

S CD & DVD BURNERS BROWSERS HARD DRIVES SECURITY E-MA





When you have an important message to deliver, get the right tool for the job: the Optoma EzPro737. Ultralight, ultrabright and whisper-quiet, the EzPro737 features 1500 lumens and a 32dB operating level while weighing a mere 3.5 lbs. State-of-the-art Double Data Rate (DDR) DLP technology and 1800:1 (typical) image resolution provide the unsurpassed performance you need. DVD & HDTV compatibility, PIP and remote mouse with laser pointer give you the flexibility to deliver your message with power and style anytime, anywhere.



The EzPro737 from Optome The Ultimate Road Warrior Power Tool



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CLIP & SAVE BONUS

Online Troubleshooting Help

WHEN YOU'RE WRESTLING with a gnarly PC dilemma, advice from other users can provide more help than any other resource. Most of the sites listed here feature dynamite user forums, along with reviews in case you need to replace faulty equipment.

Windows

author Woody Leonhard helps you keep your computer system up-to-date on new Windows bugs, patches, and other news (www.woodyswatch.com/windows).

Black Viper: The OS user guides are packed with tips on every flavor of Windows (www.blackviper.com).

Hard Drives

Storage Review: You'll find product reviews, a FAQ page, and a guide to harddrive basics to help you diagnose trouble or-if worse comes to worse-replace a faulty drive (www.storagereview.com).

CD and DVD Burners

DVD-R Help: Check out great how-to guides, tips, product guides, and active forums (www.dvdrhelp.com).

DVD+RW Help: Having trouble getting Woody's Windows Watch: PC World your DVD+RW machine or discs to function properly? Consult the compatibility charts posted here (www.dvdplusrw.org).

Printers

Guide to Printers and Scanners: This site offers tips on how to deal with printer drivers and how to save a few bucks on ink cartridges (printscan.about.com).

Notebooks

Talk Notebooks: If you aren't getting anywhere with your notebook manufacturer's tech support department, try the peer-to-peer tech support for your brand at these forums (notebookforums.com).

Wide-Screen TV

Home Theater Forum: Get help from people obsessed with obtaining the best picture and sound from their living room setup (www.hometheaterforum.com).

AVS Forum: Good advice about HDTV. TiVo, and other gadgets that keep you entertained (www.avsforum.com).

Security

Secunia: Go to the TestZone to make sure that your browser and PC can withstand a hack attack (www.secunia.com).

CERT: Wondering what nasties are currently prowling the Internet? This site has up-to-the-minute info (www.cert.org).

DVD Players

DVD File's Forums: Visit the Glitch Exhaust for the skinny on DVD problems (find.pcworld.com/41660).

Digital Cameras

Digital Photography Review: Fast and efficient searches help you find answers to nearly any question related to digital photography (www.dpreview.com).

Steve's Digicams: Includes a list of forums for users of major brands of digital cameras (www.steves-digicams.com).



PC WORLD



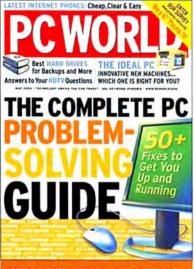
The ViewSonic VPW425 displays HDTV signals.

Tell us about your PC and other devices, and enter for your chance to win this ViewSonic TV.

Enter here to win: www.pcworld.com/survey Tell us your experiences with PCs and other technology devices-you'll automatically be entered in the prize drawing. To take the survey online, you'll need a copy of the magazine with your subscriber number on the mailing label. The Web site explains the official rules and how to participate in the drawing if you're not a subscriber. You need submit only one entry to qualify, and you can enter through July 1, 2004.

SURVEY DETAILS: No particular answer will impact your chances of winning. We will not sell your personal data or share it with any third parties. The prize drawing is open to all legal U.S. and Canadian residents (except those in Quebec and Puerto Rico), age 18 or older. No purchase or survey participation is required to enter or win the prize drawing.

CLIP & SAVE BONUS



SEE PAGE 78 or find.pcworld.com/41693 for our story on fixing PC problems.

PC WORLD

Instant Reference Guide to Troubleshooting

Tracking down PC problems can be tough when you don't know where to turn. We'll show you the first simple steps you should try and some invaluable sites where you can find more help.

Six First Steps for Fixing Problems With Your PC

IT PAYS TO CHECK the basics before you begin a complex troubleshooting process. See if there's a simple solution to your problem by following this guide to the steps you should undertake to start tracking down any PC problem.

Back up your critical data. If it looks as though things might head south at any time, make sure that you have copies of any and all important files.

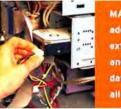
Power things down, wait a bit, and try again. The old standby of rebooting your machine fixes a lot of temporary but mystifying problems. Sometimes systems overheat and need a minute to cool down. Other times, random errors occur. Be sure to back up your critical files if you suspect a catastrophic disk failure; then see if a reboot cures your ills.

Ask yourself what you did last. Did you install some new software? Replace an old driver? Insert an add-in card? If your problems began shortly after you altered your system in some way, check to see whether reversing that change makes the problems disappear.

Cables and add-in cards can work their way loose over time. First check all externally connected cables and confirm that they're tightly connected. Then open your PC's case and check all of the system's internal connections. Make sure that all cards are firmly seated and that all power and data cables are connected.

Search out hardware configuration problems. Misconfigured hardware often can be at fault when things aren't working right. Open your system's Windows Device Manager by right-clicking *My Computer* and choosing *Properties*. Click the *Hardware* tab, and then click the *Device Manager* button. If you see any devices that have yellow exclamation marks in front of their entries, doubleclick them for more information on how to correct the problem.

Get the latest driver update. If it seems that one specific component is acting up, head to the manufacturer's Web site and download the latest driver. That's one of the first things tech support will ask you to do, so you may as well get it out of the way—and there's a chance the update will fix your problem.



MAKE SURE add-in cards, external devices, and power and data cables are all connected.

The drivers for this device are not installed. [Code 28]	
To reinstall the drivers for this	device, click Reinstall Driver.
	-
	Reinstal Driver



See other side for more Web resources.



"The Optoma RD50 and RD65 delivered outstanding image and picture quality for both computer and video applications to capture the 2004 DisplayMate Best Video Hardware Guide™ Five-Star Award for the best large screen High Definition Television Display available Dr. Raymond Soneira, President of DisplayMate Technologies. today."



▲ RD65: The world's first 65-inch HD² DLPTM HDTV

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www.optomatv.com



Optoma TVs are the winners of the 2004 DisplayMate Best Video Hardware Guide and of the CES 2003 Design and Engineering Innovations Showcase Award.

"One thing that's for sure is that the G5 is the biggest advance in computing in recent years, and not just because it is the first personal computer to use a 64-bit desktop processor." — **Peter Lewis**, Fortune; 10/27/03

"To say that the latest and greatest G5 screams does a disservice to the word. I can say flatly that if you have been waiting for the G5 to update your aging Power Macs, you need wait no longer. It will chew through any processor-intensive task you throw its way." — **Ken Mingis**, Computerworld

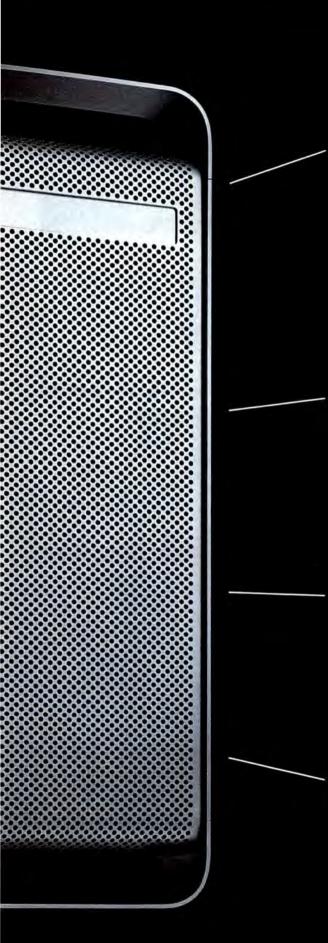
"After two weeks with a dual processor 2GHz Power Mac G5, it's the fastest Mac I've ever used in my entire life, and not by a small margin, either. I'd call it wicked fast, but that wouldn't even come close to doing it justice. It was astonishing."

- Bob Levitus, in the Houston Chronicle

"The Power Mac G5 shatters the longstanding limits of expectation imposed by Intel and Microsoft."

- Tom Yager, InfoWorld

nn 1. Vin 14 Kale - Jangua vit für Allmina vien in 1. van eine alle allminer of United of Chine in Keinen of Chine hat han dere information, can be DD MARPEL on vien www.ppBe.com/pawermo



"With the Power Mac G5, the increase in speed is three-fold over the old machine. Especially in my line of work, this means more rendered scenes in the same amount of time, more freedom to try different versions, or simply a chance to go home before midnight."

- Thomas Tannenberger, Look Effects

"I wasn't prepared for the truly overwhelming performance of my new dual 2 GHz G5. The combo of this amazing hardware and OS 10.3 [Panther] adds up to a work platform that is not only astounding in its power but also in the joy that it brings to the user – just for the quality of work life that it offers those of us who spend hours and hours in front of our machines." — **Pat Metheny**, Musician

"It is a leap of not only faith, but over tall buildings in a single bound. The G5 is so revolutionary, it almost cannot be thought of as simply a better Macintosh, or as a trump card over the hand dealt to us by the Wintel world. This changes everything; the Power Mac G5 is really in a class by itself."

- George Tomlin, Digital Output

"Having Apple Computer's new Power Mac G5 around the office is like having a superhero assistant. If you've got lots of graphics or video heavy-lifting to do all at once, it's amazing."

- Jon Fortt, San Jose Mercury News

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AMD Athlon™ 64 FX Processor



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Model# CRX230E - OEM

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ZT recommends Microsoft® Windows® XP

ZT PRO X6301

Intel® Pentium® 4 Processor with HT Technology Microsoft® Windows® XP Home Edition Intel® D865PERLK (865PE Chipset) Mainboard Crucial 512MB PC3200 (400MHz) Dual Channel DDR RAM Seagate® 160GB Serial ATA/150 7200rpm (8MB Cache) Hard Drive 7 in 1 Universal Media Reader & 1.44MB Floppy Combo Drive 256MB ATI RADEON" 9800XT w/ TV Out & DVI Plextor 8X DVD±RW & CD-RW Universal Combo Drive 16X DVD & 52x32x52 CD-RW Combo Drive MIT MDP120 HDTV Tuner Card w/ Remote Control & Receiver (Add \$259.00) Creative® Labs Sound Blaster® Audigy" 2 ZS w/ IEEE 1394 Firewire Integrated Intels 10/100/1000 Gigabit LAN U.S. Robotics® 56K V.92 Fax Modem Antec Sonata Mid Tower Chassis w/ 380W Power Supply Logitech® Internet Keyboard & Optical Wheel Mouse 3 Years Limited Warranty (4 Firewire and 4 USB 20 on the Back, 2 USB 20 on the front) Logitechn Z-640 6 PCS Speakers w/ Sub-woofer (Add \$59.00) NEC 17" 1280x1024 LCD Panel Display (Add \$429.00) FREE 1 Year On-site Service & 24/7 Toll-Free Technical Support

Intel® Pentium® 4 Processor with HT Technology 3.20 GHz......\$1,749

Intel® Pentium® 4 Processor with HT Technology 3.40 GHz......\$1,899



ZT PRO X6299

866-7

Intel® Pentium® 4 Processor with HT Technology Microsoft® Windows® XP Home Edition Intel® D865PERLX (865PE Chapse) Mainboard Crucial 512MB PC3200 (400MHz) Dual Channel DDR RAM Seagate® 80GB Serial ATA/150 7200rpm (8M8 Cache) Hard Drive 7 in 1 Universal Media Reader & 1.44MB Floppy Combo Drive 128MB ATI RADEON® 2000SE w /TV Out 16X DVD-ROM & 52x32x52 CD-RW Drive Integrated 6 Channels Audio Integrated 6 Channels Audio Integrated 6 Channels Audio Integrated Intel® 10/100 LAN U.S. Robotics® 56K V 92 Fax Modem X-MEN Mid Tower Chassis w/ 320W Power Supply Logitech® Internet Keyboard & Optical Wheel Mouse 3 Years Limited Warranty (3 Firewire and 4 USB 20 on the Back, 2 USB 20 on the front) Logitech® X-220 3 PCS Speakers w/ Sub-wcofer (Add \$39.00) NEC 17" 1280x1024 LCD Panel Disolay (Add \$420.00)

Http://www.ztgroup.com/go/pcw0504

ZT PRO X6300

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ZT

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HT Technology 3 GHz	\$1,	049
Intel® Pentium® 4 Processor with	-	000
HT Technology 3.20 GHz	\$1,	,099

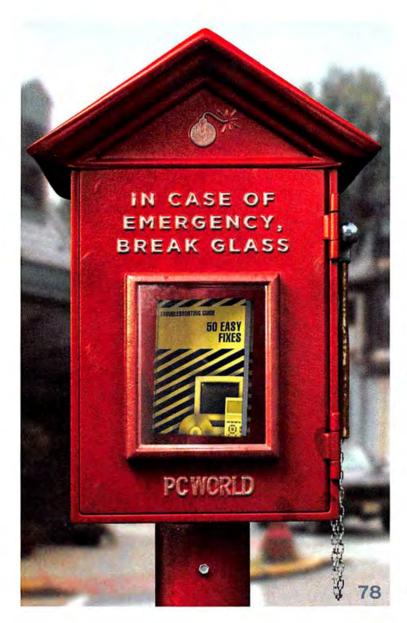
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TECH FIXES /

78 PC Problems? Fix 'Em Yourself

Most computer malfunctions don't require a trained professional to correct; you just need to know where to look for trouble and how to set things right. We offer 60 tips for do-it-yourself troubleshooting, covering everything from Windows and e-mail to displays and hard drives to printers and DVD players. You may not need tech support at all!

Cover photography by Kevin Candland





FEATURES /

PC CHOICES 90 Which PC Do You Need?

From massive towers to petite space savers, computers today come in many varieties. Learn which kind is the best for you.

COLOR LASERS

103 Color Fast

Can the newest color lasers replace your monochrome printer? We tested 13 contenders for print quality, speed, and affordability.



WIRELESS NETS

115 Beating the Wireless Blues

Ditching cables may be cool, but it can be frustrating, too. Here are solutions to five common types of Wi-Fi network headaches.

NET PHONES

127 Internet Phones: Clear Winners

Have Net phones finally come of age? We compare these phone services with each other—and with the landline alternative.

ON THE COVER



Finally, an LCD display that captures the color of life.



The FP951 19-inch LCD display- ultra-high contrast, ultra-high quality.

When you want vibrant color and vivid detail, get the FP951 from BenQ. Featuring an ultra-high 700:1 contrast ratio, a superior A+ LCD panel, and super-wide 170° viewing angle, you'll enjoy crystal clear, recognizable images from multiple viewpoints. An ultra-slim (0.7 inch) bezel design includes analog/DVI input signal. For color that rivals reality, call 1-866-700-2367 or go to www.BenQ.com.

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Beno Enjoyment Matter

TOP 100

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- 164 Top 15 Desktop PCs
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- 171 Top 10 Scanners
- 173 Top 10 Digital Cameras
- 175 More Reviews

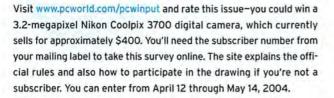
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TELL US WHAT YOU THINK



COMING UP IN JUNE

Protect Your PC: We pick the top products for fighting viruses, spyware, hackers, and spam. Who Knew it Could Do That? Tips to get more out of the hardware and apps you already own.

Build a Media-Savvy PC: Choose the right components to create your ideal living-room computer. Is E-Voting Too Risky? Many of us will vote this way in November. The advantages and pitfalls.







NEWS & TRENDS

30 After Antitrust

How well are the settlements in the Microsoft antitrust case working? We take a look.

- 34 64-Bit Universe Expands Intel is about to offer 64-bit CPUs.
- 36 Quiet PCs With No Compromise Innovative vendors introduce quiet, fanless PCs.
- 40 Out of Stock? No Problem New service offers software on demand in stores.
- 42 Firefox Outtrots IE Clean interface, add-ons boost new browser.
- 42 Three Minutes With Patrick Kolla Interview with Spybot Search & Destroy's author.

NEW PRODUCTS

60 Desktops

Falcon Northwest Mach V FX-53, Polywell Poly-900NF3-FX53

- 62 Notebook IBM ThinkPad X40
- 66 Marketing Software Avidian Technologies Prophet 2004
- 68 DVD Recorders GoVideo DVD Recorder+VCR, Lite-On LVW-5005
- 70 Digital Music Players Apple IPod Mini, Creative Nomad MuVo2 See page 61 for a complete list of new products reviewed.

NEXT GEAR

- 149 HDTV Answer Guide Key facts to know before you buy a high-def TV. 154 Satellite Radio
- Sirius Audiovox SIRBB1 Portable Audio System 154 Home Theater

Optoma H30 Digital Cinema Projector

156 Gadget Freak Remote control: Hollywood's plans for your TV.

HERE'S HOW

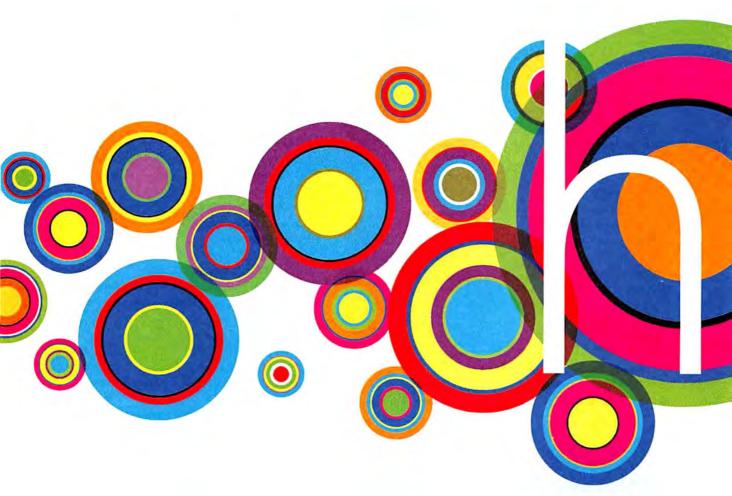
176 Windows Tips

Zoom in easily with Windows' Magnifier tool.

- 180 Step-By-Step Create a safe and secure network for your PCs. 184 Internet Tips Export your Outlook data to another e-mail client.
- 186 Hardware Tips Advice for efficient, trouble-free ink jet printing
- 188 Answer Line Get uncommunicative networked PCs to talk.

290 million printers sold. 7,000 patents.23 different color models. 2 initials to remember.

For over 20 years, HP has engineered printers with business in mind. From affordable Color LaserJet printers to high-performance inkjets, HP has a solution to meet your needs. That's because HP scientists have spent years refining our ink, toner, paper and printers to work together flawlessly. The result—the kind of rock-solid reliability and dedicated excellence that can add brilliance to any document, bring outsourced materials in-house and help any size business succeed. Which may be why HP has become the most preferred printer manufacturer in the world. And the easiest to remember.









The Xerox Digital Projector is ultra small, but with its Carl Zeiss® lens and 2000:1 contrast ratio, it'll make your ideas look really big and bright. There's a new way to look at it.

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That's Xerox for you. At 2.1 pounds, this ultra lightweight Xerox DP 1011 digital projector is the ultimate presentation tool for mobile professionals. With 1024x768 (XGA) resolution, support for up to 16.7 million colors and DLPTM technology, the DP 1011 offers unprecedented picture quality and color accuracy for both presentations and home theater entertainment. The DP 1011 also includes a credit card-sized wireless remote that will allow you to zoom and adjust the image quality from anywhere in the room. If you care how your image is projected, the DP 1011 is the right tool to place you and your ideas in the brightest light.



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Hard Drives to Go, a Hot Home Projector, and Great Gaming PCs

EXTERNAL HARD DRIVES are in our *Top 100* Spotlight this month in both desktop and ultraportable sizes. We also test-screen an affordable DLP projector in our *Next Gear* section, and spend some quality



158 External Hard Drives

High on our list of ultraportable hard drives are two 40GB models: IOGear's Combo 2.5-inch Ion Drive (left) and LaCie's silvery Data Bank.

THIS MONTH'S CROP OF TOP PRODUCTS

DESKTOP PCs

- 164 ABS Ultimate M5-64 ****
- 60 Falcon Northwest Mach V FX-53 ★★★★☆
- 164 HP Compaq Presario 8000Z ★★★★☆
- 164 MPC Millennia 920i Creative Studio ★★★★☆
- 60 Polywell Poly900NF-FX53 ★★★★☆

NOTEBOOK PCs

- 166 Dell Latitude D505 *****
- 166 EMachines M6807 ****
- 166 HP Compag Nc6000 ****
- 62 IBM ThinkPad X40 ****

15-INCH LCD MONITORS

- 169 Dell UltraSharp 1504FP ****
- 169 liyama ProLite E380S-B ****
- 169 NEC-Mitsubishi Multisync 1560NX
 - ****

169 Sharp LL-T15A4 ****

DLP PROJECTOR

154 Optoma Technology H30 Digital Cinema Projector ★★★★☆



154 Home Theater Projector

Optoma Technology's H30 Digital Cinema Projector lowers the price of home theater units with DLP technology by hundreds of dollars.

time with two powerful new PCs for gamers. Our featured products and services for May include color laser printers and Internet phone calling plans-both get extended looks and top-to-bottom rankings.



60 PCs for Gamers

The Polywell Poly900NF-FX53 (left) and the Falcon Northwest Mach V FX-53 ride Athlon's 2.4-GHz Athlon 64 FX-53 to superb performance.

COLOR LASER PRINTERS

- 104 HP Color LaserJet 5500n ****
- 104 IBM Infoprint Color 1354n ★★★★☆
- 104 Lexmark C752n ****
- 104 Oki Data Oki C7300n ****
- 104 Oki Data Oki C9500dxn ****
- 104 Xerox Phaser 7300DN ****

EXTERNAL HARD DRIVES

- 160 IOGear Combo 2.5-inch Ion Drive
- 160 LaCie Data Bank ****
- 160 Maxtor OneTouch ****
- 160 Sony Giga Vault ***
- 160 Ximeta NetDisk *****

SCANNERS

- 171 Epson Perfection 4870 Photo ★★★★☆
- 171 HP Scanjet 5530 Photosmart ★★★★☆

SATELLITE RADIO

154 Audiovox SIRBB1 Portable Audio System ****

THE HIGHEST-RANKING new products reviewed in this issue of PC World are listed above, together with the page number where pcworld.com/10860 for more about PC World's Star Ratings.

DIGITAL MUSIC PLAYER

70 Apple IPod Mini ****

DIGITAL CAMERA

173 HP Photosmart 945 ***

DVD RECORDERS

- 68 GoVideo VR3930 DVD Recorder+VCR ****
- 68 Lite-On LVW-5005 ****

INTERNET PHONE CALLING PLANS

- 128 Net2Phone *****
- 128 VoicePulse ****
- 128 Vonage *****

CD/DVD BURNING SOFTWARE

62 Roxio Easy Media Creator 7 ★★★★☆

MULTIMEDIA SOFTWARE

72 SnapStream Beyond TV 3

MARKETING SOFTWARE

66 Avidian Technologies Prophet 2004 ★★★☆

WEEKENDS Made better with MSN

itness & Recreation

MSN Search

Life's better with the Butterfly



Weathe

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Entertainment

ISN Hotmail

MSN Messer

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ONLINE FEATURES /



Laptop Essentials

find.pcworld.com/41708

Got laptop? Whether you're working at your office or heading out on the road, here are our expert's picks for must-have accessories.



Demo 2004: Picks and Pans find.pcworld.com/41710

Find out which items were most creative or curious or attracted the most chatter at this year's Demo conference, an annual preview of technology.

FEATURED COLUMN /



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HIGHLIGHTS

Next Gear Online

find.pcworld.com/41696

PC World's newest department is now online. In Next Gear, we unravel the secrets of HDTV, big screens, media servers, and all the other new technologies aimed at your living room and beyond.



TOP 10 DOWNLOADS /

Head to find.pcworld.com/41504 to locate and download these popular files.

- 1. Ad-aware 6.181
- 2. Spybot Search & Destroy 1.2
- 3. Pop-Up Stopper Free 3.1.101
- 4. ZoneAlarm 4.5.538
- 5. Norton AntiVirus 2004
- 6. SpamCatcher
- 7. Browser Hijack Blaster
- 8. WinPatrol 7
- 9. Crazy Browser 1.05
- 10. Ultimate Boot CD 2.1

MOST POPULAR PRODUCTS

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

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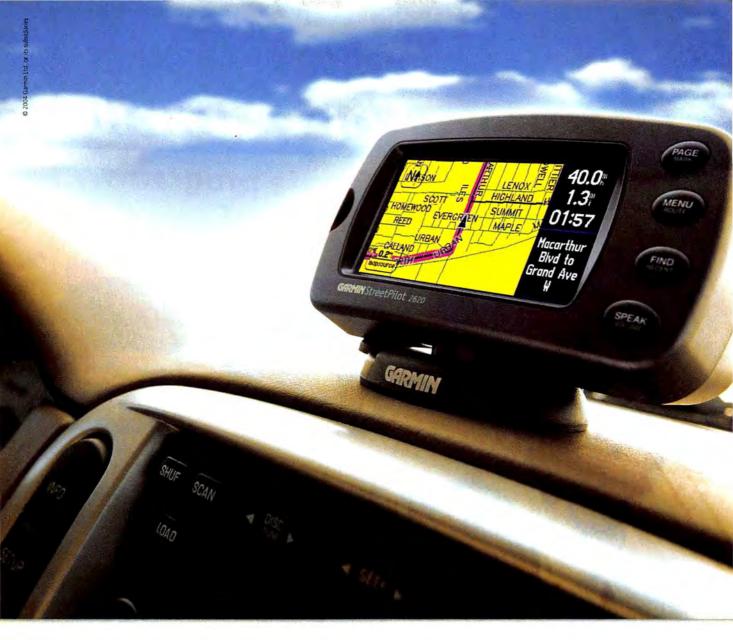
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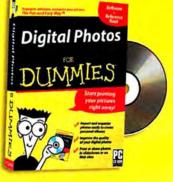




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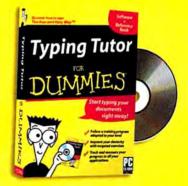
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PUT YOUR WORLD ON VERBATIM HARRY MCCRACKEN

PFRONT

Wi-Fi Networking: Can't Live With It ...

A few tips for the most frustrating (and indispensable) technology around.

"ANY SUFFICIENTLY ADVANCED TECHNOLOGY is indistinguishable from magic." So Arthur C. Clarke famously postulated in his Third Law. I'm pretty confident he wasn't talking about Wi-Fi networking. (Okay, I'm positive: He wrote that in 1962.) But every time I convince myself

that Wi-Fi is indeed a minor miracle, something happens to remind me that it's really nothing more than another majorly glitch-prone technology. Advanced, definitely; *sufficiently* advanced, definitely not.

Helping you wrangle insufficiently advanced technologies is one of the things *PC World* does best. Case in point: Reader gripes and our own Test Center travails tell us that Wi-Fi can still be a serious headache. So we asked Glenn Fleishman, the wireless guru behind Wi-Fi Networking News (www. wifinetnews.com), to write a fix-it manual for the gnarliest hassles. You'll find "Beating the Wireless Blues" on page 115.

My addiction to Wi-Fi—annoyances and all—began when I first powered up my home net. These days I connect everywhere I can muster a signal, from the *PC World* offices to assorted airport lounges.

Even so, I learned new tricks from Fleishman's guide. And (ahem) I'd like to share a few real-world tips of my own: Remember: You're not connected until you're connected. Someday, wireless Internet access may just be *there*. Right now, though, my hardware has enough trouble just figuring out whether I'm in range.

Some of this, I think, is Windows XP's fault. Last year I shut down my notebook in San Francisco and hopped on a plane to France. When I booted up in a Paris hotel, XP cheerily alerted me that it was still connected to my home network—and continued to do so (*zut alors*!) for the



duration of my trip. (Actually, I wasn't near a hot spot at all; I resorted to dial-up.) I used to get irritated by this kind of stuff; now I just roll with the punches.

Repeat after me: "Starbucks is not an office." And neither is a hotel lobby or any other Wi-Fi-enabled public place—no matter how tempting it is to think otherwise.

On the last day of a recent trip to New York, I checked out of my hotel and headed for a Starbucks with Wi-Fi. I ordered a chai (venti, nonfat) and hunkered down to answer e-mail and exchange IMs with coworkers. For 45 minutes, all was swell. Then it dawned on me: If I left my desk (er, table), another patron would instantly grab it. I pretended to sip from my empty cup and put off visiting the restroom. When I took a phone call and couldn't be heard over the din of nearby latte lovers, I

knew it was time to call it a day. Upgrade carefully. Time was when I bounded blithely onto every new tech bandwagon. More and more, though, I'm convinced that being conservative is sometimes the most cutting-edge thing you can do. Or the smartest, anyway. That's why I'm using an aging but reliable 802.11b network at home. When I'm ready to pump video around the house, I'll upgrade to something faster—by which time better, cheaper gear will be available.

Until you can roam, pay as you go. Every time I plop myself down at an airport gate or hotel and poke around for a Wi-Fi access point, I seem to find one run by a different provider. Roaming deals will make this all seamless someday. For now, however, I haven't committed to an allyou-can-eat account with any national network. It's still cost-effective for me to pay an hourly rate to whichever provider happens to serve the location I'm at.

Got Wi-Fi wisdom of your own? Fill me in at mageditor@pcworld.com.

Harry McCracken is editor in chief of PC World.

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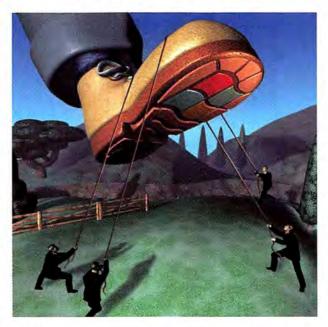
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AFTER ANTITRUST

EIGHTEEN MONTHS AGO, A JUDGE ORDERED MICROSOFT TO STOP ABUSING ITS MONOPOLY POWER. HAVE THINGS CHANGED FOR USERS SINCE THEN? BY SCOTT SPANBAUER

WHEN THE DUST settled on the landmark Microsoft antitrust case with an agreement intended to curb the company's abuse of its operating system monopoly, PC users might have cautiously expected a kinder, gentler Microsoft. Eighteen months later, while some legal wrangling continues and Microsoft is under new attack abroad, the agreement seems to be achieving its objectives-though individual users may notice only small changes.

True, Microsoft's operating system and browser (not to mention its office suite, which was not at issue in the lawsuit) are still dominant—a situation that has some observers concerned about a Microsoft "monoculture" that has left most computers, and even the Internet, vulnerable to welldesigned attacks such as those by last year's Sobig worm and this year's Mydoom virus.



Although ongoing security problems with Microsoft's products have long since grabbed the spotlight from the lawsuit's main concern namely, the company's use of its monopoly power to squash competitors—the settlement agreement does appear to have changed Microsoft's business behavior. Rivals in key areas—notably media players, e-mail, instant messaging, and Internet search are holding their own against their Windows counterparts. Google, for instance, has a 40 percent share of the search market, compared with 30 percent for MSN Search (see "Microsoft and Competitors").

The antitrust ruling also prohibits Windows licensing schemes that make it costly for PC vendors to install operating systems other than Windows on every computer they sell—but this hasn't boosted the overall percentage of desktop computers running Linux (Windows' chief competitor), a number that continues to hover at around 3 percent.

FUTURE PRODUCTS

BUT THE question remains: Will the 2002 ruling keep the software giant in check?

Many of the categories in which Microsoft has failed to gain dominance—handheld PCs, game consoles, personal finance, and Internet connectivity, for example—involve products not directly bundled with Windows. It's therefore perhaps not surprising that Microsoft's new ventures may be more closely tied to the operating system. The company plans to beef up search capabilities in future versions of Windows, and last year it purchased Romanian antivirus software company GeCAD. Search and antivirus tools are big business in today's online world, but Microsoft says it has learned its lesson: Its future products will fully comply with the antitrust settlement-in these areas and othersand it will not use its operating system ubiquity to put existing search engines and antivirus vendors out of business.

Not everybody buys Microsoft's story. In January, Massachusetts Attorney General Tom Reilly's office filed a brief, warning that Microsoft could be planning a "campaign against various Internet search engines similar to the campaign it previously waged against Netscape's Navigator browser."

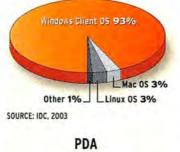
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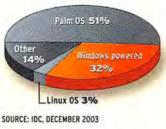
MASSACHUSETTS remains the only state that's actively fighting to overturn Judge Colleen Kollar-Kotelly's final judgment and the settlement, which took effect more than a year ago. Court-mandated reports filed since then show that Microsoft and the plaintiffs-the U.S. Department of Justice and a consortium of 20 states-have settled into a routine of review and modification that has yielded demonstrable changes in the company's products

MICROSOFT AND COMPETITORS

MICROSOFT'S WINDOWS overwhelmingly dominates the desktop operating system realm, and its Web browser isn't far behind. But competitors thrive in categories that are not tied closely to the OS, such as handhelds and Internet search.

DESKTOP OS





SEARCH ENGINE USE

Percentage of active Internet users who used these search engines in January 2004.

Google 39.4%	
Yahoo Search' 30.4%	
M5N Search' 29.6%	
AOL Search 15.5%	
Ask Jeeves 8.5%	

SOURCE: NIELSEN//NETRATINGS

AutoSearch error pages have been removed from the rankings for MSN and Yahoo only. Other sites consequently reflect higher audience traffic.

and licensing policies. Still, Massachusetts, foreign governments, and some competitors continue to press for stronger sanctions against the operating system monopoly.

Microsoft faces other challenges. The European Commission declared in mid-2003 that it might force Microsoft to yank Windows Media Player from Windows XP because Media Player allegedly competes unfairly with products from RealNetworks, Apple, and others.

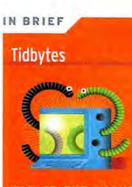
Then in December 2003 RealNetworks filed its own suit against Microsoft, claiming that the software giant used its monopoly power to try to control the digital-media market.

And on a third front, Japanese authorities recently raided Microsoft offices in Tokyo in a search for evidence of unfair contracts with Japanese hardware makers.

As to fears that Microsoft will monopolize Internet search. Microsoft spokesperson Jim Desler says that current plans for upcoming versions of Windows focus on improving local PC searching, rather than on Internet searching. "We are dedicating the resources and committing the energy and time to make sure that we are fully compliant [with the settlement agreement]," Desler adds. He says he is not allowed to comment on the European Commission case.

CHECKING UP

PART OF THE settlement agreement called for the creation of a review panel involving all parties to the suit to make sure Microsoft does not engage in the abusive business practices that sustained its monopoly power. It's this group that files the court reports revealing the



WAR OF THE WORMS: Security experts blame the jump in worm outbreaks on an escalating feud among virus writers. Antivirus vendors say the code in new variants of the Mydoom, Bagle, and Netsky e-mail worms contain text messages taunting other virus writers. They suspect the feud started back in January when the Netsky worm began removing Mydoom and Bagle worms from PCs.



CASED CLOSED? Federal judges in California and New York have enjoined 321 Studios from distributing its controversial DVD X Copy program. The software, which can make exact duplicates of DVDs by sidestepping encryption codes. is under fire from many movie companies, which maintain that it violates federal copyright laws. Executives at 321 Studios promise to appeal the rulings and are now selling a "ripper free" version of DVD X Copy: users can update the software with free rippers available online.



ongoing process of complaint, investigation, and changes in Microsoft products and policies (see find.pcworld.com/ 41567). Most recently, for example, Microsoft agreed to change a Windows Media Player music-shopping feature that persisted in launching Windows' Internet Explorer browser, even when the user had set another program as the default browser.

For Windows XP users, the most visible evidence of the settlement may be in the Set Program Access and Defaults interface that Service Pack 1 added to the Control Panel's Add or Remove Programs tools. This interface lets users and system vendors dictate what browser, e-mail program, media player, and instant messaging client the operating system will useeither Microsoft's own, or those from other software vendors. The tool can also make Microsoft's versions of those applications appear to vanish (though the underlying code remains installed). customers are not likely to see tangible impact from the settlement, she adds.

DiDio believes the antitrust decision has led, indirectly, to larger discounts on Microsoft volume software licenses, no-

The antitrust case has at least given Windows users more control over default apps.

"The consent decree has given Microsoft's competitors some breathing room and relief," says Laura DiDio, an analyst with the Yankee Group. But aside from the possibility of Microsoft offering rebates (see "Get Your Money Back From Microsoft," below) or incentives for choosing its software, individual tably in the small-businessoriented Open License program. But she doubts that individual Windows buyers in the U.S. and Canada will see discounts. DiDio suspects the European Commission's pursuit of Microsoft may be "a bit of a witch hunt" stemming from anti-American sentiment related to the war in Iraq. The Europeans could require Microsoft to bundle other browsers or media players with its software—a remedy that might be onerous for Microsoft, but no big deal to Windows users, many of whom already routinely use more than one player.

NO SIMPLE SOLUTION

THE ANTITRUST CASE may have slowed erosion in the competitive landscape; at the least it's given Windows users more control over default apps.

But Windows remains the personal computer's dominant operating system. And for most of us, its dominance has meant coping with Windows security problems that the settlement was never intended to address—or even could. It's a problem that only Microsoft can solve.

REBATES

GET YOUR MONEY BACK FROM MICROSOFT

IF YOU'VE BOUGHT Microsoft products over the years, you could get some of your cash back-eventually. The software giant has reached settlement agreements in ten states where class-action lawsuits were filed on behalf of consumers who alleged that

Microsoft used its monopoly status to overcharge for its products. In those states, individuals and businesses are eligible for vouchers to obtain rebates for the purchase of new computer hardware and softwareincluding non-Microsoft products.

The eligibility requirements and deadlines vary from state to state. In general, anyone who purchased Microsoft software from the mid-1990s through the early 2000s-including software preinstalled on new PCs-is eligible. In most states the rebate amounts are \$12 for each copy of Windows 95, 98, or

Me, and \$5 for each copy of Microsoft Office or its stand-alone apps; Californians get \$29 for each copy of Office, \$26 for Excel, \$16 for Windows, and \$5 for Word. To redeem a voucher, you send it-plus proof of purchase for qualifying products-to your state's settlement administrator, who sends back a check. ber of products without any proof of purchase; in California they can claim up to five products with no receipt. The claim forms for participating states, as well as more information about the cases, are available online (enter find.pcworld.

In many states consumers can claim rebates for a select num-

com/41540 in your browser).

At this writing, you can currently apply for rebates in California, Florida, Kansas, North Carolina, North Dakota, South Dakota, Tennessee, West Virginia, and the District of Columbia. The deadline to file claims in Montana has already passed. In addition to the ten states where agreements have been reached, six more states have cases pending. Customers will not receive their vouchers until a judge in each case grants final approval, which could take months or years.

In general, the vouchers can go toward the purchase of most types of software, computers (including Apple Macintoshes), and some peripherals, such as printers, monitors, keyboards, and mice. However, devices such as digital audio players and digital cameras are usually not included. *–Liane Cassavoy*





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INTEL WILL OFFER 64-BIT CPUs THAT CAN ALSO HANDLE 32-BIT APPS.

AN ALL-64-BIT-computing world just took a significant step forward, and your upgrade path to that world just got a lot less risky. Why? Intel's new Xeons and future Prescott-based CPUs will support the same 64-bit software as AMD's existing Athlon 64 and Opteron chips. And like those AMD chips, the new Intel CPUs will continue to support your favorite 32bit apps, as well. Another potential selling point for early adopters: If Intel follows AMD's lead in terms of pricing, you won't have to pay much-if any-premium for better-performing 64-bit desktop systems over comparable 32-bit-only PCs.

Because these Intel and AMD 64-bit chips will run the same OS and apps, development of software to take advantage of such chips—especially their ability to address larger amounts of system memory—should be faster, says Peter Glaskowsky, editor in chief of *Microprocessor Report.* "This eliminates the last bit of confusion for the application developers," he adds. By moving to include 64-bit



support in more mainstream x86 CPUs, Intel has abruptly altered its often-repeated position that only large servers—such as those using its pricey Itanium chip—currently require 64-bit capabilities. It's a public about-face that executives at longtime underdog AMD clearly relish. Meanwhile, that company expects

its 64-bit-capable processors to make up 50 percent of its sales before year's end.

Does this mean your next purchase must be a 64-bit PC? Not necessarily, says Martin Reynolds, a vice president at research firm Gartner Dataquest. The lack of 64-bit apps could delay broad acceptance of 64-bit servers for a year, and 64-bit desktops won't hit the mainstream until after that, he predicts.

Which is why Intel has made no specific desktop announcements. It is waiting for drivers and OS support to arrive first, says Intel spokesperson George Alfs.

Full driver support won't be widespread for some time, but Microsoft will launch a 64-bit version of Windows XP later this year. Still, most analysts point to Longhorn—due in 2006—as the likely crossover point for 64-bit desktop computing to hit the mainstream. —Tom Mainelli

SOFTWARE

WHITHER WINDOWS 64?

TO FULLY EXPLOIT a 64-bit chip, you need a 64bit operating system, but to date only Linux fully supports 64-bit processing with x86-based CPUs. Originally scheduled for the first half of 2004, the launch of Windows XP 64-Bit Edition for 64-Bit Extended Systems is now slated for the second half, after Microsoft completes Service Pack 2 for Windows XP.

The delay, however, will lead to a better product, says Brian Marr, Microsoft Windows client product manager. The company has added many features to the current public beta that were missing from earlier versions, including XP's popular Luna Interface. But support for legacy 16-bit apps and power management tools for notebooks continue to be off the features palette.

Microsoft has not announced plans for distributing the upgrade. The OS will come with some high-end systems, but details of availability for existing owners of 64-bit PCs remains unclear.

IN BRIEF

Tidbyte

UNDER COVER: Have you ever wanted to disguise your true location when making a

phone call? We haven't tried to use this yet, but it sounds like fun: Simeda has released an applica-



tion called SounderCover that adds background noise to your cell calls. Late for work? The \$15 application lets you pretend that you're caught in a traffic jam or waiting at the dentist's office. Or add the sound of a ringing phone for authenticity as you tell a long-winded interlocutor that you have to take another call. A free demo is available online. find. pcworld.com/41570



Product Pipeline

ON DISPLAY: Show off your digital snapshots with Digi-Frame's DF-1710 LCD picture frame. The gold-framed, 17inch display comes with a CD-ROM drive so you can easily transfer favorite digital photos onto the unit's 12GB hard drive. You can add audio tracks to your images, as well, to make them talk or sing. This digital decoration doesn't come cheap, however: The DF-1710 retails for a very steep \$1999.

LG FLATRON LCDs. Available in LG, XLG and XXLG.



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DESKTOPS

QUIET PCs WITH NO COMPROMISE

NEW GENERATION OF FANLESS SYSTEMS PROVE BOTH POWERFUL AND EASY ON THE EARS.

WHEN THE PC'S primary home was in the office, noise wasn't a real factor. But no one wants a noisy computer in their living room. And as PCs make a serious play for a spot in your den or as part of your home theater setup, users and vendors have started paying more attention to this annoyance.

Here's the problem: To handle media-heavy functions, PCs need lots of processing power. Power means heat, and that typically means more buzzsaw-like fans. But two companies, Hush Technologies and Voodoo PC, offer PCs that boast multimedia power, bold style, and very low noise level, thanks to fanless cases.

Each company uses the same basic method to cool its PCs: custom-designed heat pipes and a case that acts like a big heat sink. With fans gone, hard drives are the main source of noise. But that's



QUIET AND COMPACT: Hush Technologies' ATX-Business PC.

where similarities end. Aimed at both the digital home and the executive office, the \$2230 Hush ATX-Business PC is a tightly integrated machine in a sleek, low-profile case with the minimalist appeal of highend audio gear. The \$3750 Voodoo Rage F-50 is a serverlike system well suited for networked gaming, with broad expansion capabilities, easy access to the interior, and a macho, industrial look. (Prices do not include a monitor.)

TEST REPORT

SILENT RUNNING

BOTH THE HUSH and Voodoo units fit well into the living room, with noise levels below those of a normal conversation (60 dBA).

SYSTEM	SOUND LEVEL (IN dBA)	
	At idle	With drive active
Hush ATX-Business PC find.pcworld.com/41651	27	33
Voodoo Rage F-50 find.pcworld.com/41180	24	38
Average of 10 standard desktops '	35-50	40-60
Ouietest desktop '	17	19

FOOTNOTE: ¹As tested by SilentPCReview.com. HOW WE TEST: Noise was measured at 0.6 meters, per the ISO 9296 standard for noise measurement for PCs on a tabletop. For details on configuration and testing, go to find.pcworld.com/41654. Tests conducted by Mike Chin, editor of SilentPCReview.com.

We tested the units with PC WorldBench 4 and performed sound tests both with the PCs on idle and with intense harddrive activity (see chart).

SOUND CHECK

UNLIKE MANY prior quiet PCs, the two we saw used mainstream, fairly powerful CPUs. The Hush, with a 2.8-GHz Pentium 4 and 512MB of RAM, earned a PC WorldBench 4 score of 122: the Voodoo had a 2-GHz Athlon 64 3200+ and 1GB of RAM, and scored 138. Both were on a par with PCs in their processor class, so you won't have to compromise performance for quiet.

Both units also deliver on that promise of muted operation. The Hush at idle measures 27 decibels adjusted for a human ear's sensitivity (dBA). With the drive cranking, that figure rises about 6 dBA. The Voodoo has a noticeably quieter idle state at 23 to 24 dBA, but that goes up to 38 dBA with its two 120GB RAID-configured

drives at work. The Voodoo's thick-walled aluminum case helped keep noise down at idle. But unlike the Hush's rubber-cushioned drives, the Voodoo's drives are hard mounted, and the noise with drives at work seemed to echo in the undampened interior.

Though neither system is completely silent, both yield far better results than typical PCs, which measure up to 60 dBA-a level few users would tolerate in their living rooms.

Whether either of these PCs is right for you depends partly on the level of low noise you require, and whether their unusual styling is worth the cost.



SILENT TOWER of power: Voodoo PC's 70-pound Rage F-50.

Specialists such as Arm Systems and even PC market leader Dell offer fairly quiet PCs using optimized fans and case designs at better prices. -Mike Chin PHOTOGRAPHS: MARC SIMON

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SOFTWARE

OUT OF STOCK? NO PROBLEM

HARD-TO-FIND SOFTWARE BURNED TO CDs IN RETAIL KIOSK SYSTEM.

CAN'T FIND THE software you want at your local computer store? A new softwareon-demand system that is now debuting at a major computer retailer's stores seeks to

make the problem of outof-stock and hard-to-find titles a thing of the past.

At the push of a few buttons, SoftwareToGo can create CDs—complete with logo labels and DVDstyle cases—for 1500 software titles from some 240 publishers. Warranties and prices for the products are identical to their shrink-wrap versions.

SoftwareToGo is already in use at about two dozen CompUSA stores in Dallas, San Francisco, San Jose, and Seattle, and the company behind it, New York-based Protocall Technologies, expects to complete its rollout to all 227 CompUSA outlets by fall. The company is also negotiating with other major retailers.

The system isn't intended to eliminate shrink-wrapped software from CompUSA's shelves, company officials say. Its main benefit is to enable retailers to sell high-end and specialty software that they normally might not carry, such as heavy-duty business applications and advanced computer-aided design tools.

BURN IT, BABY

COMPUSA CUSTOMERS encounter SoftwareToGo as a kiosk about the size of a video arcade game (see photo). The company calls this stand a Product Preview Station.

Once a customer decides to purchase a SoftwareToGo title, he or she obtains an or-



SOFTWARETOGO'S Product Preview Station at CompUSA in San Bruno, California.

der receipt and brings it to a sales clerk to produce the CD, which is burned in a matter of minutes at a separate machine. The final product is an attractively packaged CD, down to the vendor's custom label and a DVD-type case.

Bruce Newman, Protocall's president, says that you're more likely to get the latest version of a program from SoftwareToGo than from a retailer's shelf, because the company can install updates in a matter of days or even hours. Most software packages include documentation on the CD, but Newman says that Protocall can mail out printed manuals if the publisher so desires.

> Newman says that the publishers his company has distribution agreements with include seven of the top ten in the United States—Microsoft and Symantec among them.

> SoftwareToGo doesn't necessarily offer all of a given publisher's titles, however: Microsoft, for example, has not yet permitted Protocall to offer its top selling Windows XP and Office. And as of this writing. Protocall has yet to sign agreements with Adobe, game publisher Electronic Arts, and finance/accounting market leader Intuit.

Could SoftwareToGo eventually replace shrink-wrapped products altogether? Dewey Thoes, senior buyer for Comp-USA, thinks not: "People like to see stuff and touch it before they buy," he observes.

Analyst Rob Enderle of the Enderle Group agrees, but says that if shrink-wrap does disappear, it is more likely to give way to online delivery of software.

In the meantime, Software-ToGo can help ensure that a brick-and-mortar store will always have the software package you're looking for.

—Yardena Arar

Product Pipeline

IN BRIEF

(200% enlargement)

SanDisk 22/ T-Flash ► 128 soccup.tat.yvy

THANKS FOR THE MEMO-RY: SanDisk has unveiled a new removable flash memory storage format called TransFlash: the vendor claims it's the smallest of its kind. Designed for compact mobile phones, the 0.6-by-0.4-inch cards will first ship In capacities of 32MB and will hit 512MB next year. It will debut in two different Motorola phone models. San-Disk plans to offer the cards direct to consumers by the end of the year: the company will reveal pricing when it announces retail availability.

Tidbyte

FEELING REFRESHED: Windows users who don't want to wait until Microsoft's expected release of Longhorn in 2006 to get their hands on a new version of the operating system may be in luck. The company reportedly is considering releasing an updated version of Windows XP in the interim. Microsoft has offered few details about the possible. update, internally dubbed Windows XP Reloaded, but it would appear only after the release of the upcoming Service Pack 2 for XP. The software giant is also reportedly considering releasing an updated version of its Office 2003 suite to accompany the updated OS.

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SOFTWARE UPDATE

FIREFOX OUTTROTS IE

ALTERNATIVE BROWSER SHINES WITH A CLEAN INTERFACE AND MANY ADD-ON OPTIONS.

THE MOZILLA Foundation's new Firefox 0.8 Web browser, once known as Firebird, is a great alternative for those who long for a

change of pace from Microsoft's Internet Explorer.

I tried out a free preview release of the browser (find. pcworld.com/41555) and was impressed by such improvements as a download manager, offline viewing of previously downloaded Web pages, and support for a growing assortment of Extensions browser add-ons such as a fullfeatured calendar and an auto-



matic Web form filler. Also included: easy-tounderstand privacy controls, a tabbed browsing feature for keeping

multiple Web pages open, a customizable search

box, and a banner-ad blocker.

However, Firefox remains too geeky for nontechies: Customizing some features isn't intuitive (it took me half an hour to master toolbar adjustments). Still, look to Mozilla to take chances on innovative tools for Firefox that Microsoft won't risk developing for IE.

—Tom Spring

WIRELESS TECHNOLOGY

A CUSHY WI-FI RIDE

FAST NET ACCESS IN A LUXURY LIMO.



WELL-HEELED BUSINESS travelers who crave constant Internet access can now stay connected even when riding in a limousine. Limo company Carey International has part-

nered with In Motion Technology to offer Mobile Office, which allows passengers to use Wi-Fi-enabled devices in transit.

I tried the service on a recent trip to the airport from downtown San Francisco (cost: \$90). Carey's black Lincoln town car featured comfortable leather seating, a sleek wooden desk, and a power outlet. The Wi-Fi connection's DSL-like speeds let me download my Yahoo e-mail to my Palm Tungsten C in under a minute.

Carey offers Mobile Office service in Boston, Chicago, Los Angeles, New York, San Francisco, and Washington, D.C.; In Motion expects to partner with other companies, as well. The service is primarily designed for corporate customers, but is also available to individuals (see find.pcworld.com/41549). -Michael S. Lasky

THREE MINUTES WITH

Spybot's Creator Patrick Kolla



PATRICK KOLLA wrote the free anti-spyware scanning program Spybot Search & Destroy. Kolla, 26, runs his company, Safer Networking Limited, from an office in his parents' home in Germany, with the help of students-Team Spybot-and his father, Michael.

How do you define spyware?

Well, it's some piece of software the user doesn't know about that transmits personal information.

What got you interested in writing Spybot?

In 2000, I read an article in c't (a German PC magazine) about some of the first kinds of spyware, and found that my own computer was infected. Being a software developer, I decided it was easier to write a very small application to remove the spyware instead of manually removing it. I e-mailed a question to the editor, who put it with a link to my tool in c't's readers' section.

How can you afford to keep Spybot as freeware (with donations accepted)? Why is it important to you to do so?

Not many people donate, but those who do give enough to keep up the operation. It's simply a very good feeling to help people without having money as the primary reason.

How hard is it to keep Spybot up-to-date?

I couldn't do it without Team Spybot. They collect system reports, gather new threat samples, even work on the detection database. What changes or updates can we expect in Spybot?

We now can detect browser hijacks in nine different browsers, I would say. I've also improved speed a lot in the new version. The most noticeable change is in the user interface.

What do you do for fun?

Fun? What's that? No, honestly...the work on Spybot is often fun. I am preparing for an upcoming marathon. In summer, I ride my 1978 Honda CX 500 motorbike. And I like to simply go to the pub, have a pint of Guinness, and get together with friends.

Download Spybot S&D at find.pcworld.com/41582. To read a longer version of this interview, go to find.pcworld.com/41624. -Andrew Brandt

I'd like to...

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... make a DVD from my home videos.
... create a Slideshow from my digital photos.
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COMPANIES FAIL GOODWILL TEST

SCARING OFF THE BIRDS

A MAC-FRIENDLY ENVIRONMENT



STORM OVER REBATES

I AM GLAD TO KNOW my frustrations with rebates are not isolated ["Rebate Roulette," March]. Though I have received many rebates over the years, I've never seen a rebate center send a check on a contested claim. Expecting rejection, I now ignore ads offering rebates and purchase sale items instead. I don't intend to fill out another rebate form again.

Jay Ibanez, via the Internet

I RECENTLY BOUGHT a new computer, complete with a \$300 rebate (for which the store printed a small tree's worth of receipts for me). Although I have a master's degree in English and 14 years of experience as a technical writer, it still

LETTER OF THE MONTH

A New Use for Those Old CDs

IN THE MARCH Answer Line, Lincoln Spector tells how to safely destroy unwanted CDs. Instead of destroying them, however, our little community in the Ozarks has found a valuable application for used CD-ROMs. We are situated next to Table Rock Lake, so we have many boats, docks, and boat slips. In the spring took me nearly half of the allotted 45 days to figure out which original UPC to saw off which cardboard box and send to which address with which photocopies of the other UPCs from the other boxes—not to mention remembering who got which receipt.

Ana Madani, via the Internet

LIKE OTHERS, I had rebate problems with Symantec, but I finally did what any good consumer should do: I simply switched to another product. I am now happily using McAfee VirusScan, Registry First Aid, and ZoneAlarm Pro to do all the tasks that I used the Norton products for, more inexpensively and with no rebate hassles. There is always an alternative, even to such market leaders as Symantec and Microsoft.

Kevin Reed, via the Internet

WHEN YOU DO GET a rebate, often the check is sent as a postcard—which can easily be stolen. So if the company claims to have sent it, but it was taken from your mail, you're out of luck.

Mike Bonett, Mount Airy, Maryland

REBATES HAVE become an accepted method for borrowing money from customers and holding on to it interest-free

birds love to make their nests in the docks above the slips. Needless to say, it becomes a very messy situation. Everything has been tried to make them move on, including rubber snakes and plastic owls. But the thing that has worked the best is to hang CDs above the boat slips.

George J. Ferguson, via the Internet

for as long as possible; then when the customers insist on being paid, companies can give them more grief and a load of implausible excuses—anything to avoid sending out the check!

John Simone, via the Internet

I CANNOT THINK of a better way to alienate good customers than to stiff them over something purported to be a goodwill builder. How stupid and shortsighted can such vendors be?

> R. W. Richard, CEO PVF International

INK CARTRIDGE STINK

THE COST OF ink jet cartridges has always been way out of line ["Irate Over Ink," *News and Trends*, March].

The industry should develop a standard ink cartridge. The economies of scale with a universal cartridge would enable tens of millions of cartridges of the same kind to be produced, lowering costs dramatically and letting us buy cartridges for a few dollars, instead of the current, absurd prices.

Phil Hargis, Woodbridge, Virginia

I CAN'T UNDERSTAND why Tricia Judge, executive director of the International Imaging Technology Council, which represents third-party ink manufacturers and vendors, is quoted as saying, "Don't hold your breath for standards." I also don't understand why the ink cartridge/printer manufacturers can't come up with some standardized testing. It appears that PC World did just that, with some commonsense, real-world testing. Go figure!

Pat Conover, Galloway, New Jersey

YOUR ARTICLE SAYS that you can't continue to use some Epson printers when the cartridge is supposedly out of ink. This is not the case with my Epson Stylus Color 980, as I learned by accident when the device chose to stop printing at a very inopportune time. Thinking I had a replacement, I removed the old cartridge. But I couldn't find the new one, so, in a moment of desperation, I put the old one back in. Lo and behold, the printer started working again—and it has been working just fine for the last couple of months. *David Gavenda*

University of Texas at Austin

WHERE MICROSOFTIES PLUG IN

AHA! The Nagging Question in March's *Plugged In* is curiously revealing. Windows versions are code-named for ski resorts and bars, eh? Now we know how Microsoft uses the proceeds from licensing. *Kevin Carroll, Easton, Pennsylvania*

MACS AND PC WORLD

WHAT I REALLY like about your site and magazine is that they treat the Apple Macintosh as part of the family of personal computers—respectfully and honestly. When I see an item on an Apple product on your site, I trust what you say about it more than what I read on a Mac site.

Jacob Feenstra, via the Internet

DUMPING OLD PCs OVERSEAS

IN YOUR ARTICLE "Where Do Old CRTs Go to Die?" [*News and Trends*, March], you fail to point out that even though many computer makers offer recycling programs, most of the systems sent their way are instead shipped to Third World countries, which don't have the facilities to recycle them safely. Funny how in Europe the laws differ: U.S. computer makers there are required to recycle the PCs instead of unloading them on poor nations that lack environmental laws.

Brett Otte, Lincoln, Nebraska

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

CORRECTIONS

IN APRIL'S *Top 100* Spotlight on scanners, we should have said that the Epson Perfection 3170 Photo does not use Kodak's Digital ICE photo autocorrection technology.

March's *Top 100* Spotlight on motherboards, "Building a Better System," should have compared PCI Express's expected sustained transfer rate of 200 megabytes per second against PCI's rate of 133 MBps. Also, in the chart on page 152, the Abit V17 should have been listed as supporting Intel Pentium and Celeron processors.

In March's *Top 10 Digital Cameras*, we should have listed the price of the Toshiba PDR-5300 as \$350.

March's Internet Tips should have said more clearly that you can run MSN Messenger under Windows XP.

PC World regrets the errors.



WHAT IS YOUR DATA WORTH?

One nasty little virus or hard drive meltdown could mean big trouble for you. Think about it...your priceless proposals, databases, files, photos and email address books all wiped out in seconds. Back them up! Apricorn's backup solutions provide a simple, quick way to do it. It's like life insurance for your data. For over 20 years Apricorn has provided computer users with storage devices sold under such brand names as IBM and Toshiba. All Apricorn products undergo rigorous testing and carry a one to three year limited warranty the best in the business.

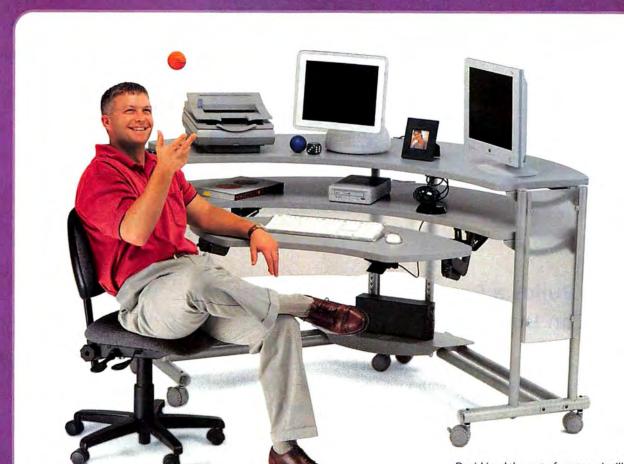
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small business solutions



Supercharged Notebooks Are Coming

Plus: Connecting with friends, 8GB CompactFlash, and an Office competitor.



Intel's Centrino Overhaul

The Buzz: Thinking about getting a new notebook? Hold off until later this year, when the elves in Intel's workshop are slated to introduce several new mobile technologies. The fun begins in the second quarter of this year, when the Pentium M chip code-named Dothan arrives. Not only will it have a larger cache, but the 90-nm process that Intel is using should support higher clock speeds. In the second half of the year, notebooks based on a revamped mobile Centrino platform will ship with built-in support for 802.11a/b/g wireless standards. And finally, we can expect Alviso, a mobile chip set supporting Serial ATA, gigabit ethernet, eight USB ports, PCI Express, 2GB of DDR2 memory, and lots of multimedia goodies.

Bottom Line: This isn't a tweak; it's a major overhaul. But the staggered rollout makes it tough to know exactly when to buy.

Buddy Doubles

The Buzz: It's official: Social networking (Friendster, Linked-In, et al.) is the Web tech trend of the year. Even so, two new entries are rethinking the basic "my friend is your friend" mod-

el. Ludicorp's Flash-based Flickr (flickr. com) offers instant messaging, as well as easy tools for joining groups, but sets itself apart with cutting-edge real-time photo sharing. Flickr is free but will have feebased services at some point. Meanwhile, Ultimate Arena aims Xfire (xfire.com) at online gamers.

Users receive alerts regarding where and when their buddies are playing, so it's easy to start or join games. The Xfire IM client has been tuned to ensure that players won't get bounced from their games when they toggle to the chat window.

Bottom Line: Gamers certainly could use something like sponsor-supported Xfire; and for on-the-fly picture swapping, Flickr

NAGGING QUESTION

Why Is the Blue Screen of Death Blue?

MICROSOFT CLAIMS that the famous color scheme of the Windows crash screen-aka the Blue Screen of Death-was picked for simple

readability. It's not like there were a lot of choices. Earlier versions of Windows dropped down to a 16-color mode after a



catastrophic event. In that palette, the first background color (after black) is dark blue, as represented by the HEX code 0x01. So maybe we can blame lazy programmers for the

we can blame lazy programmers for the decision to use blue. Though let's face itthe Cyan Screen of Death lacks menace. looks dynamite. Regrettably, however, both of these services' business models put me in a Webvan state of mind.

Compact in Name Only

The Buzz: The CompactFlash arms race has gone nuclear. This month Lexar Media is slated to ship a Type II CF card with an 8GB capacity. Priced in the \$4000 to \$5000 range, it targets digital photography pros, who'll be able to snap more than 1000 high-resolution photos contin-

uously without having to swap in a new card.

Bottom Line: Competitor SanDisk markets a \$1000 4GB CF card, so Lexar Media's entry isn't for the faint of wal-

let. I mean, what do you do if you misplace your \$4K memory card?

Cloning the Office

ЯĤ

The Buzz: A Chinese company is going after Microsoft with Evermore Integrated Office 2004, an office suite with more than a passing resemblance to Microsoft Office. The single, highly integrated application handles all of the customary office tasks, and imports and exports standard Microsoft Office file formats. Written in Java, it runs on Windows, Linux, or Mac OS, and costs \$99 per year. Bottom Line: Evermore? Nevermore—at least not in the United States, where Office is simply too entrenched. On the other hand, the new suite could put a real crimp in Microsoft's China strategy.

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

LLUSTRATION: DANIEL BAXTER ; PHOTOGRAPH: RICK RIZNER

Introducing The LG 8X Super Multi Triple Format



DVD-

DVD+

DVD-RAM

Versatile...With DVD- and DVD+ and DVD-RAM, you never have to worry about format compatibility. The LG Super Multi Triple drive does it all.
Capable...DVD provides up to 4.7 GB of storage. Ideal for storing large amounts of data, recording music and saving videos. DVD-RAM features splice-in editing with built-in error correction.
Fast...With 8X maximum burn speed in DVD- and DVD+, plus DVD-RAM and CD-RW functions, the LG GSA-4082B is one fast, flexible drive.
Reliable...LG holds the #1 worldwide market share position in drives and is a trusted source for major PC brands.

In addition to our Super Multi drives, LG carries a full line of award winning CD-RW, CD-RW/DVD Combo drives and CD/DVD Readers.



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Sick of spending hours fixing other folks' PCs? Dodge the job-nicely.



A FRIEND OF MINE—I'll call him Gary —phoned me a few weeks ago in a panic. "I must have a virus or something," Gary fretted. "I can't find my file, and my computer's acting really flaky."

It turned out that Gary—a writer and self-described "PC dunce"—didn't have a virus. But he does have an 11-year-old daughter. Gary and I spent an hour or two on the phone troubleshooting. In the end, the problem we pinpointed had more to do with an inadequately supervised fifthgrader's take on file management and downloading than with technical glitches. You probably have your own share of stories about helping your less tech-savvy friends or coworkers through PC calamities. Chances are you want to help, but you're not too keen on spending long hours on the phone or making late-night house calls to decipher error messages. If you work at a small company, you may be the de facto IT department, a role that complicates getting your real work done. And let's face it: even if you're the most attentive son, sister, or colleague in the world, you can't always be there when your PC dependents need you. So how do you get out from under without feeling like a jerk? There are a lot of good strategies—from security checkups to bringing in some hired help—that can save hours of frustration for you and your hapless family, friends, and coworkers.

AN OUNCE OF PREVENTION

THERE MAY NEVER be an easy way to, say, talk Grandma through removing spyware from two time zones away, but with a little preventive maintenance, you can help stop plenty of potential disasters from striking her PC.

Start by making a list of the folks who count on you for tech support. Then help them make their computers as secure as your own. Make sure they're running antivirus software and updating it frequently. Get them to install a firewall, especially if they're on a broadband connection. And point them to a good antispyware application like Ad-aware or Spy-Bot Search & Destroy (both available at find.pcworld.com/39125).

Show them how to download patches from Microsoft's Windows Update, or if they're on XP—set up their PC to install the updates automatically.

Be sure that their PCs have a good datarecovery application in place. Windows Me and XP have the reliable though rudimentary System Restore feature; but for older operating systems, you'll need a third-party utility such as Symantec's Go-Back 3 (\$40; www.symantec.com).

Make a list of simple fixes for people to try before they dial your number. For example, they can close the application and reload it, reboot the system, or check the online FAQ list for the PC maker or for the application that's been acting up.

For chronic problem PCs, applications like Famatech's Remote Administrator (\$35 per single license, www.radmin. com) can save time by letting you access and control a remote PC via either a network or a dial-up connection.

If your friend's or relative's PC is running Windows XP Professional, you can access the system remotely for free with a computer running any version of Windows, including Windows 95. Go to find. pcworld.com/40562 for instructions.

The next time your sister wakes you at 3 a.m. with a long-distance problem, you should point out that another resource really is available 24/7—the Internet.

About.com offers plain-English help for stymied PC beginners (pcsupport.about. com); novices may also discover helpful leads by plugging a brief description of the problem (for example, "PC won't shut down") into Google or another search engine. Visit find.pcworld.com/40457 for additional search tips and a list of recommended tech support sites.

FREEBIES HAVE LIMITS

IF THE FREE ADVICE doesn't work, there are plenty of fee-based tech support sites to consult for phone or online chat help, but they can be pricey. Before you recommend one to Mom, make sure that both of you understand the fee structure.

Some sites charge per incident, with rates typically starting at about \$25 per call. Others charge by the minute (the sites I looked at range from \$1.50 to \$2 per minute). Make sure that the site offers a free estimate before it starts the clock, and check the details of its guarantee.

A better approach, especially for folks with lots of questions, is a membershipbased service. Askdrtech.com charges from \$90 to \$300 annually, depending on the level of service, and Speakwithageek.com offers a monthly membership for about \$35. (Happy birthday, Mom!)

Of course, there are times when only an in-the-flesh geek will do. Chances are there's at least one PC house-call service in Mom's area, but it's not always easy to tell how qualified—or how trustworthy the proprietors are. The best way to find a reputable repair service is to ask around for personal recommendations. And always check with the local BBB (www.bbb. com) for complaints filed against any company that you're considering recommending to friends or family. Also ask for details of the repairperson's educational background and qualifications.

Most PC house-call services charge by the incident. For example, one company I spoke with charges a \$50 "visit fee" plus \$22 per 15 minutes, for a minimum

PRIVACY WATCH

The Credit Card Fraud That Would Not Die

WHEN JONATHAN KAMENS of Boston got a phone call from American Express about suspicious activity on his credit card, he immediately canceled the card and had the company issue him a new number. But as he learned weeks later, that wasn't enough to put

an end to the fraudulent charges.

Kamens discovered that American Express-without telling him-had sent the replacement number directly to America Online. The person who had stolen Kamens's old Amex number had used it to open two AOL accounts with automatic billing, and as a result the thief got automatic use of Kamens's new card, too. Even after getting a new card, Kamens was still paying for the bogus accounts.

"I was dismayed to learn that they would give my [replacement] card number to a merchant after I'd reported [the original] stolen," Kamens said. "That seemed ludicrous to me."

AOL spokesperson Nicholas Graham says the company has put a block on the use of Kamens's American Express number so that it can't be used to create new accounts. AOL has also refunded the charges incurred by the fraudulent accounts, and shut them down.

According to American Express spokesperson Desiree C. Fish, the company has had "a program in place [for several years] where we do this with a few select merchants [including AOL] for recurring billing customers." The company declined to tell me the names of the other businesses involved in the program, or even to give the number of merchants included.

Don't count on American Express to tell you, either: It is the mer-

chant's job to alert cardmembers that the merchant may receive updated information about the cardmember's account, Fish says. In AOL's case, the paragraph that informs customers is buried in the terms of service. Fish says that her company is looking at ways to "strengthen the...notification requirement."

In fact, the policy seems to be unknown even to some American Express employees. After he discovered that the thief's AOL accounts were on his new Amex bill, Kamens called American Express to complain. He says the person he talked to "categorically denied" that the card com-

pany ever provided merchants with updated numbers.

Think you can avoid this kind of problem by avoiding American Express? Think again. MasterCard and Visa's Account Updater program allows companies that you have recurring bills with to get your new credit card number if your old card expires or if you cancel it and obtain a new card. In all three cases, however, you can opt out of the programs by calling customer service.

-Andrew Brandt







Even more to love about the NEC MultiSync[®] LCD 60 Series. 20" more to be precise.

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NEC/MITSUBISHI NEC-MITSUBISHI ELECTRONICS DISPLAY



charge of \$72, but fees can range widely. Just as you would in the case of online tech support, look for companies that offer an estimate before they start working, and read the fine print so you understand the limits of their liability.

In the end, you won't be able to dodge every request for free tech support—after all, why should your cheapskate brother pay a stranger when you'll fix the thing for no money? But when you have some preventive practices and outside backup in place, those panicked telephone calls should become a little less frequent.

Anne Kandra is a contributing editor and Grace Aquino and Andrew Brandt are senior associate editors for PC World. You can send them e-mail at consumerwatch@pcworld.com. If you'd like to read previously published Consumer Watch, Privacy Watch, or On Your Side columns, visit find.pcworld.com/31703, find.pcworld.com/31706, or find.pcworld. com/31709, respectively.

ON YOUR SIDE

Ban Pesky Webcam Software

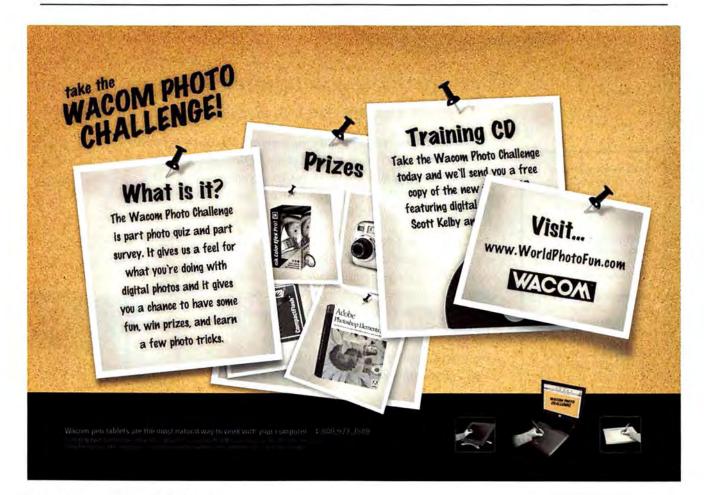
I BOUGHT Logitech's QuickCam Messenger Webcam to communicate with family in England. After I loaded the product's driver, it corrupted my system: My e-mail and Web browser would randomly stop working. My ISP, EarthLink, said the problem was likely an ad-serving program that was included with Logitech's driver. I eventually fixed my PC and called Logitech about the issue. The company said it uses a technology called BackWeb in its software and can't change how BackWeb does certain things. But Logitech is allowing BackWeb to cause problems on people's PCs.

Philip Shone, Cumming, Georgia On Your Side responds: Logitech uses Back-Web's technology in software called Logitech Desktop Messenger to send QuickCam (and other Logitech hardware) users pop-up alerts about software upgrades and new Logitech products, services, and special offers. The company says it does not collect personal information. To target messages, however, it collects data about system configuration and about which Logitech products are connected to the PC.

The anti-spyware utility Spybot Search & Destroy identifies Logitech Desktop Messenger as spyware. But using Spybot to remove LDM may cause problems.

To completely remove LDM, use the Windows Add/Remove program. To prevent LDM from sending you messages, go to Start+Programs+Logitech and select Desktop Messenger. Uncheck the two notifications check boxes and click Done.

-Grace Aquino



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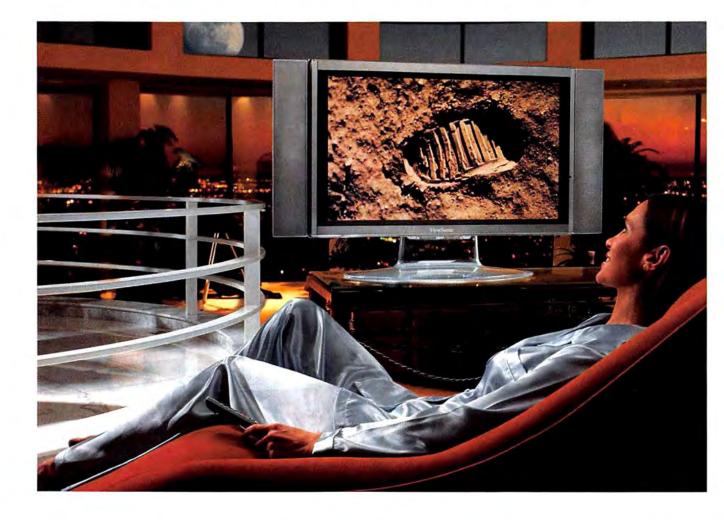
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Super Browser Outdoes Internet Explorer

Save time and boost your productivity with this high-powered IE replacement.



LOOK OUT, MICROSOFT: Internet Explorer is toast. There's a brilliant new browser crashing IE's beach party, with features that have been on my browser wish list for years. I can't wait for you folks to try MyIE2, a true Web star.

Over the years, I've used dozens of browsers besides IE, including Mozilla/ Netscape, NetCaptor, Opera, and Slim Browser. None of them can match My-IE2, the program I think is the best of the bunch. Skedaddle over to find.pcworld. com/40934 to download the "Lite" version (which lacks the AI RoboForm auto-form utility and several other third-party addons). Later, when you're ready for all of the browser's extras, you can return to the same page to download the full version.

MyIE2's tremendous collection of intelligent features boosts my browsing productivity. The quality of the product's support forums is astonishing—answers arrive almost immediately, and incremental updates for MyIE2 plug-ins and fixes appear regularly at www.myie2.com. The crowning touch is that the browser and its support services are free—with no annoying ads or spyware. After downloading and opening the program, you can configure it to suit your style: Select Options•MyIE2 Options (or click the MyIE2 Options icon), and run

through the items in the tree on the left, selecting the features you prefer on the right for each tree listing. One of my favorites is Ad Hunter, which permits me to block all pop-ups or to filter them selectively. It even lets me choose the sound I hear when it blocks an ad.

I love the way MyIE2 lets me open multiple Web pages, each with a separate tab for quick switching (long available in Netscape/Mozilla and Opera). Navigating via tabs may take Internet Explorer users some time to get used to, but it's a dream for IE exiles. Press **<Ctrl>-<Tab>** to bring up a list similar to Windows' <Alt>-<Tab> for moving between open windows.

GET WITH THE GROUPS

MYIE2'S TABS are handy, but the browser's groups are real time-savers. They let me save a bunch of open pages and recall them all later with a single click. Imagine that you're shopping and have 15 pricecomparison sites open. You can save all of them as a group; and when you return the

next day, you can reopen all 15 sites with a single click. Super shortcut 1: If you want to see all of your open browser windows at the same time, press <Ctrl>-T to tile them ver-

tically, and then simply double-click any window's title bar in order to maximize it.

This is just the beginning of MyIE2's flexibility. Many of the browser's toolbar buttons have extra drop-down options (see **FIGURE 1**). For instance, the Undo menu brings up a list of the last 15 Web sites you visited (much more efficient

than IE's History pane), and the New button's menu lets you open a blank page, your home page, or one displaying the Clipboard's contents. You also get immediate control of scripts, ActiveX, Flash, and other safety and download features. And I love the browser's Flash Saver plugin, which enables me to save Flash animations to my hard drive.

Super shortcuts 2 and 3: If your supervisor (or worse, your spouse) walks in, hit the Boss keystroke combination (<Alt>-<~>), and MyIE2 vanishes without a trace. Or keep the browser open but showing a blank page by pressing <Ctrl>-<Shift>-W.

Concerned about pop-ups and ads? Me too, and MyIE2 does a better job of blocking them than either the Google Toolbar or Mozilla. In fact, it's as good at ad blocking as my longtime browsing companion, InterMute's AdSubtract.

Super shortcuts 4 and 5: Some of the browser's best features aren't obvious. It took me a while to figure out that I could resize pages. To make them bigger, press <Ctrl>-<+>; to shrink them, hit <Ctrl>-<->.

I also admire MyIE2's manager for my favorite plug-ins. And I no longer fret



FIGURE 1: MyIE2's toolbar makes switching apps a breeze.

about IE's inability to open maximized one of many hassles that MyIE2 avoids.

Note to Microsoft: Today, Internet Explorer; tomorrow, Windows?

Contributing Editor Steve Bass is the author of PC Annoyances, published by O'Reilly. Contact him at homeoffice@pcworld.com.

Gateway recommends Microsoft" Windows XP" Tablet PC Edition.







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STUART J. JOHNSTON

Microsoft Releases a Big CD Full of Fixes

Plus, XP's new Service Pack is waiting in the wings-here's what to expect.

IF YOU HAVEN'T been religious about updating your operating system every time a security patch comes out, you'll probably be happy to hear the news: Microsoft is now shipping a CD that includes every fix for all versions of Windows. going back to the original Windows 98. The disc is free-you don't even have to pay for shipping and handling. Head to find.pcworld.com/41294 to order the Windows Security Update CD.

Once you pop the disc into your PC's drive, the CD will act a bit like Windows Update. It will figure out which operating system you're running and the patches you lack, and then it will present you with



the list of fixes you need. After that, the CD will install them.

The bad news, though, is that the disc contains patches only through October 15, 2003. So you'll still need to fire up Windows Update (find.

BROWSER TEST: READER SEES WEIRD RESULT

I WANTED TO CHECK if my version of Internet Explorer was vulnerable to the security problem you described in your March column (find.pcworld.com/41291). I clicked the link at Secunia's Web site (available at find.pcworld.com/39980) to run the test you suggested, but my McAfee Anti-Virus program said it had found and deleted a Trojan horse. Was that supposed to happen?

-Bege Bowers, Youngstown, Ohio

Bugs and Fixes responds: Don't worry. There is no Trojan horse program hiding in Secunia's test code. The test checks your browser to see if it can be fooled by a phony site masquerading as the valid site. Secunia's test attempts to get your version of IE to display a false URL, something a Trojan horse site might try, but the test poses no threat. If Secunia's test shows that your browser is vulnerable to URL spoofing, go to find.pcworld.com/40940 to get Microsoft's cumulative update (numbered 824145). pcworld.com/19081) and get any patches issued since then, one by one.

BUGS & FIXES

NEW XP UPDATE

MICROSOFT IS readying Service Pack 2 for Windows XP. This huge bundle of fixes is being tested now, and the company says it should be available by the end of the first half of 2004. SP2 will apply, in one shot, all of the bug fixes and security patches that have been released since XP first came out. Perhaps more important,

it has new features aimed at blocking attacks on your PC. For example, SP2 turns on XP's Internet firewall by default and automatically closes any unused ports.

SP2 will probably be too big for a dial-up download, so the update will undoubtedly be available on CD, just as SP1 is. Visit find.pcworld.com/41300 for details about *PC World*'s SP2 test-drive. If you want to see Microsoft's SP2 information in excruciating detail, head to find.pcworld.com/ 39977 to download the company's Word document. But be warned: The documentation is aimed at programmers.

If you are a Windows XP user and are tempted to put off getting the CD and wait for SP2 instead, don't. Release dates for updates as large as SP2 can slip, and in the meantime the bad guys will continue to scale up their attacks.

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

IN BRIEF

A Real Fix

REALNETWORKS released updates to RealOne Player and RealPlayer 8 that should prevent villains from invading your PC. Hop over to find. pcworld.com/41303 for a link to Real's new versions.

Security Analyzer Gets Updated

MICROSOFT released version 1.2 of its Baseline Security Analyzer (available as a download at find.pcworld. com/41306). The analyzer tool, which is meant to check your system's security, adds support for Office 2000 through 2003. The previous version had a reputation for being difficult to use. Do you find the new version any easier? Write to bugs@pcworld. com and let us know.

BUGGED?

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

NEW PRODUCTS

EDITED BY ANNE B. McDONALD

Speed-Demon PCs

Two loaded systems using AMD's fastest processor show just how swift (and expensive) PCs can get. But should you buy all the frills?



HOT-ROD desktops from Polywell (left) and Falcon Northwest.

DESKTOPS AMD'S FASTEST processor ever to undergo our series of tests—the 2.4-GHz Athlon 64 FX-53—is now powering pricey gaming PCs packed full of goodies such as gigabytes of memory, high-end graphics cards, and superfast hard drives. But the hottest configuration doesn't always mean the best value.

We tested two towers: Poly-

well's \$3499 Poly900NF3-FX53, which racked up a blazing PC WorldBench 4 score of 146 the highest we've recorded so far—and Falcon Northwest's \$4746 Mach V, which earned a not-too-shabby 143. The highest performance score we had seen previously was 144, from a system equipped with a 2.2-GHz Athlon 64 FX-51 CPU.

Both of these shipping systems team the FX-53 chip with 1GB of DDR400 memory, a swift Serial ATA RAID hard-drive setup, and a graphics board based on NVidia's GeForce FX 5950 Ultra chip. But while these ultrafast rigs should leave performance fans drooling, I'd advise savvy buyers to tweak either configuration a bit before they buy.

For instance, Polywell's system shipped with two superfast (10,000-rpm) 74GB hard drives from Western Digital. That feature added about \$400 to the system's cost, but it accounted for most of the very small performance difference between the two PCs. On the other hand, the Falcon's morestandard 120G B 7200-rpm Hitachi drives cost less and store significantly more data.

BUY LOW, SAVE DOUGH

EVEN THOUGH the NVidia GeForce FX 5950 Ultra-based board is (at this writing) the company's fastest offering, it's probably not the best option for graphics right now.

Based on our graphics tests, which show ATI's comparably priced Radeon 9800 XT currently holding a performance lead in most high-end gaming benchmarks, I'd recommend ATI's recent graphics boards as better buys. What's more, either of these PCs is capable of running today's games at high frame rates with only a midrange graphics board. The next generation of high-end graphics cards is just around the corner, so it seems sensible to make do with a less expensive board until the next wave of graphics-intensive games like Doom 3 and Half-Life 2 finally hits the market.

I thought the Mach V's 19inch NEC LCD monitor and great-sounding Klipsch Pro-Media Ultra 5.1 surround set were better than the Polywell's

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- 70 DIGITAL MUSIC PLAYERS Apple IPod Mini, Creative Nomad MuVo2



equipment. The LCD was a bit sluggish on fast first-person shooter games, but its brightness and overall picture quality put to shame the Polywell system's surprisingly dim 19inch AOC CRT monitor. For speakers, the Polywell offers Creative's less-impressive Inspire T7700 7.1 set.

Other premium parts inside these monster gaming boxes are virtually identical. Both have integrated 10/100 LAN ports. Both include Creative's Sound Blaster Audigy 2 sound card. Both offer two optical drives, although the Mach V pairs its Plextor DVD burner with a standard DVD-ROM drive instead of with a DVD-ROM/CD-RW combo drive, as the 900NF3-FX53 does its Sony DVD burner. The Polywell system also comes with a TV-tuner card.

As for the outside, whereas Falcon's system uses an understated brushed-aluminum case. Polywell uses its "monster gaming tower" case-a black steel model presenting a demonic-looking plastic front bezel featuring sinister red lights and a somewhat flimsy chrome door that covers the front-mounted USB 2.0 and FireWire ports.

The 900NF3-FX53's tower does have some impressive design features, including toolless access to drives and addin cards. In addition, the PC

sports front and rear mounting points for large 120mm fans, which move more air than the 90mm fans found on most systems. Unfortunately, though, in practice the harddrive mountings inside the Polywell block a lot of the airflow from the front of the case, and the routing of power and data cables further impedes cooling. In contrast, every cable inside the Falcon is tucked neatly against the side of the case or routed out of the way.

Either PC represents a solid choice for gamers; a few configuration tweaks would make each near-perfect. Falcon's Mach 5 is more expensive, but its better case, monitor, and speakers-not to mention its

Mach V FX-53

Falcon Northwest ***** Gaming powerhouse with wellchosen components is overpriced. List: \$4746 find.pcworld.com/41531

interior organization and premium components-almost justify its stiff price premium. Overall, however, the speedy Polywell Poly900NF3-FX53 is probably the better value. -Eric Dahl

Poly900NF3-FX53 Polywell ***** Loaded tower with so-so case is the fastest we've ever tested. List: \$3499 find.pcworld.com/41528

Sharp's 3D Notebook

NOTEBOOK TEST IF USING three-Center dimensional images enhances your work or play, there's now a notebook with 3D screen capability: the Sharp Actius RD3D. But it's big, bulky, and expensive.

When the 3D function is on, light emitted by the laptop's LCD is divided by a "parallax barrier," causing slightly different images to reach each eye. When you sit centered in front of the notebook, your

Actius RD3D

Sharp *****

Buy this notebook only if its 3D capability is useful to you. List: \$2999 find.pcworld.com/41495

brain processes those varying images and gets tricked into perceiving depth, without special glasses. I found, however, that shifting position even slightly makes it impossible to see the 3D effect on an image. Fortunately, an easily accessible button that's situated above the keyboard turns the 3D feature on and off. But if 3D data visualization is useful to you, this notebook may be worth a try. Without 3D, the \$2999

SHARP Actius RD3D with 3D toggle button. heavy (12 pounds), and expensive desktop replacement. Its 119 score in our PC World-Bench 4 test suite was slightly higher than those of other, similarly configured laptops; but our battery tests showed subpar results: 2 hours. —Kalpana Ettenson

RD3D is a well-appointed,

IBM ThinkPad Thinks Thin

NOTEBOOK TEST Center AIRLINE travelers know quite well that big-screen notebooks aren't practical unless you can swing a wider, business-class seat. The new IBM ThinkPad X40 measures barely 1 inch thick and weighs just 2.8 pounds nearly a pound less than its predecessor (the X31)—and it has a sharp 12.1-inch screen.

ThinkPad X40 IBM **** Thin, peppy, and startlingly light laptop feels solidly built. Street: \$1924 find.pcworld.com/41357 So when you're wedged into coach, and the clod in front of you decides to recline his seat all the way back, you might still be able to get some work done if you're using the X40.

My first impression of the X40 was that it was *too* light almost toylike. But its structure seems stronger than that of the twice-as-heavy Think-Pad T41, and the keyboard is fantastic, with comfortably large keys and lots of travel.

The \$1924 shipping X40 that I looked at came with an ultralow-voltage 1-GHz Pentium-M processor, 512MB of RAM, and Windows XP Professional, and it earned a PC Worldmakes it sound poky compared with some of the barnburner notebooks we've tested, whose scores have reached as high as 137, but I found it sprightly nevertheless. Other interesting features: IBM's Active Protection System, which parks the hard drive's heads if it senses the laptop falling; and the company's Rescue and Recovery system, which can boot the notebook and allow you to connect to the Internet for driver downloads, even if the operating system is hosed.

Bench 4 mark of 104. That

In our tests, battery life from the standard four-cell battery was 2 hours, 41 minutes—not bad, but a bit disappointing IBM THINKPAD X40 with an optional Ultrabase Dock.

for a power-sipping processor. On the other hand, an optional \$199 eight-cell battery that uses new hybrid lithium ion technology held out for nearly 6 hours when tested.

-Alan Stafford

Roxio's Friendly New Look

BURNING SOFTWARE ROXIO'S EASY MEDIA Creator (formerly Easy CD/DVD Creator), a set of programs that assist you in burning digital files to discs, has undergone an impressive makeover in Easy Media Creator 7. Gone is the hodgepodge of graphical user interfaces that made the older suite so difficult. Replacing them is a dazzling new interface standardized across version 7's applications.

The new launch pad is the biggest treat; not only does it let you start modules by task type or program name but it



THE TIMELINE VIEW for Easy Media Creator 7's VideoWave 7 makes it easy for newbie or intermediate users to edit and preview video.

also handily keeps track of recent projects. My only complaint is decidedly minor: Navigation by <Alt> key combinations is missing from various dialog boxes and buttons.

The suite's mainstays are still on hand, albeit in much improved form: Creator Classic for mastering, Drag to Disc for packet writing and collecting data for mastering, Photo Suite for photo editing, DVD Builder for DVD creation, and VideoWave 7 for video editing and processing. The last three are now tightly integrated, so they share projects and launch one another when needed.

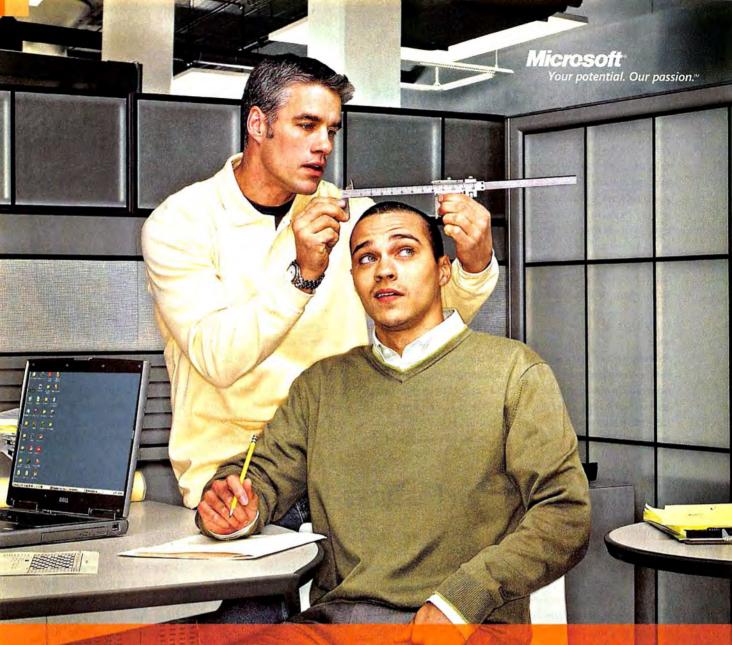
Version 7 is a few features shy of a complete set. The package is not as efficient as a single all-in-one app, there's no incremental backup, and support for more-arcane file types is limited compared with that in archrival Nero 6 Ultra Edition. All mastering and packet-writing basics are here, however, and advanced features abound: You get a full-fledged DVD-copy program (for use on non-copyprotected discs only), sound and photo editing, Cinemagic automated video production, and DivX encoding.

After receiving lots of user e-mail decrying prior versions' bugginess, 1 kicked version 7's tires hard and long, to a nearly bug-free result—though that's no guarantee of an equally smooth encounter for everyone. One caveat: Booting and switching between the apps often seemed a bit labored, even on my superfast Athlon 64 3200+-based system.

—Jon L. Jacobi 🔳

Easy Media Creator 7 Roxio ★★★★☆ Great new interface makes this

suite more elegant than Nero 6. List: \$99, upgrade \$79 find.pcworld.com/41429



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Desktop Support Technician

Server Has So-So Services

S E R V E R THE Mirra Personal Server is sold as a way to automate backups of multiple PCs on a small network and to provide remote access to the files that those systems contain. With a Mirra connected to your network through ethernet, and the company's software installed on your PCs, you may

Mirra Personal Server Mirra

Preproduction unit, not rated Serviceable for automatic backups and remote access, but don't expect full server capability. List: \$500 (120GB version) find.pcworld.com/41420 designate files or folders for automatic backups of up to eight versions of a single file.

After some time with a preproduction \$500 120GB minitower, however, I realized that I expected more from something called a personal server.

If you're traveling and need a file, you can go to the Mirra Web site, which will connect you to the server in your home or office so you can download what you want. You can designate certain folders, like one containing photos, for sharing and can invite friends or coworkers to access them. But I found the Mirra's remote access unreliable and slow. I frequently got messages that my download could not go through because of a server error. A minute later, it would work fine.

Restoring a lost file is simple, though not necessarily speedy. The Mirra is no multitasker—if it is already at work backing up files, it will wait to restore your file until it has finished performing the backup job.

What really annoyed me, though, were all the things I felt a personal server should be capable of, but that the Mirra's creators chose to omit. Why does it lack the ability to stream audio or video files to any PC on the network? And why not let PCs grab files from the Mirra, change them, and



MIRRA Personal Server.

then save them back to the Mirra? In other words, why not let the server be a server? —Edward N. Albro

Studio 9: Good New Features, but Buggy

VIDEO EDITOR AN UPDATE of Pinnacle Systems' popular Studio video editing software is out, with mixed results. On the plus side is improved background rendering: Using Pinnacle Studio Version 9, you can now continue working on an edit without having to wait until the last one renders completely. However, I found a shipping copy of version 9 to be buggy.

Other updates include a basic surround-sound editor and the ability to edit wide-screen video. The program's interface is now scaled to run at 1024 by 768 resolution, compared with Studio 8's maximum of 800 by 600. Moviemaking in this program, which is aimed at beginning and intermediate users, still is divided into three phases: video capture, editing, and writing to DVD or videotape.

Version 9 also provides a selection of new video and audio effects, as well as automatic color correction, which does a reasonably good job of improving video shot under bad lighting conditions. The SmartMovie feature will automatically edit video in a num-

ber of styles to fit with a song track.

But as nice as these features are, they don't make up for the quirks. The dialog boxes (such as those for opening video and audio files) always default to the drive where Studio 9 is installed. This is annoying if you store your data elsewhere, as you have to go into another dialog box to get to your files.

I also encountered intermittent crashes when creating videos, several leading to lost edits. The problems seemed to crop up mostly when video was being rendered in the background. (Before I completed this review. Pinnacle issued one patch, which didn't clear up my bugs; it is working on a second.) Studio 9 was rather slow, too: On my test PC (with a gigabyte of RAM), it sometimes took several seconds to update the screen when editing long videos composed of a large number of files. Before you buy, wait until Pinnacle fixes the bugs.

-Richard Baguley

Pinnacle Studio Version 9 Pinnacle Systems ★★★☆☆☆ Bugs and quirks drag down easyto-use video editing software. List: \$99

find.pcworld.com/41492



PINNACLE STUDIO 9 has some solid new features, including fresh video and audio effects, but the interface is similar to that of previous versions.

OPEN THE VICTIM'S AIRWAY

CD

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Make Outlook More Useful

MARKETING

IF YOUR WORK involves using Microsoft Outlook, you probably know that the savvier it becomes, the more productive you can be. Avidian Technologies' \$150 Prophet 2004 can help you get there, by bringing customer relationship management (CRM) techniques to Microsoft's ubiquitous e-mail, scheduling, and contact-management app.

Unlike Best Software's \$230 Act 6, FrontRange Solutions' \$180 GoldMine 6.5, and even Microsoft's own Business Contact Manager for Outlook 2003, this plug-in works directly inside Outlook. Not only does this keep all contact info in one place, it helps your system's performance by reduc-



EASY OUTLOOK INTEGRATION: When you install Prophet 2004, folders for the plug-in show up immediately in Outlook.

ing the number of apps you have to open to do your work.

I tested a shipping version with Outlook 2003 (Prophet 2004 also supports Outlook 2000 and 2002, the latter being the version that comes with Office XP). Installation places a Prophet folder within Outlook's Personal Folders. Inside that Prophet folder, a Contact Manager subfolder lists existing Outlook contacts but lets you manage them in many more ways. For example, in just a few clicks, you can send personalized e-mail to a group (with each recipient seeing only his or her own address), without opening Word to use the mailmerge function. You can also view in a single window all the e-mail and attachments sent by several different contacts. And Prophet 2004's built-in Report Wizard makes creating many types of custom reports based on your contact information a breeze.

Opportunity Manager, a second subfolder, tracks potential sales leads, whether they are associated with your existing Outlook contacts or with new ones. All tasks and appointments linked to one of these leads are updated automatically in your Outlook calendar and task list.

Finally, the Prophet Administrator, accessed via a menu option in Contact Manager, lets you determine who has access to your opportunity data. This is also where you customize Opportunity Manager's fields and values.

-Dennis O'Reilly

Prophet 2004 Avidian Technologies ★★★★☆ Well-designed Outlook-based plug-in gives small businesses a sales-management edge. List: \$150 find.pcworld.com/41396

-/-

Olympus Photo Printer Falls Behind

PHOTO PRINTER

WHEN OLYMPUS introduced its dye-sublimation photo printer, the P-400, in 2000, the unit's ability to print highquality photos was a revelation. Now Olympus has released a new model, the \$499 P-440, but this time technology seems to have passed it by.

Rather than using liquid ink, a dye-sub printer uses an

P-440

ink ribbon that is heated by the printhead to transfer the color dye onto special paper. This process used to produce photos that put ink jet printers to shame, but that's no longer the case. Recent advances in competing ink jet models, such as more nozzles, smaller dot sizes, and extra ink colors, allow them to print faster, with finer detail and better color reproduction.

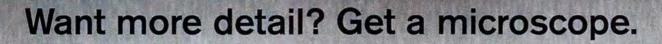
I compared a number of test prints generated on a shipping P-440 side by side with the same photographs printed on a Canon i900D and on an HP Photosmart 7960 Photo Printer. The P-440 can apply 256 different levels of color from each of its cyan, magenta, and yellow dyes, so in its output I saw accurate, bright colors and smooth tonal changes in areas of color. But the ink jet printers, with more ink colors (including black), turned out prints that appeared sharper and

showed more detail in dark areas. Neither type of print was perfect, however.

Viewed alone, prints from the P-440 might look as if they had come straight from your local print lab. But if you want

OLYMPUS P-440 photo printer.

better contrast in your images, go for an ink jet photo printer that uses six or more inks.



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Kodak EasyShare DX6490 zoom digital camera

It's the first camera to unite a professional-quality Schneider-Kreuznach Variogon 10X optical zoom lens (38–380 mm equivalent) with the exclusive KODAK color science image processing chip, for the finest details and richest, most accurate colors. Its four megapixels and auto and manual controls deliver extraordinary, artistic results in the most challenging photographic situations. For more on the most advanced EasyShare camera, go to www.kodak.com/go/dx6490a

Kodak

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NEW PRODUCTS /

A Pair of Innovative DVD Recorders



GOVIDEO VR3930 (left) and Lite-On LVW-5005.

DVD RECORDERS

MAKING THE decision to go digital with your living-room video recorder is easy; deciding which of the many new models to buy is a bit tougher. I looked at shipping versions of GoVideo's VR3930 DVD Recorder+VCR and Lite-On's LVW-5005, and liked both, but for different reasons.

The \$449 GoVideo VR3930 does what GoVideo does best: It combines a DVD recorder and a VCR into a handsome. single, dual-deck unit that makes copying from one medium to the other easy. Consider the VR3930 if you have a library of treasured VHS recordings that you'd like to preserve on DVD. With two button presses, you can initiate the copy process and transfer 1, 2, or 4 hours of video from VHS to disc. GoVideo's integrated approach eliminates the hassle of connecting a VCR to a DVD recorder using composite-video cables, and then manually fussing with

VR3930 DVD Recorder+VCR GoVideo

For copying VHS tapes to DVD, this unit eliminates the hassle of connecting a VCR to a burner. List: \$449 find.pcworld.com/41399 the recorder's input settings and making sure the recording starts when you want it to.

In addition, the VR3930 is itself a capable DVD player, DVD-R/RW recorder, and VCR. The device comes with a well-designed remote control, DVI inputs, a good user interface, and excellent documentation to help users get past setting the clock.

MANY FORMATS

THE REASONABLY priced Lite-On LVW-5005 lacks a VCR component but offers a whole slate of powerful recording options in its slim silver box. This \$379 unit impressed me with its extremely friendly and smart menu design (for example, you can view the channel you want to record, while you set the channel in the timer view). I appreciated the slim remote control's minimalist yet highly functional design, as well as the Lite-On device's recording flexibility: It can write to both

LVW-5005 Lite-On

This sleek living-room DVD and CD recorder has a friendly interface, but no VCR capability. List: \$379 find.pcworld.com/41402 the DVD-R/RW and DVD+R/ RW formats, and can record audio from any video or audio source to CD-R/RW.

Recording was as easy on the Lite-On as it was on the GoVideo: You just press the record button, wait a few seconds for the recording to kick in (the interval depends on the media type), and you're good to go. Alternatively, the nifty Guider button walks you through the recording process. My gripes with the Lite-On were few: I didn't like how some features. such as changing the recording speeds or slow-motion playback, were buried under menu options, and I found the drive's whirring noise as it spun up a bit annoying.

Neither unit is perfect. Both could use help in creating DVD navigation menus, for example, and neither provides prompts on screen for finalizing a disc, a necessity with most DVD media in order for discs to play back in other DVD players (Lite-On says a firmware update will fix this). But none of these flaws are fatal. Depending on your recording needs, I highly recommend both models.

-Melissa J. Perenson

QUICK TAKES

Clever Keypads

A DESKTOP PC'S keyboard usually has a built-in extended numeric keypad, which is useful for inputting a lot of numbers. Laptop keyboards don't afford the same convenience. Now you can add a separate numeric keypad to your notebook with either of two \$45 USB options: the Targus Wireless Keypad & Mouse Combo (find.pcworld.com/ 41426) or Kensington Technology's Pocket Keypad Calculator (find.pcworld.com/41423). Kensington's model is particularly versatile since it doubles as a battery-powered calculator, with or without a PC connection. A mode but-



ton toggles between the keypad and the calculator, and a send button exports the number on the keypad's screen directly to the cursor point

in a document. The Targus keypad doesn't calculate, but neither is it tethered to the PC by a cable. The unit communicates wirelessly with a finger-size USB receiver that also works with the included miniature, optical, scrollwheel mouse. Both keypads include a previously omitted <Backspace> key.

-Michael S. Lasky





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Tiny Players, Many Songs



NEW PRODUCTS

DIGITAL MUSIC PLAYERS

DON'T WANT to choose between a small-capacity flash memory MP3 player offering less than a gigabyte of storage space and a roomy hard-drive model? Look into the new Apple IPod Mini and Creative Nomad MuVo2 (pronounced "MuVo Squared"), small players that each hold a generous 4 gigabytes of digital music.

The older 1Pod's smaller sibling, the rectangular 1Pod Mini is 3.6 by 2.0 by 0.5 inches and weighs a mere 3.6 ounces. The square MuVo2 is 2.6 by 2.6 by 0.8 inches and weighs 3.2 ounces. I tried out shipping models of both.

The \$249 IPod Mini's thin anodized aluminum case resists scratches and fingerprints, and its small, bright monochrome screen is viewable from many angles. The bundled ITunes software lets you automatically sync your desktop and portable music collections every time you dock the player in its USB 2.0- or FireWire-connected cradle (or you may manually update). IPods don't support the Windows Media format. but they do support MP3 and .wav, among others.

To install the \$200 MuVo2, I plugged its cable into the player's USB 2.0 port and into



CREATIVE Nomad MuVo2 (left) and Apple IPod Minl.

my PC, which instantly recognized the unit as a USB massstorage device. I then dragged and dropped music and files to the player in Windows Explorer. (You can also do the job via Creative's easy-to-use MediaSource software.) The MuVo2 supports MP3, WMA, and .wav formats. However, navigating music on the player via its small monochrome screen is tedious. The only way to advance to another album or song is to hit the forward button until you find the track you want to hear.

Overall, due to better design, the IPod Mini is the better choice of the two.

—Alexandra Krasne 🔳

IPod Mini

Apple ★★★★↓. Well-designed small player. List: \$249 find.pcworld.com/41405

Nomad MuVo2

PHOTOGRAPH: MARC SIMON

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SnapStream's Beyond TV 3

MULTIMEDIA

SNAPSTREAM'S software has long been tops in turning a PC into a device for digitally recording television, and Beyond TV 3—the latest update of the SnapStream package



BEYOND TV 3's interface is chock-full of details about the program you select.

Screen

formerly known as Personal Video Station—continues that streak, although it still feels a bit rough around the edges.

I tested a shipping version of the \$80 software and Hauppauge's PCI-based WinTV

> PRV-250 tuner card with remote control (part of a \$200 bundle from SnapStream). After 1 finished installing the card, software, and drivers, 1 was quickly watching television shows using Hauppauge's very basic WinTV2000 software.

Installing Beyond TV 3 itself didn't go as smoothly, owing first to a driver problem and then to my lack of a DirectX 9-capable graphics card (a requirement left out of my setup guide). The DX9 requirement is significant, as few older graphics cards support the technology.

After addressing these issues, I loaded the software, and found the interface—navigated via mouse, keyboard, or remote—quick and easy to learn. Recording shows using the program guide and search tools was one-click simple, and accessing more-advanced playback and recording features was equally straightforward (though I was unable to retain those changes due to the lack of a save button). New to the software are SmartSkip, which attempts to identify commercials on recorded programs for easier bypassing, and ShowSqueeze, which lets you compress recordings further for archiving or for transfer to a handheld.

The bottom line? If you want to record television programming on your PC, Beyond TV 3 is your package. Otherwise, a stand-alone digital video recorder like TiVo is probably a better bet.

—Tom Mainelli 🔳

Beyond TV 3 SnapStream

Turns your PC into a decent, not great, digital video recorder. Street: \$80 (CD or download) find.pcworld.com/41417

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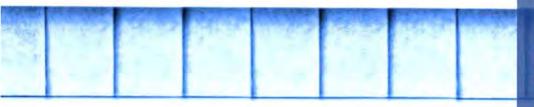
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warranty issue may be subject to additional charges. These services are available for machines normally used for business, professional or trade purposes, rather than personal, family or household purposes. Service period begins with the equipment date of purchase. If the machine problem turns out to be a Customer Replaceable Unit (CRU), IBM will express ship the part to you for quick replacement. Onsite 24x7x2-hour service is not available in all locations. For ThinkPad notebooks requiring LCD or other component replacement, IBM may choose to perform service at the depot repair center. 'For PCs without a separate video card, memory supports both system and video. Accessible system memory is up to 64MB less than the amount stated, depending on video mode. 'Standard shipping included when you order online. U.S. only. ''Requires download of client software. ''As defined by ISO/IEC 15412. IBM, ThinkPad and ThinkCentre are trademarks or registered trademarks of IBM Corporation in the U.S. and other countries. Microsoft and Windows are trademarks or registered trademarks of Intel Corporation. Intel, Intel Inside logo. Intel Centrino, the Intel Centrino logo, Intel Pentium, Intel Celeron and Intel SpeedStep are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Other company, product and service names may be trademarks or service marks of others. © 2004 IBM Corp. All rights reserved.

Power. Security. Wireless. Talk about a roundup.



IBM ThinkPad[®] R40 Distinctive IBM Innovations:

 IBM Embedded Security Subsystem 2.0' – Strongest security as a standard feature

System Features:

- Intel® Centrino® mobile technology
 Intel Pentium® M processor 1.40GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional⁴
 14.1⁻ XGA TFT Display (1024x768)
- 256MB DDR SDRAM[®] 20GB[®] hard drive
- Integrated Ethernet and modern
- Integrated Ethernet and modern
- Ultrabay^{IV} Plus CD-RW/DVD-ROM compo
 IBM UltraConnect^{IV} Antenna for increased signal strength^{III}
- · 1-yr system/battery limited warranty"

\$1,279' NavCode 289793U-W208

ServicePac[®] Service Upgrade:¹⁶ 3-yr Depot Repair #30L9192 ¹132

IBM ThinkPad R40

- Distinctive IBM Innovations: • Rapid Restore[™] – Push-of-a-button data
- backup and recovery

System Features:

- Intel Centrino mobile technology
- Intel Pentium M processor 1 50GHz
 Intel PRO/Wireless Network Connection 802,11b
- Microsoft Windows XP Professional
- 15' SXGA+ TFT Display (1400x1050)
- 256MB DDR SDRAM · 60GB hard drive
- Integrated Ethernet and modem
- Ultrabay Plus CD-RW/DVD-ROM combo
- · IBM UltraNav¹⁰ TrackPoint[®] and touch pad
- · 1-yr system/battery limited warranty



IBM ThinkPad T41 Distinctive IBM Innovations:

- · Access IBM IBM help at your fingertips
- IBM Active Protection System Air-bag technology to help protect your ThinkPad

System Features:

- Intel Centrino mobile technology
 Intel Pentium M processor 1.40GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 14.1 XGA TFT Display (1024x768)
- 256MB DDR SDRAM⁵ 40GB hard drive
- Integrated Gigabit Ethernet and modem
- Ultrabay Slim CD-RW/DVD-ROM combo
- IBM UltraConnect Antenna for increased signal strength
- Only 1" thin' 4.5-lb travel weight"
- 1-yr system/battery limited warranty⁵⁴

\$1,679 NavCode 2378DHU-M208

With Microsoft Office Small Business Edition 2003:" \$1.919 ServicePac Service Upgrade: 2-yr Onsite Repair/9x5/Next Business Day Response #30L9189 **'197**

IBM ThinkPad T41

Distinctive IBM Innovations:

 IBM Active Protection System – Air-bag technology to help protect your ThinkPad

System Features:

- Intel Centrino mobile technology
 Intel Pentium M processor 1.6CGHz
- Intel PRO/Wireless Network Connection 802 11b
- Microsoft Windows XP Professional
- 14.1 SXGA+ TFT Display (1400x1050)
- 256MB DDR SDRAM · 40GB hard drive
- Ultrabay Slim CD-RW/DVD-ROM combo
- 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 warranty^m
- \$1,939

NavCode" Get the latest pricing and information fast. Use NavCode on the phone or on the Web.

*1,939 NavCode 2379DJU-M208 With Microsoft Office Small Business Edition 2003: S2179

ServicePac[®] Service Upgrade: 5-yr Onsite Repair/9x5/Next Business Day Response #69P9200 **1449**

NEW! IBM ThinkPad X40 Distinctive IBM Innovations:

- Rapid Restore Push-of-a-button data backup and recovery
- IBM Active Protection System Air-bag technology to help protect your ThinkPad

System Features:

- Intel Centrino mobile technology
 Intel Pentium M processor ULV 1GHz
- Intel PRO/Wireless Network Connection 802 11b
- Microsoft Windows XP Professional
- 12.1 XGA TFT Display (1024x768)
- 256MB DDR SDRAM
- 20GB hard drive
- Integrated Gigabit Ethernet and modem
- Legendary IBM full-size keyboard
- Only .94" thin
- 2.7-lb travel weight
- 1-yr system/battery limited warranty¹⁶
- 1-yr system/battery limited warranty

\$1,499 NavCode 23861CU-M208

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

NEW! IBM ThinkPad X40 Distinctive IBM Innovations:

 Longest standard battery life of any leading brand notebook¹⁰

System Features:

- Intel Centrino mobile technology
 Intel Pentium M processor LV 1.20GHz
- Intel PRO/Wireless Network Connection 802.11b
- Microsoft Windows XP Professional
- 12.1 XGA TFT Display (1024x768)
 Intel Extreme graphics
- 256MB DDR SDRAM
- 40GB hard drive with IBM Active Protection System
- Integrated Gigabit Ethernet and modem
- Legendary IBM full-size keyboard
- 7.5-hr Li-lon battery
- · 3.2-lb travel weight

Visit Ibm.com/pc/safecompating periodically for the latest information on safe and effective computing. Warranty Information: For a copy of applicable product warranty Information, PO- Box 12195 RTP, NC 27709. Attr. Dept. JDJA-8203.

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Publishing Holdings Inc. In the U.S. and other countries: A description of the environment in which the test was performed is available at itm compoliwinthinad battery/life. Battery life (and recharge times) will vary based on many factors including screen brightness, applications, features, power management, battery conditioning and other countries. A description of the environment in which the test was performed is available at itm compoliwinthinad battery/life. Battery life (and recharge times) will vary based on many factors including screen brightness, applications, features, power management, battery conditioning and other customer preferences. 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." This machine is designed to be repaired during the applicable warranty period primarily with customer-replaceable.

· 1-yr system/battery limited warranty*

\$1,749 NavCode 23866GU-M208

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



NEW! IBM ThinkPad X40 Solution Pack

Distinctive IBM Innovations:

 Access Connections – Easiest wired and wireless connectivity

. Intel Pertium M processor ULV 1GHz

Intel PRO Wireless Network Connection 802.11b

Microsoft Windows XP Professional

· 1-yr system/battery limited warranty

Ultrabay Slim CD-RW/DVD-ROM combo

3-yr Onsite Repair/9x5/Next Business

NEW! IBM ThinkPad X40

Distinctive IBM Innovations:

· Intel Centrino mobile technology

Intel Pentium M processor LV 1 20GHz

Microsoft Windows XP Professional

12.1' XGA TFT Display (1024x768)

Intel PRO/Wireless Network Connection 802.11b

· Integrated Gigabit Ethernet and modem

3-yr system/1-yr battery limited warranty³⁴

· Ultrabay Slim CD-RW/DVD-ROM combo

\$2,199 NavCode 23826UU-M208

4-yr Onsite Repair/9x5/Next Business

· Longest standard battery life of any

NavCode 23861ZU-M208

• 12.1 XGA TFT Display (1024x768)

System Features: • Intel Centrino mobile technology

256MB DDR SDRAM

· 2.7-Ib travel weight

Accessories Included:

UltraBase[™] X4 media slice

ServicePac" Service Upgrade:

· 20GB hard drive

^{\$1,799}

Day Response

#301.9195 1243

Solution Pack

leading brand notebook

System Features:

256MB DDR SDRAM

. 7.5-hr Li-Ion battery

Accessories Included:

Day Response

#69P9198 '299

· UltraBase X4 media slice

ServicePac Service Upgrade:

· 40GB hard drive



(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 HT Technology 2.80GHz
- Microsoft Windows XP Professional
- 256MB DDR SDRAM⁶
- 40GB hard drive CD-RW
- Integrated 10/100 Ethernet
- Norton AntiVirus[™] (2003 OEM Edition)
- · Lotus" SmartSuite" Millennium license
- 1-yr limited warranty with limited onsite service¹⁰

\$789 AvCode 843398U-M208

With Microsoft Office Small Business Edition 2003:¹⁵ \$1,029 ServicePac[®] Service Upgrade:¹⁰ 2-yr Onsite Repair/9x5/Next Business Day Response #54P1859 **175**

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 warranty"

^{\$859} □ NavCode 843298U-M208 With Microsoft Office Small Business Edition 2003; \$1,099

ServicePac® Service Upgrade: 3-yr Onsite Repair/9x5/4-thr Response #41L2732 1229



(Monitor not included)

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 SDRAM⁵
- 40GB hard drive CD-ROM
- · Gigabit Ethernet-integrated
- Norton AntiVirus (2003 OEM Edition)
- Lotus SmartSuite Millennium license
- · 3-yr limited warranty with limited
- onsite service™

\$1,049 🖾 NavCode 8187EJU-M208

With Microsoft Office Small Business Edition 2003: \$1,289 ServicePac® Service Upgrade: 4-yr Onsite Repair/9x5/Next Business Day Response #69P9161 189

IBM ThinkCentre M50

- Distinctive IBM Innovations: • Rapid Restore Ultra – Push-of-a-button
- data backup and recovery
- IBM Embedded Security Subsystem 2.0 Strongest security as a standard feature
- System Features: • Intel Pentium 4 Processor with
- HT Technology 3.0GHz
- Microsoft Windows XP Professional
 512MB DDR SDRAM⁵
- 512MB DDR SDRAM
- 40GB hard drive
 DVD-ROM
 Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited
- onsite service^m

\$1,069 ▷ NavCode 8187F4U-M208 With Microsoft Office Small Business Edition 2003: \$1,309 ServicePac® Service Upgrade: 3-yr Onsite Repair/24x7/4-hr Response #41L2740 *159

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Save on shipping. Order online."



(Monitor not included)

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 SDRAM⁵
- ST2MB DDR SDRAM
- 40GB hard drive CD-ROM
- Gigabit Ethernet-integrated
- Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service^{se}

\$1,079 S NavCode 818336U-M208

With Microsoft Office Small Business Edition 2003: \$1,319 ServicePac® Service Upgrade: 4-yr Onsite/9x5/4-hr Response #69P9162 ***250**

IBM ThinkCentre S50 Distinctive IBM Innovations:

- The smallest IBM desktop without compromise: 62% smaller than a standard IBM desktop
- IBM Embedded Security Subsystem 2.0 Strongest security as a standard feature

System Features:

- · Intel Pentium 4 Processor with
- HT Technology 3.0GHz Microsoft Windows XP Professional
- 512MB DDR SDRAM[®]
- · 40GB hard drive · DVD-ROM
- Intel Extreme Graphics 2
- Gigabit Ethernet-integrated
- Norton AntiVirus 2003 OEM Edition
- · Lotus SmartSuite Millennium license
- 3-yr limited warranty with limited onsite service^M

\$1,119 NavCode 818343U-M208

parts provided by IBM. IBM will only send a technician onsite to perform a repair if (a) remote telephone diagnosis and/or customer part replacement are unable to resolve the problem, or (b) the part is one of the few designated by IBM for onsite replacement. For a list of onsite replaceable parts, contact IBM. Support unrelated to a warranty issue may be subject to addinonal charges. "These services are available for maintenes normally used for business, professional or trade purposes, striver has personal, timb or household be crustomer. Toxia 24 will approve service period begins with the equipment. Onsite 24/772-hour service is not available in all locations. For ThinkPad notebooks requiring LCD or other component replacement, IBM may choose to perform service at the depot repair center. "Standard shipping included when you order online. U.S. only. "Requires compable wired's enabled of relations, sold separately. "ThinkPad Protection is not available in all states; contact your sales representative for details. ThinkPad Protection cannot be combined with other warranty service upgrades. ThinkPad Protection is not available in all states; contact your sales representative requires and ther design set in the product, for purchase with 1-year warranty systems. "BM does not manufacture, warrant or support the product, IBM logos and trademarks used under license. Contact IBM for details. "Certain Microsoft software product(s) is not oneptide with this computer may use technological measures for copy protection. IN SUCH EVENT, YOU WILL NOT E ABLE TO USE THE PRODUCT IF YOU DON TO FULLY COMPLY WITH THE PRODUCT ACTIVATION PROCEDURES. Product activation procedures and Microsofts privacy policy will be datield during to the top 5 vendors in 2003 notebook sales, as of 1/29/2004. IBM reserves the right to alter product offerings and specifications at any time, without notice. IBM is not responsible for photographic errors. All IBM product names are registered trademarks of International Business Machines Sompation

With Microsoft Office Small Business Edition 2003: \$1,359 ServicePac[®] Service Upgrade: 3-yr Onsite/9x5/4-hr Response #41L2734 ***129**



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.)

1-yr Depot to 3-yr Onsite + 3-yr ThinkPad Protection #58P8772 1389

3-yr Depot to 3-yr Onsite + 3-yr ThinkPad Protection #58P8774 **3279**

IBM ThinkPad Accessories

Tripp Lite Traveler portable surge

Targus Deluxe Mobile Essentials Kit #22P7437 '60

ThinkPad 72W AC/DC Combo Adapter #22P9010 199

IBM ThinkCentre Accessories

IBM Portable 40GB USB 2.0 Hard Drive

17' IBM ThinkVision™ L170 Flat Panel

ThinkPad Port Replicator II #74P6733 *179

Lexmark X6170 All-in-One

Monitor with system purchase #W9SPAB0 1479

with Rapid Restore

#09N4255 1299

#22P9147 1200

ThinkPad Premiere Leather Carrying Case" #10K0209 **'99**

suppressor #22P7141 *12

IN CASE OF EMERGENCY, BREAK GLASS





C Problems? Inside: ('F Windows 80 Digital Cameras 81 Yourselt Internet and E-Mail 82 Hard Drives

Taming tech glitches is easy-once you know what to do. Our troubleshooting guide shows how to solve them like a pro.

MICHAEL DESMOND AND WOODY LEONHARD

HAS THIS EVER HAPPENED TO YOU? You spend hours upon hours trying to fix some problem with your PC. You search Web forums, you uninstall programs, you swap out hardware, but you can't figure out what's wrong. Finally you explain the problem to a friend or even (gasp!) a tech support representative. Inevitably, your advisor suggests that you change a simple setting, and, presto: Your machine works again.

That's often the way it goes when you're fixing tech products. It takes forever to track down a problem and then about 2 minutes to solve it. But if you know a few tricks for diagnosing difficulties with PCs, cameras, TVs, and other devices, you can shrink hours down to minutes. Tell us the symptoms, and we'll help you pinpoint the problem in this handy troubleshooting guide. We'll walk you through possible causes, from minor to moderate to dire. And-oh yeah-we'll tell you how to fix each problem, too.



82



CD and DVD Burners 83











86









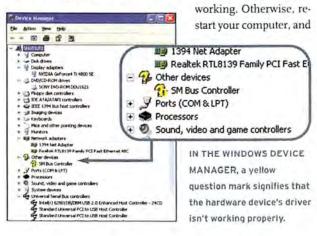


TECH FIXES



SYMPTOM: Windows won't start or crashes frequently.

MINOR PROBLEM: The best-case scenario is that a patch clobbered your system. If you authorize Windows Update to apply patches automatically, key Windows files may change without your knowledge or consent. Fortunately, whenever a patch or update gets applied—even if you manually replace a driver (by far the most common source of instability)—the installer creates a system checkpoint, so it's easy to roll back the offending patch. If you're running XP, you can try using the System Restore feature to restore your PC to a state it was in before things stopped



as soon as you hear the PC beep (indicating the completion of its power-on self-test, or POST), press **<F8>** and choose *Last Known Good Configuration (your most recent settings that worked).*

MODERATE PROBLEM: If reverting to the last known good configuration doesn't help, a piece of hardware or system software has probably gone belly-up. To investigate, you should crawl around your system using Safe Mode—a special minimally func-

tional way of running Windows that bypasses your start-up programs; ignores essentially all hardware except your keyboard, mouse, and monitor; and avoids your fancy graphics driver (frequently a source of problems). To start in Safe Mode, reboot, wait for your system to finish the POST, press **<F8>**, and then choose *Safe Mode*. To check for hardware problems using Windows Device Manager, choose *Start-Control Panel-Performance and Maintenance-System*, click the *Hard*- water, restart your computer and then allow it to boot normally.

DIRE PROBLEM: So you've tried Safe Mode, and nothing helps. Maybe one of your Windows system files has the hiccups. Before you reformat your hard drive, run a Repair. To do this, boot from your Windows XP CD: when given the choice 'To set up Windows XP now', press **<Enter>**. Accept the license agreement. Then, 'To repair the selected Windows XP installation', press **R**. Windows reinstalls all of its files and then restarts. Once your PC is running again, confirm that your firewall is working, go to Windows Update (*Start-All Programs-Windows Update*), and download and install all the patches your system requires.

SYMPTOM: My scheduled tasks don't seem to run.

MINOR: If you have scheduled any repetitive tasks to occur automatically on your PC, those jobs may not have run. As a result, your last disk backup may be four months old, or the fragmentation pattern on your hard drive may look like Swiss cheese. Windows may fail to run jobs you've scheduled using the Windows Scheduling Wizard. What's more, if your backups, disk cleaning sessions, or defrag runs never happened, Windows won't tell you. To check, click *Start-All Programs-Accessories-System Tools-Scheduled Tasks*. If the rightmost column shows that a scheduled program hasn't been running properly, the most likely culprit is an out-of-date password. To change the user account password for a task, right-click the task in the Scheduled Tasks list, choose *Properties*, make sure that the 'Run as' box on the Task tab refers to a valid user, click the *Passwords* button, and enter the current password for that account.

MODERATE: If resetting the account password doesn't work, you need to dig deeper. Windows Scheduler keeps a log of its activities, and this record may prove instructive. To see it, click Start-All Programs-Accessories-System Tools-Scheduled Tasks and

Scheduled Tasks					
e Edt. Vew Favorte		Advanced Help Search Folders (11)-			
	294	Name - Add Scheduled Task	Schedule	Next Run Time	Last Pun Time
Offer Places	-	Backup Docs and Settings Defrags California	At 11:35 PM on day 15 of every month, s At 200 AH every Tue of every week, sta At 2:00 AH every Mon of every week, sta	11:25:00 PM 3/15/2004 2:00:00 AM 2/24/2004 2:00:00 AM 2/23/2004	Never Never 2:00:00 AM 4/21/2003
Shired Decements		Elifestat and Okask	At 2:30 AM every Mon of every week, sta	2:30:00 AM 2/23/2004	2.30.00 AM 4/21/2003

WINDOWS XP may fail to inform you that it hasn't run scheduled backups or defrags.

ware tab, and click the Device Manager button. Any devices that appear with a question mark are immediately suspect: Doubleclick each to follow up. To uninstall any recently installed (and therefore suspect) software, click Start-Control Panel-Add or Remove Programs. When you feel that it's safe to go back into the bring up the Scheduled Tasks list. Click Advanced. View Log. Notepad will appear, with the file SchedLgU.txt open. Windows maintains this fixed-length log file cyclically: New entries overwrite old entries until the program reaches the end of the file, at which point Windows jumps up to the beginning of the file and resumes overwriting old entries. Click *Edit-Find* and search for five asterisks (*****). That will take you to the most recent entries in the file. Look for obvious problems such as program error codes or invalid user accounts.

DIRE: If the Scheduled Tasks log fails to pinpoint your problem, you may need to create a new account with administrator privileges and give it a password (see tips 16 through 20 at find.



Digital Cameras

SYMPTOM: Marks or blemishes appear on all my photos.

MINOR: Look at the lens—most likely you'll find a speck of dirt or a smudge on the glass. Use a clean, lint-free cloth (available at most electronics stores) to brush away any dust particles and to remove smudges. Avoid using a shirt or cloth that could leave more particles behind or that might scratch the lens.

MODERATE: If cleaning the lens doesn't do the trick, the obstruction may be on the CCD sensor that acts as solid-state "film" for digital cameras. To get a sense of the problem, take a reference shot of a white sheet, a cloudy sky, or a blank piece of paper; dust specks really stand out in a white photo. To clear debris, digital single-lens reflex users can remove the lens and spray a shot of compressed air (sold in cans) into the space behind it. Owners of other models can try extending the camera lens and shooting air at the seams. Just make sure that you do this carefully in a clean, dust-free environment.

DIRE: To remove stuff that won't blow off, SLR owners can try using methanol and a lint-free cloth (attached to something like a cotton swab) to gently mop the CCD surface. This procedure can be tricky, so you might opt to have your camera professionally serviced instead. If that doesn't do the trick, you probably have a scratched lens or a damaged CCD. Owners of fixed-lens digital cameras must seek professional service, too.

SYMPTOM: My camera's lens won't deploy or retract.

MINOR: First, is the camera's battery charged and properly installed? You need power to move the lens assembly. And if you're shooting in cold weather, keep in mind that low temperatures can freeze mechanical components.

MODERATE: A lens that fails to deploy or retract could be a sign of a confused camera—especially if you experience other odd behavior such as error messages and focus problems. Try rebooting the camera. First, power down, remove the battery (you should also remove the secondary clock battery, if your camera has one), and wait a couple minutes. Then replace the battery and power back up. If the lens remains obstinate, check the vendor's Web site for updated firmware, which may help resolve the issue. pcworld.com/41585). (Windows will run scheduled tasks only if they are attached to password-protected accounts or if they run with accounts verified on your corporate network. Neither the Scheduled Tasks Wizard nor Windows Help warns you about that crucial fact.) Once you have a password-protected account, bring up the Scheduled Tasks list again, double-click the Add Scheduled Tasks icon, and tell the wizard to use the new account.

USE A DUST-Iree, microfiber cloth

DIRE: No luck yet? Listen for any clicks or whirs from the lens assembly when you power up the camera—these are signs that the unit is trying to move. A slight nudge or tug at this point may clear the blockage. Or try gently rocking the extended lens to help it find the groove. If these efforts fail, you may have to get the camera serviced.

SYMPTOM: I can't access photos on my memory card.

MINOR: Did someone else recently use the camera, or did you recently review photos on the card? The image files may have been accidentally erased. Find out by using an undelete program like QueTek File Scavenger (find.pcworld.com/41588) to comb through the memory card and find files that are marked as deleted in the card's file allocation table.

MODERATE: If your camera can't recognize the memory card, the card may be using the wrong file system. Most older cards and cameras employ the FAT16 file system. But FAT16 can store only a little more than 2GB of data. With some CompactFlash cards already breaking the 2GB barrier, more cameras and cards are converting to the FAT32 format. You can use the camera's on-board controls to reformat the card, or you can reformat it on your PC using a card reader, but you won't be able to see the full capacity of cards larger than 2GB if you format them in FAT16.

DIRE: Still can't see the media? Try using the memory card in a working camera or a card reader that uses the same memory type. If you can't get the media to work there either, you probably have a shorted or physically damaged card in need of replacement. On the other hand, if you do manage to get the card to work elsewhere, the problem could be with your camera.

TECH FIXES



SYMPTOM: I can't get my e-mail.

MINOR: If you got all your mail yesterday and your e-mail program seems to be working properly otherwise, *don't do anything*. Almost without exception, a mail outage signifies nothing more than a problem with your Internet service provider: a severed cable, a mail server that's swimming with the fishes, or a worm attack that's left the country in slow-mo. If you change your e-mail settings, your chances of breaking something are very good. Don't do it. Wait a few hours and try again. If your ISP has a Web page with reliable status reports, keep an eye on it.

MODERATE: So you've gone a few hours without your e-mail fix; you've checked the news, and there aren't any reports of new MyDooms ping-ponging around the globe, and it seems very likely that something's wrong with your system. Your next step is to pick up the phone and call your ISP. Explain the problem in detail. In all likelihood, some change at the ISP is affecting service to you, and if you've waited a suitable amount of time, the tech support people should know exactly what went wrong.

DIRE: If the fault doesn't lie with your connection, your e-mail program may have gone out to lunch. Outlook, for one, is notorious for behaving strangely and even locking up in some instances if its data file—also called a PST file—gets scrambled. Microsoft ships an Inbox Repair Tool with Outlook. To get the most out of it, see the instructions at find.pcworld.com/41591. If you use Outlook 2000 or 2002, regenerate your PST file every month, and copy contacts, calendar entries, and in-box messages from the old PST file to the new one (see find.pcworld.com/41594).



SPYBOT SEARCH & DESTROY roots out scumware everywhere. Use it in conjunction with an unrelated scanner, such as Ad-aware, to get rid of home page hijackers and other persistent infuriating junk.

SYMPTOM: Internet Explorer has the wrong home page.

MINOR: If you have a new PC, Internet Explorer probably opens on the manufacturer's Web site. If you haven't changed that already, navigate to the home page you want, click *Tools-Internet Options*, and in the 'Home page' box on the General tab, click Use Current. Occasionally, IE may open to a Microsoft page to inform you of a critical update. If clicking the Home button returns you to the expected place, everything is fine.

MODERATE: Some programs or Web sites change your home page. (You may find a warning about the change in the fine print of a license agreement.) Follow the procedure above to switch it back; then reboot to confirm that the change has taken effect.

DIRE: If the unwanted page returns, some piece of scummy software is resetting the home page every time you start Windows. Most evil apps of this type can be cut off by one of two free programs: Ad-aware (find.pcworld.com/38240) or Spybot Search & Destroy (find.pcworld.com/41582).



Hard Drives

SYMPTOM: Some of my files won't open. The dialog box says they're corrupted or unreadable.

MINOR: Did you recently suffer a system crash while a program was writing data to your hard disk? If so, your corrupted file may simply be an isolated incident. And because programs like Microsoft Word save intermediate versions of a file as you work on it, you may have something to go back to since your last successful save.

MODERATE: If hours of running the PC occasionally yields bad files, use a tool like

Motherboard Monitor (mbm.livewiredev. com) to gauge the case interior's temperature. If it exceeds 90 degrees Fahrenheit (about 35 degrees Celsius), you're setting up your drive to fail. Check that vents and fans are clear and that all fans are working.

DIRE: When corrupt files appear, run Windows' Check Disk tool to detect physical flaws on the disk: Open My Computer, right-click the drive's icon, choose Properties, select the Tools tab, click Check Now, and click Start. Bad disk sectors can portend a drive failure. If any pop up, back up your data and consider replacing the drive.

SYMPTOM: The system won't boot or doesn't see the hard drive.

MINOR: Before you panic, take another stab at booting. Maybe your cold hard drive simply couldn't answer the call in the early chill of morning. If that fails, open the case and check the power and data cables. A loose connection can prevent your system from seeing the drive.

MODERATE: Did you recently install a new drive in your PC? If so, check the dip switches or jumper pins on the drives to ensure that the master or slave settings of



SYMPTOM: Disc burning hangs or quits halfway through.

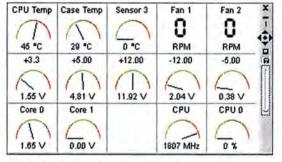
MINOR: An overtaxed system can result in failed disc burns. Use Windows XP's built-in CPU Usage monitor (on the Performance tab of Task Manager, which opens with **<Ctrl>-<Alt>-<Delete>**) to see whether CPU utilization spikes during burns. You can streamline the process by closing applications, including such background utilities as antivirus and IM software.

MODERATE: Unfortunately, incompatibilities between CD/DVD writers and different models of discs are common. A drive may work fine with TDK 4X DVD media, but fail repeatedly with Fujifilm or Philips discs. Trial and error is a time-consuming way to find out which discs work best with your drive, so consult the vendor's documentation for media recommendations, or peruse forums like those at DVDRhelp.com for user reviews of DVD- and CD-based writable media.

DIRE: If burning issues persist, use our step-by-step guide to IDE configuration (find.pcworld.com/38969) to check the IDE settings of your CD/DVD writer and primary hard disk. Each of those two drives should be set as the master drive on its IDE channel. Drives set as slaves have lower priority and may fail to receive the bandwidth they need during burns.

SYMPTOM: I can't read discs that I burn successfully.

MINOR: Does Windows Explorer note that there is used capacity on the disc, but fail to see any files? If so, you may not have closed the disc properly. You must finalize DVD-R and CD-R discs if you



KEEP AN EYE on system temps with Motherboard Monitor.

the IDE devices don't conflict. (Go to find. pcworld.com/38969 for detailed guidance.)

DIRE: Worst case, your drive is dead or unbootable (the critical boot sector of the disk may be damaged). If this is your boot drive, you can use a floppy- or CD-ROM– based utility to boot the PC and investigate want them to play on other PCs or devices. Be sure to check that box before you burn. Also, try lowering the burn speed in software you may be able to avoid errors by slowing the rate of rotation.

MODERATE: Even if you properly close your discs, you may still

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USE ISOBUSTER to recover files from damaged CDs and DVDs.

see occasional corrupt-file messages or other errors on playback. You can recover information from troubled discs with a utility like IsoBuster (find.pcworld.com/41597) that scans balky optical discs and can rebuild lost files on your hard drive. You may be able to resolve persistent issues by downloading a file that upgrades the firmware on your CD or DVD writer; check with the drive vendor for the latest firmware version.

DIRE: Some combinations of drives, burning software, and disc media may never get along. Try new media first, and look for a firmware upgrade if you continue to have problems. Ongoing difficulties may force you to experiment with another software package or to purchase a more reliable drive.

the problem. Or take the drive out, set it as a slave, and plug it into a working PC to test it. If it works, pull your critical files off the drive and reformat it.

SYMPTOM: Disk access takes too long and my PC has slowed down.

MINOR: A fragmented disk rarely has a significant impact on performance, but you should rule out the possibility first by running Windows' Disk Defragmenter. If your XP system has less than 256MB of RAM, a likelier cause is that Windows is using your hard disk as virtual memory too often. Install more memory, and the problem will probably go away.

MODERATE: Mysterious disk activity may be due to spyware running on your PC. Programs like Ad-aware and Spybot Search & Destroy can help remove those nasty little freeloading apps.

DIRE: No infections? Excess disk activity and abnormal noise could indicate a defective disk at work. Back up your files immediately and replace the drive. TECH FIXES /



SYMPTOM: My printer refuses to print.

MINOR: You know the usual stuff. Check power and data cables, make sure the printer is turned on, and confirm that no paper is jammed inside the unit. Then open the Printers and Faxes window to see whether the printer you're using is set as the default. If it isn't, applications will blithely send print jobs off to another target, whether or not it's installed on your PC. Finally, print a test page using your printer's driver software, to rule out the existence of a problem with the specific application you're using.

MODERATE: Most printers sold over the past three years use the Universal Serial Bus to connect to PCs—but USB can be pretty flaky. If you notice intermittent printer outages, unplug the USB cable from the printer and then plug it back in after about 30 seconds. If your print job resumes, you may have a faulty connection or an overloaded USB bus. If the problem recurs, unplug a few noncritical USB devices and see if that solves the problem.

DIRE: Check the print queue. Jobs that are reported as complete when nothing comes out at the other end indicate an issue with the printer itself. You might try cycling the printer on and off. Of course, frequent paper jams, misaligned prints, and mangled output paper are all indicators of a mechanical problem.

SYMPTOM: Printouts are light, have the wrong colors, or smear. Photos look grainy or lack detail.

MINOR: Check ink levels first. Printing photos and graphics can consume ink at a prodigious clip. Also, make sure that you're using the proper paper for the job (superior photo output requires top-notch photo paper) and that it matches the specifications in the printer properties dialog box. If these variables check out, calibrate the printer using its driver software.

MODERATE: Printers sometimes suffer from trapped air or dried ink in the printhead. Your printer software may recommend a cartridgecleaning routine for flushing out obstructions to ensure proper flow of ink. Another possible culprit is the printer's driver software, particularly if

the problems arose shortly after you used a newly installed application or operating system. Visit the vendor's Web site and download the most recent driver. If you're having trouble printing photos, consider using a fine photo-printing application called Qimage Pro (www.ddisoftware.com/qimage) to output your photos. This software's special sampling techniques produce superior output that can boost the quality of older printers. **DIRE:** Are you using reconditioned cartridges? Such cartridges can spring leaks or gum up. Pull the cartridge and check it for excess ink or blockage—dab a wet paper towel on the head and examine it for evenly distributed color or black ink. If the distribution is uneven, you can try soaking the head in water for a few hours, dabbing it dry, and reinstalling it in the printer. Worst-case scenario, your printer just doesn't have what it takes to produce acceptable photo output. Our *Top 5 Photo Printers* chart (find. pcworld.com/40595) has capable photo printers for around \$200.

Notebooks



that you run. If you play Unreal Tournament or compress video

files on battery power, your por-

table won't remain charged for

long. Finally, try lowering the

MODERATE: Rechargeable

batteries wear out, and some

types wear faster than others.

You can expect lithium ion bat-

teries to start losing their youth-

ful vigor after about 18 months.

Nickel-based batteries (nickel

cadmium and nickel metal hy-

dride) are more robust, but they

require regular deep discharg-

ing to avoid shortened battery

life (the well-known "memory

effect"). For aging lithium bat-

screen brightness.

SYMPTOM: Battery life is way too short.

MINOR: Check your Windows power settings. Your notebook may be running full blast even when no activity is under way, robbing you of useful battery life. Review the settings in your laptop's Setup program, too, to make sure your system isn't ignoring power-saving opportunities. Next, consider the applications

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ADJUST THE POWER options in Windows to save battery life when your system is not in use.

teries, your only real option is to replace the unit.

DIRE: Is this a new PC? If so, check your specs. Some desktop replacement notebooks use desktop parts like Pentium 4 CPUs and 7200-rpm hard drives that can exhaust a battery within an hour. If your PC is one of these beasts, its battery life will always be low, though you can buy a third-party battery extender pack or install a second battery (if your notebook supports this).

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Windows^{xp} C Edition

TECH FIXES

Displays and Graphics Cards

SYMPTOM: The graphics on my display look garbled, grainy, or unclear.

MINOR: Do graphics and text appear grainy or chunky? Does it look as though application windows no longer fit on screen in the way you're used to? A resolution or device mix-up can wreak this kind of havoc. If you can read the screen well enough, review the graphics resolution and other settings by right-clicking the Windows desktop, clicking Properties, and selecting the Settings tab. Check the Screen Resolution slider bar and the graphics card model to confirm that they are as expected. When this kind of problem occurs in a game, driver software could be at fault. Go to the vendor's Web site for the most recent driver. Sometimes, an older, more stable driver may produce better results than the latest version. You might also check for a patch to the game.

MODERATE: If the screen has become extremely dim or has acquired a red or blue cast, a loose or damaged cable may be allowing only a portion of the intended signal through. Also check the pins in the VGA cable plug to see if they are bent-you can use a pair of needle-nose pliers to gently straighten pins before reconnecting the cable. If you have a CRT monitor and the image appears wavy, a likelier culprit is a magnetic field emanating from a speaker, clock, or second monitor and scrambling your CRT. Try moving any electric devices farther from the display.

DIRE: Do you have a CRT monitor that periodically loses focus or makes popping noises? Or has your LCD screen grown very dim or begun flickering annoyingly? If twiddling with controls and (in the case of CRTs) manually degaussing the display does not work, there's a good chance your monitor is preparing to shuffle off this mortal coil. Take it in for service or replace it.



SYMPTOM: There is no visible graphics output.

MINOR: Best case, you twiddle the cables or open the PC to reseat the card, and fix what had been a poor connection. If you just hooked up the monitor, make sure that you plugged it into the correct port. Many graphics cards sport both analog VGA and Digital Video Interface output connectors.

MODERATE: If the simple corrective actions fail, check for heat buildup from a failed graphics chip fan-especially if the screen goes dark after a period of operation. Again, the Motherboard Monitor utility (mbm.livewiredev.com) provides a real-time display of case temperatures. Also, after allowing things to cool a bit, open the case and boot the PC; then check whether all fans are working and all vents are clear.

DIRE: If these steps fail you, narrow down the source of the problem by plugging a different working monitor into the card. If the new display is blank as well, you may have a fried graphics card. Another clue: If at boot time you can't see even the POST output (the text that displays before Windows loads), the problem could be serious. Of course, if the second monitor works perfectly, the trouble is almost certainly in the display.

Wide-Screen TVs

A BENT PIN on

SYMPTOM: Black or gray bars show on the top or sides of the screen.

MINOR: Video comes in so many shapes and sizes these days that displaying it properly can be tough. On wide-screen sets, standard-definition television should appear in windowbox format with gray bars on either side of the picture. If you like, you can expand the picture horizontally to fill the entire screen. Use your TV's remote to enter setup mode and look for an advanced video or picture section. There should be a setting called 'aspect ratio' or 'picture mode' with several options that allow you to zoom in on a picture or stretch it horizontally.

MODERATE: If you get black or gray bars while watching HDTV, the situation is a little more complex. Depending on the program you're watching, the picture's resolution and aspect ratio can change. For example, most commercials aren't shot in high definition, so the networks switch to standard definition to show ads. Your TV will switch to accommodate that signal, so you may see a windowbox-size picture during commercials. In addition, some movies are shot in an aspect ratio that demands a wider picture than widescreen sets can display. In that situation, a letterbox-size picture-with two thin black bars appearing above and below the picture-is normal.

DIRE: Okay, so this isn't too dire, but if a DVD player is your video source, the player or your TV may not be set up correctly. See "DVD Players" on page 88 for instructions on solving the problem.

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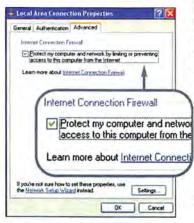
Little fish affordability



SYMPTOM: My computer is acting strangely-I think that it may have a virus.

MINOR: If you don't have an antivirus package installed already, it's time to get one. When you think you have a virus, your first step should be to update your virus definitions and run a full scan. You should also drop by your antivirus software manufacturer's home page and check for fixes to all the latest creepy-crawlies; it can take antivirus companies 12 to 24 hours to respond to fastbreaking problems, though, so the update you need may not be available yet. As a stopgap—or for a second opinion—try one of the free antivirus scanners available online, such as Grisoft AVG Anti-Virus (www.grisoft.com), McAfee FreeScan (find.pcworld. com/41606), Symantec Security Check (find.pcworld.com/ 41603), or Trend Micro (housecall.antivirus.com).

MODERATE: Two different virus scanners tell you that your system is clean, and you know you aren't uploading or downloading anything, but the light on your modem or DSL line keeps blinking like a firefly in heat. As long as you're running a firewall, such as ZoneAlarm (www.zonelabs.com) or even the muchmaligned Windows XP Internet Connection Firewall, you're probably okay. Chances are good that Windows is downloading



ENABLING WINDOWS XP'S Internet Connection Firewall provides your PC with a minimal level of protection.

patches automatically, without warning you. (To see whether ICF is running, first click Start-Control Panel-Network and Internet Connections-Network Connections. Then right-click your Internet connection and choose Properties. Finally, on the Advanced tab, check the first box.)

DIRE: If your modem/ DSL/cable connection light just won't go off, you may be in big trouble. There's always a lag

of several hours—and sometimes up to a day—after a new worm appears before the antivirus software companies can update their scanners, and you may be under attack during that highly contagious initial period. Worse, some worms can block attempts to get to antivirus software manufacturers' sites—so if you're infected, you can't download the latest files to eradicate the problem. If you think that may be happening to you, unplug your Internet connection. Use another computer to check the U.S. Computer Emergency Readiness Team site (www.us-cert.gov) to see if any debilitating worms or viruses are on the loose. CERT should have detailed instructions (or at least links to sites) explaining how to identify an infection and how to get your machine working again. Follow those instructions to the letter before you reconnect your computer to the Internet.

DVD Players



SYMPTOM: I see glitches in the video during playback.

MINOR: Don't worry if your DVD player seems to pause for a second about halfway through playing a movie. If it always happens at the same point in the film, you're most likely dealing with a normal feature of DVD mastering called a layer switch. Many DVDs store data on two layers: The first spirals outward from the center of the disc, and the second spirals inward from the edge. The pause occurs as the DVD player adjusts its laser to focus on the second layer and reverses the direction the laser is moving. This pause can be more or less pronounced depending on the player you use, but it is normal and no cause for concern.

MODERATE: If your video appears vertically stretched or squashed, you've tripped over a DVD feature called anamorphic encoding. Many DVDs use this feature to enhance picture quality on TVs that support a wide-screen mode. It looks great when it's working, but if your TV and DVD player aren't set up correctly, you get stretched or pinched visuals. To return things to proper working order, you should first check your manual to determine what modes your TV supports. If your set supports an anamorphic or wide-screen mode, set your DVD player to work in 16:9 wide-screen mode. If not, choose one of the 4:3 picture modes. A DVD Web site called The Digital Bits has a great tutorial on anamorphic DVDs (see find.pcworld.com/41612).

DIRE: The worst glitch most DVD players encounter is a disc that freezes or skips. If you experience this type of garbled video—and it can look pretty ugly the first time you see it—your DVD is smudged or scratched. Clean it with a dust-free cloth to remove smudges. Unfortunately, some scratches can be too deep or wide for a player to read. You can try a specialized cleaner like SkipDoctor (www.skipdoctor.com), but there's no guarantee it will fix every disc, and you may be stuck replacing the disc.

Michael Desmond is a freelance writer based in Colchester, Vermont. Woody Leonhard's latest book, Office 2003 Timesaving Techniques For Dummies, just hit store shelves.



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Which PC Do You Nee

BY ROY SARTOS PHOTOGRAPHS BY MARC SINGH



SMALL BUT PROUD: Stealth Computer's Littlepc measures roughly the size of a shoe box. One computer doesn't fit all. We look at systems for the office, the home, and the road to help you find the right machine.



BIG AND LOUD: The Alienware Aurora Extreme stands about 23 inches tall.



IN A WORLD filled with so many different types of PCs, is it possible to find one that fits you to a T? When it comes time to replace your home or office PC, you could opt for a big tower, a little shoe box–size unit, or a hefty desktop-replacement notebook, to mention a few possibilities. With so much variety, how do you decide which PC is appropriate for you?

We examined and lab-tested several types of computers to find out what you can and can't do with them, and to learn what trade-offs you make when you choose one over another. We scrutinized four categories: big tower PCs; small systems, including all-in-ones (units that integrate case and monitor); wide-screen desktop-replacement notebooks; and beige boxes. Using test systems in each category, we compared size, performance, upgrade potential, overall design, and price. We discovered that no matter what your quirk, there is probably a PC whether huge or tiny, portable or nearly immobile, fully equipped or basically stripped—waiting out there for you.

BIG AND TALL

HUGE TOWER PCs certainly don't appeal to everyone, but for the person who has money to burn and space to spread out, and who wants off-the-charts performance, a big PC could be the ticket.

Large, decked-out PCs typically have

several inherent advantages over small, space-saving systems or even a basic beige-box PC. Most towers tend to be huge, usually 22 inches tall by 10 inches wide by 22 inches deep. Such dimensions give them lots of room inside for massive graphics cards and the cooling apparatus required by the fastest processors, and their large motherboards can accommodate all manner of upgrades.

The Alienware Aurora Extreme, one of the tower PCs we examined, used its high-end components to blaze through our PC WorldBench 4 tests. Employing a 2.2-GHz Athlon 64 FX-51 CPU and 1GB of RAM, the Aurora Extreme earned a score of 141—one of the fastest scores

PC POINTERS

Supersize It or Downsize It?

SPACE CONSTRAINTS MAY determine which PC you choose, but other factors are also important to consider.

TOWER PCs	SMALL SYSTEMS	NOTEBOOKS	BASIC BOXES		
PROS					
Extremely upgradable: Towers tend to have more open slots and bays than other types of systems. Speedy performers: Many towers use the latest processors, graphics cards, and storage, making them ideal for gaming or video editing. Flashy style: Some tower PCs resemble otherworldly technology, with lights, knobs, and other adornments.	Space savers: Small systems can easily tuck into a corner on your desk, or even attach underneath. Unique styles: Many petite systems have distinctive cases. Some have han- dles for easy toting. Strong performers: Despite their size, many little systems use speedy proces- sors to perform briskly.	Ready to go: Even a big wide-screen notebook, which can weigh upward of 10 pounds, is much more portable than a comparable tower system. Not the latest components, but still strong: Many notebooks use processors that are a few ticks in speed behind those used by desktop systems, but big notebooks often turn in good perfor- mance numbers.	Cheap, cheap: A basic system can cost as little as \$700-not bad, when a more exotic tower or notebook can set you back several thousand dollars. Wide selection: Basic systems are available with everything from the latest processors to somewhat older CPUs-offering plenty of choice between performance and cost.		
CONS Space hogs: Plan on clearing out space for your tower-they take up lots of room, whether on the desk or under it. Nolsy: With all the fans necessary to cool the hot-running components, tow- ers tend to run a lot louder than other types of systems. Not portable: Because they're big and heavy, towers are hard to move around.	Little room for upgrades: Because their components are compressed into a tight space, many petite systems offer no opportunity for tweaking. Hot, hot, hot: Small systems have less space to cool all the components and can run much hotter than a tower with lots of breathing room.	Bye-bye, upgrades: Compared with opening a desktop case, opening a notebook can be a much more involved task and yields few upgrade options. Expensive: The cost of a notebook can be considerably higher than that of a similarly configured desktop system, but such is the price of portability.	Less expansion room: Big towers beat smaller beige boxes on upgradability, though many basic systems offer almost as many slots and bays. Dull design: If you'd like a flashy sys- tem, a basic machine in gray or black might not suit your style.		

we've seen from any desktop PC. The other big tower we looked at, Cyberpower's Gamer Infinity 9900 Professional, used its 3.4-GHz Pentium 4 processor and 1GB of RAM to score 135 on PC WorldBench 4—obviously not as speedy as the Alienware system, but still quite fast nonetheless.

Both systems also turned in impressive graphics performance in our tests. The Alienware delivered 127 frames per second in the game Return to Castle Wolfenstein at 1280 by 1024 resolution and 32-bit color; the Cyberpower, 137 frames per second. Considering scores like those—some of the fastest we've seen—it's no wonder that many gamers prefer tower PCs.

But top speed might not be the only reason to consider a tower. A big box usually gives you flexibility: If your system didn't come with a FireWire port or enough USB ports, you can simply add a card that

has them. Want to record television programs on your computer? Add a TV-tuner card. Gigabit ethernet? A 7.1-channel sound card? A Serial ATA adapter and dual hard drives so you can set up a RAID array? With enough expansion slots and drive bays in the system, you can upgrade at will. The ample space inside both of the big towers we looked at—three slots and two bays were empty within the Alienware and two slots and three bays were available in the Cyberpower—would allow performance-hungry owners to do almost anything with them.

On the other hand, with a smaller PC upgrading can prove nearly impossible. Getting into a small system in the first place is often quite difficult; and even if you are able to open it, a small system usually lacks the room for upgrades.

The downside to a humongous tower:



ALL LIT UP: Falcon Northwest's FragBox Pro (top) and Cyberpower's Gamer Infinity 9900 Professional use blue fans.

Stuffing one full of powerful components usually means it will need lots of fans to keep cool. In fact, the Cyberpower system uses a total of nine fans—even for its hard drive and graphics card. And fans create noise; the Alienware and Cyberpower systems both ran quite loud.

However, the Cyberpower does offer some compensation: It includes control knobs and digital temperature gauges for two fans on the front of the case, allowing you to modulate some of the amount of air you send through the system.

Many big towers distinguish themselves with unusual designs. Both the Alienware and the Cyberpower look distinctive—for instance, both have seethrough panels (a feature becoming more common on big towers, especially those aimed at gamers). The Alienware system resembles a spaceship, with silver grilles decorating each of the bottom corners and an alien face with red lit eyes adorning the top. Both computers also have lights that illuminate their fans, giving the interior of each system an eerie glow.

These super systems usually require super investments. Alienware demonstrated little restraint with the Aurora Extreme we looked at; as configured, it would cost you almost \$4000, not exactly chump change when you can easily buy an unadorned basic system for less than \$800. The Cyberpower Infinity 9900 Professional costs \$3700. But if you're looking for the best in performance and upgradability, a tower should be for you.

ON THE SMALL SIDE

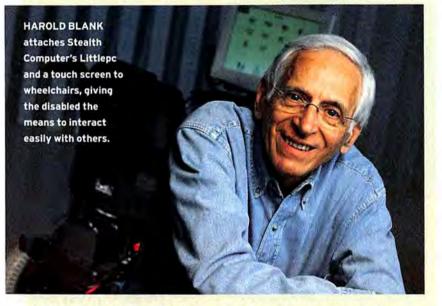
INSTEAD OF FAVORING a PC that offers infinite expansion possibilities and sky-high performance, you may prefer a small, unobtrusive system to save space, perhaps, or for portability. Some of these PCs

look like Mini Coopers next to SUV-like tower systems, but they manage to pack all their components into compact cases, making them much easier to move around. While some of these little systems are designed for use by company field representatives on the road, others are often aimed at users who need a fairly portable but high-powered PC.

One of the small systems we looked at for this review, the Falcon Northwest FragBox Pro, comes equipped with a powerful processor and graphics card to satiate the needs of performance-hungry gamers. A 2.8-GHz Pentium 4 CPU and 1GB of RAM helped it earn a score of 123 in our PC WorldBench 4 tests. The Frag-Box Pro's graphics test results were quite fast, though not as impressive as the speedy scores turned in by the Alienware and Cyberpower tower machines. Another small system we examined, the Stealth Computer Littlepc LPC-401X, had a 3.2E-GHz Pentium 4 processor (Intel's latest version of the Pentium 4) and 512MB of RAM. It earned a PC World-Bench 4 score of 121—a little slower than other systems with a similar configuration, but still quick enough to handle most tasks. Unlike the FragBox, the Littlepc uses integrated graphics, and it lacks an AGP slot that would allow you to upgrade to a graphics card.

According to Stealth Computer, the Littlepc was designed for users who need top

PROFILE



Using the Littlepc to Improve Lives

HAROLD BLANK HAS BEEN trying to assist people afflicted with cerebral palsy for many years. As a board member for CHI Centers in Baltimore, an organization that provides services to about a thousand people with various disabilities, he has led the development of specialized software that is designed to help the disabled communicate with others by using computers and touch-screen monitors.

Blank has used different PCs in the past, but currently he finds Stealth Computer's small system, the Littlepc, to have the best combination of light weight, small size, and power. Before discovering the Littlepc, Blank usually specified laptops for his clients. Though they were compact, notebook PCs were kludgy to use because Blank had to remove each machine's LCD and connect the remainder to a touch screen.

Now Blank mounts both the Littlepc and the touch screen to a special bracket on a user's wheelchair. The PC provides access to his Assistive Technology software, which includes over 4000 common words and phrases. Icons on the touch screen represent everyday categories such as food, clothing, and feelings. Through prerecorded audio, the software verbalizes user-selected categories and words, allowing the user to communicate easily by depending on common phrases or requests.

Considering that Blank started out with a DOS-based system that relied on icons glued to a keyboard, he believes the Littlepc is a vast improvement. Because he doesn't have to concentrate too much on tinkering with PC hardware, the Littlepc has allowed him to focus on improving the software to incorporate newer features, such as customized text-tospeech and different versions for other nonverbal people, such as stroke victims. processing power and portability. The unit is just 3 inches thick, under 6 pounds, and smaller than a box of crackers.

Though the Littlepc ran quietly, it came with only one small fan for the CPU. Using such a powerful processor in such a petite case without a phalanx of fans causes heat issues: The Littlepc's black aluminum chassis became very hot while the system was on. Stealth Computer insists that the heat is not a problem.

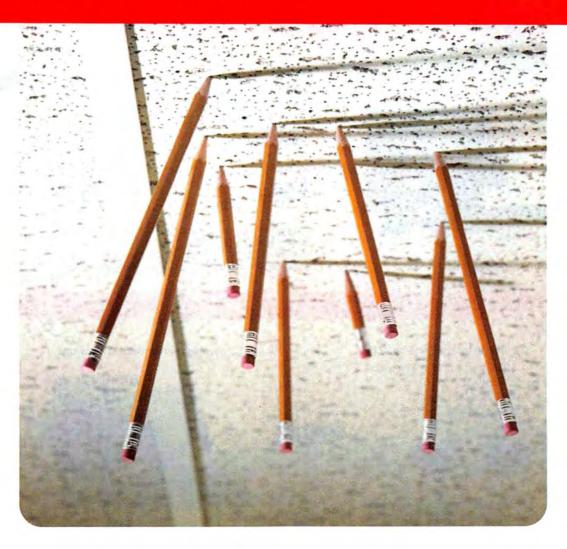
As you might imagine, upgrading a small PC such as the Littlepc would be next to impossible. Because of its diminutive size, you won't find many things on it that are standard on other PCs, like a floppy disk drive, and there's no room to add such components, either.

In fact, expansion is often limited—if not at times out of the question—with small systems. The shape and size preclude room for extra bays to hold additional drives or slots to take extra expansion cards. The Littlepc does, however, have an open slot for extra RAM. Falcon Northwest's slightly bigger but still diminutive FragBox Pro, on the other hand, offers a little more: one open 3-inch drive bay and one open expansion slot.

The FragBox Pro is a tad bulkier than the Littlepc, and it ran cooler in our tests, thanks to a few fans serving the processor and graphics card. It measures 8.3 inches wide, 9.5 inches high, and 12 inches deep, and comes with a handle on top for easy toting. At 14 pounds, it's light enough to carry around. (But don't forget: You still have to lug along a monitor, speakers, a keyboard, and a mouse.) Like many tower PCs, the FragBox has clear side panels, allowing you to peek at its slightly cramped interior, which is illuminated by blue lights.

Falcon's entry-level FragBox comes in at a relatively bargain price of \$1095 (not including a monitor), but to get the configuration we looked at, you'll have to shell out a little over \$2200, including the price of a monitor. The Littlepc models also start out at around \$1095, but the model we tested, with a 200GB hard drive and a DVD-ROM/CD-RW combina-

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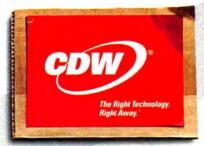


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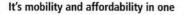
hp compaq nx9010

- > 2.4GHz Mobile Intel® Celeron® Processor
- > 256MB RAM
- > 30GB Hard Drive
- > 14.1" XGA active-matrix display



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Recommended supplies and accessories: HP 256MB Memory \$99 (CDW 548016) CPQ Port Replicator \$169 (CDW 499638) 3 Year 9x5 Next Business Day On-Site Warranty \$115 (CDW 431750)





IBM ThinkPad R40e

- > 1.8GHz Intel® Celeron® Processor
- > 128MB RAM
- > 20GB Hard Drive
- > 14" XGA active-matrix display



Recommended supplies and accessories: IBM 256MB Memory \$80 (CDW 372399) IBM 3 Year Depot \$160 (CDW 169500)

Toshiba Tecra M2-S430

- > 1.4GHz Mobile Intel® Pentium® M Processor with Centrino™
- > 256MB RAM
- > 40GB Hard Drive
- > CD-RW/DVD Combo



Recommended supplies and accessories: Toshiba Advanced Port Replicator \$129 (CDW 443721) Toshiba 3 Year System Guard \$165 (CDW 289266)







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tion drive, costs \$1965, not including a monitor. The company doesn't sell regular monitors, but it does special-order units for industrial applications.

ALL-IN-ONES

ANOTHER CATEGORY OF space savers, all-in-one PCs, don't take up much area on a desktop and also can be portable. Manufacturers such as Gateway, MPC, and Sony offer all-in-one PCs that are geared at users who need to save space and don't intend to upgrade components.

We took a look at the Gateway Profile 5XL. It weighs 25 pounds, and its small footprint takes up just a little more desk space than a piece of letter-size paper.

With all of the parts incorporated into one piece and no ugly power and video cords linking the monitor to the PC, the Profile 5XL is a good solution for users who require the quickest setup possible: Connect a few cords, press the power button, and you're good to go. Adding a wireless mouse and keyboard further cleans clutter off your desktop.

Like other small PCs, allin-one systems allow little room for expansion or upgrades. To open the Profile 5XL, we had to use a screwdriver to remove four screws. Once we got inside, we found the motherboard perched vertically behind the LCD, stretching from near the base to almost the top of the monitor's back. Components and cords were tightly packed in the narrow space, making it a challenge just to add more RAM in the one open slot. Surprisingly, the Profile 5XL has one open 3-inch bay (for an extra hard drive, for example), but no expansion slots whatsoever.

Thankfully, the assortment of components and peripherals for all-in-ones can be first-rate. The Profile 5XL we examined came with a beautiful, integrated 19-inch LCD monitor, a 3.2-GHz Pentium 4 processor, and a rewritable DVD drive. (Other lower-priced configurations provide slower processors, a CD-RW drive, and either a 15- or 17-inch LCD monitor.)

With one of Intel's faster CPUs and 1GB of RAM, the Profile 5XL achieved a respectable mark of 122 in our PC World-Bench 4 tests—about the same as other similarly configured systems but speedy, regardless. It performed a hair better than the Littlepc, but certainly not as well as the two tower systems we looked at.

The Profile 5XL we saw, with its 19-inch

optimized for home multimedia applications like photo slide shows and TV, and we found it ready for most any graphicsintensive task you might throw at it.

Using a 2.8-GHz Pentium 4 desktop processor and 512MB of RAM, the Zd7000 earned a score of 110 on our PC WorldBench 4 tests. Such a mark means the Zd7000 is not nearly as fast as many currently available tower systems; however, the laptop performed in line with similarly configured notebooks (and even most desktops with the same processor).



LCD monitor, costs about \$2300. However, like the Littlepc, the lowest-priced Profile 5 model (with an integrated 15-inch LCD monitor) costs roughly \$1100.

PORTLY PORTABLES

WHILE ONE CATEGORY of desktops has shrunk, a class of notebooks has increased in girth. Large, heavy desktop replacements often come equipped with lots of processing power, capacious storage, and monstrous wide-aspect screens. Some seem intended more for use on your desk than on your lap.

We examined HP's Pavilion Zd7000, a huge notebook with a 17-inch widescreen display that's ideal for watching DVD movies. The Zd7000 runs Windows XP Media Center, the operating system The Zd7000 weighs 11.1 pounds including its power adapter, so it's not the best system to tote from place to place. However, it would certainly be much more portable than even a small desktop system such as the FragBox—with that unit, you would have to take along all the necessary peripherals, which would add a lot of weight and be clunky to carry.

Behemoth laptops frequently include fast mobile graphics processors, such as the 128MB NVidia GeForce FX Go or the 128MB ATI Mobility Radeon 9700; the Zd7000 uses the former.

With a notebook, don't expect much in the way of upgradability. Most allow you to swap in a new hard drive or add RAM, and many have a PC Card slot for installing extras such as Wi-Fi, but that's it.



If tinkering inside a PC is your passion, a notebook might not be your best choice.

The HP Zd7000, configured as we saw it, will set you back \$2029, about \$500 more than a similarly configured desktop PC would. But if you want the best of both worlds—that is, a powerful processor and a big LCD packed into a



OPEN FOR UPGRADES: HP's Pavilion A450e (left) and Dell's Dimension 8300.

portable system—a desktop-replacement notebook could be just the sort of computer that you ought to choose.

WHAT ABOUT THE BEIGE BOX?

SOMETIMES, YOU JUST need a basic system without all the flash. The beige box is still holding tenaciously to its place in offices and homes. But "beige box" is now just a convenient term for a system that is in fact no longer beige—many PCs of this type are modern-looking machines updated with industrial grays, purples, and even metallic hues. Nevertheless, they are sometimes hard to distinguish from one another.

We discovered. though, that some supposedly boringlooking systems blur the line between beige-box units and gaming PCs. We put two outwardly straitlaced systems-a **Dell Dimension** 8300 and an HP Pavilion A450ethrough our tests, and found that each delivers performance more than adequate for

gaming or other graphics-intensive tasks.

Using a 3.2E-GHz Pentium 4 processor and 1GB of RAM, the Dell Dimension 8300 earned a PC WorldBench 4 score of 128—a mark 3 points faster than the average score of similarly configured systems. In our graphics tests, it turned in frame

PROFILE

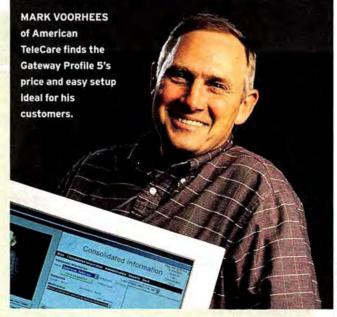
Long-Distance Health Care

AMERICAN TELECARE, an Eden Prairie, Minnesota-based company that sells hardware and software enabling patients to consult with doctors and clinicians from their homes, recently was looking for new PCs to offer to clients. American TeleCare sets up computers for both clinicians and patients that allow the two to videoconference using phone lines and video cameras. Various pieces of medical equipment can be attached to the patient's system to monitor stats such as blood pressure, pulse, and glucose levels. The system then sends the data to the clinician.

According to Mark Voorhees, the company's purchasing manager, it was important for clients to have PCs requiring little setup or maintenance. Furthermore, customers needed large monitors that pivot to allow a clinician to view the patient.

Voorhees says the company was satisfied enough with the previous performance of Gateway's Profile 4 that it decided to offer the all-in-one model's latest incarnation, the Profile 5. Among the PC's merits, Voorhees points to its "easy setup and reasonable price for both our company and the clients."

Voorhees finds that the all-in-one system provides a sleek, spacesaving box to house American TeleCare's patient-monitoring soft-



ware. Although expansion is severely limited in the Profile 5, Voorhees asserts it's not a problem for his clients, who normally don't need to open up the system to perform upgrades. The Profile 5 "fits our applications very well," says Voorhees, "and [Gateway has] strong customer support for small businesses." rates comparable to those of the towers, making it a good PC for gaming.

The HP Pavilion A450e also performed well overall, notching a score of 124 in our benchmark. However, it lagged slightly behind the Dell on our graphics tests.

Systems like the Dell and the HP offer almost as much potential for expansion as some of the huge towers do. The Dell offers a good number of available slots and bays. To open the case, you simply press buttons on the top and bottom, and the system opens like a clamshell. The Dell's drive bays have large green clips that hold the drives in place and allow for their removal without tools—a feature that even our high-end tower systems don't offer. The cables are neatly arranged, though not as well those in the Alienware. Removing and adding memory required little effort.

The HP model was more challenging to open—we had to remove a few screws and take off the side panel. Adding memory to the HP is easy, but it has fewer expansion slots and bays than the Dell. Ultimately, systems such as the Dell and the HP are great alternatives to a tower PC—they run fast, use many of the same components, and cost less. The Dell costs \$2779—over \$1100 less than the Alienware and more than \$900 below the Cyberpower—and the HP checks in at \$1730. Not a bad deal when you can save money and still have both speedy performance and room for upgrades.

Roy Santos is a freelance technology writer based in the San Francisco Bay Area.

FEATURES COMPARISON

TEST

Center

PCs: Different Sizes, but Similar Guts

MANY PCs-INCLUDING THE ONES LISTED HERE-rely on often identical components. However, big systems such as those from Alienware and Cyberpower take up significantly more space than a smaller system such as Falcon's FragBox or Dell's Dimension 8300.

SYSTEMS	Street price (2/13/04) and features	PC WorldBench 4 performance score	Other features
Alienware Aurora Extreme find.pcworld.com/41507	• \$3971 • 2.2-GHz Athion 64 FX-51 • IGB DDR400 SDRAM • 120GB hard drive (RAID)	Windows XP 141 Professional 141	 256MB NVidia GeForce FX5950 Ultra graphics Three open expansion slots/two open bays DVD±R/RW drive Two FireWire ports, flash media reader¹
Cyberpower Gamer Infinity 9900 Professional find.pcworld.com/41510	\$3700 3.4-GHz Pentium 4 Extreme Edition 1GB DDR400 SDRAM 120GB hard drive (RAID)	Windows XP 135 Home 135	256MB ATI Radeon 9800 Pro graphics Two open expansion slots/three open bays DVD±R/RW drive, 16X DVD-ROM drive Two FireWire ports
Falcon Northwest FragBox Pro find.pcworld.com/41513	• \$2244 • 2.8-GHz Pentium 4 • 1GB DDR400 SDRAM • 120GB hard drive	Windows XP Home 123	256MB BFG Asylum GeForce FX5950 Ultra graphics One open expansion slot/no open bays DVD±R/RW drive Three FireWire ports
Stealth Computer Littlepc LPC-401X find.pcworld.com/41516	S1965 (without monitor) 3.2E-GHz Pentium 4 S12MB DDR400 SDRAM 200GB hard drive	Windows XP Professional 121	Integrated Intel 865GV graphics No open expansion slots/no open bays DVD-ROM/CD-RW combo drive One FireWire port
Gateway Profile 5XL find.pcworld.com/41519 HP Pavilion Zd7000 find.pcworld.com/40460	\$2286 3.2-GHz Pentium 4 1GB DDR400 SDRAM 160GB hard drive	Windows XP Professional 122	64MB NVidia GeForceFX Go graphics No open expansion slots/one open bay DVD±R/RW drive Two FireWire ports, PC Card slot
HP Pavilion Zd7000 find.pcworld.com/40460	S2029 S2-6Hz desktop Pentium 4 S12MB DDR400 SDRAM GOGB hard drive	Windows XP 110 Media Center 110	128MB NVidia GeForceFX Go5600 graphics No open expansion slots/no open bays DVD-R/RW drive One FireWire port, flash media reader ¹
Dell Dimension 8300 find.pcworld.com/41522	• \$2779 ² • 3.2E-GHz Pentium 4 • IGB DDR333 SDRAM • 250GB (RAID) hard drive	Windows XP 128 Home 128	128WB ATI Radeon 9800 Pro graphics Three open expansion slots/four open bays DVD+R/RW drive, CD-RW drive One FireWire port
HP Pavilion A450e find.pcworld.com/41525	\$1730 2-6Hz Athlon 64 3200+ 1GB DDR400 SDRAM 200GB hard drive	Windows XP 124	128MB NVidia GeForce FX5600 graphics Two open expansion slots/one open bay DVD+R/RW drive, DVD-ROM drive Two FireWire ports

CompactFlash, Memory Stick, Secure Digital/MultiMediaCard (the Alienware also reads SmartMedia). ² Use Dell E-Value code 6V411-8300REV to get this price.

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4

The latest color laser printers promise speed and quality. We lab-test models starting at \$799 and do the math on supplies to reveal the best values. do text.

Line

OIO

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AS COLOR LASER PRINTERS have dropped in price, more people have begun to wonder whether they'd make a good replacement for the old standby monochrome lasers. And the printer companies say their color lasers can match the text quality of monochrome units; they even claim that many of them print color documents as quickly as they do text. To put these claims to the test, we revved up

COLOR LASERS

COLOR LASERS /



Oki Data Oki C7300n Best A low price and quick text printing helped this printer earn top marks on our tests. The C7300n is very easy to set up and operate, and it comes with 24/7 tech support.

our network to see which printers could keep a busy office happy—and deliver the print quality required for important business documents.

We looked at 13 models, ranging from a \$799 Oki Data unit that you could transport in the front seat of your car, to printers weighing 150 pounds or more. We judged them on speed and print quality, operating costs, paper-handling options, ease of setup and operation, and management tools.

Most of the color lasers that we reviewed cost between \$1900 and \$3000—much more than monochrome laser models, but still not an outrageous capital investment for a workgroup device. We found a number of color printers that matched the crisp black text—and neared the speed—of a good corporate monochrome laser. Plenty of these printers deliver color quality that's even adequate for reproducing photos, if you're not terribly picky. Hewlett-Packard's Color LaserJet 5500n did the best on color photos among our test set. The Xerox Phaser 6250N and Brother HL-4200CN (two versions of the same printer) were among the weaker models on print quality.

Several trends in color laser technology cropped up in this batch of printers. Single-pass printing in which paper runs through a straight path one time—was a curiosity a few years ago; most printers used a four-pass system, in which a document essentially went through four sequential print jobs. A single-pass design requires fewer moving parts, so the printer suffers fewer malfunctions. Singlepass printers are faster than the previous generation of four-pass printers, though the one four-pass printer we tested, the Samsung CLP-500N, turned in roughly average speeds. One potential drawback of single-pass printers is that they're bulkier than

FEATURES COMPARISON

TEST Center

MOST OF THESE COLOR LASER printers produce top-quality text documents at office-worthy speeds, though color speeds still lag behind.

Color Printing, Office Quality

	COLOR LASER PRINTER	Street price (2/13/04)	Overall rating	Page yield with one set of toner cartridges	Cost per set of toner cartridges	Toner cost per color page ¹	Speed for text/color graphics (ppm)	Print quality for text/color graphics	Ease of use
1	Best Oki Data Oki C7300n BUY find.pcworld.com/33929	\$1960	85	5899	\$663	11 cents	18.7/2.8	Outstanding/ Good	Outstanding
2	Best HP Color LaserJet 5500n find.pcworld.com/33941	\$3549	82	9101	\$1174	13 cents	13.5/5.2	Outstanding/ Very good	Very good
3	Oki Data Oki C9500dxn find.pcworld.com/33932	\$4600	80	9571	\$1016	11 cents	19.9/2.7	Outstanding/ Good	Outstanding
4	HP Color LaserJet 3700n find.pcworld.com/41450	\$1600	79	3545	\$643	18 cents	10.2/3.8	Outstanding/ Fair	Very good
5	Lexmark C752n find.pcworld.com/41453	\$2339	79	8578 ³	\$1292	15 cents	13.5/4.3	Very good/ Fair	Very good
6	IBM Infoprint Color 1354n find.pcwarld.com/41459	\$2300	78	5135	\$711	14 cents	13.3/4.3	Very good/ Fair	Very good
7	Xerox Phaser 7300DN find.pcworld.com/35912	\$4199	78	9307	\$990	11 cents	23.3/4.3	Outstanding/ Good	Very good
8	Brother HL-4200CN find.pcworld.com/39785	\$1999	78	4516	\$450	10 cents	16.0/2.2	Very good/ Fair	Very good
9	Xerox Phaser 6250N find.pcworld.com/41465	\$2299	78	5702 ³	\$660	12 cents	14.6/6.1	Good/ Fair	Very good
10	Oki Data Oki C5100n find.pcworld.com/39788	\$799	π	2881	\$443	15 cents	9.9/4.9	Outstanding/ Fair	Good

FOOTNOTES: 'All street prices include a network interface for the printer. ² Number of prints ol *PC World's* test document. Vendors estimate cost per page based on printing a document with 5 percent coverage per toner. *PC World's* in the coverage per toner. *PC World's* test, Page-yield test, Page-yield test results did not contribute to overall score. ³ Based on page yields from *PC World's* tests. ⁴ *True resolution* is the maximum resolution achieved without enhancements, such as algorithms; it applies to both monochrome and color. ³ Tested with high-yield cartridges. *How WE TEST:* We run time tests for text, line-art, and color and gray-scale photo samples, and a panel of judges then rates image quality. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on *PC World's* Star Ratings.

four-pass models. Another trend to note: If you need to make big prints, you'll be happy to learn that more wide-format printers have entered the market as prices for color lasers have dropped.

CLOCKING PRINT SPEEDS

ARE COLOR LASERS fast enough for everyday use by a workgroup of 10 to 20 people? For text they certainly are, and for color graphics they're faster than any alternative. Most of the printers we tested were specified by their vendor to print color documents at the same clip as black-and-white. But in our tests, the printers pushed out a black text document about four times as fast as they printed color graphics: The average speed for our 10-page text document was 15.1 pages per minute; the average for graphics was 3.7 ppm. Still, 3.7 ppm looks pretty good next to the 1.3 ppm average of the ink jets we tested most recently. More important, color lasers' text speed is nearing that of monochrome lasers: The last set of monochrome laser printers we tested averaged 16.9 ppm for the same document we used to test this group. That means you can find a color laser to replace your monochrome laser without losing much speed—even if you have a large workgroup that prints a lot of text files.

We saw a wide range of speeds and were pleasantly surprised by the results for the two sub-\$1000 printers we tested, Oki Data's \$799 Oki C5100n and Samsung's \$850 CLP-500N. The Oki printed text at 9.9 ppm, while the Samsung printed at 15.3 ppm; still, the Oki's better support hours and text quality kept the Samsung off the chart. Xerox's \$4199 Phaser 7300DN was the fastest of all, at 23.3 ppm for text, while HP's \$3549 Color LaserJet 5500n printed text at only 13.5 ppm.



HP Color LaserJet 5500n

Best Wide-format printer, this model produces very attractive color photos, and tech support runs 24/7.



Oki Data Oki C9500dxn

Very quick to print text, this wide-format model includes a duplexer and comes with 24/7 tech support.



HP Color LaserJet 3700n

The 3700n offers good print, quality for a very low price, though paper capacity is low and text printing speed is a little stuggish. Comes with 24/7 tech support.

Visit find.pcworld.com/41712 for reviews of all products tested this month and ranked in this chart

'Features'	Comments
Rated 24 ppm monochrome, 20 ppm color. Standard 64MB of RAM; 1200-by-600-dpi true resolution; 8.5-by-47.2-inch maximum paper size; 630 sheets input, 500 output.	Printed razor-sharp text and line art, but gray-scale photos looked grainy. Color photos appeared crisp, though colors seemed slightly oversaturated. Low price, considering its features, and low cost per page. ($\star \star \star \star \Rightarrow$)
Rated 21 ppm monochrome and color. Standard 96MB of RAM; 600- by-600-dpi true resolution; 12-by-18-inch maximum paper size; 600 sheets input, 250 output.	Offered very sharp text and line art. Gray-scale photos showed smooth transitions; color in photos was very natural looking. Cheapest wide-format printer on the chart. Good graphics print speeds. (★★★★)
Rated 37 ppm monochrome, 30 ppm color. Standard 320MB of RAM; 1200-by-600-dpi true resolution; built-in duplexer; 12.9-by-47.2-inch maximum paper size; 650 sheets input, 500 output.	Text and line art showed virtually no flaws. Color photos, though detailed, were marred by slight banding. Fast at printing text, but slow at color graphics. Low cost per page, but highest price on the chart. ($\star \star \star \star \Rightarrow$)
Rated 16 ppm monochrome and color. Standard 64MB of RAM; 600- by-600-dpi true resolution; legal maximum paper size; 350 sheets input, 175 output.	Text and line art looked very sharp. Gray-scale photos looked appealing, though color photos lacked subtle shading. Low price for the features, but high cost per page. Text print speeds were below average. (★★★ start)
Rated 20 ppm monochrome and color. Standard 128MB of RAM; 1200-by-1200-dpi true resolution; legal maximum paper size; 600 sheets input, 250 output.	Line art, text, and gray-scale photos looked very sharp. Color photos appeared grainy, though detailed. Affordably priced for the features. Text print speeds were slightly below average, while graphics speeds were slightly above. (★★★★☆)
Rated 20 ppm monochrome and color. Standard 128MB of RAM; 1200-by-1200-dpi true resolution; legal maximum paper size; 600 sheets input, 250 output.	Text, line art, and gray-scale photos looked sharp overall. Grain was noticeable in color photos, though colors looked natural. Text printed a tad slowly, but graphics speeds were a bit above average. ($\star \star \star \star$
Rated 37 ppm monochrome, 30 ppm color. Standard 192MB of RAM; 600-by-600-dpi true resolution; built-in duplexer; 12-by-36-inch maximum paper size; 650 sheets input, 600 output.	Line art and text printed with very crisp edges. Gray-scale photos lacked subtle shading. Colors looked vibrant, though some areas appeared too dark. Low cost pe page. Fastest text printing on the chart. ($\star \star \star \star \pm \pm$)
Rated 26 ppm monochrome and color. Standard 64MB of RAM; 600- by-600-dpi true resolution; built-in duplexer; legal maximum paper size; 600 sheets input, 250 output.	Text was crisp, though slightly fuzzy at the edges. Gray-scale photos were grainy; color photos looked slightly dark, but details were sharp and colors seemed natural. Very fast at printing color graphics. ($\star \star \star s_{\rm scal}$)
Rated 26 ppm monochrome and color. Standard 256MB of RAM; 600-by-600-dpi true resolution; 8.5-by-35.5-inch maximum paper size; 600 sheets input, 250 output.	Text and line art looked fuzzy, reminiscent of an ink jet print. Gray-scale photos appeared dark; colors seemed accurate in photos, though some details were slight ly blurred. Low cost per page. (★★★কি)
Rated 20 ppm monochrome, 12 ppm color. Standard 32MB of RAM; 1200-by-600-dpi true resolution; legal maximum paper size; 400 sheets input, 250 output.	Slow to print razor-sharp text, though color graphics speeds were better. Low price, but same 24/7 toll-free tech support as offered on Oki's two pricier models on the chart. (* * * * * * *)

CHART NOTES: The overall rating for color laser printers is based on print quality (25 percent), price (25 percent), features (15 percent), ease of use (15 percent), speed (10 percent), and service and support (10 percent). For all ratings, higher is better.

PRINT QUALITY

Best and Worst Prints

MOST OF THE color lasers that we tested printed razor-sharp text, as shown in the example at lower right from the \$4600 Oki Data Oki C9500dxn. The Xerox Phaser 6250N, which costs half as much, printed the least attractive text. That's not to say that text quality closely followed purchase price. The Oki Data Oki C510On, the least expensive printer on the chart at \$799, printed letterforms that were just as sharp as those from models costing at least twice as much. It was less impressive at printing color graphics, however. Colors looked oversaturated, skin tones were very reddish, and textures appeared grainy. In contrast, the \$3549 HP Color LaserJet 5500n printed color photos with extremely fine grain and smooth color transitions; colors seemed accurate, and skin tones looked natural.



This is 9 point text This is 10 point ter his is 11 point te tis is 12 point t is is 13 point Best: 0ki C9500dxn Worst: 0ki C5100n This is 9 point text This is 10 point text

his is 10 point tes nis is 11 point te is is 12 point t is is 13 point 1 Worst: Phaser 6250n



Lexmark C752n

Like its twin, the IBM Infoprint Color J354n, the C752n prints sharp lext, but less impressive graphics. A good price for the features.



IBM Infoprint Color 1354n

This is essentially the same printer as the Lexmark C752n; both models are affordably priced for the features and print at roughly average speeds. The Xerox Phaser 6250N, the HP Color LaserJet 5500n, and the Oki Data Oki C5100n all turned in fast graphics speeds: 6.1 ppm, 5.2 ppm, and 4.9 ppm, respectively. The slowest graphics speed we clocked was from the \$2395 Kyocera Mita Ecosys FS-C5016N, an LED model that printed graphics at a sluggish 1.3 ppm (comparable to ink jets).

INSPECTING OUTPUT

THE NEW GENERATION of color lasers puts another truism out to pasture: that color lasers can't print text as well as monochrome lasers. In fact, *PC World*'s jury gave 8 of the 13 models tested an Outstanding for text quality, and 4 more a Very Good. Only 1 printer, the Xerox Phaser 6250N, did not match the text quality of a decent monochrome laser. Its letters looked slightly hazy around the edges, though they were still good enough for all but the most formal correspondence.

In our line-art test, which monochrome laser printers usually pass with flying colors, we print a page of closely spaced parallel lines. Now, most color lasers make the grade, too: Nine of them rated as either Outstanding or Very Good on this test, printing the narrowest lines clearly, without mucking up the interstices with the random dots we affectionately call "crud." Only two printers, Samsung's CLP-500N and Oki Data's Oki C5100n, received the lowest score possible, printing uneven lines that resembled strings of beads and blending color toner into the black (a common technique for creating a richer-looking black), which made narrowly spaced lines look like plaid fabric.

We also tested the group on printing color and gray-scale photographs on standard paper. Monochrome lasers print notoriously poor gray-scale photos, and color ink jets are too slow for a workgroup to share, so color lasers have a broad niche to fill. And for the most part, we were impressed by how well they fill it. Several printers, especially the two Hewlett-Packards-the Color LaserJet 3700n and 5500n-produced smooth-textured gray-scale photos with fine detail and lifelike shadows and highlights. Several others, including the Xerox Phaser 6250N, and Oki Data C9500dxn and C7300n, printed detailed, lifelike gray-scale images marred only slightly by dottiness or lines. Despite these advances in color laser quality, if you need top-notch prints of color and gray-scale photos, ink jet is still the only affordable technology that really delivers. The print speeds and text quality of these higher-end color laser printers, however, qualify them to replace monochrome laser printers-at least in offices that can afford them.

CALCULATING COSTS

SO MANY ELEMENTS add to the cost of owning a color laser printer that it's tough to estimate the cost of printing a page—but we tried. The PC World Test Center limited itself to gauging toner consumption and estimated a cost per page (see the chart on page 104 for specific numbers).

We created a test page consisting of a spreadsheet and two bar charts, to approximate a typical business-presentation page. Printer makers calculate their page yields using a document with 5 percent coverage each of black, yellow, red, and blue toner—which is meant to approximate the typical rate of consumption; however, we did not scientifically measure the toner coverage for our page (see our test page at find.pcworld.com/41486).

We printed our file, and counted pages, until either the printer stopped or we deemed the print quality no longer acceptable. Interestingly, WHEN YOU NEED POWER PROTECTION Backed by an 80-year history of trusted reliability, Tripp Lite offers over 1,000 high-quality

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PRINT QUALITY

Printers for Perfectionists

ALONG WITH OUR batch of general-business color lasers, we looked at two costlier models as well (\$6800 to be exact). Xerox and HP say that their high-end models-the Phaser 7750DN and Color LaserJet 9500n, respectively-produce color output that graphics pros wouldn't hesitate to show to clients. We tried the units out on the toughest of images to print: color photos. Using default modes, both models produced impressively sharp images, even on plain paper. We also tried each company's glossy stock, but it's likely not worth the extra money unless a glossy sheen is critical. When printed on glossy paper using high-quality settings, our test images didn't show a discernible improvement over the prints on plain paper. Nonetheless, when compared with a prepress proof of the same image used at *PC World*, both printers' images impressed our panel of in-house graphics professionals with their sharpness, though neither was a clear winner. Which set looked better ended up being a matter of personal choice.





Xerox Phaser 7300DN

This wide-format printer kicks out very crisp text at a blistering pace, and produces vibrant color photos.



Brother HL-4200CN

It resembles the Xerox Phaser 6250N, but costs less, includes a duplexer, and prints sharper text. Plus, you get 24/7 tech support. though every printer output the same document, there was no consistency in which of the four toners ran out first. In all but two cases, the printer stopped when the first toner cartridge hit empty. The IBM Infoprint Color 1354n and the Lexmark C752n continued printing long after the toner had run so low that the prints looked weathered, and long after we stopped counting the pages as usable. After printing-and counting-almost 80,000 copies of the same document, we concluded that if our test file is representative of typical business documents, the manufacturers' figures for perpage toner cost are significantly too low. Although our page yields and estimated costs per page varied widely, on average page yields were one-third lower than the vendors' specs.

Our average toner cost per page was 13 cents, ranging from a low of 6 cents per page for the Kyocera Mita Ecosys to a high of 18 cents per page for the HP Color LaserJet 3700n. We used standard toner cartridges in all but two printers. Lexmark and Xerox supplied high-yield cartridges for the C752n and the 6250N, respectively. We found their high-yield cartridges no more cost-effective than other printers' standard cartridges: The Xerox's cost per page was just below average, at 12 cents, while the Lexmark's was 15 cents per page.

A set of toner cartridges for any of these printers is a hefty investment, though the sets vary widely in price. A set of four standard-capacity cartridges for the IBM Infoprint Color 1354n costs about \$700—almost one-third the price of the printer itself. Standard cartridge sets for some of the largeformat models surpass \$1000. Some vendors, such as Kyocera and Samsung, hasten the day when you'll shop for replacement cartridges by shipping their printers with partly empty "starter" cartridges.

Several other consumable components, such as imaging drums, add to a color laser printer's ongoing expenses, though they last a lot longer than toner cartridges. The part-ceramic, part-metal drums in Kyocera Ecosys models, for example, are designed to last the lifetime of the printer. The Oki Data C7300n's drums cost \$144 for the black and \$155 each for the color, and Oki Data rates them to last for 30,000 pages. On some printers, however, the imaging drum is part of the toner cartridge.

All printers have a *replaceable fuser*, an element that heats toner to affix it to the paper. The Xerox Phaser 6250N's fuser costs \$200, for example, and is rated to last for 100,000 pages. Most color lasers also have a component called a *transfer belt* or *image transfer unit*. On HP's LaserJet 3700n, the transfer unit costs only \$80 and is designed to produce up to 75,000 pages, depending on how many fourcolor files you print; the LaserJet 5500n's transfer unit costs \$200 and is designed for up to 120,000 prints. In total, the per-page costs for color from a color laser are several times higher than those of black pages printed on a monochrome laser.

CHECKING PAPER CAPACITY

ALL OF THE PRINTERS we tested have at least two paper sources as standard equipment. The HP Color LaserJet 3700n and the Oki Data Oki C5100n are the only printers on our chart that don't hold at least 500 sheets in the main tray. Three of the printers on our chart include a duplexer, as does the \$850 Samsung CLP-500N, by far the cheapest printer in our group with this feature. Two of the duplex models print large-format banners: The Oki Data Oki C9500dxn can handle sizes up to 12.9

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Xerox Phaser 6250N

Xerox's version of the Brother HL-4200CN is extremely fast at printing color graphics, and quick to print text, though its letters lack the sharpness of the Brother's text.



Oki Data Oki C5100n

Great price for the print quality and fast color printing speeds, though text printing is slow. Tech support runs 24/7. by 47.2 inches, and the Xerox Phaser 7300DN sizes up to 12 by 36 inches. The HP Color LaserJet 5500n prints at up to tabloid-extra size (12 by 18 inches).

More paper-handling options abound: You can add up to three 500-sheet trays to Lexmark's C752n (at \$412 each) or one 2000-sheet drawer (\$1249), a 650-sheet output expander (\$226), and a 3000-sheet stapler/hole-punch finisher (\$2499). IBM sells the same add-ons for its version of the printer, the Infoprint Color 1354n, at similar prices. The Brother HL-4200CN accepts an extra 500-sheet paper tray (\$549) or an extra 1000-sheet tray (\$999).

POPPING THE HOOD

FORTUNATELY, COLOR LASERS continue to get easier to use. The control panels on most of our printers are designed well enough to let even a casual user quickly accomplish basic tasks. But more-advanced functions are another story: We tried the printers' utilities for tasks such as tracking usage and specifying which users can print in color. We concluded that these chores are best handled by a network-savvy manager.

Xerox's control panels deserve special mention, because they provide an assortment of help documents that you can print without needing a PC or a network connection. And while there aren't separate buttons for each level of the control panel menus, as there are on the Oki Data control panels, the LCD always provides prompts so that you don't get lost in the menu hierarchy.

Single-pass designs have made replacing internal components and clearing paper paths easier than before, since all the components are aligned and clearly visible. In the Sharp AR-C200P and Oki Data Oki C7300n, all of the toner cartridge/drum assemblies sit in a rack or basket that can be completely removed, exposing the entire paper path.

All of the printers we tested have an ethernet port, which should, in theory, enable you to manage the printer remotely. And remote management is a heavily promoted feature for most of the units: Most vendors offer an embedded Web server that makes it easy to check the printer's status from anywhere on the network when, for example, it stops because someone left a paper tray pulled out. But for the most part, we found that installing these printers and using their management software are beyond the skills of a PC-savvy but not networking-trained person. For example, as we tested the printers under Microsoft Windows Server 2003, we couldn't install Oki Data's PrintSuperVision tools because Oki printers lack an embedded Web server; instead, they require a Web server (Microsoft's Internet Information Server) running on the network server and the SNMP network status tracker. Few of the utility installers told us when or how to create a TCP port, without which the printers wouldn't show up on our network.

On the other hand, both HP's WebJet Admin and Xerox's CentreWare Internet Services installed without much fuss and readily displayed the printer's embedded Web pages. If you aren't familiar with managing printers, however, you'll likely still face hours of experimentation as you set up e-mail notifications and configure user permissions. If you lack sufficient training as a network manager, you should leave these features to the experts.

CALLING ON TECH SUPPORT

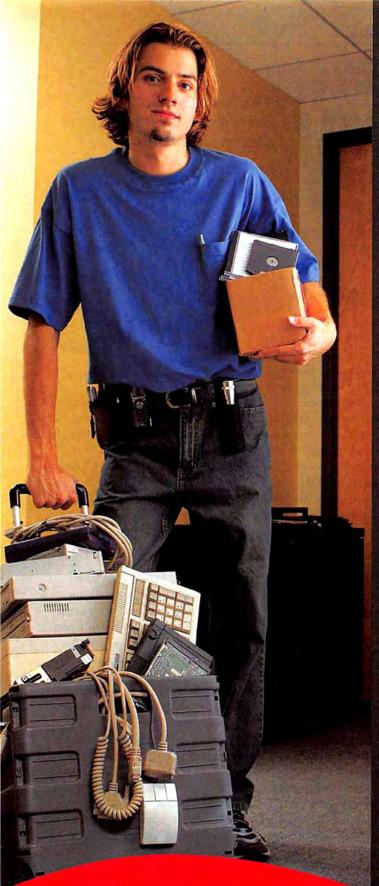
STANDARD WARRANTIES for color lasers are far shorter than those for some other peripherals (monitors, say). All of the models we tested come with a one-year warranty. Oki Data and Sharp cover their units' LED array for five years but cover the rest of the components for only one year. Xerox, on the other hand, offers only one year of coverage for all components. Most vendors sell warranty extensions and service contracts, such as the three-year warranty extension for the Lexmark C752n, which includes on-site repair service and costs \$1999.

Most of the vendors provide good support policies, such as on-site repair service. All of them field toll-free tech support calls during the warranty period. Brother, HP, and Oki Data run their telephone support 24 hours daily; all of the companies also answer tech questions by live Internet chat, by e-mail, or by both means. HP and Xerox provide especially thorough information on their Web sites in searchable knowledge bases and FAQs.

In our tests, color lasers matched the print quality of monochrome lasers, and most of them printed photos well enough—and at decent speeds—to permit users to include them in business presentations. But our printing yields for color pages were lower than the vendors specified; so if the amount of color on our test page is typical of the documents you print regularly, you'll likely spend more on toner than the vendor's specs suggest. Still, despite demanding a hefty initial investment and significant ongoing expense, color laser printers are becoming less exotic and more of a vital business tool.

PHOTOGRAPHS: RICK RIZNER

Dan Littman is a contributing editor for PC World.



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 CruzerTM 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.

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





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Efficiency ENGINES

The smart SOHO drives out costs and drives up profits

>>> Gary Riles has some advice for small office/home office (SOHO) workers: "Run your office the way a CFO runs a big company, with full accountability for every dollar you spend and a laser focus on driving out waste and costs."

Riles ought to know. He spent 10 years as the CFO of a mid-sized company before he opened his three-person consulting operation from his Long Island, NY home. "You'd be amazed at the bad habits many, if not most, office workers acquire—even good workers," notes Riles. "It's hard for them to see that a little wasted time here and a little inefficiency there adds up to huge numbers, if it could all be tallied. But in the SOHO, there's just no excuse. You've got to think like a CFO to maximize your bottom line."

Experts like Riles agree: In the small office/home office (SOHO), waste is public enemy number one. Smart SOHO workers know that a penny saved on office supplies, time, or aggravation is a penny that drops directly to the profit line. Take label making, for example. Research shows that nearly three quarters of the people who attempt to make labels using their printers make errors. These errors cost time, chew up paper and toner, and cause needless wear and tear on equipment.

But one company, Dymo (www.dymo.com), a world leader in innovative office solutions,

A More Efficient SOHO

According to Riles, there are several ways to convert your SOHO into a virtual efficiency engine.

■ WATCH THOSE TELECOM BILLS! Due to tremendous competition, phone and other services charges are in constant flux. But providers seldom tell their existing customers about their best deals—only their new prospects. Demand the latest and greatest deal, and you'll almost never be refused.

HIRE A TRUSTED ACCOUNTANT. The tax laws are also in a state of constant flux—it is simply too difficult for most SOHO proprietors to keep up with them. For example, individually owned businesses couldn't deduct healthcare insurance payments two years ago. Today, they can. Leave the job of navigating tax law changes to the pros—unless, of course, that is your business.

RIDE THE LEADING EDGE OF TECHNOLOGY.

Technology vendors have focused tremendous energy on the SOHO market, because it is still expanding. The products and services they offer target productivity and efficiency demands, like the label printers mentioned above. But remember: Technology is an enabler, not a solutions provider! That's your job.

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Beatingthe Wireless Blues

<image>

Wi-Fi may be cool, but it's certainly not bulletproof. Here's why-and how you can boost your network's reliability now. EVERYTHING WAS working swimmingly when Harold Martin first set up his wireless network. But after a few weeks, the wireless gateway mysteriously started having problems. "It would drop the connection after 5 minutes," said Martin, a tech support specialist with a Des Moines, Iowa, ISP.

Martin installed NetStumbler on his laptop, an application he hoped would help him diagnose the problem. NetStumbler found eight other gateways, all using the same Wi-Fi channel as his. But changing his gateway's channel solved nothing.

In the end, his connection was restored when Martin enabled the Wireless Zero Configuration service, a part of Windows XP that his wireless card software had disabled. "I turned it back on, and all of a sudden, the computer picked up the wireless **>** network and kept on working," he said.

Martin's case differs from the experience of many Windows XP users and the recommendations of Wi-Fi experts, some of whom suggest ditching the Wireless Zero Configuration service altogether. But it illustrates the maddeningly unpredictable nature of Wi-Fi problems. What works for me might not work for you.

With 4.5 million households in the Unites States going wireless, the benefits of Wi-Fi—a fast, untethered way to connect to other computers and devices on a network—are hard to ignore, as are the problems you might encounter.

Besides conflicts with Windows software, wireless networking hardware can fail or have bugs. Our readers report that Wi-Fi devices are the most troublesome type of peripheral we asked them about.

In *PC World's* most recent Reliability and Service survey, over 9 percent reported that a new wireless network device had problems—a far higher rate than the one for PCs, or for any other peripheral we asked about. And 36 percent of the respondents said a problem significantly limited the usefulness of their gateway.

The difficulties our readers reported are

'At a bare minimum, change the gateway's default settings.'

borne out in tests performed by the wireless networking industry's standards body, the Wi-Fi Alliance. The group tests products in its labs to make sure they work well together. "About 25 percent of the products we get in the labs fail our tests in their first pass, from catastrophic failures to performance problems," says Alliance spokesman C. Brian Grimm. "And these are products that have been prepared for testing."

If you're singing the wireless blues, there's good news. We've got solutions to five common Wi-Fi problems: dead zones; Windows glitches that stop you from connecting, even when you should be able to; poor Wi-Fi range; interference jamming your network; and security gaps.

BANISH WI-FI BLACK HOLES

IN ITS TESTS, the Wi-Fi Alliance determined that your PC's wireless card can talk to a gateway that's situated 40 to 60 feet away within a home, and 60 to 80 feet away in an office. That range is smaller than the theoretical 150-foot radius promised by some Wi-Fi manufacturers.

You can't do much about the main problem—interference that is caused by interior walls, floors, or even those walking bags of signal-absorbing water we call human beings. But the antennas on your gateway can cause trouble, too. Even the best antenna can't radiate a perfect sphere of signal strength.

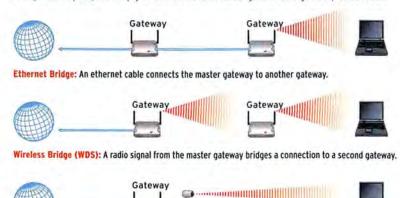
In these situations, you can move your gateway, or you can buy one or more new antennas. Before deciding on a course of action, however, you need to measure the strength of the Wi-Fi signal around the dead spot—a place where you want to use a computer, but can't. For example, a survey might show that you can get a signal at one end of your dining room table, but not at the other, and that you could solve the problem just by moving your chair.

The utilities that accompany many Wi-Fi-enabled notebooks or cards include a rudimentary signal strength meter, but they rarely give enough data to perform real troubleshooting. With the help of NetStumbler (www.netstumbler.com), a free application, you can temporarily turn your laptop (or Wi-Fi-enabled Pocket PC) into a slick Wi-Fi signal analysis device that scans the frequencies used by Wi-Fi devices. The program lists all the nearby Wi-Fi devices it detects, and the precise strength of the signal you can receive.

NetStumbler is a little fidgety, however: It doesn't work with all models of Wi-Fi cards, and there's a steep learning curve to using it. An alternative is Smart ID's WFS-1 WiFi Detector (\$25, find.pcworld. com/41372); like NetStumbler, it displays signal strength in the 2.4-GHz band. The WFS-1 is a handheld sensor about the size of a deck of playing cards, and it contains four LEDs that display signal

Beat the Wi-Fi Black Holes

YOU CAN USE three methods to extend the range of your wireless network, with the goal to fill any "dead spots," or simply to add areas where a single wireless gateway can't reach.



External Antenna: A directional antenna connected to the master gateway aims the signal at dead spots.

Antenna

strength while you hold down a button. Because it's directional, it can even help you figure out if a non-Wi-Fi device (like your microwave oven or a cordless phone) is the source of your problems-something that NetStumbler can't do.

Once you've ruled out obvious potential sources of interference, your next step is to move your gateway around, if at all pos-

sible-and ideally, closer to the dead spot. Pay special attention to the gateway's spatial orientation; even so-called omnidirectional antennas can be highly directional, so that a gateway hung on a wall might send its signal into the ceiling and floor. Each time you reposition the gateway or antenna, recheck the signal strength where you want to receive a signal.

If moving or reorienting the gateway or

WARDRIVING When Wireless Insecurity Strikes

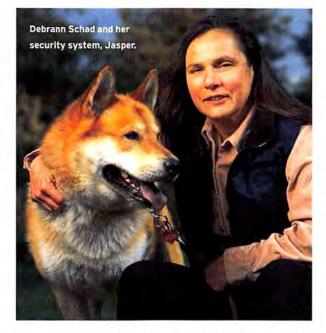
"HOW DID YOU KNOW THAT NAME?" asked a concerned-looking Debrann Schad, an Oakland, California-based contractor, whose trip to the garbage can was interrupted by my question. "Only four people in the world know that nickname."

I'd found the name (which Schad asked me not to publish) using a wireless-enabled Pocket PC outside her house. Schad's gateway,

located inside her home, was spilling Wi-Fi out to her curbside. The gateway had been set up in such a way that its identifier, labeled with Schad's high school nickname, was broadcast to anyone who happened to wander within range.

Though Wi-Fi is designed to work over short distances, folks who live or work adjacent to a Wi-Fi network (or who simply sit in a car near one) may be able to "borrow" access and use the wireless network.

Some Internet users scope out unprotected wireless networks (an activity known as wardriving) just for sport, A few Web sites publish maps that show the locations of



open networks, with data provided by users who drive around and collect the information, using GPS-enabled laptops and software such as NetStumbler (www.netstumbler.com) or Kismet (www. kismetwireless.net). A search on WiGLE (www.wigle.com) can yield anything from a handful to hundreds of listings of unprotected Wi-Fi networks, depending on the geographic location you search.

Using a pricey tool for network administrators called AirMagnet (www.airmagnet.com) and a Pocket PC handheld, I saw her network identifier, or SSID, the brand of gateway she was using, the channel it was broadcasting on, and the fact that it was unencrypted.

its antennas doesn't solve your problem. you may be able to use a different antenna. Apple, for instance, sells two antennas for its AirPort Extreme Base Station. Some companies make high-quality antennas-such as the SuperCantenna (\$50, find.pcworld.com/41375)-that can work with any gateway, but there's a 🕨

In Schad's case, the risk was moderate. A friend had set up her network; Schad relied on it only occasionally, and never used it to check mail or shop online. But the friend left the gateway's default passwords enabled. Anyone nearby could have logged in, using the password published in the gateway's manual (and widely available on the Internet to those who know where to look), and altered her

network settings.

If someone had deleted her DSL log-in, for example, Schad would have lost Internet access. An intruder could have set up WEP encryption, locking Schad out of her own network.

The risks would not have stopped there, however. A wardriving passerby probing Schad's local network would have discovered a networked printer and her PC, connected by wires to the gateway. Schad didn't have Windows' built-in file sharing enabled, but if she had, the snoop would have been able to root around in the files on her computer. A vandal could also have used up all the paper in Schad's net-

worked printer, or could have printed obscene messages or images. And if a worm or a virus had placed a Trojan horse on her PC, someone could have remotely controlled it.

What can a Wi-Fi user do? "People, turn your security on, please," says Wi-Fi Alliance spokesman C. Brian Grimm, in a tone of mock exasperation. "At a bare minimum, change the default settings, like the SSID and passwords, and password-protect your shared drives, if you have any." Our Wi-Fi security section on page 122, and this month's Step-By-Step on page 180, offer other tips about encrypting and limiting access to your wireless network. -Andrew Brandt





XP'S WI-FI BUGS sometimes gray out the button you need to click in order to connect.

catch: Though you can legally purchase third-party antennas that will work with your gateway, FCC rules don't allow you to use antennas not specifically designed for your manufacturer's equipment. To our knowledge, nobody's ever gotten in trouble over this, but breaking the rules might pose problems someday.

WORK AROUND WINDOWS XP'S WI-FI QUIRKS

THE TERM zero configuration implies an easy setup, but with Windows XP's Wireless Zero Configuration (WZC) service, that frequently isn't the case.

The problem: From time to time, when you insert your card (or power up), XP won't let you connect to a network. The most common symptom is that the Connect button in the networking dialog box is "grayed out," unavailable for use. To complicate matters, the card will even flash its LEDs and appear to be installed properly in the Device Manager.

In some setups, this glitch arises every other time you reboot; in others, it's only every fifth or sixth time. Some people never see the problem at all, but whenever it happens, it's a major nuisance.

On discussion forums, some—but not all—users report that installing the Wireless Update Rollup Package from Microsoft (find.pcworld.com/41378) may fix this particular Wi-Fi annoyance.

You may already have installed this rollup (released in October 2003) via Windows Update. To find out, click Start-Windows Update, then click View Installation History in the left pane. Look for an entry named 'Update for Microsoft Windows XP (KB826942)'. If it's present, you have the rollup installed.

If you have the patch, and the connection problem persists, try stopping and then restarting the Wireless Zero Configuration service. This forces Windows XP to reset the card's drivers, which should snap to attention immediately afterward.

To start this procedure, you must open the Services console: Right-click *My Computer* on the Desktop, and select *Manage*. In the management console, click the plus sign next to the *Services and Applications* item in the left pane, then click *Services*. Scroll down and double-click *Wireless Zero Configuration* in the right pane.

Unless you had previously shut off the service, the dialog box will report the service's status as Started, and the Stop button will be active. Click *Stop*, wait a moment, and then click the *Start* button when it becomes active. If this fixes the problem, you'll likely have to repeat the process each time you encounter the same

set of symptoms.

If restarting the service doesn't fix the problem, you may need to update firmware in your notebook's Wi-Fi card, or update your Wi-Fi card

drivers to versions that have been certified for Windows XP. In a worst-case scenario, where WZC fails more often than it works, use the instructions above to stop the service, and then just use the software that came with your card to set up a connection to your LAN.

EXTEND YOUR NETWORK'S LIMITS

WHEN YOU WANT to spread a wireless network wider than the maximum range of a single gateway, you have a number of options. The cheapest (\$35 to \$80) and best alternative is to add more Wi-Fi gateways. Access points contain just a Wi-Fi radio, and as a result are simpler to configure and troubleshoot, but they often cost a little more than a gateway.

If you can run wires through walls or under floors, ethernet can link more than one gateway in a network, creating a much larger bubble of connectivity. Another option, called a wireless distribution system (WDS), lets you daisy-chain Wi-Fi gateways wirelessly. With WDS, a gateway in your home office, for example, can talk to another one halfway across the house, and that one can talk to a third gateway in the front of the house.

WDS is also known as wireless bridging, because traffic from each gateway is



connected (bridged) to other gateways. But since WDS isn't a standard, not all gateways support WDS, and the system works differently in different manufacturers' devices. If you want to use WDS, it's safest to buy all your gateways from the same company. Buffalo's WBR-G54 (\$85 to \$110, find.pcworld.com/41669) and Apple's AirPort Extreme Base Station (\$199, find.pcworld.com/41666) are good examples of WDS-enabled gateways with full Windows compatibility.

Whether you use gateways or access points, if you set up the WDS bridges incorrectly, you can cause more headaches. Eric Myerson of Los Angeles learned that lesson the hard way when

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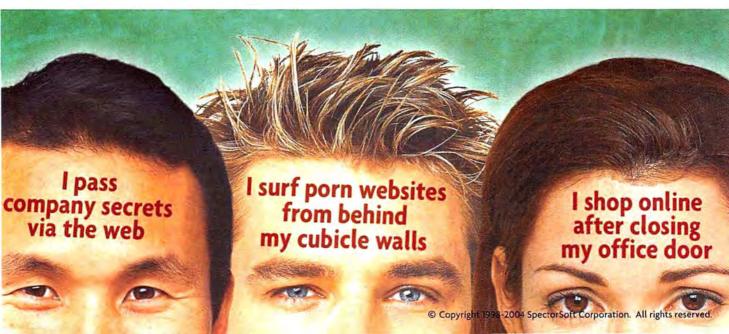
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he tried to bridge three access points: They talked in circles to one another, never reaching the Internet. "Figuring this out was quite frustrating," Myerson said.

In a typical home or office, you should set up one *smart* wireless gateway to bridge your wired network to wireless clients, to act as a firewall, and (optionally) to issue an IP address to any computer that connects to the network using DHCP (Dynamic Host Configuration Protocol). You want only one gateway to offer these features as your barrier and link between the Internet and your internal network.

The other gateways should be *dumb*, with all features other than the wireless access point disabled. (Problems will very likely crop up if more than one gateway has its DHCP server enabled. Run the DHCP server only on the gateway that connects directly to the Internet.)

Another way to extend the reach of your wireless network is to use a HomePlug product, which routes data over power lines. You could connect two relatively distant gateways within a single building to fill in any dead spots in your wireless network. To do so, you would attach the network cable from one gateway to a HomePlug adapter in one room, plug the adapter into a power outlet, plug in another HomePlug adapter in a distant room, and then connect the network cable from the second HomePlug adapter to the second gateway. Some companies even sell HomePlug-to-Wi-Fi adapters, which eliminate the need for another gateway.

HomePlug's main limitation is that it doesn't work over isolated circuits power outlets wired directly to the circuit breaker—which might restrict its use in newer homes and buildings, where you're more likely to find such circuits.

SOLVE NETWORK PROBLEMS THAT CROSS PROPERTY LINES

EVEN IF YOUR WI-FI network has glorious coverage one day, it might act up the next. The problem might be good neighbors running bad Wi-Fi technology.

All equipment that operates in the 2.4-GHz band (including Wi-Fi hardware) is

WI-FI TOOLS

Wireless Networking Kit

WHEN YOU TRAVEL, keep copies of a few applications on your laptop or handheld as a sort of wireless toolbox to help you find networks you can use. A few hardware add-ons can improve your ability to surf, too. This small arsenal can effectively help you find a public hot spot and stay connected.

NetStumbler (free, www.stumbler.net), when installed on your laptop or Pocket PC, will help you find a wireless network almost anywhere.

Boingo Wireless software (free, www.boingo.com), used for connections to that wireless ISP, can also be used by noncustomers of Boingo to store network profiles with encryption keys. If you use more than one encrypted network on a regular basis, the time savings of not having to reconfigure your Wi-Fi card settings with different WEP or WPA keys every time you switch networks make this freebie worth the download.

JiWire's AvantGo directory of hot spots (free, find.pcworld.com/41390) retrieves lists of free access points, then downloads them to your PDA. (Full disclosure: JiWire is a con-



NETSTUMBLER scans all of the WI-Fi channels, and delivers a list of every gateway and Wi-Fi card it finds.

a laptop (and running down its batteries) as you search for a nearby Wi-Fi network you can use.

Cantenna Wireless Network Antenna (\$50, find.pcworld.com/41387) may look like a simple metal cylinder, but it acts as a highly directional antenna that can vastly improve your ability to connect to a wireless network. Included in the package are connectors that allow you to screw the Cantenna into your wireless gateway or connect it to a network card, an 18-inch length of cable, and a small desktop-size tripod. –Andrew Brandt

designed to minimize interference with other devices using that band—such as cordless phones. Wi-Fi equipment has to sort out usable signals from the radio mishmash in the air. But some Wi-Fi chip sets don't play nicely with others.

For example, chip maker Broadcom last year released test results that it says show chips made by its rival, Atheros, interfere with other wireless network devices. Broadcom supplies 802.11g chips to Apple, Belkin, Buffalo, Linksys, and Motorola, as well as to Dell, EMachines, and Fujitsu for their laptops. Atheros technology is found in most D-Link and NetGear gateways and devices.

tent partner of PC World, and

Wifinetnews.com, author

Glenn Fleishman's Web site, is

Smart ID WFS-1 Wi-Fi

Detector (\$25, find.pcworld.

com/41372) is a handheld sig-

nal strength meter for the Wi-

Fi band, It can help track

down dead spots on a wireless

network, and it can also reduce

the number of awkward fum-

bles you make while balancing

part of JiWire's network.)

The problem, Broadcom alleges, stems from a proprietary Turbo setting available on Atheros-based gateways; this setting doubles the raw speed of the link if you use another Atheros-based device.

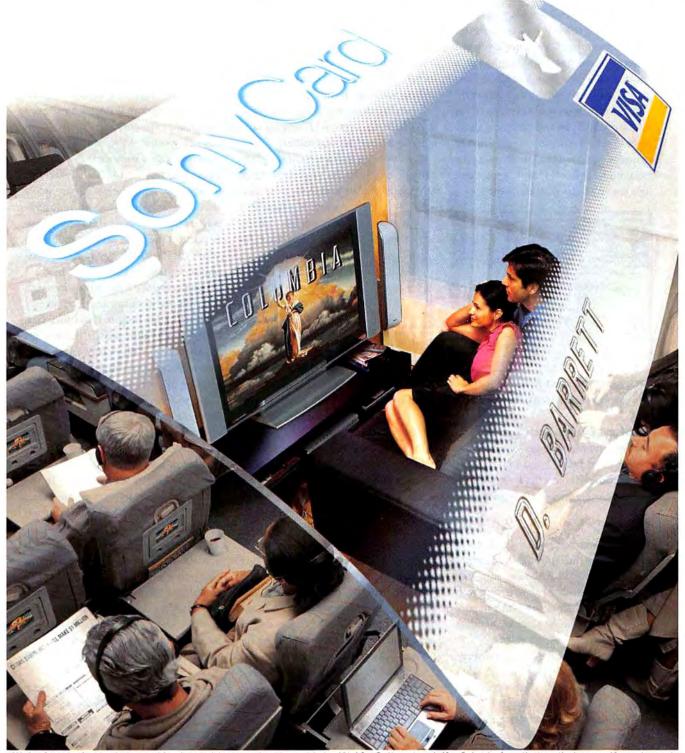
Atheros says that its engineers don't detect interference problems from its chips. CEO and president Craig Barrat says, "You can argue that the aggregate amount of interference generated is roughly unchanged." Barrat also says the company stands by its claim that its

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So if your neighbor has Atheros-based equipment with Turbo mode, you might need to have a chat—if you can figure out who's responsible. Conversely, if you use Atheros-based gear, you might get a knock on the door from a neighbor asking, "Did you just install a new gateway?"

In any case, you could cut some of the interference if you and your neighbors agree to set the gateways to use different channels. But if you can't track down your interfering neighbor, and changing channels doesn't help, consider installing a

WEP may be weak, but any encryption is better than none.

bay, though widely available software will let a serious intruder break a WEP key in as little as 15 minutes on a busy network.

You can limit access to your network by using Media Access Control (MAC) address filtering on your gateway, where you restrict access based on a unique code that's built into every Wi-Fi adapter (and ethernet adapter, for that matter).

MAC filtering may keep out neophyte hackers, but it also isn't foolproof: Since MAC addresses are sent in the clear even

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Key 3			
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ENCRYPT IF YOU WANT WI-FI security. Choose WPA encryption in your gateway's administration tool (or WEP, If WPA's not available).

directional antenna. Such an antenna in the right part of your house and aimed at the rest of it should boost your gateway enough to overcome the interference, without ruining anyone else's good time.

IMPROVE WI-FI SECURITY

WI-FI EARNED a reputation early on as an insecure technology to link machines in a LAN. Most Wi-Fi devices ship with security features disabled, so anyone with a Wi-Fi-enabled laptop or PDA can park outside your home or place of business and access your wireless network.

The first line of defense, known as Wired Equivalent Privacy (WEP), didn't meet the security test. WEP is built into every Wi-Fi device, and using it is better than nothing, but its encryption routines are flawed. WEP keeps casual snoops at Fi-certified device that's been released since September 2003. WPA firmware upgrades are available for many (but not all) older 802.11b gear sold between 1999 and 2002. Check the manufacturer's Web site for more information about your particular brand of card and gateway.

For Windows XP, you must download a patch (find.pcworld.com/41366) before you can use WPA, though newer PCs may ship with the patch installed. The patch adds basic support for WPA in the operating system, along with several other new technologies that are required for WPA to work correctly.

Laptops with Intel's Centrino mobile wireless technology will also let you install the WPA patch; but even though Intel has released updated drivers, individual laptop manufacturers have to integrate those drivers into their versions of Windows XP before WPA will work on them. Check with your notebook manufacturer's tech support to find out whether, and how, to upgrade. Intel's new 802.11g Centrino adapter, due to appear in laptops this year, will fully support WPA without extra downloads or patches.

When you use WPA, you protect your network with a passphrase (a longish password, from 8 to 63 characters in length). You enter the passphrase into a WPA configuration page on your gateway; thereafter, anyone who wants to connect enters the same passphrase into the Wi-Fi card settings. Without the passphrase, a would-be user can't connect.

To enter the WPA passphrase into your Wireless Network Connections profile, double-click My Network Places, then click View Network Connections in the left pane. Right-click your Wi-Fi network connection, select Properties, and double-click an existing network in the Preferred Networks pane (in the lower half of the Properties dialog box). In the Association tab, choose WPA-PSK from the Network Authentication pop-up menu. (Unless you're on a business network, don't choose the plain WPA option.) In the Data Encryption pop-up menu, select TKIP, enter your WPA passphrase twice. and click OK to save the profile.

One proviso with WPA: Though this privacy standard is highly secure, a researcher reported in late 2003 that a passphrase less than 20 characters long composed entirely of words could be cracked. Use a longer passphrase, and include some punctuation marks or numbers for maximum security.

Glenn Fleishman, a freelance writer based in Seattle, Washington, is the Webmaster of Wifinetnews.com. Andrew Brandt is a senior associate editor for PC World.

when you encrypt, a competent snoop can defeat MAC filtering easily.

Instead of relying solely on MAC filtering, combine its use with WEP's replacement, Wi-Fi Protected Access (WPA). WPA fixes all the broken parts of WEP, and it comes built-in on any Wi-

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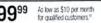
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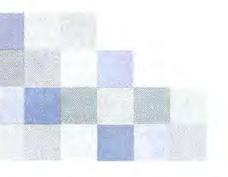
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INTERNET PHONES: CLEAR WINNERS

With improved call quality and low rates, the best Net phone services may finally be ready to

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BY JEFF BERTOLUCCI

ADDODDA

INTERNET PHONES have come a long way since the early days. A few years ago, you had to use software and a PC microphone to initiate a call from your PC to a regular phone. And you probably encountered some of the most garbled, inaudible conversations since tin can met string.

Thanks to advanced technology, the call quality of Internet phones has improved dramatically. The upsurge in affordable broadband service, combined with a new breed of hardware adapters, has led to a slew of Internet phone (aka Voice-over-Internet-Protocol, or VoIP) services eager to woo you away from your phone company. The Internet phone market includes telecommunications titans such as AT&T and Time Warner Cable, Net phone veterans like Dialpad and Net2Phone, and upstarts like VoicePulse and Vonage.

So is the Internet phone a viable alternative to your trusty landline? To find out, we tested eight broadband-phone services (see the chart below). For one month we made a series of local, long-distance, and international calls, morning, noon, and night, and rated each service on its ease of use, audio clarity, and value for the money. Our verdict: Net phones vary considerably in price and performance, but the best—VoicePulse and Vonage—offer near-landline dependability, as well as a host of advanced features (voice mail, call forwarding, and so on) for much less money. (And as of press time, Net-phone customers pay minimal taxes and surcharges, in part because of the ongoing regulatory debate.) Still, we did encounter some setup problems and choppy calls.

CHOICE OF NET PHONES

BOTH HARDWARE- and software-based Net phones are available. The hardwarebased services give you two options: adapters (to which you connect your own

REPORT CARD

Internet-Phone Calling Plans: Choose Your Provider Carefully

VONAGE AND VOICEPULSE STEAL THE SHOW with top ratings in audio quality, but other services lag behind.

	INTERNET PHONE SERVICE	Equipment required, price	Payment plan '	International-call charges '	Setup/ ease of use/ audio quality	Comments
1	Best Vonage *****/ www.vonage.com	Motorola VT1000; free	Unlimited local calls plus 500 long-distance (U.S. and Canada) minutes for \$25 per month	5 cents to \$5.92 per minute	Easy/ Good/ Excellent	Top-notch audio, and great support Web site. Excellent printed documen- tation. Only Internet phone provider tested that offers access to 911 service
2	Best VoicePulse ****** www.voicepulse.com	Sipura SPA-2000 phone adapter; \$80 with \$25 monthly plan (hardware is free with the \$15 or \$35 plans)	Unlimited U.S. calls for \$25 per month	3 cents to \$5.08 per minute	Easy/ Good/ Excellent	Outstanding audio quality; easy to configure. Unit ships with one-sheet setup guide; would benefit from more troubleshooting advice.
3	Net2Phone ★★★★☆☆ www.net2phone.com	Max IP10 phone adapter; \$200	1000 U.S. and international minutes (25 countries) for \$25 per month	Included in calling plan	Very easy/ Good/ Good	Setup is a cinch because the phone and the adapter are combined into one unit. Good call quality generally, but choppy at times.
4	InternetTalker ★★★完立 www.i2telecom.com	InternetTalker phone adapter; \$99	600 U.S. minutes for \$23 per month	2.5 cents to \$10.60 per minute	Easy/ Good/ Good	Adapter is easy to configure. Good audio quality overall. Bad news: Receives incoming calls only from other InternetTalker users.
5	Packet8 ★★★☆☆ www.packet8.com	Packet8 DTA-310 phone adapter; \$75 for Freedom Plan (hardware is free with plans starting at \$20 per month)	Unlimited calls to U.S. and Canada for \$20 per month	Unlimited calls to Asia or Europe for \$50 per month, or unlimited calls to both for \$80 per month	Easy/ Good/ Fair	The DTA-310 is the only equipment we tested that includes a voice-mail message light. Audio is sometimes muffled or garbled.
6	Dialpad ★★★:>>>> www.dialpad.com	Cisco ATA 186 phone adapter; \$149	500 U.S. minutes for \$10 per month (roughly 2 cents per minute)	3 cents to \$6 per minute	Easy/ Good/ Fair	Easy setup, but doesn't receive in- coming calls. (Dialpad will launch a two-way Net phone by June.) Incom- ing voices were sometimes inaudible.
7	TalkPro U-120 ★★★☆☆☆ www.talkpro.net	TalkPro U-120 USB-based hand- set (requires a PC); \$140	TalkPro-to-TalkPro calls are free; 3 cents per minute for calls to U.S. and Canada; no monthly fees	TalkPro-to-TalkPro calls are free; other calls are 4 cents to \$6.17 per minute	Easy/ Good/ Fair	Only unit tested that needs a PC. Easy setup, but audio quality is hit or miss. Landline and cell phone users dial lots of numbers to call TalkPro users.
8	Earthphone	Earthphone 502 phone adapter; \$450	Earthphone-to-Earthphone calls are free; \$25 per month (after 30 days) to call U.S. landline and cell phones	Earthphone-to-Earthphone calls are free; other inter- national service should be available by press time.	Fair/ Poor/ Fair	Very expensive hardware. Tedious dialing procedure for landline and cell phone calls. During some calls, audio quality was uneven.

¹ Most Internet phone companies offer more than one calling plan; see the providers' Web sites for more details. The plans listed here are the comparable offerings from each company. ² International calling plans—and the country codes available—vary across the board. Some Internet phone companies offer access to a limited number of country codes. VOICEPULSE and Vonage deliver excellent audio clarity that's a notch above what the competition provides. Both of these phone services offer directory assistance (for a

Best BUY

small fee), and their service plans can cost half as much as landline alternatives. Vonage throws in the benefit of 911 service.

standard phone) and all-in-one phone units (which include a built-in adapter). To use the hardware-based services, you must have a broadband connection. To get set up, you connect either hardware type to the router on your home network (via ethernet) or to your PC (via USB). Unlike the USB devices, the ethernet devices don't require that your computer be turned on before you can make a call. The purely software services, such as Skype and MediaRing, rely on a software program to handle the call.

The latest breed of hardware adapters delivers better audio quality than the software-based services do. That's because they're dedicated devices and don't share processing time with PC programs. Since

the quality of some of the software services can be poor, we decided not to test them.

SETUP SETBACKS

IN OUR TESTS, getting set up was occasionally problematic. Some providers' sites make setup seem as though it will be a simple plug-andplay scenario. But when we tested the services with the Speedstream 5100 modem/ router supplied with our SBC Yahoo Standard Plus DSL Service, none of the Internet phones worked. We learned that the Speedstream 5100 will not support the DHCP (Dynamic Host Configuration Protocol), which automatically assigns different IP addresses to the devices on our home network.

We then upgraded to the 2Wire HomePortal, a fourport router that supports DHCP, and had no further

installation or firewall problems. (Note: If your network is running a firewall, you may need to grant the phone adapter access to certain Internet ports. Your Net-phone vendor should provide details on how to do this.) Bottom line: If you're thinking about using an Internet-phone service, first confirm with your router manufacturer that your hardware is up to the task.

When you're ready to make a call, most services let you simply dial your number, and off you go. Some units, however, require you to press one or more keys before dialing. With the InternetTalker, for instance, you press the # key to activate the dial tone. The most laborious dialing sequence belongs to Earthphone, which forces you to complete a 17-key

> sequence before dialing a landline or cell number. For example, when we used

the Earthphone 502 to call the *PC World* offices, we had to dial *799 001 124*2345* 914152430500. Try memorizing that!

CLEAR CALLS, SOME SNAGS

ONCE OUR EQUIPMENT was up and running, we were pleasantly surprised by the audio clarity overall. The quality was quite good in most instances, despite an occasional clipped syllable, echo, or muffled voice. Only a few people complained about the audio quality, which often was better than that of cell phones.

The glitches? In some Dialpad conversations, we couldn't hear the person we called. For unknown reasons, some Earthphone and TalkPro calls didn't connect. In fact, a handful of Earthphone calls were very choppy. Sy Richardson, Earthphone's president and founder, told us that we could address the problem by updating the Earthphone's firmware. But after we installed the update, the audio quality of our calls didn't noticeably improve.

Since Internet phones, unlike their landline cousins, aren't bound by geographical constraints, you can choose any area code. A homesick New Yorker living in Omaha, say, may opt for a 212 prefix.

Power outages are the bane of the Netphone customer. Traditional phone networks provide their own power and deliver service during blackouts. But with Net phones, you're out of luck. One option is an auxiliary power source, such as a UPS, to run the phone adapter during an

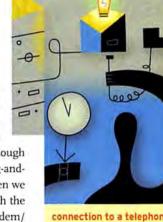
IS A NET PHONE RIGHT FOR YOU?

YOU SHOULD CONSIDER an Internet phone if you...

...rely exclusively on your cell phone but still want a fixed phone line in your home or office. Cell phones are convenient, but they can be quite expensive, especially if you use them to make international calls.

...are comfortable troubleshooting your home network. Net phones sometimes require power cycling-you unplug the adapter, wait 10 seconds, and reconnect. You also may need to tweak IP addresses to activate the adapter. ...don't have a security system or satellite TV decoder that requires a

connection to a telephone line. Internet phones don't work with such devices. If you own either one or both, you might consider retaining a regular phone line just to use with them, despite the added cost. ...are willing to sacrifice audio quality for dollar savings. On one hand, clipped and garbled words aren't uncommon; but on the other hand, Net-phone quality is typically superior to that of cellular calls.



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15* XGA TFT Display 1024 X 768 60GB 5400RPM Hard Drive 512MB DDR 2100 SDRAM DVD/CDRW Combo Drive 56K V.92 Modern & 10/100 NIC 1 Firewire port, 3 USB 2.0 Ports 1 PCMCIA Type II Socket & 1 Multimedia (SD/MMC/MS) Reader Travel Weight: 6.2 lbs.

Starting at only \$1299

Starting at only \$1399

emergency; but that arrangement doesn't address broadband outages, which twice disrupted service in the midst of our tests.

NET PHONES

PLANS AND TAXES

NET-PHONE PROVIDERS generally offer service plans at about half the price of the Baby Bells. VoicePulse provides unlimited local and long-distance calls, with voice mail, for \$25 per month. By comparison, SBC Communications charges nearly twice as much for a comparable landlinebased plan. VoIP subscribers must pay federal and state taxes, but far less than the average landline customer, who faces a monthly barrage of nickel-and-dime fees and surcharges (see chart at right). Most Net-phone companies do charge you for the required phone adapter; Vonage, however, provides its adapters for tree.

Internet taxation is a hot topic in Congress, which is debating whether to continue its moratorium on taxing online commerce. For Internet-phone users, this

PLAN COMPARISON



The Price Is Right: Cut Your Phone Bill in Half

DEPENDING ON YOUR CALLING PLAN, your state, and your long-distance company, you can save a significant amount of cash by switching to an Internet-phone service. Our comparison here offers one example of the potential cost savings; your mileage may vary.

BREAKDOWN OF CHARGES	Internet phone plan: VoicePulse America Unlimited	Landline phone plan: SBC All Distance
Flat monthly fee for unlimited long- distance calls	\$24.99	\$48.95
Monthly taxes and surcharges '	\$2.25	\$9.47 ²
Total fee	\$27.24	\$58.42

FOOTNOTES: ¹ The charges listed come from actual bills. ² Includes California state taxes. CHART NOTE: In this chart, we chose VoicePulse because it is one of our Best Buys; SBC's (comparable) landline plan is the author's current phone service.

translates into lower taxes than those paid by traditional-phone customers—at least for now. Will the party last? "[For] the next couple of years, [Congress] will take a hands-off approach" and allow the IP telephony industry to develop, predicts Daryl Schoolar, In-Stat/MDR senior analyst.

"The FCC is supportive of continuing the moratorium," says Jeff Carlisle, codirector of the Federal Communications Commission's Internet policy working group. At press time, the FCC had ap-

> proved a proceeding inviting comments on how to regulate VoIP (see find.pcworld.com/ 41165 for details).

> Net telephony isn't flawless, but the future looks bright. According to Charles Golvin, Forrester Research senior analyst, fewer than 150,000 of 106 million U.S. homes currently use Net phones. "By 2006 we'll have about 5 million VoIP lines in households," he predicts.

Someday Internet phones may deliver crystal-clear phone conversations that far exceed the standard set by today's regular phones. "On a network with [a speed of] 100 megabits per second [roughly 20 times that of a DSL connection], you can have voice calls that are better than CD quality," says Brian Willingham, a consultant with Long & Associates, a telecommunications consulting firm.

Take that, Alexander Graham Bell.

Jeff Bertolucci is a California-based freelance writer. Michael Reagan is a staff reporter for the Times Record in Brunswick, Maine.

SERVICE FROM THE BIG DOGS: AT&T AND TIME WARNER CABLE

Note: California-based PC World was not able to test either AT&T's or Time Warner Cable's services for the main part of the story; both companies are rolling out services on the East Coast.

AT&T AND TIME WARNER CABLE now offer their own Internetphone services. AT&T plans to roll out its service by the second quarter. Unfortunately, a trial service wasn't available in time for testing. The company has not finalized its pricing plans yet.

Time Warner Cable currently offers its Digital Phone service to

customers in Portland, Maine, and Raleigh, North Carolina (see find.pcworld.com/41150 for details). The company plans to provide service in 27 states by the end of the year.

As a Portland resident, I tested Digital Phone for a few weeks. When you sign up, Time Warner, unlike other Net-phone companies, sends a technician to your home or office to install the free equipment. The setup: A vertical modem connects to a splitter, which hooks up to the same cord that delivers my cable and Internet service. My telephone connects to the jack at the back of the modem. Installation took about an hour. When it was done, I just picked up the receiver, heard a dial tone, and started to make some phone calls. I made local, long-distance, and international calls, and I was very impressed with the audio quality of all of them.

If you're an existing Time Warner customer, you pay \$45 per month for unlimited local and long-distance calls; otherwise you pay \$50 per month. Digital Phone lets you transfer your existing telephone number to the new service. Plus, it supports 911 calls and caller ID.

I have decided to switch to Digital Phone. Its call quality matches that of my landline phone, and I will save between \$10 and \$20 a month on phone charges. —*Michael Reagan*

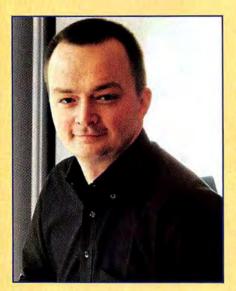


3 MILLION CUSTOMERS HAVE ALREADY JOINED THE WORLD'S #1 WEB HOST





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"ENABLING ALL OF OUR CUSTOMERS TO DO MORE ON THE WEB IS OUR #1 PRIORITY."

1&1 offers a one-stop shop for all your web hosting needs to help you maximize your full web potential – without barriers, without downtime and without reservation. We don't believe you should pay extra or have to search for the right solution, so we offer all-inclusive, feature-rich packages at some of the lowest prices around and with no hidden costs.

1&1 is dedicated to our customer's complete satisfaction. From total beginners to veteran industry professionals, all users are fully catered to. And since we stand behind all of our products and services, we offer a 90-day Money Back Guarantee in case you're not 100% satisfied.

Don't let your current web host hold you back

any longer. Switch to 1&1 today and join the 3 million customers who understand what makes 1&1 the World's #1 web host.

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Andreas Gauger 1&1 CEO

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Are you ready to begin your web presence? Or maybe you've received a renewal letter from your current Registrar and you're searching for a new one.

Make your mark with your own .com, .net, .org, .info or .name Top Level Domain from 1&1 and find out why **4 million domains** have already been



registered with us. With complete **DNS management**, you'll have full control over your domain. And because 1&1 is an **ICANN Accredited Registrar**, your domain is registered immediately and without delay. Plus, 1&1 is proud to offer the best domain price in the U.S. at just **\$5.99 per year**!

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SWITCH TO 1&1 AND GET MORE TO BEGIN WITH:

OVER \$550 OF THE LATEST SOFTWARE - FREE WITH ALL HOSTING, SERVERS, AND ESHOPS

- NetObjects Fusion 7.5 suggested regular retail price \$130
- PhotoImpact 8 SE suggested regular retail price \$90
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- Wise FTP 3.0 suggested regular retail price \$40 (All software is free. \$6.99 shipping and handling charge applies.)

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- Chat & Forums
- 1&1 WebStatistics

ranking

- 1&1 Newsletter Tool
- 1&1 WebDatabase
- 1&1 WebElements

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- Service Guarantee: Your questions will always be answered promptly
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THE MOST EXPERIENCE

- 12 years experience and one of the first companies to offer web hosting.
- Long-time profitable company, over 1,100 employees.
- Part of publicly held United Internet, an industry leader with over 3,600 employees and \$500 million in revenue.

THE MOST COMPLETE HOSTING SOLUTIONS

- All the new 2004 features to make your website truly interactive.
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- Our Data Center IV plus three other centers form the biggest web hosting arena in the world.
- 20,000+ servers already stationed in high-security zones with room for over 40,000 more.
- 43,000 GB of data stored and backed up. 255 million e-mails each month.



Just one data center alone contains 11 rooms with space for over 660 racks for a total of 26,400 servers.



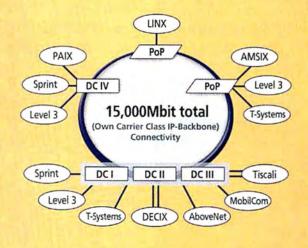
Lead gel batteries guarantee continuous power without interruption.

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THE BIGGEST CONNECTIVITY IN THE INDUSTRY

- 15,000 Megabits versus the competition's limited bandwidth means more visitors get to your site faster.
- Nine fiber optic carriers piped in at different points gives us real redundancy. Multiple direct peerings.
- 1&1 Network Operations Center features 24/7 monitoring and administration by a dedicated team.



own Data Center / own Point of Presence

THE ONLY WEB HOST THAT CONTROLS ITS ENTIRE VALUE CHAIN

- Operate 4 Data Centers globally.
- A research and development team of over 150.
- Own backbone We do not rely on third parties.



Powerful diesel generators supply constant, reliable power.

THE STRONGEST PARTNERSHIPS AND SUPPLIERS

CISCO SYSTEMS

- One of select Microsoft Joint Development Partners.
- Multiple Juniper M40s, Multiple Cisco GSR 12000.
- Part of the global Linux developer community from the onset.







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DOMAINS

THE ULTIMATE SOLUTION FOR DOMAIN REGISTRATION.

With the 1&1 Group, registering or transferring your domain is straightforward and fast. In minutes, you will have a professional web address plus lots of features you'd pay extra for with other providers. And when you're ready, you can add-on to send professional e-mail or even build your own homepage. So, if you want to take your ideas to the next level, 1&1 has everything you need to get started.

RICH LOEN www.etherwatch.com

"Setting up my domain was quick and painless - and very cheap.

BEST

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Etherwatch - See what's going on!

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Ether Wetch memory of Ethenest tadfic, tesking for IPO to GP unages, and Google starch terms, and displays to an access as a real single year

Watch in real-time as EtherWatch shows you:

- JPOs and GP's bring viewed by anyone anywhere
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- Fade older images out to black or white
 Log all images found to an bind log for
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EtherWatch.com

- Log file shores IP addresses, and which to ages were varwed, sloog with a timelonel as
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- Log all Google searches an the log file
 Specify test to search for, and what to do when it's found dupley on accord, or avve to a limit.

Specify what to asserts for, and what to display as any

I've been paying \$25 to \$50 per year for domains in the past – and have had very little control over the domain once it was set up. With 1&1 I was able to set up my email and website, and be online that evening. And now, with 1&1 Webmail, I can even check my email from anywhere. It's the greatest!"

DOMAIN PRICE

IN THE U.S.!

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THREE INGENIOUS SOLUTIONS YOU DON'T HAVE TO BE A GENIUS (OR A MILLIONAIRE) TO USE.

1&1 INSTANT DOMAIN REGISTRATION

REGISTER YOUR NEW DOMAIN.

It's fast, easy, and it's only the beginning of what you can accomplish online with 1&1. DNS management gives you full control over your domain. What's more, the most affordable domains in the industry come without hidden charges and binding contracts.

TRANSFER YOUR DOMAIN TO 1&1.

Quickly and easily transfer unlimited existing domains to 1&1 at no additional cost. We only charge you the regular low cost to register a domain – just \$5.99 per year! Or if you have a domain that you'd like to keep with another Registrar, DNS transfer allows you to simply point your domain to 1&1 name servers – also at no additional cost!



ENJOY THESE GREAT FEATURES AND MORE:

- I free e-mail address (alias)
- Masked forwarding
- DNS management
- Domain parking for future use

1&1 INSTANT MAIL

PUT YOUR DOMAIN TO WORK. Easily arranged through your Control Panel, this add-on package gives you the power to send and receive e-mail from your domain name.



1&1 INSTANT WEBSITE

CREATE YOUR OWN WEBSITE in just 20 minutes. Instant Website is ideal for anyone building a first website or experienced users looking for a quick additional site with no programming hassles.

\$299 PER MONTH

ENJOY THESE FEATURES AND MORE:

Includes WebsiteCreator with 12 pages

- Over 100 customizable templates
- Online is just 5 easy steps

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THE LATEST SOFTWARE TO CREATE AND PROMOTE YOUR WEBSITE.

Sign up for any of our shared hosting packages and you'll get all the software you need to create, publish and promote a professional web presence. Best of all, the software is free (plus \$6.99 shipping & handling)! And these are not free trials – you'll be shipped a CD with full-version software plus manuals!



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INCLUDING THE LATEST SOFTWARE AND INTERACTIVE TOOLS TO CREATE THE ULTIMATE WEB PRESENCE.

ADD PERFORMANCE FEATURES FOR A TRULY INTERACTIVE WEBSITE.

Once you have created your new website, add exciting features that will connect you with your visitors to give them exactly what they are looking for. These features are included with the Business and Developer shared hosting plans – at no additional cost.

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Easily create and integrate customized databases into

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Alan	Buhop	634 E. 29th Street, New York, NY 10015	alanb@myhout.com
Stephen	brachaw	1954 Corgin Street, Hudson, CH 44215	bradhaisthnyhust.com
Catherine	Leonard	A4 Stanhope Drive, Pritsburgh, PA 15237	family# miname.com
Carl	Brown	453 Elberty Avenue, Wanington, NC 28403	brown/2521@lycos.com
Tart	Stowe -	26 N. Hills Road, Chandler, AZ 85226	webunited@gms.twt
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your website with no programming knowledge needed. Just select the fields you'd like and you're ready to go!

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The closest thing to selling one-on-one, live and in



person, with dialogue in real time. Offers site visitors a live consultant, at your discretion. Informs you of a new visitor by a visual indication or auditory alert.

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Share your news and important information via e-mail



1&1 WEBELEMENTS

newsletters. No special programming is needed! Track your newsletter's performance and store previously published newsletters.

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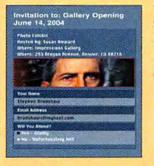
Comprehensive numerical and graphical statistics



let you understand the dynamics of your visitors so you can fully optimize your website.

CHAT & FORUMS

Great for making your site a meeting place for



Make your site interactive by adding contact forms, online polls, complex Q&A scenarios and more. Ideal for gaining qualified leads. Data is delivered to you easily by e-mail.

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customers and vendors. Chats in private rooms are possible. You can even trade experiences, interests, and views with a simple step-by-step forum.



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HOSTING

GET TRULY INTERACTIVE WITH THE LATEST FEATURES FROM 1&1.

1&1 feature-rich web hosting packages offer the best value for your money. With three fully loaded hosting solutions to choose from, we provide everything you need to create a high-performance website and realize the full potential of the internet.

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GLORIA VAUGHN www.ggphotography.com

"We were pleasantly surprised at how quickly and easily we were able to create a professional-looking website with 1&1! There were so many beautiful templates to

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choose from in the 1&1 WebsiteCreator, it was hard to decide which one we liked best. In addition, our website contains several photos, and we were amazed at how fast we could upload photos. When we had a technical question, it was answered promptly, by email, as promised."

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UNLOCK YOUR FULL POTENTIAL WITH LINUX HOSTING - MADE **EASY AND AFFORDABLE FROM 1&1.**

90-DAY MONEY BACK GUARANTEE

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INCLUDES 5 DOMAINS

DOMAIN NAMES

- Includes 5 domains at no additional cost
- Handling of unlimited domain names Point 200 external domains to 1&1
- 200 sub domains

WEBSITE/CONNECTIVITY

- 2,000 MB of Web space
- 25 FTP accounts, unlimited access 30,000 MB/Month bandwidth
- Protected by up-to-date firewall
- No limits on simultaneous hits/bandwidth
- Server priority
- Daily backups

APPLICATIONS

- WebsiteCreator for 25 pages
- Full version software worth \$550
- 1&1 Control Panel

E-MAIL

- 300 POP3 e-mail accounts
- Aliases, auto-responders, forwarding
- 1&1 WebMail
- Virus scanner for 6 POP3 accounts

WEBSITE FEATURES

- Logfiles CGI library (counter, guestbook, etc...)
- Own CGI programming FrontPage 2002 extensions
- Advanced password protection
- Perl, PHP3 and PHP4
- 3x MySQL databases (100 MB each)
- Cron jobs
- SSH shell access
- Advanced developer tools
- SSI (Server side includes)
- **Dedicated SSL Certificate**

CRM/E-COMMERCE

- 1&1 WebStatistics
- 10 chat channels
- Customizable forums
- in2site one-on-one dialogue
- Newsletter Tool
- 1&1 WebDatabase
- 1&1 WebElements Sophisticated Form Editor

EXPRESS SUPPORT

- 24/7 support by phone and e-mail

INCLUDES 3 DOMAINS

BUSINESS PACKAGE

99

DOMAIN NAMES

- Includes 3 domains at no additional cost
- Handling of unlimited domain names
- Point 100 external domains to 1&1
- 50 sub domains

WEBSITE/CONNECTIVITY

- 1,000 MB of Web space
- 5 FTP accounts, unlimited access 15,000 MB/Month bandwidth
- Protected by up-to-date firewall .
- Daily backups

APPLICATIONS

- WebsiteCreator for 18 pages
- Full version software worth \$550
- 1&1 Control Panel

E-MAIL

- 150 POP3 e-mail accounts
- Aliases, auto-responders, forwarding
- 1&1 WebMail
- Virus scanner for 3 POP3 accounts

WEBSITE FEATURES

- Logfiles
- CGI library (counter, guestbook, etc...) Own CGI programming FrontPage 2002 extensions
- Advanced password protection
- Perl, PHP3 and PHP4
- 1x MySQL database (100MB)
- SSH shell access
- SSI (Server side includes)
- Cron Jobs

CRM/E-COMMERCE

- 1&1 WebStatistics
- 5 chat channels
- Customizable forums
- in2site one-on-one dialogue
- Newsletter Tool 1&1 WebDatabase
- 1&1 WebElements Sophisticated

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Form Editor

EXPRESS SUPPORT

24/7 support by phone and e-mail

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Customizable forums **EXPRESS SUPPORT** 24/7 support by phone and e-mail

HOME PACKAGE

INCLUDES 1 DOMAIN

Includes 1 domain at no additional cost

Handling of unlimited domain names

Point 50 external domains to 1&1

1 FTP account, unlimited access

Protected by up-to-date firewall

Full version software worth \$550

Aliases, auto-responders, forwarding

CGI library (counter, guestbook, etc...) FrontPage 2002 extensions

Virus scanner for 1 POP3 account

5,000 MB/Month bandwidth

WebsiteCreator for 12 pages

50 POP3 e-mail accounts

DOMAIN NAMES

5 sub domains

Daily backups

1&1 Control Panel

1&1 WebMail

WEBSITE FEATURES Logfiles

CRM/E-COMMERCE

1&1 WebStatistics

chat channel

Password protection

APPLICATIONS

E-MAIL

WEBSITE/CONNECTIVITY

500 MB of Web space

PER

MONTH

PER MONTH

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WHATEVER YOU NEED FROM A DEDICATED SERVER, 1&1 HAS THE DEFINITIVE SOLUTION.

1&1 Managed Servers deliver the ease of shared hosting, but with the power and space of a dedicated server. 1&1 Root Servers offer the same power and space, but you are in total control. Both are loaded with features that help you do more on the web.

15,000 MBIT CONNECTIVITY

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- Own global backbone
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- Most advanced Data Centers in the world
- Powered by Cisco and Juniper
- Over 99.9% uptime guaranteed
- 43,000 GB of data stored and backed up

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- Use, create and manage your Linux based system
- Create new e-mail accounts
- Manage entire domains and web spaces
- Become your own host by segmenting your
 - server into shared webspace
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24/7 MONITORING, SUPPORT & SERVICE

- Netsaint continuously tracks 40 parameters
- Technicians on standby 24/7 to maintain operations
- 24/7 assistance over the phone or by e-mail
- Highly specialized department of trained technicians

RELIABILITY & CREDIBILITY

- 12 years experience
- Offering dedicated hosting for 4 years
- Over 1,100 employees
- Lowest churn rates in the industry for years

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"Choosing 1&1 was the best business decision we ever made. The dedicated server packages offer an industrialstrength solution with every feature we have ever needed. High traffic? No problem! With 1&1, we have a fast, reliable website and no worries."

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90-DAY

MONEY BACK

MONEY

GUARANTEE

100% SATISFACTION

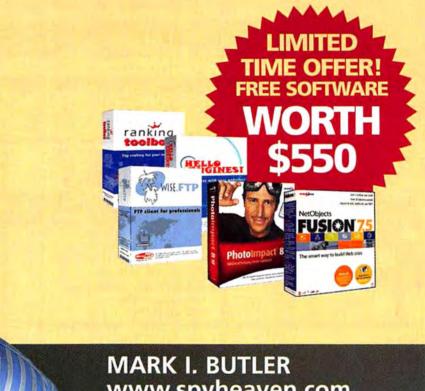
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SIMPLE E-COMMERCE WITH HIDDEN POWER.

1&1 eShops are as powerful as any major online retailer, but with no software or hardware to install. Online wizards and professionally designed templates offer such simplicity that your online shop can be up and running in less than an hour.





matter of hours we had a professional looking, and well organized site up and running, with the capability of taking secure online payments. The 1&1 eShop gives our customers a great deal of confidence in providing credit card details, and as a result, our business has benefited to no end!"

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EASY TO HANDLE. EASY TO USE. **BEING PROFITABLE HAS NEVER** BEEN EASIER.

90-DA NONEY BA GUARANT

100% SATISFACTION OR YOUR MONEY MONEY BACK **BACK** GUARANTEE

LOADED WITH 30+ TEMPLATES

If you want to start selling online without a big budget, lots of time and know-how - start off with one of our 30+ professional shop templates ready to be loaded with your products. They've been designed by experts in optimizing online results. You can even customize them to your liking by changing fonts, colors, and positioning.

8 EASY-TO-USE WIZARDS

With eight well-designed wizards to guide you through the shopping basket, order process, delivery methods and, of course, payment settings, configuring your eShop is simple.

HOSTED SOLUTION - ALL INCLUSIVE

There's no software to install - traffic and webspace are included. We even take care of all updates and enhancements, leaving you to concentrate on your business.

FULLY CUSTOMIZABLE

eShops use PHP-based templates and rules so you can change styles, edit all text modules, and even run an eShop in a different language on your completely private skin. Using PHP scripts you can even edit context-sensitive rules.

ACCEPT ONLINE PAYMENTS WITH PAYPAL AND WORLDPAY

1&1 Professional or Developer eShops deliver you secure and easy-to-use e-commerce solutions via PayPal or WorldPay. With PayPal - an eBay company you don't even need a special merchant account. Just sign up, and without any paperwork or any bank applications, you can accept all payments from 35,000 loyal PayPal users. WorldPay, a member of the Royal Bank of Scotland, provides you with everything you need to securely accept credit card payments.

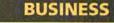




Vital for customers who shop in an SSL-secured environment. All shop-based settings you make on the webserver are in SSL-secured pages for maximum integrity of your confidential data. Third parties cannot access these areas.



SETUP FEE WAIVED FOR A LIMITED TIME





- 50 MB web space
- Full version software worth \$550
- 50 item product catalog
- 2 shipping methods IO GB bandwidth/month included
- SSL (Secure server)
- Free support by mail and phone
- Money Back guarantee

PROFESSIONAL



Features as above, in addition to:

- 300 MB web space
- Unlimited item variants
- 200 item product catalog
- 30 GB bandwidth/month included
- Product categories/sub-categories
- Product data import/export
- Multi-currency support
- Offer customer discounts
- 5 shipping methods
- Customer account management
- Newsletter administration
- Import/export customer data
- Self-administration for customers
- Customize images/color/fonts
- Shopping cart integration
- Online credit card clearing with
- Paypal and Worldpay (charges apply) Tax clearing server included (calculates
- taxes by state, city and country)

DEVELOPER PFR MONTH

Features as above, in addition to:

- 1200 MB web space
- FTP access
- Unlimited item product catalog
 60 GB bandwidth/month included
- Discounts for customers, and specific customer groups
- Unlimited shipping methods
- Export of orders & append customer data Customer account management, including customer groupings
- Fully customizable templates
- 1 Dedicated SSL Certificate included



FOR MORE DETAILS GO TO **1AND1.COM**

THE HOST WITH THE MOST **GOING FOR YOU**

HERE ARE JUST A FEW REASONS WHY YOU SHOULD JOIN 1&1, THE WORLD'S #1 WEB HOST





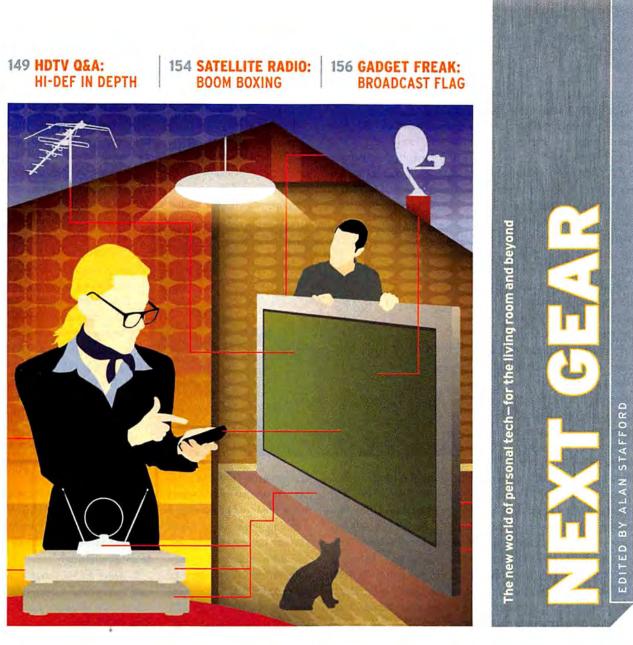
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1&1 INSTANT DOMAIN REGISTRATION ENJOY THESE FEATURES

- I free e-mail address (alias)
- Masked forwarding
- DNS management
- Domain parking for future use







HDTV ANSWER GUIDE

READY FOR NEXT-GENERATION TELEVISION? BEFORE YOU TAKE THE HIGH-DEFINITION HIGH DIVE, READ THIS GUIDE TO THE SERVICES, THE SETS, AND MORE. BY YARDENA ARAR

AS HIGH-DEFINITION television programming finally approaches critical mass and the prices of everything from smaller CRTs to big plasma displays continue to fall, millions of Americans are considering making the upgrade to HD's sharp, luscious picture and movie-quality sound. But if you visit your local consumer electronics store without doing a little research first, you may leave with more questions than you had when you went in. At the very least, you should know what HD programming you'll be able to get in your area, what equipment you'll need to get it, and whether you'll have to make compromises with your new set that you don't with your analog TV. Here's a good start on that research.

Q. What's the difference between HDTV and digital TV? A. Under a federal government mandate, broadcasters

ment mandate, broadcasters are switching from our halfcentury-old analog system to a digital one that promises to use public airwaves more efficiently and to improve broadcast quality. The target date for completing the transition from analog to digital is 2006. In the United States, digital TV is based on Advanced Television Systems Committee standards. HDTV is a subset of digital TV; it is an umbrella term for the higher-resolution formats that are included in the ATSC standards.

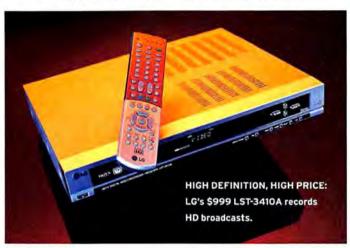
ATSC transmission formats are defined by image resolution (the pixels per line and

the number of lines per frame); by aspect ratio; by the refresh rate of the image (in frames per second); and by how images are scanned, transmitted. and received. With progressive scanning, the scanner first creates and transmits a line from left to right; then it draws the next line underneath, then the next. and so on, creating each frame in a single pass of sequentially drawn horizontal lines. With inter-

laced scanning, the scanner creates the odd-number scan lines in its first pass; then it starts over from the top of the screen to complete the image by scanning the even-number lines. Progressive scanning tends to make action scenes look smoother, but interlaced scanning permits greater perceived resolution in the same amount of bandwidth.

Current National Television Systems Committee (NTSC) analog transmissions consist of 480 lines of interlaced video information (plus a 45-line interframe gap inserted for synpect ratio uses the same number of pixels per line, 704).

The term HDTV applies to 720p, 1080i, or even higherdefinition broadcasts (and to the equipment capable of displaying those formats). All such formats are transmitted



chronization purposes, making a total of 525 lines). The most similar digital TV counterpart is the ATSC's 480i format, denoting frames with 480 interlaced lines. Known as standard-definition TV, 480i most commonly is broadcast in a 4:3 aspect ratio (a widescreen version with a 16:9 asin a 16:9 aspect ratio, so 1080i refers to a 1080-by-1920-pixel image produced by interlaced scanning, while 720p denotes a 720-by-1280-pixel image produced by progressive scanning. The broadcast networks have committed to different versions of HDTV: Both CBS and NBC have opted for 1080i;

TELEVISION FORMATS

DIGITAL TV BY THE NUMBERS

DIGITAL TV STANDARDS set by the ATSC governing body encompass 18 different transmission formats, of which these are the most common. An image's aspect ratio has no effect on its total pixel count; to display a wide-aspect picture, broadcasters simply stretch the image to fit the screen. The older National Television System Committee format (for reference) covers analog broadcasts only.

FORMAT	Vertical resolution (lines per frame)	Horizontal resolution (pixels per line)	Aspect ratio	Audio	Pixel count
Standard Definition (SD)	480 interlaced	704	4:3	Dolby Digital 5.1-channel	337,920
Enhanced Definition (ED)	480 progressive	704	4:3 or 16:9	Dolby Digital 5.1-channel	337,920
High Definition (HD)	720 progressive	1280	16:9	Dolby Digital 5.1-channel	921,600
High Definition (HD)	1080 interlaced	1920	16:9	Dolby Digital 5.1-channel	2,073,600
NTSC (analog)	480 interlaced	450 (equivalent)	4:3	Stereo (2-channel)	216,000

SOURCE: ADVANCED TELEVISION SYSTEMS COMMITTEE

ABC and Fox, for 720p. (There is also a 1080p format, but as yet no company makes consumer equipment to handle its huge bandwidth and high processing requirements.)

Yet another ATSC format, 480p, has 480 lines scanned

progressively. Though its resolution matches that of standard-definition TV. the progressive scanning results in a better image. This format is known as enhanced-definition TV. The Fox network has been broadcasting some EDTV shows, but it intends to begin its HDTV broadcasts next fall. Most commercial DVD movies are recorded in 480p as well as in 480i; for this reason they will look better on a set that supports EDTV.

Q: So what about watching 1080i or 720p on an EDTV set? And what about switching among broadcasts with different resolutions?

A. Your ATSC tuner will convert whatever format it receives into whatever format your set supports.

Q. What's the difference between an HDTV set and an HD-ready or HD-capable set?

A. High-definition content must be displayed by a tuner that can process the HD signal and by a set capable of displaying IID resolution. A true HDTV set comes with a builtin ATSC-compliant HD tuner (such tuners support all HD formats, so you don't have to worry about which one you're receiving). Some TVs that can support HDTV resolutions lack a built-in tuner; these HD-ready sets require purchase of an external tunercosting up to \$500-in order to receive HD programming.

Q: Why might I want to buy an HD-ready set instead of an HD-capable one (besides to save money)?

A. You might want to purchase an HD-ready set if your cable or satellite company provides a set-top box with an ATSC tuner—there's no point in having two of them (one in the box, one in the TV).

Q. How much HD programming is available?

A. The National Association of Broadcasters reports that ABC, NBC, CBS, and the WB were broadcasting more than 60 prime-time shows in high definition by early 2004.

Under FCC rules, commercial broadcasters had to begin digital TV transmissions by May 2002, and the National Association of Broadcasters' Web site says that 1155 of the United States' over-the-air broadcasters met the deadline. But while the FCC allocated sufficient bandwidth for these stations to broadcast HD content, it established no statutory or regulatory requirement that they do so. At least a few stations have begun using the bandwidth to broadcast standard-definition digital channels-a practice known as multicasting-because they can fit about half a dozen such broadcasts within the bandwidth of 19.4 megabits per second that is required for a single HD channel.

Though the FCC has made no hard-and-fast rule that stations must broadcast HD content, "There's a general understanding that we have to be good stewards and not completely subvert the positioning of HDTV broadcasts," says Steve Pair, vice president of engineering for WCBS (the CBS-owned-and-operated station in New York). The FCC says broadcasters may use the channels "according to their best judgment" as long as they offer free digital service at a resolution comparable to that of the analog shows they air during the same time periods.

A likely scenario, in Pair's opinion, is that stations will use some portion of the 19.4mbps bandwidth for additionservices to offer a full range of local programming) should apply to digital TV. Right now they don't, except in the rare instances in which a station has a digital signal but no analog one. Consequently, to pick up local stations, you'll likely have to resort to a special overthe-air HD antenna (pictured on the next page).

Most cable and satellite services offer at least some HD content, but it varies depending on the operator. Tradition-

HD IN THE SKY: Voom's satellite brings in 34 HDTV channels.



al broadcast streams, which would remove some data from an HD show but not enough to degrade the quality of the image significantly.

Q. Can I expect my cable or satellite provider to deliver all those channels?

A: Probably not. Cable carriers don't want to be obligated to carry all of the different data streams that terrestrial (overthe-air) broadcasters choose to send out. The result is an unresolved dispute over how the FCC's must-carry rules (which in effect have required cable al satellite services have little HD content: DirecTV, for example, offers only eight channels. Four of these (HDNET, HDNET Movies, ESPN HD. and Discovery HD) are in an \$11-per-month bundle (on top of whatever your standard service costs); both the HBO and Showtime HD channels are free to customers whose packages include those services. Customers can also buy \$5 pay-per-view movies-that's \$1 more than other PPV films cost-or adult content.

You can get a lot more HD

from the Voom satellite service, which at this writing offers more than 30 channels of HD content (including 21 that it developed and provides exclusively). There is a trade-off, however: Voom offers far fewer standard-cable channels than DirecTV does.

The best way to determine what's available in your area is to get a good online programming guide. Decisionmark's TitanTV (www.titantv.com), for example, identifies the par-

> ticular broadcast stations and HD content (as well as the SD content) that you can get at your location. And it's free.

Q. Aside from an HDcapable set, what will I need to get HD programs?

A. You'll need an HD video source: an HD cable or satellite box, an HDcapable video card (so you can use your PC as a TV tuner), or an HD antenna for over-the-air broadcasts.

If you're a cable or satellite customer, you'll need a new set-top box. Standard satellite and cable boxes—even digital cable boxes—cannot process

HD signals. Whether you are a new customer or an existing one, most satellite services will make you buy the equipment. Voom, for example, charges \$749 for its starter package, which consists of a dish, an HD antenna for local programming, and a tuner with remote. Cable companies are likelier to rent the box to you than to sell it: Comcast, for instance, says that it typically charges \$5 per month for an HD-capable set-top box.

If you are contemplating purchasing a new television set, you might want to

wait a few months for a new plug-and-play HD cable-ready set. These sets will have the circuitry of an HD cable box built in; all you'll need from your operator is a PC Card– like Cable Card, which will include the descrambling info for your particular service package. After inserting the card in a slot on the back of your set and attaching the cable, you'll be in business.

If you decide to buy an antenna, you'll be presented with several choices. Fortunately, the Consumer Electronics Association has guidance on the Web. Go to www. antennaweb.org and plug in your street address; you'll receive a list of stations and the antenna type required for each one. The site uses the same technology that TitanTV uses.

Q: How do I switch among these antennas?

A. You don't. The set-top box takes care of this—the process is seamless to the user.

Q. I know HD pictures will look better than today's analog ones. What about audio?

A. The ATSC ED and HD standards require support for Dolby 5.1-channel audio. Of course, to enjoy the improved sound quality, you'll need a 5.1-channel sound system.

Q. Will I be able to record HDTV on a VCR, TiVo, Replay-TV, or other video recorder?

A. Yes, but probably not in HD. Most HD sets have analog outputs for this purpose. The set converts a digital HD signal into a standard-resolution analog signal that today's video recorders—whether cassette or hard drive-based, like TiVo and ReplayTV—are designed to record.

HD-capable recorders are available now, but the first

ones aren't cheap. LG's \$999 LST-3410A is a combination HDTV/analog TV tuner that contains a 120GB hard drive capable of recording up to 12.5 hours of HDTV (or up to 120 price. Comcast, for example, says that by year's end its customers who use Motorola digital cable boxes will have the option to upgrade to an HDcapable box with a built-in



the-air high-definition broadcasts.

hours of analog TV). Standalone tuners cost as little as \$300, so you would be paying \$500 to \$600 for the recorder.

If that kind of money scares you, wait a while. Your cable operator will likely step in with a less expensive (though less capable) alternative: an HD cable box with an HD-capable digital video recorder built in. Expect a smaller hard drive than you'd get on a third-party box, but at a much smaller DVR that can record up to 7 hours of HD programming.

Q. Do any HD-capable DVD burners exist? How about movies recorded in HD?

A. Hollywood and the consumer electronics industry are still wrangling over the technology for HD-capable optical drives, so you might not want to spend big bucks on an HDcapable burner until the format fight is settled. The leading contenders are Blu-ray,

SITES TO SEE ABOUT HDTV

Consumer Electronics Association's A Consumer's Guide to the Wonderful World of HDTV: find.pcworld.com/41672

Advanced Television Systems Committee's DTV Standard (latest version of the complete technical standard): find.pcworld.com/41675

National Association of Broadcasters' list of stations transmitting DTV: find.pcworld.com/41678

Samsung's interactive guide to DTV (a good general technology primer): find.pcworld.com/41681

Consumer Electronics Association's AntennaWeb (a location-based guide to choosing an antenna for over-the-air broadcasts); www. antennaweb.org

TitanTV (an online program listings guide): www.titantv.com

HDTVGalaxy (news, tips, consumer advice, product reviews, programming highlights, and all things HDTV): www.hdtygalaxy.com named for the blue laser that it uses (traditional burners use red lasers, which have longer wavelengths and can't pack data as tightly), and HD-DVD. Once this standards war is settled, experts anticipate motion picture studios will start making HD versions of their films available on disc the way 480p ones are now. You can already get HD versions of a handful of movies recorded in Windows Media format, but so far you can play them in HD only on a very fast PC with a display capable of HD resolution.

Q. What about the analog programming still available?

A. Today's digital TV sets are equipped to display analog content, too. But the FCC's plans call for stations to relinquish their rights to the current analog spectrum to the FCC by 2006, or when 85 percent of households in their markets can receive digital TV-whichever is later. At that point, people who hang on to their analog sets will need to get digital-to-analog converters. Most external HD tuners can perform this conversion, but by the time the mandated digital TV transition takes effect, less-expensive settop boxes may be available.

Q. Is there any downside besides price to the technology?

A. Analog programs don't look that great on big-screen HDTVs. Artifacts, jaggies, and other flaws become much easier to see on a more-detailed display (and even standarddefinition format has greater pixel density than today's analog image), especially if you have a large screen that magnifies the image.

PHOTOGRAPH: KEVIN CANDLAND

Yardena Arar is a senior editor for PC World.

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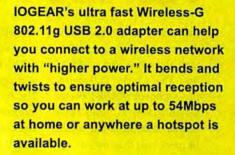
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SATELLITE RADIO

SIRIUS SOUND FOR PEOPLE ON THE GO

TO MANY PEOPLE, boom boxes are more about portability than about listening gratification. That's lucky: Otherwise, the Audiovox SIRBB1 Portable Audio System, Sirius's first satellite-radio boom box, would be more bust than boom.

This stylish silver-and-black device consists of a \$100 speak-

SIRBB1 Portable Audio System Audiovox ★★★★☆ Be the life of the picnic with portable satellite radio. List: \$100

find.pcworld.com/41360

HOME THEATER

er shell that accepts either of two Audiovox head units-the SIRPNP1 or the SIRPNP2sold separately for \$100 each. The receiver units can dock into home and automobile devices (also sold à la carte) as well. With either head unit inserted into the boom box (and with your \$13-per-month subscription paid), you can enjoy mostly commercial-free music, sports, or talk radio anywhere you can see sky. The integrated speakers are fine for almost any outdoor occasion, although they won't blow you off your picnic bench.

The SIRBB1 is powered by



either eight D batteries (monitored by a cool LED array) or AC power. Plug in the antenna, aim it at the sky, snap the head unit into the cradle, and start listening. The box also has a headphone jack, plus an input for a CD or MP3 player. Unfortunately, its only audio controls are an on switch and a volume control. The remote control that comes with the head unit, however, lets you change channels while you're barbecuing burgers.

I wouldn't consider anteing up \$100 for the boom box unless I already owned the head unit. If you have to buy both and subscribe to the satellite service, the total cost is far more. But if you're among the Sirius faithful, an extra \$100 isn't too much for being able to play while you're away.

-Michael Cahlin 🔳

AN INEXPENSIVE DLP PROJECTOR

I'M BIASED ABOUT projectors: I recognize that LCD units typically deliver a little better color saturation than Digital Light Processing models do, but I prefer the sharper imaging and superior contrast that you get from DLPs.

My main beef with DLP projectors has been their high price, a problem that Optoma Technology has addressed by

H30 Digital Cinema Projector Optoma Technology ***** Budget DLP home theater projector cuts a few corners but

is still a bargain. List: \$1395 find.pcworld.com/41237 introducing its H30 Digital Cinema Projector at \$1395, making it the first hometheater DLP unit with such a low initial price. Just last year, DLP projectors cost well over \$2000.

At this appeal-

ing price, the H30 definitely makes some compromises, as you might expect. The product has a native resolution of 800 by 600, while more-expensive projectors commonly have XGA resolution (1024 by 768). If you care only about watching DVDs, the lower resolution won't matter, because



\$1395 H30 brings DVD movies to life.

most DVDs are burned in 720 by 480 resolution. A higherresolution product will display HDTV better, but the H30 is compatible with HDTV, and the HD signals that I watched on the H30 looked great.

I found the projector's lens hood too shallow. The design permitted a small amount of light spillage to appear about 3 feet above images, on the ceiling. I jury-rigged a paper cone around the hood to kill the excess light, but this light might not bother you.

The H30 delivered an attractive, minimally pixelated image that required little adjustment. Both zooming and focusing worked smoothly, and other controls were well designed. I found the H30's fan noise—a factor any smart projector buyer should worry about—acceptable.

If, like me, you intend to use a digital projector for watching DVD movies rather than for viewing standard television or HDTV, the H30 is a bargain.

-Ramon G. McLeod 📕

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3



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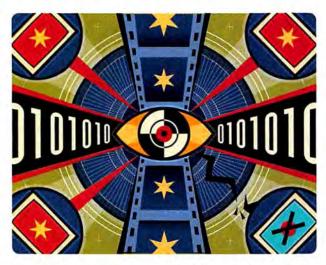
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GADGET FREAK

DAN TYNAN

WHOSE TV IS IT, ANYWAY?



IF YOU'RE OLD like me, you remember the voice-over at the beginning of *The Outer Limits*: "There is nothing wrong with your television set. Do not attempt to adjust the picture. We are controlling the transmission...." Well, it turns out they weren't kidding.

The conversion to digital television (DTV) has led to a spitball fight between users and the movie industry. The issue: who controls how you receive and record digital TV.

THE HOLE PROBLEM

THE THOUGHT OF Napster-like sharing of movies (which is already happening on a small scale) has Hollywood's collective boxers in a bunch. As a result, all new digital-cableready TVs and set-top devices must have copy-protected Fire-Wire or Digital Video Interface ports. But older gear, including millions of early HDTVs, have analog connections that lack copy protection. Owners of such sets could take a digital TV feed, output it to a VCR, digitize it on their PCs, and then share it with 4 million of their closest friends.

So Hollywood has come up with ways to close the "analog hole" and control DTV:

Broadcast flag: This bit of data, sent along with the digital stream, tells your tuner the restrictions on copying a show. By July 2005 all new DTV devices must be able to read the flags. The rules for each device vary, but copies are encrypted, and probably won't work on older DVD players.

Selectable output control: If content providers believe your set-top box can be hacked to allow unfettered copying, they can turn off the picture for that particular show. ("We will control the horizontal. We will control the vertical.") So far the FCC has nixed this idea, but it will consider approving SOC for "facilitating new business models."

Down-resolution: In this scenario, content providers lower the resolution of HDTV programs for high-definition sets that have analog inputs. In other words, you could still watch Unforgiven, but because you would be watching it at DVD, not HDTV, quality, you wouldn't be able to gaze as deeply into Clint Eastwood's pores. The FCC has scotched this practice for broadcast TV, but has yet to decide about cable, premium stations like HBO, or pay-per-view movies.

That's not exactly welcome news to the 5 million owners of HDTV sets, most of which have analog ports. The Home Recording Rights Coalition (www.hrrc.org) advocates a ban on down-resolution and SOC, and supports federal laws that give users the same copy privileges for digital content as they have for analog.

Interestingly, the Motion Picture Association of America makes no pretense that the use of down-resolution will halt piracy. Instead, according to Fritz Attaway, MPAA executive vice president, Hollywood hopes to give consumers an incentive to move to all-digital boxes that provide more pro-

NEXT UP

Really Cheap HDTV



HDTV for \$100? What's the catch? You have to watch it on your PC using the HDTV Wonder (find.pcworld.com/ 41684), an expansion card that ATI Technologies will begin bundling with some of its All-In-Wonder graphics cards: the bundle costs about \$100 more than one of the graphics card alone. The company says that it will sell the PCI card separately later on for use with other cards. You can use it to view only over-the-air HDTV broadcasts via an HDTV antenna; the card will not decrypt signals coming from your cable or satellite provider.

tection against copying.

But this is an old and silly game. Fifty years ago TV's growing appeal made it the bogeyman. Hollywood reacted by changing the aspect ratio of films so they'd look less attractive on TV. And the film studios that fought the VCR all the way to the Supreme Court now make billions licensing movies to video stores and broadcasters. Maybe this time the content kings will realize that trying to strong-arm consumers into following their rules could end up stifling DTV instead of stimulating it.

Then again, maybe I watch too much science fiction.

Contributing Editor Dan Tynan watches too much science fiction.

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Lab-tested rankings of the best in PCs, peripherals, and upgrade components

EDITED BY THE REVIEWS STAFF

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Spot IOGear's \$220 Combo 2.5-Inch Ion Drive (far left) puts 40GB in a small, light package. For \$130 more, LaCie's chic Data Bank squeezes that data into a pocket-size package. For deskbound duty, Maxtor's 250GB OneTouch drive takes the prize.

SPOTLIGHT: EXTERNAL HARD DRIVES /

The Outsiders: Disks That Do More

Are you a data pack rat—obsessively archiving your e-mail or incessantly collecting digital photos and new songs? If so, your PC's internal hard drive may be getting cramped. And what about backing it all up? Whether your drive holds the hottest tunes or the dullest financial records, losing your data is a disaster. An external hard drive adds storage space and provides a safe place for your backups. We evaluated and lab-tested nine external drives: six semiportable desktop units based on 3.5-inch hard drives and three ultraportables based on 2.5-inch or smaller drives. Maxtor's OneTouch desktop drive won our Best Buy designation thanks to good performance and smooth operation (made easier by a detailed manual). The 250GB model is pricey at \$350, but Maxtor sells other sizes, such as a 120GB (USB-only) unit for \$200. Among



Notebook PCs

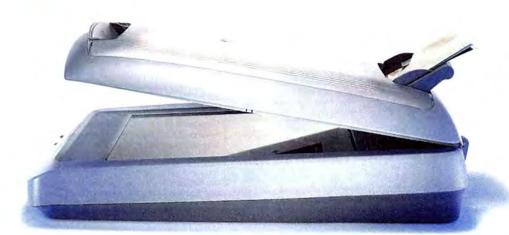
166

Top 10 The first notebook we've tested that uses AMD's CHART Mobile Athlon 64 CPU, the EMachines M6807 turned in speedy performance in our PC WorldBench 4 tests.



Top 10 CHART FlexScan L367 flexes its muscles to earn a Best Buy among the 15-inch LCDs on our Top 10 Monitors chart. In addition to a slender profile, it has a very slim bezel.

169



Scanners

Top 10 CHART HP Scanjet 5530 Photosmart scanper costs \$230, it

ner costs \$230, it includes a snapshot feeder and a software application to assist with creating layouts.

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INSIDE THE TOP 100

See find.pcworld.com/15720 for details on how we compile our charts for the Top 100. Freelance writers Richard Jantz, Mick Lockey, and Carla Thornton and PC World editors Richard Baguley, Laura Blackwell, Tracey Capen, Seán Captain, Rebecca Freed, Kalpana Ettenson, Alexandra Krasne, Melissa J. Perenson, and Alan Stafford contributed to the Top 100 section. 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 from Julian Weatherby. TOP 100 / SPOTLIGHT

ultraportables, we picked the \$220, 40GB IOGear Combo 2.5-Inch Ion Drive for its compact design and relatively low price.

Choosing an external hard drive offers some advantages over simply installing a second drive inside your system. You can use an external model with multiple PCs, and as a means to shuttle data from place to place. And you don't have to crack the case to install it; you simply plug it into a USB or FireWire port in most cases, and for some models you install drivers. All but one of the drives we evaluated have a USB 2.0 interface (which we used for our performance tests). The models from IO-Gear, LaCie, Maxtor, Seagate, and Western Digital also have FireWire ports. Ximeta's NetDisk augments its USB connection with an ethernet port. External hard drives are especially handy for notebook PCs, which tend to have hard drives of lesser capacity than desktops and typically don't carry bays for a second hard drive.

FAST ENOUGH?

YOU'LL HAVE TO give up some speed with most external drives, as those with a USB 2.0 or FireWire interface can't keep up with drives that use internal parallel or Serial ATA connections. But external SATA drives should match the performance of internal products. At press time, the SATA II Working Group was still polishing up the external standard, and compliant products will probably not appear until late this year at the earliest. But CMS Products issued a prestandard kit that simply provides a pass-through for the PC's internal SATA interface to an external port you install in one of your system's slot covers. (If you own an older system without an internal SATA

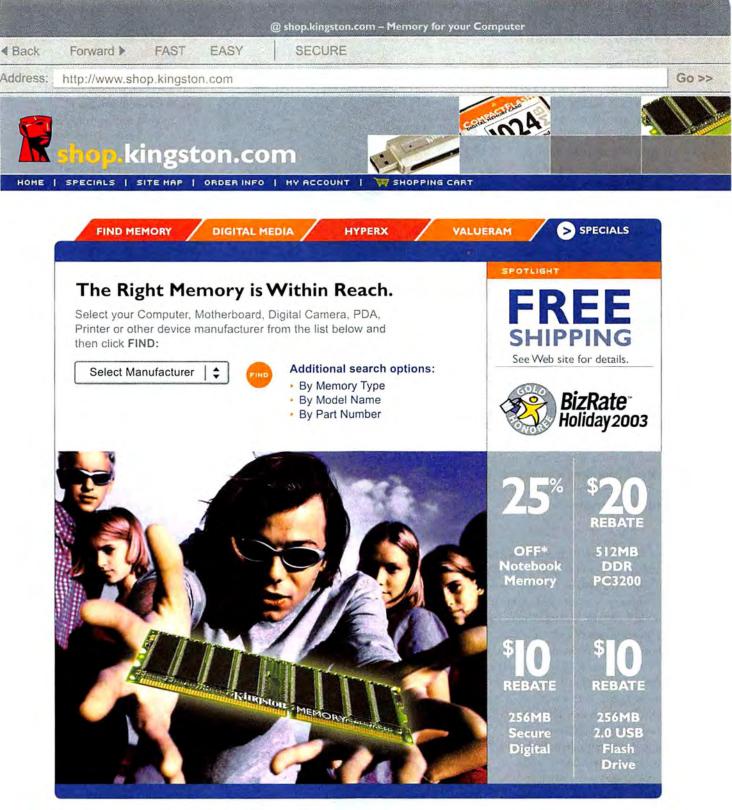
TOP 100

Center External Drives for the Office and the Road

MAXTOR'S ONETOUCH IS FAST and easy to use. Among ultraportables, IOGear's 2.5-Inch Ion Drive offers the most for the money.

the second second	SKTOP ARD DRIVE	Price and features '	MB per second ^a Copy to external drive Copy from external drive	Comments
1	Best Maxtor OneTouch BUY find.pcworld.com/41219	\$350 \$350 \$00 FireWire \$250GB, 7200 rpm \$4 pounds, 0.2 ounces	14	Maxtor's speedy drive is a cinch to use, and it comes with great documentation. Other capacities: 80GB, 120GB, 160GB, 200GB, 250GB, 300GB. (★★★★:::)
2	Ximeta NetDisk find.pcworld.com/41231	• \$240 • USB 2.0 and ethernet • 1606B, 7200 rpm • 2 pounds, 11.8 ounces	19 19	Second only to the CMS drive in speed, the NetDisk can serve a single PC or a network. A software upgrade is on the way. Other capacities: 80GB, 120GB, 250GB. ($\star \star \star \star =$)
3	Seagate 160GB External Drive find.pcworld.com/41222	• \$250 • USB 2.0 and FireWre • 160GB, 7200 rpm • 3 pounds, 13.6 ounces	15	Handsome drive provides one-button access to configurable backups. Available only in 160GB capacity. (★★★↓)
4	AcomData RocketPod DrivePod find.pcworld.com/41210	• \$229 • 160GB, 7200 rpm • USB 2.0 • 3 pounds, 12 ounces	15 20	Multiples of this unique stackable drive can share a single USB connection. No backup software included. Also available in 120GB capacity. ($\star \star \star \star$)
5	Western Digital Dual-Option Media Center find.pcworld.com/41228	• \$400 • USB 2.0 and FireWre • 200GB, 7200 rpm • 4 pounds, 5.2 ounces	14	Great all-in-one storage box includes a USB hub and a memory card reader, but drive performance is a bit slow. Other capacities: 160GB, 250GB. (★★★づご)
6	CMS Products Velocity SATA Automatic Backup System find.pcworld.com/41213	• \$350 • 120GB, 7200 rpm • Serial ATA • 3 pounds, 7.1 ounces	32	Pricey drive provides impressive performance. Backs up data lightning-fast and can serve as a bootable hard disk. Other capacities: 80G8, 200GB. (★★★ ☆)
	TRAPORTABLE ARD DRIVE			
1	Best IOGear Combo 2.5-Inch Ion Drive find.pcworld.com/41207	\$220 \$220 \$4068, 4200 rpm \$1 pound, 0.6 ounces	20	Nearly as fast as the Sony Giga Vault, the Ion is light, durable, and fairly compact. Other capacities: 20GB, 30GB, 60GB, 80GB. (★★★::27)
2	Sony Giga Vault find.pcworld.com/41225	• \$250 • 40GB, 5400 rpm • USB 2.0 • 1 pound, 3.3 ounces	1521	An unusually quick ultraportable drive, the Giga Vault accepts USB 2.0 and FireWire interface modules. Also available in 80GB capacity. (\star \star \star \star)
3	LaCie Data Bank find.pcworld.com/41216	• \$349 • 40GB, 4200 rpm • 5.7 ounces	11	The fashionable Data Bank is superportable, but you pay for it in low performance and a high price. Also available in 20GB capacity. ($\star \star \star$

¹Measured weight is for the drive, power supply, and one data cable. ¹Numbers reflect average throughput. We copy a total of 1.3GB, consisting of 715 files in 155 folders. The file types include typical office application data files, MP3s, and images. Higher numbers indicate better performance.



Purchase online direct from Kingston at www.shop.kingston.com/pcworld

*Discount applies to Kingston SDRAM and DDR memory modules for select notebook PCs only. Offer valid in USA only and ends on April 30, 2004. This discount cannot be combined with any other promotion, discount or rebate and is subject to change at any time. See Web site for complete details.





port, you can buy CMS's \$39 SATA PCI Controller Card.) On average, the company's Velocity SATA Automatic Backup System drive completed our four file-copy tests in nearly 40 percent less time than the nextfastest drive (which used a USB 2.0 connection).

We saw notable differences in performance among the USB 2.0-connected drives. Ximeta's NetDisk was the fastest desktop drive overall, though Maxtor's OneTouch was a close second.

Western Digital's Dual-Option Media Center drive was the slowest of the desktop models by about 10 percent on average. It was also slightly outpaced by two of the slower-spinning portable drives, Sony's 5400-rpm Giga Vault and IOGear's 4200-rpm Combo 2.5-Inch Ion Drive. Western Digital says that the performance hit on its product may be due to overhead from using a single USB connection to support the device's hard drive, USB hub, and card reader.

BACK ME UP, SCOTTY

AN EXTERNAL DRIVE provides a key safety feature by keeping backup data separate from your system. Losing a laptop is a hassle because of the expense; but it's a tragedy if you also lose your only copy of key business files or archived e-mail.

Five of the six desktop models include software that lets you schedule backups. Maxtor and Western Digital bundle Dantz Retrospect Express; once you configure it, backups happen automatically at the times you schedule, or you can run them on demand. Maxtor's OneTouch drive takes its name from a single button on the front that launches the Retrospect backup job. Western Digital uses the same trick, but it adds a second button that launches Retrospect so that you can configure or alter a backup set. With only cryptic, faintly stamped labels, though, the two buttons are hard to distinguish.



WESTERN DIGITAL'S Dual-Option Media Center includes a hard disk, a card reader, a USB 2.0 hub, and a few too many buttons.

> The button on Seagate's 160GB External Drive launches the BounceBack Express utility from CMS Products. CMS Products' own Velocity drive, meanwhile, lacks the launch button but comes with BounceBack Professional, which can make the external drive bootable in case a hardware or software glitch trashes the PC's internal disk. Ximeta provides its own basic software, called NetDisk SureSaver. No backup software comes with Acom-Data's RocketPod DrivePod desktop drive or with the ultraportable drives from IOGear, LaCie, and Sony.

DECKED-OUT DISKS

MANY OF THE desktop drives have amenities you'll never see on an internal model. Best-equipped honors go to Western Digital's Dual-Option Media Center, which has a two-port USB 2.0 hub and an eight-in-one media card reader. (You can



ACOMDATA'S ROCKETPOD DrivePod hard disks snap together and can share a single power supply and USB 2.0 connection.

buy a version without the card reader for about \$40 less.)

When you stack two of Acom-Data's RocketPod DrivePods, the unit above snaps into a socket on top of the drive below that provides both power and data connections. Each bundled RocketPod power supply can handle two stacked disks, and a separate DockPod module powers up to five. Either way, you need only one USB connection to accommodate up to five disks.

Besides attaching to a single PC via its USB port, Ximeta's NetDisk can connect to a single PC or to a network hub via its ethernet port. Software installed on each networked PC allows the system to mount the NetDisk and retrieve data. At press time, Ximeta was working on software to permit more than one PC to write to the NetDisk, as well.

THREE FOR THE ROAD

WE TRIED OUT three 40GB ultraportable drives that sport travel-friendly design innovations. IOGear's Combo 2.5-Inch Ion Drive has a durable, lightweight aluminum case. Additionally, regardless of whether you use its USB 2.0 or FireWire data connection, you can plug in a Y-cable that draws power from either a USB 2.0 or PS/2 (mouse or keyboard) port. According to IOGear, the Ion Drive gets enough juice from most laptops to allow you to leave the drive's standard power

> supply at home. You can also forgo the power supply for a while with Sony's Giga Vault. Sony says that the built-in battery can power the drive for 1.5 hours. Our unit had a snap-on USB 2.0 interface module; Fire-Wire modules are also available.

> The 40GB, 1.8-inch hard drive in LaCie's Data Bank can get all the power it needs from its USB 2.0 or FireWire connection. Resembling a small block of silver bullion, the Data Bank is the only drive in this review that can easily fit in a shirt pocket.

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TOP 100

Center

TOP 15 DESKTOP PCs

	POWER SYSTEM	Overall rating	Street price (2/13/04)	PC WorldBench 4 performance score '	Comments
1	Best ABS Ultimate M5-64 EUY find.pcworld.com/41186	90	Inexpensive \$2249	Windows XP Outstanding Home 142	Top-notch performer at a bargain price comes with a strong selection of software. Bundled Samsung CRT is good, but bulky. $(\star \star \star \star \star$:)
2	MPC Millennia 920i Creative Studio (Internet Internet Int	87	Average \$2999	Windows XP Good Professional 127	System includes great speakers and a sleek LCD; software bundle is geared toward photo and video enthusiasts. ($\star\star\star\star$)
3	Micro Express MicroFlex 64 KB find.pcworld.com/39365	86	Inexpensive \$1999	Windows XP Outstanding Home 141	This 64-bit PC sped through PC WorldBench 4; it's also a bargain for a model with a 19-inch LCD and a fast graphics card. (★★★☆☆ Feb 04)
4	Sys Technology Performance 3400+/64 find.pcworld.com/40397	85	Average \$2718	Windows XP Outstanding Professional 141	One of the fastest systems we've tested, this industrial-black Sys comes with a fantastic-sounding audio system. (★★★★): Apr 04)
5	Dell Dimension 8300 find.pcworld.com/40409	84	Average \$28997	Windows XP Fair Home 126	Well-equipped to handle media, this 8300 has a 250GB hard drive, a fine 17-inch LCD monitor, and a satisfying sound system. (★★★★☆ Apr 04)
6	Amax Max64 5100+ find.pcworld.com/41192	83	Expensive \$3899	Windows XP Outstanding Professional 140	This PC has an internal-temperature readout and a utility for overclock- ing the graphics card; LCD displayed sharp text. (★★★★ Mar 04)
7	HP Compaq Presario 8000Z find.pcworld.com/41177	82	Average \$2809	Windows XP Good Professional 129	Sleek model's performance isn't as strong as what we've seen from other, similar 64-bit systems. (\star \star \star \star :)

	VALUE SYSTEM	Overall rating	Street price (2/13/04)	PC WorldBench 4 performance score '	Comments
1	Best Dell Dimension 4600 BUY find.pcworld.com/40406	87	Inexpensive \$1119*	Windows XP Good Home 123	This well-appointed Dell offers fine performance for its configuration, plus an attractive, basic LCD and good speakers. ($\star \star \star$ in Apr 04)
2	Dell Dimension 2400 find.pcworld.com/41174	86	Very inexpensive \$699*	Windows XP Good Home 115	Good performance and a generous, home-oriented software bundle are highlights of this bargain-price system. (\star \star \star
3	Sony VAIO PCV-RS530G find.pcworld.cam/40478	84	Expensive \$1750	Windows XP Very good Home 126	Sony's media PC is loaded with amenities for watching and recording television, playing music, and working with images. (★★★↑ Apr 04)
4	Micro Express MicroFlex 3000D find.pcworld.com/40007	82	Inexpensive \$999	Windows XP Very good Home 130	Nicely designed tall black tower is highly expandable and functional; graphics performance is middling. (★★★★ ☆ Mar 04)
5	HP Compag Business Desktop D330 find.pcworld.com/39464	82	Expensive \$1571	Windows XP Good Home 123	Business system is easy to set up, and its DVD playback and sound system performed well in our tests. (★★★ → Feb 04)
6	Polywell Poly 900VF find.pcworld.com/40004	79	Average \$1250	Windows XP Outstanding Home 136	Fastest PC on our value list when running productivity applications, but graphics performance was disappointing. (★★☆☆☆ Mar 04)
7	IBuyPower Dream 2004 find.pcworld.com/40001	79	Average \$1179	Windows XP Very good Home 125	PC has the look of a gaming machine, with a fancy front panel and side window. But it had low frame rates in cur tests. (*** Mar 04)
8	Gateway 310X find.pcworld.com/40400	78	Very inexpensive \$760	Windows XP Fair Home 108	Attractively priced, the 310X is a good candidate for a starter system or an extra, basic workstation. (★★★ ಬೆರ್ನ್ Apr 04)

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. Performance word scores reflect comparisons of PCs in the same category (power or value). See find.pcworld.com/ 15720 for more details. Total capacity in gigabytes (may represent multiple drives). ⁴ Vertical cases are towers (over 20 inches), midsize towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches).

SUPPLANTING LAST MONTH'S BEST BUY is ABS'S Ultimate M5-64, which vaults to the top of the power side of our chart on the strength of its stellar performance and very affordable price. Juiced up with AMD's 2.2-GHz Athlon 64 3400+ CPU and a gigabyte of DDR400 memory, the Ultimate M5-64 churned out a score of 142 on PC WorldBench 4. Gamers in particular will appreciate the superior graphics performance from the ATI Radeon 9800 XT card, along with the great surround sound from the Logitech Z-680 speakers.

Debuting in second place is MPC's Millennia 920i Creative Studio. Equipped with a 3.2-GHz Pentium 4 processor and a gigabyte of DDR400 SDRAM, the blueand-beige midsize tower pulled down a score of 127 on PC WorldBench 4 tests not the best we've seen (it's a full 15 points slower than the ABS), but in line with the results we've seen from similar

Visit find.pcworld.com/41558 for reviews of all products tested this month and ranked in this ch	1.pcworld.com/41558 for reviews of all products	tested this month and ranked in this chart.
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C	PU	RAM (MB/ type)	Hard drive ²	Monitor	Graphics	Case type ³	Optical drives	Other features *	Graphics quality	Setup and ease of use	Vendor's reliability/ service
Athle	2-GHz Ion 64 100+	1024/ DDR400 SDRAM	160 (RAID)	19-inch CRT	256MB ATI Radeon 9800 XT	Tower	4X DVD±RW and 16X DVD-ROM drives	Flash media reader, ⁵ gigabit ethernet, Logitech Z-680 5.1 speakers, Microsoft Works 7, McAfee VirusScan 8, Half-Life Platinum Edition	Very good	Outstanding	Good/*
	2-GHz tium 4	1024/ DDR400 SDRAM	320 (RAID)	19-inch LCD	256MB NVidia GeForce FX 5950	Midsize tower	4X DVD±RW and 52X CD-RW drives	lomega Zip 750 drive, Microsoft Wireless Multime- dia Keyboard, Microsoft Office XP Small Business Edition, Pinnacle Studio, Roxio PhotoSuite 55E	Outstanding	Outstanding	Good/*
Athle	GHz Ion 64 200+	1024/ DDR400 SDRAM	120	19-inch LCD	128MB ATI Radeon 9800 Pro	Midsize tower	4X DVD-R/RW and 52X CD-RW drives	Flash media reader*	Outstanding	Very good	4.
Athle	2-GHz Ion 64 100+	1024/ DDR400 SDRAM	240 (RAID)	17-inch LCD	128MB PNY Verto GeForce FX 5700 Ultra	Midsize tower	4X DVD±RW drive	Flash media reader, ⁵ Creative Inspire 17000 speakers, no modem, Microsoft Office 2003 Small Business Edition	Outstanding	Good	
	2-GHz tium 4	1024/ DDR400 SDRAM	250	17-inch LCD	128MB ATI Radeon 9800 Pro	Midsize tower	8X DVD+R/RW and 48X CD-RW drives	Altec Lansing ADA-995 Surround Sound 5.1 speakers, no modern, Microsoft Office XP Small Business	Very good	Good	Good/Fair
Athle	2-GHz Ion 64 X-51	2048/ DDR333 SDRAM	240 (RAID)	19-inch LCD	256MB ATI Radeon 9800 XT	Midsize tower	4X DVD±RW and 16X DVD-ROM drives	Flash media reader, ⁵ Creative Inspire T5400 speakers, Microsoft Works Suite 2004, Microsoft Wireless Optical Desktop keyboard	Very good	Good	4.
Athle	GHz lon 64 200+	1024/ DDR400 SDRAM	250	17-inch LCD	256MB ATI Radeon 9600 Pro	Midsize tower	8X DVD+R/RW and 48X CD-RW drives	Flash media reader, ^{\$} Klipsch ProMedia Ultra 5,1 speakers, Corel WordPerfect Office 11	Outstanding	Fair	Fair/Poor
c	PU	RAM (MB/ type)	Hard drive *	Monitor	Graphics	Case type *	Optical drives	Other features *	Graphics quality	Setup and ease of use	Vendor's reliability/ service
	3-GHz tium 4	512/ DDR400 SDRAM	120	17-inch LCD	128MB NVidia GeForce FX 5200	Minitower	16X DVD-ROM and 48X CD-RW drives	Corel WordPerfect Productivity Pack, Microsoft Money 2003, Quicken 2003 New User Edition	Good	Good	Good/Fair
	7-GHz tium 4	256/ DDR333 SDRAM	80	19-inch CRT	Integrated Intel 845GL graphics using main memory	Minitower	16X DVD-ROM/48X CD-RW combo drive	Microsoft Works Suite 2003, Sonic MyDVD, Britannica 2003, Quicken 2002, Jasc Paint Shop Pro 8, Dell A425 speakers	Poor	Very good	Good/Fair
	2-GHz tium 4	512/ DDR400 SDRAM	160	15-inch LCD	128MB ATI Radeon 9200	Minitower	4X DVD±RW and 16X DVD-ROM drives	Flash media reader, ⁵ TV tuner card with remote, Giga Pocket PVR hardware and software, Microsoft Works 7	Very good	Fair	Good/Fair
Athle	7-GHz Ion XP D00+	512/ DDR400 SDRAM	120	15-inch LCD	128MB ATI Radeon 9600 Pro	Midsize tower	16X DVD-ROM/52X CD-RW combo drive	Flash media reader, ⁹ Creative SBS 4.1 450 speakers	Good	Good	у.
3-1 Pent	GHz tium 4	512/ DDR400 SDRAM	80	15-inch LCD	128MB NVidia GeForce FX 5200	Minitower	16X DVD-ROM/48X CD-RW combo drive	Gigabit ethernet, no modem, Microsoft Works 7	Good	Very good	Fair/Fair
Athl	GHz Ion 64 200+	512/ DDR400 SDRAM	80	17-inch CRT	128MB NVidia GeForce FX 5200	Midsize tower	16X DVD-ROM and 52X CD-RW drives	Brushed-aluminum case with window and neon light, wireless keyboard and mouse, no modem, games	Good	Good	4.
	-GHz tium 4	512/ DDR400 SDRAM	120	19-inch CRT	128MB NVidia GeForce FX 5200	Midsize tower	4X DVD±RW and 16X DVD-ROM drives	Gamer's case with side-panel window, no modem	Poor	Good	4.
	6-GHz tium 4	256/ DDR266 SDRAM	40	17-inch CRT	Integrated Intel Extreme Graphics (845GV)	Minitower	16X DVD-ROM/48X CD-RW combo drive	Microsoft Works 7	Poor	Good	Good/Fair

⁴ Unless otherwise stated, systems come with a modem and a 10/100 network adapter. ⁵ Flash media readers typically support some combination of CompactFlash I/II, MultiMediaCard, Memory Stick, Memory Stick Pro, Secure Digital, and SmartMedia cards.

* Insufficient data to give a rating. Yuse Dell E-Value code 6V411-D83REV to get this price.

Use Dell E-Value code 6V411-D83REV to get this price. Use Dell E-Value code 6V411-460RPW to get this price.

systems (and it represents more than enough power for performing most computing tasks—including video editing).

Also new on the power side of the chart: HP's Compaq Presario 8000Z, which joins the lockstep march to 64-bit computing. Loaded with an AMD 2-GHz Athlon 64 3200+ processor and a gigabyte of DDR400 memory, the 8000Z earned a 129 score on PC WorldBench 4—trailing the speediest of the bunch by a significant 10 percent.

We saw far less turnover on the value side of this month's chart. The only newcomer, Dell's \$699 Dimension 2400, comes in second to its Best Buy sibling. This new model lacks the 4600's amenities, which include more room for upgrades, a dedicated graphics card, and twice as much memory.



'Use Dell E-Value code 6V411-D24REV to get this price.

DELL'S DIMENSION 2400 is low-priced, but it lacks the powerful components of the 4600.

TOP 100

TOP 15 NOTEBOOK PCs

	DESKTOP REPLACEMENT	Overall rating	Street price (2/13/04)	PC WorldBench 4 performance score '	Comments
1	Best HP Compaq Nc6000 BUY find.pcworld.com/41093	82	Average \$2020	Windows XP Very good Professional 125	Lightweight corporate notebook comes with dual wireless capabilities and great battery life. ($\star\star\star\star$
2	Gateway 450XL find.pcworld.com/38528	81	Expensive \$2279	Windows XP Very good Professional 125	An unremarkable exterior conceals such top-notch features as built-in Wi-Fi, very good battery life, and upgradability. ($\star \star \star \star$ Dec 03)
3	Dell Latitude D600 find.pcworld.com/36077	79	Average \$1887	Windows XP Very good Professional 122	Midweight machine has legacy ports, but unappealing sound and a springy keyboard. (★★★ポン: Aug O3)
4	Dell Inspiron 5150 find.pcworld.com/41147	78	Average \$1786	Windows XP Good Home 115	This notebook has a high-resolution screen. It's hefty, however, and you can't remove its optical drive to swap in a second battery. (\star \star)
5	EMachines M6807 find.pcworld.com/41063	77	Inexpensive \$1649	Windows XP Outstanding Home 128	The first notebook we've tested with a Mobile Athlon 64 CPU whips through applications and piles on the features. (\star \star \star

	ALL-PURPOSE NOTEBOOK	Overall rating	Street price (2/13/04)	PC WorldBench 4 performance score '	Comments		
1	Best IBM ThinkPad R50 EUVA find.pcworld.com/40025	82	Average \$1699	Windows XP Very good Home 117	Well-rounded, affordable laptop turns in strong performance, and has long battery life and a great keyboard. (\star \star \star \star J. Mar O4)		
2	Toshiba Satellite M35 find.pcworld.com/40439	81	Inexpensive \$1499	Windows XP Very good Home 118	Reasonably priced wedge-shaped portable allows comfortable typing and displays graphics beautifully on its 15.4-inch screen. (\star \star \star \star \star		
3	Micro Express NP5015A find.pcwarld.cam/40415	81	Very inexpensive \$1199	Windows XP Outstanding Home 128	Fast, low-cost unit has nice features, but the keyboard layout is annoying. The manuals we received didn't match the system. (\star \star \star) \Rightarrow Apr O4)		
4	IBM ThinkPad T41 find.pcworld.com/39476	81	Expensive \$2039	Windows XP Very good Professional 123	Eraserhead and mouse buttons feel a bit flimsy, and the battery is awkward to remove, but the overall design is still pleasing. (\star \star \star \sim		
5	Dell Latitude D505 find.pcworld.com/41144	79	Inexpensive \$1620	Windows XP Good Professional 111	This slim, Celeron M-based business portable turns in lackluster performance but has a sleek modular optical drive with built-in release. (★★★ 1)		

	ULTRAPORTABLE	Overall rating	Street price (2/13/04)	PC WorldBench 4 performance score	Comments
1	Best IBM ThinkPad X31 BUY find.pcworld.com/39512	80	Average \$1698'	Windows XP Good Professional 116	This near-perfect small notebook's only flaw: The optical drive is located in a separate \$199 docking station. (★★★★↓ Feb 04)
2	Toshiba Portégé M100 find.pcworld.com/38870	78	Expensive \$2249	Windows XP Good Professional 115	Sporty notebook almost does it all, with a good keyboard, solid performance, strong audio, and a long battery life. ($\star \star \star \star$ Jan 04)
3	Dell Latitude X300 find.pcworld.com/38531	76	Expensive \$22867	Windows XP Good Professional 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	Fujitsu LifeBook P5020 find.pcworld.com/39482	76	Average \$1899	Windows XP Good Professional 107	Relatively compact for a portable with a modular bay, the P5020 has a small screen. (\star \star \star \sim Feb 04)
5	Sharp Actius AV18P find.pcworld.com/38873	73	Inexpensive \$1399	Windows XP Poor Professional 95	Basic thin-and-light offers Wi-Fi computing on the go, but only so-so typing and a hard-to-remove battery. (★★⊀ctaria Jan 04)

Go to find.pcworld.com/10860 for details on PC World's Star Ratings. Go to find.pcworld.com/40049 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. See "Your Guide to the Top 100" at find.pcworld.com/15720 for more details. All Intel CPUs listed are SpeedStep chips, which run at a slower speed on battery power. (We performance-test all notbooks plugged in.) Preatures listings are not exhaustive. ⁴ Unless otherwise noted, all notebooks come with a lithium ion battery.

³ Includes computer, AC adapter, power cord, optical drive, and floppy drive (if offered).

CORPORATE NOTEBOOKS RARELY WOW US with stellar performance and long lists of exciting new talents, but the HP Compaq Business Notebook Nc6000 we tested this month is fast and feature-packed. It zooms to the top of the desktop replacement section of our chart. Moderately priced at just over \$2000, it offers features that would be welcome in any

office, including support for both 802.11a and 802.11g wireless, and gigabit ethernet for fast network connections.

Meanwhile, the EMachines M6807 is the first notebook we've seen that uses AMD's powerful new Mobile Athlon 64 processor, and this newcomer doesn't dis-

	Screen	RAM	Hard	Pointing			Overall	Pattory life	Average	Vendor's reliability/
CPU '	(inches)	(MB)	drive (GB)	device	Bays and optical drives	Other features '	Overall design	Battery life (hours:min) *	Average weight (pounds) ^s	reliability/ service
1.6-GHz Pentium M	14.1	512	60	Touchpad, eraserhead	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11a/g, gigabit ethernet, SD slot, embedded security chip	Very good	Outstanding/ 6:23	Light/ 6.6	Fair/Fair
1.7-GHz Pentium M	15.1	512	60	Touchpad	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11g, six-in-one media card reader, Microsoft Works 7	Very good	Very good/ 4:59	Average/ 8.1	Good/Good
1.6-GHz Pentium M	14.1	512	40	Touchpad, eraserhead	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11b, Smart Card reader	Good	Good/ 3:26	Light/ 6.5	Good/Fair
3.06-GHz Pentium 4-M	15.0	512	60	Touchpad	Fixed DYD+R/RW drive	802.11g, WordPerfect Produc- tivity Suite	Average	Good/ 4:02	Very heavy/ 10.3	Good/Fair
1.8-GHz Mobile Athlon 64 3000+	15.4	512	60	Touchpad	Fixed DVD-R/RW/+R/RW drive	802.11g, six-in-one media card reader, Microsoft Works 7	Good	Fair/ 2:49	Heavy/ 9.1	4.
CPU *	Screen (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Bays and optical drives	Other features ^a	Overall design	Battery life (hours:min) *	Average weight (pounds) ^s	Vendor's reliability/ service
1.4-GHz Pentium M	14.1	256	40	Touchpad, eraserhead	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11b, S-Video-out	Outstanding	Good/ 4:04	Light/ 6.5	Good/Good
1.4-GHz Pentium M	15.4	512	60	Touchpad	Fixed DVD-ROM and CD-RW combo drive	xed DVD-ROM and CD-RW combo drive 802.11b, SD slot Good 3:47			Average/ 7.1	Good/Fair
1.5-GHz Pentium M	14.1	512	40	Touchpad	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11b	Good	Very good/ 4:41	Average/ 6.9	.1.
1.6-GHz Pentium M	14.1	512	40	Touchpad, eraserhead	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11b, Bluetooth, gigabit ethernet	Good	Good/ 4:19	Light/ 5.9	Good/Goo
1.2-GHz Celeron M	15.0	256	40	Touchpad	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11b	Good	Very good/ 4:45	Average/ 7.1	Good/Fair
CPU ²	Screen (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Bays and optical drives	Other features ³	Overall design	Battery life (hours:min) *	Average weight (pounds) ^s	Vendor's reliability, service
1.3-GHz Pentium M	12.1	512	20	Eraserhead	DVD-ROM and CD-RW combo drive*	802.11b, CompactFlash slot	Very good	Very good/ 4:49	Light/ 6.4	Good/Goo
1.2-GHz Pentium M	12.1	256	40	Eraserhead	One multipurpose bay with DVD-ROM and B02.11g Very good Good/ 4:11		Light/ 5.3	Good/Fair		
1.2-GHz Pentium M	12.1	640	40	Touchpad	DVD-ROM and CD-RW combo drive *	802.11g, SD slot	Very good	Fair/ 2:07	Light/ 6.0	Good/Fai
1-GHz Pentium M	10.6	256	60	Touchpad	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11b, SD and CompactFlash slots	Good	Good/ 4:15	Very light/ 4.7	•/•
1.53-GHz Mobile Athlon XP-M 1800+	12.1	256	40	Touchpad	One multipurpose bay with DVD-ROM and CD-RW combo drive	802.11g	Fair	Fair/ 2:55	Light/ 5.1	·/·

Insufficient data to give a rating.
 Price includes the extra-cost docking station.
 Multipurpose bay is in docking station.

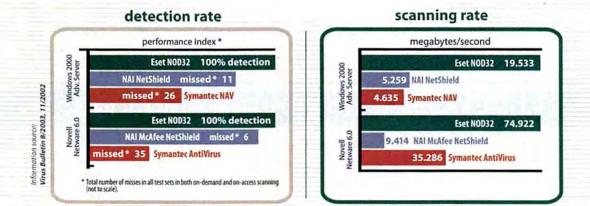
appoint: The M6807 earned a PC World-Bench 4 score of 128, tying the Micro Express NP5015A for fastest on the chart.

It's a bargain at \$1649. Several new systems fell short of the chart: Acer's Ferrari 3000 looks stylish (as the name suggests, its case is painted Ferrari red), and it performed adequately on our benchmark tests, but its battery life (just over 2 hours) was disappointing. Likewise, though ABS's new gaming notebook, the Mayhem G1, delivered strong performance, its included battery lasted a paltry 1 hour, 38 minutes.

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TOP 10 MONITORS



Visit find.pcworld.com/41363 for reviews of all products tested this month and ranked in this chart.

THIS MONTH, WE'VE UPDATED our test suite for 15-inch LCD monitors, so besides testing all newcomers to this month's chart, we've also retested existing models. The new liyama ProLite E380S-B takes the top slot, while Eizo Nanao's stylish FlexScan L367 earns the second spot, garnering a Best Buy on the strengths of both fine image quality and flexible design. The new Dell UltraSharp 1504FP can pivot its screen into portrait mode—an ability most 15-inch LCD monitors lack. However, it does not come with software (such as Pivot-Pro) to rotate the screen image; this is sold separately.

	15-INCH LCD MONITOR	Street price (2/24/2004)	Overall rating	Quality of text/ graphics	Comments
1	Best livama ProLite E3805-B BUY find.pcworld.com/41198	\$350	84	Outstanding/ Very good	FEATURES: 5.1 pounds; analog video input; tilt adjustment; built-in speakers; head-phone jack; TC0'99 compliant; three-year warranty; 12-hour weekday toll-free tech support. SUMMARY: This moderately priced monitor has very good graphics image quality, and text was sharp and easy to read, even at smaller font sizes. No weekend tech support is offered, however. ($\star \star \star \star$;)
2	Best Eizo Nanao FlexScan L367 EUY find.pcworld.com/41246	\$400	84	Outstanding/ Very good	FEATURES: 8.2 pounds; dual video inputs: ¹ tilt, height adjustments; built-in speakers; headphone jack; TCO'03 compliant; three-year warranty; 24-hour daily 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 dis- play from your PC via a USB connection. Retested this month. (**** 5 Sept 03)
3	Hewlett-Packard L1530 find.pcworld.com/41204	\$360	83	Good/ Very good	FEATURES: 9.9 pounds; dual video inputs: ¹ tilt, swivel, height, pivot adjustments; built-in speakers; headphone jack; TCO'03 complaint; 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 volume-control wheel. Retested this month. (****: Jan 04)
4	Dell UltraSharp 1504FP find.pcworld.com/41252	\$399	82	Good/ Very good	FEATURES: 10.1 pounds; dual video inputs;' tilt, swivel, height, pivot adjustments; TCO'99 compliant; three-year warranty; 24-hour daily toll-free tech support. SUM- MARY: The adjustable stand on this slate-gray monitor allows for easy positioning, and the on-screen menu is well organized. This model is only one of two on the chart that can pivot to a portrait view, but no image-rotation software is included. ($\star \star \star \star \star$)
5	Sharp LL-T15A4 find.pcworld.com/40805	\$399	82	Good/ Good	FEATURES: 8 pounds; analog input; tilt adjustment; built-in speakers; headphone jack; TCO'99 compliant; three-year warranty; 24-hour daily toll-free tech support. SUM- MARY: This monitor features a compact case and low-profile bezel, as well as a low- power mode. It offers nice image quality and has built-in speakers that produce clear (if not overly loud) sound. (***
6	NEC-Mitsubishi Multisync 1560NX (Ind. peworld.com/40808)	\$375	81	Very good/ Very good	FEATURES: 9.9 pounds; dual video inputs:' tilt, height adjustments; TCO'99 compliant; three-year warranty; 24-hour daily toll-free tech support. SUMMARY: This stately black unit provides dual analog and digital inputs, along with a bright screen and a wide viewing angle. The NaviSet software allows you to adjust settings from the PC as well as from the convenient on-screen menu. (****)
7	LG Electronics Flatron L1515S find.pcworld.com/41258	S380	80	Very good/ Very good	FEATURES: 6 pounds; analog video input; tilt adjustment; TCO'99 compliant; three- year warranty; 24-hour daily toll-free tech support. SUMMARY: LG Electronics' new lightweight, no-frills monitor produced very good-looking output for both text and graphics. The on-screen menu can be locked in order to prevent users from adjusting the settings. ($\star \star \star \star$
8	Philips 150P4 find.pcworld.com/41261	\$365	78	Good/ Good	FEATURES: 7.9 pounds; dual video inputs; ¹ tilt, swivel, height adjustments; TCO'99 compliant; three-year warranty; 13-hour weekday, 7-hour Saturday and Sunday toll- free tech support. SUMMARY: Good performer includes screen-adjustment software, plus an application for highlighting portions of the screen. Control menus and physical adjustments are rather awkward, however. Retested this month. (* * * *) Jan 04)
9	CTX International S500B find.pcworld.com/41333	\$370	78	Good/ Very good	FEATURES: 8.2 pounds; analog video input; tilt adjustment; TCO'99 compliant; three- year labor, two-year parts warranty; 24-hour daily toll-free tech support. SUMMARY: Well-priced monitor produces attractive graphics images with strong, bright colors, but the on-screen menu is awkward to use, the bezel is wide, and the black-on-black button labels are difficult to read. (★★★☆☆)
10	Planar PE150M find.pcworld.com/41240	\$350	78	Very good/ Very good	FEATURES: 10.5 pounds; analog video input; tilt adjustment; built-in speakers; TCO'03 compliant; three-year warranty; 13-hour weekday toll-free tech support. SUMMARY: This sleek, low-profile monitor includes a built-in wall mount and reasonably good speakers. Image quality was consistently strong for both text and graphics. There is no weekend tech support available, however. (* * *)

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 lind.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 (15 percent), features (20 percent), ease of use (15 percent), and service and support (10 percent). For LCDs, the entire screen area is viewable. See find.pcworld.com/10860 for details on PC World's Star Ratings.

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TOP 10 SCANNERS



Visit find.pcworld.com/41579 for reviews of all products tested this month and ranked in this chart.

ALL OF THE NEW scanners we tested this month appear on our chart. With strong overall performance and good ease of use, Microtek's ScanMaker i320 places second on the smalloffice side. HP's speedy Scanjet 5530 Photosmart comes with ArcSoft Collage Creator, a nifty software application that has tools for creating layouts. The 3-pound Visioneer OneTouch 7300 USB motors into seventh place; its low price and greatlooking scans compensate for slowness and skimpy features.

	SMALL-OFFICE SCANNER	Street price (2/29/04)	Overall rating	Scan quality (color/ monochrome)	Scan speed (color/ monochrome, in seconds per document)	Comments
1	Best Canon CanoScan Lide 50 BUY Find.pcworld.com/37376	\$100	84	Very good/ Very good	44/21	FEATURES: USB 2.0,' 1200 by 2400 dpi, 10.1-by-1.5-by-14.7-inch case, 4 pounds, 8.5-by-11.7-inch scanning area; no transparency adapter or automatic document feeder. SUMMARY: The Lide 50 offers good overall performance at a nice price. Has a light, slim design, but no transparency adapter. (★★★☆☆ Oct 03)
2	Microtek ScanMaker i320 find.pcworld.com/41543	\$150	80	Good/ Fair	36/29	FEATURES: USB 2.0,' 3200 by 6400 dpi, 11.6-by-3-by-19.1-inch case, 6 pounds, 8.5-by-11.7-inch scanning area; includes trans- parency adapter; no ADF. SUMMARY: Midrange scanner pro- duces nice color, but its transparency adapter can handle only one 35mm slide at a time. (★★★)
3	Visioneer OneTouch 9000 USB find.pcworld.com/29882	\$80	80	Fair/ Fair	36/25	FEATURES: USB 2.0, 1200 by 4800 dpi, 11.9-by-2.6-by-17-inch case, 5.1 pounds, 8.5-by-11.7-inch scanning area; no transparency adapter or ADF. SUMMARY: A low price and a generous software bundle make this model a good value. Its image quality could be better, though. (* * * # 555 Sept 02)
4	Epson Perfection 1670 Photo find.pcworld.com/37379	\$129	80	Good/ Good	37/18	FEATURES: USB 2.0, ¹ 1600 by 1600 dpi, 10.8-by-3.4-by-16.5-inch case, 6.8 pounds, 8.5-by-11.7-inch scanning area; includes trans- parency adapter; no ADF. SUMMARY: Easy-to-use driver includes one-click photo restoration, but we've seen better image quality. (****
5	HP Scanjet 5530 Photosmart find.pcworld.com/41546	\$230	80	Good/ Good	38/18	FEATURES: USB 2.0. ¹ 2400 by 4800 dpi, 12.3-by-3.6-by-21.5-inch case, 7 pounds, 8.5-by-11.7-inch scanning area; includes trans- parency adapter, photo feeder. SUMMARY: Successor to HP's 5500 has the same snapshot feeder. Ties for fastest model on the small-office chart at monochrome scanning. (★★★★:)
6	Microtek ScanMaker 4900 find.pcworld.com/29124	\$100	80	Good/ Good	39/42	FEATURES: USB 1.1, 2400 by 4800 dpi, 11.8-by-2.4-by-19.3-inch case, 5.7 pounds, 8.5-by-11.7-inch scanning area; includes trans- parency adapter; no ADF. SUMMARY: Solidly constructed scan- ner provides great-looking color photos, but its quick-start but- tons can be tricky to configure. (* * * * - Aug 02)
7	Visioneer OneTouch 7300 USB find.pcworld.com/41561	\$80	77	Good/ Very good	108/33	FEATURES: USB 2.0, ¹ 1200 by 1200 dpi, 14.8-by-1.4-by-10.1-inch case, 3 pounds, 8.5 by 11.7-inch scanning area; no transparency adapter or ADF. SUMMARY: Lightweight, portable model pow- ered via USB cable is sluggish at color scans, but its image quali- ty is worth the wait. (★★★ ¹ 222)

	CORPORATE SCANNER	Street price (2/29/04)	Overall rating	Speed for plain text/full-page graphics (ppm)	Scan speed (color/ monochrome, in seconds per document)	Comments		
1	Bost HP Scanjet 8200 BUY find.pcworld.com/37382	\$500	85	Fair/ Very good	43/11	FEATURES: USB 2.0, ¹ 4800 by 4800 dpi, 22.5-by-5.25-by-16-inch case, 22.6 pounds, 8.5-by-14-inch scanning area; includes trans- parency adapter; ADF optional. SUMMARY: Speediest scanner of monochrome images on the chart has six buttons, and more software than HP's consumer units do. (★★★★ C Oct 03)		
2	Epson Perfection 4870 Photo find.pcworld.com/41564	\$449	83	Good/ Good	43/20	FEATURES: USB 2.0, ¹ FireWire, ⁴ 4800 by 9600 dpi, 12-by-5.3-by- 18.7-inch case, 14.8 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter, photo feeder. SUMMARY: High- resolution scanner gets good marks for its color accuracy and ability to capture fine details. (★★★☆)		
3	Microtek ScanMaker 8700 Pro Design find.pcworld.com/15843	\$575	81	Very good/ Good	31/24	FEATURES: USB 1.1, FireWire, ¹ 1200 by 2400 dpi, 15.25-by-6.3- by-22.3-inch case, 25.5 pounds, 8.5-by-14-inch scanning area; includes transparency adapter; no ADF. SUMMARY: Produced crisp and realistic color scans in our tests. Performs both reflec- tive and transparency scanning. (*** * — Aug 02)		

FOOTNOTES: ¹ All USB 2.0 devices are backward-compatible with USB 1.1 ports; however, performance may vary from our results, as we test with USB 2.0 (unless otherwise noted). ¹ Tested using FireWire 400 interface. HOW WE TEST: See find,pcworld.com/34424 for our test methodology, and see find,pcworld.com/10860 for details on PC World's Star Ratings.



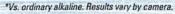
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TOP 10 DIGITAL CAMERAS

Visit find.pcworld.com/41498 for reviews of all products tested this month and ranked in this chart.

HIGH RESOLUTION IN SIMPLE point-and-shoot models is the hot trend in digital cameras. Case in point: Kodak's new EasyShare CX7430 records 4-megapixel images and is priced under \$300. Like most Kodak models, the CX7430 has simple controls and text prompts to help novices navigate its menus. Also new, HP's bulky, black Photosmart 945 has the look of a high-end model—and 5-megapixel resolution to match but it packs only a handful of advanced controls. Canon cameras have left the chart this month. The company revamped its lineup, and the new models weren't available for testing.

	POINT-AND-SHOOT CAMERA	Street price (3/1/04)	Overall rating	Image quality	Ease of use	Battery life/ shots	Comments!			
1	East Nikon Coolpix 3700 Find.peworld.com/40298	\$400	79	Very good	Good	Good/ 364	FEATURES: 3.2-megapixel resolution, 16MB SD card, 35mm to 105mm focal range, 640 by 480 video with audio, 5.8 ounces. SUMMARY: Impressive imaging and a good blend of features at a reasonable price. Includes some advanced functions, such as the ability to shoot in time-lapse movie mode. (* * * * *: Mar O4)			
2	EGST Kodak EasyShare DX6440 EUY Find.pcworld.com/38795	\$350	79	Good	Very good	Good/ 363	FEATURES: 4-megapixel resolution, 16MB internal memory plus SD 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 can connect to an included docking station or an optional printer. (** * ** Jan 04)			
3	Kodak EasyShare CX7430 find.pcworld.com/41348	\$280	79	Fair	Very good	Outstanding/ over 500 ²	FEATURES: 4-megapixel resolution, 16MB internal memory plus SD slot, 34mm to 102mm focal range, 640 by 480 video with audio, 7.3 ounces. SUMMARY: Has a great price for a 4-megapixel camera, but in image quality it scored lower than other cameras with the same resolution. Optional S80 docking station. (★★★☆☆)			
4	Toshiba PDR-5300 find.pcworld.com/40301	\$350	Π	Very good	Good	Fair/ 231	FEATURES: 5-megapixel resolution, 16MB SD card, 35mm to 105mm focal range, 320 by 240 video with audio, 7.5 ounces. SUMMARY: This camera has a good set of features and a high resolution for a low price. A plus: Its rare backlight control can be an asset when you're shooting in difficult lighting conditions. (* * * * **** Mar 04)			
5	HP Photosmart 945 find.pcworld.com/41264	\$500	76	Good	Good	Outstanding/ over 500 ²	FEATURES: 5.1-megapixel resolution, 32MB SD card, 37mm to 300mm focal range, 288 by 208 video with audio, 16.5 ounces. SUM- MARY: HP's top-of-the-line model has the chunky body and long zoom of some advanced cameras, but few high-end controls. Option- al \$80 docking station. (★ ★ ★ 1/27)			
6	Sony Cyber-shot DSC-P10 find.pcworld.com/38468	\$400	76	Fair	Outstanding	Fair/ 206	FEATURES: 5-megapixel resolution, 32MB Memory Stick, 38mm to IIAmm focal range, 640 by 480 video with audio, 6.9 ounces. SUM- MARY: Small and fun to use, with extra features (like image editing in the camera). Flash shots looked fine, but a greenish cast in some images lowered the overall photo-quality score. (* * * * * Dec 03)			
7	Kyocera Finecam L3v find.pcworld.com/38057	\$220	76	Fair	Good	Good/ 349	FEATURES: 3.2-megapixel resolution, 16MB SD card, 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. Has a bargain price for a camera with an aperture-priority mode. (★★★☆☆ Nov 03)			
8	Pentax Optio 555 find.pcworld.com/38798	\$550	74	Good	Good	Very good/ 395	FEATURES: 5-megapixel resolution, 16MB SD card, 37.5mm to 187.5mm focal range, 320 by 240 video with audio, 8.8 ounces, SUM- MARY: An advanced camera in a generic point-and-shoot's case, this model includes a 5X optical zoom with an optical viewfinder, as well as manual exposure controls. (★★★★ Jan 04)			
9	Fujifilm FinePix F700 find.pcworld.com/38792	\$400	74	Good	Good	Fair/ 239	FEATURES: 6.2-megapixel resolution, 16MB XD-Picture Card, 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. (★★★☆☆ Jan 04)			
10	Minolta DiMage G500 find.pcworld.com/38786	\$400	73	Very good	Fair	Fair/ 213	FEATURES: 5-megapixel resolution, 2MB internal memory, 16MB SD card plus Memory Stick siot, 39mm to 117mm focal range, 320 by 240 video with audio, 8 ounces. SUMMARY: High resolution, impressive images, and compatibility with two types of media; but deeply lay- ered menus make some controls slow to reach. (* * * ******************************			

FOOTNOTES: ¹ Resolutions are expressed in effective pixels, focal range is identified as 35mm equivalent, and camera weights include batteries. ¹ We cut off testing at 500 shots, or approximately 4.5 hours of testing. HOW WE TEST: We take a series of shots, with and without flash, at the camera's highest resolution and at its default automatic 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:** Each camera's overall rating is based on price (25 percent), picture quality (25 percent), ease of use (20 percent), features (10 percent), bettery life (10 percent), and support (10 percent). For all ratings, higher is better.



HardOCP: "The Shuttle **SN85G4** is blazingly fast, and well designed while still only occupying the small footprint of a Small Form Factor PC."







MORE REVIEWS

TEST Center

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, the *Top 100* section will include charts for graphics boards, advanced digital cameras, and rewritable DVD drives. In our Spotlight review, we will take a look at several new wireless input devices.



SONY'S BIG AND BOXY Cyber-shot DSC-F828 Is the first camera to use Sony's new four-color CCD. It delivered some of the sharpest images we've seen.



THE SPEEDY Plextor PX-708A offers flexibility: It can write at 8X with certain brands of 4X DVD+R media.

	ADVANCED DIGITAL CAMERAS		REWRITABLE DVD DRIVES		COLOR LASER PRINTERS			LCD MONITORS
	find.pcworld.com/40922		find.pcworld.com/41537		find.pcworld.com/40208			find.pcworld.com/40019
1	Best BUY Wide Zoom find.pcworld.com/39527	1	Best Plextor PX-708A BUY find.pcworld.com/38396	1	Best Oki Data Oki C7300n BUY find.pcworld.com/33929		1	Best Dell UltraSharp 1901Fi BUY find.pcworld.com/35777
2	Canon EOS Digital Rebel find.pcworld.com/38810	2	Lite-On LDW-811S find.pcworld.com/40463	2	ECST Xerox Phaser 8400N find.pcworld.com/39782		2	Sharp LL-T19D1 find.pcworld.com/35765
3	Canon PowerShot G5 find.pcworld.com/37358	3	Kano Technologies K8Xtreme find.pcworld.com/40472	3	Xerox Phaser 7300DN find.pcworld.com/35912	19-INCH MONITOR	3	Sony SDM-X93 find.pcworld.com/38303
4	Olympus C-750 Ultra Zoom find.pcworld.com/37364	4	TDK External Indi DVD 840G 8x Multiformat find.pcworld.com/40475	4	Ricoh Aficio CL5000 find.pcworld.com/33947	- 6	4	Cornea CT1904 find.pcworld.com/35774
5	Sony Cyber-shot DSC-F828 find.pcworld.com/40802	5	Pacific Digital Mach-8 DVD Burner find.pcworld.com/40466	5	Oki Data Oki C9500dxn find.pcworld.com/33932		5	Princeton Digital SENergy 914 find.pcworld.com/39395
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7	Olympus C-5000 Zoom find.pcworld.com/39530	7	Memorex True 8X Dual Format DVD Recorder find.pcworld.com/40424	7	Panasonic KX-CL500 find.pcworld.com/35909		2	Samsung SyncMaster 173P find.pcworld.com/39383
8	Nikon Coolpix 5400 find.pcworld.com/37370	8	HP DVD Writer DVD400i find.pcworld.com/40454	8	Konica Minolta Magicolor 2300 DL find.pcworld.com/33926	17-INCH MONITOR	3	Eizo Nanao FlexScan L557 find.pcworld.com/39377
9	Nikon Coolpix 5700 9		Alera DVD Cruiser 8 Plus find.pcworld.com/40469		Brother HL-4200CN find.pcworld.com/39785		4	IBM ThinkVision L170p find.pcwarld.com/37499
10	Minolta DiMage A1 find.pcworld.com/40883	10	Pioneer DVR-A07 find.pcworld.com/40421	10	Oki Data Oki C5100n find.pcworld.com/39788		5	AOC LM729 find.pcworld.com/39371
	From the April 2004 Issue	1000	From the April 2004 Issue	1.2.6	From the March 2004 issue			From the March 2004 Issue

EDITED BY MICHAEL S. LASKY, DENNIS O'REILLY, AND ERIC DAHL



WINDOWS TIPS

Windows' Magnifier Gives You a Zoom With a View



Windows IF YOU THINK Windows' Accessibility tools and set-98 ME tings are only for the dis-

abled, you're missing some real gems. Magnifier, for example, does exactly what its title suggests. It's valuable for classroom instruction, product demos, or almost any kind of presentation. Magnifier is also useful for software engineers, interface designers, and anyone else who needs to zoom in on a piece of work.

In Windows 9x, you may have to install

this utility from your Windows CD: Insert the CD, click Start-Settings-Control Panel, and double-click Add/Remove Programs. Click the Windows Setup tab, and confirm that Accessibility is selected in the Components list. Then click Details, check the box for Accessibility Tools, and click OK twice.

To start Magnifier, choose Start-Programs (All Programs in XP) . Accessories. Accessibility Magnifier. If that's inconvenient, just drag the shortcut to a different menu. Or choose Start-Run, type magnify,

and click OK. In most versions of Windows, Magnifier starts by displaying an explanatory message box; check Do not show this message again if you wish.

Click OK to start the utility. By default, the Magnifier window appears at the top of your screen, enlarging whatever is under your mouse pointer. If you don't like its size, position the pointer at the edge of the window and drag to make it larger or smaller. Reposition the magnifier by placing the pointer inside the window and dragging it to any screen edge. Alternatively, you can make it a free-floating window in the screen's center (see FIGURE 1).

The Magnifier dialog box lets you set the magnification level, decide whether the magnifier should always show what's under the pointer, determine whether it should follow text cursors as you type and edit, and so on (see FIGURE 2). Try using the defaults at first; they're especially handy if you want to show others in a large room what work you're doing with the mouse or what text you're typing. On the other hand, if your goal is to enlarge a single hard-to-see part of the screen (such as a toolbar with tiny buttons), uncheck Follow keyboard focus and Follow text editing. Then make sure the area you want is shown in the magnification window, and press <Alt>-M to turn off 'Follow mouse cursor'. Click OK to minimize the dialog box (in Windows 9x) or click the minimize button (in other versions).

Naturally, you don't want to be futzing with Magnifier settings during a class or demo. If your keyboard has a <Windows> key, you may not have to. For example, pressing <Windows>-<Up Arrow> will increase the zoom level, and pressing <Windows>-<Down Arrow> will decrease it.

A final tip: If you use a version of Win-

INSIDE

176 WINDOWS TIPS

Take a closer look with Windows' Magnifier; customize your screen saver; a shortcut to Safe Mode.

180 STEP-BY-STEP

Get connected with our complete guide to networking-whether your net is wired or wireless, local or distant.

184 INTERNET TIPS

Export your Outlook e-mail, address book, calendar, and other data; tools for better Google newsgroup searches.

186 HARDWARE TIPS

Avoid printer problems with these nine quick and easy steps; use a free utility to track your system's performance.

188 ANSWER LINE

Get to the bottom of local-network connection woes; turn your screen saver on and off with one click.

lick.

dows other than XP and you need an occasional screen shot that includes the mouse pointer, you can use Magnifier instead of purchasing a screen-capture tool. First, arrange the Magnifier window and any other windows you need to capture. In the Magnifier Settings dialog box, set the Magnification level to 1. Then position your pointer where you need it, and press **<Print Screen>** (or your keyboard's version of this key) to copy the entire screen to the Clipboard. Choose Start-Programs-Accessories-Paint to start Windows'

the Magnifier window appe i, enlarging wh≩tever is und don't like its size, just move



FIGURE 1: DRAG THE MAGNIFIER window to place it at center stage (as shown) or on any screen edge to keep it handy but out of view.

bitmap image editing application, and press **<Ctrl>-V** to paste the image into the image window. Click *Yes* if prompted to enlarge the bitmap area, and then click any tool on the left to complete the paste. Choose the rectangular select tool, and drag to crop the captured screen down to the area that you want in your final shot. Finally, choose *Edit*•*Copy To* to place the resulting image in a separate file. Set a location, type a name, and click *Save*.

For more magnification magic, check out this month's Windows Toolbox.

CUSTOMIZE YOUR LOG-ON SCREEN SAVER

WINDOWS WHEN YOU TURN ON YOUR computer but don't log in to Windows (or when you log out but don't power down), Windows automatically displays its floating-logo screen saver. Borrrrrrrring. Fortunately, you can exchange this screen saver for something you like better—and adjust its timeout setting—with a simple Registry tweak.

To find out what screen saver options are currently available on your system, choose Start-Search or Start-Search-For Files and Folders. Enter ***.scr** in the top text box, and choose your Windows folder (in XP) or your Winnt folder (in 2000) in the 'Look in' box (be sure to include all subfolders). Then click Search. When the search is completed, pick a screen saver from the list of results on the right.

If you can't identify the screen saver by its file name, double-click it in the results window to see it in action, but keep your fingers off your mouse and keyboard while it loads. Move the mouse or press a key to turn it off. When you've decided on one, select it, press **<F2>**, and then press **<Ctrl>-C** to copy its name to the Clipboard. Close the search window.

Now click Start-Run, type regedit, and press **<Enter>** to launch the Registry Editor. Navigate the tree pane on the left to HKEY_USERS\.DEFAULT\Control Panel\Desktop. With the Desktop icon selected on the left, double-click SCRNSAVE. EXE in the pane on the right. Press **<Ctrl>-V** to paste the name of your chosen .scr file over the existing logon.scr text, and click OK. To adjust how long Windows waits before the screen saver kicks in, double-click ScreenSaveTimeOut, type the number of seconds you want Windows to wait, and click *OK*. If you would prefer not to have any log-on screen saver at all, no problem. Just double-click *ScreenSave*-*Active*, change the '1' to **0**, and click *OK*.

DUMP THAT DRIVER

Windows IT HAPPENS TO the best of us: You download a new driver for a graphics board, keyboard, sound card, or other hardware component, and things get worse. What to do? You could resort to Windows' System Restore feature, but moving back in time might undo other important system changes while fixing the driver problem.

Fortunately, as reader Noah Voelker of Austin, Texas, explains, Windows retains your old driver to let you undo the booboo. Log on as an administrator, open Windows Explorer, right-click *My Computer*, and choose *Properties*. (Or simply press **<Windows>-<Break>** if you have a Windows keyboard.) Now click *Hardware-Device Manager*. (Or press **<Windows>-R**, type **devmgmt.msc**, and press **<Enter>**.)



FIGURE 2: THE MAGNIFIER Settings dialog box lets you choose what gets zoomed when.

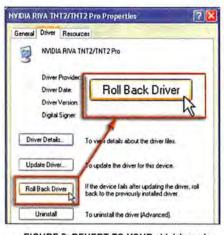


FIGURE 3: REVERT TO YOUR old driver via the Driver tab of the Properties dialog box.

In the Device Manager window, navigate to the hardware device with the problematic driver. Double-click the gizmo's icon and choose Driver. Click the Roll Back Driver button, and respond to any on-screen prompts (see FIGURE 3).

WALL OFF BAD DISK SECTORS



I HAVE TROUBLE saving files to my hard disk, perhaps due to 98 ME bad clusters on it. I plan to replace the drive; but in the meantime, can any

Windows program block off the bad clusters? Ted Hyatt, Bronx, New York

THE SCANDISK UTILITY accompanying Windows will do this for you. In Win-



FIGURE 4: BLOCK OFF hard-disk potholes via this option in the ScanDisk utility.

dows 9x and Me, choose Start-Programs-Accessories · System Tools · Scan Disk. Select the drive or drives, choose Thorough under 'Type of test', and click Start. In Windows 2000 and XP, open Explorer, rightclick the drive you want to check, and select Properties. Click the Tools tab and, under 'Error checking', click Check Now.

In the Check Disk dialog box, select Scan for and attempt recovery of bad sectors. Windows will recover as much data from your bad sectors as it can and will move the data to another part of the disk. It will then mark the defective area as "bad" and won't use it in the future (see FIGURE 4).

Choosing either the 'Thorough' or 'recovery' options can make the scan seem interminable. But it's worth doing anyway to prevent your data from falling into those black holes in the future.

A SHORTCUT TO SAFE MODE

Windows SAFE MODE IS a great way to troubleshoot your computer. 9K I X P 9x MS To enter it, you usually have to reboot your PC, press <Ctrl> or <F8> to see the boot menu, use the arrow keys to select Safe Mode, and then press <Enter>. Vic Ferri of Timmins, Ontario, describes how to make a shortcut that restarts Windows in Safe Mode with a click or two.

First, open the folder where you'll keep the shortcut. If you want to put the shortcut on the Start menu, right-click the Start button and choose Open or Explore. Navigate to the subfolder corresponding to the menu you want to use for your Safe Mode shortcut, right-click in this folder, and choose New-Shortcut. In the Command line box, type win /d:m and click Next. Type a name for your shortcut and click Next again. Finally, select an appropriate icon and click Finish (see FIGURE 5). Now rightclick your new shortcut icon and choose Properties. Select the Program tab and then the Advanced button. Check the MS-DOS mode box, and uncheck Warn before

entering MS-DOS mode. Click OK twice. From now on, you simply have to choose your shortcut from its Start menu location (or double-click it if it's on the desktop), and sit back until Windows has finished the switch to Safe Mode.

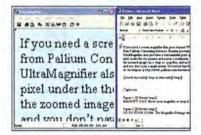
IS YOUR OS ABOUT TO EXPIRE?

Windows NOTHING LASTS forever. 2K XP And with computers, that's 98 ME an understatement. Microsoft supports each Windows version for only about five years. When one of its operating systems starts to show its age, Microsoft encourages you to upgrade to a

WINDOWS TOOLBOX

Enlarge Your Virtual World With UltraMagnifier

IF YOU NEED a screen magnifier that goes beyond Windows' own Magnifier utility, try Pallium Consulting Services' UltraMagnifier. Besides providing several zoom levels (1X, 2X, 4X, 8X, 16X, and 32X), UltraMagnifier gives you a customizable pixel grid and a status bar that shows the color values of the pixel under the pointer and its screen coordinates. You can even save the zoomed image as a .bmp or .png file, and you get printing and print preview functions as well. The topper: It doesn't cost a penny. Go to find. pcworld.com/40511 for the download.



newer version by phasing out support for the old one (saving the company money in the process). Visit find.pcworld.com/ 40502 for information on the life cycles of



FIGURE 5: ZIP TO SAFE MODE via an icon you choose in the New Shortcut Wizard.

various Windows versions, as well as the estimated date when your version's support may be set to expire. If Microsoft's support is important to you, it may be time to think about an OS upgrade.

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.

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Power @ 50°C:	460W	244W	50°C is the spec for an industrial PC
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Ripple:	10mv	50mv	Turbo-Cool's outputs are 5X cleaner
Max. Cooling:	44 cfm	40 cfm	Tests show "550's" 2nd fan is ineffective
Active PFC:	Yes	No	Continuous range line conditioning
Voltage Pots:	Yes	No	Adjustments for system fine tuning
Intel Listed:	Yes	No	Turbo-Cool 510 tops Intel's ATX12V list
Warranty:	5-Years	1-Year	Reliability and longevity indicator

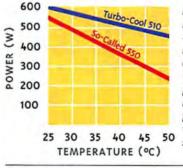


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SATA Drive Connectors

Don't be Mislead by Wattage Claims!



Even though the ambient temp, in a power supply is at least 40°C (104°F), most manufacturers unrealistically assume 25°C (77°F) in order to exaggerate their wattage claims. Since the proper full-load rating is 15°C higher, these power supplies produce 33% less power than their advertised ratings as shown on the derating chart.

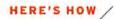
Turbo-Cool 510 derating spec: full load @ 40°C, decrease to 90% load @ 50°C. So-Called 550 manufacturer's spec: full load @ 25°C, decrease to no load @ 70°C.



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STEP BY STEP

STAN MIASTKOWSKI

How to Build a Safe, Secure Network

THE ERA OF THE unconnected PC has largely passed into history. Beyond the home office and children's rooms, PCs are popping up in such formerly unconventional locations as on the kitchen counter or on a shelf in the living room.

A network will let you share a broadband Internet connection or a printer, as well as documents, spreadsheets, digital photos, and MP3 audio files.

Wireless remains the hot technology; and as standards evolve, increased security and higher-speed connections are becoming available. The casiest way to share a broadband Internet connection is to use a router, and even today's inexpensive routers have firewall features for added security. You'll still need to take steps to lock down your network, though (see "Wireless Network Security 101" on page 182).

A word about compatibility: While Wi-Fi standards theoretically allow wireless network equipment from different manufacturers to work together, it doesn't always happen that way. If you're starting from scratch, your best bet is to use wireless hardware from a single manufacturer. Thankfully, you won't have the same

CHOOSING THE RIGHT NETWORK

THE TOP DOWN

Benefits: Share documents, photos, MP3 music, printers, and a high-speed Internet connection among multiple desktop and notebook PCs.

Expertise level: Intermediate

Time required: 30 to 60 minutes per PC

Tools required: Phillips screwdriver and antistatic wrist strap (for add-in cards)

Vendors: D-Link (www.dlink.com), Linksys (www.linksys.com), Microsoft (www. microsoft.com), Netgear (www.netgear. com), SMC Networks (www.smc.com), ZyXel (www.zyxel.com)

problems with wired ethernet networking equipment from different manufacturers.

Installation is slightly different for every product. The steps illustrated here are generic. Consult your manual before you begin, and back up any critical data on each of your PCs before you start assembling your network (see "Ultimate Backup Guide," find.pcworld.com/30719).

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.

THERE ARE MORE CHOICES than ever in types of networks. Though each arrangement has its advantages and disadvantages, the large selection of products eases the job of setting up the network that's best for you.

STANDARD WIRED ETHERNET

Advantages: 10/100 wired ethernet is inexpensive, easy to set up, and faster than wireless. New gigabit (10/100/1000) technology is superfast, though it's designed primarily for business settings. Disadvantages: Requires running cables to a central connection

switch or router. More-expensive gigabit adapters and switches require special, more-expensive cable.

Costs: 10/100 add-in cards, \$15-\$20 per PC, or gigabit add-in cards, \$90-\$110 per PC; 10/100 switch, \$35-\$75, or gigabit switch, \$100-\$200; Internet router/firewall, \$50-\$75.

WIRELESS (WI-FI)

Advantages: No wires to run through your walls or hallways; use your laptop to surf the Web from your couch or patio.

Disadvantages: More expensive than wired. Must be set up carefully for maximum security and range. Evolving standards can be confusing and incompatible. Speed falls as distance increases.

Costs: 802.11b PC Card (10 mbps), \$50-\$90, or 802.11b/g PC Card (54 mbps), \$70-\$100; add-in wireless PCI card, \$90-\$125 per PC, or USB wireless adapter, \$50-\$90 per PC; single-speed wireless router, \$50-\$100, or dual-speed wireless router, \$225-\$300.



CHOOSING THE RIGHT NETWORK, CONTINUED

HYBRID NETWORK

Advantages: Offers the best mix of convenience and cost. Disadvantages: Different technologies can make setup difficult. Costs: See "Standard Wired" and "Wireless" on the previous page.

POWER-LINE NETWORK

Advantages: Simple to install; network runs on your electrical wiring. Disadvantages: Slow (12 mbps); relatively expensive; adapters from different companies won't necessarily work with one another. Costs: \$90-\$100 per PC.



INSTALLING NETWORK ADAPTERS

NOTE: IF YOUR DESKTOP or laptop PC carries a built-in wired or wireless network adapter, you have a head start. If it's part of the motherboard, it's usually enabled by default, but make sure by opening and examining your PC Setup program. Refer to your PC manual for details.

In all three situations shown here, Windows should automatically recognize the network product. Follow the manufacturer's directions for installing the driver and any additional utilities; some require you to install the driver before adding the adapter.



(A) Add-in cards (wired or wireless): Turn off your PC and unplug it from the wall. Wear an antistatic wrist strap to avoid static damage. Find a free PCI slot, remove the slot cover, carefully insert the network card into the slot, and fasten the card down with a screw.



Close your PC's case and restart the machine. (B) Wireless and power-line USB products: With your computer up and running, plug the adapter into a free USB port.

(C) PC Card: Simply plug the card in while the laptop is running.



Hook up the router. To share a broadband Internet connection, you'll have to hook up your DSL or cable modem to your router. Use the cable that comes packed with the router, and make sure you plug it into the correct jack, usually labeled 'WLAN'.



Connect the wires. If you're using a standard, wired network, plug a Category 5 network cable into the computer's network jack, and insert the other end into the hub, switch, or router. (Many wireless routers include a built-in switch that allows you to connect additional PCs using an ethernet cable.) Repeat for each connected PC.



Install drivers and software. Many wire-1 less adapters and other networking products require software apps beyond their basic drivers. Follow the

manufacturer's directions. Windows' Network Setup Wizard will guide you through the final steps. In Windows XP, go to Start. My Network Places, and

Welcome to the Setup Wizard

- This wizard will help you set up run on your network. With a net
- Share an Internet connection Set up Internet Connection Share files and folders
- Share a printer

ontinue, click

click Set up a home or small office network in the Network Tasks section.

Search for Network Troubleshooter in Windows Help if you encounter problems.

WHAT'S THIS THING CALLED DHCP?

ONE OF THE MOST confusing parts of configuring a router involves the Dynamic Host Configuration Protocol (DHCP) settings. Despite the intimidating terminology, it's quite simple. Just as every Web site on the Internet has a unique TCP/IP address associated with its URL (PCWorld.com's main Web site address is 65.228.224.30), every PC on your home and office network needs to have a unique TCP/IP address to share an Internet connection. Specific require-

ments govern how these addresses are formed. Instead of your generating addresses manually, the DHCP server included in the router automatically assigns

lletwork Address	DHCP Server:	Enable	le ODisable
Server Settings (DHCP)	Starting IP Address:	192.168.	1. 100
	Maximum Number of DHCP Users:	50	
	Client Lease Time:	0 r	ninutes (0 means one day)

addresses to all PCs. For the easiest network setup, make sure that DHCP is enabled in your router and on the network adapters of all PCs connected to the network.

IF YOU'RE RUNNING A wireless network with a router connected to the Internet, you have a small two-way broadcasting station that's a tempting target for unscrupulous folks. If you don't take some basic precautions, someone cruising by with a wireless-equipped laptop can freeload on your Internet connection, or

Change the router password. One important (and often forgotten) security measure is to change the default password that lets you access the router settings.

Router Password	Router Password	
Local Router Access	Re-enter to	******

Disable remote router access. This won't prevent a determined local wireless user from accessing your router, but it will keep anyone from accessing your router from a remote location through the Internet.

Remote Router Access	Remote O Enable O Disable		
	Management Port:		

Change the SSID and disable broadcasting. The Service Set Identifier (SSID) is the name of your local wireless network. You'll need to know it in order to set up other wireless clients on your network. All wireless routers come with a default SSID that you should change. While you're at it, disable SSID broadcasting, which advertises the network to anyone in the vicinity who is using a wireless-equipped computer.

Wircless Network	Wreless Network Mode	Mixed M
	Wireless Network Name (SSD):	Peregrine
	Wreless Channet	6-2.437GHz +
	Wreless SSID Broadcast	Enable

gain access to your PCs to steal your data or to use your computer to send spam.

WIRELESS NETWORK SECURITY 101

Wireless security is a work in progress, with evolving standards; and given enough time and access, a determined hacker can probably break into your wireless system. Still, you can take a number of steps to make

Turn on the firewall. Routers usually have their firewall turned on by default, but make sure that's the case. Also, enable any additional firewall features such as the ability

the interloper's job far more difficult. The settings shown here (from a Linksys

WRT54G router) are typical, but check your manual for specific directions on how to access and change your router settings (usually by using a Web browser). For more tips, see "Beating the Wireless Blues," page 115.

Firewall	Firewall Protection: ③Enable 〇Disable
Block WAll Requests	Block Anonymous Internet Requests

shown here to block anonymous Internet requests. For extra security, run a software firewall on every PC on your network. For more information on how to do this, see "Bulletproof Your PC With a Software Firewall" (find.pcworld.com/37553).

Enable data encryption. Data transmitted by a wireless network can be read by anyone who picks it up unless it's encrypted. All wireless routers have encryption capabilities.

Wireless Security	Security Mode.	Disable
	1.00	Disable
		WPA Pre-Shared Key
		WPA RADIUS
		WEP

We don't have room here for a full discussion of the various types of encryption, but WPA (Wi-Fi Protected Access) is the standard that offers the most protection of data. Choose 'WPA Pre-Shared Key' for home or small-business networks. (Don't worry about any entries with 'RADIUS' options. Those are for large corporate installations.)

Wired Equivalent Privacy (WEP) isn't as secure as WPA, but if you have older wireless cards on your network computers, you'll have to use it. WEP and WPA aren't compatible.

When you make your choice, additional options and menu items will appear. Check your router manual for detailed instructions.

Enable MAC filtering. The Media Access Control (MAC) address is a unique identifying number assigned to each network device. Enabling MAC filtering in your router improves

Wireless MAC Filter	Wreless MA Prevent Permt only	C Farr: SEnable Disable Prevent PCs lated from accessing the wreless network Pernit only PCs lated to access the wreless network
		Edit MAC Filter List

your network's security by accepting transmissions only from PCs with specific MAC addresses. You can also prevent certain MAC addresses from accessing the network.

Using this option takes some work. The MAC address is usually printed on a sticker attached to a network card, or on the bottom of a laptop PC. To find your PC's MAC address in Windows XP, open a command box (*Start+All Programs+Accessories+Command Prompt*), type getmac, and press **<Enter>**. Do this for each PC on your network and enter it in your router's list.

EasyWireless Two words you normally don't see together



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Create secure wireless connections



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INTERNET TIPS

SCOTT SPANBAUER

Tricks for Exporting Your Precious Outlook Data

SURE, MICROSOFT OUTLOOK is (for the most part) great for e-mail, contacts, and calendars. But what if you want to switch to another program? We now have cell phone number portability—why not personal information and e-mail portability?

Why not? Ask Microsoft. The software giant has done little to help you get your e-mail, addresses, calendar appointments, and other data out of Outlook's .pst files.

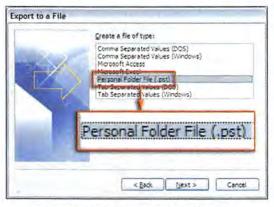


FIGURE 1: OUTLOOK'S LIMITED EXPORT options needn't discourage you from trying alternatives.

To see for yourself, choose *File-Import and Export*, and select *Export to a file*. The only options are a variety of comma- and tabseparated text formats, plus Microsoft's Access, Excel, and .pst formats (see **FIGURE** 1). Visit find.pcworld.com/41432 for tips on exporting Outlook data to Palm PDAs.

OUTLOOK, LOOK OUT

FORTUNATELY, makers of other e-mail programs want to help you liberate your Outlook data. If you're switching to the capable e-mail program in the Mozilla and Netscape browsers, the conversion is smooth. With Outlook still installed on your PC (the Mozilla 1.5 release notes state that Outlook must be the default mail program), open Mozilla or Netscape, press **<Ctrl>-2** to launch the Mail & Newsgroups module, and choose *Tools-Import*.

In my experience, it made little difference which of the three options I chose in the next dialog box. Selecting either 'Address Books' or 'Mail' always imported all of my Outlook addresses *and* mail folders;

> choosing 'Settings' always resulted in an error message stating that the settings were not important. I entered my e-mail server account information by hand (choose *Edit*•*Mail & Newsgroups Account Settings*, and then click *Add Account*).

> Mozilla and Netscape don't have a calendar, but after you install the free and surprisingly good Calendar plug-in from the Mozilla site (find.pcworld.com/ 40652), you'll possess a fullfeatured Outlook alternative for both browsers. Launch either

program and choose *Window-Calendar* to start scheduling your appointments.

Calendar can't import Outlook contacts directly from the .pst file, but it can read a comma-separated text file created with Outlook's file export feature. To export your appointments from Outlook, choose *File-Import and Export*, select *Export to a file*, choose either of the comma-separated formats, and click *Next*. Select the *Calendar* folder as the export source, click *Next*, give the file a name (or accept the default), click *Next* again, and then click *Finish*.

To import contact data into Calendar, choose Tools- Import From File, click OK to discard duplicate appointments, and then select *Outlook Comma Separated* from the 'Files of type' list in the Open dialog box that pops up. Browse to and select the .csv file you created in Outlook, click *OK*, and be sure to click *No* when Calendar asks if you'd like to open every appointment in the course of importing them. Look out for the occasional botched appointment listing—the import process isn't perfect.

GOOGLE THOSE NEWSGROUPS

N EWSG ROUPS—online forums with names like alt.politics.democrats and comp.os.ms-windows—are a free source of up-to-the-minute information that can be difficult if not impossible to find elsewhere. Even if you use a dedicated newsreader, such as Forte's Free Agent (www. forteinc.com), Google is a fast and easy way to search or browse newsgroups.

Start by visiting groups.google.com, where you can click one of the top-level group links (alt., comp., and rec. are good places to start). To search all of Google's thousands of archived groups, type a term into the search field and click *Google Search*. To browse other message threads in the same newsgroup as your search results, click the newsgroup link at the bottom of each result. To run the search on the Web, click Google's *Web* tab.

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.

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HARDWARE TIPS

KIRK STEERS

Nine Quick Tips for Hassle-Free Printing

PRINTERS—NOTABLY those econo-box ink jets that cost less than a couple of replacement ink cartridges—can be finicky beasts. Here are some tips to minimize the pain of your publishing experience. **Be a quick-change artist.** If you frequently switch orientation (landscape or portrait), paper size, or print quality, configure a separate copy of your printer's driver for each group of settings. When you print, pick the driver whose settings you need from the drop-down menu under *Printer* in the Print dialog box (see **FIGURE 1**).

In Windows XP, click Start-Control Panel-Printers and Other Hardware (in XP's Category view)-Printers and Faxes, and double-click Add Printer. In 98, 2000, or Me, click Start-Settings-Printers, and double-click Add Printer. Step through the wizard, and when prompted, select your printer and the settings you prefer. When you're asked to enter a name, give the driver a title that reflects its settings, such as DeskJet-draft, portrait, legal.

Flip the right switch. Turn off your ink jet printer via its own power switch, not the switch on its surge protector or on some

WATCH YOUR PC'S PULSE

IS YOUR PC tired, overworked, and maybe running a bit torpidly? The first step in diagnosing the cause of a pooped PC is to monitor its CPU, RAM, and virtual memory as it performs various tasks. The Cool Beans System Info utility does just that-displaying all this information in a small, unobtrusive box the size of a couple of postage stamps. And best of all, the program is free. Go to find, pcworld. com/40535 for the download. other device. Many ink jets automatically clean and park the printhead only after the on-board power switch is thrown. Get the latest and greatest. Download and

install the latest drivers for your printer from the vendor's Web site. This will help improve its performance, enable new features, and fix any bugs.

Keep it clean. Dust, dirt, and paper scraps can cause all kinds of printer problems. Keep a can of compressed air handy—it costs less than \$10 at your local computer store. If your printer sits in a dirty or dusty environment, cover it with a piece of plastic when you aren't using it.

To keep your printheads clear, run the head-cleaning program that came with the device. If that doesn't work, soak the printhead in warm

water and then gently dab it with a dry, lint-free cloth. As a last resort, brush it lightly with a cotton swab soaked in isopropyl alcohol, but take care not to spill any of the liquid on other printer parts. Use the right paper. Most ink jets print well on standard, 20-pound copier paper, but they tend to jam when loaded with heavier-weight paper. Some types of paper absorb too much ink, resulting in blurry or too-light images. Use different paper brands and weights, especially those recommended by your printer's maker, until you find the best mix for your machine. Avold paper Jams. Before inserting paper

in the printer's tray, even up the edges by placing them against a flat surface. Don't mix paper of different weights or types. In humid climates, store paper in an airtight container to keep it from absorbing moisture, which can lead to paper jams. Get a faster connection. If your printer connects to your PC's parallel port, use an IEEE 1284-compliant printer cable (if you bought the cheapest cable available, it's probably not 1284-compliant). Next, enable ECP or EPP in your PC's Setup program. These features are often disabled by default. Either technology can boost your parallel port's data throughput. To enter your Setup program, strike the key you're prompted to enter when your PC starts but before Windows loads. Look for an option labeled 'ECP' or 'EPP'.

Use it or lose it. If you don't use your printer very often, print a test page once a week. And if you have a color printer but print mostly in black and white, print a

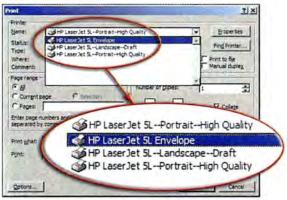


FIGURE 1: CHANGE PRINTER SETTINGS quickly by creating multiple copies of your printer's driver.

> color image once a week. If you switch between color and black ink printheads, store the cartridge you're not using in its factory container or in a sealed bag. Don't waste wood. The FinePrint utility lets you print multiple documents on one sheet of paper. The program is free to try and \$50 to keep. Go to find.pcworld.com/ 40532 to download your copy.

> For more tips on reducing your printer costs, see "The Cheapskate's Guide to Printing" (find.pcworld.com/41381).

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.



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ANSWER LINE

LINCOLN SPECTOR

What to Do When Network PCs Don't See Eye to Eye

I HAVE ATTACHED my two computers to my cable modem through a router. Both PCs access the Internet just fine, but neither sees the other one. What can I do to fix this situation?

Bruce Wise, Elmhurst, Illinois FEW CHORES ARE as frustrating as debugging a small network. The last time I did it, I cursed colorfully enough to em-

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FIGURE 1: CHECK THE TCP/IP listing for your adapter in Local Area Connection.

barrass Quentin Tarantino. The one thing we can be certain of is that there's no problem with your hardware—the successful Internet access tells us that.

The first step is to verify that each system's network-configuration and file- and printer-sharing options. We'll also make sure that both of the computers are using the TCP/IP protocol, and that they are in the same workgroup but listed under different names. Here are the instructions for various versions of Windows.

Windows 98 and Me: Right-click Network Neighborhood (in 98) or My Network Places (in Me) and select *Properties*. On the Configuration tab, verify that the Primary Network Logon drop-down menu is set to *Client for Microsoft Networks*. Click *File and Print Sharing* and make sure both of these options are checked. Scroll down the list of network components to see what protocols are installed, and make sure you've got a TCP/IP entry for your network card. Then look under the Identification tab to ensure that the computer's name is unique while the workgroup name is the same on both networked systems.

> Windows 2000 and XP: Choose Start-Settings-Network and Dial-up Connections (in 2000) or right-

click My Network Places and select Properties (in XP). Right-click Local Area Connection and choose Properties. Make sure 'Client for Microsoft Networks' is the first listing under 'Components checked are used for this connection' (in 2000) or 'This connection uses the following items' (in XP). If it isn't there, choose Install•Client•Client for Microsoft Networks. The second item in this list should be 'File and Printer Sharing for Microsoft Networks'. If it isn't there, select Install• Service•Add•File and Printer Sharing for Microsoft Networks.

Now scroll down the window to verify that you have a TCP/IP entry for your network adapter (see **FIGURE 1**). To check your workgroup and computer names, return to the network properties window and select *Advanced*•*Network Identification*. Make sure each computer's 'Full computer name' is unique. If you have to change either name, click *Properties* (in 2000) or *Change* (in XP) and enter a new name in the highlighted text box. All versions: Each computer on your network also has to have a different IP address. To view the system's IP address in Windows 98 and Me, select *Start-Run*, type winipcfg, and press **<Enter>**; in the resulting dialog box, select your network card from the drop-down menu. In Windows 2000 and XP, click *Start-Run*, type cmd /k ipconfig, and press **<Enter>**. If two machines on the network have the same IP address, your router has a problem. Check its documentation for instructions on resolving the conflict.

Make sure at least one folder or printer on each system is set for sharing. To do so, open Windows Explorer and navigate to the folder or printer you want to share. If the folder or printer icon doesn't have a little hand under it, right-click the icon and select *Sharing and Security* (in XP) or *Sharing* (in 2000). In the resulting dialog box, click *Share This Folder* and check other options as appropriate.

Finally, it's possible that your router's built-in firewall is interfering with your network's settings. Check your router's documentation for instructions on troubleshooting firewall conflicts.

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.

TURN YOUR SCREEN SAVER ON OR OFF WITH ONE CLICK

ELIZABETH HOLDEN of Langhorne, Pennsylvania, asks if there's a simple way to turn a screen saver off and on-a handy convenience before defragging your hard drive and performing other time-consuming tasks. The easiest way I know is with a small, free program by Trainedmonkey called Tarsier (I don't make up these names, folks). After you load it, Tarsier sits quietly in your system tray, and one click will either disable or enable the screen saver. The icon's appearance changes to tell you the current status. Visit find.pcworld.com/ 40577 to download the program.

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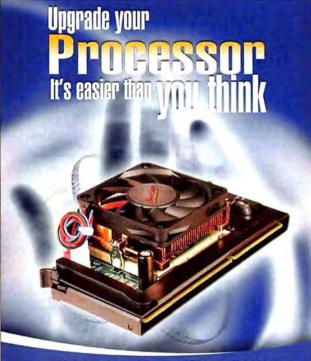


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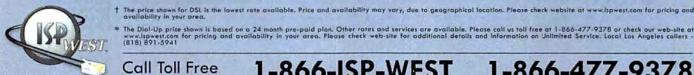
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At the annual Demo conference recently, several luncheon tablemates and I grappled with a topic that sounds simpler at first blush than it actually is: How do you store your precious digital photos? A CD-R or a DVD may last 100 years, although we don't really know for sure. But how will your grandchildren read that disc or know what's on it?

Consider a product that I was using as recently as ten years ago: the 5.25-inch floppy disk. I've got lots of files of at least some value on old-style floppies, but the only drive I own that will read them is in an ancient, closeted machine that may not even boot. If you organize your pictures with a product like Adobe Photoshop Album or Apple's IPhoto, will compatible software exist twenty years hence? Fifty years down the road, who's to say whether your heirs will be able to find a drive that reads your CD-Rs and software that understands their file formats?

Even in the digital world, good old analog paper gets around all that. Print out a photo or document, and, short of flame or water, it's likely to be around for a long time. And as anybody who's flipped through photo albums can attest, a photo is essentially self-documenting. Even if you have no idea what a picture is about or when it was taken, and even if it's faded, you have an inkling of what it represents. That's something a cryptic file name on a CD can't tell you.

At a break later in the day, I noticed another Demo attendee pulling out her

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PDA—a paper datebook. This savvy professional had been a Palm fashion victim before she chucked her handheld for paper's directness. Ending her slavery to the time-wasting synchronization process, the slow-moving data entry of character recognition, and the tyranny of battery monitoring greatly outweighed the slim downside that she might lose the datebook. Old, reliable, low-tech paper beat high-tech electronics yet again.

STEPHEN MANES

I've personally returned to paper for things like receipts from Web purchases. Once upon a time I saved them as files, but overly clever sites kept conspiring with an overly stupid browser to save the pages incorrectly. And even when the file was okay, it wasn't always on the ma-

chine I happened to have with me so that it could serve as proof in case of a snafu at a rental car lot or hotel. My love affair with paper was consummated when Alaska Airlines began letting me print out my boarding pass at home—which enabled me to

bypass check-in.

Not convinced? If you're reading this in the print version of PC World, glance at its Web-based equivalent (find. pcworld.com/41243) to see how much richness, legibility, and convenience get lost. The onscreen world is something, but not everything. Viva paper!

Visit find.pcworld.com/31595 to see additional columns by Contributing Editor Stephen Manes. He has been writing about technology for two decades.

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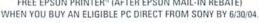
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