface. But HAMR drives use a laser to heat the spot being written to in order to make it easier to orient magnetically. Seagate has demonstrated HAMR technology that it claims could ultimately store 50 terabytes per square inch.

However, warns Porter, such technology could be five to ten years away. Data density is still growing at about 50 percent per year using less-costly, conventional techniques.

"The most important spec on any drive is price," says Porter. "None of this [new] technology will turn into products as long as manufacturers can produce conventional drives for less." ▶

WINDOWS

LONGHORN

WHAT OS will future PCs run? For a preview of Microsoft's Longhorn, see "Your Next OS: Windows 2006?" on page 34.

Big Storage for Small Spaces

WITH HANDHELD DEVICES LIKE digital cameras and music players proliferating, you can expect to see continued efforts to cram more data into smaller spaces. In mid 2004, for example, Iomega will introduce its DCT removable 1.8-inch drives. The drive mechanism is small enough to fit into a notebook PC Card; the individual discs, premiering at 1.5GB, will cost only about \$10. Iomega expects the drives to appear in PC Card adapters, USB key chain (thumb) drives, MP3 players, and digital still and video cameras.

While those Iomega drives spin up, flash-memory competitors will not be standing still. SD cards, now at 1GB, will hit 2GB by the middle of 2004. You could shoot a day's worth of high-resolution digital photos without changing cards on your ultras-small camera. And some companies are substituting SD for comparatively gargantuan MiniDV tapes to build camcorders about the size of an iPod, such as the Panasonic SV-AV100 D-snap.



IOMEGA'S DCT removable disc (left) and drive mechanism.

—Sean Captain

Go Mobile, Stay Connected



THOUGH DSL AND CABLE MODEM connections continue to increase, your Internet experience will become more and more mobile, as laptops, handhelds, and cell phones reach out and connect from virtually anywhere.

For most users the choice will be speed versus availability, says Adam Zawel, Yankee Group analyst. Will you hook up through a low-bandwidth but ubiquitous cellular connection, or will you hunt down a Wi-Fi hot spot and log on at broadband speeds? "Ideally, you'd have both options, so you can connect to the fastest network that's available to you," he says.

For the short term, 802.11 (or Wi-Fi) local-area networks will dominate. Wi-Fi LANs are easily fast enough to handle cable or DSL. According to the Wi-Fi Alliance, the number of 802.11-ready devices will climb from around 25 million in 2003 to 60 million in 2007; public Wi-Fi access points (hot spots) will climb from about 30,000 to nearly 150,000, says In-stat/MDR.

You soon may be able to enjoy high-speed connections while moving at high speeds: NEC recently demonstrated technology that allowed a test user to switch seamlessly from one 802.11 network to another in a Porsche traveling 205 mph.

Starting in 2005, WiMax networks based on the 802.16a spec will start to appear (see below). "We see 802.16 as a kind of silver bullet—it gives you the range of a wide-area network with the throughput of Wi-Fi," says Clint Wheelock, director of wireless research at In-stat/MDR, adding, "It will be especially good for

areas that can't be served by cable modem or DSL. But it's not a market reality yet."

WILL 3G FINALLY ARRIVE?

WHILE 802.11 EXPLODES, you'll see gradual growth in wireless Net access over the cellular network. After two years of false starts, the U.S. transition to third-generation (3G) data networks may finally be under way. Verizon recently rolled out a high-speed 3G service in the San Diego and Washington, D.C., metro areas that delivers data at 300 to 500 kilobits per second, with bursts up to 2 mbps. AT&T Wireless is planning to launch a 384-kbps data service in four U.S. cities by the end of 2004.

But adoption has been slowed by a welter of incompatible cellular standards, pricey handsets, and limited speeds. "There are no apps driving demand for 3G data access," says Wheelock. "Wi-Fi is a much more logical extension of broadband."

Meanwhile, Japan's DoCoMo (the world's leading wireless data provider) is conducting field trials of 4G networks, which will theoretically shuttle data at speeds of 100 mbps, though a working network probably won't be in place before 2010.

WIRELESS WORLD

THESE WIRELESS NETWORKS will lead to a raft of powerful portables. Intel is requiring Wi-Fi support in Centrino notebooks and has announced a new Xscale chip for PDAs and cell phones. Code-named Bulverde, the processor will support 3G networks and allow for real-time video capture, better multimedia playback, and lower power consumption.

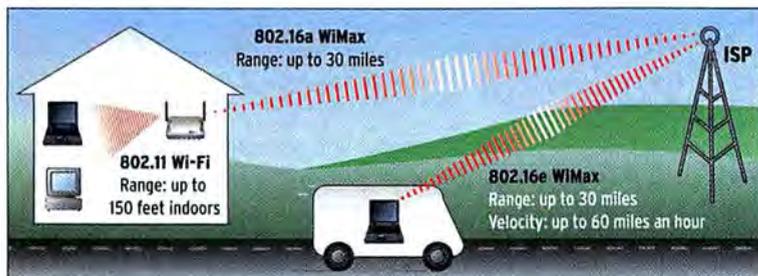
Future devices will support multiple wireless technologies, so they can connect to any kind of hot spot without breaking a sweat, and deftly switch between Wi-Fi and cellular networks.

"You'll use Wi-Fi in the airport or your hotel room, and once you walk out the door, you'll switch to 3G," says Wi-Fi Alliance spokesperson Brian Grimm. "It just makes sense." ▶



NOKIA'S 6230—supporting EDGE 3G—comes to the U.S. this year.

WiMax: Wireless on Steroids



WHILE TODAY'S 802.11 Wi-Fi standards reach up to about 150 feet indoors, an emerging wireless technology called 802.16, or WiMax, could stretch as far as 30 miles. In late 2004 or early 2005 some homes and offices in areas without sufficient wired connections for DSL or cable services may receive broadband from a version of WiMax called 802.16a. Intel, a member of the nonprofit WiMax Alliance, envisions routers with two antennas: one using 802.16a to link to an ISP, and another with a form of 802.11 for faster connections within the home or office network.

By 2005 or 2006 another dual radio may appear in notebooks and handhelds, allowing them to connect to 802.11 networks when near a hot spot and to WiMax networks at other times. This will likely be the 802.16e flavor of WiMax, which may be able to maintain connections with users moving at up to 60 miles per hour. —Seán Captain

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PC-land Security



THE YEAR 2003 MARKED A TURNING point in PC security—and not in a good direction. Users were overwhelmed by waves of e-mail worms, from Blaster to SoBig, that stole personal information, spewed spam, and conducted DDoS (distributed denial of service) attacks. Security experts expect all of these threats to increase, not diminish.

“Over the next few years, we’ll see a lot more controlled zombie networks, with end-user desktops used as servers for spammers and DDoS,” says Thor Larholm, senior security researcher at PivX Solutions in Newport Beach, California.

For the next two years, we’ll use the same weapons to fight back: antivirus software, spam filters, personal firewalls, and Windows patches. The difference is that many of these utilities may become part of the OS and operate automatically.

For example, Microsoft has announced a scheme that would turn XP’s Internet Connection Firewall on by default; the plan might also install Windows and Office patches automatically. The company has test-marketed versions of Windows containing a stronger firewall, plus antivirus and backup utilities. Given Microsoft’s history of packaging watered-down utilities in its OS, experts are skeptical of this approach.

The good news is, you’ll see fewer buffer overflows or software “holes” that allow malicious code to take control of a machine, says Chris Wysopal, VP of Research and Development for security consultancy firm @stake. That improvement is due in part to new tools that find overflows before they’re exploited, and partly to a shift toward “managed code,” which examines each set of instructions and grants permission before the code can execute.

The bad news? “Social-engineering attacks to draw people to fake Web sites or run Trojan [horse] programs will be worse,” Wysopal says. “The human will still be the weak link.”

SECURE-BUT AT WHAT PRICE?

REMOVING HUMAN ERROR from the equation is a key part of Microsoft’s Next Generation Secure Computing Base, an ambitious proposal that aims to solve myriad security problems. Formerly known as Palladium, NGSCB (pronounced “eng-scub”) will be woven into Microsoft’s Longhorn OS when it’s released in 2006.

Among other things, this scheme will verify the identity of each application, so you’ll know that the software you just downloaded isn’t a Trojan horse. NGSCB will encrypt data and keystrokes so they can be read only by trusted apps. It will create a sealed memory space for each program, so viruses won’t be able to affect other programs.

And it will allow companies to determine how people use their content. For example, a software firm might prevent you from using unregistered versions of its products. If

you download a film, the OS might let you view it but not make copies. Or a business might allow only certain individuals to open a Word document containing sensitive information, and then make the doc delete itself after a few days.

Office 2003’s Information Rights Management feature allows you to control who can read or print documents, as well as to set expiration dates. But these capabilities demand some big trade-offs: Only Office 2003 apps can open restricted documents, and your network must be running Windows Server 2003.

Critics warn that such schemes could hand control of your computer to major corporations and could have other unintended consequences. “Vanishing e-mails will be attractive to corporations terrified of legal discovery,” notes Ross Anderson, reader in security engineering at Cambridge University in England.

NGSCB will require new hardware. So Intel is developing a chip architecture, code-named LaGrande, to support it. Citing privacy concerns, Intel has said it will recommend that system builders let consumers opt in to enable LaGrande functions. ▶

Stealth Security

GOOD ENCRYPTION technologies already exist, but using them can be daunting for anyone other than a security geek. However, several products promise to bring encryption to the masses by implementing it automatically, with little or no work needed from end users.

PGP Corporation’s new Universal software turns a server into a security box that encrypts, decrypts, and digitally signs a company’s e-mail, without requiring employees to lift a finger. People outside the company can download client software that manages encrypted communication with the server.

And recently Leadtek Research started shipping motherboards with ENova’s X-Wall LX-64 security chip installed. It automatically encrypts all data going into the hard drive and decrypts the data coming out, but

only if users first insert a dongle containing the encryption key into the system’s FireWire port.

—Sean Captain

A FIREWIRE key (above) unlocks data on the hard drive encrypted by the ENova chip (left).



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That's Digitainment

AFTER DECADES OF HYPE, the long-promised convergence of PCs and consumer electronics has arrived. What will the home of the not-too-distant future look like? You'll still have your PCs and your wireless LAN, but new devices will connect your more-traditional PC to the big-screen TV in the living room and the surround-sound stereo upstairs.

"The home PC will evolve from a processing device to much more of an entertainment and networking hub," says Dominic Ainscough, senior analyst for The Yankee Group.

Yankee projects that, by 2007, some 18.5 million households—or about 1 out of 5—will own digital media receivers (like the Roku HD 1000 pictured on our cover) that connect their PCs to their home entertainment systems.

New game machines will add features like the ability to record TV shows and to handle video and audio. And digital set-top boxes designed to show video on demand and play streaming media will also vie for your dollars, thanks in part to big pushes by Intel and Microsoft to gain a foothold atop the boob tube.

"Consumers are reluctant to add yet another black box to their entertainment centers," says Kurt Scherf, VP of research for Parks Associates in Dallas, "but putting a DVD player, a disc burner, and a [digital] video recorder in one box is pretty compelling."

KING OF ALL MEDIA

THE KEYS TO THE PC'S media domination will be new ways of handling multimedia data and moving it quickly between devices.

Do-It-All Boxes and Home Broadcasting



IN 2004 NON-PC boxes, like the one shown here (and reviewed on page 131), will further challenge media-savvy PCs. For example, Sony's networkable PSX—merging the PlayStation 2 game console, a TiVo-like video recorder, and a DVD player/recorder—should be hitting Japanese stores about now; Sony has not revealed U.S. plans. But a company called Ucentric says it will provide software to Samsung for a digital media hub that can "broadcast" stored content to TVs and stereos throughout the home by various means, including via ethernet cable or existing cable TV or phone-line wiring. That convenience could expand networking's appeal beyond early adopters with their spools of Cat5 ethernet cable. And by mid-2004, the IEEE should finalize the 802.11e standard to ensure "quality of service" for the smooth wireless streaming of audio and video content. —Sean Captain

PIONEER'S DVR-810H-S plays from and records to a hard disk and DVDs.

One technology likely to emerge by 2006 is UltraWideBand. Also known as IEEE 802.15a, UWB is a wireless technology that can blast out data at 100 mbps over distances of up to 10 feet.

UWB would be perfect for moving huge HDTV images between a media center and a TV set, says Parks Associates' Scherf. It could also replace USB 2.0 and FireWire cables for transferring images from digital camcorders to PCs.

"It requires a great deal of overhead to get HDTV packets to the right place at the right time," he adds. "Overwhelming speed is one way to guarantee quality of service."

In the next five years, the CPU's ability to handle multimedia will increase tenfold, notes *Microprocessor Report's* Peter Glaszkowsky. "Real-time HDTV-encoding would be something the CPU could do casually," he says. That should pave the way for affordable HDTV camcorders and hi-def home-movie editing.

HI-DEF JAM

COUCH POTATOES WILL MAKE a gradual transition to high-definition television, though not as quickly as once predicted. Currently, about a third of TV stations offer HDTV broadcasts, though only 4 percent of U.S. TV sets are able to display them, according to The NPD Group. The FCC has mandated that all new TVs be able to receive HDTV broadcasts by July 2007.

One barrier to digital TV has been the challenge of protecting digital content from file swappers. In November the FCC approved a plan that would require digital signals to contain a "broadcast flag"—code that allows broadcasts to be shared inside a home network but prevents their distribution on the Net. Critics fear such code may prevent consumers from burning copies of shows to a DVD—a form of copying currently allowed by law.

Assuming that consumers are able to record HDTVs, they'll face still another difficulty. The next home video standard—High-Definition DVD—really consists of two incompatible standards. Both the Advanced Optical Disc format, backed by NEC and Toshiba, and Sony's competing Blu-ray format use blue lasers to pack more much more data on to discs than today's DVDs. AOD can store up to 20GB on each side of a single-layer disc. Blu-ray discs hold up to 27GB of data per side. Both formats require new players, which (naturally) can't play discs produced in the other format. Who will win this particular format war? Stay tuned. ■

In the future, Contributing Editor Daniel Tynan and Senior Associate Editor Sean Captain will be much older.



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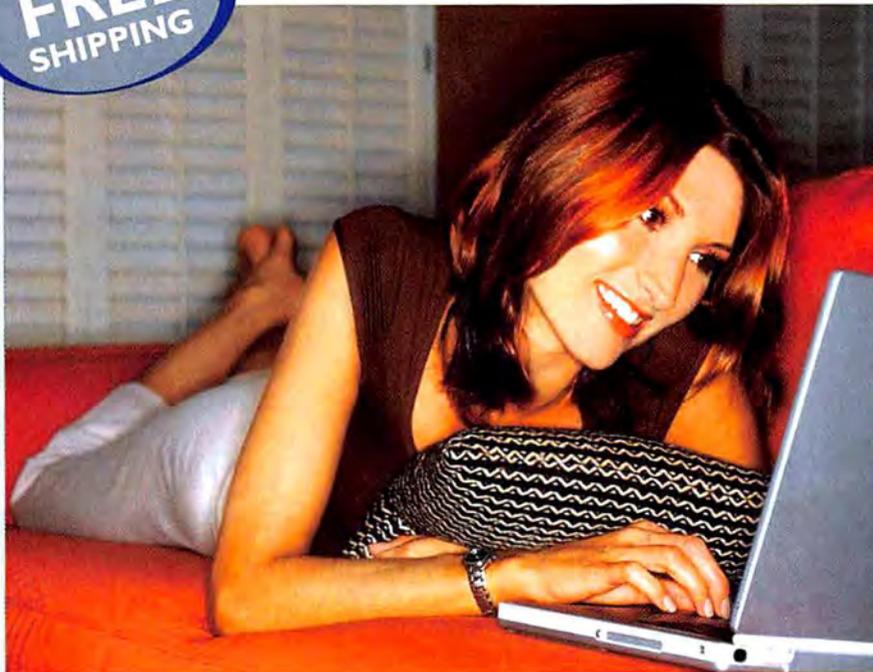
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BY JAMES OLIVER CURY

The



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Deal

IF THERE'S A golden rule of shopping, it's that you can always score a better deal. But finding real bargains on PCs, digital cameras, and other types of tech products takes skill, patience, and persistence. To help you get started, we've compiled a list of insider shopping secrets that can save you money, shield you from shady retailers, and help you recognize a genuinely good buy.

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the phrase *Find all digital cameras for less than \$300* in the search window, and Overstock searches its database for items that match the request.

COMPARE EVERY WHICH WAY: It's not enough to purchase the cheapest product that pops up in a search of one price-comparison site. For better deals and a better sense of who is selling what, try multiple search options. Visit a few pricing engines (see the chart below), consult sites like Froogle (Google's product search site), and browse retail shelves. Exhaustive searches pay.

SEARCH LIKE A PRO: At search and pricing engines, different combinations of words produce different results. Be as specific as possible. For instance, the search term *cameras* is less specific than *digital cameras*, which in turn is less specific than *Sony Cyber-shot DSC-U50*. Add the word *bargain* to the string, and you'll



NEXTAG.COM provides a chart that shows a product's price history.

likely get results for sites that claim to sell the Sony Cyber-shot DSC-U50 at lower prices. Experiment with words and with using quotation marks around phrases: Replace *bargain* with words like *deal*, *sale*, *reduced*, and *rebate*. But be skeptical: Some vendors that come up on your search for, say, *discount digital cameras* may be selling the goods at top dollar.

LET DECISION TREES GUIDE YOU: Instead of researching every feature, follow an automated decision tree to find product

candidates. Activebuyersguide.com employs an on-screen question-and-answer process that explains key features and ends with recommended products. PriceScan.com offers a similar weeding-out engine for pinpointing the product that matches your needs.

SIGN UP FOR E-MAIL ALERTS:

Ask to receive e-mail messages when the price of an item you want drops. At Yahoo Shopping (shopping.yahoo.com), you can set an alert; at Nexttag.com and PriceGrabber.com, you can indicate a target price and specify item condition (for example, new or refurbished).

CHECK BARGAIN SITES: For lists of sales, coupons, and rebates, browse AmazingBargains.com, CleverMoms.com, Bargainshopping.org, DealCatcher.com, DealHunting.com, Getmeadeal.com, Overstock.com, RefundSweepers.com,

FEATURES COMPARISON

HOW TO SIZE UP PRICE-COMPARISON SITES							
PRICEGRABBER.COM OFFERS MANY USEFUL TOOLS to help you find bargains.							
WEB SITE	Site interface	Compares products side-by-side	E-mails price-drop alerts	Supplies rebate form	Other features	Merchant ratings posted by	Advertising policies
MySimon.com	<ul style="list-style-type: none"> Buying advice through Shopping Picks 	No	No	No	<ul style="list-style-type: none"> MySimon Says feature has brief descriptions, pros, cons, and tips Refine-search option narrows price range 	Site staff	<ul style="list-style-type: none"> Some stores pay for prominent placement in search results but their business relationship is not identified Ads appear at top and bottom of search results
NexTag.com	<ul style="list-style-type: none"> Intuitive but text-heavy Almost no ads to compete with main content until you reach merchant lists 	Yes	Yes	Yes	<ul style="list-style-type: none"> Shows recent price drops and a graph of price change over time 	Users	<ul style="list-style-type: none"> Some stores pay for prominent placement in search results but their business relationship is not identified Merchants pay for messages like "free shipping" in search results
PriceGrabber.com ¹ Best BET	<ul style="list-style-type: none"> Efficient use of space thanks to text-heavy listings Featured Merchants sometimes clutter the page 	Yes	Yes	Yes	<ul style="list-style-type: none"> Indicates whether the best deal found is refurbished or used Displays sellers who ship internationally For multiple items, Shopping list indicates whether it's cheaper to buy from one vendor or several 	Users	<ul style="list-style-type: none"> Featured Merchants pay for prominent placement and are clearly labeled and defined Most ads appear on right side of page
Shopping.com	<ul style="list-style-type: none"> Clean and simple Front page displays fewest number of product categories and subcategories Some product photos blurry 	Yes	No	No	<ul style="list-style-type: none"> Uses hierarchical subcategories (price, brand, feature) to narrow browsing results Explains terms like <i>processor speed</i> through pop-up boxes Posts user reviews from Epinions (its sibling company) 	Users	<ul style="list-style-type: none"> Stores pay for prominent placement in search results but their business relationship is not identified Ads appear at right of page

¹ PC World's online Product Finder service is operated by PriceGrabber.com.

Techbargains.com, and TotalDeals.com. You'll find both new stuff and old clunkers at these sites, many of which link directly to deals featuring the latest products at the manufacturers' sites.

BROWSE THE MAKER'S SITE: With a little effort on your part a good deal can become a great one. Once you see on a pricing engine a product you like for a price that seems reasonable, you should check the manufacturer's site to see how much your desired item costs there. Sometimes makers update prices on their sites before the data can reach the pricing engines.

CLICK SALES AND CLEARANCE LINKS: Brand-name sites always have sales. Scroll around, and you'll see links for sales, clearance centers, free shipping, and so on. Shopper.com, for example, has a tab for its Clearance Center, which includes refurbished and overstock items, and another for Price Drops, which shows the discounting date and percentage of savings. Amazon.com dedicates sections of its site to Today's Deals and an Outlet link. Dell.com has Dell Outlet and an area for refurbished systems (which includes almost-new, returned items), while IBM.com has a Special Offers page.

SEEK OUT REBATES: At Ebates.com, search for coupons, free shipping, or other kinds of deals. Search by product category—computers, DVD and video, books, and so on—and specify the manufacturer or store you're interested in (for example, Amazon.com, HP, or Sears). But beware: Getting your rebate money can be a hassle. So be prepared to put some time and effort into the process.

VISIT NEWSGROUPS: To get the most exhaustive and impassioned counsel, visit sites dedicated to a particular device. From any search engine, type the name of your desired product in the search field. For example, doing a search at Google's Groups page can lead you to newsgroups where people debate a product's merits and flaws. Post a message, and you're



READER TIP: “ If a vendor asks for a coupon code at checkout and you don't have one, go to Google and search for the store name and the words 'coupon code' (or whatever the merchant asked for). This often leads to the shop's special offers and discounts. I've saved money this way—and even received free stuff. ”

—Steve Bielski, computer programmer

likely to be besieged with advice (consider using a secondary e-mail address to avoid spam). Alternatively, visit Epinions.com for product and vendor reviews. If you favor a particular reviewer, you can add him or her to your network of reliable, online-shopping sources.

KEEP RECORDS: Invoke your inner lawyer. Print or capture a screen shot of every page of your online transactions, save all receipts and e-mail correspondence, and write down the names of the salespeople you talk to, along with the dates of your conversations. Write the description and price of the item (in case you don't get what you ordered), plus warranty information, expected delivery date, and other pertinent data. If dates don't automatical-

ly appear on your paper trail, write them in; disreputable vendors may put incorrect information in their documentation.

READ PRIVACY NOTICES: It may seem unnecessary to inquire about privacy issues when all you want is a bargain, but you might really pay, so to speak, if you're not careful. For example, a site may offer attractive discounts but make up for the resulting low profit margin with revenue earned by selling your data—name, credit information, shopping habits, and so on. This could lead to more spam, unsolicited telephone calls, or even identity theft. If a site shows seals from Truste, BBBOnline, or WebTrust, it will likely exercise a reasonable level of privacy protection. But even these seals are no guarantee. ▶

BEWARE OF BAIT-AND-SWITCH PLOYS:

It's the world's oldest scam: a store advertises a great price for a product and then claims to have sold out of it when you want to buy it, forcing you to opt for a similar but different product—at a higher price. Or vendors may try to persuade you to buy accessories as a way to jack up

the price. For more about all-too-common shady sales tactics, check out "Camera Confidential" (find.pcworld.com/39143).

AVOID THE GRAY MARKET:

You can find deals on items that were intended for sale in another country and rerouted to the United States. But gray-market goods,

also known as international models, may come with non-English manuals or with AC adapters set to the wrong voltage, and they may not carry a U.S. warranty.

READ THE WARRANTIES: Find out what the product warranty covers, how long the coverage lasts, and where you have to ▶

SMART SHOPPING

How to Verify No-Name Vendors

BEFORE CLICKING THE PURCHASE BUTTON, make sure you're buying from a reliable vendor. The first place to check up on a company is at the Better Business Bureau (www.bbb.org). This organization processed more than 600,000 complaints in 2002 alone and maintains an online database of more than 2 million reports, according to BBB spokesperson Holly Cherioco. The BBB also works with a wide range of local and national government officials and agencies (state attorneys general, the FTC and SEC) to crack down on consumer fraud.

RESEARCH A COMPANY'S BACKGROUND AT BBB.ORG: Click *Business*, and type in the name of the U.S. or Canadian company and the city where it operates. If the BBB has a listing, you'll receive a report about

the business, including its start date, principals, and contact numbers, and whether it is a member of the BBB (and hence subscribes to the organization's code of ethical business practices), plus a history of prior complaints and whether they were resolved (the BBB had a 70 percent settlement rate in 2002). For more information, contact your local BBB branch (type in your zip code at the BBB site).

VISIT CONSUMER WEBWATCH (www.consumerwebwatch.org): This watchdog organization is run by the same folks who publish *Consumer Reports*. Though the site maintains a growing database of companies deemed credible by Consumer WebWatch standards, it's more of a repository of e-commerce ethics guidelines, research findings, and links to consumer groups, e-commerce committees, journalism associations, and privacy advocates.

BROWSE RATINGS SITES: They offer user feedback about products and companies. Type a product name into Epinions.com, for example, and you'll see essential information—specs, reviews, and

details about merchants—plus a quick summary of the vendor's ease of ordering, customer service, on-time delivery record, and selection. Read reviews or post your own. Get a sense of how trustworthy the reviewers themselves are by looking at the number of

reviews they have posted, when they joined Epinions, and who else trusts their judgment.

Senior analyst Christopher Kelley of Forrester Research recommends that prospective buyers visit a wide range of sites to get the most complete picture possible. "Look

for patterns that exist with previous shoppers' feedback," he suggests. "One consumer may have a bad experience with a retailer, but if there are thousands of good responses and only one

bad response, chances are you're buying from a great company."

Other ratings sites include Complaints.com, Corporationtrust.com, Epubliceye.com, PlanetFeedback.com, Resellerratings.com, and RipoffReport.com. These sites, however, won't get your money back. Visit pricing engines, too: They tally and post user feedback.

WHAT TO DO IF THE VENDOR IS NOT AT BBB OR OTHER SITES: If Joe-Bob's PC Shoppe is not listed in the BBB's database or elsewhere, don't write the company off; it may be too new to have a listing, or it may be located on foreign soil. E-mail the company for more information, and ask if it belongs to accredited consumer organizations. Steer clear of vendors that do not list contact information.

CLICK EVERY SEAL OF APPROVAL: Make sure seals (such as BBB, Truste, VeriSign, and WebTrust) link to the sponsoring organization. For example, clicking the BBB seal should take you to its merchant reports. Finally, pay a little extra for a vendor with a good track record. After all, your peace of mind is worth every penny.

Avoiding Debit Scams
Top 10 Scams
Keys to Safe Shopping
Are You on a Sucker List?
High Octane Gasoline
MORE...

The screenshot shows the Epubliceye.com website interface. At the top, there's a navigation bar with links for 'about us', 'links', 'contact', and 'sign up!'. Below that is a search bar with the text 'Search Safe Shopping Sites' and a 'GO' button. The main content area is divided into several sections: 'Global Connections' with a globe icon, 'Categories' listing various product types like 'A List', 'Collectibles', 'Home', etc., and a 'Consumers' section. The 'Consumers' section is highlighted with a red box and contains links for 'about', 'faq's', 'compare', 'safe shopping radio', 'seals', 'privacy', and 'naked scams'. A red arrow points from the 'MORE...' link in the left sidebar to the 'Consumers' section.

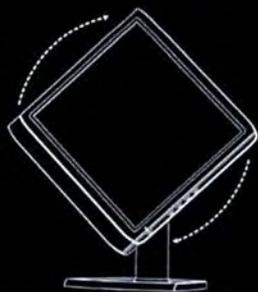
EPUBLICEEYE.COM offers tips on how to avoid scams and has an area for consumers that covers such topics as privacy and safe shopping.

SUDDENLY, YOUR BIG, FAT, BEIGE MONITOR SEEMS SO EXPENSIVE.

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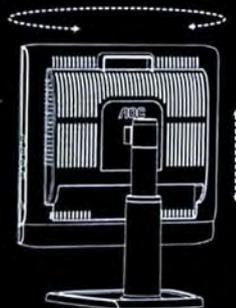
The astonishing and affordable new line of AOC flat-screen displays are here. And when you're done admiring its revolutionary design and razor sharp LCD screen, be sure to check out some other impressive features. The LM729 boasts a 17" screen, 1280x1024 resolution, 2W+2W speakers, front/back tilt, 90° screen rotation for landscape or portrait mode, 70° swivel, and height adjustment. The LM929 has all that with a 19" screen and awesome 3W+3W speakers. Put one on your desk today, it's all the office improvement you'll ever need.



90° screen rotation for landscape/portrait mode



3W+3W speakers, front/back tilt



110mm height adjustment, 70° swivel

AOC[®]
EYES VALUE

send the product to obtain repairs, a refund, or replacement. By law, if the item costs more than \$10, the seller must explain whether it's covered by a full or limited warranty; the former type entitles you to free repair during the warranty period at no additional costs for shipping, removal, or reinstallation. But don't assume that you'll get a warranty: Used (or as-is) items often come with none at all, or they may include only scanty, 90-day coverage.

ASK ABOUT RETURNS AND RESTOCKING FEES:

If you're ordering online and the policies are not in plain sight, your smartest course is to leave the site and do your shopping elsewhere. Remember to check the money-back guarantee period, and find out whether you can return an item that you purchase online at the one of the company's brick-and-mortar outlets. Would the return be for cash or for credit? Does it matter if the box is already opened? There should be no extra charge if you return a damaged or incorrect item, but if you want to return your purchase for some other reason, the vendor may charge you a restocking fee—usually between 10 and 30 percent of the original sale price.

ELIMINATE SHIPPING FEES: Instead of buying at sites that have brick-and-mortar equivalents (for example, Best Buy and Target), call in an order to the real-world store and pick it up. Or look for free shipping offers from Web-only stores such as Amazon.com and Buy.com.

ONLINE



FOR TIPS on how to participate in online auctions safely and successfully, go to find.pcworld.com/39188.

VISIT SHIPPING CARRIERS' SITES: Make sure that the vendor you're buying from is not compensating for a low price by overcharging you for shipping and handling. Compare shipping costs by visiting the U.S. Postal Service site (www.usps.gov) or the United Parcel Service (www.ups.com) and plugging in package weight and destination. At IShip.com, you can

via e-mail (if you must, break it up into two messages), and don't give out passwords, PINs, or the name of your bank.

DON'T ACCEPT DELAYS: When a company says that it will take more than 20 days to send you your item, unless you're pre-ordering a product such as a book or a DVD, it may be a sign that you will never receive the product. PayPal, for example, requires sellers to ship items within 7 days of receiving payment. The FTC's Mail or Telephone Order Merchandise Rule (find.pcworld.com/38825) covers online orders and stipulates that vendors must send ordered goods within 30 days,

must explain any delay beyond the expected delivery period, and must give you the option to cancel the transaction and obtain a refund. However, some delays are unforeseeable or result from substandard service, and are not necessarily illegal.

OPEN BOXES IMMEDIATELY:

Don't let your package sit unopened. Inspect the contents immediately, making sure that the item is what you ordered and is working, and that you were charged the correct amount. If you discover a problem, contact the vendor about repairs or refunds, and keep detailed accounts of your interaction. Some payment services, such as PayPal, require that you file a claim within 30 days of purchase. So don't delay.

COMPLAIN TO AUTHORITIES: If you're unhappy with your purchase, contact the seller via phone, e-mail, and/or postal mail. If that doesn't produce results, file complaints with your state attorney general, the Better Business Bureau, local media, the FTC, your state's department of consumer affairs, and other organizations like ConsumerWorld.org. ■

James Oliver Cury is a New York-based writer who hunts for bargains any way he can.

PRICEGRABBER displays sellers' rebate offers (above), outlines the terms (right), and supplies the rebate form.

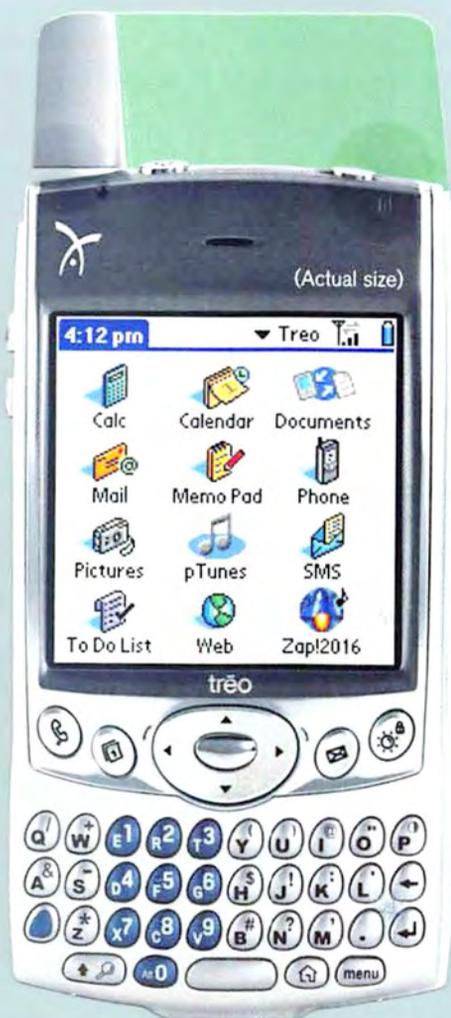
Product	A15-S127 (2.0GHz Celeron, 256MB, 30GB, DVD/CD WSP, 13" TFT)
Manufacturer	Toshiba
Rebate Amount	\$50 Rebate
Start Date	Jun 27, 2003
Expiration Date	Nov 20, 2003
Postmark Deadline	Dec 20, 2003
Restrictions	Click Here to view rebate form
Rebate Notes	With purchase of the Toshiba A15-127 you can receive the Noteworthy Bag, the 75W AC Adapter, or \$50 back from Toshiba.
Rebate Form	Click Here to view rebate form

compare shipping fees from carriers like Airborne Express, Federal Express, UPS, and the Postal Service.

USE A CREDIT CARD: The Fair Credit Billing Act (find.pcworld.com/38822) protects your transaction if you use a credit card. This law empowers you to withhold payment temporarily if you suspect that someone has stolen your card number. No matter what happens, likely the most you'll pay is \$50. Do not use ATM cards; they're not protected as credit cards are.

SHOP SAFELY: Sites using SSL (Secure Sockets Layer) or SET (Secure Electronic Transaction) technology are safe. To be sure that a site is using such a precaution, look for an unbroken key or padlock icon at the bottom of your browser when you load the vendor's Web page. Or check the Web address for the string "https://" at the beginning. Remember: Never send your credit card or bank account number

Finally, a smartphone that's
smart enough to look like a phone.



The new Treo™ 600.

It's smart alright. Go ahead, pick it up and try it for size. Can you believe it's a full-featured mobile phone and a Palm Powered™ organizer with a QWERTY keyboard? Not only that, but Treo 600 offers email, messaging, and web browsing with your wireless data plan. And it really is the size of that card you're holding in your hand. No, really.

treo™

The new Treo 600 smartphone. You know you want it. Here's why you'd be smart to get it.



Full-featured mobile phone

Carry thousands of business and personal contacts with you. Dial any of them by typing a few letters on the QWERTY keyboard. Speakerphone, speed dial, conference calling, call history and caller ID all make your calls even easier.



Full Palm OS organizer

Organize and simplify your business and personal life with just one device. Easily synchronize your calendar, contacts and more with your computer. Transfer information quickly and seamlessly from any previous Palm OS device.



Wireless email and messaging

Access business and personal email in seconds. Just press the email button—no booting, dialing up or logging in. Type SMS text messages quickly and accurately with the QWERTY keyboard. Point, shoot and send photos via email or photo messaging with the built-in camera.



Wireless web access

Access virtually any website in full color. Get driving directions while you're on the road. Check the latest news and sports headlines while you're at the airport.



Introducing the Handspring Treo 600. When it comes to small, it's one huge breakthrough. It's a full-featured mobile phone, it's a Palm Powered organizer and it's a digital camera. With a wireless data plan, Treo 600 also offers email, messaging, and web browsing. The integrated QWERTY keyboard makes entering information fast and easy. Treo 600 even offers a choice of wireless carriers. And the really big news is that all this comes in a small, sleek device the size of a cell phone. That means you can simply slip one device in your pocket to stay connected. All of which makes the Treo 600 a giant leap forward for smartphones. In fact, when a phone is this advanced the only smart thing to do is to get your hands on one. To find out more information call 1-888-565-9393 or visit www.handspring.com.

treo

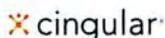




PHOTO FINISHERS

We round up powerful, affordable image editors that'll give your snapshots professional polish.

BY DAVE JOHNSON

PHOTO ILLUSTRATIONS BY DIEGO AGUIRRE

A NSEL ADAMS HAD just a camera, a chemical darkroom, and his fertile imagination to create his photographic masterpieces. These days, with a laptop in your rucksack, you can carry a digital darkroom all over Yosemite. But to get the best results from your photos, you need powerful image editing tools at your fingertips. You don't have to spend a fortune to get them—many photo ▶



DUST AND SCRATCHES

Unless you're a masochist, you'll want to remove all of the dust specks and scratches from your scanned image with one click of a filter.

editing packages cost less than \$100. We put nine of these programs through their paces to see which have the power to improve on Mother Nature's shortcomings—and which suck more wind than you will while huffing up Half Dome.

Our tests began with a 35mm photograph of a speaker at a podium in a convention hall. The photo looks bad—it's underexposed, it suffers from unsightly red-eye, and the contrast is low. And we scanned it with a really dusty scanner, to boot. Our goal? Clean it up, knock out the background, and move our speaker and podium to a more attractive background scene that we shot with a digital camera. But this second image is also underexposed, and the view out the window looks a bit dull, so we'd like to insert a digital photo of a blue sky.

After accomplishing these steps, we still want to adjust the foreground and background images independently; to manage this easily, we need each image to reside in its own layer. And last, we want to add a snappy title to the piece and crop the final,

composited image to make an 8-by-10-inch print.

So which of these nine programs can do every one of these things, and perhaps even approach the power of our benchmark, the professional-level Adobe Photoshop Creative Suite? Read on.

THE POWERFUL AND THE PITIFUL

THOUGH PHOTOSHOP Creative Suite is truly the most powerful image editor of the bunch (no surprise there, considering it costs a defibrillating \$649), we discovered that some programs, including Jasc Paint Shop Pro 8 and Microsoft Digital Image Pro 9, are more user-friendly. So for basic tweaks like those under Task 1 in the table, we might pass up Photoshop for a simpler program. We ended up picking Paint Shop Pro 8 as our Best Buy because it easily juggled multiple layers and offered the most flexible tool set, free from the restrictions of wizards. Plus, many of its tools are easier to master than are their Photoshop equivalents.

Microsoft Digital Image Pro 9 also proved to be

FEATURES COMPARISON

AFFORDABLE PHOTO EDITORS

A POWERFUL PHOTO EDITING program can help you create stunning compositions—but some are clearly for beginners only.

PHOTO EDITOR	Street price (10/28/03)	TASK 1: FIX EXPOSURE AND DELETE BACKGROUND						TASK 2: ENHANCE NEW BACKGROUND			
		Dust and scratch removal	Red-eye removal	Cloning and healing	Erasing background	Feathering edges of selection	Ease of use	Adjusting brightness and contrast	Adjusting color saturation	Arbitrary rotation	Ease of use
Adobe Photoshop Elements 2 ★★★★★ find.pcworld.com/38831	\$90	Good	Fair	Good	Fair	Good	Fair	Good	Good	Good	Fair
ArcSoft PhotoStudio 5.5 ★★★☆☆ find.pcworld.com/38834	\$80	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair
Broderbund Print Shop Pro Publisher ¹ ★★★☆☆ find.pcworld.com/38837	\$100	Poor	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor
CorelDraw Essentials 2 ★★★☆☆ find.pcworld.com/38840	\$73	Poor	Poor	Poor	Poor	Fair	Poor	Fair	Poor	Fair	Fair
Best Buy Jasc Paint Shop Pro 8 ★★★★★ find.pcworld.com/38843	\$95	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Fair
Microsoft Digital Image Pro 9 ★★★★★ find.pcworld.com/38846	\$100	Fair	Fair	Good	Fair	Good	Good	Good	Good	Good	Fair
Roxio PhotoSuite 5 Platinum ★★★☆☆ find.pcworld.com/38849	\$45	Poor	Fair	Fair	Poor	Fair	Fair	Poor	Fair	Good	Fair
SmartDraw Photo 2 ★★★☆☆ find.pcworld.com/38852	\$69	Poor	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair
Ulead PhotoImpact 8 ★★★★★ find.pcworld.com/38855	\$90	Poor	Fair	Good	Fair	Good	Fair	Good	Good	Good	Good
Adobe Photoshop Creative Suite find.pcworld.com/38858	\$649	Good	Fair	Good	Fair	Good	Fair	Good	Good	Good	Fair

¹ Full name: Broderbund The Print Shop Pro Publisher Deluxe 20.

very strong, with a task pane particularly well suited for beginners. Unfortunately, that same task pane can begin to feel confining once you've earned your image editing stripes. Ulead PhotoImpact 8 was also a good editor, but its interface is sometimes confusing—its content creation and Web publishing features, while thorough, take up valuable space in the menus, where we'd rather see more photo editing options. If you don't need those extras, you'll likely prefer the less cluttered interface of Paint Shop Pro 8, Digital Image Pro 9, or Adobe Photoshop Elements 2. Of these three, Photoshop Elements is the most daunting for photo editing beginners to learn. We found that its easy-to-follow tutorials, called *recipes*, helped us accomplish most of our tasks without checking the user guide or online help. Overall, however, Adobe doesn't provide enough of these recipes.

POWER AND EASE

**Best
BUY**

JASC PAINT SHOP PRO 8 is easy to learn and puts a lot of photo editing brawn at your fingertips. Highlights include customizable red-eye removal and an accurate background eraser tool. The program easily juggles multiple layers, and it offers flexible tools that enable you to grow with the program instead of forcing you to work in accordance with rigid wizards. To save time, you can use One Step Photo Fix to make multiple adjustments simultaneously—and this hit the bull's eye on our test shots.



ArcSoft PhotoStudio 5.5 offers some capable tools, but it lacks key features. Don't bother with the online help—it's the worst we've seen, with no context-sensitive assistance and only a 1995-era help menu. Farther from our ideal, but excellent for beginners, is Roxio's deceptively simple-looking PhotoSuite 5 Platinum Edition. Because it offers only a few task icons and edit categories, we didn't think it would get anywhere near completing ▶

TASK 3: COMBINE IMAGES								Comments
Working with layers	Color correction (auto)	Color correction (manual)	Masking or selecting an area to brighten	Sharpening/ blurring image	Cropping	Ease of use		
Good	Fair	Good	Good	Good	Good	Good	Elements is a powerful program. The dust filter was the best we saw, and one-click brightness and color corrections were accurate. Tutorials are helpful and often activate needed tools.	
Fair	Fair	Good	Good	Good	Fair	Good	Performed many editing tasks well, but lacks a feathering tool. Magnetic lasso was better than Photoshop's. Layer support was powerful and easy to use, though levels and curve adjustments are absent.	
Poor	Poor	Fair	Poor	Fair	Poor	Poor	Primarily for making banners, cards, and the like, Print Shop skimps on editing features. It doesn't support feathering, and the clone brush is restricted. The editing preview window is tiny.	
Fair	Poor	Fair	Fair	Fair	Poor	Fair	CorelDraw is primarily a vector-drawing program—and a good one at that. But with its limited editing tools, you can't do much to improve your photos.	
Good	Good	Good	Good	Good	Good	Good	This powerful program competently handled multiple layers and selections, and many of its tools were easier to use than Photoshop's. Red-eye removal worked well, but the noise reduction filter didn't.	
Fair	Good	Good	Good	Good	Good	Good	Microsoft's photo editor offers lots of wizards for beginners and many capable editing tools, such as one-click color correction. Its unique Smart Erase tool made short work of hiding large blemishes.	
Poor	Fair	Fair	Poor	Fair	Good	Fair	Roxio's editing tools are few in number, but they're wizard-based, which makes them handy for beginners. Automatic adjustments made our bad photo even more unsightly, however.	
Poor	Poor	Fair	Good	Fair	Fair	Fair	For novices, SmartDraw Photo adequately corrects color and contrast. But dust removal worked poorly, and the red-eye tool ruined our photo. There's no true clone brush or support for layers.	
Good	Fair	Good	Good	Good	Good	Good	PhotoImpact proved very powerful at correcting bad exposures. It has many clone tool options and a complete set of layer and selection tools, but no background eraser. Adding text was easy.	
Good	Fair	Good	Good	Good	Good	Good	The premier professional photo editor's capabilities go far beyond our simple test project. But for basic photo editing, some budget programs offer competitive and more user-friendly alternatives.	



FIGURE 1: Microsoft Digital Image Pro 9 offers a unique **Smart Erase** tool that easily removed the microphone stand from our subject image. We outlined the stand and let the tool do the work. Though a few artifacts lingered, Smart Erase saved us a lot of stamping with the cloning tool.

our test composite, but it surprised us by finishing almost every step of the process. Nevertheless, advanced users will feel stifled by its wizard-based editing tools and its lack of manual adjustments.

Some contenders were way out of their league: CorelDraw Essentials 2, SmartDraw Photo 2, and Broderbund's The Print Shop Pro Publisher Deluxe 20 simply lack necessary tools. Print Shop Pro 20—descended from a venerable DOS program used to make dot matrix banners for high school cafeterias back in 1984—is still intended primarily for making posters, greeting cards, calendars, and the like; it lacks many common image editing features. And while CorelDraw Essentials promises “powerful photo-retouching tools,” they proved too weak for our project. SmartDraw Photo tries to be a jack-of-all-trades for novices, offering photo organizing and Web publishing tools, among other things. But virtually all of its photo editing tools are underpowered or poorly implemented.

The top challenger to Adobe Photoshop Creative Suite comes down to Adobe Photoshop Elements 2, Ulead PhotoImpact 8, or Jasc Paint Shop Pro 9. The right one for you depends largely on your comfort level with image editing conventions. You'll need lots of experience with Photoshop-like tools to get the most from PhotoImpact or Photoshop Elements; PhotoImpact offers the most bang for the buck if you're also interested in Web design. Paint Shop Pro presents a somewhat friendlier interface—and as you become more familiar with image editing, you can delve deeper into its tools.



RED-EYE

Most image editors get rid of unsightly red-eye either by stamping a hard, black spot over the unfortunate subject's pupil or by desaturating the offensive red.

TASK 1: COSMETIC TOUCH-UP

WHEN YOU HAVE a picture in dire need of help, the smartest place to start is to get rid of all the dust. Only Adobe Photoshop Elements managed to replicate Photoshop CS's effective dust removal. Paint Shop Pro and Digital Image Pro did a passable job, but several others were ineffective or clumsy. Print Shop Pro 20 and PhotoImpact, for example, left us with the unenviable task of using the clone brush to stamp out dust one speck at a time. Arcsoft PhotoStudio's default setting blurred our image into an impressionistic mess and required us to make manual adjustments. Photoshop Elements's default setting did a much better job without causing undue blurring.

Red-eye removal, on the other hand, was particularly easy with several applications. Without a doubt, Paint Shop Pro stands head and shoulders above the competition for red-eye removal. Instead of simply stamping a black dot over the retina or desaturating the red like most other image editors do, Paint Shop Pro actually stamps a customizable replacement eye in its place. You can tweak the eye color, size, glint, and even species (yes, you can remove the red from your dog's eyes). On the other hand, SmartDraw Photo distinguished itself as uniquely bad here, with only three preset sizes and no transparency adjustment. Its tool placed a pure-black cross in the iris, which made our subject look like an evil lizard alien, announcing her plans to conquer Earth from some hotel in Indiana.

If your photo has bigger blemishes than dust motes, you'll need a program with cloning and/or healing tools, so you can copy adjacent, clean parts of the image over the imperfections. We had two primary targets set in our sights for the cloning and healing tools—the long hair that runs over our subject's face, and the microphone stand that obscures her left arm. Both had to go before we could isolate her from the background.

For these tasks, Microsoft Digital Image Pro was our hands-down favorite. Most programs required us to carefully dab over the microphone stand with their clone brushes; but using Digital Image Pro's Smart Erase tool, we simply outlined the object, and the program automatically erased it—with very believable results (see **FIGURE 1**). The program also contains a traditional cloning tool, which we used to clean up a few leftover artifacts.

CorelDraw's clone brush is virtually unusable, and SmartDraw doesn't have a dedicated clone

brush at all—instead, we used its multipurpose touch-up tool, but it was unable to remove either the hair or the microphone stand in our example photo without leaving visible smears and artifacts. And the clone brush in Print Shop Pro 20 offers a mere six sizes, with no way to fine-tune its operation, causing us to massacre the woman's face while trying to remove the hair over her cheek.

THE TRIPLE BYPASS

NOW WE WERE READY to perform some major surgery: to separate our subject and podium from the background. This was a real challenge because the image's low contrast made it hard for the programs to find the boundary between the foreground and the background. Don't get us started on her hair—we had to guess where her 'do ends and the nearly identical background begins. Knocking out the background was easiest in programs like Photoshop Elements and Paint Shop Pro, both of which have Photoshop-style background erasers. As with a traditional eraser tool, you drag a background eraser around your image, but you don't

have to be exact—a background eraser can discern color changes and the edges of your subject in order to remove the background intelligently. Even so, to trace an outline of the woman's hair we had to resort to a Smart Edge tool in Paint Shop Pro and Photoshop Elements (where it's called a Magnetic Lasso). This tool automatically snaps a selection onto high-contrast boundaries near the cursor as you move around the image, which is much easier than trying to trace an object by hand.

Paint Shop Pro comes out on top for having a smoother, less "twitchy" background eraser than the one in Photoshop Elements, which lagged behind our mouse movements and sometimes overshot the edge, erasing more than we intended. PhotoImpact was a great runner-up—it lacks a background eraser, but its magnetic lasso tool tracked edges superbly, and it includes a Bezier curve-style keypoint system that lets you adjust a selection after you've made it. In most apps, once you select a boundary, it's set in stone. CorelDraw's image editor, Corel Photobook, doesn't have a magnetic lasso tool. We resorted to using its ►



BACKGROUND ERASER

Removing a background by hand can be painstaking, but background erasers detect the edges of your subject—so you don't have to.

Photo Organizers: Can They Edit?

Many photo organizers come with image editing tools, but can you really forgo a dedicated editing program? We tried editing with four programs: Adobe Photoshop Album 2, ACDSee 6, Jasc Paint Shop Photo Album 4, and Picasa 1.5. We didn't attempt to evaluate their image management capabilities,

ACDSEE lets you choose an eye color when eliminating red-eye.



only their image editing features. ACDSee and Jasc stood out.

ACDSee 6 shows a lot of editing brawn for an organizer. It was the only program to offer a noise-reduction tool (which we used to eliminate virtually all of the dust in our foreground image), and its red-eye remover is the best of the four—it lets you choose which eye color to use when eliminating the red. It also has a surprisingly powerful set of color and brightness controls, including a true histogram-based levels tool.

Jasc Paint Shop Photo Album 4 is the only organizer with a variety of selection tools, though it doesn't have any kind of magnetic lasso tool or edge-feathering capability. Jasc delivers a one-step Quick Fix tool for color and brightness, as well as manual sliders. The red-eye remover and rotation tools

are unremarkable, but you can embed text in your image.

Adobe Photoshop Album 2 is clearly intended to be a companion to an editor like Photoshop Elements. With Photoshop Album, you perform your edits in a dialog box that shows before and after views of potential changes. You can adjust brightness, contrast, and color—either automatically or manually—and sharpen the image, but aside from a rudimentary red-eye tool, that's all this program offers.

Picasa 1.5 tries, but its convoluted interface and nonstandard approach to editing make it hard to recommend. The red-eye tool is difficult to use without a zoom control to help your accuracy. On the upside, the one-click color and brightness adjustments perform adequately, though they do not permit manual override.



LAYERS

Layers are the cornerstone of effective image editing—they allow you to touch up different elements of your image independently.

freehand lasso tool and automask function, but the tool didn't accurately select our dimly lit subject.

Before pasting the foreground image onto the new background, we needed to feather the edge of our speaker to create the illusion of space between her and the background. Most of the programs support edge feathering (though Print Shop Pro 20 allows no feathering of any kind). ArcSoft PhotoStudio produced the least impressive results, and we could apply its "soft edges" function only after adding the foreground as a new layer in a new composition. The blurred edges looked clearly artificial, as if the speaker were pasted on. Likewise, without feathering, the foreground in Print Shop Pro 20 resembled one of those magnetic Colorform stickers you might have played with as a kid, standing out in sharp contrast to the background.

TASK 2: QUICK FIXES

THE NEW BACKGROUND needed some work as well. Thankfully, making adjustments to brightness, contrast, and color saturation was a snap with almost all the programs. We particularly appreciated the Quick Fix option in Photoshop Elements and—even more—the One Step Photo Fix in Paint Shop Pro. Elements's Quick Fix requires a separate step for each adjustment (such as focus and color), while One Step Photo Fix runs an entire script of fixes (see **FIGURE 2**). We didn't have to make each adjustment manually in Paint Shop Pro: Its auto fixes were spot-on. In contrast, Roxio's PhotoDoctor wizard produced disastrous results, dramatically overexposing our image, though we were able to use its manual sliders to make things look right.

For the most precise control over color and light-

ing, we prefer to work with a Photoshop-like level control, which lets you set the exposure in highlights and shadows by manipulating the x-axis of a histogram. The histogram is a graph that shows the quantity of information stored in each color channel in your image. In plain English, it shows how many pixels are dark and light—the darkest to the left, and the lightest to the right. Photoshop Elements, Paint Shop Pro, Digital Image Pro, and PhotoImpact all include levels controls, but PhotoImpact had other handy manual controls as well, like a tone map (which helps redistribute colors to fix imbalances or remove unwanted shadows) and separate histograms for highlights, shadows, and midtones (for very precise contrast control).

The entire image seemed slightly askew, so we wanted to rotate it a little bit as well. Print Shop Pro 20 made this cumbersome: its photo editor rotates an image only in 90-degree increments. For incremental rotations, you have to import the image into a project. Several programs (like PhotoSuite, Paint Shop Pro, and Digital Image Pro) permitted us to straighten the image just by aligning an on-screen ruler. ArcSoft PhotoStudio failed to include a straightening ruler, and it wouldn't let us rotate by fractions of degrees—whole numbers only. To straighten an image, it often takes just a very small adjustment to make a picture look perfectly true.

TASK 3: LAYING IT ON

SUPPORT FOR LAYERS is essential for an advanced image editor, because they let you edit different parts of a picture independently. We wanted to create three layers in this project: the speaker at the podium, the room with the windows, and the sky in back. With layers, you can adjust the colors in these images separately, resize them, and then merge them together into a single image.

Layers clearly separated the better image editors from the pretenders. SmartDraw Photo has no layer support at all; we had to select the speaker and podium, and then copy and paste the selection into the background image (the room with the windows). This work-around was problematic: SmartDraw merged the images, so we couldn't edit the components separately. Roxio PhotoSuite 5's selection tools were limited: While adjusting one "cutout" (layer), we could not hide the others. That made it difficult to gauge our edits and also created a strange ghosting effect on the selected area.

Working with layers in Corel Photobook felt counterintuitive, and features were hard to ▶



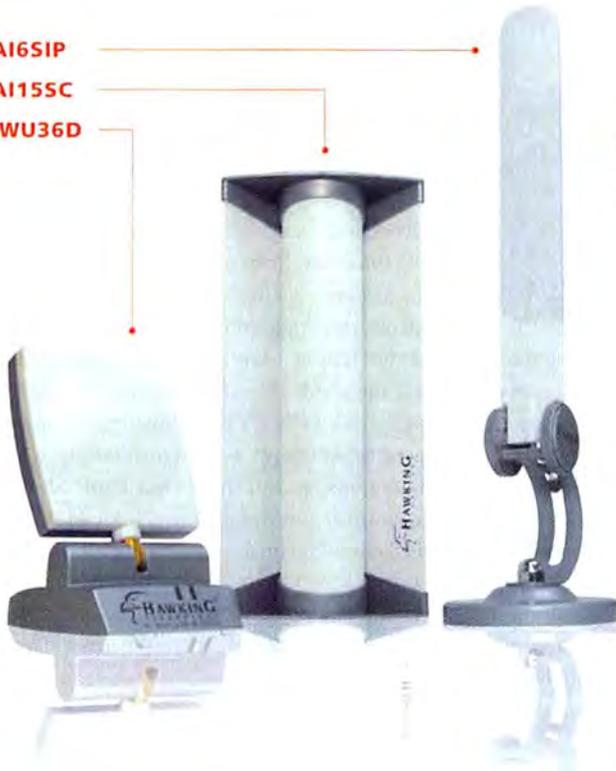
FIGURE 2: We appreciated the **One Step Photo Fix** in Paint Shop Pro, which runs a variety of adjustments at once. We could have adjusted the brightness, saturation, focus, and color separately, but we didn't need to—the auto fixes to our background image met the accuracy test.

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FIGURE 3: Replacing our overcast background with a dramatic blue sky wasn't easy in some cases. Using Roxio PhotoSuite's magic wand, we couldn't accurately extend the sky to the horizon (left). *Photoshop Elements*, in contrast, performed this task well, as shown in the finished composition (right).

find. Like PhotoSuite, it has limited selection tools. Using layers in Print Shop Pro 20 required a lot of back-and-forth because its image editor doesn't support layers. We had to use Print Shop's graphics program and import our images into a photo collage project, a cumbersome process. Neither Print Shop Pro 20 nor Corel Photobook offered an eraser to help us get rid of the background, so we had to draw a freehand crop around our subject in order to do so. Even then, when we imported the cropped image into our project in Print Shop Pro 20, the erased background wasn't transparent, but opaque white.

To vary a layer's opacity in Jasc Paint Shop Pro, you have to open a dialog box, while Photoshop Elements and PhotoImpact provide a layers palette with a slide bar in the header. You see the opacity changing on your image, not in a dialog box.

To replace the overcast sky in the windows, we used the magic wand tool to select the sky in each of the window panes, varying the tolerance to avoid including any of the ground in the lower part of the frame. Then we punched out the sky using the delete key and added the new sky image as a layer behind them so it would show through the transparent areas we created. Though difficult in Roxio PhotoSuite 5, it was easy with Photoshop Elements (see **FIGURE 3**). Finally, we added the podium from the first image as a layer in front of the room.

At this point, our composition was nearly complete. We wanted to select our subject's face and brighten it a bit. But manually correcting the color in an image like that of our speaker can be difficult and time-consuming; you often need to move the sliders for red, green, and blue in small incre-

ments, eyeballing the results. That's why we appreciate programs with good, one-click automatic color correction like Paint Shop Pro, PhotoImpact, Photoshop Elements, and Digital Image Pro.

Similarly, a variations tool is handy: Photoshop Elements, PhotoImpact, and CorelDraw show your image in various iterations, each with a slightly different color cast. Also, PhotoImpact and Photoshop Elements show proposed color adjustment in the actual image window, while CorelDraw shows them only in a tiny preview window.

Sharpening the foreground and blurring the background were both simple in the compositions built on layers, since adjustments to one layer don't affect the other. Print Shop Pro 20 required opening a fixed-size dialog box to perform this task.

All of these applications have fairly powerful text tools for adding a caption. In most cases you just select the text tool, pick a font and size, and start typing. And while it's not a big deal, we were disappointed whenever we had to enter our text into a dialog box, as you must with Paint Shop Pro, PhotoSuite, and SmartDraw, instead of typing directly onto the image. The dialog box complicated our task of positioning, sizing, and editing the text, since we couldn't see what the results would look like as we typed and manipulated the text.

A FINAL STEP

THE LAST STEP of our project was to crop the completed image so it would fit in an 8-by-10-inch print. The better applications let you choose specific dimensions, like 8-by-10 or 5-by-7, from a menu, and then resize the crop box while it keeps the correct proportions. That way, you know exactly what's going to come out of your printer. Most of the programs had great cropping tools with easy-to-pick presets for common print sizes, though PhotoStudio and SmartDraw Photo didn't.

PhotoStudio gives its crop dimensions in pixels, so it's impossible to size your crop for a 5-by-7-inch print. Similarly, you can drag SmartDraw Photo's crop box wherever you want, but there's no dialog box to set fixed dimensions. Corel Photobook is sheer frustration: It crops the image the instant you draw a crop box, with no opportunity to resize or reposition the image. You can't even do that with Print Shop Pro 20—it only crops individual images, not multilayered compositions. ■

Dave Johnson writes the Digital Focus e-mail newsletter for PCWorld.com.



AUTO COLOR CORRECTION

One-click color correction takes the sweat out of a time-consuming process. Of course, if you don't like the results, you'll need manual tools.

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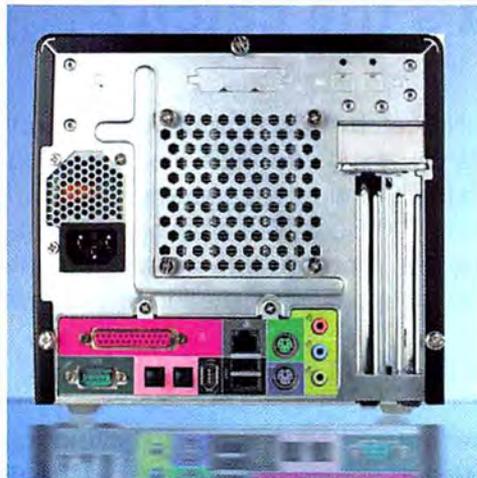
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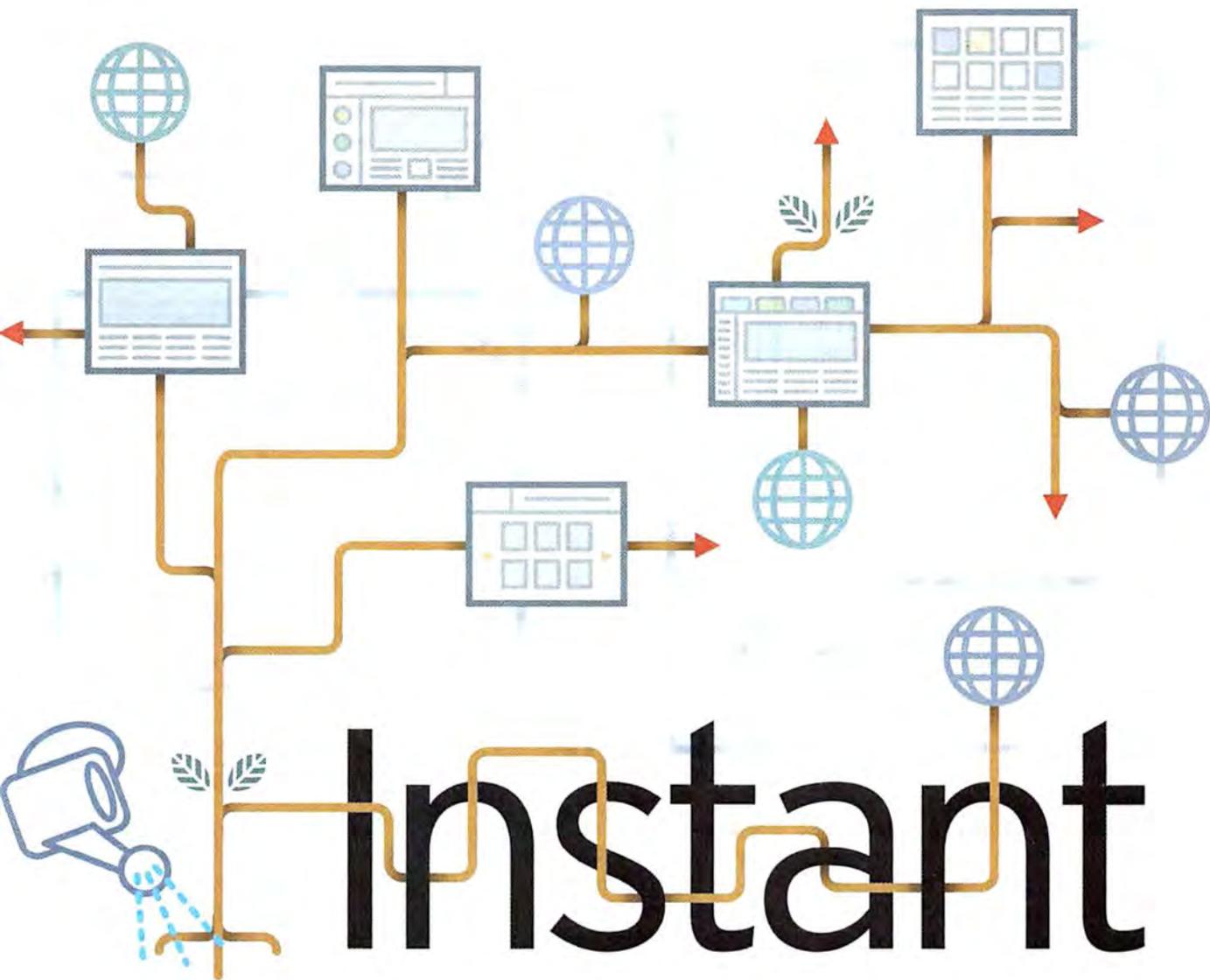
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BY SCOTT SPANBAUER

THE WEB IS A TWO-WAY street, but most of us travel in just one direction: We view other people's sites. Though your Internet service provider probably includes Web hosting as part of your package, you may not have gotten around to creating and post-

ing a Web page yourself. That's too bad, because the Web is a great place through which to reach customers and to share files, photos, and information with family, friends, and coworkers.

When it comes to building a superb Web site, ►

there's no substitute for a solid background in hypertext markup language, or HTML. But with the right shortcuts, you can have your starter Web site up and running in minutes. We've designed a series of HTML templates for you to download, personalize using free tools, and then post online in less time than it takes to brew a pot of French roast.

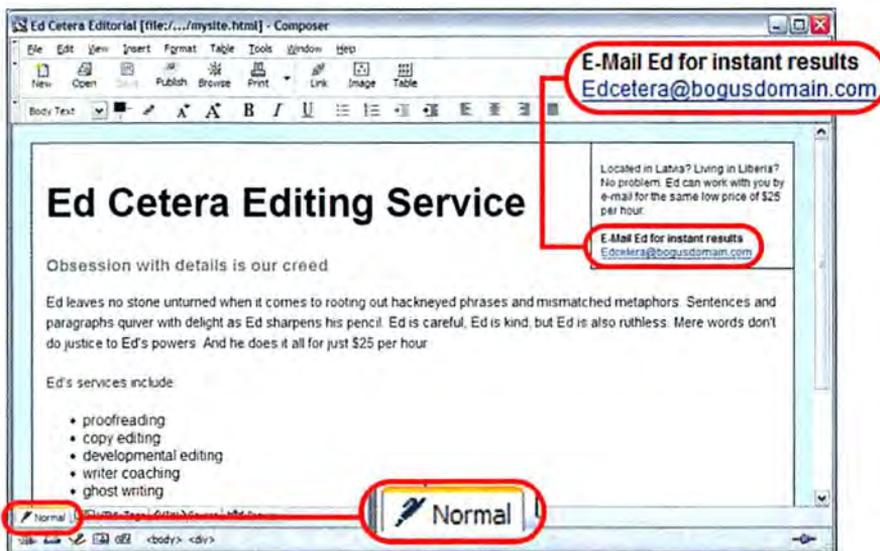
KEEP IT SIMPLE

BORROWING LIBERALLY from existing Web site designs that we liked, we created three templates for specific types of sites. The first is a single-page billboard for your service, business, or activity. The second is a slightly more sophisticated page that accommodates photos, linked files, navigation controls, and links to other Web pages. The last template lets you set up a site that supports an interactive Web log (also known as a blog), with links to shared files and photos.

The tools you need to manipulate these templates are free or inexpensive (see "Web Authoring Toolbox," page 126), and you don't need to know a lick of HTML to customize the templates to your liking. You will, however, need to know the location of your Internet account's Web host, and the user name and password (usually the same as your account log-in), to upload your finished pages (see "How to Post Your Pages," page 128).

We provide three variations of each template. Go to find.pcworld.com/38876 to see thumbnails of each design and to download the templates themselves. Our template sites are intended to be interesting to look at, without sacrificing legibility and ease of use. Simply replace each template's placeholder text, links, and images with your own to create a site that communicates your message effectively.

These designs won't accommodate tons of text and dozens of images, nor will they fit every need. Consider them a jumping-off point in your Web-design journey. To start taking your design efforts to the next level, read Web usability expert Jakob Nielsen's article "How Users Read on the Web" (find.pcworld.com/38879).



OPEN OUR BILLBOARD TEMPLATE in Composer's Normal view, and change the active link.

A Basic Billboard Site

COMPANIES SPEND thousands of dollars whipping up slick Web sites that take weeks to explore from end to end. But if all you want to do is hang out your shingle or make yourself known to people with similar interests, a single, straightforward Web page will suffice. Begin by browsing to find.pcworld.com/38876 and downloading one of the three variations of our Billboard template. To do so, right-click the template's link and choose *Save Target As* (in Internet Explorer) or *Save Link Target As* (in Mozilla or Netscape). Be sure to place the HTML file in an easy-to-remember folder on your system.

The Composer Web editor included with the latest versions of the Mozilla and Netscape browsers (1.4 and 7.1, respectively) is a more-than-adequate program for editing our templates. Though the instructions below specify Composer, you can accomplish the same tasks by using nearly any Web editor. If you don't already have one of these two browsers, visit find.pcworld.com/38882 to download Netscape or find.pcworld.com/38885 for your free copy of Mozilla, or visit find.pcworld.com/38999 (and scroll down the page) for other downloadable editors.

To open Composer, launch Mozilla or Netscape and choose *Window•Composer*. Alternatively, with Netscape, you can start Composer by choosing *Start•Programs* (All Programs in Windows XP)•*Netscape•Composer*. Click *File•Open File*, navigate to and select the HTML file you just saved, and choose the *Normal* tab near the bottom of the screen. To replace the template's placeholder text, put the cursor in the text and press **<Backspace>** or **<Delete>** to remove text before or after the cursor, respectively. Or select all of the text in a heading or paragraph, press **<Delete>**, and either type new text to replace it or paste text copied from another program over the selection. To avoid deleting hidden HTML formatting tags, don't select anything before or after the visible text. If you accidentally delete more than you intended, press **<Ctrl>+Z** to undo the damage.

You may have information to share that works best as a list. To create a list, simply type the relevant items in one of the paragraph areas, select the items to be formatted as a list, choose *Format•List*, and then select either *Bulleted* or *Numbered*. For font effects such as italics, bold, highlighting, or underlining, select the text

and click the appropriate toolbar button.

To customize the template's solitary link, replace the link text with your own, right-click the link, and choose *Link Properties*. Enter a file name, a Web address, or an e-mail address (precede an e-mail address with **mailto:**), and then click *OK*. Depending on what you enter in the Link Location field, Composer may uncheck or

disable the 'URL is relative to page location' option. For best results, leave that setting checked. Be sure to change the page's title (the text that displays in the browser's title bar): Choose *Format>Page Title and Properties*, enter your preferred descriptive title in the Title field, and click *OK*. To publish your completed Web page, click the *Publish* icon.

images download. For faster page loading, use a graphics program to scale your pictures down to a reasonable size (in a process called downsampling). While more advanced (and more costly) graphics programs such as Adobe's \$99 Photoshop Elements and Jasc's \$109 Paint Shop Pro are great for optimizing Web graphics, you don't need them to handle basic image editing tasks: The Paint program that comes with every copy of Windows works just fine for this job.

The original digital photo of a rose we used as a placeholder image in the templates was a whopping 1600 by 1200 pixels. That's too big to fit into most browser screens without the user's having to scroll horizontally and/or vertically. And at 363KB, the image's original size was an impediment to speedy page display. To make the image Web-ready, we opened it in Paint (right-click the image in Windows Explorer or any folder window and choose *Open*). If Paint isn't your default image editor, just right-click the image, select *Open With>Choose Program*, click *Paint*, and then click *OK*.

Once the image was open in Paint, we selected *Image>Stretch/Skew*, entered **25** in both the Horizontal field and the Vertical field under the Stretch heading, and clicked *OK*. The resulting image is only 400 by 300 pixels and has a more reasonable size of 19KB. We saved the image file under a new name, and then we performed the same shrink procedure, this time entering **50** in the Stretch fields, producing a 7KB, 200-by-150-pixel image for use as a thumbnail.

You may choose to create images that are slightly larger or smaller than our example, but the ideal range for image size is between 10KB and 20KB. Save images in a compressed format that all browsers can read, such as JPEG. To convert a bitmap (.bmp) file to JPEG, open the file in Paint, choose *Save As*, select *JPEG* in the 'Save as type' drop-down menu, and click *Save*.

To replace our template's dummy graphics with your own, right-click each image in Composer, choose *Image* ▶

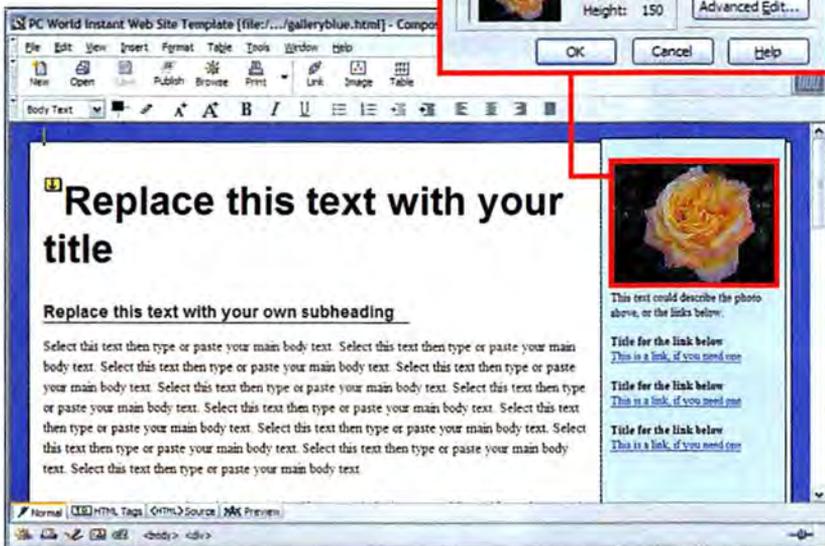
An Easy Image Gallery

A PICTURE CAN BE worth much more than a thousand words on the Web, where attention spans are notoriously short. Adding photos or images to your site is a good way to attract visitors and entice them to explore its contents.

To use the Gallery template, go to find.pcworld.com/38876 and right-click one of the three variations under "Gallery" (as described above) to download it. Open the template in Composer, and as with the Billboard example, replace our placeholder text and links with your own. Because the Gallery template contains navigational links that allow visitors to move quickly around the page, you can place more lines of text on this page than will fit easily on the Billboard template. The Gallery page also contains locations for inserting

your own images, including a table set up as a gallery of a dozen pictures.

Before publishing images on the Web, you may need to reduce their resolution, as the images that scanners and digital cameras produce are often too large for practical use on a Web site. Although your page can rescale the image, this forces your visitors to wait while the large



TO ADD AN IMAGE TO YOUR GALLERY, specify the file's location in its Properties dialog box.

WEB AUTHORIZING TOOLBOX



POWERFUL software for Web site authoring and graphics production such as Microsoft FrontPage, Macromedia Dreamweaver, and Adobe Photoshop cost *mucho dinero* (from \$180 to \$500). Luckily, you don't need to spend a dime on Web development tools. All of the programs below are free, and some of them may already be on your PC.

Mozilla/Netscape Composer: Integrated with the Mozilla and Netscape browsers (the latter is a commercial version of the former with nearly identical features), Composer lets you create pages that include links, images, tables, and basic HTML effects without having to write any HTML code (though its <HTML> Source pane lets you do so if you wish). Given that the products are nearly identical, you may prefer the noncommercial Mozilla, which eschews unwanted addons. Mozilla 1.4: www.mozilla.org; Netscape 7.1: www.netscape.com

Microsoft Paint: You wouldn't want to use this simple program for high-end (or even medium-end) image editing, but old Paint works fine for shrinking your Web image files. And it's already installed on your computer. Paint lacks a cropping tool, but you can get around this omission: Select the area you want to crop to, press <Ctrl>-C to copy it to the clipboard, and close the file (without saving it, to preserve the original image). Open a new file, press <Ctrl>-V to paste, and save the new file under a different name.

Blogger: Both a Web-hosted Web log generator and a blog-hosting site, Blogger is a highly customizable and easily accessible tool for publishing private, public, single-user, or multiuser online conversations. www.blogger.com

and *Link Properties*, and click the *Location* tab. Type your file's name in the *Image Location* field; click *Choose File* to browse to and select your file; then click *OK*.

Images can act as links that open another file or site, or that move site visitors to another location on the current page. Our Gallery template's first two images are examples of the latter type—when a visitor clicks either image, the page scrolls to an anchor point just above the image gallery (another link at the bottom of the page labeled "Home" scrolls the visitor back to the top). You can leave these nav-

igational links intact if you like, and simply replace our image with your own.

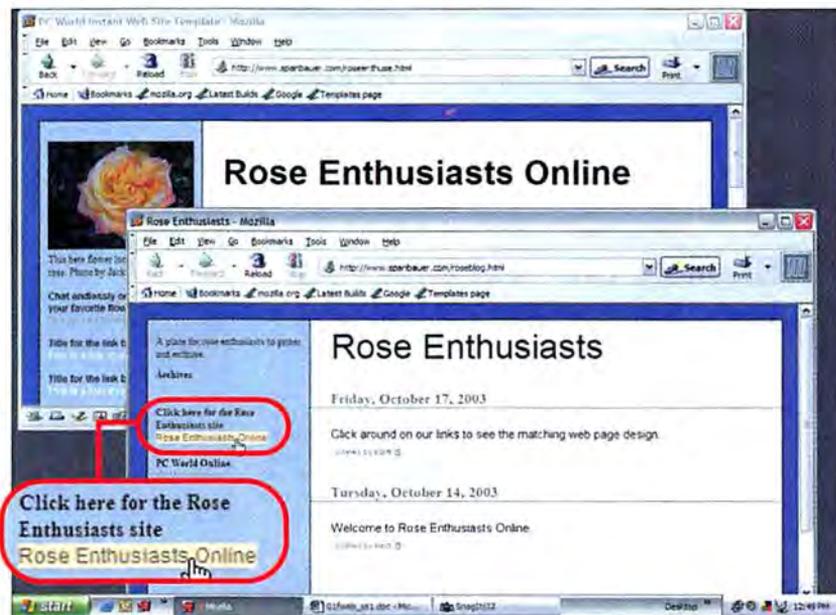
Each image in the gallery table—all of which contain the same 200-by-150-pixel thumbnail—links to a larger version of the same image. You can create this kind of effect with your own images by saving them in two different sizes and linking the smaller one in the gallery to the larger one on another page. But remember that by default Composer will upload only the images shown in the table. See "How to Post Your Pages" on page 128 for tips on uploading the linked files.

An Interactive Blog

WE SALUTE WEB engineers who spend years learning how to program features into their sites that mere HTML code can't handle. Group calendars, Web logs, and other interactive elements can turn your site from a static document into a live community hub. And now you can accomplish this without actually joining nerddom: Instead, simply link your existing page to the interactive Web elements created by various free services.

Let's say that you want to magnetize an

online community of rose enthusiasts. Starting with an existing page like one based on our Gallery template above, you could add a Web logging feature simply by creating links to and from the free Blogger site. First, go to www.blogger.com and click *Start Now!* to create your blog (everyone who contributes to the blog will need a Blogger account and membership in your blog). When Blogger asks you to choose a blog template, pick a two-column design (such as Sand ▶



LINK YOUR BLOG TO YOUR OWN SITE—it takes one simple change to Blogger's HTML code.

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CISCO SYSTEMS



Dollar) that includes a Links area (not all Blogger templates allow you to include links in a nonscrolling area).

Did we say you wouldn't have to bother with any HTML to use our templates? Well, we had our fingers crossed. Inserting a link to your Web page in a Blogger page requires a little hand editing of the HTML source code, but it's a piece of cake, really. First, log in to your Blogger account and select the blog you want to customize. Click *Template>Main Template*, choose either *EditFind (on This Page)* in IE or *EditFind In This Page* in Mozilla/Netscape, and then search for *EDITME!* to locate the template's dummy link: `Edit-Me`.

Replace *EDITME!* with your Web site's

URL, and *Edit-Me* with the text you want the link to display. Edit or delete the other links (including the stock Google link), and click *Save Changes*. The next time you or another member of your blog publishes a new post, the links you created will appear on the page.

Your blog will be nearly ad-free if you publish it on your own FTP site instead of on Blogger's ad-subsidized Blogspot.com. But wouldn't it be nice if the blog's design matched that of your own Web page? This is a little icing on the blog cake. If you're using our Billboard or Gallery template, simply download our matching Blogger template from find.pcworld.com/38876, open it in Composer, select the `<HTML>` Source tab, choose *Edit>Select All*, and

press **<Ctrl>-C** to copy the contents. Switch to Blogger's Main Template window as described above, choose *Edit>Select All*, and press **<Ctrl>-V** to paste our template into place. Click *Save Changes* to complete the matching blog makeover.

Linking a Yahoo Groups or individual Yahoo calendar to your site is relatively mundane, since Yahoo's free service doesn't allow you to modify its code in the ways Blogger's does. Nevertheless, each Yahoo calendar or group has a unique Web address that you can insert in your page, and you can add your Web page to a Yahoo group's Links page. ■

Scott Spanbauer, a PC World contributing editor, writes the Internet Tips column.

HOW TO POST YOUR PAGES



MOST OF US ARE pretty comfortable with the process of downloading files. But with Web publishing, the files are going in the other direction: They're being uploaded to a Web-hosting service's computer. Many Internet service providers support an established way of moving these files between your computer and their servers, called the file transport protocol, known

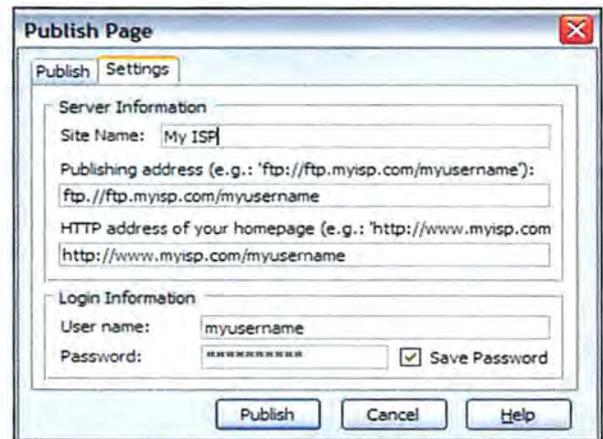
more familiarly as FTP. Because FTP is a standard method of moving files around the Internet, many programs, including the Internet Explorer and Mozilla browsers, support it.

To use FTP, you need to know the addresses of the folders your account is allowed to write to on the remote server, and the correct user name and password. Your ISP probably sent this information to you when you signed up—but if it didn't, or if you can't find the information, call the company's tech support line and ask for it.

To publish a page in Composer, first save the file and then click the *Publish* button to open the Publish Page dialog box. Click the *Settings* tab; fill in the blank lines for publishing address, HTTP address, and log-in information; and click *Publish*. If the information you supplied is correct, Composer will then upload the Web page as well as any embedded files to the Web server.

PUBLISHING RELATED FILES

THOUGH COMPOSER does a good job of uploading images embedded in your Web pages, it doesn't by default upload the external files and Web pages that your pages link to. To get these files posted, you can use a third-party FTP program such as Ipswitch's



COMPOSER'S PUBLISH PAGE dialog box lets you send files from your local folders to the correct folder on your ISP's hosting server.

WS_FTP LE (free for personal use, \$40 for the commercial Pro 8 version; go to find.pcworld.com/38888 to register for the download). Or just use Internet Explorer. Type your FTP address and log-in information in IE's address bar using this format:

`ftp://username:password@myisp.com/mywebfolder`

Replace *username* with your log-in name, *password* with your password, and *myisp.com/mywebfolder* with the location of your upload directory on the server. This is almost the same publishing address you entered into Composer, with 'username:password@' inserted just after 'ftp://'. Press **<Enter>** to make the connection. If the information is correct, you should be able to drag and drop files from your local machine into your folder on the server.

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tools that cool



fig. 1 - AIR FLO PC
14 Fully Assignable Buttons

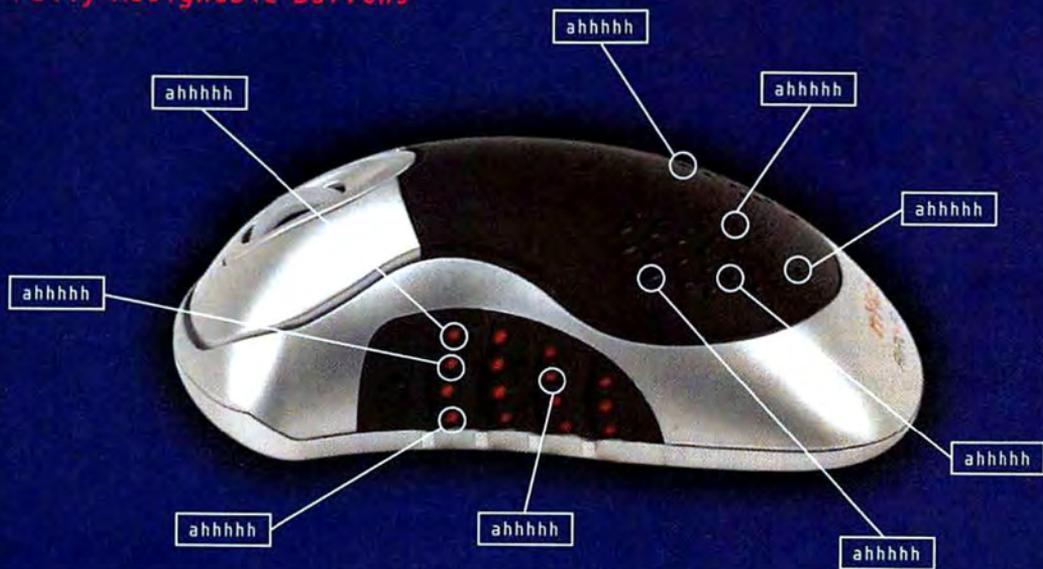


fig. 2 - AIR FLO MOUSE
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Wireless connectivity requires additional software, services or external hardware that may need to be purchased separately. Availability of public wireless access points is limited. System performance, battery life and functionality will vary depending on your specific hardware and software.

¹When referring to storage capacity, GB stands for one billion bytes. Total user-accessible capacity may vary depending on operating environments.

²For a free copy of the standard limited warranty see a reseller where Acer products are sold or write to Acer America Corporation, Warranty Department, P.O. Box 6137, Temple, TX 76503.

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NEXT GEAR

EDITED BY ALAN STAFFORD

CAPTURE TV ON DVD

THE LATEST DVD RECORDERS ARE MORE VERSATILE THAN YOUR VCR, BUT GETTING THE MOST FROM ONE ISN'T AS SIMPLE AS PUSHING 'RECORD'. BY MICHAEL GOWAN

STAND-ALONE DVD recorders use the same drive technology you'd find on your PC—only they come clothed as a home theater component.

These devices have many of the advantages of DVD players. DVD discs take up less physical space than do bulky VHS tapes. And DVDs, in-

cluding those created with a recorder, have menus that let you easily jump to specific points within a recording. Plus, with these devices you can record high-quality video: up to 700 horizontal lines of resolution, compared with 250 lines using a VCR.

In our evaluation of six

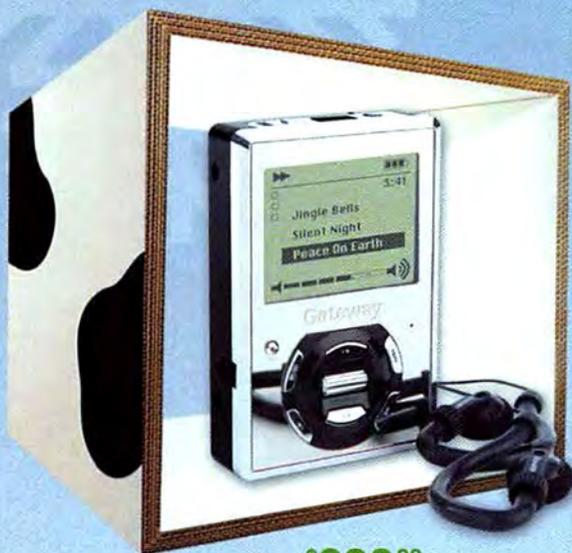
DVD recorders, we discovered major differences in the way these models operate. Of the ones we tested, we liked the \$700 Sony RDR-GX7 the best: It was the easiest to use and produced great image quality.

As with a VCR, basic DVD recording can be as easy as hitting the record button. But

unlike a VCR, whose most difficult feature to learn might be how to stop the clock from blinking, DVD recorders tend to be more complicated to use.

Rewritable discs need to be formatted before you record video to them. We found this under-1-minute task simple enough to complete, but ▶

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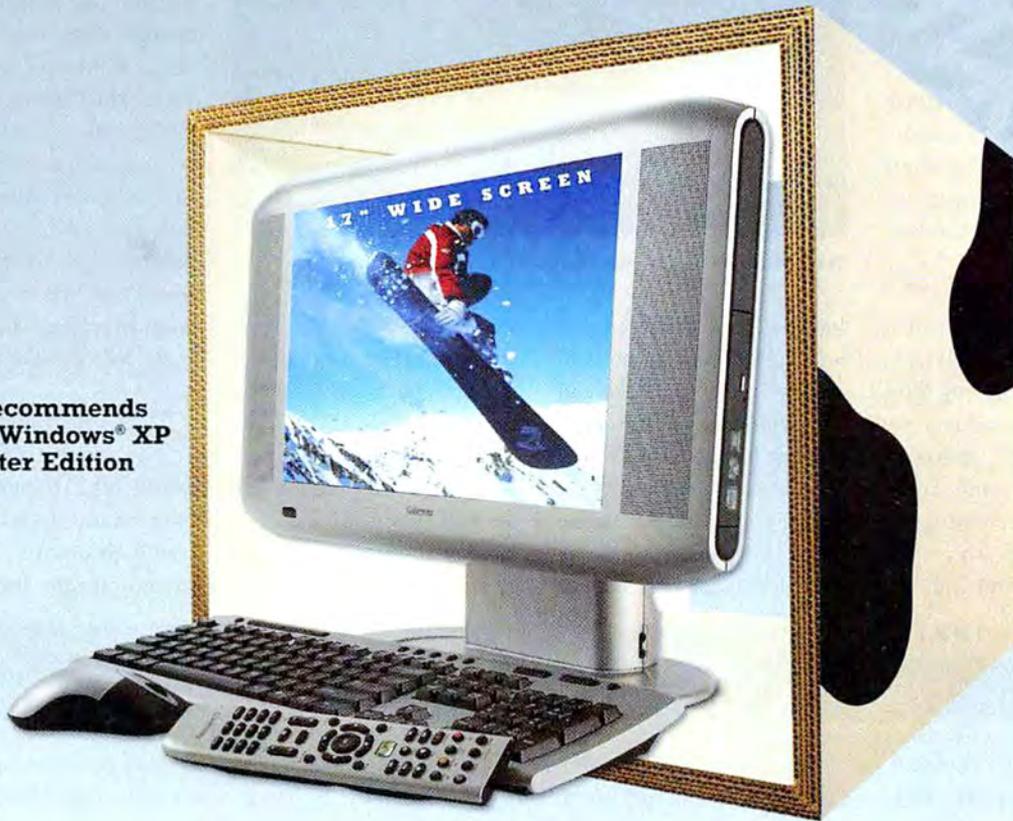
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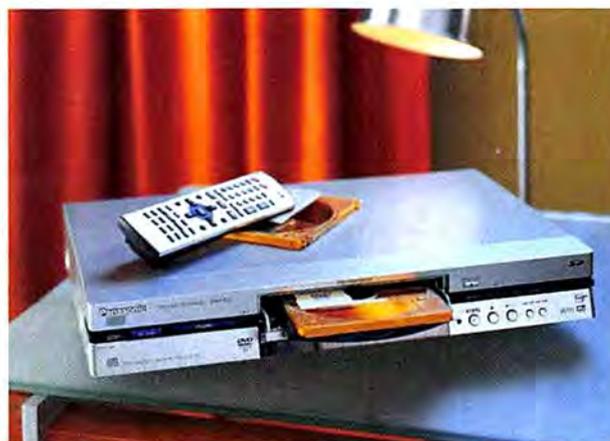
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it's an extra step that may cost you the start of the Super Bowl if you don't think ahead.

Furthermore, if you want to play a recorded write-once disc in another player, you must first finalize the disc, as you would a CD-R you wanted to play on your stereo. But only one of the units we reviewed, the Pioneer, does this automatically; none of the others prompts you to perform this task prior to ejecting the disc.

RECORDING FINESSE

NOT ALL DVD recorders that support the same media types behave in the same way. Most of the DVD recorders we looked at (from Panasonic, Philips, Sharp, and Sony) allow basic video editing on rewritable media—so you can erase, say, the first and fifth



TIME-SHIFTER: Pause recordings with Panasonic's DMR-E60.

half-hours you've recorded and then record an hour of content in their place without overwriting your other items.

When using DVD+RW and DVD-RAM, these recorders typically let you delete a scene or an entire program. Some DVD-RW recorders, such as

the Sharp DV-RW2U, also allow editing and erasing. But the Apex DRX-9000 lets you erase just the last title on a DVD+RW disc. And Pioneer's DVR-810H-S can erase the entire DVD-RW disc only.

All of the units we tested give new recordings a sepa-

rate, generic title. You can also have the recorder automatically place chapter markers within each title so you can quickly advance to specific spots.

The Panasonic DMR-E60 had the most extensive editing features of the bunch, in part because the unit uses DVD-RAM, which writes to the disc in the same way a hard drive records data. As a result, you can pause a recording without losing any of it, or watch one program while recording a different one—two features you would find on a hard disk-based recorder like a TiVo.

EASY NAVIGATION

IF YOU PLAN TO record primarily off TV, your DVD recorder's interface—and how well it creates the navigation menus on your disc—will be

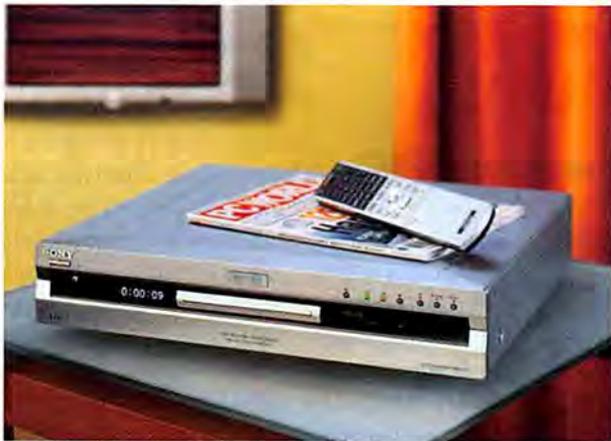
FEATURES COMPARISON

DVD RECORDERS WILL LET YOU TOSS AWAY YOUR VCR

ANY OF THE DVD RECORDERS we reviewed will make you want to give up your VCR and its bulky tapes. All six models use progressive scan, have analog video inputs, and include composite, component, and S-Video output ports. Our pick: Sony's easy-to-use RDR-GX7.

DVD RECORDER	Street price (11/3/03)	Basics	Extras ¹	Comments
 Apex DRX-9000 ★★★★☆ find.pcworld.com/38978	\$360	<ul style="list-style-type: none"> DVD+R/RW recording Digital audio coaxial, optical output One-touch, manual, timer recording 	<ul style="list-style-type: none"> Audio CD, JPEG, MP3 playback 	Easy to use, and the price is right. It has great recording quality, though our unit required a firmware upgrade to fix crashes.
 Panasonic DMR-E60 ★★★★☆ find.pcworld.com/38981	\$500	<ul style="list-style-type: none"> DVD-RAM and DVD-R recording Digital audio optical output One-touch, manual, timer, time-shift (DVD-RAM) recording 	<ul style="list-style-type: none"> Digital video input (FireWire) Audio CD, JPEG, MP3, VCD playback VCR Plus programming PC Card and SD card slots 	Provides editing tools and has some advanced features. You can watch one show you've recorded on DVD-RAM while recording another.
 Philips DVDR80 ★★★★☆ find.pcworld.com/38984	\$700	<ul style="list-style-type: none"> DVD+R/RW recording Digital audio optical output One-touch, on-screen, manual, timer recording 	<ul style="list-style-type: none"> Digital video input (FireWire) Audio CD, JPEG, MP3, VCD, SVCD playback Guide Plus program guide 	Has a free program listing guide to make recording from TV simple, but its on-screen menus and documentation are unclear. Has a disc catalog.
 Pioneer DVR-810H-S ★★★★☆ find.pcworld.com/38987	\$1000	<ul style="list-style-type: none"> Hard-disk recording with DVD-R/RW archiving Digital audio optical output On-screen, manual, timer recording 	<ul style="list-style-type: none"> 80GB hard drive TiVo Basic (full service optional) Audio CD, JPEG, MP3, VCD, SVCD playback 	TiVo-enabled model can't record directly onto a disc; you must record to the hard disk first—even when dubbing from other video sources.
 Sharp DV-RW2U ★★★★☆ find.pcworld.com/38993	\$500	<ul style="list-style-type: none"> DVD-R/RW recording Digital audio optical output One-touch, manual, timer recording 	<ul style="list-style-type: none"> Digital video input (FireWire) Audio CD, MP3, VCD playback VCR Plus programming 5.1-channel Dolby Digital recording 	Handles the basics well, has some pro-level editing, and is the only unit we tested to record 5.1-channel audio. Has an inelegant interface.
 Editor's Pick Sony RDR-GX7 ★★★★★ find.pcworld.com/38990	\$700	<ul style="list-style-type: none"> DVD±R/RW recording Digital audio coaxial, optical output One-touch, manual, timer recording 	<ul style="list-style-type: none"> Digital video input (FireWire) Audio CD playback Four surround-sound playback modes 	Dual-format recorder has an intuitive and attractive on-screen interface. It is the only player that can't play MP3s or VCDs.

FOOTNOTE: ¹ All models support audio recording in 2.1-channel Dolby Digital, except as noted.



DUAL-FORMAT DVD RECORDER: the well-designed Sony RDR-GX7.

of paramount importance.

Tapping out segment titles on a remote control—a necessity on all of the units except the Pioneer—is tedious, and it naturally doesn't work as well as using a PC keyboard would.

The Pioneer, though, is extremely easy to operate: Basically it's a TiVo hard-drive recorder with an integrated DVD burner. TiVo's simple, attractive interface services not only hard-disk recording but also DVD playback and recording. When you copy a TV show to DVD, you get neat, TiVo-like menu navigation and program titles, complete with the show's detailed program information—a far cry from the generic titles most of the other models in this roundup automatically provide.

However, unlike the other models we tested, all of which record directly to disc, the Pioneer requires you to record your video to the 80GB hard drive first. Even if you're dubbing your old videotapes to DVD via the unit's analog inputs, you must copy video to the hard drive before you can transfer it to DVD.

The Apex and Sony models also offer attractive, intuitive graphical interfaces. In con-

trast, the Philips DVDR80's on-screen menu frequently presents arcane symbols that you'll need a key to decode—so using this unit is more difficult than it should be.

The Sharp isn't hard to use, but its interface isn't pretty, either: Its navigation menus look identical to the simple blue-and-white text screens of the company's VCRs.

READY, SET, RECORD!

EACH OF THE MODELS we tested permits manual and timer recording, similar to

DVD MEDIA

DVD: NO SINGLE STANDARD

SET-TOP DVD recorders support at least one write-once format (either DVD-R or DVD+R) and at least one rewritable format (DVD-RW, DVD+RW, or DVD-RAM).

Write-once discs are less expensive, selling for approximately \$3 apiece, while rewritable discs cost around \$5 apiece. A DVD-RW or DVD+RW disc is rated to handle 1000 rewrites

(and DVD-RAM is rated for something on the order of 100,000 rewrites) without suffering any quality loss. Such durability makes DVD media a bargain for preserving programs compared with relatively perishable magnetic VHS tape.

what you'd find on a VCR; all but the Pioneer (which relies on its TiVo guide) have one-touch recording for immediately capturing shows in 30-minute increments.

The slickest on-screen programming guides accompanied the Pioneer and Philips models. The TiVo Basic service on the Pioneer device lists three days' worth of programs and allows you to record all episodes of a particular television series at a specific day and time. (You can upgrade to the full TiVo service to get enhanced options, such as recording all shows with a specific actor, for \$13 a month.)

Philips offers an attractive alternative to TiVo with its Guide Plus System, a free, on-screen program guide that taps into your cable feed to display a week's worth of TV shows, mimicking some of TiVo Basic's functions. On the other hand, the Panasonic, the Pioneer, and the Sharp products all integrate the spartan VCR Plus, a holdover system for inputting a number you

find in TV listings for a show you want to record.

Just as VCRs have three recording speeds (SP/LP/EP), all of the DVD recorders we evaluated had at least three image-quality presets for recording (the Philips device provides eight presets). The more recording time you pack on a disc, however, the lower the video quality—as a result you'll see blocky and choppy images, with obvious visual artifacts. The highest quality setting—equivalent to what you'd see in a DVD movie—gets you just 1 hour of recording time. The sweet spot: 2 hours per disc, at which the image is good, with only occasional artifacts.

DVD recorders are wonderful tools, especially when they are easy to use, like our pick, Sony's RDR-GX7. One would make a great addition to any home theater setup—once you free up the slot formerly occupied by your VCR. ■

Michael Gowan is a frequent contributor to PC World.



All of the recorders we reviewed will create discs that most DVD players can read, but because no model records to every format, you should check to see which formats the other DVD players in your household support, before you buy a recorder. Older DVD players tend to have more trouble with DVD-RW and DVD+RW discs, and few players—old or new—will read DVD-RAM discs.

The lone DVD-RAM unit we looked at, Panasonic's DMR-E60, also burns to DVD-Rs, which will work in most players. Meanwhile, Sony's RDR-GX7 is the only model that can burn to either DVD-R/RW or DVD+R/RW media.

MOBILITY

FIND THE WAY WITH GPS

NAVIGATION DEVICES KEEP YOU ON TRACK ON UNFAMILIAR GROUND.

ORBITING roughly 11,000 miles above the earth, the 24 satellites of the Global Positioning System are perhaps the most important navigational tools created since the invention of the compass. With a clear line of sight to at least three satellites, any modern GPS receiver can calculate your location anywhere on the planet with extreme accuracy, 24 hours a day, rain or shine.

Originally built by the U.S. government for military purposes, GPS technology today is showing up in all sorts of consumer devices. PDAs, cell phones, two-way radios, cars, and even wristwatches have become GPS-enabled.

In my sampling of such



FINDING THE BEST driving route to your destination is easy with the RoadMate 700.

location-aware products, I came away most impressed with Thales Navigation's **Magellan RoadMate 700** (\$1299), an automotive navigation system. On a four-day road trip, the device proved accurate, easy to use, and a big help on unfamiliar streets and highways in Southern California.

The diminutive, Bluetooth-

enabled **Earthmate GPS Receiver** (\$290) from DeLorme is harder to use if you are driving, but it's more portable and a lot cheaper than the RoadMate. Whether I placed the receiver on the dashboard or in a bag, it broadcast GPS data via its wireless connection to my note-

book PC and my Palm Tungsten T3 PDA, both of which stored and displayed the maps. Combined with DeLorme's Street Atlas USA 2004 mapping software, the device is a powerful navigation tool—especially if you have a copilot to work it.

Garmin's **Rino 120** (\$250) combines two-way radio com-

munication and GPS navigation in one light and rugged unit that is great for route-finding on a mountain or regrouping in the chaos of Disneyland. The Rino packs an astounding variety of features, but its best trick is its use of the unlicensed Family Radio Service band to show the location of another nearby Rino user (so buying two of them is useful).

Sports training is an endeavor in which location is less important than your speed, distance, time, and pace. Over the course of a 10-mile run and a 20-mile bike ride, the **Timex Ironman Triathlon Speed + Distance System** (\$185 to \$250 depending on the model you choose), which includes a GPS transceiver that is wirelessly connected to a wristwatch, gave me real-time data on all four of these vital statistics. My only complaints: The small numbers on the Ironman watch are difficult to read, and I lost the GPS signal twice. —Tracey Capen ■

FEATURES COMPARISON

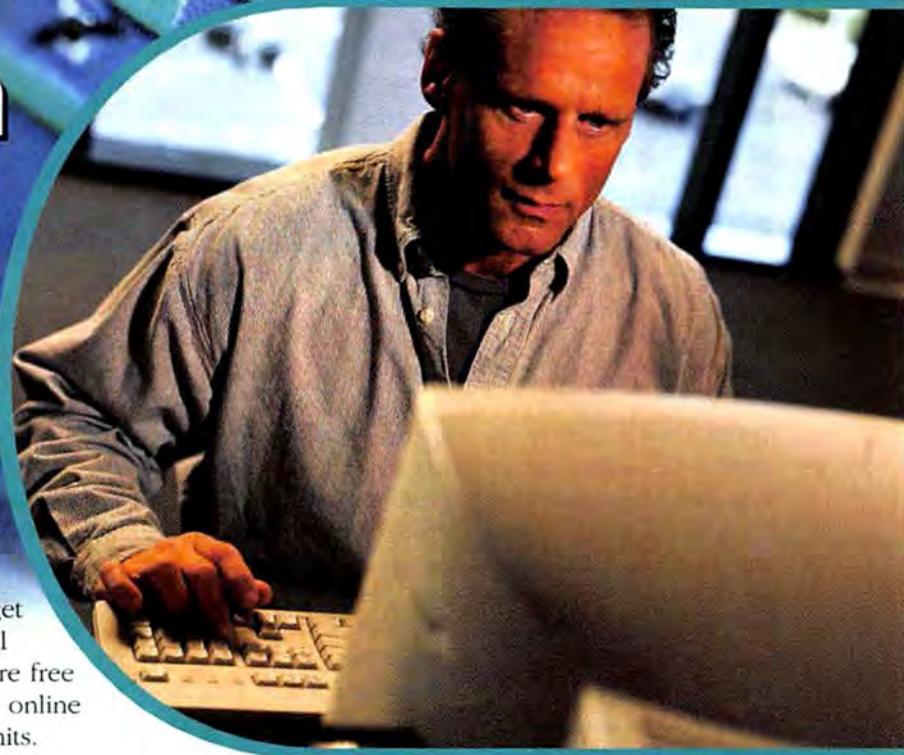
GPS DEVICES: BE LOCATION-AWARE EVERYWHERE

GPS PRODUCTS ON THE ROAD OR IN THE WILD can help you figure out both where you are going and where you have been, but features vary widely depending on the device's intended use.

GPS DEVICE	Device type	Features	Pros	Cons
 <p>DeLorme Earthmate GPS Receiver ★★★★☆ find.pcworld.com/38729</p>	Portable GPS receiver	<ul style="list-style-type: none"> • \$290 • 12-channel GPS receiver • Street Atlas USA 2004 Handheld • USB cable 	<ul style="list-style-type: none"> • Rechargeable or AAA batteries • Compact size 	<ul style="list-style-type: none"> • Requires a separate handheld or notebook to store and access maps
 <p>Garmin Rino 120 ★★★★★ find.pcworld.com/38735</p>	Two-way radio/GPS receiver	<ul style="list-style-type: none"> • \$250 • 12-channel GPS receiver • North America map built in • Water-resistant 	<ul style="list-style-type: none"> • Shows location of and direction to another Rino user • Rugged construction 	<ul style="list-style-type: none"> • Family Radio Service has limited range, up to 2 miles • Added cost for detailed street or topographical maps
 <p>Thales Navigation Magellan RoadMate 700 ★★★★★ find.pcworld.com/38738</p>	Automotive GPS navigation system	<ul style="list-style-type: none"> • \$1299 • 12-channel GPS receiver • 3-by-2.25-inch color display • 10GB hard drive 	<ul style="list-style-type: none"> • Large color LCD touch screen • Audio directions are loud enough to be heard over a car radio • Automatic rerouting is quick 	<ul style="list-style-type: none"> • Expensive • Zoomed-out map provides few details
 <p>Timex Ironman Triathlon Speed + Distance System ★★★★☆ find.pcworld.com/38732</p>	GPS-enabled wristwatch	<ul style="list-style-type: none"> • \$185 to \$250 • Ironman Triathlon Watch • 12-channel Garmin GPS receiver • Speed, distance, pace recording 	<ul style="list-style-type: none"> • Wireless connection between GPS receiver and watch • Lightweight • Inexpensive 	<ul style="list-style-type: none"> • Numbers on the watch face sometimes hard to read • Does not record location data

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*Salary information is based on the *Occupational Outlook Handbook*, a publication of the U.S. Department of Labor. Growth figures represent a ten-year period ending 2010. Source: *National Industry-Occupation Employment Matrix*, a publication of the U.S. Bureau of Labor Statistics. Individual student earnings vary.

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GADGET FREAK

DANIEL TYNAN

COOL YOUR GADGET FEVER

AFTER A WHILE the symptoms are impossible to ignore. You open the Hammacher Schlemmer catalog and start to hyperventilate. The remote controls on your coffee table have multiplied like guppies, and you can't remember what any of them do.

You've got gadget fever, and all you can think about is buying another digital doohickey.

As a recovering gizmoaholic, I've spent thousands on devices I used briefly and then tossed aside. Along the way, I've learned how to break the grip of gadget fever and find stuff I really like. Here are some mistakes to avoid:

Early Adopteritis: No matter what it is, you want to be the first person on your block to own one. But manufacturers frequently

(well, okay,

always) release new technologies before they're ready. And even familiar widgets like Wi-Fi need some time to adjust to new surroundings (such as your living room). Later, a version that works better will arrive. Wait for it.

Manual Labor: If the manual for the product is thicker than the Manhattan phone book, beware. This usually means the dingus has tons of complicated features you'll never use. (A caveat: If you're buying something truly complex, like a digital video editing system or an ICBM launcher, a thick manual is probably good.) Most vendors now post manuals on the Web; check them out before you buy.

500 Easy Pieces: The more parts it has, the more hassle you'll endure. For example, Sony's \$280 Net MD music player comes with two software discs, three manuals, and a half-dozen other bits. It's so complicated I knew I'd never use it.

In contrast, Apple's \$300 iPod is packed with one set of earphones, one power supply, one manual, and one disc. And Apple's austere packaging was so

Zen-like I hated taking it apart. Simple is better.

Media Monopolies: Betamax, 8-track, super floppies, Jaz—the path to gadgetopia is littered with the corpses of obsolete storage media. We're seeing this happen again with competing standards for high-definition DVD. Think twice before committing your data to a proprietary device.

The Lifetime Channel: Vendors that charge monthly fees may offer lifetime subscriptions at a big discount. Try it for a month first. After a few weeks of using TiVo, I was ready to pony up \$300 for a lifetime sub. But with satellite radio (see December's *Gadget Freak* at find.pcworld.com/39230), one month was plenty.

Fashion Faux Pas: Maybe I've been watching a bit too much *Queer Eye for the Straight Guy*, but I think you should avoid any device that makes you look like the village dork. Like those radio headphones people wear while jogging—they're fine if you're parking airplanes on the tarmac, but embarrassing anywhere else. If you look stupid using it, you probably won't.

Finally, remember that a 30-day money-back guarantee is your best friend. If a gadget isn't everything you hoped it would be, ship it back. Even if you have to pay a restocking fee (though you should avoid

NEXT UP

Talk to the Tube

SOME SPRINT mobile phone owners can now watch live television on their handhelds. The new service, provided by MobiTV (www.mobitv.com), costs \$10 per month and will offer viewers about 14 cable channels, including Discovery Channel and MSNBC. MobiTV says subscribers will hear a high-quality, continuous stream of audio; the video tops out at two frames per second (so calling it "live" TV seems a stretch), but the company insists you'll always at least hear your program. Only five Java-enabled Sprint handsets support it now, but more are coming.

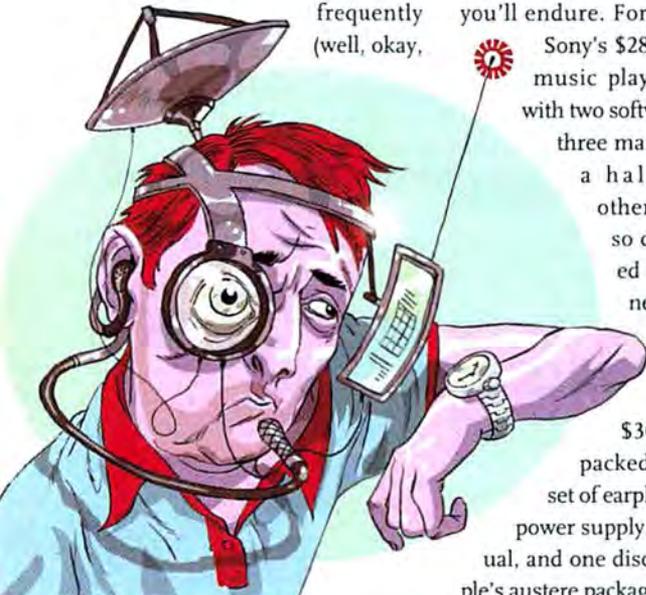


Dell Does Bigger LCD TVs

WATCH OUT, Sony and Circuit City: Dell has a new LCD television, complimenting the \$699 W1700 LCD TV we reviewed in December (see find.pcworld.com/38546). The 30-inch W3000 costs \$3299, is HDTV-compatible, and uses Faroudja image-enhancement technology.

stores that charge them, if possible), it's better than having another widget cluttering the garage. Besides, you'll need the room for all the nifty gear you'll use and cherish with each passing moment. ■

Contributing editor Daniel Tynan resides at the Betty Ford Clinic for Gizmo Dependency.



WEB RESOURCES

GEAR UP ONLINE**HANDY SITES FOR DIGITAL ENTERTAINMENT, MOBILE TECHNOLOGY, AND MORE.**

PC-LIKE POWER. PC-like complexity. Today's living-room products and mobile gadgets deliver both of the above—so the more information you have at your fingertips, the better. Herewith are a few of our favorite Web destinations:

Gizmodo

A first-rate Web log of Web gadget coverage.
www.gizmodo.com

AV Science Forum

Advice from real people on home theater, TiVo, and more.

www.avforum.com

Dynamism

Tiny cameras, high-tech phones, and other items—direct from Japan.

www.dynamism.com

Cheap-Plasma-TV.com

Like the name says: tips on buying a big screen cheap.

www.cheap-plasma-tv.com

InfoSync World

News and reviews about smart phones and PDAs.

www.infosyncworld.com

Remote Central

All about remote controls.

www.remotecentral.com

MORE AT PCWORLD.COM

WE ALSO THINK you'll like these items at (ahem) our own site:

DV Camcorder Guide

How to buy the right digital video camera for you.

find.pcworld.com/38669

Cell Phone Guide

Cool features, hot deals.

find.pcworld.com/38666

Digital Music Studio

How to get vinyl, tape, and

CDs onto digital media.

find.pcworld.com/38678

Living Room Tech

New goodies from Japan.

find.pcworld.com/38654

Consumer Electronics

From cameras to phones—our complete archive.

find.pcworld.com/38675



GADGET HEAVEN: Gizmodo and Remote Central.

Audio Review

Reports by expert users on home theater products.

www.audioreview.com

The Gadgeteer

Web logs and more from gadget fans "Julie and Judie."

www.the-gadgeteer.com

Satradio

Info on satellite radio from Sirius and XM.

www.strathlachlan.com/satradio

Having It Your Way With PVRs

The numbers tell a compelling story. The 1.5 million personal video recorders (PVRs) sold in 2002 will swell to more than 11 million in 2005, according to various research sources. The reason for this growth is simple: Like a VCR, PVRs can record, stop, fast-forward, and pause. But a PVR has a hard drive instead of a tape, allowing users to record far more programming and then to do so much more with the full functionality PVRs offer.

For example, PVR users can easily eliminate commercial messages from recordings, and they can pause and then resume a live broadcast. Moreover, an interactive interface with the PVR allows users to fully customize the viewing experience. Users can record any episode of any television series, no matter when it airs.

The big news is that users no longer have to track down hard-to-find hardware to enjoy the PVR experience. Available at most major retailers are Media Center PCs, running Windows® XP Media Center Edition 2004. They allow you to control PVR functions using an on-screen programming guide and remote control. You select the programming and then record it directly to your hard drive.

Not only that, but if the PC also has a CD-RW drive or recordable DVD drive, users can create their own personalized video collections—classic TV shows, for example. Using a PC PVR, users can also play back digitized shows and then record them on a standard VCR.

■ For more information on this exciting innovation in home entertainment, click now on www.microsoft.com/mediacenter.

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WORLD WITHOUT WIRES



▲ 3Com's 11a/b/g Wireless PC Card with XJACK® Antenna



▲ 3Com's Wireless LAN Access Point 8750

Somewhere Guglielmo Marconi is smiling proudly.

As the father of wireless communications, Marconi would be pleased to witness today's veritable explosion of digital wireless technology, which is literally changing the way we work.

Just how hot is wireless today? Consider the growth in the numbers of public wireless LANs, called "hotspots," that on-the-go business professionals use for anytime, anywhere access to data and applications. Hotspots tripled in number in 2003 to nearly 10,000 worldwide, according to Gartner Inc.

Meanwhile, products supporting Wi-Fi, which is a group of industry standards for wireless LAN equipment, have doubled in number in the last year alone to more than 800—yet another sign of the wireless LAN market's significant growth.

At small and mid-sized businesses, managers with limited budgets considering wireless strategies must be particularly vigilant about buying

wireless solutions that will interoperate with other technologies, despite evolving standards. These managers are also concerned about the security of the wireless world. How do SMBs make the right moves today with confidence that their wireless investments will still deliver value tomorrow?

3COM: SECURITY AND RELIABILITY THAT LASTS

Vendors like 3Com are working to make such choices easier. At the top of any wireless technology wish list, you would surely find a request for solutions that combine advanced wireless security with integrated products that support all three Wi-Fi standards—and do so at a highly competitive price. That is exactly what you get now from 3Com (www.3com.com), with its Tri-Mode 802.11a/b/g Wireless Access Points and Client Adapters. These products are suitable for organizations ranging from the SOHO to the enterprise and everything in between.

With tri-mode products, users can connect from any environment in which they happen to find themselves. Also with tri-mode, users with different standards-based wireless PC cards and PCI adapters get

reliable network access at multiple speeds and frequencies, all on the same network.

Moreover, by integrating three Wi-Fi standards into a single platform, 3Com helps solve the difficult challenge of migrating upward to the latest technologies, while at the same time protecting the valued investments made previously in the wireless environment.

3Com users can also rest assured that their wireless security needs have been addressed with these products, which feature integrated wireless standards such as WPA, AES, and 802.1x.

"Our 3Com wireless network greatly enriches our educational experience at USD by stretching the learning environment across the entire campus," says Tina Wing, network technician, University of San Diego. "The high-value wireless network is practical, easy to maintain, and, with 3Com's management solution, provides an exceptionally low total cost of ownership."

■ For more information on these and other outstanding wireless network products, click on www.3com.com/wireless.

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Making Easy Work of Creating Drive Image Files

As the leading vendor of data recovery and undelete solutions for the Microsoft Windows world, R-Tools (www.r-tt.com) has dedicated itself to developing products and technology that help forgive our errors.

Now R-Tools has added to its lineup of data recovery products with **R-Drive Image**, its drive image creation and back-up software. Without stopping Windows and therefore without interrupting business, R-Drive Image creates drive image files on the fly. What's more, these images can then be stored in a variety of places, including various removable media.

R-Drive Image is capable of restoring those images on the disks on the fly. It then creates a special bootable diskette to restore system partitions while connecting images as virtual disks to copy only certain files from the images. R-Drive Image also compresses image data with variable compression levels to save free space.

R-Drive Image joins the family of reputable R-Tools products, which includes:

- ✓ **R-Studio**, a family of data recovery utilities capable of rescuing data on both local logical and physical disks, as well as remote disks over networks.
- ✓ **R-Undelete**, a low-cost, user-friendly, powerful file undelete solution capable of restoring deleted files on any valid logical disks visible to the host operating system.
- ✓ **R-Mail**, designed to rescue inadvertently deleted email messages and to recover damaged *.dbx files where folders with email messages are stored.
- ✓ **R-Wipe&Clean**, for users wanting to keep their disks free and clear of unwanted data.

■ For more information, click on www.r-tt.com.

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...by R-Tools Technology, the leading provider of data recovery and undelete solutions for the Windows OS family.

R-Studio 2.0

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TOP 100

EDITED BY THE REVIEWS STAFF

INSIDE

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Spot LIGHT The Olympus E-1 (left) and the Canon EOS Digital Rebel both use lenses that can be swapped out quickly and easily, making the cameras more flexible.



SPOTLIGHT: DIGITAL SLRs

Serious Cameras for Serious Photos

Digital single-lens reflex (SLR) cameras are designed for serious photographers who want more control over how their photos look. They have several advantages over the more conventional point-and-shoot digital cameras: They let you swap out their lenses, and in most instances the lenses and accessories are interchangeable with your existing 35mm film SLR camera if you stick with the same manufacturer. For example, Canon's digital SLRs can use most of the several hun-

dred available Canon EF mount lenses. Some older lenses and the Olympus E-1, which uses lenses specially designed for this camera, are exceptions.

The standout product in this month's spotlight is the Canon EOS Digital Rebel, which at \$899 (for the body only) is the cheapest of the models we reviewed. This 6.3-megapixel camera takes beautifully sharp pictures, with accurate, vivid colors, and it is very easy to use. Though not quite as robust or as feature-packed as ►



Monitors

Top 10 CHART BenQ's swank 15-inch FP591 LCD monitor has speakers that surround the screen and a media card reader integrated into the top. It earned outstanding ratings for text and graphics in our tests.

157

159



Hard Drives

Top 10 CHART Western Digital's Raptor WD360GD, the first 10,000-rpm Serial ATA hard drive, did well in our lab tests but carries only 36GB. The drives that made the chart hold 120GB to 250GB.



Digital Cameras

Top 10 CHART Kodak's EasyShare DX6440 comes in for a landing on its included docking station. The dock recharges the camera's battery and simplifies picture transfers.

160

INSIDE THE TOP 100

See find.pcworld.com/15720 for details on how we compile charts for the Top 100. Freelance writers Dan Littman, Mick Lockey, and Carla Thornton and PC World editors Richard Baguley, Tracey Capen, Seán

Captain, Rebecca Freed, Kalpana Ettenson, Alexandra Krasne, Melissa J. Perenson, and Alan Stafford contributed to the Top 100 section this month. Ulrike Diehlmann, Julio Giannobile, Elliott Kirschling,

Jeff Kuta, Tony K. Leung, and Thomas Luong of the PC World Test Center performed testing on the products reviewed in this section, with logistical support provided by Julian Weatherby.

some of its more professional cousins, it's a great choice for the serious photographer without a pro's budget. Our other favorite is the Olympus E-1; although this model is more expensive, it is also very easy to use and has a number of helpful features, such as an excellent noise reduction mode. The Canon EOS 1-Ds is another outstanding camera: It produced the sharpest, best-looking images in our tests. Although its price of \$8000 is way beyond what most people can afford, you'll probably see cameras similar to this one, but costing much less, appear within the next couple of years.

FOCAL LENGTH

ALTHOUGH YOU may be able to use a standard film SLR lens on a digital SLR, there is a price to pay. The image sensors in digital SLRs are almost always smaller



THE NIKON D100 (left) is a very flexible camera that gives the photographer lots of control, while the Pentax ist D is the lightest of the cameras we examined.

than a 35mm film negative, a difference that increases the effective focal length of the lens. This is great for zoom lenses because it increases the magnification; but when you are using a wide-angle lens, it decreases the angle of view.

The exceptions are the Canon EOS 1-Ds and the Olympus E-1. The 1-Ds has a sensor that is the same size as a 35mm nega-

tive, while the Olympus uses special lenses that provide the same angle of view as an equivalent film SLR lens.

IN LIVING COLOR

COLOR IS THE HEART of any photograph, and all of the cameras that we tested produced images with impressively vivid colors. Overall, the three Canon models took top marks for color accuracy. The Nikon D100 over-emphasized the yellow, but we found this flaw easy to correct by using either the supplied Nikon View software or Adobe Photoshop; and once they were corrected, the images looked as good as those produced by the other cameras.

All of the models reviewed here support an uncompressed RAW mode, which saves all of the information captured by the image sensor. But this mode also produces big files—often in excess of 10MB

TOP 100



Digital SLR Cameras: Loaded but Pricy

THESE CAMERAS provide more features and flexibility than their point-and-shoot cousins, but they are also more expensive.

SLR CAMERA	Basic features ¹	Extra features	Comments
Canon EOS 10D find.pcworld.com/38807	<ul style="list-style-type: none"> • \$1500 • 6.3-megapixel resolution • 1.6X focal-length multiplier 	<ul style="list-style-type: none"> • Rechargeable lithium ion battery • USB 1.1 interface • 1/4000 to 30 sec shutter speed range 	This Canon takes very attractive images with good color and low noise, even at the higher ISO settings. Although it shares the same image sensor as the Digital Rebel, the 10D has more features. (★★★★☆)
Canon EOS 1-Ds find.pcworld.com/38804	<ul style="list-style-type: none"> • \$8000 • 11.1-megapixel resolution • No focal-length multiplier 	<ul style="list-style-type: none"> • Rechargeable NiMH battery • FireWire interface • 1/8000 to 30 sec shutter speed range 	A true professional's digital SLR, with a price to match. It produced the best images in our tests, with very low noise and lots of detail. It's also very expensive and heavy, and the controls are a little awkward. (★★★★☆)
Best Buy Canon EOS Digital Rebel find.pcworld.com/38810	<ul style="list-style-type: none"> • \$899 • 6.3-megapixel resolution • 1.6X focal-length multiplier 	<ul style="list-style-type: none"> • Rechargeable lithium ion battery • USB 1.1 interface • 1/4000 to 30 sec shutter speed range 	The EOS Digital Rebel provides strong image quality and a good selection of features at a good price. The body is made of plastic, so it's lighter than the other cameras, which are made of metal, and it feels less sturdy. (★★★★☆)
Nikon D100 find.pcworld.com/38816	<ul style="list-style-type: none"> • \$1500 • 6.1-megapixel resolution • 1.6X focal-length multiplier 	<ul style="list-style-type: none"> • Rechargeable lithium ion battery • USB 1.1 interface • 1/4000 to 30 sec shutter speed range 	The D100 is an older model that takes sharp pictures when the internal sharpening is enabled, but colors are not always accurate. Noise can be a problem on the higher ISO settings or with longer exposures. (★★★★☆)
Olympus E-1 find.pcworld.com/38813	<ul style="list-style-type: none"> • \$1800 • 5-megapixel resolution • No focal-length multiplier² 	<ul style="list-style-type: none"> • Rechargeable lithium ion battery • FireWire and USB 2.0 interfaces • 1/4000 to 60 sec shutter speed range 	The first digital SLR from Olympus takes sharp pictures with good color and is easy to use. Its lenses are designed for the E-1 only; You cannot use standard 35mm camera lenses. (★★★★☆)
Pentax ist D find.pcworld.com/38819	<ul style="list-style-type: none"> • \$1700 • 6.1-megapixel resolution • 1.5X focal-length multiplier 	<ul style="list-style-type: none"> • Two CR-V3 or four AA batteries • USB 1.1 interface • 1/4000 to 30 sec shutter speed range 	The smallest and lightest of the cameras we reviewed, the ist D took pictures with accurate color, but with disappointing sharpness, even with the in-camera sharpening option enabled. (★★★★☆)

FOOTNOTES: ¹ Price is for the body only—without lens. Focal-length multiplier is the amount a lens's focal length is increased against the same lens in a 35mm film camera. ² The Olympus E-1 uses special lenses to provide full focal length. **CHART NOTE:** Additional testing performed by Rick Rizner. Visit find.pcworld.com/38861 for more information on products in this chart.

for a single image. It consequently makes viewing pictures in the camera's LCD screen a slow process, but the Canons use an interesting trick: In RAW mode, they also save a JPEG version of the photo that the camera can quickly display.

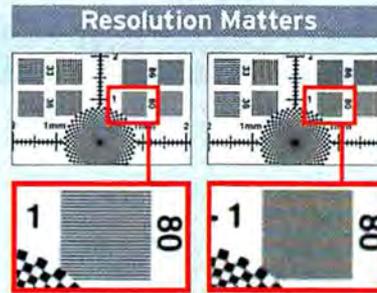
NOISE ANNOYS

NOISE—SPECKLING OR mottling, most often visible in broad planes of color, such as sky—is an inevitable fact of digital photography. We saw noise in photos taken by all of the cameras, although most of the time these blemishes were barely noticeable. The Nikon D100 showed the most noise, but we wouldn't say it has a big problem: The images it produced still looked great when enlarged, with the noise being only just visible at lower ISO settings. The Olympus E-1 has a noise reduction mode in which the camera takes the photo and then takes another with the same settings but with the shutter closed. Finally it subtracts this noise-only image from the first, eliminating much of the noise (see "Noise Reduction," at right).

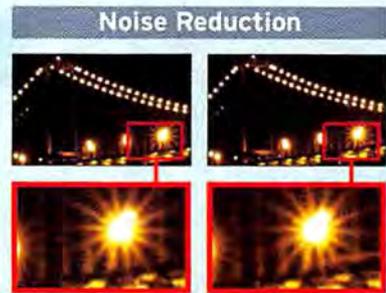
HANDS ON

THE DOWNSIDE OF the creative control these cameras offer is that they can be much more difficult to use than a conventional point-and-shoot digital camera. The Canon EOS 10D's body, for instance, has a total of 17 buttons, two switches, and three dials, and it takes some time to learn which button does what. The Canon EOS Digital Rebel and the Pentax ist D are

OUTPUT SAMPLES



FOR OPTIMAL detail in images, the greater the resolution, the better. The 11.1-megapixel Canon 1-Ds (left) picks up much more fine detail in photos of our test chart than does the 6.1-megapixel Pentax ist D (right).



THE OLYMPUS E-1 includes a mode that uses a blank image to remove noise (the red blotches) from an image. Both photos are 4-second exposures; the photo on the right has the noise-removal mode enabled.

the easiest to use: Neither requires a huge amount of button pushing to access its settings. The Olympus E-1 puts controls you'd want to use while looking through the viewfinder (such as exposure lock and the focus point selector) under your right thumb for easy access, while the Nikon D100 offers two dials for shutter speed and aperture near the shutter button.

All of the cameras proved to be quick at focusing in good light, although in low light the Digital Rebel often spent several seconds trying to focus. All of the models also offer several user-selectable focus zones. The Digital Rebel and the Pentax have nine zones, which cover most of the frame, while the Olympus gives you three in the center of the frame. The Canons provide an automatic depth-of-field mode, and this is very useful for getting both a

nearby object and a distant one in focus.

The cameras we tested have a variety of metering modes, as you'd expect, including spot, center-weighted, and automatic. The Pentax and Nikon provide a dedicated dial, instead of buttons or a menu, for switching between metering modes.

PHOTOS À LA MODE

THE CAMERAS ALL offer modes such as aperture-priority, shutter-priority, full manual, and program, but the Canon Digital Rebel and 10D also include scene modes (such as sports and portrait) that set the camera up for the subject. For instance, the sports mode enables the camera to take photos in quick succession and keep quick-moving subjects in focus.

Most of the models connect to a PC over a USB 1.1 interface, and copying the large files these cameras produce takes a long time. The 1-Ds provides a FireWire interface, while the Olympus E-1 includes both USB 2.0 and FireWire. Both of these faster connections make the process of transferring images much quicker.

While the Digital Rebel is the standout camera of the group, there are several other attractive options. The Olympus E-1 is easy to use and takes great images, but it can't take existing Olympus lenses. The Pentax ist D is the smallest and lightest of the group, but the images were not as sharp as the others. The Nikon D100 is a very flexible camera, but the others have more accurate colors and less noise.

—Richard Baguley ■



THE CANON EOS 1-Ds (right) is a heavyweight professional model with a huge list of features and a price to match, while the Canon EOS 10D is cheaper and significantly lighter.

TOP 15 DESKTOP PCs

POWER SYSTEM			Overall rating	Street price (10/22/03)	PC WorldBench 4 performance score ¹ 	Comments
1	Best BUY ABS Awesome 6300 find.pcworld.com/39152	NEW	90	Very expensive \$3600	Windows XP Professional Outstanding 142	Packed with lots of extras, the Awesome 6300 is one of the fastest systems we've tested in business applications and in games. (★★★★★) Oct 03
2	Dell Dimension 8300 find.pcworld.com/37289		89	Expensive \$3128	Windows XP Home Good 127	Pricy machine offers a beautiful LCD monitor and good speed. The case interior can be accessed easily, sans tools. (★★★★☆) Oct 03
3	Gateway 710XL find.pcworld.com/38516		88	Expensive \$3500	Windows XP Home Good 126	Tons of storage space, solid performance, and FireWire ports make this model a good choice for video editing. (★★★★☆) Dec 03
4	MPC Millennia 920i Professional find.pcworld.com/37835		87	Average \$2831	Windows XP Home Good 127	Roomy interior; unit includes a dual-format DVD burner and Pinnacle's Studio 8.5 for video editing and DVD authoring. (★★★★☆) Nov 03
5	Alienware Aurora Extreme find.pcworld.com/38507		86	Very expensive \$4113	Windows XP Professional Outstanding 141	Outstanding performer is a great choice for gamers who want a PC that can effortlessly render complex graphics. (★★★★★) Dec 03
6	Polywell Poly 900NF3-FX1 find.pcworld.com/39149	NEW	86	Expensive \$3279	Windows XP Professional Outstanding 142	Sailing through our gaming tests with sky-high frame rates in Unreal Tournament 2003, this system ties for fastest model. (★★★★★) Oct 03
7	Micro Express MicroFlex 30A find.pcworld.com/34742		84	Inexpensive \$1999	Windows XP Professional Very good 131	Reasonably priced and fairly quick, the system comes with a TV tuner. (★★★★☆) June 03

VALUE SYSTEM			Overall rating	Street price (10/22/03)	PC WorldBench 4 performance score ¹ 	Comments
1	Best BUY Dell Dimension 4600 find.pcworld.com/38510		83	Expensive \$1675	Windows XP Home Very good 123	This system produced solid frame rates in our tests, making it ideal for work and play. The LCD was stellar, too. (★★★★☆) Dec 03
2	HP Business Desktop D325 find.pcworld.com/37829		82	Very inexpensive \$924	Windows XP Professional Very good 122	Bare-bones business system offers room for expansion and dual VGA inputs, but it lacks a CD-RW drive. (★★★★☆) Nov 03
3	Micro Express MicroFlex 32A find.pcworld.com/37331		81	Average \$1399	Windows XP Professional Outstanding 130	A strong performer, the 32A blazed through our 3D graphics tests, pumping out high frame rates at 1280 by 1024 resolution. (★★★★☆) Oct 03
4	Polywell Poly 880NF2-2800 find.pcworld.com/37334		80	Inexpensive \$990	Windows XP Home Very good 127	This model has good speed and room for additional storage. A window on the side of the case lets you see the interior. (★★★★☆) Oct 03
5	HP Pavilion A350n find.pcworld.com/37832		80	Average \$1480	Windows XP Home Good 116	Well-designed minitower has clear labels and easy-to-access ports. The 15-inch LCD showed crisp text and vibrant graphics. (★★★★☆) Nov 03
6	IBuyPower Value XP Pro find.pcworld.com/35684		78	Very inexpensive \$849	Windows XP Home Good 115	Bargain system has plenty of expansion room. The PC's budget graphics card yielded poor performance in our tests. (★★★★☆) Aug 03
7	ViewSonic M2000 find.pcworld.com/39155		77	Expensive \$1648	Windows XP Media Center Good 118	ViewSonic's first PC fits onto your TV cabinet. Like other Media Center models, the M2000 offers TiVo-like functionality. (★★★☆☆) Sept 03
8	HP Presario S5300nx find.pcworld.com/37826		77	Inexpensive \$1160	Windows XP Home Fair 109	Low-cost system comes with an excellent software bundle, including Microsoft Office XP. (★★★☆☆) Nov 03

Go to find.pcworld.com/10860 for details on PC World's Star Ratings.

Go to find.pcworld.com/39209 for a breakdown of the weightings we give to the various factors that contribute to a desktop PC's overall rating in each of the two categories.

¹Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. For more details, see find.pcworld.com/15720.

²Total capacity in gigabytes (may represent multiple drives).

TEST
Center

FORMERLY THE DOMAIN OF SERVERS and top-end workstations, 64-bit processors are cropping up on consumer desktops. Two new systems on the power side of this month's chart sport AMD's new 64-bit chip, the 2.2-GHz Athlon 64 FX-51.

Among the FX-51's performance enhancements over previous AMD CPUs are a 1MB L2 cache (up from the Athlon XP's 512KB), a faster system bus, and an on-chip memory controller that eliminates the

frontside bus. Even though no 64-bit operating system exists to help the processors achieve their full potential, they still provide an immediate boost for power users, and also they shine running data-intensive tasks such as audio and video encoding and gaming.

Systems from ABS and Polywell join the Alienware Aurora Extreme, a top-notch entertainment desktop we reviewed

Visit find.pcworld.com/39212 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION						Extra features ⁴	Graphics quality	Setup and ease of use	Vendor's reliability/service
CPU	RAM (MB/type)	Hard drive ²	Monitor	Graphics	Case type ³				
2.2-GHz Athlon 64 FX-51	1024/DDR400 SDRAM	240 (RAID)	19-inch LCD	256MB ATI Radeon 9800 Pro	Midsized tower	Very good: DVD-R/RW/+R/RW drive, 16X DVD-ROM drive, flash media reader (SD/MMC, CF/I/II, MS, SM), ⁵ Microsoft Works Suite 2003	Very good	Good	Good/ ⁶
3.2-GHz Pentium 4	1024/DDR400 SDRAM	250	18-inch LCD	128MB ATI Radeon 9800 Pro	Midsized tower	Good: DVD+R/RW drive, 16X DVD-ROM drive, Microsoft Office XP Small Business Edition	Outstanding	Good	Good/Fair
3.2-GHz Pentium 4	1024/DDR400 SDRAM	500 (RAID)	18-inch LCD	256MB NVidia GeForce FX 5900G Ultra	Tower	Outstanding: DVD-R/RW/+R/RW drive, 48X/16X/40X CD-RW drive, flash media reader (SD/MMC, CF I/II, MS, SM), ⁵ Microsoft Works Suite 2004	Outstanding	Very good	Good/Fair
3.2-GHz Pentium 4	1024/DDR400 SDRAM	250	19-inch CRT	128MB ATI Radeon 9800 Pro	Midsized tower	Very good: DVD-R/RW/+R/RW drive, 48X/24X/48X CD-RW/DVD-ROM combo drive, Norton AntiVirus 2003, Pinnacle Studio 8.5	Very good	Good	Good/ ⁶
2.2-GHz Athlon 64 FX-51	1024/DDR400 SDRAM	160 (RAID)	19-inch CRT	256MB ATI Radeon 9800 Pro	Tower	Outstanding: DVD-R/RW/+R/RW drive, 52X/32X/52X CD-RW drive, flash media reader (SD/MMC, CF I/II, MS, SM), ⁵ no modem	Outstanding	Very good	/ ⁶
2.2-GHz Athlon 64 FX-51	1024/DDR400 SDRAM	322	19-inch CRT	256MB NVidia GeForce FX 5900 Ultra	Midsized tower	Very good: DVD-R/RW/+R/RW drive, 52X/24X/52X CD-RW drive; Veritas RecordNow DX, DLA, and Simple Backup; Sonic MyDVD, Musicmatch	Very good	Fair	/ ⁶
2.167-GHz Athlon XP 3000+	512/DDR333 SDRAM	120	19-inch LCD	128MB ATI All-In-Wonder Radeon 9700 Pro	Midsized tower	Good: DVD-R/RW drive, 52X/24X/52X CD-RW drive, CyberLink PowerDirector 2.1 ME, Pinnacle Studio 8	Outstanding	Good	/ ⁶
BASE CONFIGURATION						Extra features ⁴	Graphics quality	Setup and ease of use	Vendor's reliability/service
CPU	RAM (MB/type)	Hard drive ²	Monitor	Graphics	Case type ³				
2.8-GHz Pentium 4	512/DDR400 SDRAM	80	17-inch LCD	128MB NVidia GeForce FX 5200	Minitower	Good: 16X DVD-ROM drive, 48X/24X/48X CD-RW drive, Dell Enhanced Multimedia Keyboard, Corel WordPerfect Productivity Pack	Good	Good	Good/Fair
2.13-GHz Athlon XP 2600+	256/DDR333 SDRAM	40	15-inch LCD	Integrated NVidia GeForce4 graphics using main memory	Minitower	Fair: 24X-48X CD-ROM drive, no modem, Microsoft Works 7.0	Good	Very good	Fair/Fair
2.2-GHz Athlon XP 3200+	512/DDR433 SDRAM	120	19-inch CRT	128MB ATI Radeon All-In-Wonder Radeon 9700 Pro	Midsized tower	Good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, flash media reader (SD/MMC, CF I/II, MS, SM) ⁵	Very good	Good	/ ⁶
2.08-GHz Athlon XP 2800+	512/DDR333 SDRAM	80	17-inch CRT	Integrated NVidia GeForce2 graphics using main memory	Midsized tower	Good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, Lotus SmartSuite 9.7, Symantec Norton AntiVirus 2003	Fair	Good	/ ⁶
2.6-GHz Pentium 4	512/DDR333 SDRAM	120	15-inch LCD	64MB NVidia GeForce4 MX 440-based	Minitower	Outstanding: DVD+R/RW drive, 24X-48X CD-ROM drive, flash media reader (SD/MMC, CF I/II, MS, SM), ⁵ WordPerfect Productivity Pack 2002	Good	Good	Fair/Fair
2.67-GHz Pentium 4	512/DDR400 SDRAM	80	19-inch CRT	64MB NVidia GeForce4 MX 440-based	Midsized tower	Fair: 52X/24X/52X CD-RW drive, no modem, Symantec Norton AntiVirus 2003	Fair	Good	/ ⁶
2.8-GHz Pentium 4	512/DDR266 SDRAM	160	19-inch LCD	64MB NVidia GeForce4 MX 440-based	Compact	Outstanding: DVD-R/RW/RAM drive, flash media reader (SD/MMC, CF I/II, MS, SM) ⁵	Very good	Good	/ ⁶
2.4-GHz Pentium 4	512/DDR333 SDRAM	120	15-inch LCD	Integrated Intel 845G graphics	Minitower	Good: 16X DVD-ROM drive, DVD+R/RW drive, Microsoft Office XP, Microsoft Works 7.0, and Money 2003	Poor	Fair	Fair/Poor

¹ Vertical cases are towers (over 20 inches), midsized 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).

⁴ Unless otherwise stated, systems come with a modem and a network adapter.

⁵ CF = CompactFlash, MMC = MultiMediaCard, MS = Memory Stick, SD = SD memory card, SM = SmartMedia.

⁶ Insufficient data to give a rating.

last month, in the 64-bit club. Topping our power list, the ABS Awesome 6300 earned a screaming 142 on our PC World-Bench 4 tests, matching the highest score we've seen to date. The Awesome 6300 unit we tested aced our gaming tests, as well, with sky-high frame rates in Unreal Tournament 2003 (undoubtedly spurred by the included 256MB ATI Radeon 9800 Pro graphics board).

Slipping in at number six, the Polywell Poly 900NF3-FX1 was just as fast on our PC Worldbench 4 suite, equaling the 142 score of the Awesome 6300. Like the ABS, the Polywell's virtues don't stop with its processor; its 10,000-rpm enterprise-class SATA RAID hard drive setup provides 72GB of extremely fast primary storage in a striped RAID array. This Polywell also carried ▶



BESIDES AN Athlon 64 FX-51 CPU, Polywell's Poly 900NF3-FX1 offers a removable hard drive.

an extra, removable 250GB ATA 7200 hard drive with a convenient handle on the front that lets you easily remove the drive to lock up off-site for added security. Gainward's 256MB NVidia-based GeForce FX 5900 Ultra graphics board packed with our test unit helped the system turn in commendable speed performance on Return to Castle Wolfenstein and Unreal Tournament 2003 tests.

To read about innovative case features

now appearing on other systems we've reviewed, see *Tech Trend* below.

The value side saw little movement this month because vendors discontinued the two new PCs we tested before our chart went to press. Gateway is scrapping the 500S-series system we reviewed—a 2.6-GHz Pentium 4 500S with a GeForce4 5200 graphics card and TV-out—and is replacing it with models from the new 510S series. The 510S has a sleeker case

design that lacks the bulky door found on the front of 500S cases. We plan to review a 510S system for an upcoming chart. The other value newcomer, IBM's business-oriented ThinkCentre A50p, sports a 2.4-GHz Pentium 4 CPU, toolless hard drive access, and system management tools. Unfortunately, the configuration we looked at won't be available on IBM's site after December. A faster version of that model is still on sale, though. ■

TECH TREND

Getting the Most Out of Your PC's Case

YOU MAY CONSIDER a case to be no more than just a box to house your PC's internal components, but new designs and modifications allow you to personalize your system to make your computing experience a more enjoyable one. Cases come in a variety of colors and textures, from brushed aluminum to boring beige, though the latter is becoming something of a rarity. Some cases may be souped up with clear side panels

and lights that illuminate your system's whirring fans and moving components. Rather than buy a case with all of its ports located on the back—which means you'll have to crawl behind your PC to connect your speakers, mouse, keyboard, and any USB and FireWire devices—think about buying a system with those ports on the front panel. The two cases shown below highlight some of the more recent innovations we've seen on desktop PCs.



Case innovations on HP's Pavilion A350n means that ports aren't hidden on the back; rather, everything is within reach on the case's front panel. Mounted on top is a camera dock, and toward the bottom is a door that opens to reveal headphone, audio, USB, and FireWire ports. Flash card readers are within easy reach as well.

Let there be light...inside your case. Seen through a clear window in the side panel of the ABS Awesome 6300, a rainbow light is attached to the case fan. The red, blue, and green light shines most brightly when the fan is running at its highest setting. A door near the bottom of the front panel reveals USB and FireWire ports.

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TOP 15 NOTEBOOK PCs

DESKTOP REPLACEMENT		Overall rating	Street price (10/17/03)	PC WorldBench 4 performance score ¹	Faster 0	Comments
1	Best BUY Gateway 450X find.pcworld.com/38528	95	Average \$2195	Windows XP Professional	Outstanding 125	An unremarkable exterior belies this notebook's built-in Wi-Fi, extensive set of connections, very good battery life, and upgradability. (★★★★☆ Dec 03)
2	Dell Latitude D600 find.pcworld.com/36077	91	Inexpensive \$1987	Windows XP Professional	Very good 122	Midweight machine has legacy ports, but unappealing sound and a springy keyboard. (★★★☆☆ Aug 03)
3	Toshiba Tecra M1 find.pcworld.com/37022	89	Very expensive \$3049	Windows XP Professional	Good 113	Stylish notebook in black and silver boasts phenomenal battery life, good sound, and many upgrade options. (★★★★☆ Oct 03)
4	HP Compaq Business Notebook Nx7000 find.pcworld.com/37664	89	Inexpensive \$1975	Windows XP Professional	Very good 123	This wide-screen notebook offers many attractive design touches, but the keyboard is flimsy. (★★★☆☆ Nov 03)
5	MPC TransPort T2000 find.pcworld.com/37028	86	Expensive \$2510	Windows XP Professional	Very good 121	Slim blue-and-silver notebook has speed, handy audio controls, all legacy ports, and a biometric fingerprint reader. (★★★★☆ Oct 03)
VALUE NOTEBOOK		Overall rating	Street price (10/17/03)	PC WorldBench 4 performance score ¹	Faster 0	Comments
1	Best BUY Acer TravelMate 290LMi find.pcworld.com/37661	95	Very inexpensive \$1499	Windows XP Home	Very good 121	This fast, reasonably priced model has long battery life, but the sound is weak and no docking station is available. (★★★★☆ Nov 03)
2	Chem USA ChemBook 2300 find.pcworld.com/37031	93	Very inexpensive \$1394	Windows XP Home	Very good 122	Low-cost notebook is ready for the road with modest weight, long battery life, and built-in Wi-Fi. (★★★★☆ Oct 03)
3	Micro Express NP500A find.pcworld.com/38867	93	Very inexpensive \$1499	Windows XP Professional	Outstanding 127	Laptop includes a top-end processor but lacks some finer design touches, and the keyboard feels a tad cheap. (★★★★☆ Dec 03)
4	Dell Inspiron 5150 find.pcworld.com/38525	92	Very inexpensive \$1799	Windows XP Home	Very good 121	This bulky portable has easily accessible hard-drive and memory slots, and it boasts great battery life. (★★★★☆ Dec 03)
5	Amax Elite 6053M find.pcworld.com/37025	87	Inexpensive \$1929	Windows XP Professional	Very good 123	Powerful notebook squeezes plenty of ports, both modern and legacy, into a slim profile. (★★★★☆ Oct 03)
ULTRAPORTABLE		Overall rating	Street price (10/17/03)	PC WorldBench 4 performance score ¹	Faster 0	Comments
1	Best BUY Toshiba Portégé M100 find.pcworld.com/38870	90	Inexpensive \$2099	Windows XP Professional	Good 115	Sporty little notebook almost does it all, with a good keyboard, solid performance, strong audio, and long battery life. (★★★★☆)
2	Gateway 200XL find.pcworld.com/37655	87	Average \$2180	Windows XP Professional	Outstanding 125	This thin, elegant system is lightning-fast but strikes out on battery life. (★★★☆☆ Nov 03)
3	Dell Latitude X300 find.pcworld.com/38531	85	Average \$2366	Windows XP Professional	Good 116	On its own, this portable weighs just 3 pounds; its 1.9-pound media slice adds a full set of connections and great sound. (★★★★☆ Dec 03)
4	Averatec 3150P find.pcworld.com/36197	83	Very inexpensive \$1049	Windows XP Professional	Average 94	Thin and light, this bargain portable is good for the road. It's relatively slow, but fine for basic computing and e-mail. (★★★☆☆ Sept 03)
5	Sharp Actius AV18P find.pcworld.com/38873	82	Very inexpensive \$1449	Windows XP Professional	Average 95	Basic thin-and-light offers Wi-Fi computing on the go, but only so-so typing and a hard-to-remove battery. (★★★☆☆)

Go to find.pcworld.com/10860 for details on PC World's Star Ratings. Go to find.pcworld.com/39083 for a breakdown of the weightings we give to the various factors that contribute to a notebook's overall rating in each of the three categories.

¹ Performance word scores reflect comparisons of PCs in the same category. For more details, see "Your Guide to the Top 100" at find.pcworld.com/15720.

² Except where noted, all Intel CPUs are SpeedStep chips, which run at a slower speed on battery power. (We performance-test all notebooks plugged in.)

³ Word score reflects both listed and unlisted features. Unless otherwise noted, all notebooks have a built-in modem and network adapter.

THIS MONTH, USING THE STRUCTURE of last month's "The Best of Everything" hardware guide, we've split the Top 15 Notebooks chart into three categories: desktop replacement, value, and ultraportable. Small laptops make big waves in the last of those sections, led by Toshiba's Portégé M100, our new Best Buy ultraportable. The 4.5-

pound (sans power adapter) M100 stands out for its comfortable keyboard and powerful stereo speakers. With a 1.2-GHz/600-MHz CPU, this portable handles applications almost as effortlessly as a full-size 1.6-GHz/600-MHz notebook.

The Sharp Actius AV18P is our new

Visit find.pcworld.com/39086 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION						Extra features ¹	Overall design	Battery life (hours:min) ¹	Average weight (pounds) ¹	Vendor's reliability/service
CPU ²	Screen (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Multi-purpose bays					
1.7-GHz Pentium M	15.1	512	60	Touchpad	1	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW drive, FireWire port, built-in 802.11g Wi-Fi, Microsoft Works 7	Very good	Outstanding/ 4:59	Heavy/ 8.1	Good/Good
1.6-GHz Pentium M	14.1	512	40	Touchpad, eraserhead	1	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi, Smart Card reader	Good	Good/ 3:26	Average/ 6.5	Good/Fair
1.6-GHz Pentium M	14.1	512	40	Touchpad, eraserhead	1	Very good: DVD-R/RW drive, FireWire port, built-in 802.11b Wi-Fi, gigabit ethernet, SD memory card slot	Very good	Outstanding/ 6:42 ⁴	Average/ 7.1	Good/Fair
1.6-GHz Pentium M	15.4 (wide)	512	60	Touchpad	0	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port	Good	Good/ 3:00	Average/ 7.6	Good/Poor
2.5-GHz Pentium 4-M	14.1	512	60	Touchpad	1	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port, built-in 802.11b Wi-Fi, Office XP SBE 2002	Very good	Fair/ 2:53	Average/ 6.8	?'

BASE CONFIGURATION						Extra features ¹	Overall design	Battery life (hours:min) ¹	Average weight (pounds) ¹	Vendor's reliability/service
CPU ²	Screen (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Multi-purpose bays					
1.3-GHz Pentium M	15	512	40	Touchpad	1	Outstanding: DVD-R/RW drive, FireWire port	Very good	Outstanding/ 4:50	Average/ 7.2	?'
1.4-GHz Pentium M	14.1	512	40	Touchpad	1	Good: 8X DVD-ROM and 16X/8X/24X CD-RW combo drive, FireWire port, built-in 802.11b Wi-Fi	Fair	Outstanding/ 4:49	Average/ 6.3	?'
1.6-GHz Pentium M	15	512	60	Touchpad	1	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port, built-in 802.11b Wi-Fi	Good	Very good/ 4:00	Average/ 7.1	?'
3.06-GHz Mobile Pentium 4	15	512	60	Touchpad	0	Very good: DVD-R/RW drive, FireWire port, built-in 802.11b Wi-Fi, WordPerfect Productivity Pack	Fair	Outstanding/ 5:20	Very heavy/ 10.5	Good/Fair
1.6-GHz Pentium M	15	512	40	Touchpad	1	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port, built-in 802.11b Wi-Fi, SD memory card slot	Good	Good/ 3:15	Average/ 7.1	?'

BASE CONFIGURATION						Extra features ¹	Overall design	Battery life (hours:min) ¹	Average weight (pounds) ¹	Vendor's reliability/service
CPU ²	Screen (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Multi-purpose bays					
1.2-GHz Pentium M	12.1	256	40	Eraserhead	1	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port, built-in 802.11b Wi-Fi	Very good	Very good/ 4:11	Very light/ 5.3	Good/Fair
1.6-GHz Pentium M	14.1	512	60	Touchpad	0	Very good: DVD-R/RW drive, FireWire port, Microsoft Works 2003, Pinnacle Expression	Fair	Limited/ 1:00	Light/ 5.9	Good/Good
1.2-GHz Pentium M	12.1	640	40	Touchpad	0	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port, built-in 802.11b/g Wi-Fi, SD memory card slot	Very good	Fair/ 2:07	Light/ 6.0	Good/Fair
1.4-GHz Mobile Athlon XP-M 1600+	12.1	256	30	Touchpad	0	Good: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi	Fair	Fair/ 2:50	Very light/ 5.3	?'
1.53-GHz Mobile Athlon XP-M 1800+	12.1	256	40	Touchpad	1	Good: 8X DVD-ROM and 24X/24X/24X CD-RW combo drive, FireWire port, built-in 802.11b Wi-Fi	Fair	Fair/ 2:55	Very light/ 5.1	?'

¹ Unless otherwise noted, all notebooks come with a lithium ion battery.

² Includes computer, AC adapter, power cord, optical drive, and floppy drive (if offered).

³ We typically test at a notebook's highest power-conserving setting, but this model's "Super Long Life" and "Long Life" options resulted in an unacceptably dim screen. Instead, we tested at the default "Normal" power setting.

⁴ Insufficient data to give a rating.

number five ultraportable. Its features are more typical of machines in this class—connections are limited—and though this Athlon-based system is slower than competing Pentium M systems, at \$1449, it's the second-least-expensive ultraportable.

Sluggish performance prevented the

Panasonic CF-W2 Toughbook, a ruggedized ultraportable, from making the chart. The MPC TransPort X1000, a candidate for our desktop replacements list, fell short, too. A sturdily built fingerprint-security-equipped notebook, the X1000 also suffered from slow performance. ■

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AMD

▶ AMD 64 3200+ CPU Processor
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Nikon

▶ Nikon SQ 3 1MP Digital Camera
Part#: NIKCPXSQ



Western Digital

▶ Western Digital 250 GB ATA100 Hard Drive
Part#: HD-2500BB



SONY

▶ Sony UX40 Handheld PC
Part#: SONY-UX40



intel

▶ Intel Pentium 4 CPU 3.0 GHz 800MHz
Part#: 3.0_800BX



hp

▶ IPAQ h1935 Pocket PC
Part#: SYN-980410



LINKSYS

▶ Linksys Wireless G Access Point
Part#: LS-WAP54G



D-Link

▶ D-Link AirPlus Enhanced 2.4GHz Wireless Router
Part#: DL-DI714P



MSI

▶ MSI K8T Neo-FIS2R Socket 754/Athlon 64 Motherboard
Part#: MB-K8TNEO



Kingston

▶ Kingston 256MB DDR400HyperX Memory
Part#: D400HX256K



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Maxtor

▶ Maxtor 80GB Ultra ATA133 Hard Drive
Part#: HD-MX80A7Y



Pioneer

▶ Pioneer DVRA06 4X DVD +/-R, 2X DVD-/+RW Drive
Part#: DVD-DVRA06



CREATIVE

▶ Creative Nomad Jukebox Zen MP3 Player
Part#: JUKE-ZEN30



ABIT

▶ Abit IC7 Max 3 P4/B75P ATX Motherboard
Part#: MB-IC7MAX3



Canon

▶ Canon PowerShot s400 Digital Camera
Part#: Canon-S400



Shuttle

▶ Shuttle SB65G2 Barebone PC w/Wireless LAN
Part#: MB-SB62G2



SONY

▶ Sony Playstation 2 Game Console
Part#: 97004



Logitech

▶ Logitech Cordless Trackman Mouse
Part#: MO-MARBLE3



CREATIVE

▶ Sound Blaster Audigy 2 ZS Platinum
Part#: SC-0360PE



Nintendo

▶ Nintendo Gamecube System
Part#: DOL-S-VTB



Microsoft

▶ Microsoft Xbox Video Game System
Part#: F23-00097

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TOP 10 MONITORS

Visit find.pcworld.com/38906 for reviews of all products tested this month and ranked in this chart.

FIFTEEN-INCH LCDs go high and low this month. On the high end, several well-equipped monitors win chart positions, including our new Best Buy, the HP L1530—a silver, fully adjustable model with powerful, clear-sounding speakers. But the most tricked-out monitor is BenQ's pricey FP591 with its

media card reader and rocking surround-sound system. On the low end, a basic unit from LG missed the chart, partly due to disappointing image quality. Even basic monitors are more expensive nowadays, as a result of booming demand for 15-inch LCD panels (see *News and Trends*, page 42, for details).

15-INCH LCD MONITOR		Street price (10/22/03)	Overall rating	Quality of text/graphics	Comments
1	Best Buy Hewlett-Packard L1530 find.pcworld.com/38714 NEW	\$330	95	Very good/ Very good	FEATURES: 13.8 by 10 by 12.1 inches; 9.9 pounds; dual video inputs; ¹ tilt, swivel, height, pivot adjustments; TCO'03-compliant; three-year warranty; 24-hour daily toll-free tech support. SUMMARY: Despite this monitor's fairly low price, HP packs in thoughtful extras, including full position adjustability and strong integrated speakers with a handy volume-control wheel. (★★★★☆)
2	Best Buy NEC MultiSync LCD1560M find.pcworld.com/33005	\$360	92	Very good/ Outstanding	FEATURES: 13.6 by 6.5 by 13.6 inches; 9.7 pounds; dual video inputs; ¹ tilt, swivel adjustments; TCO'95-compliant; three-year warranty; 24-hour daily toll-free tech support. SUMMARY: This stately black unit shines, thanks to a triple treat of desirable features: rich screen colors, a four-port USB 2.0 hub, and unusually crisp sound from its built-in speakers. (★★★★☆ Mar 03)
3	IBM ThinkVision L150p find.pcworld.com/38717 NEW	\$380	90	Outstanding/ Very good	FEATURES: 14.3 by 8.4 by 12.4 inches; 9.3 pounds; dual video inputs; ¹ tilt, swivel, height adjustments; three-year warranty; 24-hour daily toll-free tech support. SUMMARY: Especially good at text, this slick-looking charcoal gray monitor offers very smooth height and swivel adjustments. Advanced controls include the ability to set individual red, green, and blue levels in digital mode. (★★★★☆)
4	Philips 150P4 find.pcworld.com/38723 NEW	\$365	90	Outstanding/ Very good	FEATURES: 13.5 by 8.5 by 11.6 inches; 7.9 pounds; dual video inputs; ¹ tilt, swivel, height adjustments; TCO'03-compliant; three-year warranty; 16-hour weekday, 14-hour weekend toll-free tech support. SUMMARY: Good performer includes screen adjustment software, plus the LightFrame application for highlighting portions of the screen. Control menus and physical adjustments are rather awkward, however. (★★★★☆)
5	Compaq TFT 1520 find.pcworld.com/32921	\$350	90	Good/ Very good	FEATURES: 13.9 by 8.2 by 15.6 inches; 10.3 pounds; dual video inputs; ¹ tilt, height, pivot adjustment; three-year warranty; 24-hour daily toll-free tech support. SUMMARY: Gray-and-black business model has detailed and intuitive on-screen controls and good position adjustability. But its price is a bit high compared with some competing models that offer even better image quality. (★★★★☆ Mar 03)
6	Sharp LL-T15G3 find.pcworld.com/36389	\$320	89	Very good/ Very good	FEATURES: 13.3 by 5.7 by 12.3 inches; 8.4 pounds; analog video input; tilt adjustment; three-year warranty; 24-hour toll-free tech support. SUMMARY: This basic LCD offers quite nice image quality for an analog-only unit. A Mode button on the bezel allows you to toggle through three color-setting presets. It lands lower on the chart this month due to a price increase since our last review. (★★★★☆ Sept 03)
7	Samsung SyncMaster 153T find.pcworld.com/38726 NEW	\$380	89	Very good/ Very good	FEATURES: 13.4 by 6 by 13.5 inches; 7 pounds; dual video inputs; ¹ tilt, height, pivot adjustments; TCO'95-compliant; three-year warranty; 24-hour daily toll-free tech support. SUMMARY: The 153T produced rich colors, though we found them a bit too dark (even after raising the brightness setting). The basic-black unit offers easy adjustment and a slim, smart-looking bezel. (★★★★☆)
8	Cornea MP503 find.pcworld.com/34694	\$290	88	Very good/ Very good	FEATURES: 15.1 by 2.5 by 14.1 inches; 5.1 pounds; analog video input; tilt adjustment; three-year warranty; 10.5-hour weekday toll-free tech support. SUMMARY: This model's unique easel-style stand allows for greater-than-average tilt adjustment (but no other positioning). Colors looked deep but a bit dark on some test photos; screens of Word and Excel documents showed sharp, focused text. (★★★★☆ June 03)
9	BenQ America FP591 find.pcworld.com/38711 NEW	\$425	85	Outstanding/ Outstanding	FEATURES: 15.8 by 7.2 by 15.5 inches; 7.7 pounds; dual video inputs; ¹ tilt adjustment; TCO'95-compliant; three-year warranty; 8-hour weekday toll-free tech support. SUMMARY: In addition to providing great image quality, the FP591 brims with goodies, including surround-sound speakers and a memory card reader for displaying digital photos. But it's expensive, and tech support hours are a bit short. (★★★★☆)
10	Eizo Nanao FlexScan L367 find.pcworld.com/36386	\$419	85	Very good/ Very good	FEATURES: 12.8 by 6.8 by 13 inches; 8.2 pounds; dual video inputs; ¹ tilt, height adjustments; three-year warranty; 8-hour weekday toll-free tech support. SUMMARY: This slim-bezel monitor is available in black or gray and provides basic speakers. Eizo's bundled Screen Manager Pro software lets you adjust the display from your PC via a USB connection. Tech support hours are limited. (★★★★☆ Sept 03)

FOOTNOTE: ¹ Includes both digital (DVI) and analog inputs. DVI requires a graphics card with a DVI digital output, which we use to test all monitors that offer DVI. **HOW WE TEST:** Judges rate how well each monitor displays 13 text and graphics images at a native resolution of 1024 by 768. Some screens are from DisplayMate for Windows (www.displaymate.com). See find.pcworld.com/34613 for testing details. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Overall ratings are based on text and graphics quality (20 percent each), price (25 percent), features and ease of use (20 percent), and service and support (15 percent). Monitors are TCO'99-compliant unless otherwise noted. For LCDs, the entire screen area is viewable. Dimensions (given as width by depth by height) include the base. See find.pcworld.com/10860 for details on PC World's Star Ratings.

TOP 10 DVD DRIVES

Visit find.pcworld.com/39113 for reviews of all products tested this month and ranked in this chart.

WHETHER HEDGING THEIR BETS in the DVD format battle or just keeping up with the competition, nearly all DVD rewritable drive vendors offer dual-format models—typically -RW and +RW. Eight of the ten drives on the chart are dual-format, and one of these, the LG Electronics GSA-4040B, also

supports DVD-RAM. Prices are dropping, too. For example, the Memorex Dual Format DVD Recorder has shed \$45 since last month. A newcomer, TDK's \$290 External Indi DVD 4X Multiformat, is reasonably priced for an external drive with USB 2.0 and FireWire, and it has a terrific software bundle.

	REWRITABLE DVD DRIVE	Street price (11/3/03)	Overall rating	Performance	Write speed/rewrite speed	Comments
1	Best BUY Memorex Dual Format DVD Recorder find.pcworld.com/36671	\$175	88	Very good	4:39/7:14 4:48/8:47'	FEATURES: Internal IDE drive, 4X/2X DVD-R/RW, 4X/2.4X DVD+R/RW, 16X/10X CD-R/RW, 2MB buffer, Roxio DVD Builder 1.1, Easy CD & DVD Creator 6.1, Drag-to-Disc 6.1, VideoWave Movie Creator 6, PhotoSuite 5 SE, and DVD Max Player; 9-hour weekday toll-free support. SUMMARY: Dual-format model turns in fast burn times for both DVD formats and is attractively priced. (★★★★★ Sept 03)
2	Best BUY TDK Indi DVD 440N find.pcworld.com/36668	\$190	87	Very good	4:04/7:56 4:20/13:00'	FEATURES: Internal IDE drive, 4X/2X DVD-R/RW, 4X/2.4X DVD+R/RW, 16X/10X CD-R/RW, 2MB buffer; Roxio DVD Builder, Easy CD & DVD Creator 6, Drag-to-Disc 6, PhotoSuite 5 SE and DVD Max; TDK AudioCentral; 10.5-hour daily toll-free support. SUMMARY: Has all the appealing qualities of its external sibling—including great write-once performance—but costs \$100 less. (★★★★★ Sept 03)
3	LG Electronics GSA-4040B find.pcworld.com/38399	\$180	87	Very good	4:25/8:00 5:38/48:09'	FEATURES: Internal IDE drive, 4X/2X DVD-R/RW, 4X/4X DVD+R/RW, 3X DVD-RAM, 24X/24X CD-R/RW, 2MB buffer; MedioStream NeoDVD, BHA B's Recorder Gold 5 and B's Clip, CyberLink PowerDVD; 24-hour daily toll-free support. SUMMARY: One of the few drives that supports all DVD formats, including DVD-RAM. Formatting DVD-RW media is slow with bundled media. (★★★★★ Nov 03)
4	TDK External Indi DVD 4X Multiformat find.pcworld.com/39029 NEW	\$290	86	Very good	4:03/7:09 4:20/8:16'	FEATURES: External USB 2.0 and FireWire drive, 4X/2X DVD-R/RW, 4X/2.4X DVD+R/RW, 16X/10X CD-R/RW, 2MB buffer, Roxio DVD Builder 1.1, Easy CD & DVD Creator 6.1, Drag-to-Disc 6.1, and PhotoSuite 5 SE; 10.5-hour daily toll-free support. SUMMARY: Great performance, excellent documentation, and strong support policies, plus flexible connectivity. (★★★★★)
5	Plextor PX-708A find.pcworld.com/38396	\$240	85	Outstanding	4:38/5:34 4:49/8:24'	FEATURES: Internal IDE drive, 4X/2X DVD-R/RW, 8X/4X DVD+R/RW, 40X/24X CD-R/RW, 2MB buffer, Roxio DVD Builder 1.1, Easy CD & DVD Creator 6.1, Drag-to-Disc 6.1, and PhotoSuite 5 SE; 11-hour weekday toll-free support. SUMMARY: This drive can write at 8X—even to some brands of 4X DVD+R media. It's the quickest we've tested reading from DVD discs. (★★★★★ Dec 03)
6	Sony DRU-510A find.pcworld.com/35495	\$210	83	Very good	6:51/4:40 7:43/8:43'	FEATURES: Internal IDE drive, 4X/2X DVD-R/RW, 4X/4X DVD+R/RW, 24X/16X CD-R/RW, 8MB buffer; Sonic MyDVD 4.5, Veritas RecordNow DX 4.6 and DLA 3.57, Veritas Simple Backup, CyberLink PowerDVD, ArcSoft ShowBiz; 12-hour weekday and Saturday toll-free support. SUMMARY: Lightning-fast drive for burning DVD+RW discs using packet writing—but 4X media is still tough to find. (★★★★★ July 03)
7	Hewlett-Packard DVD Writer Dvd300i find.pcworld.com/34454	\$180	83	Good	3:59/8:44	FEATURES: Internal IDE drive, 4X/2.4X DVD+R/RW, 16X/10X CD-R/RW, 2MB buffer, ArcSoft ShowBiz DVD 1.3, Veritas RecordNow 4.56 and DLA 3.59, Veritas Simple Backup, CyberLink PowerDVD, ArcSoft Multimedia Email, HP Memories Disc Creator; 24-hour daily toll-free support. SUMMARY: Still one of the speediest we've seen at authoring a DVD movie; includes backup software. (★★★★★ May 03)
8	Pacific Digital Dual Format 4X DVD find.pcworld.com/39032 NEW	\$230	82	Very good	4:24/7:10 4:40/8:17'	FEATURES: Internal IDE drive, 4X/2X DVD-R/RW, 4X/2.4X DVD+R/RW, 16X/10X CD-R/RW, 2MB buffer, Roxio DVD Builder 1.1, Easy CD & DVD Creator 6.1, and Drag-to-Disc 6.1; InterVideo WinDVD; 9-hour weekday toll-free support. SUMMARY: Good performer overall, and among the best at our write-once tests, but a bit sluggish when ejecting rewritable media. (★★★★★)
9	Plextor PX-504UF find.pcworld.com/37448	\$265	81	Very good	4:03/8:13	FEATURES: External USB 2.0 and FireWire drive, 4X/2.4X DVD+R/RW, 16X/10X CD-R/RW, 2MB buffer; Roxio DVD Builder, Easy CD Creator 5 DVD Edition 5.3, DirectCD 5.3, and PhotoSuite 5 SE; CyberLink PowerDVD; 11-hour weekday toll-free support. SUMMARY: Sleek, silver chassis has an appealing look, and dual interfaces make this model flexible. (★★★★★ Oct 03)
10	Pioneer DVR-A06 find.pcworld.com/36692	\$175	80	Good	6:16/2:44:14 6:26/46:59'	FEATURES: Internal IDE drive, 4X/2X DVD-R/RW, 4X/2.4X DVD+R/RW, 16X/10X CD-R/RW, 2MB buffer; Ulead DVD MovieFactory 2 SE, DVD PictureShow 2 SE, VideoStudio 7 SE, and DVD Player; Ahead Nero Express 5.5; SAI WriteDVD 5; 10.5-hour weekday toll-free support. SUMMARY: Hardware defect management offers extra data protection, but stretches rewrite times into hours, not minutes. (★★★★★ Sept 03)

FOOTNOTE: * Results are for DVD+R/RW and then for DVD-R/RW. **HOW WE TEST:** We test drives under Windows XP Home on PCs with 1.67-GHz Athlon XP 2000+ CPUs and 512MB of DDR SDRAM, using the DVD software supplied by the vendor, and media from the vendor or Verbatim. Some vendors may change drive suppliers midstream; our results reflect the configuration tested at time of review. **CHART NOTES:** Write speed is the time (in minutes:seconds) to write two 10-minute video files to DVD; rewrite speed, the time (in minutes:seconds) to format a blank rewritable DVD disc and to copy 1.18GB of data to the disc. Overall rating is based on performance (35 percent), price (25 percent), features (15 percent), ease of installation (15 percent), and service and support (10 percent). All drives listed have buffer underrun protection and a one-year warranty unless otherwise noted. See find.pcworld.com/10860 for details on PC World's Star Ratings.

TOP 10 HARD DRIVES

Visit find.pcworld.com/39077 for more details about all products tested this month and ranked in this chart.

HIGH-PERFORMING SERIAL ATA DRIVES continue to make their way onto the chart, but a new ATA/133 drive from Samsung claims the top Best Buy honor. In terms of cost per gigabyte, Samsung's SpinPoint SP1614N offers the best deal on our list, as well as very good (though not the best) perfor-

mance. The speed crown goes to Hitachi Global Storage Technologies' Deskstar 7K250 (SATA), which squeaks aboard in the number ten spot. A rather steep price (though a reasonable one for its 250GB capacity) and somewhat limited features prevented it from earning a higher ranking.

HARD DRIVE		Street price (10/27/03)	Overall rating	Capacity (GB)	Performance/support policies	Comments
1	Best Buy Samsung SpinPoint SP1614N find.pcworld.com/39056 NEW	\$159	85	160	Very good/ Outstanding	FEATURES: 7200 rpm, ATA/133 interface, 8MB buffer, three-year warranty, 24-hour daily toll-free support. SUMMARY: A good blend of strong performance and great price (just under a dollar per gigabyte), plus round-the-clock phone support, helps this drive claim the top spot—though it lacks an installation kit. (★★★★☆)
2	Best Buy Seagate Barracuda 7200.7 ST3160023AS find.pcworld.com/36137	\$170	83	160	Very good/ Fair	FEATURES: 7200 rpm, Serial ATA interface, 8MB buffer, installation kit, three-year warranty, 12-hour weekday toll-call support. SUMMARY: A \$59 price drop boosts this model up the chart. It includes good documentation and lots of software for partitioning, drive cloning, diagnostics, and formatting. (★★★★☆ Aug 03)
3	Maxtor 250GB SATA Ultra Series Kit find.pcworld.com/39059 NEW	\$350	83	250	Outstanding/ Fair	FEATURES: 7200 rpm, Serial ATA interface, 8MB buffer, installation kit, one-year warranty, 12-hour weekday toll-free support. SUMMARY: The third-fastest performer overall, this drive ships with an installation kit that includes an extensive software bundle, plus a Serial ATA interface card and cable. (★★★★☆)
4	Seagate Barracuda 7200.7 ST3200822A find.pcworld.com/39065 NEW	\$210	82	200	Outstanding/ Fair	FEATURES: 7200 rpm, ATA/100 interface, 8MB buffer, installation kit, three-year warranty, 12-hour weekday toll-call support. SUMMARY: Finished fourth overall in our speed tests. Comes packed in an innovative, protective enclosure, and includes an easy-to-follow setup poster that helps with installation. (★★★★☆)
5	Maxtor DiamondMax Plus 9 6Y160M0 find.pcworld.com/36125	\$230	80	160	Very good/ Fair	FEATURES: 7200 rpm, Serial ATA interface, 8MB buffer, installation kit, one-year warranty, 12-hour weekday toll-free support. SUMMARY: Though not the fastest drive we've tested, this Maxtor turned in impressive performance. Includes a complete drive kit and comprehensive documentation. (★★★★☆ Aug 03)
6	Western Digital WD Caviar SE SATA WD2500JD find.pcworld.com/39068 NEW	\$255	79	250	Very good/ Good	FEATURES: 7200 rpm, Serial ATA interface, 8MB buffer, one-year warranty, 10-hour Monday through Thursday and 9-hour Friday and Saturday toll-free support. SUMMARY: Debuts as the second-fastest performer in our speed tests. Western Digital provides extensive diagnostics information online. (★★★★☆)
7	Maxtor DiamondMax Plus 9 6Y080L0 find.pcworld.com/36107	\$135	78	120	Good/ Fair	FEATURES: 7200 rpm, ATA/133 interface, 8MB buffer, installation kit, one-year warranty, 12-hour weekday toll-free support. SUMMARY: No longer has the lowest cost per gigabyte among models on the chart, but still a great value. Bundled with a drive kit and excellent documentation. (★★★★☆ Aug 03)
8	Hitachi Global Storage Technologies Deskstar 120GXP 120GB find.pcworld.com/36101	\$137	77	120	Very good/ Fair	FEATURES: 7200 rpm, ATA/100 interface, 8MB buffer, one-year warranty, 12-hour weekday toll-free support. SUMMARY: This bargain-priced Deskstar has excellent speed. It does not include a mounting kit, so you'll have to obtain an IDE cable, screws, and drive rails separately. (★★★★☆ Aug 03)
9	Western Digital WD Caviar SE WD1200JB find.pcworld.com/36152	\$150	75	120	Good/ Good	FEATURES: 7200 rpm, ATA/100 interface, 8MB buffer, installation kit, one-year warranty, 10-hour Monday through Thursday and 9-hour Friday and Saturday toll-free support. SUMMARY: This drive fell in the middle of the pack in speed and cost per gigabyte. Diagnostic tools are available online. (★★★★☆ Aug 03)
10	Hitachi Global Storage Technologies Deskstar 7K250 (SATA) find.pcworld.com/39074 NEW	\$384	75	250	Outstanding/ Good	FEATURES: 7200 rpm, Serial ATA interface, 8MB buffer, three-year warranty, 12-hour weekday toll-free support. SUMMARY: The fastest drive we've tested to date is also the most expensive on the chart, but it doesn't come with an installation kit, and its support hours could be longer. (★★★★☆)

HOW WE TEST: To test performance, we copy a 1.3GB folder and a single large 1.3GB Zip file to the Windows Desktop, scan a 1.85GB folder with McAfee Virus Scan 7, search the files on the drive for a text string, time how long it takes to open a file in Adobe Premiere 6 and perform several tasks, create CD-ROM images with Ahead Nero Burning ROM 5.5.7.6, and time how long it takes to compress files with WinZip 8.1. All tests are carried out on a Dell Dimension 8200 configured with a 2-GHz Pentium 4 CPU, Windows XP, and a Promise SATA150 Plus (SATA and ATA/133) hard-drive interface. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Each drive's overall rating is based on price (30 percent), performance (35 percent), features (20 percent), and technical support policies (15 percent). See find.pcworld.com/10860 for details on PC World's Star Ratings.

TOP 10 DIGITAL CAMERAS

Visit find.pcworld.com/39146 for reviews of all products tested this month and ranked in this chart.

WE'RE LAUNCHING NEW CATEGORIES for our *Top 10 Digital Cameras* review: This month it's point-and-shoots; next month we follow up with advanced cameras for the serious photographer. (Previously, we categorized cameras by price.) Nikon's Coolpix 3100 and Canon's PowerShot A70 are excel-

lent examples of easy-to-use, relatively compact cameras that can take fine photos, too. The Coolpix 3100 is smaller than the PowerShot A70 and outscored it slightly in our image quality tests. But the PowerShot A70 is a better choice for snapshotters who want a high level of creative control.

	POINT-AND-SHOOT CAMERA	Street price (11/07/03)	Overall rating	Image quality	Ease of use	Battery life/shots	Comments
1	Best BUY Nikon Coolpix 3100 find.pcworld.com/36065	\$300	80	Good	Very good	Very good/ 480	FEATURES: 3.2-megapixel resolution, 16MB CompactFlash media, 38mm to 115mm focal range, 640 by 480 video (without audio), 6.9 ounces. SUMMARY: One of the smallest Nikons is also one of the easiest to operate; it has a huge selection of shooting aids for the casual photographer. (★★★★☆ Aug 03)
2	Best BUY Canon PowerShot A70 find.pcworld.com/36512	\$300	78	Good	Good	Good/ 319	FEATURES: 3.2-megapixel resolution, 16MB CompactFlash media, 35mm to 105mm focal range, 640 by 480 video with audio, 11.1 ounces. SUMMARY: Bargain price for a relatively advanced point-and-shoot; has an extensive complement of manual controls and takes optional add-on lenses. (★★★★☆ Sept 03)
3	Canon PowerShot SD100 Digital Elph find.pcworld.com/38789 NEW	\$300	77	Good	Very good	Fair/ 200	FEATURES: 3.2-megapixel resolution, 16MB SD card media, 35mm to 70mm focal range, 640 by 480 video with audio, 6.6 ounces. SUMMARY: This new budget-priced member of the popular Digital Elph line is small and rugged; but a 2X optical zoom is short—most cameras come with at least a 3X zoom. (★★★★☆)
4	Kodak EasyShare DX6440 find.pcworld.com/38795 NEW	\$400	77	Good	Very good	Good/ 363	FEATURES: 4-megapixel resolution, 16MB internal memory and SD card slot, 33mm to 132mm focal range, 320 by 240 video with audio, 9.9 ounces. SUMMARY: The 4X optical zoom on this stylish model is longer than most point-and-shoots'. The camera docks onto an included docking station or an optional Kodak printer. (★★★★☆)
5	Pentax Optio 555 find.pcworld.com/38798 NEW	\$550	74	Good	Good	Good/ 395	FEATURES: 5-megapixel resolution, 16MB SD card media, 37.5mm to 187.5mm focal range, 320 by 240 video with audio, 8.6 ounces. SUMMARY: An advanced camera in a generic point-and-shoot's case, this model includes a 5X optical zoom in a camera with an optical viewfinder, plus manual exposure controls. (★★★★☆)
6	Sony Cyber-shot DSC-P10 find.pcworld.com/38468	\$450	74	Fair	Outstanding	Fair/ 206	FEATURES: 5-megapixel resolution, 32MB Memory Stick media, 38mm to 114mm focal range, 640 by 480 video with audio, 6.9 ounces. SUMMARY: Small and fun to use, with extra features (like image editing in the camera). The photo quality is unimpressive, however. (★★★★☆ Dec 03)
7	Kyocera Finecam L3v find.pcworld.com/38057	\$250	74	Fair	Good	Good/ 349	FEATURES: 3.2-megapixel resolution, 16MB SD card media, 38mm to 115mm focal range, 320 by 240 video with audio, 7.3 ounces. SUMMARY: Oversize, 2.5-inch LCD makes composing and reviewing shots on this camera especially pleasant. Bargain-priced for a camera with an aperture-priority mode. (★★★★☆ Nov 03)
8	Minolta DiMage G500 find.pcworld.com/38786 NEW	\$400	73	Very good	Fair	Fair/ 213	FEATURES: 5-megapixel resolution, 2MB internal memory, 16MB SD card media and Memory Stick slot, 39mm to 117mm focal range, 320 by 240 video with audio, 8 ounces. SUMMARY: High resolution, impressive images, and dual media slots; but deeply layered menus make some controls slow to reach. (★★★★☆)
9	Fujifilm FinePix F700 find.pcworld.com/38792 NEW	\$500	72	Good	Good	Fair/ 239	FEATURES: 6.2-megapixel resolution, 16MB XD-Picture Card media, 35mm to 105mm focal range, 640 by 480 video with audio, 6.7 ounces. SUMMARY: Has an ultrahigh pixel count and a fine selection of advanced user controls, plus superquick start-up. Includes both shutter- and aperture-priority exposure modes. (★★★★☆)
10	Minolta DiMage Xt find.pcworld.com/36530	\$300	71	Fair	Good	Fair/ 200	FEATURES: 3.2-megapixel resolution, 16MB SD card media, 37mm to 111mm focal range, 320 by 240 video with audio, 5 ounces. SUMMARY: Still one of the smallest digital cameras with an optical zoom lens. Improved controls makes this point-and-shoot easier to use than earlier DiMage X models we've seen. (★★★★☆ Nov 03)

HOW WE TEST: To gauge picture quality, we take a series of shots, with and without flash, at the camera's highest resolution and default settings. 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; we then average those scores. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Overall ratings are based on price (25 percent), picture quality (25 percent), ease of use (20 percent), features (10 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. Resolutions are expressed in effective pixels, focal range is identified as 35mm equivalent, and camera weights include batteries. See find.pcworld.com/10860 for details on PC World's Star Ratings.

MORE REVIEWS

MISSED AN ISSUE OF *PC World* or passed your copy along to a friend? Here's a recap of other *Top 100* topics from previous issues. To read reviews of the products ranked on these Top 10 charts, go online and type in the *PC World* Find-It

URL at the top of each chart. Next month, we'll review ink jet printers, PDAs, 21-inch CRT monitors, and advanced (\$500 and over) digital cameras. Our spotlight review will shine on computer speakers and multichannel sound cards.



SEE THE BIG PICTURE with Toshiba's PDR-M700 digital camera. Its 2.5-inch display is one of the largest of the cameras we tested.

DUDE, YOU'RE GETTING a
Lexmark: Dell's network-ready M5200n laser printer is a twin of the Lexmark T630n, but it costs \$100 less. Both turn out extremely sharp text in a hurry—more than 22 pages per minute in our tests.



19-INCH CRT MONITORS	DIGITAL CAMERAS UNDER \$500	LASER PRINTERS	SCANNERS
find.pcworld.com/37904	find.pcworld.com/39053	find.pcworld.com/37847	find.pcworld.com/37391
1 Best BUY NEC MultiSync FP912SB find.pcworld.com/37856	1 Best BUY Canon PowerShot A70 find.pcworld.com/36512	1 Best BUY Minolta-QMS PagePro 1250W find.pcworld.com/32414	1 Best BUY Canon CanoScan 5000F find.pcworld.com/34409
2 Best BUY Hansol 920A find.pcworld.com/37865	2 Best BUY Olympus C-4000 Zoom find.pcworld.com/30476	2 HP LaserJet 1300 find.pcworld.com/37646	2 Canon CanoScan Lide 50 find.pcworld.com/37376
3 Samsung SyncMaster 957mb find.pcworld.com/35177	3 Kodak EasyShare DX6340 find.pcworld.com/36089	3 Brother HL-5040 find.pcworld.com/34802	3 Visioneer OneTouch 9000 USB find.pcworld.com/29882
4 IBM C190 find.pcworld.com/37868	4 Nikon Coolpix 3100 find.pcworld.com/36065	4 Dell Personal Laser P1500 find.pcworld.com/34799	4 Epson Perfection 1670 Photo find.pcworld.com/37379
5 Compaq S9500 find.pcworld.com/35171	5 Olympus C-740 Ultra Zoom find.pcworld.com/36059	5 Oki Data Oki B4300 find.pcworld.com/34796	5 Microtek ScanMaker 4900 find.pcworld.com/29124
6 ViewSonic G90fb find.pcworld.com/37859	6 Nikon Coolpix 4300 find.pcworld.com/32000	1 Best BUY Dell M5200n find.pcworld.com/37643	6 HP Scanjet 5500c find.pcworld.com/31163
7 Dell M992 find.pcworld.com/35192	7 Samsung Digimax V4 find.pcworld.com/36593	2 Xerox Phaser 4400/N find.pcworld.com/32405	7 HP Scanjet 5550c find.pcworld.com/34406
8 Hitachi CM721F find.pcworld.com/35195	8 Canon PowerShot S400 Digital Elph find.pcworld.com/35324	3 Lexmark T630n find.pcworld.com/34790	1 Best BUY HP Scanjet 8200 find.pcworld.com/37382
9 NEC MultiSync FE991SB find.pcworld.com/35180	9 Fujifilm FinePix 3800 find.pcworld.com/32450	4 Oki Data Oki B8300n find.pcworld.com/32399	2 Epson Perfection 3200 Photo find.pcworld.com/33827
10 BenQ V991 find.pcworld.com/37853	10 Toshiba PDR-M700 find.pcworld.com/38060	5 Brother HL-2460N find.pcworld.com/30103	3 Microtek ScanMaker 6800 find.pcworld.com/34400
From the November 2003 Issue	From the November 2003 Issue	From the November 2003 Issue	From the October 2003 Issue

HERE'S HOW

EDITED BY MICHAEL S. LASKY, DENNIS O'REILLY, AND ERIC DAHL



WINDOWS TIPS

SCOTT DUNN

Free Add-Ons Bring Out the Best in Windows

DESPITE ALL THE utilities, browsers, and other features Microsoft has added to Windows over the years, the operating system still falls short in many areas. You could shell out dough for software that fills Windows' gaps. But before you crack open your wallet, check out the terrific freeware floating around the Windows universe. Some programs are free for a reason—the product is too narrow in scope, or it's not valuable enough to command a price. Still, a large pool of great

free Windows add-ons is out there. Here are the most useful free tools I've run across (or that readers have kindly pointed out to me) lately. Go to find.pcworld.com/38162 to download the programs.

BELLY UP TO THE SIDEBAR

Windows 2K | XP | 98 | ME MICROSOFT'S Longhorn—the next version of Windows—will include an interesting new feature: a customizable panel called the Sidebar that provides quick

access to oft-needed information. (See page 34 for more on Longhorn.) To get this feature without waiting for Longhorn, download Desktop Sidebar, a fabulous freeware equivalent.

Desktop Sidebar shows you a clock, Quick Launch icons, a command line, and system info. More important for Microsoft Outlook users, Desktop Sidebar displays mail, calendar, and task information from that program. Desktop Sidebar's window can also display mail from POP3 servers. And if you have an Internet link, you can view headlines, weather reports, and stock prices that update automatically (see **FIGURE 1**). But that's just the default setup. You can add, remove, and customize panels, and even change the look of the sidebar. Desktop Sidebar can incorporate play controls for Windows Media Player or Winamp. It even has a sticky-notes feature. I hate to say it, but this program is just too good to be free.

IF ONE DESKTOP IS GOOD...

Windows 2K | XP | 98 | ME LONGHORN IS also expected to feature multiple virtual desktops. Alejandro Bascuas of Rochester, Minnesota, points out that Windows XP users can get this feature by going to find.pcworld.com/38165 and clicking *Deskman.exe* in the right-hand column under Virtual Desktop Manager.

After the download, double-click the *DeskmanPowerToySetup.exe* icon and follow the instructions to install the program. Next, right-click an empty part of the taskbar and choose *Toolbars•Desktop Manager*. The Microsoft Virtual Desktop Manager gives you up to four desktops so you can juggle windows without all the dragging, resizing, minimizing, and maximizing. To see a map of all desktops,

162 WINDOWS TIPS

Free add-ons give you fast access to information, virtual desktops, one-click shutdowns, roll-up windows, and more.

165 HARDWARE TIPS

Match your memory module to your motherboard to ensure peak performance; hard-copy help for PC glitches.

166 STEP-BY-STEP

Install a rewritable DVD drive to convert videotapes and store up to 4.7GB of video or other data on one disc.

168 INTERNET TIPS

Get antivirus protection for free with one of four gratis virus-detection tools that have passed independent tests.

170 ANSWER LINE

Find and delete unwanted programs from the Windows Startup group; a fix for corrupted System Restore points.



166

FIGURE 1: THE FREE Desktop Sidebar utility puts a world of information on your desktop.

press <Windows>-V. Switch desktops by clicking one in the map or by pressing the <Windows> key, followed by a number from 1 to 4. To customize the shortcuts, right-click the MSVDM icon and choose *Configure Shortcut Keys*. You can also change desktops by right-clicking the icon and choosing *Show Quick Switch Buttons*.

To see open apps in the taskbar of each desktop, choose *Shared Desktops*; to select a background, choose *Configure Desktop Images* (see **FIGURE 2**); and to add dissolves and other effects as you move in the map, choose *Use Animations*.

SIMPLE FOLDER PRINTING

Windows 2K XP 98 ME ONE WAY to print a list of a folder's files is with a batch file—such as the one from

last August's "Pain-Free Windows Tweaks" (browse to find.pcworld.com/38183 to download the file). But if batch files aren't your bag, two freeware tools may suit you better. Vernon Solomon, writing from South Africa, points us to PrintFolders, a free utility from programmer Roman A. Pivovarov. PrintFolders instantly generates a text file listing the contents of a folder and (if you choose) subfolders. PrintFolders is blaz-

ingly fast and easy to use. The tool provides a number of useful formatting options, such as complete file details and full path information (see **FIGURE 3**). You can easily edit and print the list using any word processor or text editor.

For even more control over your file-list printing, reader Connie Stanifer from White-land, Indiana, recommends Directory Lister, the brainchild of Leszek Skorczyński. The program allows you to select non-contiguous folders across multiple drives, decide exactly which details to include, specify the column width for each detail, and customize the sort order, among other options. You can preview the results in plain text or in an HTML table to verify your file and folder selections. When you're satisfied, Directory Lister lets you save the file as text or HTML. As with PrintFolders, you then have to open the resulting file in another application (such as a text editor or a Web browser) to do the actual printing.

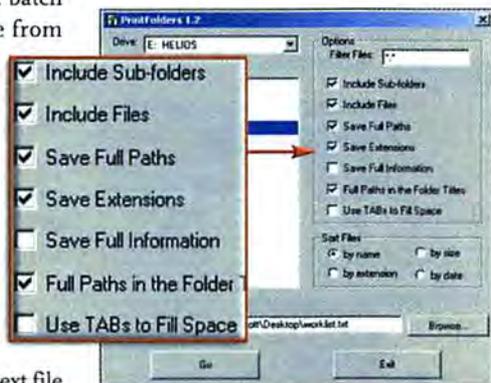


FIGURE 3: FAST AND THOROUGH file and folder printing is a breeze with PrintFolders.



FIGURE 2: WINDOWS TOO CRAMPED? Get up to four desktops with Microsoft's free Virtual Desktop Manager.

ONE-CLICK EXITS AND REBOOTS

Windows 2K XP 98 ME IF YOU KNOW how to type the secret codes, Windows 9x and Me let you exit, log off, or restart your PC from a command line that you can add to a batch file or make into a shortcut (go to find.pcworld.com/38186 for the full skinny). I'm often asked whether Windows 2000 and XP offer a way to create such batch files and shortcuts. The answer is yes, although Windows 2000 doesn't have this capability built-in. The Windows 2000 Resource Kit comes with a utility called Shutdown that lets you turn off your own machine (or others on the network, providing you have the necessary permissions). For those of us who don't have the Resource Kit, Sysinternals (www.sysinternals.com) has made PsShutdown, a freeware equivalent of this utility. To get the most out of the program, set up some shutdown shortcuts with the different command-line options you'll need. For example, if you want a command line that will ▶

reboot your computer after a 5-second warning delay, your command line would look like this: "C:\Program Files\psshutdown.exe" -l -r -t 5 (your path may differ, of course). You can even add a custom message to the shutdown announcement by typing -m followed by a space and then the message in quotation marks.

Although PsShutdown works with Windows XP, users of that operating system don't need it, since Windows XP includes the shutdown.exe program after which PsShutdown was modeled. To learn more about this utility's command-line options, choose *Start>All Programs>Accessories>Command Prompt*, type either `shutdown.exe` or `shutdown.exe -?`, and press <Enter>.

AUTOMATE START-UPS AND SHUTDOWNS

Windows 2K XP 98 ME SURE, YOU CAN place any application in your Startup group to have it load every time Windows opens. But what if you want some items to start only once a day? Or you may want to schedule an app to run just before shutdown (such as backing up the day's work). Maybe you want your computer to power down at a certain time. The X-ecutor utility lets you do all of this and more. When you add a program to X-ecutor's window, you're able to set the time and date it launches, specify delays before or after it launches, and control the order in which the applications launch. X-ecutor includes a task scheduler and a box for adding command-line switches. The program has a few quirks to get accustomed to—for example, any application you set to launch at shutdown has to have its own means of shutting down automatically (such as a batch file). Otherwise, X-ecutor will keep Windows running while it waits for your scheduled application to finish. X-ecutor is free for home use, though the author, Andreas Spang, asks that you send him a postcard if you choose to keep using the utility.

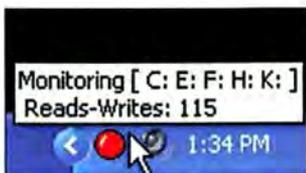


FIGURE 4: VIEW DISK activity with the Hard Disk Indicator.

their windows to show just their title bars, à la Apple's Macintosh. The free WinRoll program lets you do this with a right-click.

YOU LIGHT UP MY DRIVE

Windows 2K XP 98 ME "THOSE OF US with desktop cases under our desks can't see the hard-disk activity indicator," says Bill Hirsch of Issaquah, Washington. "Does a software substitute exist?" It does, although only for Windows 2000 and XP. Hard Disk Indicator is a little freeware gem that sits in your system tray and does pretty much what a hard-drive indicator light does: flash each time the drive is used. You can customize the light's color and specify up to five hard-disk partitions to be represented by the single flashing light (see FIGURE 4). Thanks go to its creator, "LoneWolf."

RECOVER LOST FILES

Windows 2K XP 98 ME IF YOU'VE EVER lost work due to careless deletion or formatting, a virus, or hardware or software crashes, you can understand why people shell out for a program that can save their bacon. But why pay? First, go to find.pcworld.com/38189 to learn about Lincoln Spector's approach to recovering deleted files. Then try PC Inspector File Recovery, a free program that restores lost files in any

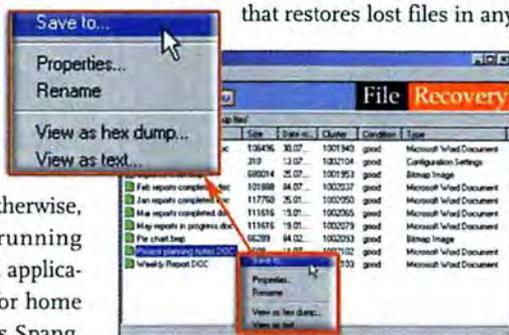


FIGURE 5: RESTORE DELETED files or lost data with PC Inspector File Recovery.

WINDOWS TOOLBOX

Better Font Previewing

Windows 2K XP 98 ME Last February I gave a tip for printing a font sampler (find.pcworld.com/38195).

Sharon Matthies of Boise, Idaho, gently chided me for wasting paper, saying, "I avoid paper when possible for both economic and environmental reasons, but also to help reduce and manage my paper collection." Fortunately, developer Peter Theill heard the pleas of readers like Matthies and created FontLister, a utility that displays fonts on your system at a size you choose and in regular, italic, and boldface. You can edit the sample text and select multiple fonts to see them side by side in the Compare Mode pane. FontLister can also print font samples (with a number of useful formatting



options). Unlike the other utilities in this month's column, FontLister isn't free—but it's close. A measly five bucks gets you this product guilt-free. Visit find.pcworld.com/38198 for the download.

of the above situations, even if the file header is damaged (a complication some other file-undelete utilities can't handle). PC Inspector File Recovery works on disks formatted with FAT 16, FAT 32, and NTFS. The program's Explorer-like interface is elegant and simple to use (see FIGURE 5). PC Inspector File Recovery should be in every PC user's personal tool kit. ■

Send Windows-related questions and tips to scott_dunn@pcworld.com. We pay \$50 for published items. Visit find.pcworld.com/31607 for more Windows Tips. Scott Dunn is a contributing editor for PC World.

HARDWARE TIPS

KIRK STEERS

Choose the Right Kind of Memory for Your System

ADDING RAM TO your PC usually delivers the most bang for your upgrade buck, but only if you buy the right kind of memory module for your PC. There are more types of PC RAM than there are lattes at Starbucks: Do you want SDRAM, PC100, nonparity, or unbuffered DIMM? Why not enjoy a refreshing DDR SDRAM, PC2700, CL2.5, or registered DIMM? Here are the ins and outs of PC memory. (Go to find.pcworld.com/38390 for step-by-step RAM installation instructions.)

Begin by checking your system's user manual to identify the types of RAM your PC's motherboard supports. If you don't have the manual, visit the manufacturer's Web site and search for downloadable manuals or other tools that might help you find the information you need. Memory vendors Crucial Technology (www.crucial.com) and Kingston Technology (www.valueram.com) include utilities on their sites for identifying the right RAM for your PC. Enter the make and model of your PC or motherboard to generate a list of compatible RAM types. The configura-

AVOID THE RUSH FOR HELP

TIRED OF BEING computer guru to your friends and family? Preempt their inevitable postholiday pleas to install their new hardware and software with a useful holiday gift: *Get More Out of Your PC and Add-Ons*, about \$22 from Que Publishing (www.quepublishing.com). This well-written and copiously illustrated step-by-step guide covers PC basics, maintenance, upgrades, networking, and other topics. It's great for both PC newbies and moderately experienced users.

tor maintained on Memory Stock's site (www.memorystock.com) indicates your model's standard and maximum memory, and its total number of memory sockets, among other things (see **FIGURE 1**).

Before you buy, ascertain the following: **Maximum module size:** Find out the maximum size of memory module that your PC supports. Don't buy a module larger than what your motherboard's memory slots can each accommodate.

RAM and connector types: Determine which of the four types of RAM your system uses: DRAM (EDO or FPM), SDRAM, DDR SDRAM, or RDRAM. All four types are mounted on one of three module types: SIMM, DIMM, or RIMM.

Most machines support only one type of RAM and have one type of module or connector, so mixing types isn't an option. The few motherboards that do accept two types of RAM allow only a single type to be used at any one time.

Memory speed: SDRAM, DDR SDRAM, and RDRAM are rated to match or exceed the PC's frontside bus speed, which is the speed at which data moves between the CPU and RAM. If your system comes with PC66 SDRAM, you can use PC100 SDRAM to replace it and get the faster speed, as long as your PC's frontside bus supports the higher rate. But if you mix RAM of different speeds, all RAM will operate at the speed of the slowest chip.

Memory banks: On some PCs, the memory slot closest to the CPU—usually called

bank 0—must be filled before the motherboard's other memory slots. On other systems, bank 0 must have the largest RAM module (if you are using modules of different sizes). There's no fixed rule, so check your PC's documentation.

Nonparity or ECC: If your system supports error-correcting code (ECC) and has more than 512MB of RAM, buying ECC memory may be worth the added cost. Large amounts of RAM are more likely to experience occasional, random errors (which may be caused by cosmic rays, among other sources). However, unless your current RAM is ECC, forget it; you can use nonparity and ECC modules together, but error correction will be disabled.

To determine your type of memory, count the number of chips on the memory module. If the number is divisible by

The image shows a screenshot of the Memory Stock online configurator. On the left is a navigation menu with options like 'HP Printer Memory', 'Apple/Mac Memory', 'Server Memory', 'Desktop Memory', 'Laptop Memory', '72 Pin Simm', '144 Pin Sdimm', 'SDRAM PC66', 'SDRAM PC100', 'SDRAM PC133', 'DDR SDRAM', 'RDRAM Rambus', and 'RAM Required'. The main content area is titled 'Memory Specs' and contains the following information:

Standard Memory:	128 MB (removable)
Maximum Memory:	2.0 GB
Memory Expansion:	4 sockets (2 banks of 2)
Memory Comments:	PC800 RDRAM RIMMs. Supports ECC. Modules must be installed in like pairs.

Below this, there is a 'System Specs' section with details like 'Type of system: Desktop/Server', 'Bus Architecture: PCI/AGP', 'Hard Drive Bus: Ultra ATA/100', 'Native OS: Windows NT/2000/XP', and 'CPU Type: 1.70GHz Intel Pentium 4'. A red box highlights the 'Memory Specs' table.

FIGURE 1: FIND OUT WHAT TYPE OF RAM your PC uses, and other information, with Memory Stock's online configurator.

three, you have ECC or parity memory.

Column address strobe: The lower the CAS rating—or the CL rating—is, the better. SDRAM comes in CL2 or CL3 types, and DDR SDRAM comes in CL2 or CL2.5. Unless your motherboard requires a specific CAS or CL rating, get the lower (faster) rated module. Cost differences should be negligible. Again, if you mix modules of different speeds, they'll all operate at the slowest module's speed. ■

Go to find.pcworld.com/31511 for past Hardware Tips columns. Send your tips and questions to kirk_steers@pcworld.com. We pay \$50 for published items. Kirk Steers is a PC World contributing editor.

STEP BY STEP

STAN MIASTKOWSKI

Burn Your Own DVDs for Backup or Video Playback

MOST PC TECHNOLOGIES don't become popular until they drop to a price where making a purchase decision is relatively easy. And that's exactly what's happened to DVD writers over the past few months. A year ago the \$500-plus price of a DVD burner made it the province of early adopters and users with deep pockets. But DVD writers are now hovering around the \$200 to \$250 range for internal models, making them a wise upgrade for many PCs manufactured in the last couple of years. External DVD drives, which plug into a FireWire or USB 2.0 port, are much easier to install but cost an extra \$75 to \$100 over internal drives.

The middle letter in DVD stands for *versatile*, and the 4.7GB capacity of write-once (DVD-R and DVD+R) and rewritable (DVD-RW and DVD+RW) media makes such discs versatile indeed. Write-once DVDs are excellent for archiving important data, and rewritable DVD media can serve as extra 4.7GB drives, for on-the-fly backups or everyday storage. DVD drives also read standard CD-ROMs, and write both CD-R and CD-RW discs.

One popular application for DVD writers is to use them to create video DVDs—from your digital camcorder or analog videotape collection—that you can pop into a standard DVD player and enjoy in the comfort of your living room. (See "From Videotape to DVD" on the next page.)

FORMATS AND SPEEDS

WRITE-ONCE AND rewritable DVDs are available in two types: DVD-R/RW and DVD+R/RW. The formats were created by competing industry groups, and for a while it looked as if many users would have to pick a format, and hope their choice wasn't the loser. But manufacturers have come up with a neat solution: Most DVD writers are now a combination design, offering support for both formats. We don't have space here to delve into the pros and cons of each, but the short story is that (for video) DVD+R is more compatible with standard DVD players. For additional background, see find.pcworld.com/38294 and find.pcworld.com/38609.

Most drives now support 4X writing for DVDs, although 4X-compatible media is

THE TOP DOWN

Benefits: Create DVDs from videotape, make large-scale data backups, use as a 4.7GB drag-and-drop drive.

Costs: Internal, \$200 to \$300; external, \$300 to \$400

Expertise level: Beginner-intermediate

Time required: 30 to 60 minutes

Tools required: Needle-nose pliers, Phillips-head screwdriver, antistatic wrist strap (recommended)

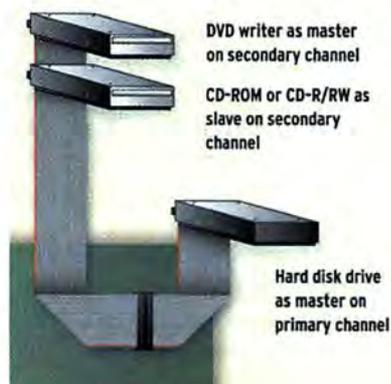
Vendors: Hewlett-Packard (www.hp.com), Iomega (www.iomega.com), LaCie (www.lacie.com), LG Electronics (www.lgeus.com), Memorex (www.memorex.com), Pioneer (www.pioneerelectronics.com), Plextor (www.plextor.com), Sony (www.storagebysony.com), TDK (www.tdk.com), Toshiba (www.toshiba.com)

currently rather expensive and hard to find. But all 4X drives will also write at 2X, and 2X media is affordable and readily available. Prices for DVD media vary considerably, but figure on spending \$2 to \$4 per disc, depending on the format and whether it's write-once or rewritable.

Most DVD burners come with a wide selection of backup, packet-writing, and digital-video software. For help in choosing a suitable drive, check out our *Top 10 DVD Drives* chart on page 158.

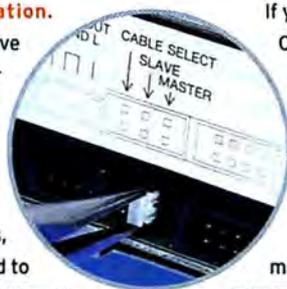
Some words of caution: You'll need plenty of PC horsepower to write DVDs. Your system should have a CPU that runs at 1 GHz or faster, and 256MB of RAM is a bare minimum; 512MB of memory—or more—will make life much easier. ■

Stan Miastkowski is a PC World contributing editor. Contact him at stan_miastkowski@pcworld.com. Visit find.pcworld.com/31676 for past Step-By-Step columns.



Plan the drive installation.

Unplug your PC and remove the cover. Since a DVD writer requires a continuous flow of data for creating discs, it should ideally be installed as the master drive on its own IDE channel. In most systems, your hard drive will be attached to the primary IDE channel, so you'll want to use the secondary IDE channel. Don't put your DVD burner on the same channel as a hard drive—the hard drive may slow down.



If you already have a CD-ROM or CD-R/RW drive connected to your secondary IDE channel and plan to keep it (not a bad idea for directly copying CD-ROMs), change that drive's jumper to "Slave." Before you go any further, make sure the jumper on the DVD burner is set to "Master."

For more on this topic, see the September 2002 column "Get Maximum Speed From Your New Drives" (find.pcworld.com/38969).

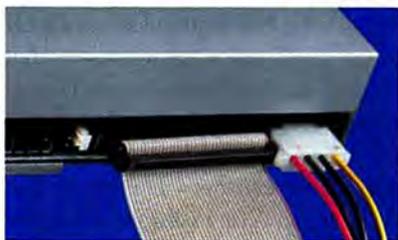
2 Install the DVD drive. Find a free 5.25-inch bay in the front of your case. If your case requires special brackets for holding externally accessible drives, install those first. Slide the drive part of the way into the bay. If your secondary IDE channel already has a CD drive, you should find a spare connector on the wide data cable. If not, use the cable that came with the DVD writer. Make sure that the colored edge of the data cable is attached to pin 1 on the DVD drive.



Attach a power connector to the DVD drive. If you can't find a free one, you'll need a Y-adapter, available at most PC stores.

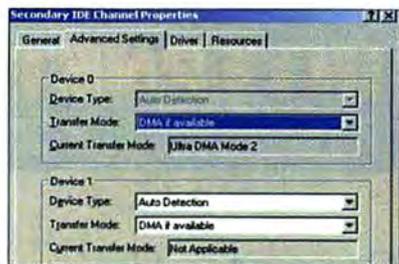
In some cases, your DVD drive and sound card may require you to connect small analog and/or digital sound cables to the back of the drive. Check your manuals.

When all cables are connected, slide the drive fully into the bay. If your case doesn't use mounting brackets or rails, secure the drive with four screws.



3 Install the software. Replace the cover on your PC, plug in the system, and turn it on. Versions of Windows above 98 should automatically detect and install the burner.

Insert the CD-ROM that came with your drive and follow the directions for installing the software packages (which vary by DVD maker). This may require several reboots.

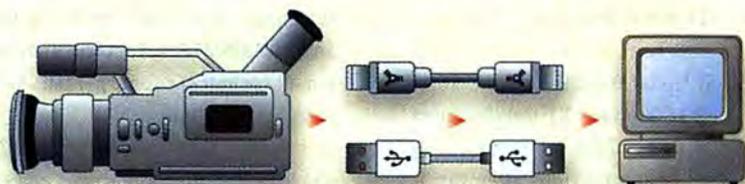


4 Activate DMA transfer for maximum performance. In Windows 98 and Me, right-click *My Computer*, choose *Properties*, click the *Device Manager* tab, double-click first *CD-ROM* and then the name of the DVD drive. Click the *Settings* tab, check the *DMA* box, and click *OK*. Follow the on-screen directions. Then restart your PC.

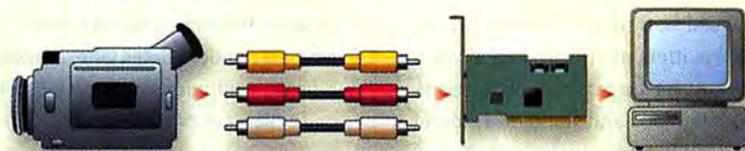
Windows 2000 and XP usually are set up to activate DMA if the drive supports it. To check, right-click *My Computer* (on the desktop, or on the Start menu in XP) and choose *Properties*. Select the *Hardware* tab, click the *Device Manager* button, and double-click *IDE ATA/ATAPI controllers*. Next, double-click the channel (usually *Secondary*) that the DVD drive is connected to, and click *Advanced Settings*. The *Transfer Mode* drop-down list should show *DMA if available*. If not, fix it.

FROM VIDEOTAPE TO DVD

MAKING VIDEO DVDs from videotapes is one of the big attractions of buying a rewritable DVD drive. Here's a summary of the process.



1. Video from a digital video camcorder feeds into a FireWire or USB 2.0 port (depending on which port type the camcorder supports) and is stored on the hard disk.



2. Video from an analog camcorder (VHS, 8mm, Hi-8) or VCR feeds into an analog capture card or an external USB 2.0 capture box (see find.pcworld.com/38300, for example), which converts it to digital format. The digital version is stored on the hard disk.



3. Through software (included with the DVD burner), you can create DVD menus, convert the stored digital video into the MPEG-2 format of video DVDs, and write it to the DVD media.

4. The resulting DVD can play on most stand-alone DVD players, although some older players may have trouble handling it.

INTERNET TIPS

SCOTT SPANBAUER

Free Antivirus: Finally Ready for Prime Time

AS W32.BLASTER, Sobig, and earlier virus threats have shown, the Internet is not a terribly safe place to connect your PC. Besides updating Windows and your Internet applications regularly, please, I beg you, install two key utilities—a firewall and antivirus software—to ward off future attacks. And if you install any of the products I recommend below, the ounce of prevention won't cost you a dime.

In last month's column, I recommended a quartet of effective no-cost firewalls (find.pcworld.com/38393). If you'd had one of those apps running on your PC when Blaster hit in August, you'd have escaped the worm's effects. Free antivirus utilities have been around for a while, but I've never felt comfortable recommending them because testing organizations such as Virus Bulletin (www.virusbtl.com) and ICISA Labs (www.icsalabs.com) hadn't endorsed them. To pass the tests administered by these labs, an antivirus

utility must, among other things, stop all viruses known to exist in the wild, on demand (during manual or scheduled scans of the hard disk and memory) and on access (using memory-resident shields to block viruses from loading into memory).

HOW THE FREE FOUR SCORE

UP-TO-DATE performance test results for free antivirus programs aren't always easy to come by, but the little information I've been able to dredge up indicates that most of these utilities are improving. I tried all four of the programs below—the only free Windows antivirus programs I could find—and though I found Grisoft's AVG and Alwil's Avast 4 to be the most feature-rich, I feel comfortable recommending any of the four. They all update their virus definitions automatically and have a seal of approval from at least one testing lab.

Grisoft's AVG Anti-Virus System: AVG passed Virus Bulletin's June 2003 VB100 Windows XP test (the most recent available at press time) after failing previous attempts; it also passed ICISA's June 2003 test.

AVG includes memory-resident scanners, plus e-mail scanners for Outlook, Outlook Express, Eudora, and Exchange client.

Alwil's Avast 4 Home Edition: Avast likewise passed both the VB100 and ICISA tests, and it offers memory-resident scanning. But Avast surpasses AVG by scanning both Outlook and standard Internet (POP3/SMTP) mail, making it a good choice if you use a non-Microsoft mail client. Amazingly, Alwil also offers support via e-mail for its free product.

H+BEDV Datentechnik's AntiVir Personal Edition: This utility doesn't appear in

Virus Bulletin's June 2003 tests; it did, however, pass ICISA's June 2003 tests. AntiVir includes a memory-resident scanner, but it lacks e-mail scanning (it watches only file read and write operations and looks for suspicious macros). You can use AntiVir's separate scheduler program to launch scheduled hard-disk scans, and virus-signature and program updates; but how to perform these tasks (or whether they're possible) is far from obvious.

Softwin's BitDefender Free Edition Version 7: BitDefender Free Edition does not appear in the VB100 and ICISA test results, but the Standard Edition passes both tests using the same scanning engine as the free version. Like the other free AV tools, BitDefender employs a memory-resident scanner and is set to download updates automatically. But like AntiVir Personal Edition, it doesn't scan e-mail for viruses during send and receive operations. ■

Send your questions and tips to nettips@spanbauer.com. We pay \$50 for published items. Go to find.pcworld.com/31523 for more Internet Tips. Scott Spanbauer is a contributing editor for PC World.

GRATIS ANTIVIRUS

Alwil Avast 4 Home Edition: VB100 and ICISA certified, on-access and on-demand scanning, e-mail scanning for Outlook and POP3/SMTP, automatic updates, e-mail technical support, 7.1MB. find.pcworld.com/38561

Grisoft AVG Anti-Virus System: VB100 and ICISA certified, on-access and on-demand scanning, e-mail scanning for Outlook and Outlook Express, automatic updates, 5.7MB. find.pcworld.com/38564

H+BEDV Datentechnik AntiVir Personal Edition: ICISA certified, on-access and on-demand scanning but no e-mail scanning, automatic updates (after fairly significant configuration effort), 3.8MB. find.pcworld.com/38567

Softwin BitDefender Free Edition Version 7: Uses same scanning engine as the VB100- and ICISA-certified Standard Edition, on-access and on-demand scanning but no e-mail scanning, automatic updates, 8.8MB. find.pcworld.com/38570

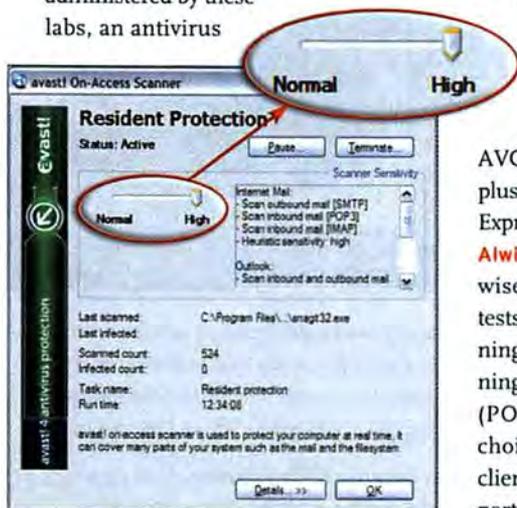


FIGURE 1: BOOST YOUR antivirus security by setting the AV utility's scan to the max.

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Protect Yourself Against Application Sneak Attacks

? SOME PROGRAM has installed itself on my computer, bringing up unwanted pornography. I have tried to remove it, but it just keeps coming up again. What can I do?

Teng Beng Koay, McAllen, Texas

FIRST, CHECK Windows' System Configuration Utility to see whether the uninvited program is renewing itself every time you boot. (Windows 2000 lacks this

likely to be obvious. Be suspicious of commands that look like 'C:\Windows\regedit.exe/s C:\Windows\System\x3z73t.tmp'. Such a command alters your Registry every time you boot. If you find a command similar to this example, uncheck it and then click OK. For good measure, delete the file that's mentioned at the end of the command—'C:\Windows\System\x3z73t.tmp', in my example—too.

If you don't discover any dubious file names, uncheck various entries in the list of Startup items one at a time and reboot. If the problem goes away, you have found the troublemaker. If an important function (such as your anti-virus program) disappears, recheck the item that you just unchecked.

Whether or not Msconfig identifies the problem application, it's a good idea to fix your Registry. Go to find.pcworld.com/38237 and read "How Do I Restore My Windows Registry?" from my April column for instructions on backing up and restoring the Registry. If you have a Registry backup from before the problem started, restore it from that backup.

If you don't have a useful Registry backup, be sure to create one right away. After the backup is complete, press **<Windows>-R** or select **Start>Run**. Type **regedit** and hit **<Enter>**. When the Registry Editor opens, press **<Ctrl>-F** and enter the name of the invasive program, the URL it points to, or any string of text that might refer to it. When you find a suspect key in the Registry, delete it with extreme prejudice.

There's a good chance that the offend-

ing program uses JavaScript, so consider limiting your browser's scripting capabilities. To do so in Internet Explorer, select **Tools>Internet Options>Security>Custom Level**. Scroll to the Active scripting section, and select either *Disable* or *Prompt* (see **FIGURE 1**). Click **OK** twice. Note that disabling this feature blocks legitimate scripts as well as bad ones—and being prompted to allow each script case-by-case gets annoying fast.

There are two free programs that may help you find the miscreant: Lavasoft's Ad-aware (find.pcworld.com/38240) and PepiMK's Spybot Search & Destroy (find.pcworld.com/38243).

You may have been the victim of a program that exploits Internet Explorer's Browser Help Object subsystem, which is intended to let plug-ins run inside the browser. Visit find.pcworld.com/38963 for more information about "stealthware" applications—and how to combat them.

RESTORE PRIVATE FOLDERS

? I HAD TO REINSTALL Windows XP on a system containing private folders. Now I can't get back into these folders, even though I've created the same user names as before. What can I do?

Robert Bell, Mohnton, Pennsylvania
REBOOT YOUR PC, and before Windows starts loading, press **<F8>** to view the boot menu. Select *Safe Mode* and log on with an Administrator-level account.

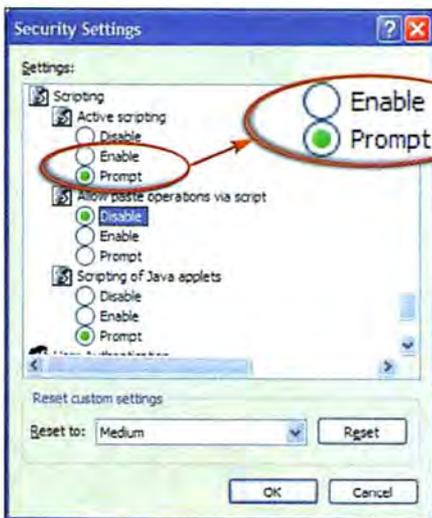


FIGURE 1: TURN OFF OR LIMIT scripts to avoid dangerous pornographic intrusions.

program, but users of that OS can go to find.pcworld.com/38234 and download Mike Lin's free Startup Control Panel.)

Press **<Windows>-R** or select **Start>Run**. Type **msconfig**, and press **<Enter>**. Click the **Startup** tab and look for a suspect command or file path in the resulting list. Unfortunately, the program's name is not

MEMORY CARD SNEAKERNET

DO YOU NEED a quick and easy way to move files from one computer to another? If you own a digital camera, a PDA, or any other device that uses memory cards, Ed Fink of Brentwood, California, recommends that you use these little squares of flash RAM on moving day. You can buy a CompactFlash or SmartMedia reader for as little as \$10; SD, Memory Stick, and MultiMediaCard readers aren't much more expensive. All of these readers plug into a USB port, so you can easily connect them to just about any PC. And once you've moved the files, you have a convenient gadget for data backup and other file-storage purposes.

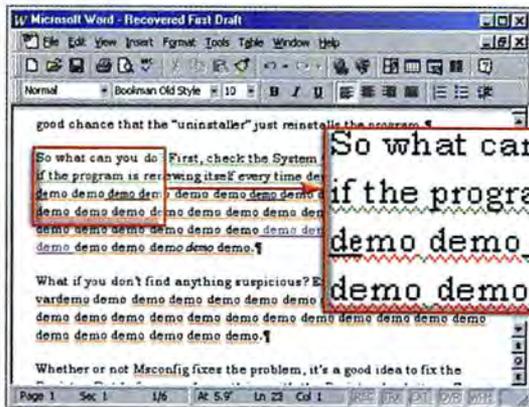


FIGURE 2: CAN THAT FILE BE SAVED? The demo version of OfficeRecovery tells you if it's salvageable.

Once XP is running in Safe Mode, open Windows Explorer, right-click a private folder, and select *Properties*. Click *Security*•*Advanced*•*Owner*. Select the appropriate owner in the 'Change owner to' box, select *Replace owner on subcontainers and objects*, and click *OK*. At the warning, click *Yes*. Reboot to return to normal Windows.

WHEN SYSTEM RESTORE DOESN'T

WHY CAN'T System Restore restore my Registry? Whenever I try to use it, I get smacked with a "restore incomplete" error message.

Vincent Wong, New York

YOU HAVE A corrupted restore point. It happens sometimes, and the way System Restore works makes the problem worse. To save disk space, System Restore saves only changes made since the previous restore point was created. If Windows creates a new restore point every day, and you tell it on Friday to restore back to Monday, it must successfully restore the points from Thursday, Wednesday, and Tuesday before it can reach Monday's. If Thursday's restore point is corrupt, you can't get to Wednesday's.

There's no fix for this problem, but there are ways to avoid it in the future. One is to download and install XP's Service Pack 1, which fixes at least one restore point—corrupting bug.

Also, don't rely on Windows' automatic backups. A newer backup will be more reliable than an older one, so create a restore point manually before you install

software or do anything else that might alter your system.

Whenever you encounter a corrupted restore point, it's a good idea to start fresh by cleaning out all previous restore points. In Windows XP, click *Start*, right-click *My Computer*, and select *Properties*•*System Restore*. Next, check *Turn off System Restore on all drives*, click *OK*, and then click *Yes*. Reboot your computer and follow the same steps, but this time uncheck the

Turn off System Restore on all drives option.

In Windows Me, right-click *My Computer* and select *Properties*•*Performance*•*File System*•*Troubleshooting*. Check *Disable System Restore* and click *OK*, *Close*, and *Yes*. After Windows has rebooted, repeat the same procedure, but this time be sure to uncheck the *Disable System Restore* option.

In Windows Me you can back up the Registry without System Restore: Select *Start*•*Run*, type *scanreg*, and press *<Enter>*. When the prompt tells you that there are no errors, click *Yes*, and then *OK*. To restore the Registry, go back to the Run box and type *scanreg /restore* (don't forget the space before the slash).

Windows XP doesn't possess this capability, but you can use Lars Hederer's free Emergency Recovery Utility NT (ERUNT) to back up and restore the XP Registry. Go to find.pcworld.com/38246 to download a copy of Hederer's program.

RESTORE OR DELETE CORRUPTED FILES

I HAVE SOME corrupted Word and Excel files that I can neither open nor delete. How are they getting corrupted, and what can I do about them?

Betty C. Jung, Guilford, Connecticut

THE PRIMARY CAUSE of a corrupted file is a system or application crash. If Windows or some other program blows a gasket while you have a file open, the file may not reopen properly later (fortunately, it's more likely to be unaffected).

If you're getting a lot of corrupted files, and you're not suffering a lot of crashes,

the problem could be due to a virus—yet another reason to keep your antivirus protection up to date. Or the corruption could result from a flaw in your hard drive's file system or in the drive itself, which is a more serious problem. Using a disk utility to scan the drive will uncover these glitches and fix the file system.

To scan your drive in Windows 2000 and XP, open *My Computer*, right-click the drive, and select *Properties*•*Tools*•*Check Now*. Check both options and click *Start*.

In Windows 98 and Me, select *Start*•*Programs*•*Accessories*•*System Tools*•*ScanDisk*. Choose the drive, click *Thorough*, and check *Automatically fix errors*. Click *Start* to begin the scan.

The best way to recover a corrupted data file is from a recent backup. If you don't have a recent backup, the program that crashed may have created one for you automatically. For instance, by default, Word backs up every .doc file as a .wbk file in the same folder. Just load this file into Word and save it as a .doc file.

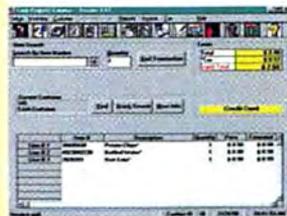
In the absence of any backup, you'll have to use a data-recovery program to retrieve the file. Ontrack markets a series of recovery programs called EasyRecovery (www.ontrack.com), and Recoveronix offers a similar line called OfficeRecovery (www.officerecovery.com, see **FIGURE 2**). In either case, you can download a demo program that will tell you whether your file is salvageable. If it is, you'll still have to buy the actual program—which will probably cost \$150 or more—to recover the data. And if that doesn't get you into the backup habit, I don't know what will.

When you encounter a corrupted file that you can't even delete, there are two possibilities. First, the file may no longer exist, but a ghost of it may remain in the file system. Second, Windows may think that a program is still using it. Scan the drive as described above to solve the first problem, and reboot to fix the second. ■

Send your questions to answer@pcworld.com. Answer Line pays \$50 for published items. See find.pcworld.com/31577 for more Answer Line columns. You'll find Contributing Editor Lincoln Spector's humorous writing at www.thelinkinspector.com.

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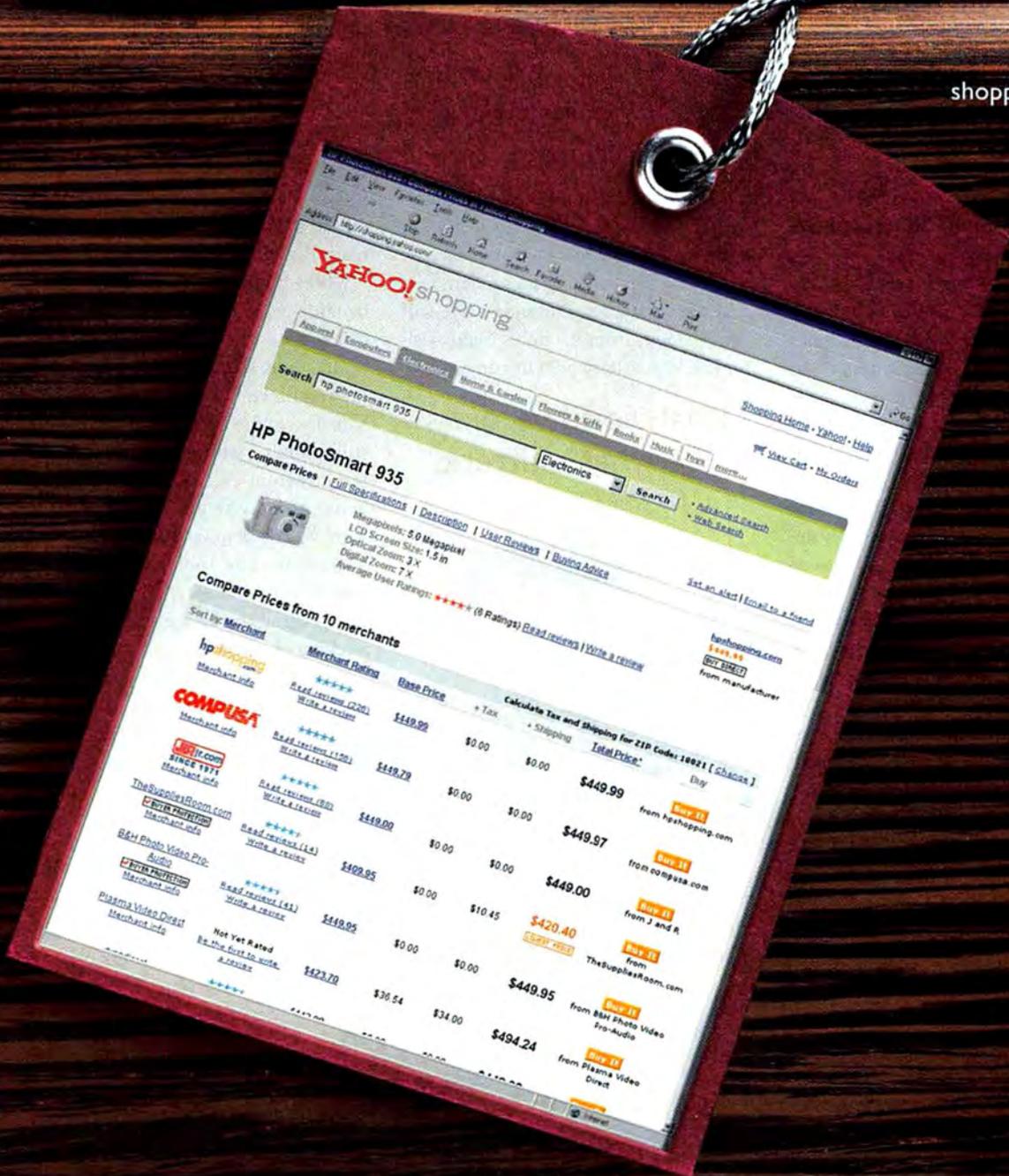
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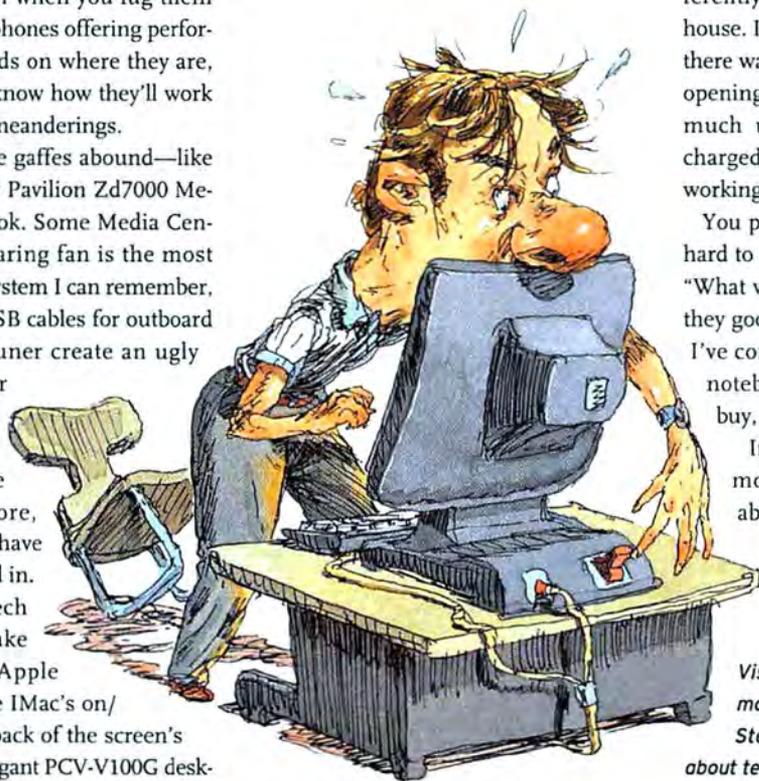
Just when we need it most, when every product design is a wee bit different from the last, try-before-you-buy is becoming an endangered concept—even in retail stores. With the car-radio guys booming their woofers across the aisle, it's impossible to judge how loud a computer's fan will seem in the silence of your home. With notebooks strapped to the counter, it's impossible to determine how heavy the things will feel when you lug them around. With cell phones offering performance that depends on where they are, it's impossible to know how they'll work during your daily meanderings.

Too bad, because gaffes abound—like those in HP's new Pavilion Zd7000 Media Center notebook. Some Media Center! The unit's roaring fan is the most annoying on any system I can remember, and its separate USB cables for outboard IR port and TV tuner create an ugly snake's nest. Order on the Web, and you won't see the wires or hear the noise. Go to a store, and they may not have everything plugged in.

Even the best tech designers can make dumb mistakes. Apple perversely puts the iMac's on/off switch on the back of the screen's pedestal. Sony's elegant PCV-V100G desk-

top comes with an integrated LCD monitor and wireless mouse and keyboard, so it can work off a single AC power cable—but if you happen to use a modem or a wired network, its plug-ugly cable will dangle dopily from the unit's highly visible left edge instead of hiding in back.

Real-world verdicts are what matters.



My most recent exercise in exasperation was with the two-line cordless phone I bought for my bedroom. I wanted it because it uses the 900-MHz spectrum, thereby avoiding conflict with my 2.4-GHz Wi-Fi network. When I got it home, I discovered its tragic flaw: You can turn off the ringers on the base, but you can't make the handset shut up.

With a home office, I need to keep the bedside lines silent so that East Coast dimwits don't awaken me at 5:30 a.m. Seattle time, so the old phone is back on the nightstand. The new one has been banished to the living room—where I'm still fumbling with it, since it works differently from every other phone in the house. It doesn't sound great, either. But there was no demo unit in the store, and opening the box wouldn't have revealed much unless the handset had been charged and the base plugged in to two working phone lines.

You probably don't have to think very hard to come up with more examples of "What was the designer thinking?"—be they goofy cell phone interfaces or what I've come to call malfunction keys on notebooks. So forget try-before-you-buy, even if you have the chance.

Instead, think no-questions-asked money-back guarantee—if you're able to find a retailer or Web merchant who still offers one. Just consider yourself lucky if you don't have to use it. ■

Visit find.pcworld.com/31595 to see more columns by Contributing Editor Stephen Manes. He has been writing about technology for the past two decades.



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- 40GB (7200 RPM) Ultra ATA/100 Hard Drive
- Integrated Intel® 3D Extreme Graphics
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- Integrated 10/100 Ethernet
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- Monitor Not Included

\$499 as low as **\$14/mo.** (46 prmts*)
E-VALUE Code: 19192-S51204y

Recommended Upgrades:

- Dell™ Personal Inkjet Printer J740, add \$79
- 15" E151FP Flat Panel Display, add \$300

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- Monitor Not Included

\$599 as low as **\$16/mo.** (46 prmts*)
E-VALUE Code: 19192-S31205y

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- 3-Yr Next Business Day On-Site Service; add \$99
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Exceptional Performance Desktop

- Intel® Pentium® 4 Processor with HT Technology at 2.60GHz with 800MHz Front Side Bus
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- 40GB (7200 RPM) Ultra ATA/100 Hard Drive
- Integrated Intel® Extreme Graphics 2
- 48x CD-ROM, Integrated Audio
- Integrated Intel® PRO 10/100 Ethernet
- 1-Yr Limited Warranty; 1-Yr On-Site Service¹
- Monitor Not Included

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E-VALUE Code: 19192-S51206y

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- Dell All-In-One Printer A940, add \$129
- 3-Yr Limited Warranty; 3-Yr On-Site Service; add \$149



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Mobility and Performance – Starting at 7.2 lbs.²

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- Windows® XP Home Edition, Productivity Pack including WordPerfect® and Money®
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- 2-Yr On-Site Service plus CompleteCare³, add \$158

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- Featuring Intel® Centrino™ mobile technology
- Intel® Pentium® M Processor at 1.30GHz
- Intel® PRO Wireless 2100 802.11b 11Mbps Mini-PCI Wireless Card
- Windows® XP Home Edition
- 14.1" XGA TFT Display
- 128MB Shared® DDR SDRAM
- 20GB Hard Drive
- Integrated Intel® Extreme Graphics Up to 64MB Shared™ System Memory, Internal Modem and NIC Included
- Serial and Parallel Ports Included, 1-Yr Mail-In Service

\$1149 as low as **\$31/mo.** (46 prmts*)
E-VALUE Code: 19192-S71211

Recommended Upgrades:

- Windows® XP Professional, add \$60
- 3-Yr Next Business Day On-Site Service, add \$298

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Thin and Light – Starting at 5 lbs.²

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- Windows® XP Home Edition, Productivity Pack including WordPerfect® and Money®
- 14.1" XGA TFT Display
- 256MB DDR SDRAM, 30GB Hard Drive
- 32MB DDR ATI™ MOBILITY™ RADEON™ 9000 AGP 4X Graphics
- Modular 8x DVD-ROM Drive, Internal Modem and NIC
- Serial and Parallel Ports Included, 1-Yr Mail-In Service

\$1349 as low as **\$37/mo.** (46 prmts*)
E-VALUE Code: 19192-S81213

Recommended Upgrades:

- Dell™ TrueMobile™ 300 Bluetooth Internal Card, add \$49
- Dell™ Laser Printer P1500 Printer, add \$249



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NEW POWEREDGE™ 400SC SERVER

Small Business Value Server

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- Upgradable to Intel® Pentium® 4 Processor at 3.20GHz with 800MHz Front Side Bus¹
- 128MB 333MHz ECC DDR SDRAM (Up to 4GB)
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- Upgradable to 240GB of Internal Hard Drive Storage
- Embedded Intel® PRO Gigabit™ NIC
- 1-Yr 24x7 Dedicated Server Phone Tech Support
- 1-Yr Next Business Day On-Site Service¹
- Small Business Pricing

\$399 E-VALUE Code: 19192-S21203

Recommended Upgrades:

- PowerConnect™ 2016 16-Port Ethernet Switch, add \$89
- System including Windows® Small Business Server 2003 (256MB SDRAM Min. Required), now \$999

POWEREDGE™ 1600SC SERVER

High-Speed Small Business Server

- Intel® Xeon™ Processor at 2GHz
- Dual Intel® Xeon™ Processor Capable (Up to 3.06GHz)
- 128MB DDR SDRAM (Up to 4GB)
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- Upgradable to 876GB of Internal SCSI Hard Drive Storage
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- 1-Yr Next Business Day On-Site Service¹
- Small Business Pricing

\$699 as low as **\$19/mo.** (46 prmts*)
E-VALUE Code: 19192-S21206

Recommended Upgrades:

- PowerConnect™ 2024™ 24-Port Ethernet Switch, add \$129
- System including Windows® Small Business Server 2003 (256MB SDRAM Min. Required), now \$1299

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- Integrated Intel® PRO 1000MT Gigabit™ NIC
- Lifetime 24x7 Dell Precision™ Dedicated Tech Support
- 3-Yr Next Business Day On-Site Service¹
- Monitor Not Included

\$999 as low as **\$27/mo.** (46 prmts*)
E-VALUE Code: 19192-S51209y

Recommended Upgrades:

- 3-Yr Same-Day 4-Hour (5x10) On-Site Service; add \$199
- 17" Dell UltraSharp™ 1703FP Flat Panel Monitor, add \$479

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- Integrated Intel® 3D Extreme Graphics
- 16x DVD-ROM Drive
- Integrated Audio
- Desktop Speakers
- 56K Data Fax Modem; Integrated 10/100 Ethernet
- WordPerfect® Productivity Pack
- 6 Months of America Online® Membership Included¹
- 1-Yr Limited Warranty²; 1-Yr At-Home Service³

\$699 Ask about No Payments for 90 Days for well-qualified customers⁴
E-VALUE Code: 19192-D51206m

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Exceptional Performance

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- Integrated Intel® Extreme Graphics
- 48x CD Burner/DVD Combo Drive
- Integrated 5.1 Channel Audio
- Stereo Speakers
- 56K Data Fax Modem; Integrated 10/100 Ethernet
- WordPerfect® Productivity Pack
- 6 Months of America Online® Membership Included¹
- 1-Yr Limited Warranty²; 1-Yr At-Home Service³

\$999 Ask about No Payments for 90 Days for well-qualified customers⁴
E-VALUE Code: 19192-D51209m

DIMENSION™ 8300 DESKTOP

Cutting-Edge Performance

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- 512MB Dual Channel DCR SDRAM at 400MHz
- 80GB Hard Drive (7200 RPM)
- 17" (16.0" v.i.s., 27dp) E773 Monitor
- 128MB NVIDIA® GeForce FX 5200 Graphics Card
- 48x CD Burner/DVD Combo Drive
- Sound Blaster® Audigy™ 2 (D) Sound Card
- Dell™ A425 Speakers with Subwoofer
- 56K Data Fax Modem; Integrated Intel® PRO 10/100 Ethernet
- WordPerfect® Productivity Pack
- 6 Months of America Online® Membership Included¹
- 1-Yr Limited Warranty²; 1-Yr At-Home Service³

\$1569 Ask about No Payments for 90 Days for well-qualified customers⁴
E-VALUE Code: 19192-D51215m

INSPIRON™ 1100 NOTEBOOK

Notebook Essentials – Budget Friendly

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- 8x DVD-ROM Drive
- Integrated Intel® Extreme Graphics
- 65Whr Li-Ion Battery (8-Cell)
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- WordPerfect® Productivity Pack
- 6 Months of America Online® Membership Included¹
- 1-Yr Limited Warranty²; 1-Yr Mail-In Service³

\$799 Ask about No Payments for 90 Days for well-qualified customers⁴
E-VALUE Code: 19192-D81207n

INSPIRON™ 5100 NOTEBOOK

Perfect Balance of Performance and Price

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- Microsoft® Windows® XP Home Edition
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- 512MB DDR SDRAM
- 30GB Hard Drive
- 24x CD Burner/DVD Combo Drive
- 32MB DDR ATI's MOBILITY™ RADEON™ 7500 AGP 4X Graphics
- 96Whr Li-Ion Battery (12-Cell)
- Internal Fax Modem and NIC Included
- WordPerfect® Productivity Pack
- 6 Months of America Online® Membership Included¹
- 1-Yr Limited Warranty²; 1-Yr Mail-In Service³

\$1279 Ask about No Payments for 90 Days for well-qualified customers⁴
E-VALUE Code: 19192-D81212n

INSPIRON™ 5150 NOTEBOOK

Enhanced Performance

- Mobile Intel® Pentium® 4 Processor at 3.06GHz
- Microsoft® Windows® XP Home Edition
- 15" SXGA+ TFT Display
- 512MB DDR SDRAM
- 60GB Hard Drive
- 24x CD Burner/DVD Combo Drive
- 32MB DDR NVIDIA® GeForce™ FX Go5200 AGP 4X Graphics
- 96Whr Li-Ion Battery (12-Cell)
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- 6 Months of America Online® Membership Included¹
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\$1699 Ask about No Payments for 90 Days for well-qualified customers⁴
E-VALUE Code: 19192-D81216p



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- Productivity Pack including WordPerfect® and Money®
- 128MB Shared™ DDR SDRAM
- 40GB (5400 RPM) Hard Drive
- 17" (16.0" v.i.s., 27dp) E773 Monitor
- 48x CD-ROM
- Integrated Intel® 3D Extreme Graphics
- Integrated 10/100 Ethernet, Integrated Audio
- 1-Yr Limited Warranty, 1-Yr On-Site Service*

\$599 Ask about our financing plans for qualified customers
E-VALUE Code: 19190-D51205m

Recommended Upgrade:

- Dell All-In-One Printer A940, add \$129

The Dell Dimension 2400 redefines value. With features that can be tailored to meet the specific needs of your business or home, it's customized technology that won't break your budget. Available with a range of Intel® processors, expandable memory, and integrated graphics, and all at a price you can't resist. Plus, you'll get the peace of mind that comes with Dell's award-winning 24x7 service and support. Don't wait to get customized technology at a price that was made for you.

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