

FREE DOWNLOADS: Protect Data, Zap Spies & More

100+  
Lab-Tested  
Products Inside

# PCWORLD



**TAKE THE NET  
EVERYWHERE**

10 WEB PHONES AND PDAs



**BROADBAND: How to  
Get the Speed You Need**

Hot New **WEB MUSIC** Services

SEPTEMBER 2003 • TECHNOLOGY ADVICE YOU CAN TRUST® • AOL KEYWORD: PCWORLD • WWW.PCWORLD.COM

# UPGRADE SECRETS



*Fast and  
Affordable*  
**Ways to  
Boost  
Your PC's  
Power**

**Plus: Best Tune-Up Tips**





**\$3799<sup>99</sup>**

**NEW**

### 46" Gateway™ Plasma Digital TV

- Brilliant digital picture with widescreen format for a stunning theater experience
- Slick and lightweight with 20% more viewing area than a traditional 42" plasma
- 160-degree viewing angle
- Zoom and Freeze functions allow you catch every detail!
- Includes built-in NTSC tuner and 5-watt Stereo Amplification and Speakers
- Tabletop stand and wall-mount bracket sold separately<sup>5</sup>



**\$2999<sup>99</sup>**

### 42" Gateway™ Plasma Digital TV

America's Best-Selling Plasma TV!<sup>†</sup>

- Ultrathin (less than 4" deep)
- Wall mountable (bracket sold separately)<sup>5</sup>
- Includes built-in NTSC tuner, speakers, remote control and tabletop stand



**\$249**

**NEW**

### Gateway™ Connected DVD Player

Music, Photos and Video On Your TV from Your PC!

- Create a music, photo and video digital library on your PC – no more loose stacks of CDs, pictures and DVDs.
- Put a connected DVD player in every room with a TV or stereo to connect wirelessly to your PC library.
- Grab your favorite digital entertainment from your PC library and play it on your entertainment system!



**\$899<sup>99</sup>**

**NEW**

### Gateway™ 18" LCD TV

- Sleek, lightweight digital TV that fits almost anywhere
- Gateway's LCD TV picture-in-picture allows TV to double as a PC monitor for one space-saving device



How to get your family to spend more time at home.



\$6999<sup>99</sup>

NEW

### 50" Gateway™ HD Plasma Digital TV

- Brilliant digital picture with widescreen format for a stunning theater experience
- Slim and lightweight for wall-mountable option (brackets sold separately)<sup>5</sup>
- 160-degree viewing angle
- Includes built-in NTSC tuner, speakers, remote control and tabletop stand



Gateway™ KAS-203 shown

\$699<sup>99</sup>

NEW

### Gateway™ KAS-203

Stunning audio surround sound is as important for your overall movie experience as the crystal-clear picture from a plasma TV. Gateway's new home theater systems utilize advanced audio engineering to provide room-filling, pulse-pounding sound – a movie theater experience in your home.

- Relax. Our home theater systems provide a full 5.1 channel digital surround-sound experience.
- Enjoy great sound from our mini speaker set that includes 4 satellite speakers, a dedicated center channel and a Hsu Research-engineered subwoofer.
- See a clear, crisp picture with our progressive scan DVD player with component video outputs.
- Experience incredibly realistic voices through the Ventriloquist™ center channel on our KAS-203 model.

\$499<sup>99</sup>

NEW

### Gateway™ KAS-103

Have a smaller room? Try our basic home theater solution.

All offers subject to change without notice or obligation and may not be available through all sales channels. Unless noted, prices exclude shipping and handling. New consumer desktop and laptop prices include shipping and handling charges for Continental U.S. (except AK, HI) orders only. Applicable taxes extra. <sup>5</sup>Gateway had the best-selling home plasma display model for the period 11/02–2/03. Source: The NPD Group and Gateway.





From our family to yours.

## \$1599 NEW Gateway® 200X

with Intel® Centrino™ Mobile Technology. Ultra-thin, lightweight and packed with all you need to go wireless.<sup>1</sup>

- Intel® Pentium® M processor 1.40GHz
- Integrated Wireless 802.11b
- 256MB DDR SDRAM
- 40 GB hard drive<sup>3</sup>
- DVD/CD-RW Combo Drive
- Microsoft® Windows® XP Professional
- Microsoft® Works Suite 2003

Notebook batteries starting at just \$99.99



## \$1599 NEW Gateway® M500

Featuring a 15.2" widescreen and powerful speaker system, so you can take your movies and music with you!

- Intel® Pentium® 4 processor - M 2.20GHz
- 512MB DDR SDRAM
- 40 GB hard drive<sup>3</sup>
- DVD/CD-RW Combo Drive
- Big 15.2" WXGA TFT Active Matrix Display
- Microsoft® Windows® XP Home Edition
- Microsoft® Works Suite 2003



\$199<sup>99</sup>

### FujiFilm FinePix 2650

Great for first-time buyers.

- 3X optical, 2.5X digital zoom
- 2.1 megapixel CCD
- Automatic focus adjustment



\$299<sup>99</sup>

### Canon® PowerShot A70

Easy to use; incredible picture quality.

- 3X optical zoom
- 3.2 megapixel CCD
- Movie with sound up to three minutes long
- 12 shooting modes



\$399<sup>99</sup>

### Minolta DiIMAGE XT

Superthin and light.

- 3X optical zoom
- 3.0 megapixel CCD
- USB Interface and USB Direct-Print
- Includes rechargeable battery and drop-in charging cradle

Make some family memories. Then capture, crop and retouch them.

Gateway recommends Microsoft® Windows® XP Professional.

All offers subject to change without notice or obligation and may not be available through all sales channels. Unless noted, prices exclude shipping and handling. New consumer desktop and laptop prices include shipping and handling charges for Continental U.S. (except AK, HI) orders only. Applicable taxes extra.



# At home or on the go.

You'll like the sound of this.

## \$1499<sup>99</sup>

### Gateway® Media Center PC

- Intel® Pentium® 4 Processor with HT Technology<sup>2</sup> at 2.60GHz
- 256MB DDR SDRAM
- 80GB hard drive<sup>3</sup>
- CD-RW and DVD-ROM Drives
- 15" LCD Flat Panel Display
- Sound Blaster Audigy 2 Audio with IEEE 1394 FireWire®
- TV Tuner, Infrared Media Center Remote and Receiver
- GCS300 Speakers
- Microsoft® Windows® XP Media Center Edition

Wireless keyboard and mouse available as an upgrade



## \$129<sup>99</sup>

### 128MB DMP-200

## \$169<sup>99</sup>

### 256MB DMP-300

NEW



### Gateway™ 128MB Digital Music Player

Stylish, simple and convenient.

- Lightweight and compact 2.0 oz.
- Plays back over 2 hours of MP3 or WMA files
- Convenient USB Direct Connect for quick and easy file transfers from your PC
- Innovative 3-in-1 functionality as an MP3 player, digital voice recorder and data storage device

NEW

## \$59<sup>99</sup>

### RCA® LYRA™ RP2485 MP3 Player

Smooth Sounds. Feel The Flow. The extreme skip protection ensures smooth listening with 45 seconds of protection on MP3 recordings and 200 seconds for MP3s. Now you can jog, dance or just chill without interruption.

- Holds up to 12 hours of music
- Plays MP3, WMA and audio CD formats
- Includes color coordinated e.clipz™ clip-on headphones, MusicMatch Software, large three-line text display, SmartTrax™ navigation system and car kit



| 800-555-2099 | [www.gateway.com](http://www.gateway.com) | Gateway

#### Gateway recommends Microsoft® Windows® XP Professional.

All offers subject to change without notice or obligation and may not be available through all sales channels. Unless noted, prices exclude shipping and handling. New consumer desktop and laptop prices include shipping and handling charges for Continental U.S. (except AK, HI) orders only. Applicable taxes extra. Not responsible for typographical errors. <sup>1</sup>System performance, battery life, wireless performance and functionality will vary depending on your specific hardware and software configurations. <sup>2</sup>Performance may vary depending on the system configuration and software applications used. <sup>3</sup>Hard drive accessible capacity varies; GB = 1 billion bytes. <sup>4</sup>Weight varies with options. <sup>5</sup>Delivery may be required for an additional fee in select areas. Wall-mount kit sold separately. Copyright © 2003 Gateway Inc. All rights reserved. Gateway Terms and Conditions of Sale apply. Gateway.com and Gateway Stores, LLC, are separate legal entities. Gateway and the Black and White Spot Design are trademarks or registered trademarks of Gateway, Inc. in the U.S. and other countries. Intel, Intel Inside, the Intel Inside logo, Pentium, Celeron and Centrino are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are registered trademarks of Microsoft Corporation. All other brand product names are trademarks of their respective companies. Ad Code: 113305



# The dawn of a new PC era.

For the last decade, every processor chip in every personal computer in the world has been based on 32-bit architecture. It was the best technology we had. Until today. Introducing the revolutionary PowerPC G5 processor, the



*The world's most advanced personal computer chips are manufactured in the world's most advanced semiconductor factory.*

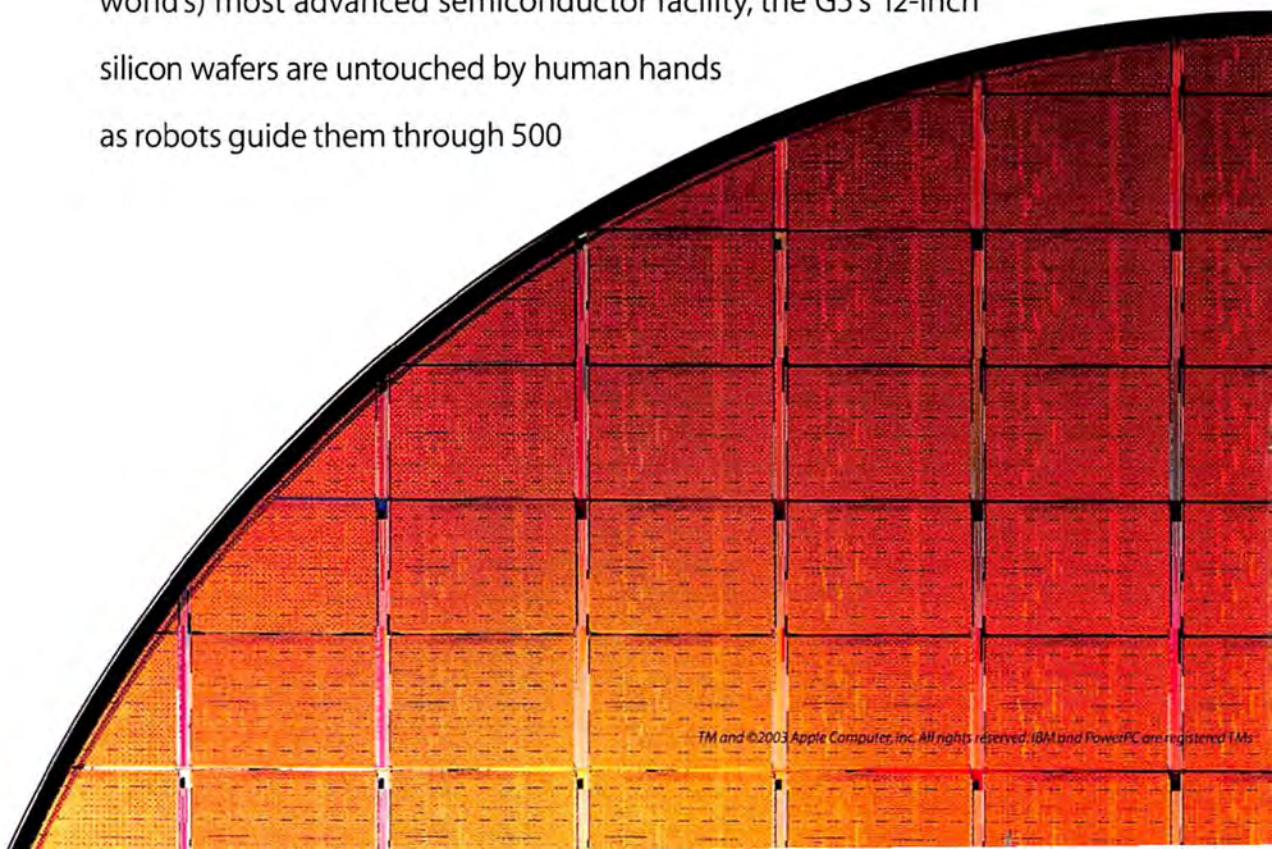
world's first 64-bit processor for personal computers.

Before now, a chip this formidable could only be found in the world's



fastest servers and supercomputers. Which is precisely where the G5 chip came from. Developed by IBM and Apple; the G5's DNA is from the core of IBM's highest performance 64-bit POWER4 processor. But just as

impressive as the G5's pedigree is how it's manufactured. In IBM's (and the world's) most advanced semiconductor facility, the G5's 12-inch silicon wafers are untouched by human hands as robots guide them through 500





# The 64-bit processor.

processing steps, creating 58 million transistors and connecting them with over 1000' of copper wire that's less than 1/800th the width of a human hair.

The new PowerPC G5 has a 1-gigahertz frontside bus\* that moves data in and out of the processor almost twice as fast as the

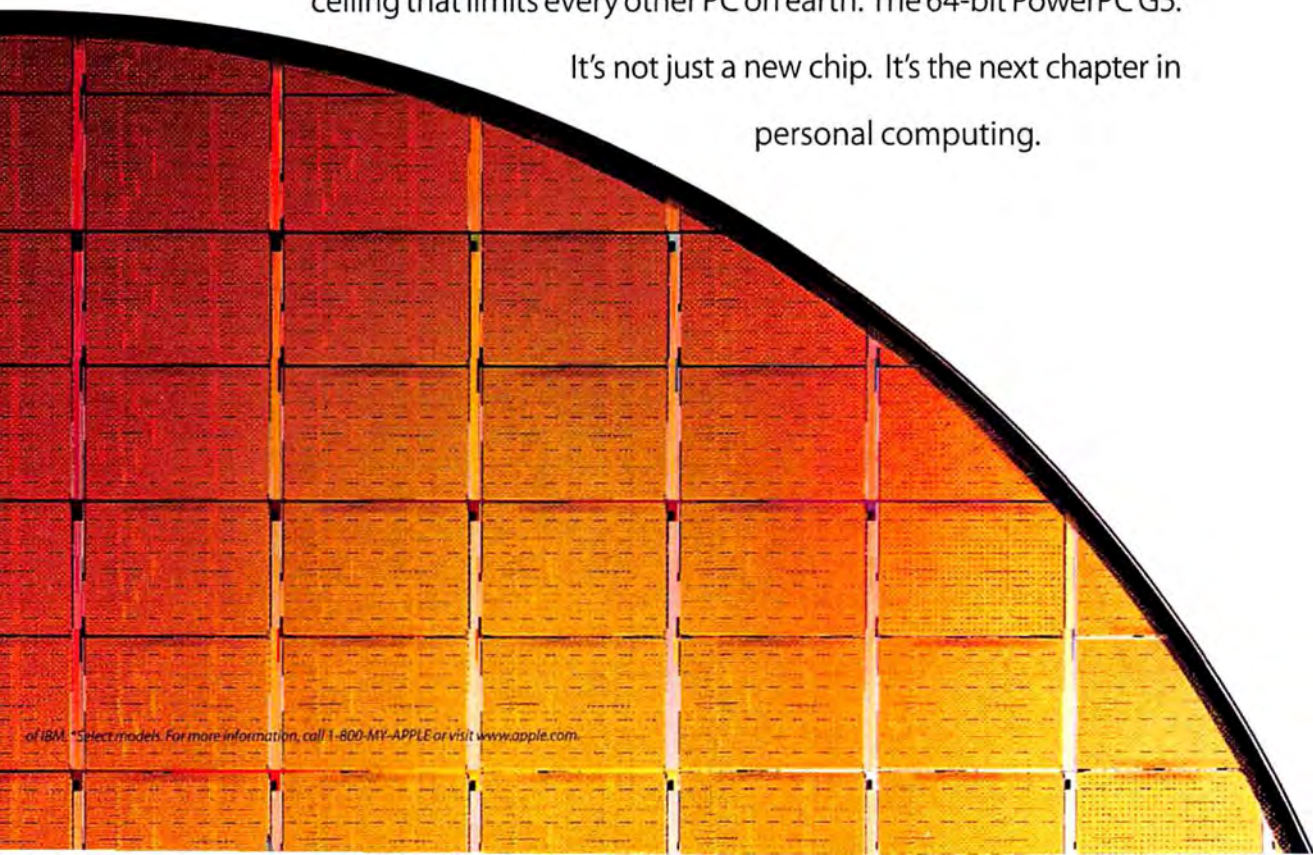


competition, removing a key bottleneck that limits performance. And it can support more than 200 in-flight instructions at a time – 71% more than the 32-bit Pentium 4. Perhaps most importantly, the G5's 64-bit architecture can address dramatically more memory – over 4 billion times more than 32-bit chips – so that systems built around the G5 can shatter the 4-gigabyte memory ceiling that limits every other PC on earth. The 64-bit PowerPC G5.

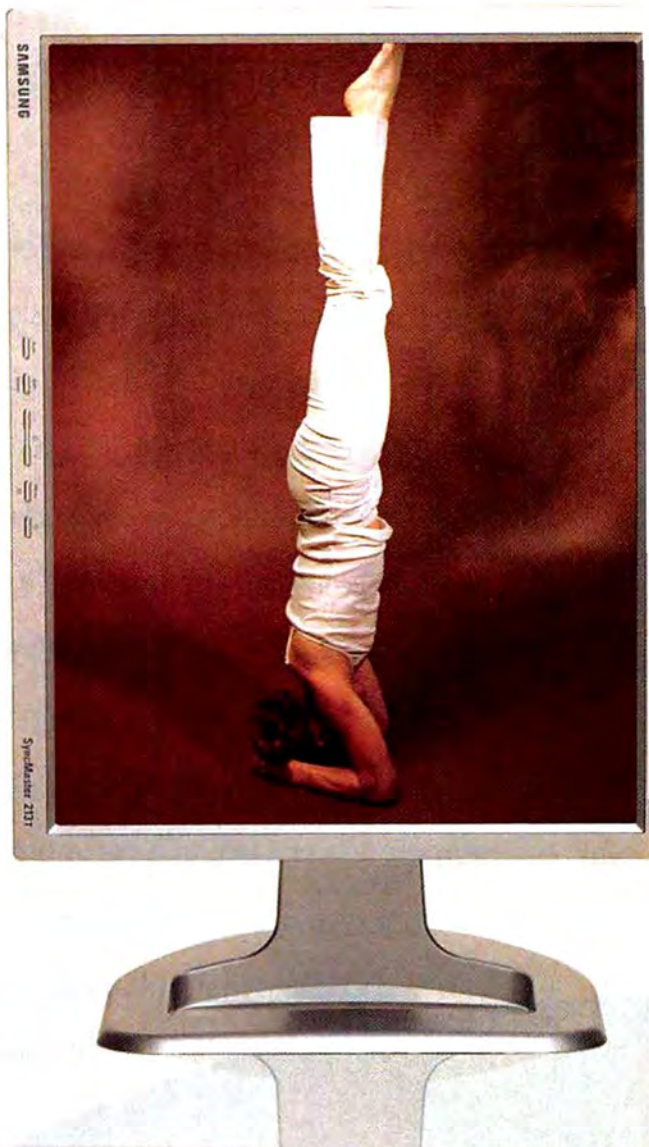


*The world's first 64-bit desktop processor can only be found in one place: Inside the new Power Mac® G5, the world's fastest personal computer.*

It's not just a new chip. It's the next chapter in personal computing.







- 21.3" analog/digital TFT/PVA
- Swivel, pivot capabilities, height-adjustable, VESA® wall-mountable
- 1600x1200, 500:1 contrast, analog RGB, DVI-I
- Ultra-narrow 0.75" bezel

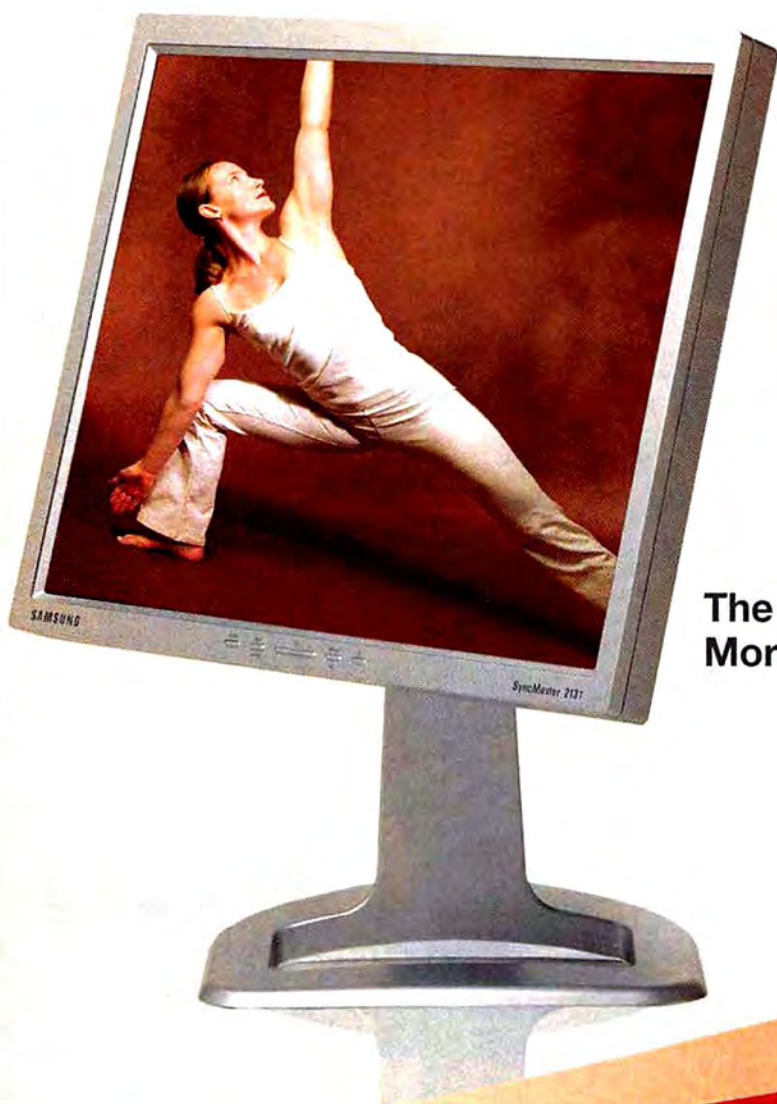
Visit [www.samsungusa.com/monitor](http://www.samsungusa.com/monitor) or call 1-800-SAMSUNG

Available at:



Office DEPOT





**The Samsung SyncMaster 21" monitor.  
More positions than a yogi.**

**.....That's DigitAll flexibility.**

Rotate right. And hold. Swivel left. And hold. The largest monitor with the most movement in its class is here. The Samsung SyncMaster 213T TFT-LCD. Its screen swivels with ease from side to side, while delivering razor-sharp images, allowing everyone to get the best view. And its sleek design adjusts from portrait to landscape display so you can maximize program applications. So go ahead and raise it. Or lower it. Give it a workout. Then relax, because the more it moves, the better you'll feel.

**SAMSUNG**



# VERIZON WIRELESS OFFICE. FOR E-MAIL ACCESS THAT'S AS MOBILE AS YOU ARE.



Simulation

**OFFICE E-MAIL & ORGANIZER** from Verizon Wireless Office keeps your workforce connected to important e-mail and schedules, when they're on the go. With the latest PDAs and Smartphones from Verizon Wireless, coupled with Verizon Wireless Sync, your data travels on America's most reliable wireless network. So business outside the office becomes more productive, efficient and convenient.

Samsung i700

Built-in  
Digital  
CameraMicrosoft®  
Pocket PC  
SoftwareIntegrated  
Phone

SAMSUNG

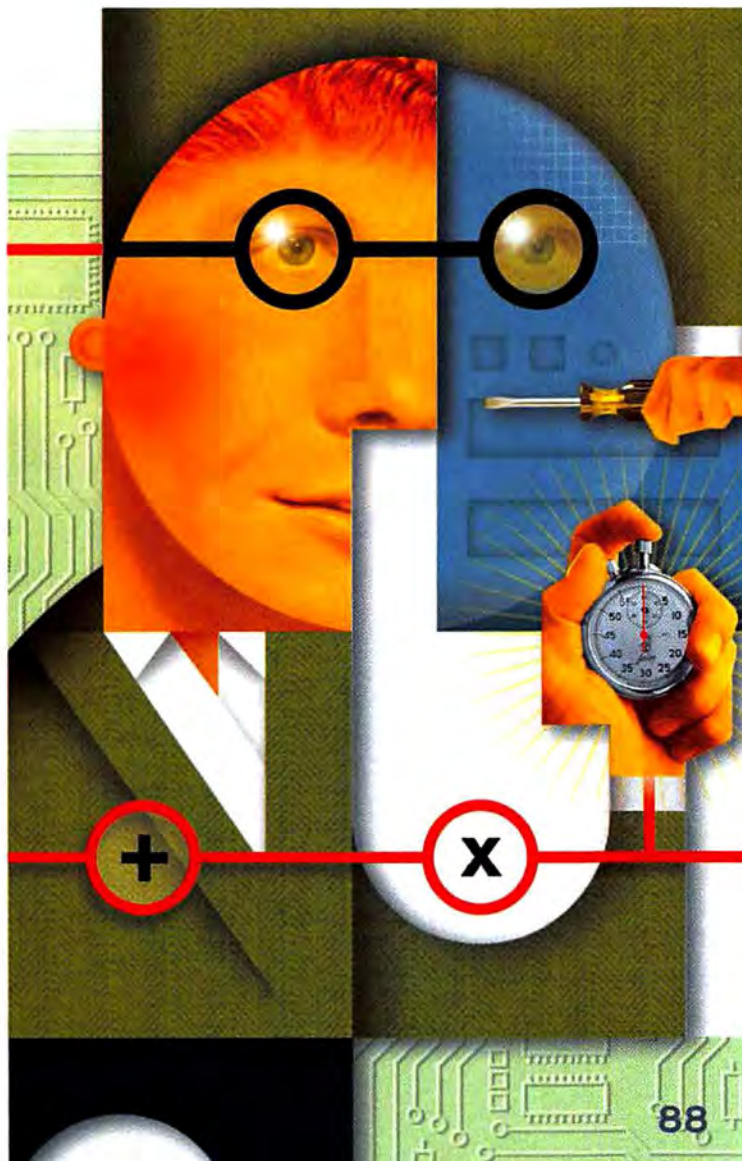


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or log on to [verizonwireless.com](http://verizonwireless.com)

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## PC MAKEOVERS

### 88 60-Minute Upgrades

Want a better PC? Got an hour? Here's how to add a giant hard drive, treat your system to a rewritable DVD burner, upgrade your CPU, quadruple your RAM, move up to a 3D graphics board or a top-of-the-line sound card, and set up a wireless network. Each project we cover takes less than 60 minutes, and each costs under \$300. Plus: a 365-day maintenance schedule for your PC.

Cover Photography by Marc Simon



# PCWORLD

20<sup>TH</sup> ANNIVERSARY YEAR  
SEPTEMBER 2003  
VOLUME 21 ♦ NUMBER 9  
AOL KEYWORD: PCWORLD  
WWW.PCWORLD.COM

## FEATURES

### HANDHELDS

#### 104 Well-Connected Handhelds

They're not just PDAs anymore: With a cell phone or Wi-Fi built in, these devices let you make calls or surf the Net. Our editors pick the two best of ten models evaluated.

### MUSIC SERVICES

#### 119 Online Music: New Hits and Misses

As the recording industry wages war against unauthorized file sharing, legal music-for-a-fee services are springing up. We check out seven sites—and movie downloads, too.

### BETTER BROADBAND

#### 127 More Broadband for Your Buck

Sure, your cable or DSL link outpaces dial-up, but are you getting all the service you deserve? Learn how to clock your speed and enjoy the features bundled with your account. And if you need a new ISP, read our shopping tips.



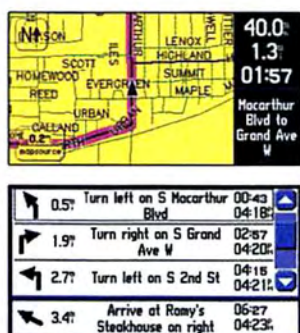
## ON THE COVER







touch and go



### StreetPilot car navigation.

Tap the display and you're on your way.

Your finger and our display are the technology touch-points that drive Garmin's StreetPilot 2610 satellite navigation system. Type in an address or point to a destination. Then relax as the StreetPilot calculates the best route and offers turn-by-turn directions with voice prompts to nearby services, restaurants and hotels. Its portable design offers car-to-car versatility while a remote control placates back-seat drivers.

See the StreetPilot 2610 for touch and go simplicity and peace-of-mind comfort.

[www.garmin.com](http://www.garmin.com) NASDAQ GRMN



Available at:





## TOP 100

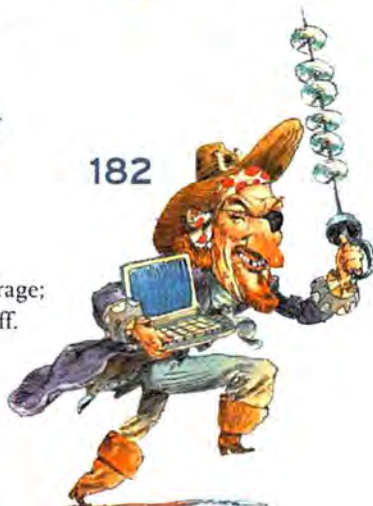
- 134 Wide-Aspect Wonders**  
Extrawide screens show up on more notebooks.
- 136 Top 15 Desktop PCs**
- 140 Top 15 Notebook PCs**
- 144 Top 5 Photo Printers**
- 147 Top 10 15-Inch LCD Monitors**
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## DEPARTMENTS

- 19 Up Front**
- 41 Letters**
- 45 Plugged In**  
Tiny gadgets, giant storage; AOL vs. spam; PC turnoff.
- 51 Consumer Watch**  
A spammer could use your PC to send junk.
- 61 Home Office**  
Ten great free utilities.
- 65 Bugs and Fixes**  
A new patch for IE security.
- 182 Full Disclosure**  
What ever happened to the idea that copying is unethical?



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## RESOURCES

- 16 How to Contact PC World**
- 170 PC World Marketplace**
- 180 Advertiser Index**



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## NOW AT PCWORLD.COM

### DOWNLOADS

#### Freeware Gems

Use these files to print a screen, protect a home page, and more.  
[find.pcworld.com/36923](http://find.pcworld.com/36923)

### BROADBAND VIDEO

#### Create a Panoramic Image

We show you how to produce a high-quality panoramic photo.  
[find.pcworld.com/36920](http://find.pcworld.com/36920)

## COMING UP IN OCTOBER

**PC Prozac:** Our second annual look at the worst PC foibles fixes hardware and software irritations.  
**The Best Software You Don't Own (Yet):** Dozens of dynamic downloads, plug-ins, add-ins, and apps.

**Should You Upgrade to Office 2003?** We put the new suite's key apps through their paces.  
**Digital Video Superguide:** Edit old analog videotapes on your PC and store them on DVD or tape.

## NEWS & TRENDS

- 22 Cheap Ink Probed**  
Thinking of saving money with a cheap, generic ink jet cartridge? Find out how third-party products compare to pricey printer-vendor inks.
- 28 ISPs Promote Premium Extras**  
AOL, EarthLink, and other providers are trying to retain customers by bundling add-on services.
- 32 A 64-Bit Computer: Your Next PC?**  
Coming this year, AMD's Athlon 64 and Apple's G5 bring pumped-up processing to the desktop.
- 32 .Zip File Format Splinters**  
Differences between two popular compression utilities result in file incompatibility problems.
- 34 Built-In Graphics Show Some Improvement**  
Intel and ATI chip sets promise budget-PC buyers high-quality graphics without a video card.
- 36 RSS: Hot Fix for Info-Junkies**  
Custom feeds of headlines from a wide assortment of news sources are just a click away.

## NEW PRODUCTS

- 72 Notebook PCs**  
HP Compaq Nc4000, Fujitsu LifeBook P5000, Sony VAIO PCG-TR1A
- 74 Privacy Software**  
Zone Labs ZoneAlarm Pro 4
- 78 Digital Camera**  
Canon PowerShot G5
- 80 PDA/Cell Phone Hybrid**  
Hitachi G1000
- 82 Hard-Drive Backup Software**  
PowerQuest Drive Image 7  
*See page 73 for a complete list of new products reviewed.*

## HERE'S HOW

- 156 Answer Line**  
Reinstall Windows without losing your data; more suspects in sudden reboot mysteries.
- 160 Windows Tips**  
Automate hard-drive maintenance; XP Pro vs. XP Home; the versatile Power Menu utility.
- 164 Step-By-Step**  
Use an add-in card to install a hard drive with the Serial ATA interface in an existing PC.
- 166 Internet Tips**  
Select the appropriate browser security settings; improve wireless-network security with WPA.
- 168 Hardware Tips**  
Lock down your system with a boot-up password; monitor your hard drive's performance.





### 3Com NJ200 Network Jack

- > "In-the-wall", managed, SNMP-compliant, 4-port Ethernet switch
- > Quadruples LAN infrastructure ports more cost-effectively than rewiring
- > Supports SNMP and includes utilities for location mapping and centralized control



**\$174.00**  
CDW 431505

AC Power Supply  
**\$28.49**  
CDW 358766



### Planar PX 191 (Black)

- > 19" digital and analog active-matrix LCD
- > Native resolution: 1280 x 1024
- > Contrast ratio: 700:1
- > Brightness: 300 nits
- > Analog and digital inputs



Black  
**\$849.01**  
CDW 485416

Silver  
**\$849.01**  
CDW 485417



### D-Link DI-624

- > 54Mbps, 4-port wireless router
- > High-speed 2.4GHz
- > Enhanced security to shield and protect your wireless communication from intruders
- > Robust firewall security features



**\$109.91**  
CDW 450603



### SimpleTech 512MB Premium Memory

- > 512MB
- > Lifetime warranty
- > Guaranteed 100% compatible



**\$115.10**  
CDW 487774



### WatchGuard Firebox SOHO 6tc Wireless

- > Protect both your wireless and wired networks using 3DES encryption, authentication, and IPSec VPN
- > Easy setup and management
- > Can handle up to ten Mobile User Clients and six Branch office VPN Tunnels
- > Dynamic DNS



**\$649.00**  
CDW 501547





> CDW: Hundreds of brand names. Thousands of products.



### hp LaserJet 1300

- > Resolution: 1200 x 1200 dpi
- > Print speed: 20 ppm
- > RAM: 16MB std., 80MB max.
- > Paper handling: 250-sheet input tray



**\$399.00**  
CDW 476934

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> **10:45 pm.** Account Manager Erin Bliss finishes Advanced Linux Volume IX. Meanwhile, husband Gary begins XP For Dummies.



A man and a woman are lying in bed, reading books. The woman on the left is reading "Advanced Linux Networking" and the man on the right is reading "Windows XP For Dummies". Between them is a large stack of technology manuals, including titles like "Modular Access Router Manuals", "Building a Storage Area Network", "CDW Systems", "Veritas", and "CDW". A small cat is lying on the bed in front of them. The background is a blue wall.

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## This Month We Look at a Networked DVD Player, PDA Hybrids, and More

82

A DVD PLAYER with networking technology, PDA/cell phones, and digital music services share the limelight in this issue. A complete list of the newcomers we

cover follows, along with each item's star rating, if any. Visit [find.pcworld.com/10860](http://find.pcworld.com/10860) for more information on PC World's Star Ratings.



### DESKTOP PCs

- 136 ABS Ultimate M5 ★★★★★
- 136 Compaq Presario S400T ★★★★★
- 136 Dell Dimension XPS ★★★★★
- 136 HP Pavilion 775e ★★★★★

### NOTEBOOK PCs

- 140 Averatec 3150P ★★★★★
- 140 EMachines M5305 ★★★★★
- 72 Fujitsu LifeBook P5000 ★★★★★
- 72 HP Compaq Nc4000 ★★★★★
- 140 HP Pavilion Ze5300 ★★★★★
- 140 Premio Kaypro A1100 ★★★★★
- 72 Sony VAIO PCG-TR1A ★★★★★

### COLOR PHOTO PRINTERS

- 144 Canon i9100 Photo Printer ★★★★★
- 144 Epson Stylus Photo 900 ★★★★★

### MULTIFUNCTION PRINTER

- 74 HP PSC 2175 ★★★★★

### 15-INCH LCD MONITORS

- 147 Eizo Nanao FlexScan L367 ★★★★★
- 147 Planar PL150M ★★★★★
- 147 Samsung SyncMaster 152N ★★★★★
- 147 Sharp LL-T15G3 ★★★★★

### REWRITABLE DVD DRIVES

- 149 Memorex DVD+/-RW Dual-X1 ★★★★★
- 149 Pacific Digital 4X DVD+R/+RW Burner ★★★★★
- 149 Pioneer DVR-A06 ★★★★★
- 149 Plector PX-504A ★★★★★
- 149 TDK Indi DVD 440N ★★★★★
- 149 Toshiba SD-R5112 ★★★★★

### NETWORKED DVD PLAYER

- 82 GoVideo D2730 Networked DVD Player ★★★★★

### MP3 PLAYER

- 80 Creative Nomad Jukebox Zen

### WEB CAMERA

- 76 Apple iSight ★★★★★

### DIGITAL CAMERAS

- 151 Canon PowerShot A70 ★★★★★
- 78 Canon PowerShot G5 ★★★★★
- 78 Minolta DiMage Xt
- 151 Samsung Digimax V4 ★★★★★

### PDA PHONES

- 107 Handspring Treo 300 ★★★★★
- 80 Hitachi G1000
- 107 Kyocera 7135 Smartphone ★★★★★
- 107 Palm Tungsten W ★★★★★
- 108 Samsung SPH-i500
- 108 Samsung SPH-i700 ★★★★★
- 110 Sony Ericsson P800 ★★★★★
- 110 T-Mobile Pocket PC Phone Edition ★★★★★
- 112 T-Mobile Sidekick ★★★★★

### WI-FI-ENABLED PDAs

- 112 Palm Tungsten C ★★★★★
- 114 Sony Clie PEG-NZ90 ★★★★★
- 114 Toshiba E755 ★★★★★

### GRAPHICS CHIP SETS

- 34 ATI Radeon 9100IGP
- 34 Intel 865G

### DIGITAL MUSIC SERVICES

- 121 Apple iTunes Music Store ★★★★★
- 121 EMusic ★★★★★

- 121 FullAudio MusicNow ★★★★★

- 121 Musicmatch MX Platinum ★★★★★

- 121 MusicNet@AOL 2.1 ★★★★★

- 121 Pressplay ★★★★★

- 121 RealNetworks RealOne Rhapsody ★★★★★

### FREE/LOW-COST UTILITIES

- 61 ActiveWord Systems ActiveWords Basic
- 61 ActiveWord Systems ActiveWords Plus
- 61 Chime Software Hot Chime
- 61 Hidden File Detector (Bill Coan)
- 61 Intel Application Accelerator 2.3
- 61 Intel Chipset Identification Utility
- 61 Javacool Browser Hijack Blaster
- 61 PanteraSoft HDD Health 2
- 61 PureText (Steve P. Miller)
- 61 R2 Studios HideOE
- 61 R2 Studios HideOutlook
- 61 Toolbar Chest
- 61 TurnFlash (Nir Sofer)

### PRIVACY SOFTWARE

- 74 Zone Labs ZoneAlarm Pro 4 ★★★★★

### REMOTE CONTROL SOFTWARE

- 76 Expertcity GoToMyPC 4 ★★★★★

### PERSONAL FINANCE SOFTWARE

- 78 Microsoft Money Premium

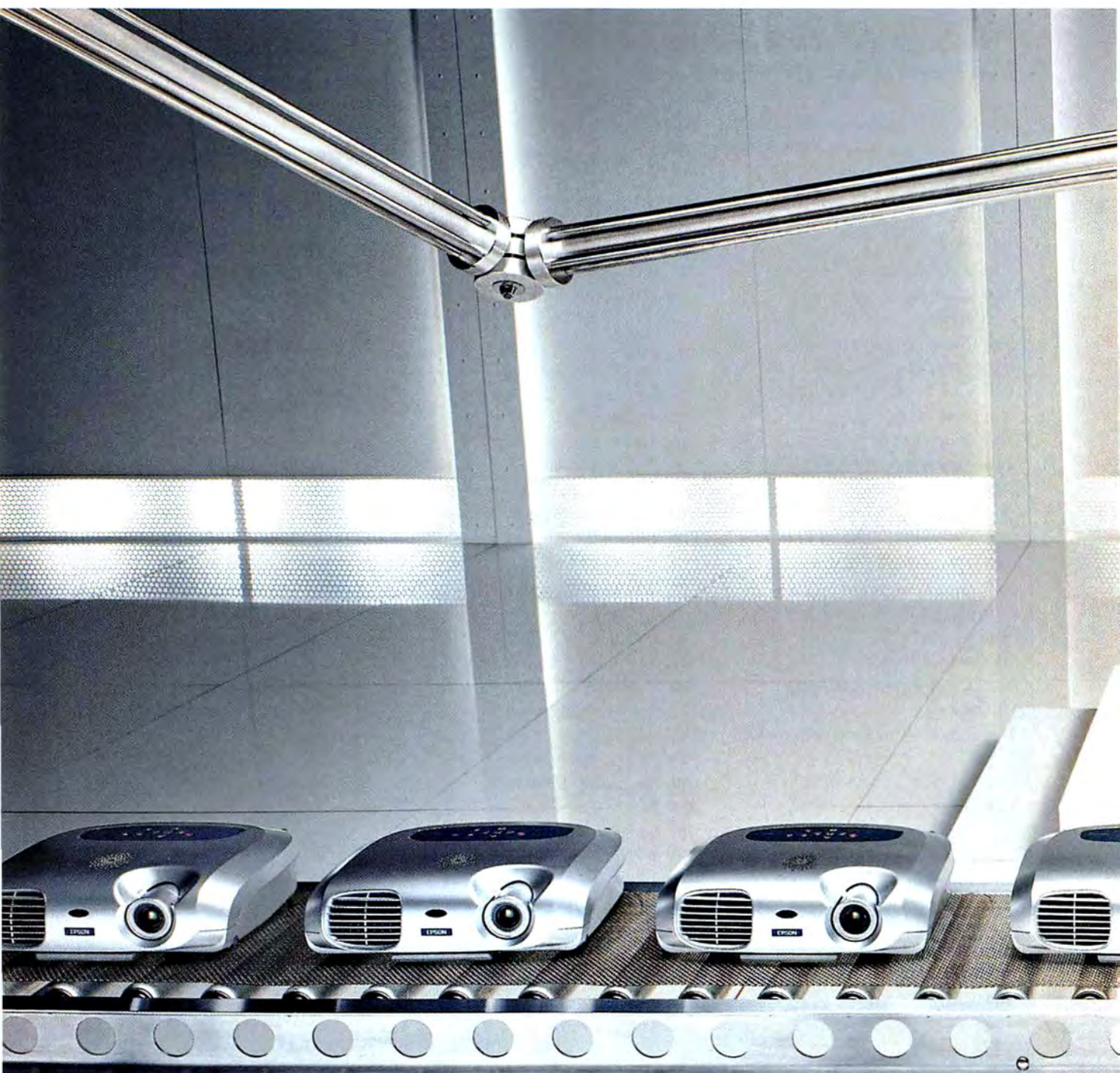
### DATA MANAGEMENT SOFTWARE

- 80 NewSoft Presto PageManager 6 ★★★★★

### BACKUP SOFTWARE

- 82 PowerQuest Drive Image 7 ★★★★★





After all our intensive inspections, there was one

Introducing the Epson PowerLite® S1. Finally, an extremely reliable projector with an equally remarkable price.

Complete results of the reliability study on Epson projectors are available by calling 1-800-GO-EPSON. Epson is a registered trademark of Seiko Epson Corp. PowerLite is a registered trademark of Epson America, Inc. © 2003 Epson America, Inc. © Hunter Freeman



EPSON®

thing we didn't need to double check. The price.

▷ *Bright:* 1200 lumens dazzle, even in a well-lit room  
▷ *Light:* 7.0 pounds travel easily wherever you go

▷ *Tested:* 60 functional tests, 12 image quality tests, 1-hr. lamp-on test  
▷ *Trusted:* Epson is chosen 5 to 1 by leading experts as most reliable

**\$999**

For more information, call 1-800-GO-EPSON or visit [epson.com/4presenters](http://epson.com/4presenters)



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VerticalMouse™  
optical



- Supports hand in relaxed handshake position.
- Eliminates twisting of wrist and forearm.
- Five programmable buttons.
- Optical sensor.
- USB and PS2.
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Experts rave about it.

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

**techTV**  
"great innovation"  
January 29, 2003

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

**PC WORLD**  
★★★★★  
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# UP FRONT

HARRY MCCRACKEN

## Finally, Services Worth Paying For

**\$10 for this, \$20 for that—maybe there's too much good stuff out there.**

I RECALL A TIME—call it 1990 or thereabouts—when the only service a smart PC user needed to pay for was a CompuServe account. Then the Web came along, and for a while there were more free Net-based services than you could shake a mouse at. And today? Welcome to the age of online and technology services that you actually might be willing to pay for.

For instance, Staff Editor Liane Casavoy's "ISPs Promote Premium Extras" on page 28 examines an array of services that ISPs are hawking, from antivirus protection to Net accelerators; some of the deals are worth a look. On page 76, our reviewer (who happens to be me) tries a new version of GoToMyPC, the slick remote-access service that lets you connect to your work system from any browser-equipped PC.

In "Well-Connected Handhelds" on page 104, edited by Associate Editor Alexandra Krasne, we field-test phone/PDA hybrids such as the Sony Ericsson P800; buy one of these next-generation handhelds, and you'll rack up monthly charges for data transfers as well as for talk time. And in "Online Music: New Hits and Misses" on page 119, Eric Dahl, associate editor and music maven, auditions seven music services and finds at least two that deserve a listen.

### TEMPTATIONS AND PITFALLS

IT'S NOT STRICTLY PC-related tech services that are increasingly tempting: I know multiple folks who cheerfully fork over a monthly service fee for a ReplayTV or TiVo digital video recorder. Me, I'm flirting with paying \$10 or so per month for satellite car radio from Sirius or XM.

Though attractive paid services are on the rise, the field continues to have plenty of problems. Many services still aren't



worth your time and money. And even the best ones aren't all things to all people: GoToMyPC is a terrific tool on a desktop or notebook system, but an eye-numbing frustration on a Pocket PC.

How do you tell the good from the bad? Start by taking advantage of no-cost trial periods. And even if your test-drive is a happy one, be careful about commitment. If you sign up for more than a few offerings, you could spend more each month for these technoluxuries than for necessities like electricity or car insurance.

Still, I'm betting the service fun has just begun, so I'll wrap up with three things

that I'd like to see service companies do. Positive responses to these unsolicited requests would persuade more buyers—or at least this one—to welcome a fee-based future with an open wallet.

**Give us discounts:** Services should let us sign up for a year at a reduced rate, as GoToMyPC and others already do. Then there's the ReplayTV/TiVo approach, which gives the buyer the option to pay one chunk of change and get service for a lifetime (sadly, the device's life, not the buyer's).

**Let us pay as we go:** As much as I like online music, I'm not quite ready to commit \$10 or \$15 a month to it. That's why Apple's iTunes is so alluring: It charges 99 cents per track, period. (Too bad it's Mac-only at the moment; we Windows types will remain deprived until later this year.)

**Help us out:** Just like hardware or software, services need top-notch tech support. So far, though, I've been more disappointed than impressed. For example, I'd love to use AT&T's GSM service to handle wireless data on my Palm Tungsten T, but I'm still puzzling over whether it's possible—and AT&T's maddeningly terse Web site hasn't helped.

What's your take on fee-based services? Shoot me a message at [mageditor@pcworld.com](mailto:mageditor@pcworld.com) and let me know if you're signing up or holding tight. ■

*Harry McCracken is editor of PC World.*

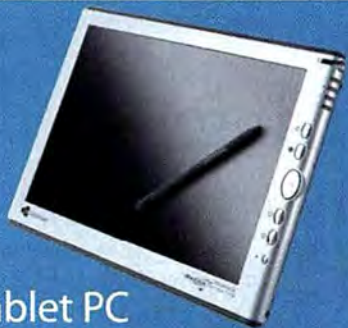
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- 2-Yr. Service Plan<sup>3</sup>- Parts/Labor/Support/Mail-in service/ 90-day lamp warranty



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# NEWS & TRENDS

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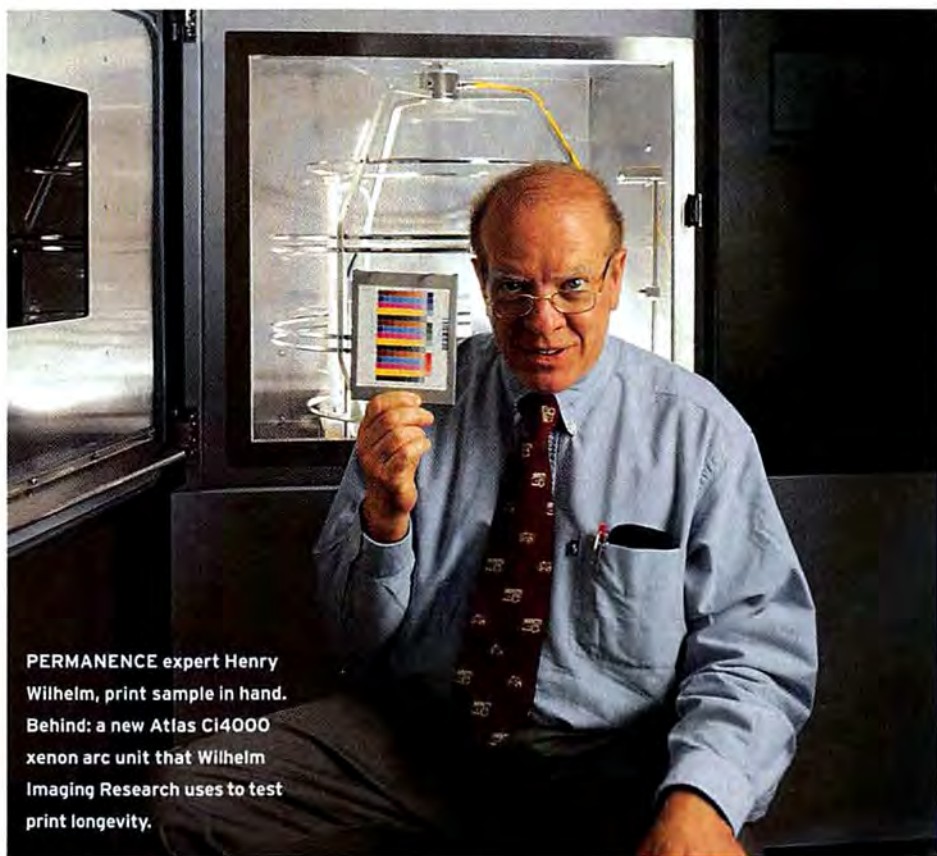
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# CHEAP INK PROBED

OUR TESTS SHOW THIRD-PARTY INK CARTRIDGES FOR BRAND-NAME PRINTERS CAN PRODUCE QUALITY PRINTS, BUT THEY'LL FADE FAST. PART TWO OF A SERIES. **BY DAN LITTMAN**

"LOWEST INK JET prices!" "Three ink jet cartridges for the price of one!" "Save up to 80 percent!" With brand-name ink cartridges running \$30 or more, the temptation to buy third-party cartridges at substantial discounts, either online or in stores, is understandable. But how do these inexpensive inks stand up next to their pricey printer-manufacturer counterparts?

To find out, *PC World* purchased inks for three popular printers—Canon's S900, Epson's Stylus C82, and Hewlett-Packard's DeskJet 3820—from several different sellers and compared their print quality and yield with those of the printer vendor's inks. Additionally, Henry Wilhelm at Wilhelm Imaging Research ([www.wilhelm-research.com](http://www.wilhelm-research.com)), a leading authority on photo longevity, tested most of the



PERMANENCE expert Henry Wilhelm, print sample in hand. Behind: a new Atlas CI4000 xenon arc unit that Wilhelm Imaging Research uses to test print longevity.

PHOTOGRAPH: BILL NELLANS



inks for permanence—the durability of the printed image when it is on display and exposed to light.

We found that third-party inks can save you money, and that some produce prints on a par with the output of printer vendor inks. But we also encountered third-party inks that produced poor-quality prints and clogged up printheads. The impact of generic inks on printer warranties is ambiguous. And if you frequently print photographs, you should steer clear of these inks: The prints might look fine, but Wilhelm reported that none of the clone inks he tested came close to matching the permanence of brand-name inks. He rated the best of the aftermarket inks to last only five years (see the chart on page 24).

### THE INK ECONOMY

THESE DAYS, you can get a capable ink jet printer for a mere \$50, and a great one for \$150. But brand-name inks are expensive, especially if you print in color: A single photo can cost 50 cents or more, not including the price of paper. Jim Forrest, who edits the *Hard Copy Supplies Journal* at market research firm Lyra Research, says the world's ink jet printers will guzzle \$21 billion worth of ink this year.

Third-party vendors have already grabbed more than 16 percent of cartridge sales, Forrest says, and that percentage is growing. Printer vendors contend that third-party inks can cause myriad problems—some of which, they say, may surface only after prolonged use of the generics—ranging from poor print quality and durability to printer damage. Third-party vendors counter



Some clone  
inks cost  
almost as  
much as their  
brand-name  
counterparts.

that printer companies simply want to scare consumers out of straying from the branded inks, which the third-parties claim are overpriced in order to subsidize the artificially inexpensive printers.

To test the quality of our clone inks, we used them to print images on several grades of paper and then rated each image as either comparable to, somewhat worse than, or significantly worse than images made using the printer manufacturer's ink.

In general, most of the third-party inks printed text on plain paper as decently as the printer manufacturers' cartridges did (see detailed test results at [find.pcworld.com/36944](http://find.pcworld.com/36944)). Results weren't as good for high-resolution shots on the printer vendors' long-lasting photo papers, but four out of the nine aftermarket brands we tested—Amazon Imaging's ink for the Canon, G&G's ink for the Epson, and Carrot Ink's cartridge

and InkTec's cartridge-refill kit for the HP—yielded prints of comparable quality to those made with printer manufacturer inks. Of the clones, only the OA100 inks for the Canon produced photos significantly worse than those made with a brand-name ink.

But some inks, even those that made good-looking pictures, didn't always work well. All three aftermarket black inks for the Epson C82—OA100 (purchased from PrintPal, [www.printpal.com](http://www.printpal.com)), G&G (from Computer Friends, [www.cfriends.com](http://www.cfriends.com)), and the no-name ink whose package had only a rainbow logo (also from Computer Friends)—plugged up the printhead nozzles so quickly and consistently that we had to abort some of our tests. But the color inks from these three companies all worked well in the Epson printer. (We bought a fourth brand of aftermarket ink, Print-Rite, for the C82 but dropped it from our tests, as the printer wouldn't install any of the cartridges.)

### CLOGS AND MESSSES

SEVERAL OA100 cartridges purchased from PrintPal, most notably the black and cyan, frequently plugged the nozzles on the Canon S900's printhead, causing wide blank stripes in documents.

The HP DeskJet 3820's cartridges integrate the printhead and ink supply in one unit that can't be replicated legally, so third-party vendors simply refill used 3820 cartridges. A Printek cartridge we bought from PrintPal had no ink in the magenta tank, but we were able to complete our quality and yield tests with other cartridges. Wilhelm ►

## IN BRIEF

### Product Pipeline

**HOT NEW PDAs:** Hand-spring's Treo 600 ([find.pcworld.com/36896](http://find.pcworld.com/36896)), due this fall in versions for both CDMA 1X 2000 and GSM/GPRS networks, is the first cell phone-PDA hybrid to run on the Palm 5 OS. It also boasts a built-in camera and a thumb keyboard. Expect to pay about \$500. Meanwhile, Palm's refresh of its Tungsten T, the T2 ([find.pcworld.com/36899](http://find.pcworld.com/36899)), shown above, boasts twice as much memory (32MB), Graffiti 2, and software for playing MP3 files and video clips, as well as for viewing photos. Its estimated street price is \$399. Also available in the fall: Sony's interesting new Clie, the \$700 PEG-UX50 ([find.pcworld.com/36902](http://find.pcworld.com/36902)), which includes wireless LAN and Bluetooth networking.



**A BEEFIER AOL:** New AOL 9 Optimized software, slated to be available soon, is expected to bring AOL closer to par with Microsoft's feature-rich MSN 8 software. AOL 9's QuickViews lets you mouse over icons and preview info, such as the most recent e-mail senders' addresses. Also included: firewall protection, improved e-mail filters, and enhanced instant messaging icons.



was unable to print all four colors satisfactorily with any of the Printek cartridges from PrintPal, but was able to test the same brand of cartridges from another vendor, Top Inkjet ([www.topinkjet.com](http://www.topinkjet.com)).

We also tried refilling our own HP cartridges with an InkTec kit that we bought from Print Country ([www.printcountry.com](http://www.printcountry.com)). What a mess! It dripped ink everywhere, but when we finally refilled our cartridges the ink made decent-quality prints. At Wilhelm Imaging Research, however, the prints produced using the kit were so poor in quality that Wilhelm did not test them for permanence.

And it was in permanence that third-party inks fell short. For example, Wilhelm projected prints made with Epson's C82 inks (colored with pigments instead of less-durable organic dyes) on Ep-

son's most stable (with these inks) paper to last 92 years when displayed, while rating none of the prints with generic inks on the same paper to last more than a year. The HP and Canon inks are dye-based, so their advantage over third-party inks was somewhat less

for the S900 (which uses six separate ink tanks) sell for a street price of about \$12 each, while the OA100-compatible inks that clogged the print-head cost only \$5 each from PrintPal. Amazon Imaging (no relation to Amazon.com) black cartridges, however, cost

of the color cartridge (street-priced at \$35 and \$50, respectively). The low-yield HP color cartridge ran out of cyan after 380 pages (ending the cartridge's useful life); the Carrot Ink ([www.carrotink.com](http://www.carrotink.com)) and Printek cartridges approached double that yield before running out of magenta.

Do-it-yourself refill kits offer the greatest savings, if you're willing to brave the messy refill process. The InkTec refill kits for HP cartridges contained more than three times as much ink as a cartridge, and they cost only \$10 for black and \$14 for color.

## In permanence, third-party inks fell dramatically short.

but still substantial. (Newer HP printers use inks that Wilhelm, in other tests, has found to be far more stable than HP's inks for the 3820.)

### MONEY SAVERS?

PRICES FOR THE aftermarket inks we tested varied greatly, and in some cases the clones cost almost as much as the printer-vendor brands. For example, Canon-brand inks

\$11 (color, \$10) at Buy.com.

In general, third-party inks for the Canon and Epson printers produced about as many color pages as the printer manufacturer's inks (see chart), though there were some variances.

The situation was different with HP's 3820, which uses two cartridges (one black, the other with three colors). HP sells 19ml and 38ml versions

### BEHIND THE PRINTS

WHY DID PRINTER makers' products usually deliver better results than their generic counterparts? Printer vendors say they've invested heavily in developing inks, papers, cartridges, and printheads ►

## TEST REPORT

# THIRD-PARTY INKS SAVE MONEY BUT GIVE UP PERMANENCE

THE QUALITY OF PRINTS made with third-party inks sometimes equals that of prints made with printer vendors' products; yield (the number of prints) can vary considerably. For additional yield and print-quality results, see [find.pcworld.com/36944](http://find.pcworld.com/36944).

PRINTER	Ink	Cartridge street price	Yield (average number of prints) <sup>1</sup>	Ink cost per page (cents) <sup>1</sup>	Print quality relative to brand-name ink <sup>2</sup>	Display Permanence Rating (years) <sup>3</sup>
Canon S900 (uses six cartridges)	Amazon Imaging	\$11 black, \$10 color	680	6.7	Comparable	5
	Carrot Ink	\$8	667	5.1	Somewhat worse	4
	OA100	\$5	687	3.2	Significantly worse	4
	Canon	\$12	653	7.8		27
Epson Stylus C82 (uses four cartridges)	G&G	\$17 black, \$9 color	953	5.8	Comparable	0.5
	OA100	\$10 black, \$8 color	1053	4.9	Somewhat worse	0.5
	Rainbow logo <sup>4</sup>	\$17 black, \$9 color	940	5.8	Somewhat worse	1
	Epson	\$33 black, \$12 color	1113	7.1		92
HP DeskJet 3820 (uses two cartridges)	Carrot Ink	\$21 black, \$24 color	760	4.4	Comparable	1
	InkTec (refill kit)	\$10 black, \$14 color	n/a <sup>5</sup>	n/a <sup>5</sup>	Comparable	4
	Printek	\$20	700	5.2	Somewhat worse	1.7
	Hewlett-Packard	\$30 black, \$35 color <sup>7</sup>	380	15.5		15

**FOOTNOTES:** <sup>1</sup> Calculations based on 5 percent coverage per color per page. For the Canon printer, our test prints used only four of the six ink tanks. <sup>2</sup> Prints made with printer manufacturers' longest-lasting photo paper. <sup>3</sup> Tests conducted by Wilhelm Imaging Research ([www.wilhelm-research.com](http://www.wilhelm-research.com)); results provided to PC World. Wilhelm Imaging Research tests prints as follows: Prints are carefully prepared and dried for two weeks in a controlled environment, and then exposed to high-intensity fluorescent light at a constant 75 degrees Fahrenheit and 60 percent relative humidity. Data from these accelerated tests is extrapolated to a real-world display condition of fairly bright room illumination (45 lux) for 12 hours per day, with prints framed under glass. For additional details on test methodology, see [find.pcworld.com/31136](http://find.pcworld.com/31136). <sup>4</sup> This ink came in a white box with nothing on it except for a rainbow logo. <sup>5</sup> Not applicable. Cartridge refill kits hold more than three times as much ink as HP's black and 19ml color cartridges do. <sup>6</sup> Wilhelm Imaging Research was unable to produce prints suitable for testing. <sup>7</sup> Price is for a 19ml color cartridge. HP's 38ml cartridge is \$50 (street).





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## OUTPUT COMPARISON

## CLONES VS. BRAND NAMES: PRINT QUALITY VARIES



A PRINT MADE using Amazon Imaging inks for the Canon S900 (center) is a bit washed out compared to the one made with Canon inks (left). But a print made with OA100 inks (right) has a yellowish cast.

that work together. For example, John Stoffel, HP's ink jet technology manager, says third-party vendors can't fine-tune fluidity so that their inks spray properly onto the paper.

Often, aftermarket retailers buy prepackaged inks from manufacturers—many of them in China—which makes it difficult for the retailers to know exactly what they're getting. But some third-party ink companies do exercise direct control over their products. Gary Miller, Amazon Imaging's sales vice president, says his company makes its inks and uses cartridges made of polypropylene, a high-quality material that printer vendors use, instead of cheaper plastics that can damage the ink if it's stored for several months.

## INK AMBIGUITIES

BUYING third-party ink online can be frustrating. Some retailers' Web sites don't identify products by name, only by printer or cartridge compatibility, so getting a steady supply of an ink you like can be a challenge. Computer Friends, whose generic inks are unidentified on its Web site, sent us G&G ink to fill most of our initial order for Epson C82-compatible ink but completed

the order later with a different brand. (The company fulfilled our request for a specific ink brand, however.)

Another murky issue relates to warranties. All the manufacturers' warranties for the printers we used state explicitly that they don't cover damage caused by other vendors' ink. But third-party vendors say the federal Magnusson-Moss Warranty Improvement Act forbids companies from dictating customers' choice of aftermarket products.

Ron Katz, a patent attorney with the firm Manatt, Phelps, & Phillips who has litigated on behalf of aftermarket vendors, says that "mere use of a third-party cartridge does not void the warranty if the cartridge does not cause the damage."

Tricia Judge, executive director of the International Imaging Technology Council, an association of aftermarket vendors, says that if a generic cartridge does damage your printer, reputable third-party ink sellers will repair the printer. However, none of the generic-ink sellers' warranties for the products we tested addressed this situation.

The IITC is working with the American Society for Testing and Materials to develop

tests of yield, image density, and ink fastness. It has also partnered with the imaging lab operated by the Rochester Institute of Technology's National Center for Remanufacturing and Resource Recovery to test and certify products. Judge says she expects the program to result in a certification sticker on boxes for the inks that meet basic standards. Printer vendors seem receptive to the idea of quality-control testing: "We are all for standards," says Pradeep Jotwani, vice president of HP's Imaging and Printing Group.

## WORTH THE RISKS?

IN THE MEANTIME, judging from our experience, finding a reasonably priced substitute for brand-name ink can be a risky business. If top quality and print longevity aren't of paramount importance, you can save money using no-name inks—but you may have to spend a lot of time cleaning clogged printheads. Still, some users may find the savings justify the hassles.

If print quality—and especially durability—are a top concern, however, you're better off playing it safe by gritting your teeth and shelling out for brand-name inks. ■

## IN BRIEF

## Did You Know?

**SPAM Watch** Lost productivity related to spam costs companies an average of \$874 per employee per year, says a study conducted by Nucleus Research, which surveyed 76 U.S. companies, talking both to employees and IT managers about their spam experiences. That figure is based on a 2080-hour work year and hourly pay of \$30, the study says. find.pcworld.com/36938

# \$874

## Product Pipeline

**SERIOUS SAVINGS:** Ink jet printing hits a new low with Hewlett-Packard's new printer—a new low price, that is. The compact HP Deskjet 3520 color ink jet printer prints at 2400 by 1200 dots per inch, comes with a fold-up paper tray, and carries a \$40 price tag. find.pcworld.com/36719



**BEND IT GOOD:** Does your thumb-drive storage device get in the way when it sticks out from your laptop's USB port? Ideative's \$13 FlexUSB allows you to rotate the drive up to 90 degrees in all directions. The device works with USB 1.1 and 2.0 devices. find.pcworld.com/36731







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## INTERNET

# ISPs PROMOTE PREMIUM EXTRAS

**SERVICES AIM AT IMPROVING CUSTOMER LOYALTY, BUT COSTS CAN ADD UP FAST.**

EAGER TO SECURE new cash streams and worried that customers now consider one Internet service provider to be about as good as another, major ISPs have increasingly turned to add-on services for more revenue and higher customer retention.

But such ISP extras—which range from Internet call-waiting and voice mail services to home networking tools and antivirus protection—don't come cheap. And though they appeal to people who want a customized Internet experience with the convenience of a single bill, the various bundled goodies being pitched by the big providers aren't necessarily a great deal.

For example, though the Internet call-waiting services from AOL and EarthLink cost \$4 a month, *PC World* found comparable services offered for less: Buzme.com is a free Internet call-waiting service, and CallWave's Alert service is available for \$18 a year (\$1.50 per month). Such call-waiting services launch a pop-up window that gives dial-up users the option of accepting or declining an incoming phone call while online.

With EarthLink, which may maintain the most extensive menu of extra services, you can get home networking help for \$10 a month. The catch is that you must buy \$150 worth of home networking hardware



**AOL'S CALL-WAITING service allows dial-up users to take, or decline, a call while online.**

from EarthLink and sign a one-year service contract for monthly support.

AOL presents a plethora of extras, including its digital music service, and antivirus protection (for a \$3 monthly payment) powered by McAfee.

Another popular add-on at EarthLink and budget Internet service providers Juno and NetZero is a Web acceleration service that speeds up connections for dial-up customers.

EarthLink charges an extra \$7 monthly for its turbo service, powered by third-party provider Propel. You can save, however, by purchasing instead a one-year subscription directly from Propel for \$60 (\$5 monthly).

## BEHIND THE PUSH

AS INTERNET service becomes a commodity, ISPs have turned to extras as a way to differentiate themselves and get more monthly fees from customers, says Joe Laszlo, a senior analyst with Jupiter Research.

The convenience of service bundling and the comfort of dealing with a company you already know may make it worthwhile for you to pay your favorite ISP a lot more than you do for basic connectivity, says Steven Harris, a research manager with IDC.

"Your ISP is a reputable company that will be around

## IN BRIEF

## Top 5 Downloads

Head to [find.pcworld.com/36395](http://find.pcworld.com/36395) to find these files.

- 1. Pop-Up Stopper 3.01** 467KB  
Eliminate irritating pop-up windows with this free program.
- 2. RegClean 4.1a** 800KB  
Clean your Windows Registry of corrupted or unused Registry keys.
- 3. SpyBot Search and Destroy 1.2** 3.5MB  
Protect your privacy by removing spybots and replacing them with empty dummies.
- 4. Sygate Personal Firewall 5.0 Build 1175** 5MB  
Secure your sensitive files from threats inside and outside your network.
- 5. SpamCatcher** 2.3MB  
Eliminate spam by creating rules that identify and blacklist bulk e-mail.

to help you out with the installation and with the technical support when you have questions," Harris says.

Before you sign up for an add-on or two, however, take a look around and be sure that you're getting the best deal.

—Liane Cassavoy ■

## FEATURES COMPARISON

## ADD-ON SERVICES GROW AT ISPs

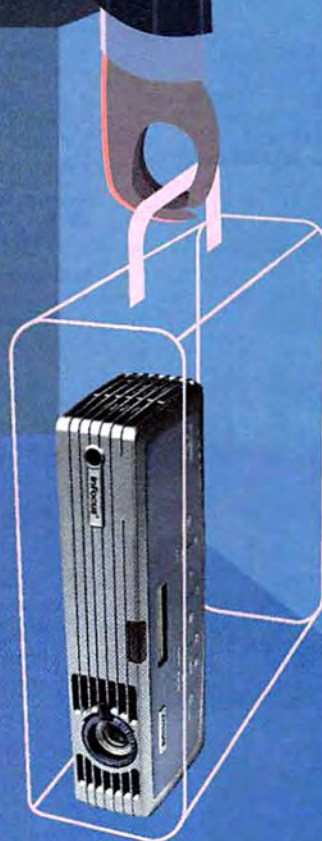
EXTRA ISP SERVICES are increasing and offer the convenience of one-stop shopping (and billing).

WEB SERVICE	INTERNET SERVICE PROVIDER					
	AOL	BellSouth	EarthLink	Juno	NetZero	Verizon
Antivirus	\$3	—	<sup>1</sup>	—	—	—
Digital music	\$9	—	\$10	—	—	\$3-\$10 <sup>2</sup>
E-mail by phone	\$5	—	\$5	—	—	—
Firewall	—	\$7	\$50 <sup>3</sup>	—	—	\$40 <sup>3</sup>
Home networking support	—	\$10	\$10	—	—	—
Internet call waiting	\$4	—	\$4	—	—	—
Web accelerator	—	—	\$7 <sup>4</sup>	\$5	\$5	—

**FOOTNOTES:** <sup>1</sup> Expected in August, with pricing to be announced. <sup>2</sup> Depends on service selected. <sup>3</sup> Price is for an annual subscription to the Zone Labs ZoneAlarm Pro firewall. <sup>4</sup> EarthLink's Web accelerator is available only as part of EarthLink Plus, which costs \$29 a month. The charge shown here is the cost of the accelerator service when broken out of the of the regular monthly payment. **CHART NOTES:** Except where noted, prices listed are monthly fees that come on top of the monthly ISP charge. A cell with no price listed indicates that the service is not offered.



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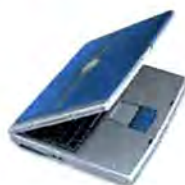
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## PROCESSORS

# A 64-BIT COMPUTER: YOUR NEXT PC?

THE NEXT GENERATION OF DESKTOP PCs IS COMING, PERHAPS SOONER THAN YOU THINK.

UPCOMING CPUs from AMD and Apple suggest 64-bit computing will come to a PC near you as soon as this fall.

What does that mean for you? Put it this way: It's not about more megahertz—it's about doubling the amount of data a CPU can process per clock cycle.

A 64-bit PC won't make your word processor run faster, but it can dramatically improve more-demanding applications, resulting in smoother, faster video encoding; better performance on complex programs like CAD; and richer, more detailed games. Over the long term, 64-bit computing will give programmers server-level power and could revolutionize what desktop software can do.

The 64-bit chips (Apple's



IBM-made G5 and AMD's Athlon 64) process more data than 32-bit CPUs (Intel's Pentium 4, the Athlon XP, and the Motorola-made G4), and they can address more memory. While 32-bit chips address up to 4GB of physical memory, a 64-bit chip can address up to 16 exabytes of RAM—that's 16 billion gigabytes. (Apple's shipping G5, and high-end

Athlon 64 PCs, due this fall, will likely hold a maximum 8GB of RAM, however.)

Though it has the 64-bit Itanium server chip, CPU powerhouse Intel has conspicuously not announced a 64-bit desktop chip. (Unlike AMD's and Apple's chips, Itanium can run 32-bit apps only under slower software emulation.) But there are rumors that Intel has ready a 32- and 64-bit-capable CPU, code-named Yamhill, in case 64-bit desktop computing takes off.

To take advantage of 64-bit chips, you need a 64-bit-capable operating system, apps, and hardware drivers. They won't emerge anytime soon.

Apple's Jaguar and Panther OS upgrades (both due this year) will support 32-bit apps

that can make 64-bit requests of the CPU. But a full 64-bit OS has not been announced. Athlon 64 will work like previous Athlons under Windows XP, but its 64-bit abilities will be dormant until Microsoft ships a 64-bit Windows for the chip. That OS, which will support 32-bit apps, is in testing; no word yet on its ship date.

Most software vendors are vague about when their products will offer 64-bit support. Epic Games, maker of the Unreal franchise, is an exception. It has already updated Unreal Tournament 2003 and is awaiting a compatible 64-bit OS, says Tim Sweeney, company founder and lead programmer. In the works is Epic's first fully 64-bit game, due in 2005.

—Tom Mainelli ■

## SOFTWARE

# .ZIP FILE FORMAT SPLINTERS

TOP COMPRESSION UTILITIES MAY NOT READ EACH OTHER'S FILES.

IF YOU'RE USING the latest version of either the PKZip or the WinZip file compression utility to create .zip files, beware: The files you make may not be accessible to other .zip software. The incompatibility is creating confusion over a format that has known remarkable stability for years.

The problem stems from the two popular programs' implementations of a long-overdue new feature, AES encryption (the password pro-

tection built in to the previous versions of the .zip format is easily hacked). PKZip publisher PKWare—the company founded by the late .zip inventor Phil Katz and the traditional keeper of the .zip format—added AES to PKZip in January; the beta of WinZip 9, with incompatible AES encryption, debuted in May.

WinZip couldn't use PKZip-compatible encryption because PKWare didn't disclose any details on its encryption

implementation until after WinZip's beta appeared. And PKWare still has not released information on certificate-based encryption, so complying with it is impossible for WinZip or anyone else.

Neither PKZip nor WinZip makes encrypted archives by default, so most new .zip files will be in the old, open format. The problem will surface only with encrypted files, but they will still bear the .zip extension, which may confuse peo-



ple who can't open such files with their .zip utility. (Competitors StuffIt and PentaZip put different extensions on files with secure encryption.) If you want to use the encryption in a new version of PKZip or WinZip, make sure that recipients of your files know—and that they have whichever .zip program you use.

—Lincoln Spector ■



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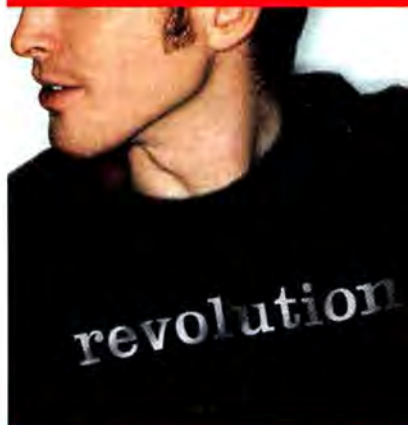
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## CHIP SETS

# BUILT-IN GRAPHICS IMPROVE, BUT...

## NEW INTEGRATED GRAPHICS GIVE YOU MORE POWER, BUT NOT ENOUGH FOR TRUE GAMERS.

EVEN IF YOU don't want to pay more than \$600 to \$1000 for a PC, you shouldn't be saddled with subpar graphics. That's the thinking behind the latest chip sets with integrated graphics: Lower the costs by eliminating a graphics card, but still deliver visual punch.

True, we've long considered integrated graphics a poor choice for serious game play. And our tests of the latest such chip sets—Intel's 865G and ATI's Radeon 9100IGP—haven't changed that opinion.

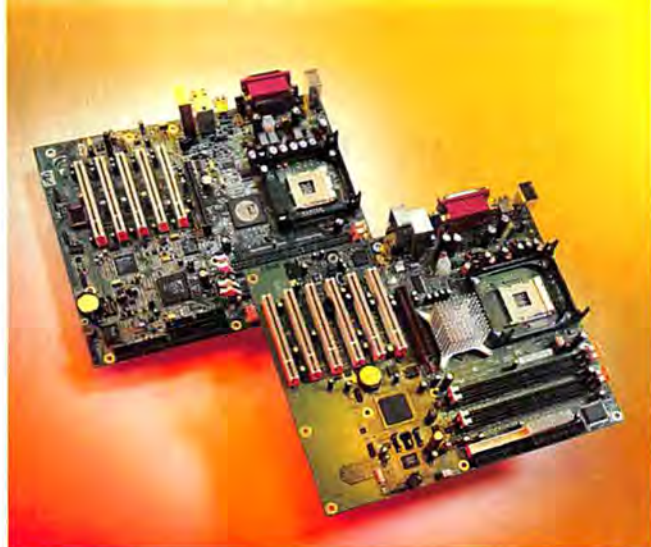
But most people aren't hardcore gamers, and both chip sets do well on office tasks. Both—especially the ATI—also do a decent job with some games at lower resolutions.

We looked at a \$1000 Gateway 500S with the Intel 865G chip set, a 2.4-GHz Pentium 4

CPU, and 256MB of RAM. Gateway markets the 500S as slightly better than a no-frills unit, perhaps an extra family PC that sees casual game use.

ATI sent us a 3-GHz P4 reference PC with 512MB of RAM and its Radeon 9100IGP chip set. With the 9100IGP, ATI continues to follow in the footsteps of rival Nvidia's GeForce chip set. The 9100IGP appears only in PCs with Intel CPUs, though ATI plans new products for the upcoming AMD Athlon 64. Shipping in budget desktops and notebooks this fall, the 9100IGP has more technology than the 865G to satisfy casual gamers.

Our results show that occasional gaming was acceptable at 1024 by 768 resolution and improved at lower resolutions (not on chart below), but the



INTEL'S 865G and ATI's Radeon 9100IGP chip sets integrate graphics.

frame rates were too low for most gamers. The boost was startling when we tested both PCs with a \$110 (street) ATI Radeon 9200 card; frame rates more than doubled with the card in some cases (see chart), though the differences were less pronounced with the ATI chip set than with the 865G.

One key to the 9100IGP's prowess: Its pixel-shading technology is programmable, so developers can do tricks like shade one pixel three times; thus, in a game with a pond, for example, you might see the water texture, a reflective object, and fish below.

Peter Glaskowsky, principal analyst at In-Stat/MDR, says

the 9100IGP's programmability and its geometry acceleration (also missing in the 865G) are key features since they're required for many modern games. Given its performance and its promise of a stable platform, the 865G should appeal more to corporate buyers than to home PC users, he says.

Whether vendors pass on savings from built-in graphics chip sets is questionable; you may get an extra goodie instead. Although such PCs are not well suited to 3D apps or serious gaming, they should ably handle standard tasks, and systems with the ATI may satisfy low-level gamers.

—Laurianne McLaughlin ■

## TEST REPORT

## INTEGRATED GRAPHICS BETTER AT LOW RESOLUTION

EVEN LOWER-END cards will give you a significant boost on games—often delivering two or more times the performance.

SYSTEM	Graphics	PC WorldBench 4 score <i>Faster</i>	Return to Castle Wolfenstein <sup>1</sup>			Unreal Tournament 2003 <sup>1</sup>		
			1024 by 768 resolution, 16-bit	1024 by 768 resolution, 32-bit	1280 by 1024 resolution, 32-bit	1024 by 768 resolution, 16-bit	1024 by 768 resolution, 32-bit	1280 by 1024 resolution, 32-bit
ATI reference PC	ATI Radeon 9100IGP (integrated)	<b>131</b>	36	33	22	86	46	25
	ATI Radeon 9200 card	<b>131</b>	86	68	43	133	72	46
Gateway 500S	Intel 865G (integrated)	<b>111</b>	34	27	19	49	17	8
	ATI Radeon 9200 card	<b>113</b>	84	68	43	132	72	46



**FOOTNOTE:** <sup>1</sup> Frame rate, in frames per second. **HOW WE TEST:** The ATI system ran Windows XP Professional and used a 3-GHz P4 with 512MB of RAM; the Gateway ran Windows XP Home and used a 2.4-GHz P4 with 256MB of RAM. Each was tested with hyperthreading turned off and with PC WorldBench 4, PC World's applications-based benchmark. We measured the frame rates at different resolutions during a demo for Return to Castle Wolfenstein and during a fly-through of one level of Unreal Tournament 2003. All rights reserved.

**CHART NOTES:** For all tests, a higher score is better. Best scores in bold.



**Pioneer** *sound.vision.soul*



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## WEB CONTENT

# RSS: HOT FIX FOR INFO-JUNKIES

GROWING WEB STANDARD MAKES IT EASY TO GET NEWS ON THE TOPICS YOU WANT.

MEET YOUR NEXT Web-based time-saver: customized news feeds that give news junkies their fix quickly and easily, without their having to scour the Web for all the latest bulletins. Called RSS, this standard could radically change the way you gather and manage information online.

Armed with an RSS newsreader—a simple cheap or free application—you can get headlines from your favorite news sites or receive an aggregated news feed on a single topic, like Iraq or computer software, that includes articles from many Web sources.

The feed reader periodically updates the display to pull in new stories; you simply click a headline to read the article.

Delightfully, the feeds themselves cost end users nothing.

Individuals aren't the only potential beneficiaries of RSS. Web sites, including Web logs, can take feeds of headlines from other sources and display them for their visitors. The sites that generate feeds also benefit: Clicking on an RSS headline sends you back to the original source, thereby increasing traffic for the site that produced the headline (see the screen shot above).

## REAL SMOOTH STUFF

THE RSS STANDARD describes a simple framework to publish headlines and links on the Web. Although it has been around since December 2000, the standard recently got a



USING A SIMPLE NEWSREADER like FeedReader, you first select a news topic (1). In this example, headlines from the feed (2) appear in a separate window. Click the headline that interests you, and the reader displays the original story (3) in a built-in Web browser window.

boost when major Web sites like those for BBC News and *Variety* began featuring RSS news feeds. PCWorld.com joined the parade in July.

RSS is a nested acronym: RDF Site Summary, where RDF stands for Resource Description Framework. But it's commonly called Really Simple Syndication—an apt name, since simplicity is key to RSS's growing popularity.

"News aggregators have the potential to let people scan a lot of different sources quick-

ly," says Joel Abrams, partnership development specialist for the *Christian Science Monitor's* site. "RSS can help people find a lot of what they're looking for in one place."

Developers appreciate the ease of launching a basic RSS feed. "It took a day or two for one of our tech people to set [our RSS feed] up once we put them on it," Abrams says.

XML, the standard increasingly used by Web sites that manage their content in databases, enhances the simplicity of RSS. The XML standard lets content producers define data with tags such as title, link, product, and description. Once a site has stored data in this format, it's very easy for a script or database query to retrieve the relevant information for an RSS feed.

News isn't the only future for RSS. "A standard like this could be applied to solve a lot of problems," says Joanne Friedman, chief executive of technology consulting firm Connected Minds. A reader can consolidate most types and sources of data, from a network or the Web. Maybe this tool is right for you, too.

—Eric Dahl ■

## BASIC TOOLS

## RSS STARTER KIT

WANT TO TRY OUT RSS? You'll need a newsreader and a list of feeds to which you want to subscribe. Here are a few of our favorites.

### NEWSREADERS

A FREE, open-source application called FeedReader (find [pcworld.com/36926](http://pcworld.com/36926)) is a good way to start. Though still in the alpha stage of development, it's easy to learn—with an interface that resembles a stripped-down Outlook—and very stable.

The \$25 NewzCrawler (find [pcworld.com/36929](http://pcworld.com/36929)) pursues Outlook style a bit further with a more polished interface. If you use Trillian Pro, you need a separate application: A simple plug-in adds RSS support to this \$25 multiconnected instant messaging program (see [find.pcworld.com/36638](http://find.pcworld.com/36638)).

### NEWS FEEDS

NEWSREADERS usually come preconfigured with a handful of popular news feeds. But

you don't have to stop there.

A gigantic feed list is available at [www.syndic8.com](http://www.syndic8.com) for your perusal. If you can't find the news source you seek, head over to NewsIsFree ([www.newsisfree.com](http://www.newsisfree.com)), which lists nearly 6000 news feeds.

Also, when you surf, keep your eye out for a little orange graphic labeled XML, which often marks a Web site's RSS feed. Visit [find.pcworld.com/36725](http://find.pcworld.com/36725) to view PCWorld.com's list of RSS feeds.



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Model	1560V+	1560NX	1560M	1760V	1760NX	1760VM	1860NX
Rapid Response	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thin Frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NaViSet™ (DDC/CI)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No Touch Auto Adjust	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LiquidView Software	No	No	No	Yes	Yes	Yes	No
Multimedia	No	No	Yes	No	No	Yes	No
Vacation Switch	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cable Management	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Input Interface Connectors	VGA	DVI-D & VGA	DVI-D & VGA	VGA	DVI-D & VGA	DVI-D & VGA	DVI-D & VGA



# LETTERS

LETTERS@PCWORLD.COM

## TRUSTWORTHY COMPUTING

## KIOSK OPTIONS FOR DIGITAL PHOTOS

## BROADBAND VIA BPL: NOT TO BE?



### ZAPPING ADWARE AND OTHER PESTS

REGARDING YOUR article on the scum of the Internet, adware ["Pest Zappers," July]: Apparently no laws prevent this form of invasion by advertising. The big question is where do you draw the line between an advertisement program and a virus? I had an ad program on my computer recently that I would describe as more a Trojan horse than an ad program. It installed itself with my permission (I thought I'd be supporting the app it came with), but it then hid itself and installed files all over my system, much the way a virus does. If the program isn't a virus, I

would think its uninstaller certainly is: Instead of uninstalling, it mutates the program into a different variation of itself.

*Darren Forster, via the Internet*

I JUST DOWNLOADED and installed Spybot Search & Destroy because of your recommendation in "Pest Zappers." You would be surprised at the number of files that it found. (Well, at least I was surprised.) The updated version of Spybot Search & Destroy has a pop-up help menu that explains what each file does. I hadn't known what a lot of these things did. I am fairly confident my computer is actually clean for once.

*Dave Lawson, Kankakee, Illinois*

LAVASOFT'S AD-AWARE seems to work very well. I was going to purchase the upgrade, but then learned that no live technical support is available in the United States! Questions must be addressed by e-mail, and for me and many of my colleagues, this won't work. I canceled my subscription (and got a prompt and full refund). If there were live tech support, I'd purchase the product again.

*Michael Rubin, via the Internet*

### BEST OF 2003?

YOU LISTED Pinnacle Studio 8 as a "best of breed" for video editing software in the July issue ["Best of 2003"]. People who don't challenge the program seem satisfied with it, but if you try to use all the features, it becomes unstable. The reviews at Amazon.com are a good place to start to find comments from frustrated users. I've contacted Pinnacle about my own problems with Studio; when one official finally suggested that I reformat my system and start again, I moved on to Adobe Premiere, which works fine.

*Steve Blackwell*

*Calgary, Alberta, Canada*

I MUST QUESTION your choice of Adobe Photoshop Album for photo management software. I found this program so lacking that I removed it from my PC. Besides Album, I've used Extensis Portfolio and ACDSee. Portfolio works very well. ACDSee is as fast as Portfolio and faster than Album, and it has nice file-listing and graphics-display capabilities.

*Lionel R. Khaton, Louisville, Colorado*

CONGRATULATIONS to PC World for its new award of World Class Loser of the Year [to Microsoft's Trustworthy Computing Initiative]. Perhaps you can grant this distinction to Bill Gates in perpetuity. After all, Microsoft has owned the operating system standard for over 20 years and has yet to produce a reliable product.

Tragically, the user community accepts this lamentable situation as normal; protest is only a feeble sigh, drowned out by the thunderous hosannas of bottomliners. And only a cheap sneak would dare hint that the Trustworthy Computing Initiative is another bogus PR ploy.

*Wm. B. Fankboner, La Quinta, California* ►

## LETTER OF THE MONTH

### No Fear of File Trading

THE ONLINE ARTICLE "Music Downloads: Is It Time to Pay?" by Laurianne McLaughlin ([find.pcworld.com/36635](http://find.pcworld.com/36635)) was thoughtful, but exaggerates the negatives of free file trading. The media has concentrated on the lawsuit against the file-sharing students—scary and sensational, to be sure. However, those guys ran servers. They were not typical file traders.

Even if they were, and even if the Recording Industry Association of America

sued 40 private people who were trading music, it would still be an infinitesimal fraction of the 4.4 million Kazaa users McLaughlin cites. Unless the RIAA can sue everyone who downloads "Thong Song," the record industry is going to have to find a way to satisfy customers and make money, like other businesses.

*Chris Coccio, Albany, New York*

**Editor's note:** For another point of view on this issue, see *Full Disclosure* on page 182.



## The word plasma excites you

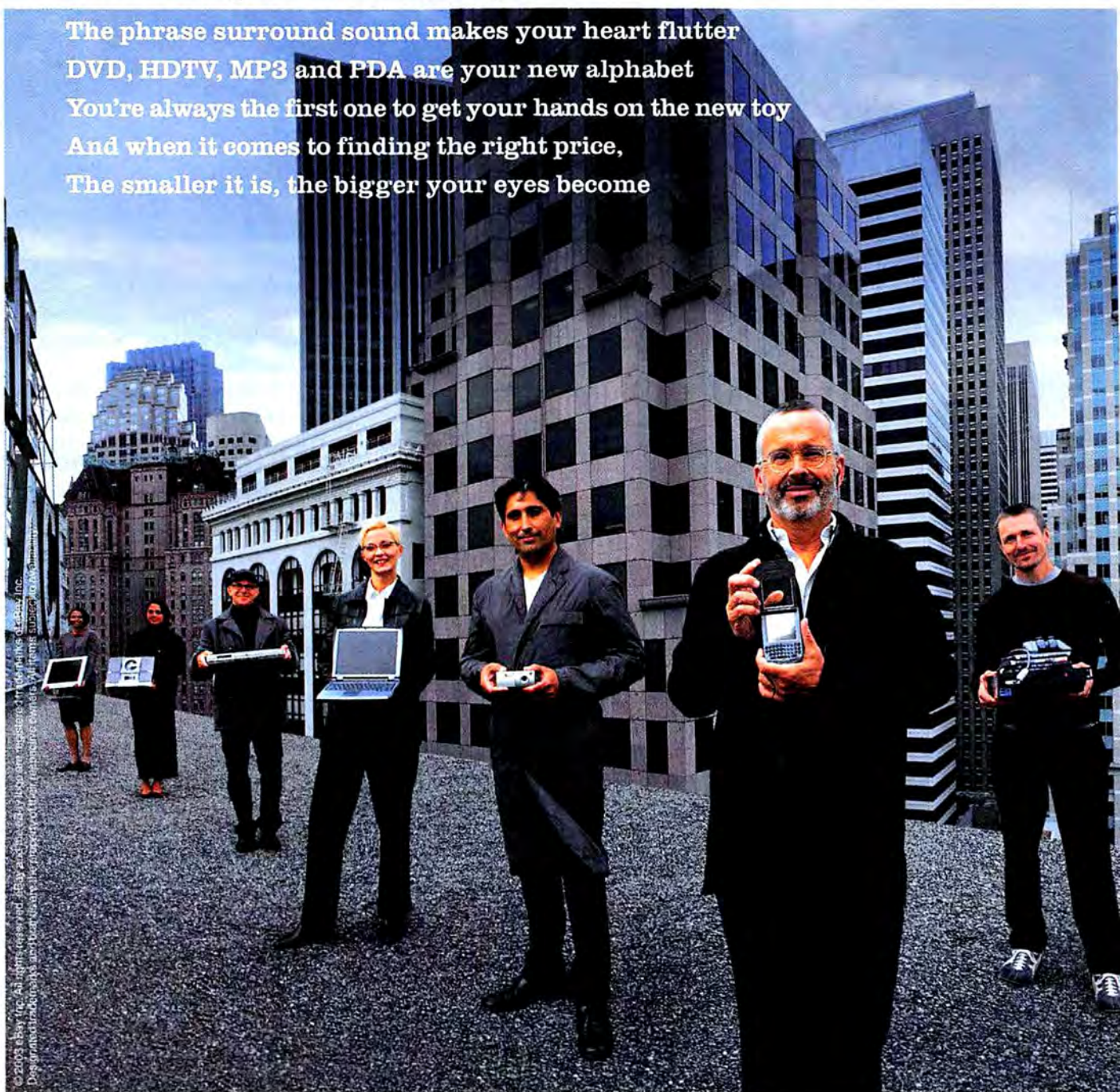
The phrase surround sound makes your heart flutter

DVD, HDTV, MP3 and PDA are your new alphabet

You're always the first one to get your hands on the new toy

And when it comes to finding the right price,

The smaller it is, the bigger your eyes become



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## MANES'S VIRUS

STEPHEN MANES [Full Disclosure, July] mentions a virus that Norton AntiVirus couldn't find on his computer. I had a similar problem. On impulse, I ran the free virus scan available at [www.symantec.com](http://www.symantec.com). It found the virus (Klez), and I was then able to remove it using the corresponding Symantec removal tool.

Alan Fleischer, via the Internet

## TRIPPED BY INTERFERENCE?

STEVE FOX [Plugged In, July] describes the Federal Communications Commission's interest in broadband over power line to allow high-speed Internet over electricity lines. But BPL is likely to generate interference with radio communications using frequencies in the 1.7-to-80-MHz spectrum, used for police, fire, and military communications, among other things.

Such interference is a consequence of the laws of physics: Power lines' long stretches of elevated wires make effective antennas, while high-speed digital data streams generate radio noise.

Donald Chester, Woodlawn, Tennessee

## YOUR PHOTO KIOSK MAY VARY

JULY'S "One-Stop Digital Photography Guide" reviewed several printing options, including kiosks. I work in a Wal-Mart Photo Center that uses both Kodak's Picture Maker and Fujifilm's Aladdin. Overall, I agree with your opinions, but I noticed some omissions.

The comparison chart lists the Picture Maker as printing out 8.5-by-11-inch sheets only. However, some models of the Kodak machine include a small-format printer for 4-by-6 prints. These prints are of higher quality and are one-tenth of the price of an 8.5-by-11 sheet. Also, the article lists the Aladdin as a direct-print kiosk only. In Wal-Mart, the Aladdin is networked to a Fujifilm Frontier minilab machine via a Photo Imaging Controller.

Chris Brooke, via the Internet

**Editor's response:** Our findings were based on our kiosk visits. None of the shops we saw had the Kodak 4-by-6-print option or a networked setup for the Aladdin service.

—Grace Aquino

## XP PATCH CONFUSION

YOUR ONLINE "Bugs and Fixes Update" ([find.pcworld.com/35435](http://find.pcworld.com/35435)) hit the nail on the head. My most recent experience with XP's service patches involved a new computer I had installed at the office. System performance degraded 23 percent after I installed every one of the "critical updates" at the Windows Update site.

I strongly recommend that Microsoft listen to what its customers are saying. Telling us that nothing's wrong—and that the problem isn't widespread—is every bit as dumb as telling the Emperor that his new clothes look just fine, when in fact, he is as naked as a jaybird.

Ed Poplin, via the Internet

**Editor's note:** To contact Microsoft on this problem, see *Bugs and Fixes* on page 65.

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

## CORRECTIONS

IN AUGUST'S *Top 10 Hard Drives*, the model number of the first-place Maxtor DiamondMax Plus 9 should have been listed as 6Y120PO.

July's *News & Trends* articles covering AMD's Athlon XP 3200+ CPU and NVIDIA's GeForce FX 5900 Ultra graphics chip should have cited Unreal Tournament 2003 as one of our test games.


In July's "Best of 2003," the page-per-minute output speeds for printers were based on PC World's tests for the *Top 10 Printers* charts, not on vendors' rated speeds. The 5.5-ppm color mode figure for the Oki Data Oki C7300n refers to our graphics speed test, which uses three color documents out of four.


In July's *Top 10 Printers*, the rated speed for the Canon i450 Color Bubble Jet Printer should have been listed as 18 ppm monochrome/12 ppm color.


July's *New Products* review of Corel's WordPerfect Office 11 Standard should have noted that the Presentations 11 program in the suite no longer provides a graphics previewing feature.


PC World regrets the errors.


## Things to know when you do it eBay

 eBay is a great place to get great deals on anything electronics related. You'll find all the top brand names and save up to 40% on retail prices.

 **Buy It Now** Don't want to bid on an item? If the thing you want has the "Buy it Now" icon next to it, you can buy it right away without waiting.

 **New** Thousands of brand new items are being bought and sold here everyday. With eBay, you have a choice of new, used and collectible items.

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# PLUGGED IN

STEVE FOX

## Tiny Gadgets to Get a Storage Boost

Plus: Microsoft Office changes labels, AOL attacks spam, and watches get wired.



### 1.5-Gig Storage for Less

**The Buzz:** Tiny MP3 players and other consumer devices are about to get cheaper, courtesy of an embedded storage device from Colorado start-up Cornice. Roughly the size of an After Eight mint (or IBM's competing, much more expensive Microdrive), the inexpensive Cornice Storage Element draws little power, is highly shock-resistant, and holds 1.5GB. Cornice-based MP3 players from RIO, IRiver, Thomson, and others should be available soon. Music gadgets are just the start: Video devices are on the way, and South Korea's Digitalway is readying a small USB storage device that should cost half as much as today's flash options.

**Bottom Line:** You can never be too thin or have too much storage. Being really cheap doesn't hurt either.

### 2 An Office by Any Other Name

**The Buzz:** It's not just Microsoft Office anymore. The upcoming sequel now bears the ponderous label Microsoft Office System. Word, Excel, PowerPoint, Access, Publisher, and XML-document builder InfoPath are available in mix-and-match packages. If you want Visio, Front-

Page, or handy note-taking app OneNote, you'll have to buy them separately. A staggering 600,000 beta testers have been pounding the code for a while, and response has been enthusiastic.

**Bottom Line:** So now I have to install a "system" on my system. What ever happened to plain old software?

### 3 AOL Gets Optimized

**The Buzz:** Apparently "9.0" didn't have enough oomph. So this summer's upgrade to the world's most popular online service (for which *PC World* provides some content) is being dubbed AOL 9.0 Optimized. The new version focuses on security and spam, adding word-specific and "learning" junk-mail filters, plus stronger parental controls. A revamped mail interface and 20MB of storage on AOL servers round out the offering, while animated "SuperBuddy icons" (don't ask) should appeal to the chat crowd.

**Bottom Line:** I guess we really need the junk-mail filters, since almost half of all e-mail in the U.S. is from spammers. The other half? From the 34 million AOL subscribers complaining about spam.

### 4 Watch Hits the Spot

**The Buzz:** High tech meets high design this fall when Fossil and Suunto unveil connected wristwatches powered by Microsoft's Smart Personal Objects Technology (SPOT). (Alas, my competing Dumb Impersonal Things Standard has been passed over once again.) For \$150 to \$250—plus \$10 per month (or \$59 for the year) to cover the MSN Direct Band Network service—subscribers in 100 metropolitan areas can get customized weather, news, stock quotes, traffic, and messages beamed directly to their wrists. And these babies even tell time: SPOT watches sync up with an atomic clock so you'll never be a nano-second late. Unable to resist the obvious, Fossil has a Dick Tracy version in the wings, as well as a model from international design guru Phillipe Starck slated for 2004.



**Bottom Line:** Right. Like this isn't the first step in Microsoft's bid to create a new standard for time. ■

Contributing Editor Steve Fox covers buzz-worthy products, ideas, and trends. Contact him at [steve\\_fox@pcworld.com](mailto:steve_fox@pcworld.com). Visit [find.pcworld.com/31643](http://find.pcworld.com/31643) for more Plugged In.

## NAGGING QUESTION

### Should I Turn My PC Off at Night?

FORGET PC VS. MAC. This is the real debate for hard-core techies. The current prevailing wisdom: Turn it off. True, switching a computer on and off causes some degree of wear and tear, which over many years could lead to a malfunction. But by then, you'll probably be ready to buy another



PC anyway. As important, according to Steve Ryan of the EPA's Energy Star program, is enabling your monitor's energy-saving features so that your screen powers down when not in use. Combining these two strategies will save you money and benefit the environment to boot.



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# CONSUMER WATCH

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OUT OF YOUR PC**

**ON YOUR SIDE: FUNDS  
FROZEN IN PAYPAL**

**PRIVACY WATCH: SHAR-  
ING MORE THAN MUSIC**

## Are You Helping a Spammer?

Bad guys can hijack your PC and use it to transmit trash with impunity.



YOU'RE A RESPONSIBLE citizen, right? You wouldn't offer a lift to a fleeing bank robber. You wouldn't share inside information about your company with a stock-speculating domestic goddess. You probably wouldn't even help a slumping big leaguer cork his bat.

But you may be unwittingly helping spammers fling their annoying and often obscene come-ons all around the Internet. And the danger isn't just that you're helping to perpetuate some get-rich-quick scams—you may also get saddled with loads of problems if a junk mailer suc-

cessfully sets up shop inside your PC.

According to many experts, it's fast becoming standard operating procedure for spammers to "hijack" unsuspecting users' PCs and steal their hardware and network resources to send unsolicited e-mail. The practice is "absolutely epidemic," says Robert Arnold, an abuse investigator at EarthLink. "We block thousands of [hijacked PCs] that are generating spam every day. And when it does happen, most [victims] are completely unaware that anything's wrong."

Spammers aren't the only culprits,

either: Researchers recently said that hackers were using similar hijacking techniques to use innocent people's PCs for hosting pornographic Web sites.

Spammers get into people's systems by exploiting holes in the intricacies of network settings that few users worry about. The wrongdoers may find these vulnerabilities already in existence on your system, or they may get you to download a virus that creates a security breach in your PC. Antivirus researchers, for instance, say this summer's Sobig virus was likely created by spammers as a way to gain access to people's machines. Once spammers locate or create a hole, they're in business. And while your machine is sending out thousands of bogus stock tips or invitations to view bizarre versions of animal husbandry, you may notice nothing more than a slight slowdown in your Internet connection.

### COVERING THEIR TRACKS

WHAT'S IN IT for spammers? Protection against efforts to shut them down. As the pressure to stop unsolicited messages increases, ISPs are closing spammers' accounts more quickly. So spammers are routing their e-mail through computers owned by unsuspecting Net users, making it almost impossible to track down and stop the real "herbal Viagra" sellers.

Though the junk mailers get a new lease on life, the people whose systems they use get nothing but trouble. You could end up on a blacklist and have your legitimate e-mail messages blocked by ISPs trying to stop the spread of spam. You'll probably get a stern talking-to from your ISP and have to change some ►





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## ON YOUR SIDE

## Locked Out of a PayPal Account

**P**AYPAL FROZE almost \$20,000 of my funds without reason. In spite of my faxing the company copies of my credit card statement, bank account statement, driver's license, and utility bill, PayPal still did not give me access to my account. Every time I called PayPal's customer service, the reps would tell me only that my account is under investigation, nothing else. When I asked how I could fix the error, they had no useful advice whatsoever. Can you help?

*Sanjay Amin, Youngstown, Ohio*

**On Your Side responds:** I contacted PayPal spokesperson Amanda Pires on Amin's behalf. Pires says that "PayPal limits a member's access when there is unusual activity on the account." Company reps try to explain to members why this is occurring, Pires adds, but they always use discretion in case there is actual fraud. For

Amin, however, the reps did not provide sufficient information to help him understand and fix the situation. PayPal ultimately restored Amin's account within a few days, and Amin now says he is happy with PayPal's handling of the situation.

When an account has been limited, PayPal asks the member to follow a few steps to verify the account information. After that, access to the account should be restored, but occasionally PayPal requires additional steps, which is what happened to Amin. "We tell members that we need to review some items and will get back to them," says Pires. "If account members have any questions during the process, we encourage them to e-mail or call us."

For additional tips on how to keep a PayPal account safe, visit the Security Center area at [www.paypal.com](http://www.paypal.com).

—Grace Aquino

network settings to safeguard your system. And it's possible your system could be damaged by the spammer's use of your network, processor, and drives.

In many cases, spammers gain access to individual systems by taking advantage of open relays or open proxies, which are basically security vulnerabilities in your mail server or in the software that allows several PCs to share an Internet link. Here's how open relays and proxies work:

When you send e-mail on a secure mail server, such as that of an established ISP, the server checks your password or IP address to make sure you're an authorized user before sending your mail. In an open relay (also known as a third-party or insecure relay), the mail server will process any e-mail message, regardless of whether it's to or from an authorized user. A spammer who acquires the IP address of an insecure mail server can simply tell the server to send junk to any user on any mail server at any domain.

Most users don't have to worry much about open relays, as long as they're using an established ISP with secure servers. If you're not sure about your service pro-

vider, check its Web site or contact the support department; ISPs should always provide publicly accessible policies that outline their security precautions.

But if either you or your business is running its own mail server, you could be at risk of having an open relay. Check with the maker of your mail server software to be sure that your server is properly and securely configured.

## PROXY DANGER

PROXIES ARE MOST often found in academic networks or in a home or small-office system with a broadband connection. Proxy software allows PCs within a network to share an Internet connection and be recognized with the same IP address. Open proxies, though, will accept and process requests from users outside the network they serve—putting out the welcome mat for spammers who want to hide their true IP address.

If you use Windows Internet Connection Sharing, or if you share your broadband connection via a standard gateway from a company such as D-Link or Netgear, you probably have no cause for ►

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concern. Open proxies generally result from having a proxy application, such as AnalogX Proxy, that has not been properly configured. Unless you are an experienced network administrator, it isn't always clear how to secure such software so that it will allow connections only from local network users.

Spammers don't need to be particularly savvy to find open relays and proxies: Plenty of readily available scanners and automated applications do nothing but scour the Web looking for openings. These tools enable a spammer to effortlessly get all the information necessary to infiltrate someone's machine.

As if that were not enough, however, some spammers now gain access to PCs by duping users into installing virus-

## "Home network security is like a sieve...be vigilant."

—EarthLink's Robert Arnold

laden applications through peer-to-peer file-sharing sites such as Kazaa. These viruses can install open proxies on otherwise secure systems and set up e-mail generators that surreptitiously exploit the victim's resources to foist a steady stream of spam on other people.

Most users learn that their systems have been invaded only if their ISP traces the spam back to their computer and noti-

fies them. EarthLink's Arnold says most hijack victims are surprised to hear that they've been targeted, but readily cooperate to close security holes.

In an effort to tighten security, some ISPs, such as the broadband provider Road Runner, routinely do probes of subscribers' connections, attempting to identify network holes and vulnerabilities. While you probably don't need to fret about Road Runner techies getting access to your personal information via a probe, there's something unnerving about the idea of your ISP actively trying to find a way into your hard drive—even in the name of keeping the troublemakers out.

Probes, whether they're from the good guys or the bad guys, won't be a problem if you make certain your system is ►

### PRIVACY WATCH

## The Danger of Too Much File Sharing

IF YOU TRADE RARE jazz tracks on a free file-swapping service, you need to worry about more than just the wrath of the recording industry: You could inadvertently end up sharing sensitive information, like passwords or tax returns, with other users.

That's exactly what happened to "Bob" (not his real name), who wrote to [privacywatch@pcworld.com](mailto:privacywatch@pcworld.com) to ask about an e-mail message he'd received. Bob uses the BearShare file-sharing tool regularly to trade music and other files online. The message he received told him that "a large number of what appear to be your personal Excel and Word documents are being made available for public consumption."

Bob was stunned by the message and asked me in his letter, "Is it really that easy for someone to access my machine and read all of my files?"

You bet it is, Bob. I contacted the cyber-Samaritan who wrote to Bob, Charles F. Sage, and he confirmed that he'd found a lot more than music when he turned off a BearShare feature that filters out files other than music tracks or video clips. Sage searched BearShare's network for files labeled 'passwords' and found ten spreadsheets full of them. And his search for files called 'tax' yielded six completed TurboTax files.

Here's how you can protect your private information if you use the BearShare, Kazaa, or Morpheus services.

**BearShare:** By default, the program shares all folders that contain image or music files (with the exception of the Program Files and

Windows folders). Click **Setup•Folders** to bring up the shared folders list, which looks like a Windows Explorer panel. A red check mark in the box to the left of a folder means all of that folder's contents are shared; a box highlighted in a red border means that the folder is not shared in its entirety, but one or more subfolders is. Create a folder that will contain all your shared files, put your music

or video there, and share only that folder. Never share your entire hard drive.

**Kazaa:** Anything you put in C:\Program Files\Kazaa\My Shared Folder is available for other users to download, by default. But you may be sharing other folders as well. To check what you've made accessible, click **Tools•Find Media to Share** to bring up the File Import tool. Click the **Folder List** tab to pull up a dialog box that looks almost exactly like BearShare's. Then uncheck the box next to any folder that contains files you want to keep to yourself.

**Morpheus:** Click the icon that looks like a wrench, directly below the traffic button. In the Properties window that appears, click **Share** in the left pane to bring up the list of shared directories. The default shared directory is C:\Program Files\StreamCast\Morpheus\My Shared Folder.

**One last tip:** Many of these types of programs continue running even if you close their main window. To completely disconnect from a file sharing service, make sure that you right-click the application's icon in the system tray and then select **Exit**.

—Andrew Brandt





secure. Suppose you have a home office with DSL or cable modem broadband access and a wireless network. You use spam filters, regularly update your virus protection software, and even have a firewall to protect your network. Does that mean you're safe from spammers and their nefarious deeds? Not necessarily, according to Arnold. "Home network security is like a sieve, and there are a lot of infected computers out there. Spammers are constantly disguising their tools and rotating locations. In this Internet climate, you should always be vigilant."

Stay current with all available vendor security patches, especially for your operating system and browser; security experts say that you can avoid most network intrusions by installing updates when they become available. (For news on the latest security holes and patches, read *Bugs and Fixes* each month.)

As always, be extremely discerning about opening e-mail file attachments. If you use a file sharing application, you're playing with fire—be extra cautious when downloading files, and limit the directories you share. (See this month's *Privacy Watch* for tips on sharing files safely.)

And finally, if you're serving as your own network administrator and aren't sure about whether your security settings are sufficient, consult an expert. Web sites such as Mail Abuse Prevention System ([mail-abuse.org](http://mail-abuse.org)) have tools to test your system for security glitches and offer advice on how to beef up your settings.

To learn more about controlling spam and protecting yourself against hijackers, visit the Coalition Against Unsolicited Commercial Email ([www.cauce.org](http://www.cauce.org)), Junkbusters ([www.junkbusters.com](http://www.junkbusters.com)), or [spam.abuse.net](http://spam.abuse.net). You'll be helping yourself—and maybe just about everyone else who has an e-mail in-box. ■

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

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# Three Questions Other Memory Providers Hope You'll Never Ask...

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*"As the official factory outlet for Micron Technology's RAM-manufacturing facilities, (Crucial) offers near-wholesale pricing for a broad array of top-quality memory modules...you have to wonder why anyone would buy memory anywhere else."*

— Computer Shopper magazine

## Do you actually make the memory you sell?

**WARNING!** Listen carefully to the answer when you ask this question. Other memory companies claim to manufacture memory, too. What they actually do is assemble the memory chips made by someone else into memory modules. Ask them this: Do you make the chips that go on your memory modules? The chips are the important part, after all.

Crucial is the only memory upgrade supplier that's part of a major DRAM manufacturer, Micron. We actually make the chips that go on the modules.

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Prices may vary according to specific system requirements. The price listed was valid on 7/7/03 when we sent this ad to the publisher; however, prices may have dramatically increased or decreased since then. Visit the FAQ section of Crucial.com to learn more about why memory prices go up and down.

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# HOME OFFICE

STEVE BASS

## Must-Have Free Utilities Catalog 2003

This year's collection of the ten best no-cost tools delivers PC speed and safety.

**FREE UTILITIES** are a dime a dozen (maybe my math's a little faulty), but the keepers—the ones you'll use forever—are worth a million bucks. The ten freebies from this year's Bass & Roebuck catalog speed your PC, protect your browser, and let you work smarter. Go to [find.pcworld.com/36242](http://find.pcworld.com/36242) to download the lot.

**Blast browser hijackers:** Javacool's Browser Hijack Blaster protects Internet Explorer from stealthware that tries to change your home, default, or search page—or otherwise lead your browser astray—without your knowledge or permission. The tool runs in the background and alerts you to changes. It also lets you revert to your original settings and breathe easy again.

**Predict a hard drive's demise:** Some day your hard drive will fail, guaranteed. HDD Health 2 from PanteraSoft increases the odds that you'll know when it's about to happen so you can herd all your files to safety beforehand. The utility uses Self-Monitoring, Analysis, and Reporting Technology (SMART) to send data about your drive's performance to your PC's BIOS. It also alerts you via pop-ups and e-mail when your drive is about to become a doorstop.

**Pedal to the CPU metal:** If you use an Intel processor, run Intel's Application Accelerator 2.3 to quicken the delivery of data from your hard drive and other system-level components to your CPU. It also speeds booting and program launching. Use Intel's Chipset Identification Utility first to determine your PC's chip set, and then download the matching AA utility.

**Cure IE toolbar chaos:** You're merrily traipsing around the Internet when suddenly your Internet Explorer toolbar is

jumbled. The address bar, links, and buttons have all changed places. Put your IE toolbar back in order, and then save those settings with Toolbar Chest. The next time the toolbar gets hosed, smile as one click prompts the utility to restore it.

**Flash on, Flash off:** Many of those blinding Macromedia Flash ads defeat my ad and pop-up blockers—but they can't beat



TurnFlash, a no-nonsense tool created by Nir Sofer that toggles Flash on and off by changing a Registry setting. I keep Flash on until I hit an annoying site; then a quick click of TurnFlash's blue circle in my system tray disables Flash. Another click and Flash is back in a flash, er, jiffy. Just double-click the program's tflash.exe executable file and its blue icon appears in your system tray, ready to toggle. If you close IE with Flash off, you have to restart TurnFlash and toggle Flash back on to get animations to play in your browser again. You can avoid this little dance by loading the utility into your Start Group.

**Purity in motion:** Use Steve P. Miller's PureText to dispose of the formatting, HTML coding, and other baggage that tags along when you paste text from e-mail, Web sites, and readme files into other applications. Just copy material to

the clipboard and click the PureText icon in your system tray to get spiffy text ready to paste. Or create a hot-key combination in Word (or some other program)—<Windows>-V, for example—to purify and paste the text in one step.

**Word fields revealed:** Bill Coan's Hidden File Detector is an add-on for Microsoft Word that tracks down linked files and hidden field codes in a Word document.

The program adds an icon to the Word toolbar for fast access. I find it handy for ferreting out, say, embedded graphics. For more of Bill's cool Word tools, browse to [www.wordsite.com](http://www.wordsite.com).

**Move Outlook and OE to the system tray:** Kick your open Outlook or Outlook Express windows out of the taskbar and into the system tray by using Hide-Outlook and HideOE from R2

Studios. These apps let you open a program to compose an e-mail message, write a note, or jot down an appointment with one click of the system-tray icon.

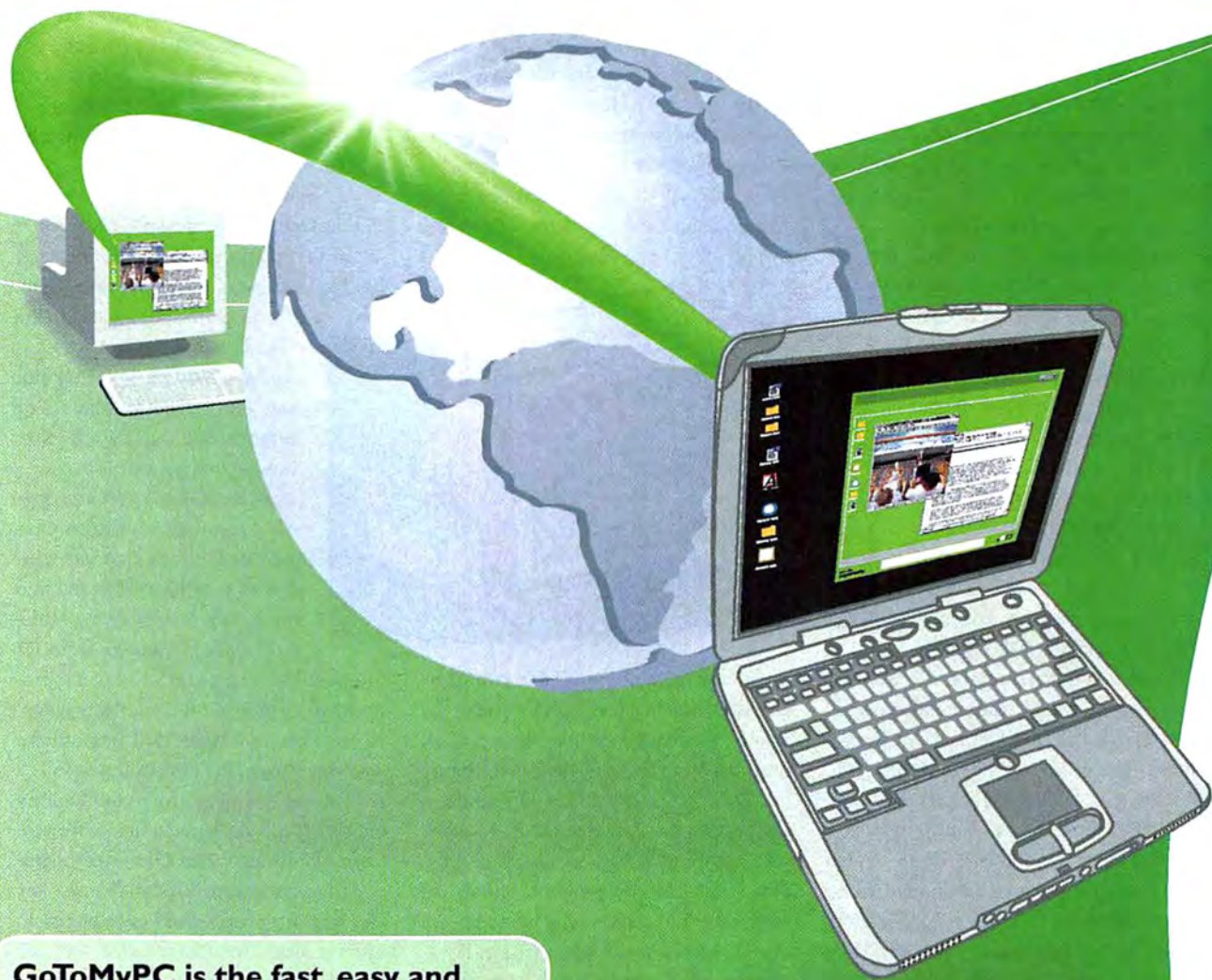
**Faster Web browsing:** I like to keep my hands on the keyboard when I browse. Chime Software's Hot Chime keyboard-macro utility lets me hit the <Pause> key and type in a preselected key or phrase to open a site. Hot Chime also lets me launch my favorite apps from the keyboard. A more powerful keyboard-macro utility is ActiveWord Systems' ActiveWords, which is available in \$20 basic and \$50 Plus versions. Go to [find.pcworld.com/36245](http://find.pcworld.com/36245) to read about it. ■

*Contributing Editor Steve Bass runs the Pasadena IBM Users Group. Contact him at [homeoffice@pcworld.com](mailto:homeoffice@pcworld.com). Visit [find.pcworld.com/31610](http://find.pcworld.com/31610) for more Home Office columns.*



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# BUGS & FIXES

STUART J. JOHNSTON

## Browser Patch Keeps Intruders Out

Plus: The new Windows 2000 service pack can clash with Symantec software.

EVER HEARD OF the movie *Piranha*? Not too long ago, I stumbled on this bad 1978 sci-fi flick, which tells the story of a secret laboratory out in the boonies that raises genetically mutated piranhas. The fish accidentally escape from the tank into a local swimming hole. Predictably, mayhem ensues.

Images from the movie came floating into my head as I researched the latest batch of Internet Explorer flaws for this month's column. While you probably don't have to worry about being eaten the next time you go for a quick dip in a mountain stream, holes in IE could let a bad guy unleash the Web equivalent of piranhas—code that could leave data on your machine all chomped up.

Of course, I'm exaggerating a bit. Like most browser flaws, the latest threats are theoretical. To plug the holes, Microsoft has released a cumulative



patch for IE versions 5.01 through 6.0. It fixes all previous security problems and two newly discovered ones.

The worst part about the new holes is that you can be attacked merely by visiting a miscreant's Web site, or by clicking a link in an infected HTML e-mail message. Once set loose, the attacker's code could eat away at everything on your hard drive.

One flaw is a *buffer overflow* or *overflow* hole, and the other is a *flooding* vulnerability. They are two of today's most common types of security weaknesses.

A buffer is where a program stores information until it's needed. If you stream video over the Web, for instance, your video app uses a special place in your PC's memory to store data until enough has been downloaded to begin playing the video. To cause an overflow error, a bad guy sends a particular buffer more data than it can hold. When it overflows, the attacker's code escapes into the rest of your PC's memory and begins executing—now the scoundrel can do anything on your PC that you can do. That's bad news.

The flooding vulnerability is similar. In this scenario, an attack program could send IE too many file download requests at once. You might experience an overpowering number of pop-up ads, say. Then, as in a buffer attack, the hacker's code executes without any system code to stop it.

Head to [find.pcworld.com/36449](http://find.pcworld.com/36449) for a link to download Microsoft's patch. ■

*Stuart J. Johnston is a contributing editor for PC World. Visit [find.pcworld.com/31580](http://find.pcworld.com/31580) to see more Bugs and Fixes columns.*

### IN BRIEF

#### Printing Problems

IF YOUR PC runs Windows XP or 2000 and you try printing using a printer connected to a parallel (LPT) port, you may find that other apps hang. Microsoft doesn't think that this is a problem, nor has it plans to fix the issue. Instead, as explained at [find.pcworld.com/36461](http://find.pcworld.com/36461), the company suggests that you use a USB port or a USB-to-parallel adapter.

#### Got XP Blues?

IN THE LAST month, at least 100 readers have written to me about PC performance problems brought on by Windows XP's service pack 1 (see [find.pcworld.com/36452](http://find.pcworld.com/36452) for details about the maddening situation so far). Contact Microsoft via [mswish@microsoft.com](mailto:mswish@microsoft.com) or use its template at [find.pcworld.com/36458](http://find.pcworld.com/36458) to submit your SP1 complaints. We can't guarantee that anyone in Redmond will listen, so please continue to write to [bugs@pcworld.com](mailto:bugs@pcworld.com).

### BUGGED?

FOUND A hardware or software bug? Tell us about it via e-mail at [bugs@pcworld.com](mailto:bugs@pcworld.com).

### NEW SERVICE PACK FOR WINDOWS 2000

SERVICE PACK 4 for Windows 2000 provides nearly 700 bug fixes and security patches. One fix, for example, eliminates a problem involving some USB keyboards with PS/2 mouse ports that caused Windows 2000 PCs to take up to an hour to start. Go to [find.pcworld.com/36506](http://find.pcworld.com/36506) for a link to the service pack.

Be warned: The service pack may clash with Symantec's Norton Internet Security 2001 or Norton Personal Firewall 2001. You may not be able to access the Internet. However, if you've run Symantec's LiveUpdate since June 27, you shouldn't experience the problem. Go to [find.pcworld.com/36509](http://find.pcworld.com/36509) for Symantec's advisory.



# Gimme Shelter!

## [ The mandate to secure data in an insecure world ]

### SECURITY

There is no question that several forces are at work creating increased demand for data security. For example, the very nature of business information systems is changing, such that vital corporate data is increasingly accessed not only by employees but also by partners, customers, and suppliers.

This means additional security measures must be implemented to insure the integrity of the data and the authenticity of the people seeking to access it. Additionally, there are socio-political pressures, such as the climate of international terrorism, boosting the demand for data security.

Even home users and hobbyists are at stage-one alert about the security of their data and computing resources. Managers know full well that the increasing reliance on the Internet to move vast sums of sensitive data and information has heightened awareness of and sensitivity to data security. Not surprisingly, even in the recent down economy, data security spending continued to grow, and often in a very robust way.

Notwithstanding the billions of dollars companies spend on data security every year—often to guard against sophisticated hackers—vital information often falls into the wrong hands, and through very unsophisticated means. One of the most common such means is the simple act of an unauthorized person viewing on-screen data surreptitiously from a side angle.

### A practical, affordable solution

This kind of data snooping can be a particularly serious problem in certain organizations for which recent

federal government regulations mandate that personal information remain confidential. For example, the Health Insurance Portability and Accountability Act (HIPAA) requires



### ■ 3M Privacy Filters can be mounted by the user literally in seconds.

that personal health information stays private; and the Gramm-Leach-Bliley Act strictly requires financial organizations to do everything in their power to protect the privacy of personal financial information.

Fortunately, there is a simple solution to a problem that can produce monumental headaches. Privacy Filters from 3M provide affordable, fast relief from the inadvertent or unauthorized viewing of on-screen data, for both desktop and laptop users. Screen data is visible



### ■ Privacy Filters work for notebooks as well as desktop computers.

only to persons directly in front of the monitor; unique 3M privacy technology blacks out data from a side view with no blurring or image distortion.

3M's unique privacy technology works like tiny vertical blinds, enabling only persons directly in front of the monitor to see the screen's contents. To a nearby snoop, the screen appears black, as if it's powered off. Although you can readily detach the filter—for instance, when you choose to share information with a small group—there's little reason to remove it, since it is lightweight and can stay in place when the notebook is closed.

Users can set the 3M Privacy

Filters literally in seconds, quickly mounting them onto a notebook or a desktop

screen using small plastic tabs or a hidden adhesive mounting system. For notebooks, the filters are available in the most popular laptop sizes: 14.1", 15.0", and 17.0". For desktop CRTs and LCDs, 3M offers models that fit 13-inch to 21-inch screens.

■ For more information, click on [www.3M.com/computerfilters](http://www.3M.com/computerfilters).

*Continued on page 3*

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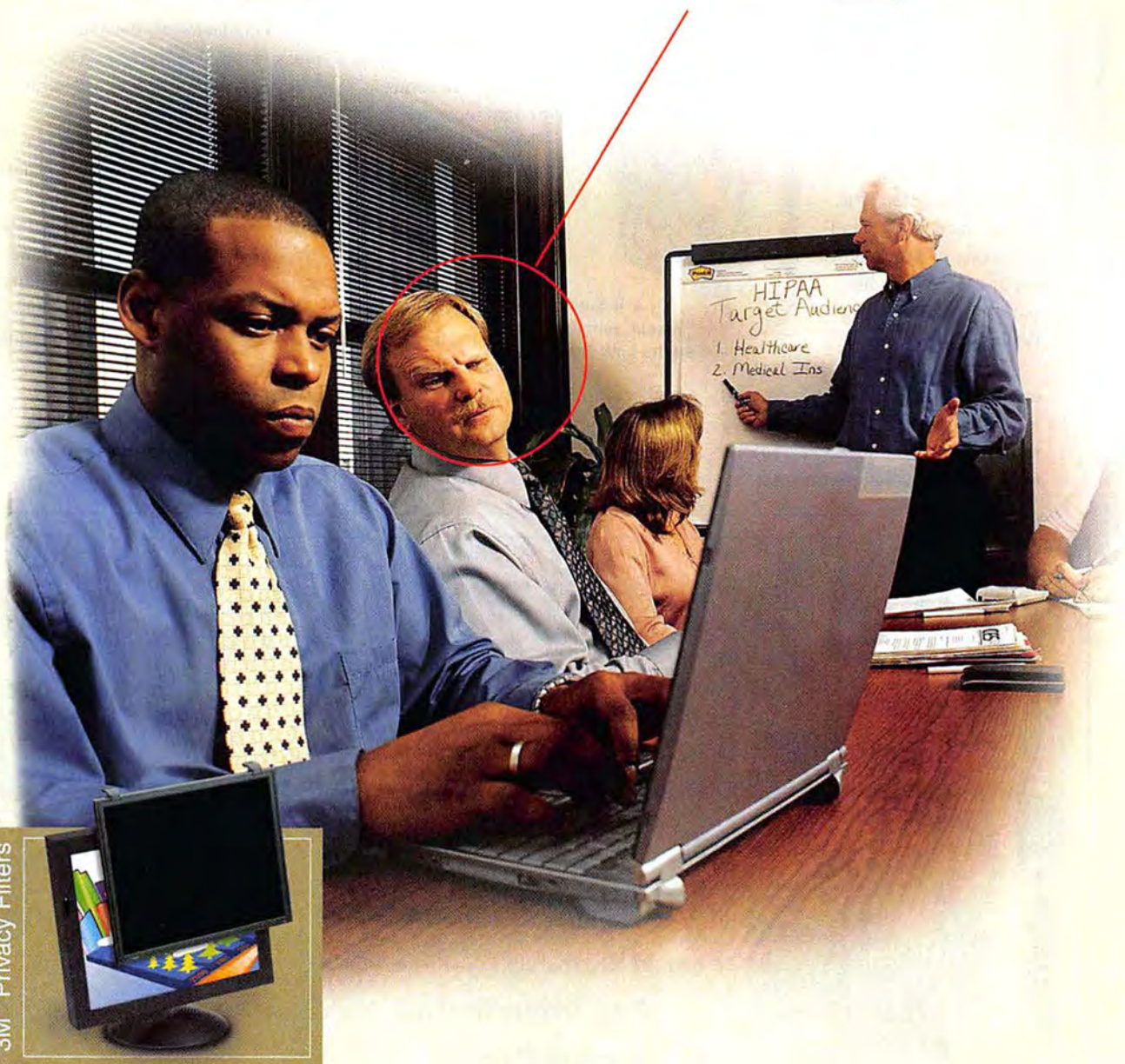
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# R-Tools Takes the "Oops" Out of Computing

SECURITY

There is no such thing as an error-free computer user, regardless of experience. And the most common errors even seasoned users make are either deleting important files or keeping unwanted or unnecessary data in storage. Fortunately, before you can say "Oops," there is R-Tools Technology Inc. ([www.r-tt.com](http://www.r-tt.com)), the leading maker of data recovery and undelete solutions for the Microsoft Windows environment.

The R-Tools' R-Studio data recovery utilities rescue data on both local logical and physical disks, and on remote disks over networks, regardless of whether their partition struc-

tures are damaged or deleted.

R-Studio includes support for RAID and dynamic disk and for recovering encrypted files, compressed files, and alternative data streams. Flexible parameters give users absolute control over data recovery.



▲ R-Studio will rescue your data, no matter how damaged.

Together with R-Studio, R-Undelete can create an image file of any object the two recognize—a very useful capability if there is a risk of total data loss

due to hardware malfunction. All data search, scan, and recovery can be done from this image.

R-Tools' R-Mail tool is designed to rescue inadvertently deleted email messages and to recover damaged \*.dbx files where folders with email messages are stored.

For users wanting to keep their disks free and clear of unwanted data, R-Tools offers R-Wipe&Clean. This highly useful tool irretrievably deletes private records of online and offline activities, including temporary Internet files, history, cookies, auto-complete forms and passwords, and other disk-clogging material.

■ Click on [www.r-tt.com](http://www.r-tt.com) for more information on these exciting and practical tools from R-Tools.

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# NEW PRODUCTS

EDITED BY TOM MAINELLI AND DENNY ARAR

## Loaded Little Laptops

New subnotebooks bulk up (ever so slightly) to improve performance and battery life.



SONY VAIO  
(left); Fujitsu  
LifeBook.

### NOTEBOOKS

ANYBODY WHO'S been on a successful diet knows how hard it is to keep the weight off. But when it comes to the latest ultraportable notebooks, their new gains are all muscle.

For example, the \$1699 Fujitsu LifeBook P5000 weighs in at 3 pounds, 14 ounces—half a pound more than its predecessor, the P2000 (see [find.pcworld.com/36572](http://find.pcworld.com/36572)). Most of the extra heft, however, comes from a larger lithium ion bat-

tery, which lasted 5 hours in PC World Test Center tests, versus 2.2 hours for the P2000.

Equally notable: My production P5000 scored 105 on PC WorldBench 4, almost twice the score of 53 for the Transmeta Crusoe-based P2000.

Fueling the P5000's pep are a 900-MHz ULV Intel Pentium M CPU, 256MB of RAM, a 40GB hard drive, and a combination 8X DVD-ROM and 24X/10X/24X CD-RW drive.

Fujitsu has addressed some of the P2000's weak points,

but it has also introduced a few new ones in the P5000. Designers wisely replaced the P2000's mispositioned right <Shift> key with a proper, wider one; but they went on to shrink the period, comma, and forward-slash keys—a move that's sure to cause typos.

Fujitsu's biggest misstep, however, involves the P5000's display. Though it looked remarkably sharp under average

office lighting, the screen was completely washed out under bright sun or fluorescent light.

Sony's \$2200 VAIO PCG-TR1A, the evolutionary offspring of the discontinued sub-3-pound

C1 PictureBook and SRX Series notebooks, offers an exceptionally high-quality display. Unfortunately, it suffers from the same reflection problems as the Fujitsu.

The 3.2-pound preproduction unit that I tested came with the same Intel processor as the Fujitsu, as well as 512MB of RAM, a 30GB hard drive, and a fixed internal 8X DVD-ROM and 8X/4X/24X CD-RW combo drive.

As with the older PictureBook, Sony throws in a 640-by-480 VGA swivel camera, built in to the top of the PCG-TR1A's screen. If you're the rare bird who uses a notebook for videoconferencing, the camera may be a boon, but for most users the novelty will likely wear off quickly (it lasted about 5 minutes for me).

Based on the same processor as the Fujitsu, the PCG-TR1A scored a comparable

### Compaq Nc4000

Hewlett-Packard

★★★★☆

Powerful, but lacks optical drive; IT buyers will like it anyway.

List: \$2099

[find.pcworld.com/36584](http://find.pcworld.com/36584)

### LifeBook P5000

Fujitsu

★★★★☆

Solid performance and battery life, but overly reflective screen.

List: \$1699

[find.pcworld.com/36578](http://find.pcworld.com/36578)



**72 SUBNOTEBOOKS**

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78

**TEST REPORT**

## Latest Subnotes: More Performance, More Weight

PENTIUM M-BASED units yield strong scores, but are a tad heavier than earlier models.

SYSTEM	Processor	Memory	Weight (pounds)	PC WorldBench 4 score	Battery life (hours:minutes)
Fujitsu LifeBook P5000	900-MHz ULV Intel Pentium M	256MB	3.9	105	5:01
HP Compaq Business Notebook Nc4000	1.6-GHz Intel Pentium M	256MB	3.7	122	3:23
Sony VAIO PCG-TR1A	900-MHz ULV Intel Pentium M	512MB	3.2	104	3:54



**HOW WE TEST:** The HP and Sony systems ran Windows XP Professional; the Fujitsu notebook ran Windows XP Home. All machines were tested with PC WorldBench 4, PC World's applications-based benchmark; a higher score is better. Tests developed and conducted by the PC World Test Center. All rights reserved.

104 on PC WorldBench 4 (although the Sony had double the RAM). The Sony's smaller, lighter battery trims weight from the unit, but it lasted just 3 hours, 54 minutes (average for a notebook of this size).

At 3.7 pounds, the double-branded **HP Compaq Business Notebook Nc4000** weighs about the same as the Fujitsu and Sony systems but packs a larger display and a faster Intel processor. HP calls the \$2099 Nc4000 an ultraportable, but its more corporate-friendly design lacks an integrated optical drive, which means that prospective buyers should also

consider it against similarly configured business units such as IBM's ThinkPad X31.

Since the Nc4000 lacks an integrated optical drive, you'll need to buy both a \$79 external MultiBay and an optical drive of your choice. My preproduction unit came with a \$219 8X DVD-ROM drive; a combination DVD-ROM/CD-RW drive sells for \$299. The downside: The extras contribute another 1 pound, 3 ounces to the mix, for a total near 5 pounds.

The Nc4000 comes with a 60GB hard drive, 256MB of RAM, a full-size keyboard, a touchpad and pointing stick combination, and full compatibility with various HP docking stations. Of course, one of the most attractive features of the HP is its powerful 1.6-GHz Pentium M processor, which propelled it to a PC WorldBench 4 score of 122, making

it noticeably faster (about 16 percent) than the LifeBook.

One of the reasons that Fujitsu and Sony used ultra-low-voltage chips instead of standard Pentium Ms was to try to achieve better battery life. The HP ran for a modest 3 hours, 23 minutes, the shortest time of the three units.

Even though these three notebooks aren't as svelte as their predecessors, each of them will appeal to some portion of the subnotebook mar-

ket. On a price/performance basis alone, the Fujitsu LifeBook P5000 wins. Despite its screen-reflection problems, the machine delivered solid performance, amazing battery life, and plenty of amenities.

The built-in camera and high-tech styling of the equally loaded (but notably more expensive) Sony VAIO create a strong first impression that erodes slightly when you realize that some of its cooler toys aren't entirely useful.

And finally, though the HP isn't quite in the same design class as the Fujitsu and Sony systems, its excellent benchmark performance and corporate-friendly bent will likely win over IT buyers.

—Michael S. Lasky ■

**VAIO PCG-TR1A**

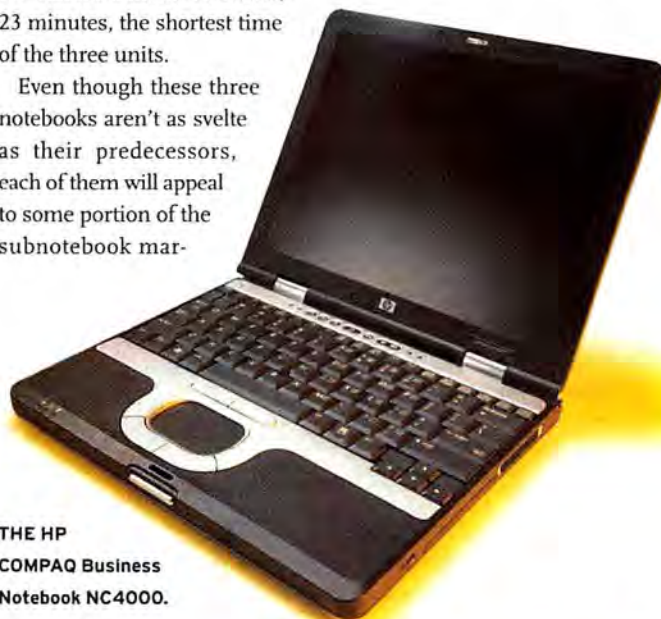
Sony

★★★★☆

Stylish pricey unit with a built-in camera has screen issues.

List: \$2200

[find.pcworld.com/36581](http://find.pcworld.com/36581)



**THE HP**  
**COMPAQ Business**  
**Notebook NC4000.**



# HP's Versatile New Office Assistant

## MULTIFUNCTION PRINTER

IF YOU'RE TIRED of spending time and money at the local copy shop, HP's reasonably priced **PSC 2175** can make your life easier—though it's less than perfect. This \$200, 8-pound, ink-jet-based all-in-one prints, scans, and copies in color; plus, it has a five-format flash-memory card reader. It does not, however, offer faxing capabilities.

My shipping unit produced business-worthy text, as well as graphics with rich color and

fine detail, especially on glossy photo paper. It prints only a little slower than the average MFP in our June roundup (see [find.pcworld.com/36533](http://find.pcworld.com/36533)).

Unfortunately, printouts of scanned images and text did not look as good as the print results we got from other digital sources. Images had jagged edges instead of curves, murkiness instead of detail, and too-saturated color. The quality of my scanned newsletter was also poor. What's more, the PSC 2175 took significantly longer to scan than other multifunction printers we've tested. For example, it posted a scan time of 51 seconds on a Microsoft Word test page that the \$100 Lexmark X75 Print-Trio finished in 31 seconds.

If you're looking to save

time, the PSC 2175's flash-media card reader lets you bypass your PC altogether and instead use a proof sheet to select the images you want. The prints I made by using this method looked pretty good, though I preferred the slightly sharper look the same shots had when printed from HP's

Photo and Imaging software. (HP says that the 2175 does some automatic image processing when you print directly from the memory card.)

The PSC 2175 is a solid, appealingly priced choice for homes and small offices. If good-quality scans are important to you, however, consider a higher-end unit like Canon's \$400 MultiPass MP730.

—Rebecca Freed



HP'S PSC 2175 all-in-one.

## PSC 2175

Hewlett-Packard

★★★★☆

Affordable multifunction device prints better than it scans.

Street: \$200

[find.pcworld.com/36482](http://find.pcworld.com/36482)

# ZoneAlarm Gets Stronger

## PRIVACY SOFTWARE

ZONE LABS' ZoneAlarm has always been a reliable firewall, and the latest Pro version continues this tradition. In my informal testing of the shipping software, it easily fended

off port scans while simultaneously keeping a close eye on Internet-enabled applications.

You can download the basic firewall for free, but spending \$50 on **ZoneAlarm Pro 4** brings you extra bundled goodies that

block cookies, Web ads, browser pop-ups, and e-mail worms. Best of all, in my tests Pro 4's extra features did not cause any of the system problems some users experienced with its predecessor.

Beyond its fundamental firewall and blocking capabilities, Pro 4 of-

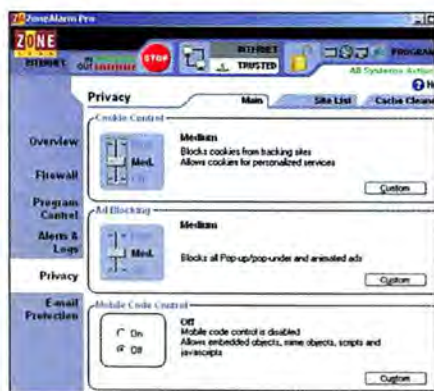
fers more tools for e-mail. In addition to the Inbound Mail-Safe feature that quarantines suspect e-mail attachments, Pro 4 includes a new, configurable Outbound MailSafe feature that stops mass-mailing viruses and worms by halting messages sent to more than 50 recipients, thwarting attempts to send more than five messages in 2 seconds, and warning you when an app other than your e-mail program tries to send a message.

These new features make Pro 4 a more robust privacy watchdog, but the program's Alert Advisor remains a weak spot. Meant to offer detailed information when Pro 4 detects a new application trying to access the Internet, Alert Advisor fails to identify most apps—even some that are well

known such as Netscape, let alone adware programs such as Ezula and Gator. Instead, the program offers generic advice, noting that if you (and ZoneAlarm) cannot identify an application, "it is safest to adopt a cautious strategy."

Still, Zone Alarm Pro 4 improves on its well-reviewed predecessors. A rock-solid firewall coupled with superior e-mail tools, it's a worthy upgrade and a strong addition to any privacy arsenal.

—Sean Captain ■



ZONE ALARM PRO 4 has privacy controls not found in the free version of the software.

## ZoneAlarm Pro 4

Zone Labs

★★★★☆

Reliable firewall has improved security and privacy apps, but omits needed advice at times.

Street: \$50

[find.pcworld.com/36527](http://find.pcworld.com/36527)



# Performance Art



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FLATRON Monitors: LCD • Flat Tube • ez Flat Tube



## ISight: See and Be Seen

### VIDEOCONFERENCING

APPLE HAS A gift for taking existing technologies and making them more simple and elegant to use—and that talent has never been more evident than with the company's new \$149 **ISight** Web camera. I tested the unit with the beta version of the company's IChat AV instant messaging program, and found it

#### ISight

Apple

★★★★☆

Web camera simplifies video chat with IChat AV, but Mac hardware requirements are strict, and it won't yet work on a PC.

List: \$149

[find.pcworld.com/36521](http://find.pcworld.com/36521)

remarkably easy to use. Unfortunately, Windows users can only watch for now: Both products are Mac exclusive.

The **ISight** looks cooler than other Webcams, with an aluminum exterior that matches Apple's new G5 desktops. My shipping unit, using one of the three included stands, perched easily atop my **iBook** notebook. The **ISight** connects via FireWire and requires at least a 600-MHz G3 processor, plus a broadband connection to transmit the video.

I downloaded the IChat AV beta (a final version of the software will ship later this year for \$30), installed the program, plugged in the camera, and instantly started video

chatting with a comparably Mac-equipped friend. No drivers were necessary. My two-year-old **iBook 600**, which met the minimum required specs, could muster only 15 frames per second—better than most video chat products, but still giving the impression of moving in slow motion. Apple says that chatters at each end need IChat AV and at least a 1-GHz G4 system to get television-quality, 30-fps video.

The autofocus **ISight** offers a good picture, and its built-in microphone captures sound well, though you can often hear a slight echo of yourself when chatting.

Currently, to fully utilize the **ISight**'s capabilities you need Apple's IChat program. However,

since the camera is built upon industry standards for video, PC compatibility may not be far off. With the right video-enabled chat client, both Mac and PC chatters could use this handsome piece of hardware for videoconferencing.

—Michael Gowan



APPLE'S  
SLEEK  
new **ISight**  
camera.

## GoToMyPC Gets Pocketed

### REMOTE SOFTWARE

FOR ANYONE WHO spends much time working without being at work, Expertcity's **GoToMyPC** can be downright addictive. This Web-based

remote-control service transforms any browser-equipped PC into a clone of your desktop back at the office. Just that easily, you have access to your applications, data, and local area network with speed and convenience.

Version 3 was one of our World Class award winners two months ago, beating out such worthy competitors as PCAnywhere and Timbuktu Pro for usability. **GoToMyPC 4**—a no-cost, automatic upgrade for current users—adds a number of tools that are designed to appeal to large organizations and to Pocket PC users.

I tested a shipping version of **GoToMyPC**

Corporate edition. The program's big-company features should help on-the-go workers convince recalcitrant IS managers that remote control isn't insecure or unmanageable.

Companies that roll out **GoToMyPC Corporate** to multiple users can require a password each time a user logs in, and they can employ RSA's SecurID technology for heavy-duty authentication. IS types can specify the features available to each employee and can run an array of usage reports. A new edition aimed at small companies, **GoToMyPC Pro**, includes a smaller set of management options.

Expertcity has also squeezed much of **GoToMyPC**'s functionality into **PocketView**, an included program for controlling a desktop PC remotely from a Pocket PC. **PocketView** was surprisingly snappy in my

tests, and it provides panning and reduce-to-fit modes. Unfortunately, maneuvering my system's 1152-by-864 desktop from a 240-by-320 screen was unwieldy in the extreme. But if Pocket PCs with beefier resolutions come along, **PocketView** may get a lot more interesting.

At \$20 a month (less for annual plans and volume purchases), **GoToMyPC** isn't dirt cheap. But as long as you're talking PCs—and not Pocket PCs—it's one of the slickest, most effective tools a mobile worker could hope to find.

—Harry McCracken ■

#### GoToMyPC 4

Expertcity

★★★★☆

Top-notch remote control gets more manageable, but Pocket PC viewer is too hard to use.

List: \$20 per month

[find.pcworld.com/36524](http://find.pcworld.com/36524)



**GOTOMYPC's** new **PocketView** lets you access your desktop from a Pocket PC.



# NAS

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# Money Goes Marketing



EXPERIAN'S LOGO dominates the Credit Center in Money Premium.

## FINANCES

MICROSOFT'S annual refresh of its Money personal finance software seems designed primarily to market new services to the wealthy or debt-ridden by offering various free trials.

Priced at \$80, the first **Money Premium** entices investors with a free helping of Gainskeeper, a \$50-a-year service that tracks

capital gains and minimizes associated tax liabilities. Both the Premium and the \$60 Deluxe versions also offer a Credit Center built around a free year-long tryout of Experian's \$50 credit rating service.

Other free options include MSN Bill Pay, H&R Block's Web-based federal tax service, and a single financial consul-

tation with American Express.

The \$90 Money 2004 Small Business—which supplants Money 2003 Deluxe & Business—adds a free year of PayCycle's payroll service. The \$30 Money Standard, however, doesn't offer any freebies.

These free trials represent real value to some people. And like their antecedents in last year's edition, Money's user interface and setup are top-notch. You even get a few minor but useful additions such as a tool for calculating the true cost of buying on credit.

Unfortunately, the partner logos sprinkled throughout my preproduction version of Money make the marketing

### Money Premium

Microsoft  
(Beta software, not rated)  
Street: \$80  
Good finance manager saddled with blatant marketing pitches.  
[find.pcworld.com/36446](http://find.pcworld.com/36446)

## QUICK TAKE

### Slim Shot



MINOLTA'S pocket-size, 3.2-megapixel DiMAGE Xt camera offers a 3X optical zoom lens and handy features such as voice annotations and video clip capture. Though generally a snap to use, the \$399 unit did prove a bit slippery for one-handed operation.  
[find.pcworld.com/36530](http://find.pcworld.com/36530)

—Grace Aquino

efforts painfully intrusive. The new edition's undisguised focus on pushing additional services hardly gives users a compelling reason to upgrade.

—Yardena Arar

# Canon G5: Minor Evolution

## DIGITAL CAMERA

WITH 5-MEGAPIXEL cameras proliferating, Canon's popular PowerShot G series arrives at the party a bit late. But the \$800 **PowerShot G5** keeps Canon's advanced model competitive with Nikon's 5000 series and Olympus's C-5050, both of which shipped months ago.

A 1-megapixel boost over Canon's existing G3, the G5

only nominally advances the G series. The shipping model that I tested retains the boxy-but-efficient design of the G3, along with the same impressive list of exposure specs, including 4X optical zoom, a fast f2 lens, and a comprehensive selection of creative exposure controls. It also preserves one of its predecessor's least-desirable traits: a lens barrel that intrudes into the corner of the optical viewfinder.

Advanced photographers should profit from the G5's array

of esoteric controls (nearly all carryovers from the G3), such as a focus-bracketing option that takes three successive shots at slightly different levels of focus, ensuring you always get the shot—a feature I have yet to see on any other brand of digital camera. New to the G5 is a second custom

white-balance setting—useful for shooting a series of shots under different light sources. The G5 doesn't boot up especially quickly, but its combination of numerous well-labeled, dedicated buttons and a dual menu system makes it faster to operate than its rivals.

And lastly, the photographs:

My test shots lived up to my high expectations, exhibiting fine detail and subtle, lifelike coloring. Overall, I enjoyed using the G5. But that said, satisfied owners of the G3 should skip this update unless they really need the extra megapixel.

—Tracey Capen

### PowerShot G5

Canon

★★★★★

Street: \$800

Late to this market, the G5 is a modest update of the worthy G3.

[find.pcworld.com/36443](http://find.pcworld.com/36443)



THE 5-MEGAPIXEL Canon G5 sports an all-black body.





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## Hitachi's Handy Handful

### HANDHELD

HITACHI'S G1000 Pocket PC-phone hybrid is so versatile that some users will forgive its heft, which exceeds standard palmtop weight by a couple of ounces, and a silhouette too big for an average shirt pocket.

The G1000 unites a CDMA 2000 1X phone (exclusive, at launch, to the Sprint PCS Vision network), a tiny swiveling camera, a thumb keyboard, and a PDA based on Microsoft's Pocket PC Phone Edition 2002. Like other Pocket PC hybrids, it lets you make



HITACHI'S hefty G1000.

### G1000

Hitachi

(Preproduction unit, not rated)

Street: \$650

Oversize unit has a decent camera and so-so keyboard.

[find.pcworld.com/36485](http://find.pcworld.com/36485)

and receive calls by cradling the device against your face (smudging the 65,000-color screen) or by plugging in an earpiece headset (not included, and seemingly never within reach when needed). Still,

the sound quality was good.

The camera's simple software makes it easy to operate; my preproduction unit captured adequate images in resolutions up to 640 by 480 (VGA). The keyboard would have been more convenient to type on if the keys had been firmer and more rounded.

The G1000 carries Intel's 400-MHz XScale CPU, an SD memory-card slot, and 32MB of memory (a bit skimpy for a camera-equipped handheld).

In addition to the standard Pocket Office apps, the device comes with Westtek's ClearVue suite for precise viewing of Word, Excel, PowerPoint, and Adobe PDF files. You also get a capable backup utility and basic image-editing software.

At 8.4 ounces and 5.8 by 3.3 by 0.9 inches, the G1000 is not for people who like their handhelds small (Samsung's i500 Palm phone, in contrast,

### QUICK TAKE

#### Get More Zen

THE UPDATED \$400 **Nomad Jukebox Zen** from Creative still isn't the best-looking hard-drive-based MP3 player on the block. But upgraded to a remarkable 60GB of storage, the unit is sure to be the apple of many a music lover's eye.

[find.pcworld.com/36479](http://find.pcworld.com/36479)

—Tom Mainelli



weighs 4.7 ounces). And at \$650, the G1000 doesn't come cheap. But right now, it's the only Pocket PC that unites a phone, a camera, and a keyboard—a combination that some users may find worth the money and the weight.

—Yardena Arar

## PageManager 6: Digitize Your Paper Trail

### DATA MANAGEMENT

IN ANY SMALL office, managing the waves of paper documents that wash in each day as regularly and irresistibly as

the tide is a never-ending task. NewSoft's \$80 **Presto PageManager 6** helps you keep your head above water, with tools to digitize random papers you

want to keep. But the software can't quite equal its more popular competitor, ScanSoft's \$100 PaperPort Deluxe 9.

PageManager works with your scanner's existing driver software; in my tests of a shipping copy, it performed well with an Epson scanner and an HP multifunction printer.

After scanning your data, you can save it as is or you can use the app's tools to transform it. The image editing feature and OCR worked reasonably well; but the software's PDF generator proved useless, producing unacceptably blurry text time after time.

PageManager also offers a customizable Application Bar

for launching programs. Unfortunately, though you can edit which applications show up on it, you can't add folder shortcuts. In addition, the program always saves documents to a single default folder.

Beyond this annoying trait, and its poor PDF generator, PageManager rates as a less-costly alternative to the better PaperPort Deluxe 9 (see [find.pcworld.com/36422](http://find.pcworld.com/36422)). But either program can help you deal with daily paper pileups.

—Rebecca Freed

### Presto PageManager 6

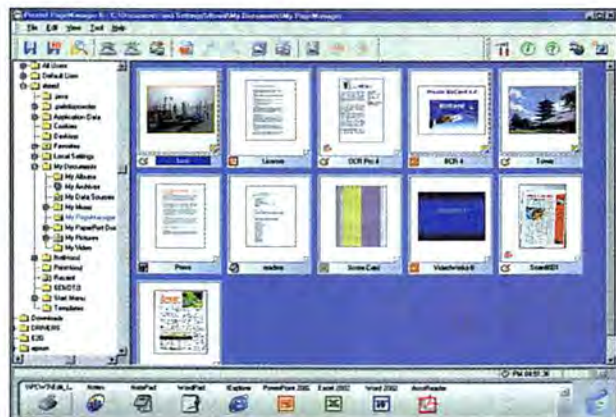
NewSoft

★★★★☆

List: \$80

Easily digitizes paperwork, but some features need refining.

[find.pcworld.com/36410](http://find.pcworld.com/36410)



THE MAIN WINDOW in Page Manager 6 lets you acquire images and recognize them with OCR, or launch files in applications you choose.



Turn your workspace into a visual playground.



**VIEWSONIC® INTRODUCES THE N1700W 17" WIDE-FORMAT LCD TV FOR WORK AND PLAY.**

**With the N1700w LCD TV, your desk chair may just be the best seat in the house.** Imagine the freedom — and fun — of instantly switching from a computer application to your favorite TV show to a video game console to a DVD movie. All on a single monitor. ViewSonic's revolutionary NextVision™ technology — featuring HDTV readiness — makes it possible. Ultra-slim, stylish and versatile, the N1700w combines all your viewing options into an entertainment experience with amazing image quality. ViewSonic's unique VXP TV tuner provides all the connections you need for HDTV, a DVD player, gaming console, even digital cameras. The wide screen display not



April 2003



"N1700w most successfully combines price, quality and versatility" and "compatibility with the highest standard of HDTV (1080i)."

only gives you more room to display computer applications, it provides a cinematic viewing experience with a crystal-clear picture, vibrant color and detail that other monitors simply can't match. ViewSonic has even included advanced functionality like video-over-data so you can watch TV while you work on the computer. And the powerful 20-watt audio system will move you as much as the stunning images. With all that versatility the N1700w LCD TV display is certain to make any desktop a lot more entertaining. So widen your horizons. Visit [ViewSonic.com](http://ViewSonic.com) to See the Difference® that makes ViewSonic displays #1 in the USA.\*

Go wide

\*Loading stand-alone, branded monitor by sales (CRT and LCDs combined); iSupply/Stanford Resources Monitor\* and Flat Panel Monitor\* 2002. Corporate names and trademarks stated herein are the property of their respective companies. Copyright © 2003 ViewSonic Corporation. All rights reserved. [10940-01E 01/03]



**ViewSonic**  
See the difference.®



## Drive Image Does Windows

### BACKUP

THE BEST WAY to protect all of your important data is to generate a sector-for-sector image file of your hard drive partitions—boot record, file tables, and all. Unfortunately, capturing the image of a Windows partition from within the comfy confines of Win-

dows itself has always been problematic: Imagine servicing your car while driving it.

Traditionally this problem has forced drive imaging software users into an archaic, DOS-like realm. But that journey is now unnecessary, thanks to PowerQuest's new **Drive Image 7**. Acronis True Image got there first, but Drive Image 7 has important options (such as verification) that its rival does not.

In addition to its new Windows capabilities, my shipping

version sported an XP-like interface, the ability to restore individual files and folders from within the main program (older versions had only a separate image browser), and a background app for mounting any Drive Image file as a read-only virtual drive.

Even better, Drive Image 7 has extensive disaster recovery options and imaged my XP partition in about half the time that the competing Acronis True Image took. The program was rock solid throughout my informal testing, as was its DOS-like recovery environment.

Despite these improvements, however, I have one major beef: Drive Image 7 includes Microsoft's .Net framework, and that adds software I never wanted along with a whopping 40MB to DI 7's 45MB installation footprint.

—Jon L. Jacobi

### Drive Image 7

PowerQuest

★★★★☆

Street: \$70 full, \$40 upgrade

A powerful drive-imaging program for power users, but .Net underpinnings are burdensome.

[find.pcworld.com/36470](http://find.pcworld.com/36470)



POWERQUEST'S Drive Image 7 offers a new interface that makes running the program easier than before.

## GoVideo DVD Player Gets Networked

### MULTIMEDIA

ONE OF THE many benefits of a home network is that your audio and video content does not have to be landlocked within your PC anymore. GoVideo's \$299 **D2730 Networked DVD Player** integrates streaming media support into a standard DVD player, so you can listen to and view your PC-based media on your living-room television. However, my shipping unit demonstrated that merging PC content with an easy-to-use consumer electronics interface can be quite a bit harder than it sounds.

Setting up the slimline unit should be relatively simple: You install a server applet on your PC, connect the D2730 to your TV (like any other consumer player), and then link it to your network via the included ethernet PC Card (wireless users can swap out the included card for their own Wi-Fi version—but the 802.11b variety may not be speedy enough for full-motion video). Network connectivity should proceed automatically; if you run into difficulties—as I did—

you may have to resort to accessing a somewhat kludgy network setup screen (often, antivirus and software firewall programs are the culprits).

Once I had the unit up and running, it streamed my music, images, and even random video clips from my PC to my TV quite capably. Out of the box, the D2730 supports a wide array of multimedia formats—MPEG-1 and MPEG-2 video, MP3 and WMA audio, and JPEG images—so I never lacked for suitable content.

Unfortunately, the remote control is poor-

### D2730 Networked DVD Player

GoVideo

★★★★☆

A networked DVD player is a great idea, but the execution here needs work.

List: \$299

[find.pcworld.com/36440](http://find.pcworld.com/36440)

ly designed, with tiny, difficult-to-push buttons in all the wrong places. And the interface for accessing the network requires too many clicks for basic tasks such as returning to the main menu.

GoVideo deserves credit for bringing this technology to market (companies such as Gateway are following suit with comparable units), but I'll wait for its next generation before I buy. The next time around, I hope, the GoVideo's interface and remote will be as slick as the current device's technical capabilities.

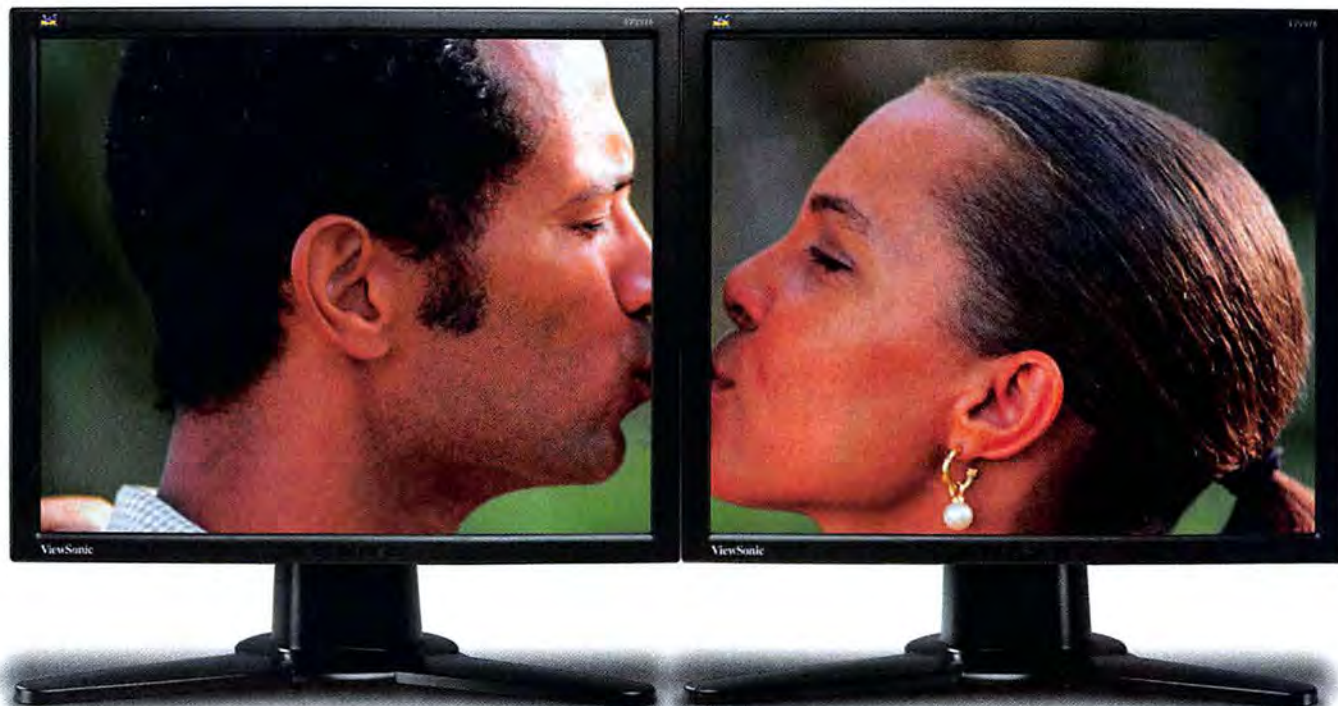
—Melissa J. Perenson



THE GOVIDEO D2730 Networked DVD Player draws multimedia from your PC and displays it on your TV.



The closer you get, the better we look.



THE NEW VIEWSONIC® VP THINEDGE™ SERIES LCDs ELIMINATE THE GAPS IN YOUR VIEW.

**See how your productivity stacks up with the versatile new ViewSonic VP ThinEdge™ Series LCDs.**

Displaying the leadership quality that makes it the number one monitor brand in the U.S.\*; ViewSonic once again raises the standard for style, versatility and visual performance. Ergonomically efficient, technologically advanced and beautifully designed, VP ThinEdge Series LCDs are equally desirable as desktop displays or professional multi-unit systems (four unit, head-only bundle available). The ultra-thin bezel (as little as 16mm) maximizes the screen area while minimizing the image gap in multi-display applications for continuous data display.



*Beautiful image. Beautiful styling. Beautiful versatility with swivel, pivot and height adjustments for unlimited configurations.*

In addition to crisp, high-resolution images with ClearMotiv™ fast-response video performance for work and play, you'll love the versatility in both portrait or landscape configurations for specialized uses like trading or media rooms. And talk about connectivity! VP ThinEdge Series displays interface with any viewing need from HDTV to sophisticated business and graphic applications, to the latest video walls via OptiSync™ analog/digital inputs and integrated USB 2.0 hubs

(port configurations vary by display size). Visit **ViewSonic.com** and find out how the new benchmark in ultra-thin bezel LCDs can make your view more spectacular.

Less is more



**ViewSonic**  
See the difference.

\*Leading stand-alone, branded monitor by sales (CRT and LCDs combined). (Source: Stanford Resources Monitor\* and Flat Panel Monitor\* 2002). Specifications and pricing subject to change without notice. All logos, trademarks and registrations are the sole properties of their respective companies and are used by permission. Copyright © 2003 ViewSonic Corporation. All rights reserved. [11043-02E 03/03]



pilot

navigator



**IBM recommends Microsoft® Windows® XP Professional for Business.**

**Warranty Information:** For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12155, RTP, NC 27709. Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services. \*Prices do not include tax or shipping and are subject to change without notice. Reseller prices may vary. †Public access not available in all areas. Access fees may apply. ‡Requires download of client software. §Based on IEEE 802.11b. This wireless LAN product has been designed to permit legal operation worldwide in regions in which it is approved. Operation on channels 12-14 is not permitted in all regulatory regions of the world. Consequently, the wireless LAN feature is limited to operate on channels 1-11 and will not support channels 12, 13 and 14. This product has been tested and certified to be interoperable by the Wireless Ethernet Compatibility Alliance and is authorized to carry the Wi-Fi logo. ¶For ThinkPad and NetVista models without a separate video card, memory supports both system and video. Accessible system memory may be up to 64MB less than the amount stated, depending on video mode. \*GB = 1,000,000,000 bytes when referring to storage capacity. Accessible capacity is less; up to 3GB is used in service partition. †These model numbers achieved eTesting Labs, Inc.'s BatteryMark™ 4.0.1 or the Ziff Davis Media, Inc.'s Business Winstone® 2002 BatteryMark Version 1.0 Battery Rundown Time of at least the time shown. This test was performed without independent verification by the VeriTest testing division of Lionbridge Technologies, Inc. ("VeriTest") or Ziff Davis Media, Inc.; neither Ziff Davis Media, Inc., nor VeriTest makes any representations or warranties as to these test results. Winstone is a registered trademark and BatteryMark is a trademark of Ziff Davis Publishing Holdings, Inc., in the U.S. and other countries. A description of the environment under which the test was performed is available at [ibm.com/pc/www/thinkpad/batterylife](http://ibm.com/pc/www/thinkpad/batterylife). 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. ‡Some software may differ from its retail version (if available) and may not include user manuals or all program functionality. Software license agreements may apply. †Telephone support may be subject to additional charges. If a machine is listed as having "Onsite service for select repairs" or "Limited onsite service," this means that onsite service is available only for the replacement of select parts. For all other warranty repairs, IBM will provide the customer a replacement part for customer installation. The parts for which onsite service is available varies by machine, but





#### NEW! IBM ThinkPad T40

##### Distinctive IBM Innovations:

- Access Connections — easiest wired and wireless connectivity
- IBM Embedded Security Subsystem 2.0<sup>1</sup>

##### System Features:

- Intel® Centrino™ mobile technology
  - Intel® Pentium® M processor 1.3GHz supports Enhanced Intel SpeedStep® technology<sup>2</sup>
  - Intel® PRO Wireless Network Connection 802.11b<sup>3</sup>
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM std/2GB max<sup>4</sup>
- 30GB hard drive<sup>5</sup>
- Ultrabay™ Slim DVD-ROM
- 6.1-hr battery life<sup>6</sup> • 5.6-lb travel weight<sup>7</sup>
- Microsoft® Windows® XP Professional<sup>8</sup>
- 1-yr system/battery limited warranty<sup>9</sup>

**\$1,599\***

■ NavCode 2378D2U-M169

ServicePac® Service Upgrade:<sup>10</sup>  
3-yr Onsite Repair/9x5/Next Business  
Day Response  
(#30L9195) <sup>1243</sup>

#### NEW! IBM ThinkPad R40

##### Distinctive IBM Innovations:

- Access Connections — easiest wired and wireless connectivity
- IBM Embedded Security Subsystem 2.0<sup>1</sup>

##### System Features:

- Intel® Centrino™ mobile technology
  - Intel® Pentium® M processor 1.3GHz supports Enhanced Intel SpeedStep® technology<sup>2</sup>
  - Intel® PRO Wireless Network Connection 802.11b<sup>3</sup>
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM std/1GB max
- 20GB hard drive
- Ultrabay Plus CD-RW/DVD-ROM combo drive
- 6.1-hr battery life<sup>6</sup> • 5.6-lb travel weight<sup>7</sup>
- Microsoft® Windows® XP Professional<sup>8</sup>
- 1-yr system/battery limited warranty<sup>9</sup>

**\$1,399\***

■ NavCode 289723U-M169

ServicePac® Service Upgrade:<sup>10</sup>  
2-yr Onsite Repair/9x5/Next Business  
Day Response  
(#30L9189) <sup>1197</sup>

**Take off to parts unknown with an IBM ThinkPad® wireless notebook.  
The world's easiest way to switch between wired and wireless.**

Wherever you want to work, the sky is the limit when you have IBM ThinkPad notebooks with Access Connections software and wireless Intel® Centrino™ mobile technology (on select models). Now it's easier than ever to switch between wired and wireless networks — whether you're at an airport, the office, an Internet café, even your kitchen.<sup>1</sup> So consider the IBM ThinkPad wireless notebook, and experience a whole new level of wireless possibilities. **think freedom**

**1 866 426-3135 | [ibm.com/shop/m169](http://ibm.com/shop/m169)**  
Save on shipping. Order online.<sup>11</sup>

may include the processor, power supply, heat sink, system board or base cover. To determine the complete list of parts for which onsite service is available for a particular machine, contact IBM. IBM will attempt to diagnose and resolve any problems remotely before sending a replacement part or technician. <sup>1</sup>These services are available for machines normally used for business, professional or trade purposes, rather than personal, family or household purposes. Not all machine types and models are covered. Service period begins with the equipment date of purchase. Service must be purchased during the original limited product warranty period. Service levels are response-time objectives and are not guarantees. A service technician is scheduled to arrive at your location within two or four business hours or the next business day (depending on service) after remote problem determination is completed. For the 9x5x4-hour service, calls dispatched after 1:00 p.m. local time, you can expect the service technician to arrive by the morning of the next business day. For noncritical service requests, a service technician will arrive by the end of the following business day. If the machine problem turns out to be a Customer Replaceable Unit (CRU), IBM will express ship the part to you for quick replacement. Onsite 24x7x2-hour service is not available in all locations. External peripherals, such as racks, tape drives and channel controllers, require their own, separate service coverage; they are not covered under the attached Machine. Service activation is required immediately following purchase. For ThinkPad notebooks requiring LCD or other component replacement, IBM may choose to perform service at the depot repair center. For failing non-IBM components, customer must provide replacement part unless IBM has a Technical Support Agreement with the manufacturer. Service does not cover accessories, supply items and certain parts such as batteries, frames and covers. <sup>2</sup>Standard shipping included when you order online. U.S. only. <sup>3</sup>With Intel SpeedStep, processor speed may be reduced to conserve battery power. IBM reserves the right to alter product offerings and specifications at any time, without notice. IBM is not responsible for photographic or typographic errors. All IBM product names are registered trademarks or trademarks of International Business Machines Corporation in the U.S. and other countries. Lotus and SmartSuite are registered trademarks of Lotus Development Corporation, an IBM Company. Intel, Intel Inside, the Intel Inside logo, Celeron, Intel Centrino, the Intel Centrino logo and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the U.S. and other countries. Microsoft and Windows are trademarks or registered trademarks of Microsoft Corporation. Other company, product and service names may be trademarks or service marks of others. © 2003 IBM Corp. All rights reserved.



# Stay wired. Go wireless. With this many choices, it's easy.



## IBM ThinkPad G40

### Distinctive IBM Innovations:

- Access IBM — Simplifies access to online and on-system information

### System Features:

- Intel® Pentium® 4 processor 2.4GHz
- 15" XGA TFT Display (1024x768)
- 256MB DDR SDRAM
- 40GB hard drive • CD-RW/DVD-ROM combo drive
- 3.5-hr Li-Ion battery\* • 8.5-lb
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,299\***

NavCode 238432U-M169

ServicePac® Service Upgrade:<sup>1</sup>  
2-yr Onsite Repair/9x5/Next Business  
Day Response

#30L9189

\*197

## IBM ThinkPad R40

### Distinctive IBM Innovations:

- IBM Rapid Restore™ PC software — Managed data backup and recovery solution

### System Features:

- Intel® Pentium® M processor 1.3GHz supports Enhanced Intel SpeedStep™ technology<sup>1</sup>
- 14.1" XGA TFT Display (1024x768)
- 16MB ATI® Mobility Radeon™ graphics
- 128MB DDR SDRAM
- 20GB hard drive
- Ultrabay™ Plus CD-ROM
- 6.2-hr Li-Ion battery • 5.6-lb travel weight
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,199**

NavCode 272224U-M169

ServicePac® Service Upgrade:  
3-yr Depot Repair

#30L9192

\*132

## IBM ThinkPad R40

### Distinctive IBM Innovations:

- IBM Embedded Security Subsystem 2.0

### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.3GHz supports Enhanced Intel SpeedStep™ technology<sup>1</sup>
- Intel® PRO Wireless Network Connection 802.11b<sup>2</sup>
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM • 40GB hard drive
- Ultrabay™ Plus CD-RW/DVD-ROM combo drive
- 6.1-hr Li-Ion battery • 5.6-lb travel weight
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,449**

NavCode 289734U-M169

ServicePac® Service Upgrade:<sup>1</sup>  
4-yr Depot Repair

#69P9195

\*249

## IBM ThinkPad X31

### Distinctive IBM Innovations:

- Access Connections software simplifies management of multiple connectivity environments

### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.3GHz supports Enhanced Intel SpeedStep™ technology<sup>1</sup>
- Intel® PRO Wireless Network Connection 802.11b<sup>2</sup>
- 12.1" XGA TFT Display (1024x768)
- 16MB DDR ATI® Mobility Radeon™ graphics
- 256MB DDR SDRAM • 20GB hard drive
- 5.5-hr Li-Ion battery • 3.6-lb travel weight
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,499**

NavCode 2884BRU-M169

ServicePac® Service Upgrade:  
3-yr Onsite Repair/9x5/Next Business  
Day Response

#30L9195

\*243

## IBM ThinkPad G40

### Distinctive IBM Innovations:

- Access Connections software simplifies management of multiple connectivity environments

### System Features:

- Intel® Pentium® 4 processor 2.4GHz
- 15" XGA TFT Display (1024x768)
- 256MB DDR SDRAM
- 40GB hard drive
- CD-RW/DVD-ROM combo drive
- Integrated Wi-Fi wireless technology<sup>3</sup>
- 3.5-hr Li-Ion battery • 8.5-lb
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,399**

NavCode 238433U-M169



MOBILE  
TECHNOLOGY

## IBM ThinkPad R40

### Distinctive IBM Innovations:

- IBM Embedded Security Subsystem 2.0<sup>4</sup>

### System Features:

- Mobile Intel® Pentium® 4 Processor 2.0GHz - M supports Enhanced Intel SpeedStep™ technology<sup>1</sup>
- 15" XGA TFT Display (1024x768)
- 32MB ATI® Mobility Radeon™ graphics
- 256MB DDR SDRAM • 20GB hard drive
- Ultrabay™ Plus DVD-ROM
- 3.6-hr Li-Ion battery • 6.3-lb travel weight
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,299**

NavCode 2896GZU-M169

ServicePac® Service Upgrade:  
2-yr Onsite Repair/9x5/Next Business  
Day Response

#30L9189

\*197

## IBM ThinkPad R40

### Distinctive IBM Innovations:

- IBM Rapid Restore™ PC software — Managed data backup and recovery solution

### System Features:

- Intel® Pentium® M processor 1.5GHz supports Enhanced Intel SpeedStep™ technology<sup>1</sup>
- Integrated dual band 802.11a/b Wi-Fi wireless technology<sup>2</sup>
- 15" SXGA+ TFT Display (1400x1050)
- 32MB ATI® Mobility Radeon™ graphics
- 256MB DDR SDRAM • 60GB hard drive
- Ultrabay™ Plus CD-RW/DVD-ROM combo drive
- 6.2-hr Li-Ion battery • 6.3-lb travel weight
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,849**

NavCode 2897GWU-M169

ServicePac® Service Upgrade:  
3-yr Onsite Repair/9x5/Next Business  
Day Response

#30L9195

\*243

## IBM ThinkPad X31

### Distinctive IBM Innovations:

- IBM Embedded Security Subsystem 2.0

### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.4GHz supports Enhanced Intel SpeedStep™ technology<sup>1</sup>
- Intel® PRO Wireless Network Connection 802.11b<sup>2</sup>
- 12.1" XGA TFT Display (1024x768)
- 16MB DDR ATI® Mobility Radeon™ graphics
- 256MB DDR SDRAM
- 40GB hard drive
- 5.5-hr Li-Ion battery • 3.6-lb travel weight
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty\*

**\$1,699**

NavCode 2884CRU-M169

ServicePac® Service Upgrade:  
4-yr Onsite Repair/9x5/Next Business  
Day Response

#69P9194

\*399

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### IBM ThinkPad T40

#### Distinctive IBM Innovations:

- Access IBM — Simplifies access to online and on-system information

#### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.3GHz supports Enhanced Intel SpeedStep® technology<sup>1)</sup>
- Intel PRO Wireless Network Connection 802.11b<sup>2)</sup>
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM • 30GB hard drive
- Ultrabay™ Slim DVD-ROM
- 5.5-hr Li-Ion battery • 4.5-lb travel weight
- Microsoft® Windows® XP Professional
- 1-yr system/battery limited warranty<sup>3)</sup>

**\$1,549**

NavCode 2378D2U-M169

ServicePac® Service Upgrade:

4-yr Depot Repair

#69P9199 '110

### IBM ThinkPad T40

#### Distinctive IBM Innovations:

- IBM Rapid Restore™ PC software — One-button data-recovery and restore solution

#### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.3GHz supports Enhanced Intel SpeedStep® technology<sup>1)</sup>
- Intel PRO Wireless Network Connection 802.11b<sup>2)</sup>
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM • 30GB hard drive
- Ultrabay™ Slim CD-RW/DVD-ROM combo drive
- 5.0-hr battery life • 4.5-lb travel weight
- Microsoft® Windows® XP Professional
- 3-yr system/1-yr battery limited warranty<sup>3)</sup>

**\$1,799**

NavCode 2379D3U-M169

ServicePac® Service Upgrade:

4-yr Onsite Repair/9x5/Next Business Day Response

#69P9188 '299

### IBM ThinkPad T40

#### Distinctive IBM Innovations:

- IBM Rapid Restore™ PC software — One-button data-recovery and restore solution

#### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.4GHz supports Enhanced Intel SpeedStep® technology<sup>1)</sup>
- Intel PRO Wireless Network Connection 802.11b<sup>2)</sup>
- 14.1" SXGA+ TFT Display (1400x1050)
- 256MB DDR SDRAM • 40GB hard drive
- Ultrabay™ Slim CD-RW/DVD-ROM combo drive
- 5.0-hr battery life • 4.5-lb travel weight
- Microsoft® Windows® XP Professional
- 3-yr system/1-yr battery limited warranty<sup>3)</sup>

**\$1,949**

NavCode 2379D6U-M169

ServicePac® Service Upgrade:

5-yr Depot Repair

#69P9201 '220

### IBM ThinkPad T40

#### Distinctive IBM Innovations:

- IBM Embedded Security Subsystem 2.0

#### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.6GHz supports Enhanced Intel SpeedStep® technology<sup>1)</sup>
- Intel PRO Wireless Network Connection 802.11b<sup>2)</sup>
- 14.1" XGA TFT Display (1024x768)
- 256MB DDR SDRAM • 40GB hard drive
- Ultrabay™ Slim CD-RW/DVD-ROM combo drive
- 5.0-hr battery life • 4.5-lb travel weight
- Microsoft® Windows® XP Professional
- 3-yr system/1-yr battery limited warranty<sup>3)</sup>

**\$1,999**

NavCode 2379D4U-M169

ServicePac® Service Upgrade:

5-yr Onsite Repair/9x5/Next Business Day Response

#69P9200 '449

### IBM ThinkPad T40

#### Distinctive IBM Innovations:

- Access Connections software simplifies management of multiple connectivity environments

#### System Features:

- Intel® Pentium® M processor 1.6GHz supports Enhanced Intel SpeedStep® technology<sup>1)</sup>
- Integrated Dual-band 802.11a/b<sup>2)</sup> Wi-Fi wireless technology
- 14.1" SXGA+ TFT Display (1400x1050)
- 512MB DDR SDRAM • 80GB hard drive
- Ultrabay™ Slim CD-RW/DVD-ROM combo drive
- 7.2-hr battery life • 4.5-lb travel weight
- Microsoft® Windows® XP Professional
- 3-yr system/1-yr battery limited warranty<sup>3)</sup>

**\$2,799**

NavCode 2379D5U-M169

ServicePac® Service Upgrade:

4-yr Onsite Repair/9x5/Next Business Day Response

#69P9188 '299

### IBM ThinkPad T40p

#### Distinctive IBM Innovations:

- Access IBM — Simplifies access to online and on-system information

#### System Features:

- Intel® Centrino™ mobile technology
- Intel® Pentium® M processor 1.6GHz supports Enhanced Intel SpeedStep® technology<sup>1)</sup>
- Intel PRO Wireless Network Connection 802.11b<sup>2)</sup>
- 14.1" SXGA+ TFT Display (1400x1050)
- 512MB DDR SDRAM
- 60GB hard drive (7200 RPM)
- Ultrabay™ Slim CD-RW/DVD-ROM combo drive
- 7-hr battery life • 4.9-lb travel weight
- Microsoft® Windows® XP Professional
- 3-yr system/1-yr battery limited warranty<sup>3)</sup>

**\$3,529**

NavCode 2373G5U-M169

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# 60-minute upgrades

Get **new PC power** in an hour-or less—with these speed boosters, storage add-ons, and more. Plus: **Tune-up tips** to keep your system going strong.

BY JEFF BERTOLUCCI

## Inside

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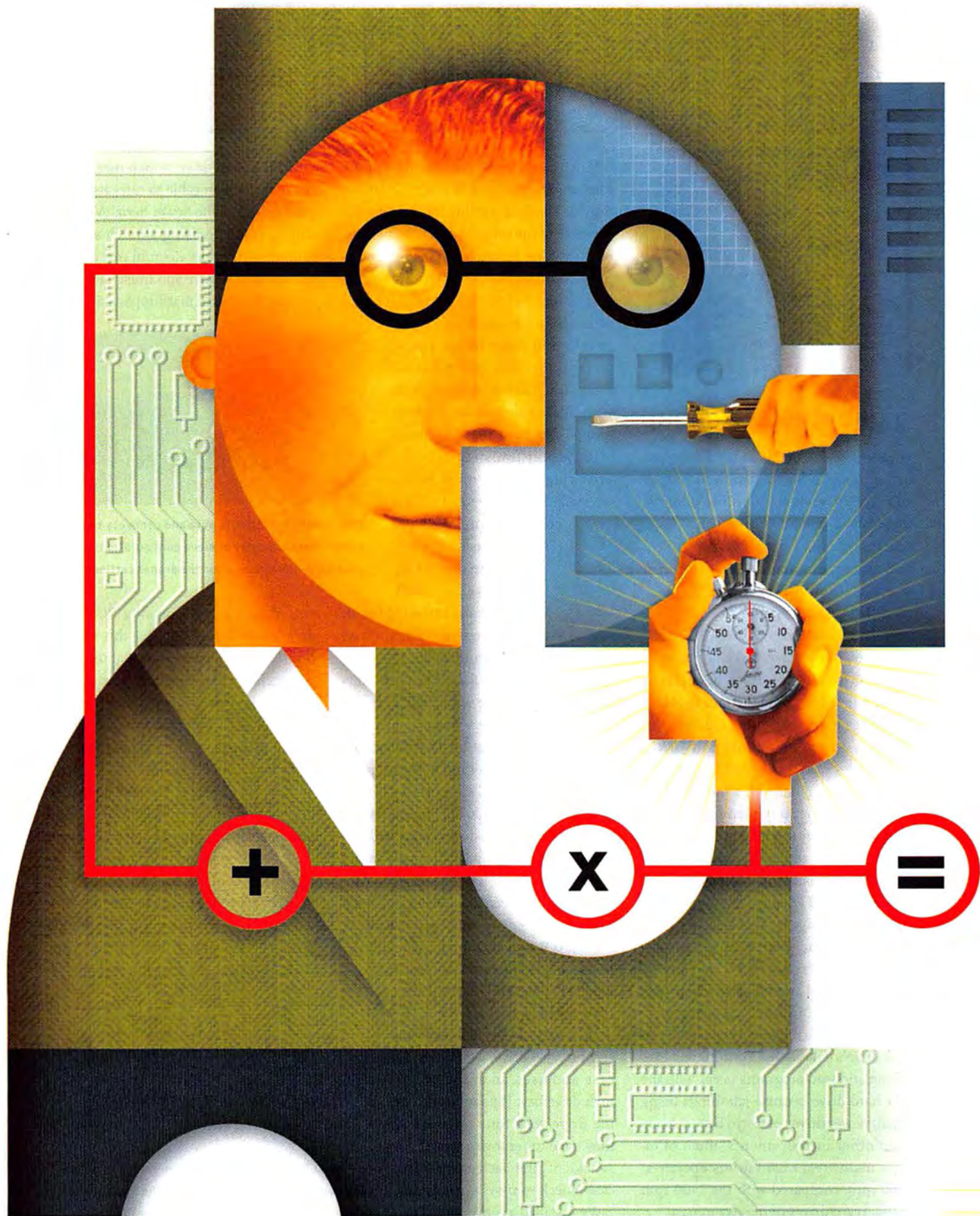
UPGRADES OF YESTERYEAR usually involved an afternoon of complicated work. These days, with a little planning and research, the process can go quickly and smoothly. We added a DVD burner to our old 700-MHz Pentium III Dell PC in just 30 minutes. Installing a new CPU took only 25 minutes.

For less than the cost of a new PC, you can have a machine that's like new. Each of our upgrades costs under \$300, and many are less than \$200. The benefits of upgrading are considerable: A higher-capacity hard drive lets you store big databases and shorten boot times. More RAM improves your productivity by helping you jump quickly between spreadsheets and presentations. A faster processor allows you to run the latest video editing programs. The newest graphics board and sound system enhance your DVD experience, and a wireless network enables you to share a broadband connection.

We can't promise that a particular upgrade will work for everyone. And when it comes to hardware installation, nobody's perfect. We made lots of the same boneheaded mistakes anyone might—and we'll tell you how to avoid them.

Regular maintenance is essential, too. Our PC Tune-Up Calendar will get your old system running in tip-top shape, improving its speed and reliability. ►







# maximum storage



## gigabytes are cheap

WHEN DID YOUR 25GB hard drive run out of room? After you digitized your LP collection? Or when your office desktop evolved into an editing console for training videos? Whatever the reason may be, that once-capacious drive is ready for a "No Vacancy" sign.

The solution is to get a 100GB or larger hard drive. Like some other PC technologies, disk storage is an overachiever, and its cost per gigabyte continues to march southward. At press time, we could fairly easily find 160GB hard drives priced at about \$1 per gigabyte. If you're pinched for room, now is the perfect time to triple or quadruple your storage at minimal cost.

Rather than replacing your existing hard drive, consider installing a second, larger disk and keeping the original for additional storage or for backup. (If you plan to maintain more than two parallel ATA hard drives on your PC, you'll probably have to add another drive controller. Your system will support a second drive if you attach it to the second connector on your drive's data cable.) Your PC will likely boot and load programs faster with the new hard drive because (all things being equal) newer drives perform better. Aside from other improvements, most of today's mainstream hard drives operate at 7200 rpm, compared with the 5400-rpm mainstream drives of the recent past.

Most hard-drive vendors—including Maxtor, Seagate, and Western Digital—provide a software utility for imaging the contents of the original disk onto the new one—as long as you buy one of the company's hard-drive kits. A bare drive usually costs less, but you'll have to purchase a separate utility, such as Powerquest's \$70 Drive Image ([www.powerquest.com](http://www.powerquest.com)), to get this job done. You'll also have to make do with scanty documentation or limited step-by-step instructions.

To permit transfers between drives, both disks must be installed simultaneously. Your

computer must have a spare 3.5-inch drive bay.

If you have only a 5.25-inch drive bay avail-

able—usually intended for an optical drive—you can purchase a 3.5-inch mounting kit at a com-

puter store for \$5 to \$10. (For a few hints on installing a drive with such a kit, see *Step-By-Step* on page 164.)

If your system is at least two years old, check with your PC or motherboard maker to see if your PC supports 137GB or bigger drives; many do not. You may need to update the BIOS, download an operating system service pack and/or a utility from the drive vendor's site, or use a controller card that enables your PC to recognize the larger drive. Since our new drive, the \$150 Western Digital Caviar 120GB ([www.westerndigital.com](http://www.westerndigital.com)), was smaller than 137GB, we didn't have to deal with this issue.

To install our Dell Dimension's second hard drive, we opened its case and used an available 3.5-inch drive bay. If possible, secure the drive with four screws; you may have to remove a drive cage or take off the back side of your case (check your system manual).

We installed a conventional par-

allel ATA hard drive, which uses a traditional flat ribbon cable to carry its data. If you buy one of the newer Serial ATA hard drives, you'll be using a much slimmer (and neater) cable. Keep in mind that to use the SATA drive you must have a very new motherboard that supports SATA, or



**THE JUMPER PLUG** fits over and connects two pins to designate a master or slave configuration; check your hard-drive manual for the proper settings.

you must buy and install a PCI SATA drive controller. (Again, see this month's *Step-By-Step* for more information.)

Installing a hard drive can be tricky, particularly if you use a parallel ATA cable, which has connectors for two drives. Install the master drive to the connector at the far end of the ribbon; attach the secondary (or slave) drive to the connector that's close to the middle of the cable. Connect the opposite end of the cable to the ATA interface on the motherboard or controller card. Make sure that you've properly set your jumper settings for master and slave on the appropriate hard drive (check your documentation). A Ser-



**A PARALLEL ATA cable** has three connectors: One end connects to the master drive, the middle to the slave drive, and the blue end to the motherboard.

**32  
MINUTES  
Hard Drive  
Upgrade  
Time**



ial ATA cable connects only one device, and it is free of master/slave issues.

Most of today's PCs support the Cable Select system, in which the parallel ATA cable automatically determines the drives' master/slave configuration. To use this feature, you must set the jumpers on both the master and the slave drives to the Cable Select position. Your drive manuals should show you how to do this.

The IDE interface card in our PC had a spare IDE slot, but we used the master/slave configuration above and left the extra slot free for a future upgrade. After closing the system case and rebooting, we ran the Western Digital setup CD, including a utility that transferred the contents of our original hard drive to the new 120GB disk. We noticed slight performance improvements, such as faster boot times, and of course we could store several humongous files (including a 20GB movie) with plenty of room to spare.

## HARD DRIVE PROBLEM SOLVERS

**Problem:** All of this master/slave business confuses me.

**Solution:** You'll find master/slave jumper diagrams, even for older hard drives, on most hard-drive manufacturers' Web sites. And your new drive kit will include a diagram in its documentation. Once you've imaged your original hard drive, you'll have to switch the cable and jumper positions to establish the newer, faster drive as the boot drive. You can use the Cable Select position on both hard drives if your PC supports it. But in our experience, the master/slave settings are more likely to work in most systems.

**Problem:** My PC won't recognize the new 160GB drive.

**Solution:** Check with your computer or motherboard manufacturer to see if your PC supports drives larger than 137GB. If it doesn't you may have to update the BIOS, download an OS service pack and/or a utility from the drive vendor's site, or use a special controller card.

## burn movies, burn files

THE LATEST INTERNAL DVD burners sell for less than \$300 and support the two most popular formats: -R/RW and +R/RW. That price and the ability of rewritable DVD media to store up to 4.7GB of data on a single side are sure to appeal to archive aficionados who are dissatisfied with the CD's maximum standard capacity of 700MB. Though numerous competing DVD recording standards persist, the latest drives support multiple formats, so you don't have to choose at the checkout line.

A multiformat drive may cost up to \$100 more than a single-format model, but the greater flexibility is worth the extra money. (For some choices, see *Top 10 DVD Drives* on page 149.) Don't overlook the venerable DVD-RAM format, which is favored for backups and archiving because of its much higher rating for rewrites and its stronger error correction. LG and Iomega offer drives that include DVD-RAM support.

Granted, many users don't need a DVD writer—not yet, anyway. If all you want to do is create CDs occasionally for your car stereo, stick with a CD burner, which is less expensive and faster than a DVD writer for this task. And if you use a high-capacity storage device such as a tape or Jaz drive to make backups, a DVD writer might seem redundant.

On the other hand, if you want to encode and write large video files to disc for playback on DVD players, a multiple-format rewritable DVD drive makes sense. According to Intellikey Labs, an independent DVD testing facility, write-once DVD+R-formatted discs have the highest compatibility with living-room DVD players, followed by write-once DVD-R. This is due to the superior reflective qualities of these discs. Rewritable discs (+RW and -RW) will work with fewer players than their write-once siblings. DVD-RAM is the least-compatible format with consumer DVD players, but most recent DVD-RAM drives also write

to the highly compatible DVD-R format.

Before buying a DVD writer, make sure your system is brawny enough to handle the drive. Our PC started with a 1.4-GHz Celeron CPU, 512MB of SDRAM, and a roomy 120GB hard drive—a good starting point for video recording, which is a demanding chore for the processor, memory, and storage systems. If you want a DVD writer solely to handle data backups, though, you'll be fine with a less powerful system. Because we expect to work entirely with DVD+R/RW media, we chose the

35  
MINUTES  
DVD Burner  
Upgrade  
Time



**SOME OPTICAL DRIVES** come with a handy, illustrated guide that shows you how to set the master/slave pins properly.

\$250 HP DVD Writer DVD300i, an internal drive with impressive 4X DVD+R and 2.4X DVD+RW speeds.

The drive came with a 7-minute CD-ROM video, which we watched *before* installing the DVD writer, per HP's instructions. The video addresses some important installation issues, such as how to reset the master/slave pins on the back of the drive. The setup program also inspects your machine for system incompatibilities. For instance, it determined that we would have to replace our computer's existing CD-ROM drive with the new DVD300i (instead of keeping both) because "an available position was not found on either the primary or secondary [IDE] controller." In other words, the only way to free up a position on the controller was to remove the CD-ROM drive.

The installation went smoothly. We disconnected the power, audio, and data cables from the CD-ROM drive, and unscrewed it from the drive bay. We ►



then installed the new DVD300i (making sure that all four screws were firmly attached) reconnected the cables, closed the case, and rebooted the system.

A hassle-free upgrade? Not quite. The DVD300i's installation program launched automatically and requested the setup CD-ROM, which we had left in the old drive now sitting on our kitchen table. Fortunately this turned out to be a minor oversight; a tiny hole on the front of most internal optical drives is designed for just this kind of situation. We straightened a paper clip, inserted the wire in the hole,

## DVD BURNER PROBLEM SOLVERS

**Problem:** My drive controller doesn't have room for another device.

**Solution:** Consider replacing your old CD-ROM drive with a new rewritable DVD drive that can also play audio CDs and run CD-ROM-based software. DVD-R/RW and DVD+R/RW drives can burn CDs for you, too—though not as quickly as a new CD writer can.

**Problem:** I installed the new DVD writer, but my PC won't recognize it.

**Solution:** Make sure that the cables are properly attached and that the master/slave jumpers on the back of the drive are set correctly.

and gave it a firm push. Presto! The CD-ROM drive tray released, and we retrieved the CD without further ado. (In the ab-

sence of a paper clip, we'd have had to attach a power connector long enough to let us push the button and eject the disc.)

# speedboosters



## a faster brain

THE NEED FOR speed is most evident with CPU-intensive tasks such as encryption, video editing, and gaming. Your 500-MHz Pentium III system may sprint like a greyhound when running applications such as Microsoft Word and Outlook, but it will hobble along when paired with Adobe's Premiere Pro, which the vendor recommends running on a 3.06-GHz Pentium 4 for optimum performance.

A CPU upgrade isn't simply a matter of swapping an old processor for a new one. The physical installation may take minutes, but the real work comes before you pop open the computer case. To ensure that you buy the right chip for your system, research is essential. Do you need a

423- or a 478-pin package? A ZIF socket or Slot 1? What's the frontside bus speed? Is a BIOS upgrade required? Your PC manual—or some online searching, if necessary—should provide this data.

When picking a CPU, you must consider two things: sockets and motherboards.

Sockets are an issue because different Pentium 4 chips have different numbers of pins. You can't upgrade from a 1.3-GHz Pentium 4 chip, which uses a 423-pin socket, to a 3-GHz P4, which uses the larger 478-pin size. But you can upgrade from a 1.3-GHz P4 to a 2-GHz P4.

If your computer can't handle a truly speedy processor, consider upgrading the entire motherboard. The Web sites

for both AMD and

Intel have information on upgrading a motherboard. Make sure that the other system components,

including the hard-disk controller, the graphics card, and the memory, not only are compatible with the system's motherboard but are your best choices. It makes little sense to match the latest motherboard, CPU, and memory with a near-obsolete graphics board.

Thanks to PC vendors' support sites and to search engines like Google, processor information is easy to find. Take our PC, a Dell Dimension XPS T700r, for instance. A search of the model name at Dell's site revealed technical data, including three key facts: The Dimension's PIII processor is affixed to a Slot 1 card that sits perpendicular to the motherboard; the maximum supported processor speed is 1200 MHz; and our machine has a 100-MHz frontside bus, which is the conduit between main memory and the CPU. (You'll need the slot and bus information to find the correct processor for your PC.)

If you bought a generic PC from an independent retailer, check the mother-

**25  
MINUTES  
CPU  
Upgrade  
Time**



**WIRES AND EXISTING COMPONENTS** may obstruct access to CPU and RAM slots. Before touching anything inside a PC, arm yourself with an antistatic wrist strap.



board manual or the motherboard maker's Web site to determine the best upgrade. This is important when a CPU maker uses the same socket type for its entire processor line. Though it's tempting to assume that a chip that fits is the right upgrade, this isn't always so. In most PCs, the processor sits in a socket on the motherboard. AMD's Athlon and Duron chips, for example, all use a 462-pin socket. But if your motherboard has a 266-MHz frontside bus, it isn't compatible with the latest Athlon 3200 chip, which requires a 400-MHz bus. AMD's site (visit [find.pcworld.com/36473](http://find.pcworld.com/36473)) has a motherboard search tool that finds the best CPU for your PC. Similarly, at [find.pcworld.com/36665](http://find.pcworld.com/36665) Intel provides a large amount of technical data on its chips.

For information on where to buy a new CPU, we visited Google ([www.google.com](http://www.google.com)), PCWorld.com's ProductFinder ([pcworld.pricergrabber.com](http://pcworld.pricergrabber.com)), and Price Watch ([www.pricewatch.com](http://www.pricewatch.com)), and typed "Pentium III upgrades" in each site's search field. For our PIII-700, we chose PowerLeap's PL-iP3/T ([www.powerleap.com](http://www.powerleap.com)), a \$150 Slot 1 card with a 1.4-GHz Celeron processor that had twice the clock speed of our original CPU while remaining compatible with our PC's 100-MHz system bus. (Online shopping is convenient, but alternatively you can visit computer stores that sell processor kits.)

Before installing a new processor, upgrade your computer's BIOS (basic input/output system). If you don't, your PC may not recognize the new chip. System and motherboard manufacturers routinely tweak BIOS instructions to fix glitches and accommodate newer components.

We found the latest BIOS for our PC at Dell's support site, which also provided instructions on how to update or "flash" the BIOS. The process involved copying a few files to a floppy disk, and then using the floppy to reboot the system. (If your system isn't from a major vendor, you may have to get the BIOS upgrade from your motherboard maker's site.)

The CPU is a fairly simple component to upgrade. If you have a Socket A moth-

erboard, your PC probably uses a ZIF (zero insertion force) socket on its motherboard, with an adjacent lever. You merely lift the lever, remove the old processor, orient and insert the new CPU, and return the lever to its locked position.

CPUs aren't always easy to locate on the motherboard, however, as some are hidden under power supplies or other components. Our computer's CPU was located on a Slot 1 card and hidden under a plastic cover that also encased the system fan. We grounded ourselves with an anti-static wrist strap, removed the plastic cover, and replaced the Pentium III module with the PowerLeap PL-iP3/T card. (The Slot 1 card does not have a ZIF socket.) The PowerLeap card has an attached fan, so we didn't reinstall the plastic cover. After connecting the PL-iP3/T's power cable (to operate the fan), we closed the case and rebooted successfully.

The benefits were faster overall performance and the ability to run advanced graphics apps designed for 1-GHz CPUs.

## more memory, more programs

INSUFFICIENT MEMORY can slow a PC to a crawl. Task switching between open applications becomes a finger-tapping exercise in frustration. Graphics take forever to load. And always audible in the background is the mechanical grumble of an overworked hard disk, churning to temporarily store data that won't fit in RAM.

How much RAM is not enough? That depends on the OS and apps you run. Microsoft says 128MB is a good baseline for Windows XP, but anyone who has used the OS knows that 256MB is the real-world minimum for satisfactory performance. If you run digital video or 3D games, memory requirements skyrocket. For example, Adobe recommends 1GB or more of RAM to run Premiere Pro.

The good news is that RAM is inexpensive and upgrades are easy to perform. But homework is crucial to a successful upgrade. Which memory technology do

### CPU PROBLEM SOLVERS

**Problem:** I can't find my old CPU.

**Solution:** It might be hidden under other system components or under a plastic cover, either of which you must remove before you can upgrade the chip.

**Problem:** My PC doesn't recognize the new CPU I just installed.

**Solution:** Update the BIOS. Download the BIOS update from your PC vendor's or motherboard maker's site, and follow the vendor's instructions.

**Problem:** I'm not sure whether the new CPU's cooling fan is working.

**Solution:** If the new processor includes a cooling fan, make sure that you connect the fan's power cable before you turn the power on. If the fan isn't spinning when you power on, turn off the PC right away and check the power connections. Running the PC without a working fan for the new processor could damage your CPU.

**5  
MINUTES  
RAM  
Upgrade  
Time**

you need—SDRAM, DDR SDRAM, or RDRAM? What about megahertz? By using an online research tool such as Kingston Technology's Memory Search ([www.kingston.com](http://www.kingston.com)) or Crucial Technology's Memory Selector ([www.crucial.com](http://www.crucial.com)), you can find answers to these questions. Simply choose the name of your computer from a drop-down menu on either site (or enter the motherboard manufacturer's name on Kingston's site), plus the model name (for example, Dell Dimension XPS T700r) from a follow-up menu, and you'll see a list of compatible memory modules for your machine. (If you can't find your system there, check your PC or motherboard manual.) These tools also identify the maximum amount of RAM your motherboard can handle, which is critical if you want to add the most memory you can.

All Pentium III, many Celeron, and some first-generation Athlon and ▶



Pentium 4 systems use Synchronous Dynamic RAM (SDRAM). Most Athlon and P4 and many Celeron PCs use Double Data Rate Synchronous Dynamic RAM (DDR SDRAM), which increases the frequency bandwidth of SDRAM to improve memory speed. Some P4 systems use RDRAM (aka Rambus memory), a pricey, less popular technology. RDRAM offers performance boosts over conventional SDRAM, too.

If you try to install RAM of the wrong size—for example, a DDR module in a motherboard built for SDRAM—it won't fit or the computer won't recognize it. Our Dell XPS T700r used SDRAM, and Kingston's \$100 256MB module fit snugly in one of two open memory slots.

Our upgrade was quick and painless. We grounded ourselves with an antistatic wrist strap, removed the system's cover, brushed aside some cables to locate the

## RAM PROBLEM SOLVERS

► **Problem:** I don't know which memory type my PC uses.

**Solution:** Go to a RAM vendor's Web site (such as Kingston.com or Crucial.com) and find the name of your PC (or motherboard, on the Kingston site). It's the fastest way to ascertain the right memory modules for your system.

► **Problem:** The memory modules are blocked by messy wires.

**Solution:** Disconnect the wires to install the memory, and reconnect them afterward.

► **Problem:** My PC doesn't recognize the new memory.

**Solution:** Turn off the PC, open the case, and examine the modules. Are they seated correctly, with clasps firmly in position? Extract them and reinsert them to make sure that the clips click into place—signaling that they are firmly seated. Don't be afraid to use a little muscle—but not too much. Memory modules are delicate and can bend or break easily.

memory sockets on the motherboard, and inserted the 256MB module in a free slot.

The module needed a strong push to fit snugly; a PC won't recognize RAM that isn't fitted correctly. (When the memory is properly situated, the clips that hold it in place will snap into position.) We then

reattached the power cable, closed the case, and rebooted the PC—completing the entire process in 5 minutes. Our RAM total tripled from 128MB to 384MB. The primary benefit was faster overall performance, particularly when jumping between several open applications.

# audio/visual power



## 3d dazzlers

THE 3D GRAPHICS and cinematic effects of Half-Life 2 thrill you—or at least they did when you tried the game out on a 2-GHz machine at the computer store. But on your system, the action is slow and choppy. Buyer's remorse sets in, and suddenly you're ready to return the game to the store. Equally aggravating: Your computer won't play DVD movies, and you're inclined to throw the whole thing into the trash.

Upgrade your graphics card instead. According to conventional wisdom, it doesn't make sense to upgrade your PC's graphics if the system is more than two or three years old. That's good advice if you covet a \$400 graphics card that costs more than your computer is worth. But many of today's cards deliver dazzling 3D effects and fast performance for far less money. The ATI Radeon 9000 Pro 64MB ([www.ati.com](http://www.ati.com)) and the NVidia GeForce FX 5200 128MB ([www.nvidia.com](http://www.nvidia.com)),

for example, cost about \$90 each and can perform sophisticated visual tricks such as anisotropic filtering to render sharp, detailed 3D textures. Unless you're avid about playing games at very high resolutions, you

don't really need to spend big bucks for a top-of-the-line graphics board.

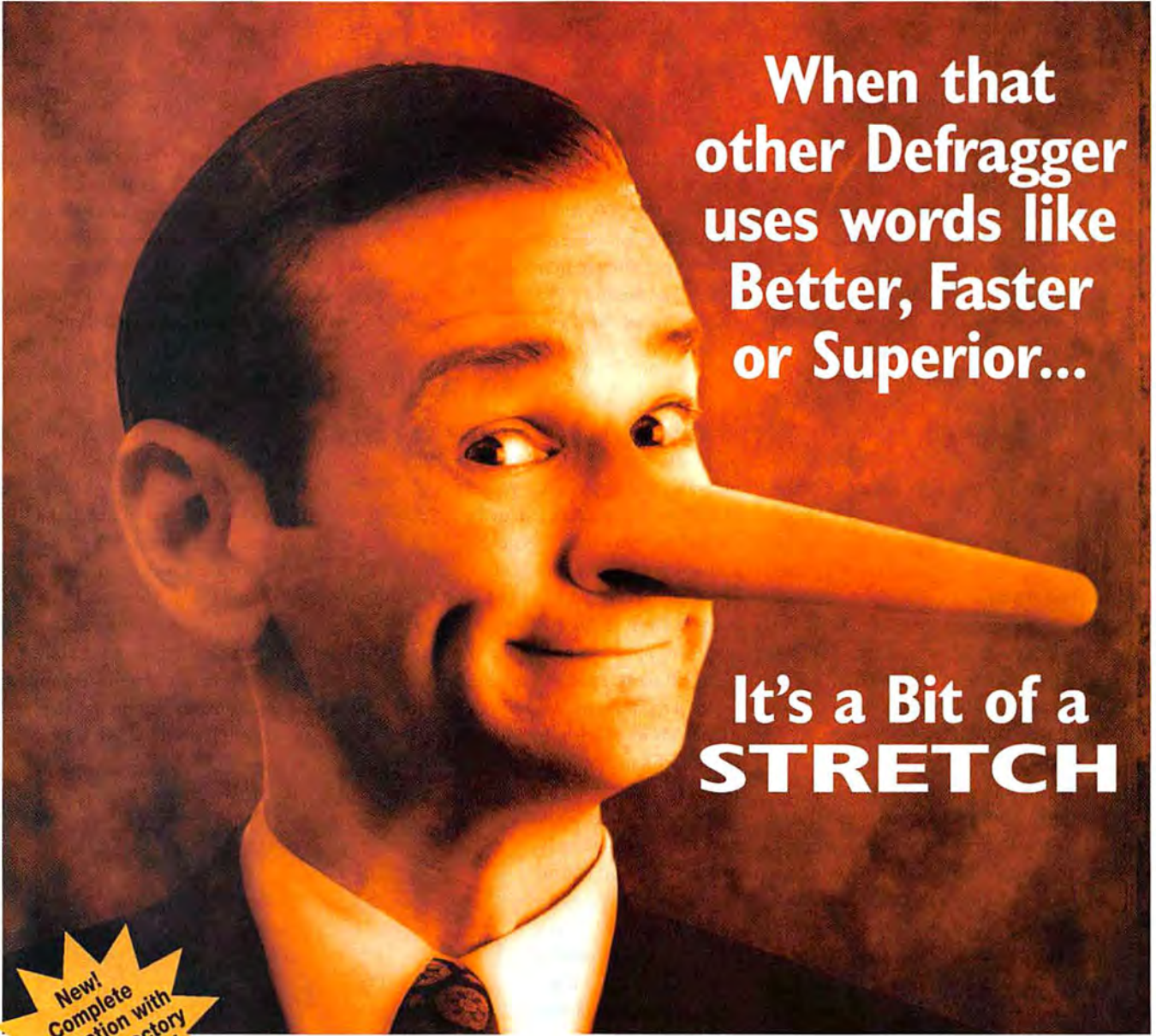
Many desktop PCs today use integrated graphics, which means that the CPU and its chip set handle the graphics functions, with some of the system memory used as graphics RAM. A more sophisticated ►



**UPGRADING THE GRAPHICS CARD** can be tricky, as not all AGP boards and slots are the same: 2X AGP (red) has three notches, while 4X and 8X AGP have only two. If your motherboard has a 2X AGP slot, a 4X/8X card won't fit.

**29  
MINUTES**  
Graphics  
Card  
Upgrade  
Time





When that  
other Defragger  
uses words like  
**Better, Faster  
or Superior...**

It's a Bit of a  
**STRETCH**

New!  
Complete  
Integration with  
Active Directory  
Group Policy!

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approach involves combining a dedicated graphics processor with a specified amount of system RAM. This integrated approach produces perfectly acceptable results for mainstream business applications (such as e-mail and word processing), but today's demanding games need a stand-alone AGP (advanced graphics port) graphics card for best performance.

Since our test PC had an AGP slot, which provides a direct path from the graphics card to system memory, we avoided the potential bottlenecks of the multipurpose PCI bus. Most PCs built during the past several years have an AGP slot on the motherboard. The exceptions are low-end Celeron PCs with integrated graphics, where the motherboard maker leaves out the AGP connector to cut costs.

Upgrading the graphics board was a tricky project. AGP cards and slots are not all alike. A 2X AGP system, for instance, transmits data at up to 533 megabytes per second. A 4X system offers 1.07-Gbps performance, and 8X AGP promises 2.1 Gbps. The easiest way to determine your system's AGP specification is to contact the PC or motherboard manufacturer. This step is crucial if you have a Pentium III or older PC, since many of these carry a 2X AGP slot. For a breakdown of

AGP specs, see [find.pcworld.com/36464](http://find.pcworld.com/36464).

For our upgrade, we installed NVidia's GeForce FX 5200, which works with 2X, 4X, and 8X slots. Our first step was to remove the existing graphics drivers by way of the Add/Remove Programs utility in Control Panel. Next we replaced the old

graphics card with the GeForce FX 5200.

We rebooted, loaded the driver, and completed the graphics card upgrade in 29 minutes. The most immediate benefit is being able to watch DVD movies on our aging computer, which refused to perform this task with its old graphics card.

## an audible feast

INTEGRATED AUDIO is a checklist item on practically every motherboard made today. So why upgrade the sound system when you're already enjoying CD-caliber playback? Because audiophiles, multimedia developers, musicians, and gung-ho gamers want the best sound, which is possible only with a high-end sound card and speakers.

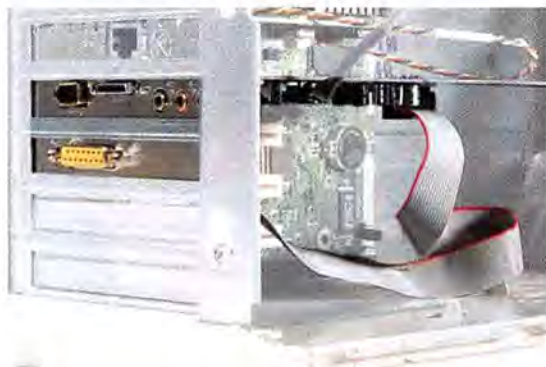
Motherboard-based audio does an adequate job of playing music and basic sound effects in games. But to get a breathtaking audio experience, you'll have to upgrade. Take 16-bit versus 24-bit sound, for instance. CD audio is 16-bit, while DVD is up to 24-bit. You've probably seen the term *bit depth* when looking at graphics cards: The higher the bit depth, the greater the palette of colors, and that translates into brighter, sharper, more-realistic images. Audio works in much the same way. Musicians prefer 24-bit recording, which captures more data and creates higher-fidelity audio with greater clarity. Playback is important, too: DVD audio content supports up to 24-bit audio, which sounds better when reproduced on a 24-bit sound card.

Today's sophisticated sound cards perform other tricks that integrated audio can't match. For example, high-end cards like Creative's \$250 Sound Blaster Audi-

gy 2 Platinum EX offers 6.1 Surround Sound and Dolby Digital EX Decoding.

The Dolby 6.1 specification provides a rear center channel not found in the more common 5.1 spec, which supplies a front center channel only. The extra channel means enhanced realism for gamers, including the ability to hear villains and monsters approaching from directly behind the player. Of course, you'll need to have a good

**43  
MINUTES**  
Sound Card  
Upgrade  
Time



**A FEW SOUND CARDS**, such as Creative's Sound Blaster Audigy 2 Platinum EX, occupy two PCI slots—one for audio and the other for a joystick/MIDI port. The Platinum EX also comes with an external box for audio control and input ports.

surround-sound speaker system to appreciate this feature.

Before installing a new sound card, you must eliminate all traces of its predecessor. Carefully remove your existing sound card, or—if your PC has integrated

### GRAPHICS PROBLEM SOLVERS

**Problem:** I don't know what type of AGP card I need.

**Solution:** Check your PC manual for the type of AGP slot on your motherboard. A 4X or 8X card will not fit a 2X slot.

**Problem:** My PC doesn't have an AGP slot.

**Solution:** You can still upgrade the system with a PCI graphics card, if you have an open slot. Even though the PCI bus is slower than AGP, it's better than integrated graphics.





**Problem:** I can't reset the resolution and refresh rate with my new graphics card.

**Solution:** Make sure you have uninstalled the old graphics driver and properly installed the new card's driver.



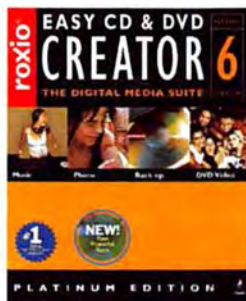


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## speaker setup

SETTING UP a six-speaker and subwoofer system reflects personal preference. One scenario puts three speakers



INSPIRE 6.1 6600 speaker system.



audio—enter your system's setup program to disable the audio. (Check your system manual for details on entering setup. Typically you press <Del> or another key as your system boots up.) If the current sound card came with software utilities, uninstall them via the Add/Remove Programs applet in Control Panel.

We upgraded our old computer's audio

## AUDIO PROBLEM SOLVERS

**Problem:** My PC won't recognize the new sound card.

**Solution:** Did you go into your system's setup program and disable its integrated audio? You'll have to do this to eliminate the possibility of conflicts with your new sound card. In addition, confirm that your new audio drivers are installed in Windows.

**Problem:** The sound card I want requires two open PCI slots to use all of its features, but my system has only one.

**Solution:** Try removing a card that your system no longer uses. For instance, if your computer has a USB or ethernet connection to broadband, you may discover that an unused 56-kbps modem is gathering dust in a PCI slot.

system to Creative's Sound Blaster Audigy 2 Platinum EX sound card and the Creative Inspire 6.1 6600, a \$130 6.1 speaker system. After opening the computer case and properly grounding ourselves, we removed the old card (a Yamaha XG 64) from its PCI slot. Then we inserted the Sound Blaster card, which takes up another slot cover because its joystick/MIDI port arrives on a separate bracket. Some cases come with an extra slot cover for just this purpose, but we had to forfeit a second PCI slot on our old PC to complete the installation. If you don't have two available PCI slots, shop for an audio card that requires only one.

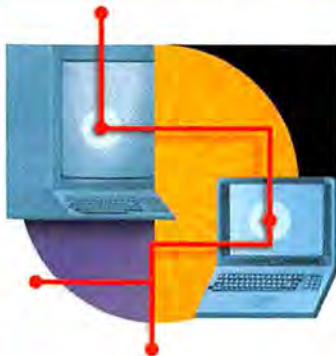
Bundled with the Sound Blaster Audigy 2 Platinum EX is an external box that connects to the sound card via an included cable. The box has a jack for headphones plus digital and analog input ports for recording music, and it was a

breeze to install thanks to the detailed setup poster. We then booted the PC and installed the application software. The installation proceeded without a hitch.

The Creative Inspire 6.1 6600 speaker set was a bigger challenge to install, particularly since it consists of six 5.5-inch-tall satellite speakers and a subwoofer slightly larger than two stacked shoeboxes. That translates into a lot of wires—from the subwoofer to each speaker, and from the PC to the subwoofer. The setup diagram was helpful, but trial and error was the modus operandi (to fix inaudible channels, mostly) until all the connections worked properly.

The results of our 43-minute upgrade: Glorious sound with crisp highs and thunderous bass. Note, however, that if you intend to experiment with speaker placement to achieve the best possible sound, the setup time may be longer.

# wireless made easy



## look, ma, no wires

WIRELESS NETWORKING WAS once a novelty for most business and home users, but that's changing rapidly as the necessary equipment drops in price and becomes easier to install. Before you go wireless, however, do some research. There are several flavors of the popular Wi-Fi wireless stan-

dard, each of which offers something a little different—speedier performance, a higher transmission frequency, or longer range.

The 802.11a standard specifies data transmission speeds of up to 54 megabits per second and operates in the vicinity of 5 GHz, thereby avoiding interference ►

**26  
MINUTES  
Network  
Upgrade  
Time**



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2. Wireless connectivity and some features may require you to purchase additional software, services or external hardware. Availability of public wireless LAN access points limited. 3. 1 GB means 1 billion bytes. 4. Three months of AOL membership included with the purchase of a Toshiba Satellite or Satellite Pro PC. Availability may be limited, especially during peak times. TO AVOID BEING CHARGED A MONTHLY MEMBERSHIP FEE, SIMPLY CANCEL BEFORE THREE MONTH PROMOTIONAL PERIOD ENDS. Premium services carry surcharges, and communication surcharges may apply, including in Alaska, even during promotional period. Members may incur telephone charges on their phone bill, depending on their location and calling plan, even during promotional period. Available to new AOL members in the United States, age 18 or older, a major credit card or checking account is required. Satellite Pro and SelectBay are registered trademarks of Toshiba America Information Systems, Inc. and/or Toshiba Corporation. Intel, Centrino, Intel Inside, the Intel Centrino logo, and the Intel Inside logo are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries. All specifications, pricing subject to change without notice. Reseller pricing may vary. © 2003 Toshiba America Information Systems, Inc. All rights reserved.



from household appliances (such as microwave ovens and cordless phones) that use the 2.4-GHz frequency. These data rates are theoretical maximums; real-world performance is roughly half the rated throughput, according to Lianne Caetano, NetGear product manager.

The 802.11b standard (used in hot spots) has a slower specified data rate of 11 mbps but a longer rated transmission range of approximately 300 feet (versus 200 feet for 802.11a). (A few manufacturers, including D-Link, offer so-called 802.11b+ products, with rated speeds of up to 22 mbps.) The newest standard is 802.11g, which offers the best of both worlds: a 54-mbps theoretical data rate and a 300-foot transmission range under optimum conditions. Both 802.11b and 802.11g transmit at 2.4 GHz.

For small-business and home users, the 802.11g standard is the best option. A few caveats: If your network has any combi-

## NETWORK PROBLEM SOLVERS

**Problem:** My router can't connect to the Internet.

**Solution:** Check the network settings provided by your ISP against the configuration of your router. Remember that if you have a PPPoE connection, you'll have to enter the username and password for your DSL account into your browser's configuration.

**Problem:** My notebook can't connect to my wireless network.

**Solution:** If you're using Wireless Encryption Protocol security, make certain that you've entered the correct network key.

**Problem:** My 802.11g PC Card doesn't transmit at the speed it's supposed to.

**Solution:** If you have an 802.11b card in your network, it will drop your entire network to the slower 11b speed. Consider upgrading to an all-11g network for faster connections.

nation of 11b, 11b+, and 11g devices, the nodes will communicate at the slower 11-mbps speed. Also, both 11b and 11g are incompatible with 11a. In office settings, wired ethernet networks still rule, because they cost less and transmit data up to 90 times faster (up to 1 gigabit per second) than wireless (11 to 54 mbps). And ethernet networks don't encounter the radio interference problems that plague some wireless LANs.

Before you begin installing your wireless network, look up some basic data about your broadband account. If you have a DSL connection, check to see whether you have a static or a dynamic IP account and whether you use Point-to-Point Protocol over Ethernet (PPPoE). You may also need to know your assigned IP address (if you have a static IP address) or your log-in and password (if you have a PPPoE account). Check the configuration instructions for your router so you have an idea of the information you'll require. It's much easier to get it now than during setup, when you may not have Web access.

In our upgrade, we plugged one ethernet cable from our DSL modem into the WAN port in the back of NetGear's WGR614 Cable/DSL router, and then we connected another ethernet cable to a port on the router and our main PC. (Alternatively, you can configure the router using a Wi-Fi-enabled PC.)

On the desktop, we called up our browser and entered the IP address of the router's configuration interface (provided by the vendor). Armed with the basic information about our DSL account, we connected to the Internet relatively easily.

Next, we installed NetGear's WG511 Wireless PC Card in a Compaq Evo notebook. This process involved installing the driver, rebooting the PC, and inserting the LAN card in the Evo's PC Card slot.

The notebook LAN card automatically detected the router, and we could surf wirelessly. But at this point, the setup was basically unsecured: Anyone driving by with a Wi-Fi-enabled notebook could use our Internet connection and (conceivably) see our private files.

Wireless Encryption Protocol, the original security system for 802.11 networks, has been supplanted by the more bullet-proof Wi-Fi Protected Access. If your equipment does not come with WPA, check the vendor's site for free firmware upgrades. Encryption may slow your network, but it also makes your setup much less attractive to interlopers.

Whether you use WEP or WPA, your vendor should provide detailed setup instructions, including how to set network passkeys. We also recommend that you change the default name (SSID) of your network. Make sure that your network and security settings are the same on all of your wireless network adapters.

*Jeff Bertolucci is a freelance writer based in Southern California.*



**CONFIGURING A WIRELESS ROUTER** such as NetGear's WGR614 involves connecting to a PC (via ethernet or Wi-Fi) and a broadband modem.



**ADDING WIRELESS CONNECTIVITY** to a notebook is simple: Install the wireless PC Card's driver, reboot, and insert the card in the laptop's PC Card slot.



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# pc tune-up calendar

## 365-DAY PLAN For a Healthy PC

MAKING upgrades to your hardware is only half the battle when it comes to having a faster machine. Maintenance is essential, too. It isn't fun, but consider the alternatives. Don't floss your teeth? Hello, gum disease. PC tune-ups work in much the same way. Ignore your computer, and you'll suffer the misery of system slowdowns, lost files, and malfunctioning components. Here are the periodic tune-ups we recommend.

### daily

**VIRUS SCANNING:** Viruses, worms, and Trojan horses roam the Net, intent on destroying your data. For less than \$50, programs such as McAfee VirusScan ([www.mcafee.com](http://www.mcafee.com)), Symantec Norton Anti-Virus ([www.symantec.com](http://www.symantec.com)), and Trend Micro's PC-cillin ([www.trendmicro.com](http://www.trendmicro.com)) operate in the background and do a fine job of keeping your system free of malicious code. Always upgrade to the next version of your antivirus program when it becomes available: Engine upgrades are critical to stopping the latest viral threats.

**BACKUP:** A rewritable DVD drive is ideal for daily, automatic backups. DVD's large capacity makes it a worthy backup buddy for behemoth hard drives, and its thin discs are easy to store. Backup tools such as Dantz's \$85 Retrospect Professional ([www.dantz.com](http://www.dantz.com)), LIUtilities' \$50 Win-Backup ([www.liutilities.com](http://www.liutilities.com)), and Stomp's \$79 BackUp MyPC ([www.stompinc.com](http://www.stompinc.com)) support DVD burners. (They also back up to second hard drives.) An exception is the basic backup utility included with Windows XP (see **FIGURE 1**).

### weekly

**AUTOMATIC HARD-DRIVE SCANNING FOR VIRUSES:** Enable your real-time antivirus protection and allow your program to check for virus signature updates as often



**FIGURE 1: WINDOWS' BACKUP** function works fine with most media but does not offer support for DVD.

as possible. But real-time protection is a slimmed-down measure in comparison with a comprehensive drive scan. Schedule a scan once a week to catch any viruses that may have slipped through. Programs such as Norton Antivirus 2003 will help you set up a schedule (for example, when your PC will be on but not in use).

**WINDOWS UPDATE:** This Internet tool—run it by clicking *Start•All Programs*, near the top of the menu—enables Microsoft to scan your PC and recommend updated drivers, system files, security applets, and other updates. To choose the files you want to download, mark the appropriate check boxes; then ignore the rest.

### monthly

**DISK CLEANUP:** This Windows utility removes temporary Internet files, clears the Recycle Bin, and dumps other disk trash. Find it at *Start•All Programs•Accessories•System Tools*. Disk Cleanup (**FIGURE 2**) is useful for smaller (20GB to 40GB) hard drives that are running low on free space.

**SCHEDULED TASKS:** With this Windows tool you can automate housekeeping chores such as Backup and Disk Cleanup. The Scheduled Task Wizard makes it easy to run maintenance utilities daily, weekly, or monthly—or even at boot time. Once a month, you should review your scheduled tasks to see if they're still appropriate. For

instance, it doesn't make sense to set Disk Cleanup for the first of the month at 7 a.m. if your PC is turned off at that time.

### quarterly

**DISK DEFRAGMENTER:** Located on Windows' System Tools submenu—and willfully ignored by many users—Defrag can maintain optimum hard-disk performance and stability by putting each file's sectors in the proper sequence, permitting more-efficient access.

One caveat: Be sure to keep at least 15 percent of your disk space free so that Disk Defragmenter (and your system) can perform at maximum efficiency.

### yearly

**PC CLEANING:** Carefully remove dust from inside your PC. Use a soft brush attachment on a home vacuum or a mini-vacuum. Use canned compressed air (with



**FIGURE 2: WINDOWS' DISK Cleanup** helps keep your hard disk running efficiently.

the straw) to clear dust in tight spots. But don't blast air into floppy, CD-ROM, or other removable-media drives; the heads and other internal components are easier to damage than you might think. Special tools (like those from Discwasher) are available for cleaning optical drives. ■



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# Well-Connected Handhelds

New wireless PDAs and cell phones put the Web, e-mail, and more in your pocket. We road-test ten models and find two with real Net savvy.

**BY YARDENA ARAR  
AND PC WORLD STAFF**

**WE MARVELED** at the very first Palm handhelds because they stored so

much information, made data entry easy with a touch screen and stylus, and, best of all, synchronized with our desktop contact managers. Since then, screens have gotten nicer, cases have gotten skinnier, and Microsoft has gotten into the act—but in many respects personal digital assistants haven't changed a lot over the years. For many users, they're still primarily electronic organizers, enhanced by software that lets one edit a spreadsheet or play a game. But in the last year or so, advances in processors and other electronics have given rise to a whole new breed of connected handhelds—powerful devices that send and receive data over wireless networks, and others that double as cell phones.

For this review, we looked at ten shipping PDAs with some sort of connectivity—either a phone/PDA hybrid such as Sony Ericsson's P800, or a Wi-Fi-enabled device such as Palm's Tungsten C handheld. Each model was entrusted to a different *PC World* editor to live with for a few weeks. We used these handhelds to access our contacts and calendars, to browse the Web, to manage e-mail, to send instant messages, and—on the phone/PDA hybrids—to make and receive voice calls. ►

PHOTOGRAPH BY KEVIN CANDLAND




**Best  
BUY**

PALM'S TUNGSTEN C wins a Best Buy for Wi-Fi PDA device, and Sony Ericsson's P800 was our favorite PDA/phone.



## WHY WIRELESS?

WIRELESS CONNECTIVITY isn't the only major hardware innovation in the current crop of handhelds—several test units had built-in cameras and MP3 players—but it has the greatest potential to change how we choose and use handhelds. Travelers who rely on phones to stay in touch and on PDAs to store and process information can now exchange the two devices for one phone/PDA hybrid. For those who want to keep track of e-mail, log on to a corporate network, or get vital information from the Internet without having to lug a notebook, any wireless-enabled handheld can potentially pay for itself in productivity gains.

Can today's technology realize this potential? Our field tests show that these products aren't quite ready for widespread adoption. Obstacles include software that doesn't always make connecting to the Internet as easy as it should be—or as productive (we've yet to come across a handheld e-mail client with a good spam filter)—and services that aren't as fast (in the case of cellular networks), as ubiquitous (in the case of Wi-Fi hot spots), or as inexpensive (all of the above) as we would like.

Though some worked better than others, we generally found that perfection in a handheld remains elusive. That's at least in part because some of the qualities prized in one are real liabilities for the other: *PC World* editors like small phones but large PDA screens. We're used to holding phones up to our ears, but we don't want the inevitable smudges our faces leave on those large screens. Battery life, of course, remains an issue, especially with power-hungry Wi-Fi handhelds. We also found that listening to

MP3s was not ideal: The devices use phone-standard 2.5mm jacks that cannot accommodate stereo headphones, so we had to make do with small speakers or use phone headsets. However, our Best Buys—Palm's Tungsten C wireless handheld and Sony Ericsson's P800 phone hybrid—encompass many of the features we're looking for in each type of device.

Your first decision is whether to go for a phone/PDA hybrid or a PDA with Wi-Fi capability. Generally speaking, the phone hybrids will work wherever your carrier has service, while Wi-Fi outside of a home or office network is limited to hot spots in airports, cafés, and other public spaces. (See [find.pcworld.com/36674](http://find.pcworld.com/36674) for information on hot spots.) We expect devices will soon support both: Texas Instruments this year demonstrated a Pocket PC prototype with built-in Wi-Fi, cellular, and Bluetooth.

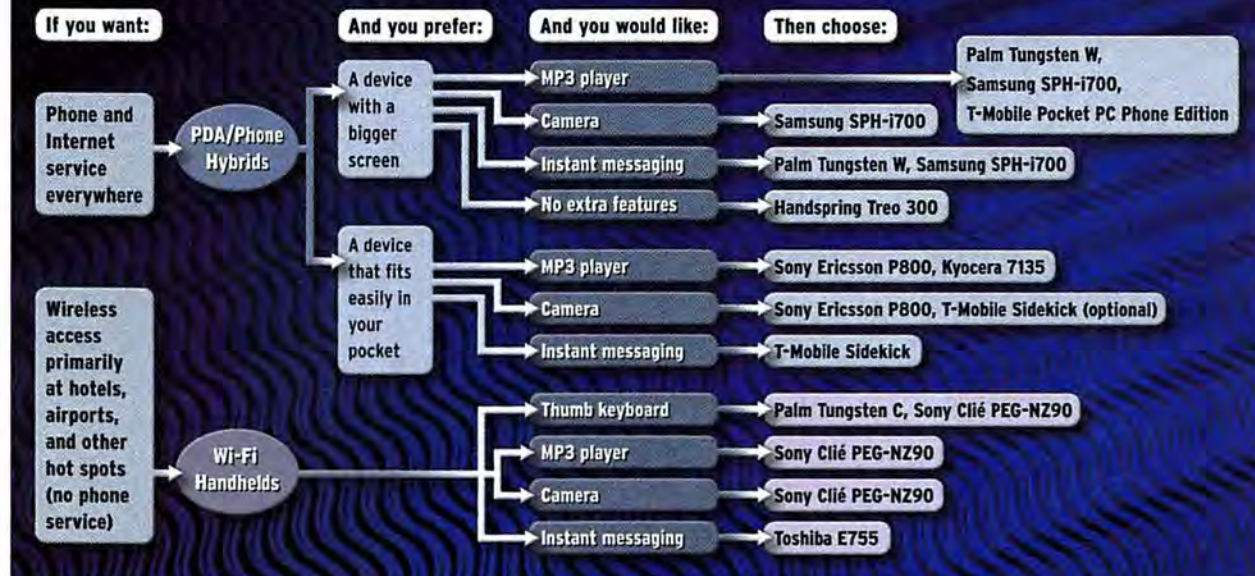
## OS OPTIONS

THE SELECTION of an operating system is also key. If you've been happily using an older Palm or Pocket PC, there's probably no reason to stray from your current OS. (The newest version of the Pocket PC operating system is called Windows Mobile 2003 for Pocket PC.) If you're not committed to one of the two major OSs, however, there are alternatives, such as Symbian, used in the Sony Ericsson P800, or Danger Research's Hiptop OS and applications, used in T-Mobile's Sidekick. Choosing the Sidekick means forgoing the thousands of applications for Palms and Pocket PCs, but you may find that the Sidekick's built-in programs meet your needs. Another option is the Sharp Zaurus SL-5600, which runs Linux. (A Wi-Fi card is sold separately.)

## DECISION TREE

### ARE YOU A PHONE PERSON OR A WI-FI PERSON?

CHOOSING THE RIGHT device can be confusing, but this decision tree can help you sort through the features.





## STILL WAITING FOR THE PERFECT PDA

WE LOVED TESTING the full-featured devices but found that many of the units loaded with large screens, cameras, and MP3 players were too bulky to carry easily in a pocket. But for all the expense and compromises we noted in these devices, they do enable communications that would have been unthinkable a year or two ago.

As corporations expand their use of wireless, and as service providers ramp up their mobile offerings, we expect that wireless connectivity will become as essential in business handhelds as ethernet is in notebooks. Today's products—shortcomings and all—point the way to a truly unwired future.

## PDA/Phone Hybrids

### Handspring Treo 300

THE PROBLEM WITH THE Palm-OS-based Treo 300 is that it's neither a great cell phone nor a great PDA. As a cell phone, it has disappointing battery life (about 2 hours of talk time), and the battery is fixed, so you can't keep a spare one charged up. Sound quality is lackluster; voices were hollow and echoey when I used Sprint's service. The device has a limited amount of memory (only 16MB) and no memory card slots. Browsing the Net with the built-in Blazer Web browser is frustrating, since even pared-down pages for mobile users are slow to load.

The thumb keyboard is smaller than those on other devices, making it fine for short notes or e-mail, but you won't want to write anything longer than a shopping list on it.

The Treo 300 includes some nice touches, though. The handy mute switch on top of the device lets you turn off the ringer without burrowing through several menus, and a power button turns off the cell phone. A Jog dial on the side of the case makes scrolling through lists easy.

Handspring has also announced the Treo 600, but we could not get a sample to test in time for this roundup. The 600 sports a new design, and Handspring claims that the new model addresses many of the usability issues of the Treo 300. More details are available at [find.pcworld.com/36695](http://find.pcworld.com/36695).

**Upshot:** The Treo 300 isn't the best hybrid, but it is suitable for those looking for a no-frills device.

—Richard Baguley



### Kyocera 7135 Smartphone

THE KYOCERA 7135 Smartphone works adequately as a PDA and tolerably as a phone, but it does a lousy job of combining their functions. Switching between the Palm-OS PDA and phone modes is one of the device's biggest hassles: I found myself stopping on the street to tap on the screen. (In phone mode, I had to use the numeric keypad or a two-way navigation button to scroll through the list of numbers.) The phone sounded clear using Verizon's service, and callers could easily hear me, but the reception still was not as clear as on my regular cell phone.

To make a call, I had to access the PDA's address book with the stylus and tap the number twice. However, for stylus-free calling, I had to put names in a separate Speed Dial list—a laborious process. Then I needed only to push a button a couple of times to start a call. (You can't use the stylus on the list.)

Kyocera includes three different Web browsers. The fastest one renders text only and won't work on pages that use JavaScript, so I couldn't check my Yahoo mail account. The other browsers work with Yahoo mail but were very slow. Likewise, because Kyocera uses an older processor (a 33-MHz DragonBall), the 7135 itself seems slow. My current PDA, a Palm Tungsten T using a 144-MHz ARM processor, is lightning-fast by comparison.

The 7135 has an SD (Secure Digital) memory card slot, so you can load up a card with MP3s and listen through the phone's speaker—or buy a \$40 headset. In my tests the device wasn't powerful enough to play a 256-kbps MP3, which skipped and stuttered terribly; a 128-kbps file sounded just fine, however.

**Upshot:** The 7135 integrates both PDA and phone functions, but it does so much too awkwardly.

—Alan Stafford



### Palm Tungsten W

AS A LONGTIME PALM USER, I found the Tungsten W's enhanced PDA functions—its cell phone, Web browsing, wireless e-mail, and instant messaging—quite attractive. Its size and shape and its keyboard are identical to the Palm Tungsten C's (see page 112), down to the bright reflective TFT screen, which I found easy to view in both dim light and full sun.

If you spend the day glued ▶





to your cell phone, the Tungsten W is a poor substitute—it lacks a built-in microphone and speaker, and you have to use a headset. When a call came in, I'd dig the PDA out of my pocket or bag, quickly unwrap the headset, stick the earpiece in my ear, and then (if my caller was still on the line) answer the phone. And Palm could have done a better job of protecting the Tungsten's power button—I often found that the PDA's backlit screen was on when I pulled it from my bag.

Keeping up with e-mail was far more valuable—and workable. I connected to my EarthLink and Yahoo accounts using the on-board VersaMail 2.0 e-mail client. Palm also offers software to connect to corporate e-mail accounts. Uploads and downloads seemed relatively quick, but Web browsing using the Palm Web Browser Pro left much to be desired. The Wireless Application Protocol browser was faster and easier but offered a limited choice of sites. When I tried instant messaging with ICQ, I found text entry on the unit's tiny thumb keyboard a bit too slow.

**Upshot:** The Tungsten W works best for on-the-go Palm users who are more interested in keeping up on e-mail and news than in fielding their phone calls.

—Tracey Capen



## Samsung SPH-i700 & Samsung SPH-i500

I'VE BEEN A PALM USER since I bought my first handheld, but despite my preference, the Samsung SPH-i700 with Pocket PC 2002 made the transition easy.

More like a small PC than a PDA, the SPH-i700 is loaded with features besides the phone: Windows Media Player for videos and MP3s (which sounded great with the optional earpieces), and a digital camera, to name just a couple. And its battery life is substantial: I was able to talk for around 3 hours (your own mileage may vary) before the battery needed a recharge. Phone and PDA functions are well integrated, and Verizon's service sounded clear.

The tiny camera mounted atop the i700 swivels so you can ▶

### FEATURES COMPARISON

## PDA/PHONE HYBRID DEVICES

MELDING PHONE AND HANDHELD, these devices come in a variety of shapes and sizes. Capabilities vary, but some let you browse the Internet, listen to MP3s, and snap photos, as well as make phone calls.

PDA/PHONE	Street price, device only (7/1/03)	Operating system	Screen	Weight/dimensions <sup>1</sup>	Features	Phone services provider (used for testing)/base service cost <sup>2</sup>
<b>Handspring Treo 300</b> ★★★★★ <a href="http://find.pcworld.com/36869">find.pcworld.com/36869</a>	\$399	Palm OS 3.5.2	4096 colors, 160 by 160 pixels	5.7 ounces/4.4 by 2.8 by 0.8 inches	16MB of RAM, speakerphone	Sprint: \$50/month with unlimited Web-based messaging and Web access, 300 anytime plus 1000 night and weekend minutes
<b>Kyocera 7135 Smartphone</b> ★★★★★ <a href="http://find.pcworld.com/36872">find.pcworld.com/36872</a>	\$499	Palm OS 4.1	65,536 colors, 160 by 160 pixels	6.6 ounces/4.0 by 2.4 by 1.2 inches	16MB of RAM, SD card slot, wireless e-mail application (syncs with Microsoft Outlook), voice recorder, photo viewing software, MP3 player	Verizon: \$30 per month voice service with 150 minutes of shared data and voice service
<b>Palm Tungsten W</b> ★★★★★ <a href="http://find.pcworld.com/34235">find.pcworld.com/34235</a>	\$419	Palm OS 4.1.1	65,536 colors, 320 by 320 pixels	6.5 ounces/4.8 by 3.1 by 0.7 inches	16MB of RAM, SD card slot, ArcSoft Photobase Palm Edition, DataViz Documents to Go, ICQ	AT&T: \$30 per month for 10MB of data, plus voice service starting at \$20 per month
<b>Samsung SPH-i700</b> ★★★★★ <a href="http://find.pcworld.com/36875">find.pcworld.com/36875</a>	\$600	Pocket PC 2002	65,536 colors, 240 by 460 pixels	6.9 ounces/5.2 by 2.8 by 0.6 inches	64MB of RAM, VGA camera, SD card slot, MP3 player	Verizon: \$30 per month voice service with 150 minutes of shared data and voice minutes
<b>Best Buy Sony Ericsson P800</b> ★★★★★ <a href="http://find.pcworld.com/36878">find.pcworld.com/36878</a>	\$600	Symbian OS 7.0	4096 colors, 208 by 320 pixels	5.5 ounces/2.3 by 4.6 by 1.1 inches	32MB of RAM, Memory Stick expansion slot, VGA camera, MP3 player, Bluetooth	AT&T: \$50 total; \$30 per month for 10MB of data, plus \$20 for voice service
<b>T-Mobile Pocket PC Phone Edition</b> ★★★★★ <a href="http://find.pcworld.com/36881">find.pcworld.com/36881</a>	\$400	Pocket PC Phone Edition	4096 colors, 240 by 320 pixels	7.1 ounces/5.0 by 3.0 by 0.7 inches	32MB of RAM, SD card slot, wireless e-mail application (syncs with Microsoft Outlook), MP3 player	T-Mobile GPRS: \$50 total; \$20 per month for unlimited data (available to add onto voice plans costing \$30 and higher)
<b>T-Mobile Sidekick</b> ★★★★★ <a href="http://find.pcworld.com/36884">find.pcworld.com/36884</a>	\$299	Danger OS	65,536 colors, 240 by 460 pixels	6.2 ounces/4.5 by 2.6 by 1.1 inches	32MB of RAM; OVGA camera (320 by 240) optional for \$40; AOL Instant Messenger	T-Mobile: \$20 per month for unlimited data with a voice plan or \$30 per month for unlimited data plus 20 cents per minute for voice calls

<sup>1</sup>In order: length by width by depth. <sup>2</sup>Your service plan may vary depending on your location and service provider. Check with providers in your area.



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snap a self-portrait or the scenery in front of you. While the camera took decent shots in bright light, the lack of a flash made it hard to take low-light shots. I wasn't able to e-mail pics directly from the PDA, but Verizon has announced a multimedia messaging service it says will support that function.

As a phone, the unit felt too bulky. And when the device is ensconced in its leather holder, plastic clips make it difficult to pry out. Unless you can quickly remove the i700 from its sheath, you've got to hold a big leather thing to your head when you get a call. (I got quite a few stares when I did this on the street.) Of course, you can avoid these hassles by using the included headset.

Since portability is more important to me than heaps of add-ons, I was happy to also try out a preproduction sample of Samsung's SPH-i500 flip-phone PDA, which should be available by the time you read this. The smallest hybrid I've seen, the i500 easily tucked into my purse and offered excellent PDA/phone integration. But it does sacrifice screen size, and the battery ran down after only an hour's talking. The i500 also lacks an external LCD screen to display caller ID or battery status when the phone is closed. Callers using Sprint's service had a difficult time hearing me, and I was able to connect to the Internet only once.

**Upshot:** The i700 will suit those who want PC-like features from their handheld. For simple PDA functions in a small case, the i500 is a better choice.

—Alexandra Krasne

## Sony Ericsson P800

THE SLEEK Sony Ericsson P800 is a tri-band (supporting GSM 900, 1800, and 1900) wireless phone and organizer with a generously sized LCD. It largely succeeds at making both voice and data functions usable, but the interface is less than elegant.

The touch screen runs nearly the entire length of this broad, somewhat chubby phone. The bottom two-thirds is protected by the translucent, flip-up keypad, but when I used the device without an earpiece, the top third of the screen became smudged with my cheek prints.

The sound quality of the phone using AT&T's service was excellent—especially when I wore the included headset with an inline microphone. (A Bluetooth headset is also available.) In my tests, 3 hours of conversation drained the battery by some 35 percent, according to the battery-life indicator.

The unit's Symbian OS is mostly intuitive to use, but completing some tasks—including Web browsing; sending text, photos, or e-mail messages; and opening Web pages—requires too many clicks (for example, entering a URL takes four clicks).



One handy feature: When you attach the phone to a PC via its USB 1.1 docking station, the device is recognized in Windows Explorer as up to two drives—one for the phone's onboard and flash memory and another for the Memory Stick Duo card (a 16MB card is bundled). But transferring files is painfully slow—it took more than 10 minutes to drag-and-drop three MP3s to the Memory Stick Duo. The integrated audio player sounds decent; however, it lacks forward and back controls.

**Upshot:** The Sony Ericsson P800 makes an excellent phone and also handles basic PDA tasks well, but its interface could offer more efficient navigation.

—Melissa J. Perenson

## T-Mobile Pocket PC Phone Edition

IF TINY CELL PHONES are the Corvettes of mobile communications, I've been cruising in a big, cushy Cadillac while using T-Mobile's Pocket PC Phone Edition (manufactured by High Tech Computer Corporation). Everything about this phone/PDA combo is well designed—yet I had just a niggling feeling of an overabundance of riches, especially for a Palm Zire user like myself.

That will be good news, however, if you're a hard-traveling, mobile business user. You'll benefit from the T-Mobile's many amenities, like excellent battery life, great reception, and a built-in, heavy-duty wireless access antenna. With Microsoft's ActiveSync software and the included USB 1.1 cradle, you can sync your calendar, contacts, to-dos, and e-mail in-box with either your own PC or your company's server, but only if you're a Microsoft Outlook user.

There's a lot to appreciate about this organizer-plus-phone. The device includes a built-in front speaker and hands-free speakerphone capability. T-Mobile brags about providing up to 5 hours of talk time on one battery charge, and I found that claim to hold true in my tests. The battery can't be removed, but T-Mobile says that it should last the life of the device. If not, you must send the PDA to T-Mobile for service. Internet access and the sound quality of calls were both excellent.

The device isn't tiny but it fits into a deep jacket pocket. It supports SMS text messaging and can give you Web access via T-Mobile's phone service plan. But as with most Internet-connected handhelds, trying to look at Web sites, even PDA-savvy ones, can drive the user nuts. Pages are small and slow to load for anyone accustomed to browsing the Web at broadband speed.

**Upshot:** If you have use for its host of Cadillac comforts, the T-Mobile Pocket PC Phone Edition might be the device for you—but you'll need roomy pockets.

—Anne B. McDonald ▶





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## T-Mobile Sidekick



AS PRODUCT OF THE YEAR in our 2003 World Class Awards, T-Mobile's Sidekick (the hardware is Danger's Hiptop) has lots of fans at *PC World*. In my case, I was charmed by it, but I wasn't won over.

Though it has almost every productivity tool you'd want from a PDA, its lack of some critical features detracts from its usefulness for business. It doesn't sync directly with common desktop personal information managers, and you can't create or send documents. Moreover, I think I'd perish from shame if the "Danger Girl" ring tone started tooting away in a business meeting. The critter clicks, rings, trills, and flashes multicolored lights just about every time you input or receive anything—but to be fair, you can turn down or turn off almost all of it. I'm happy with my monochrome Palm M500, so the Sidekick's sound and light show is more than I need.

The Sidekick's flip-out color screen makes browsing the Web easy and fun. And the GPRS-based T-Mobile service I used includes an e-mail account that you can configure to receive POP e-mail from other accounts. The device allows you to receive and view Word documents and PDF files as well as image files—but you can't save or edit them. You can, however, attach the JPEGs you take with the tiny camera to your outgoing e-mail messages (the camera is an optional \$40 add-on). The photos are 320 by 240 pixels, and my trial shots looked a little cloudy, but they were good enough considering the camera's size and design. Another quibble: While the Sidekick offers both an infrared and a USB port, neither one is functional at this time.

Keeping in touch is the Sidekick's strong suit, given its built-in

AOL Instant Messenger client and its highly readable e-mail client. T-Mobile's voice service had some echoes and static—though it's not much worse than my garden-variety cell phone.

T-Mobile's Web-only PIM is the sole way to send appointments, contacts, and to-dos to your PC. Syncing happens automatically when you turn on (or "activate") the device.

**Upshot:** If you love being reachable at all times, and you don't need to edit or send document files from your PDA, you and the color Sidekick could become joined at the hip. —Rebecca Freed

## Wi-Fi Handhelds

### Palm Tungsten C

PALM'S TUNGSTEN C IS about the closest thing to PDA nirvana I've experienced since the Palm Tungsten T ([find.pcworld.com/36515](http://find.pcworld.com/36515)), which sets a pretty high standard for products designed for serious business users. OK, so the C isn't quite as compact as the T (it lacks the T's collapsible case), but it makes up for that by offering the combination of a sturdy thumb keyboard and the Graffiti 2 handwriting recognition system. The Tungsten C, like the phone-equipped Tungsten W reviewed on page 107, has no dedicated Graffiti data-entry area, so you simply write anywhere on the touch screen. This led to my biggest complaint: Sometimes the operating system thought I was writing when in fact I was trying to send a command to an application with the stylus.

Based on the latest version of the Palm OS (5.2.1), the \$499 Tungsten C also has a powerful CPU (Intel's 400-MHz ▶



### FEATURES COMPARISON

## WI-FI-ENABLED HANDHELDS

THESE DEVICES ARE BEST USED with a home or office network, or at hot spots in airports, cafés, and other public spaces.

WI-FI HANDHELD	Street price (7/1/03)	Operating system	Screen	Weight/dimensions (l x w x d)	Features
<b>Best Buy</b> Palm Tungsten C ★★★★☆ <a href="http://find.pcworld.com/36887">find.pcworld.com/36887</a>	\$499	Palm OS 5.2.1	65,536 colors, 320 by 320 pixels	6.3 ounces/4.8 by 3.1 by 0.7 inches	64MB of RAM, SD card slot, Colligo Meeting, Printboy Printing software, DataViz Documents to Go 5, Palm Photos 1.0
Sony Clie PEG-NZ90 ★★★★☆ <a href="http://find.pcworld.com/36329">find.pcworld.com/36329</a>	\$800	Palm OS 5	65,536 colors, 320 by 320 pixels	10.4 ounces/5.5 by 3.0 by 1.3 inches	16MB of RAM, Memory Stick slot, 2-megapixel camera, Bluetooth, Wi-Fi card slot (Wi-Fi adapter optional), MP3 player, voice recorder
Toshiba E755 ★★★★☆ <a href="http://find.pcworld.com/36890">find.pcworld.com/36890</a>	\$499	Windows Mobile 2003 software for Pocket PC	65,536 colors, 320 by 240 pixels	6.7 ounces/4.9 by 3.1 by 0.6 inches	64MB of RAM, digital voice recorder, CompactFlash and SD slots



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XScale chip), 64MB of RAM, and an SD memory card slot; the device can handle Microsoft Office documents via the included DataViz Documents to Go software.

The icing on the cake: Instead of the T's rarely useful Bluetooth, the C has the most usable Wi-Fi I've encountered on a handheld. A setup utility sniffs out available networks, requests an encryption key where needed, and connects to the Internet in a matter of seconds. I found this exceptionally helpful, especially when used in tandem with Palm's VersaMail 2.5 client. When I visited friends at their Wi-Fi-connected home, I was able to download about 100 e-mail headers in a minute or so, retrieve the full messages I wanted, and even delete the spam from a POP3 server. A capable browser supports many popular Web formats, including JavaScript, but as with most handhelds, you have to scroll a lot to see pages designed for larger screens.

I was pleasantly surprised by the Tungsten C's battery life. When I used the device 1 to 2 hours a day with occasional power-hungry Wi-Fi connections, the battery ran at least two or three days without a recharge—a big plus for this forgetful magazine editor.

**Upshot:** You'll pay top dollar for this device, but for anyone who wants to be productive with a connected Palm-based PDA, I'd recommend the Tungsten C.

—Yardena Arar

## Sony Clié PEG-NZ90

I DITCHED MY AGING GRAY-SCALE Palm V for a couple of weeks to test the (initially) dazzling Sony Clié PEG-NZ90. The screen is big, the colors crisp, and after cranking up the brightness level, I had no problem viewing it in direct sunlight.

The Clié didn't fit into any of my pockets, though, and the camera lens near the hinge (along with the HotSync connection cover) added extra bulges. The battery usually lasted several hours, with more frequent recharging when I took or displayed photos or movies.

To move around the 30-plus bundled apps, I hopped from the Jog dial to the back knob to the thumb keyboard, but to finish most tasks, I had to use the stylus.

I was impressed with the Clié's built-in 2-megapixel camera and flash; at 1600 by 1200 pixels, photos looked sharp, and the quality of the MPEG rendering on video files was pretty good for a PDA. Photos at the highest setting were about half a megabyte each (about 30 shots will fit on the included 16MB Memory Stick card).

Clié Camera S and Movie Recorder (the photo- and movie-making apps) each took 8 or 9 seconds to load, though, so it was

tricky trying to capture spontaneous moments. The music quality earned a thumbs-up: 128-kbps files sounded really clear with the included no-frills (if flimsy) headphones.

With Bluetooth enabled, the Clié recognized other Bluetooth devices, but getting them to cooperate was a chore. I was finally able to partner a Sony Ericsson T68i cell phone and the Clié using Sony's Mobile Connection Wizard 1.0 (which I had to download and install separately) so I could browse the Internet. Herein lies the Clié's biggest disappointment: This \$800 beast isn't sold with a wireless module. Instead, you must pony up an extra \$150 for Sony's proprietary wireless card.

**Upshot:** The Clié goes to town on multimedia applications like music and photos, but its lack of built-in Wi-Fi makes it less compelling for business users.

—Aoife McEvoy

## Toshiba E755

I LOVE HANDHELDS. I love Wi-Fi. But judging from the time I spent with a Toshiba E755, I'm not ready to love a Wi-Fi-enabled handheld—at least not a Pocket PC.

On a recent business journey, I toted the \$499 E755 to use for unwired Web browsing and e-mail. However, the Wi-Fi wizard in Windows Mobile 2003 software for Pocket PC, modeled after the one in Windows XP, proved surprisingly clunky and a bit slow. And when the E755 powered down its Wi-Fi to conserve juice, the wizard told me I didn't have a network adapter at all. It seems to me that if you want to do something Internet-related, such as browse the Web, the Pocket PC operating system should be smart enough to turn on the Wi-Fi automatically.

Once online, I waited while Pocket Outlook downloaded headers for 158 pieces of junk mail. Oh, for a Pocket spam filter. While browsing the Web, I discovered that Pocket Internet Explorer isn't particularly good at reformatting Web pages for a lilliputian screen. And Windows Mobile still feels less optimized for on-the-go use than the Palm OS. (Memo to Microsoft: Black text on a blue background is hard on the eyeballs.)

But the E755 isn't without its virtues, starting with its generously sized 3.8-inch transreflective color display that's easy to read in bright sunlight. This unit also packs both CompactFlash and Secure Digital memory slots, a real advantage if you'd like to use one slot for semipermanent storage. (I devoted one slot to MP3s. Over earphones, I was perfectly pleased with the device's sound.)

**Upshot:** Toshiba has fielded a competent Wi-Fi-enabled Pocket PC handheld—but the Windows Mobile OS could use more wireless Internet savvy.

—Harry McCracken







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# ONLINE MUSIC:

The latest music services deliver a wealth of legal tunes—for a price. Should you pay to play?

through  
the floor,  
Senator  
Orrin  
Hatch

has discussed destroying the MP3-laden PCs of file sharing fans, and the record industry is starting a campaign to sue the pants off individuals sharing large MP3 collections on Grokster and Kazaa. On the other hand, legal sources of digital music are multiplying and improving, and suddenly Apple is selling more tunes than your local record store. Welcome to the New Age of Digital Music.

Since the days of Napster and MP3.com, people have been clamoring for music (legal or otherwise) on the Net. On the PC side, the picture is still pretty cloudy, as I discovered when I went in search of music I could download—or just listen to—legally. But with the success of the iTunes Music Store, Apple has shown that consumers—or at least a bunch of early-adopting Mac users—will pay for digital music.

Sure, an abundance of sites will let you do just that, but no two are alike in the music or the services they offer. Most PC friendly services, ►

# NEW HITS AND MISSES



BY ERIC DAHL



such as FullAudio MusicNow, Musicmatch MX Platinum, MusicNet@AOL, Pressplay, and RealNetworks RealOne Rhapsody, stream songs to you on the fly and often let you store tracks on your PC, but they won't let you play them on another PC, burn them to a CD, or move them to a portable player without paying an additional fee. Meanwhile, EMusic has an impressive group of independent record labels (but few mainstream artists) behind its unlimited downloads service, which offers files free of any digital rights management (DRM) restrictions on their use.

New options are arriving: Apple plans to introduce a Windows version of its Mac-only iTunes Music Store, which sells songs for 99 cents each with no subscription fees. At press time, Buy.com rolled out Buy-Music.com, an iTunes-like store that works with Windows PCs. And MusicNet, Pressplay, and Rhapsody plan to launch their own subscription-free stores. I went trolling on the Web to see if any of the current options are worth singing about, and found that while no service is perfect, EMusic and Rhapsody are good values.

### BUYING VS. LISTENING

THE SEVEN music services I sampled (see "Digital Music Services: Worth a Listen") work in as many different ways. Which one you'll like best depends on how you plan to consume digital music. Have a broadband connection where you do most of your listening? The wide selection of a streaming service like Musicmatch or Rhapsody could be a great value for you. Can't live without your portable MP3 player? You might prefer a download-focused service like EMusic. The decision boils down to one basic question: Do you want to take your tunes with you?

If you've ever tried to purchase music online, you know why the Apple iTunes Music Store has so many people excited. It offers the perfect take-it-or-leave-it approach: There are no initial-setup or subscription fees; find a track you like, and for 99 cents and a short download, it's yours. If the DRM scheme for the PC version works as well as it does on Macs,

### BEST BUYS

## Rhapsody and EMusic Sound Sweet

**Best Buy**

LOOKING for a place to buy music? A \$10-per-month RealOne Rhapsody subscription is a sound choice. Rhapsody has a wide selection as well as the best interface of the services tested, and burning a track to CD costs only 79 cents. If think you would prefer a download service, try running a search or two on EMusic's eclectic music collection. Its selection won't please everyone, but as downloadable-music deals go, EMusic's unlimited, DRM-free service is hard to beat, assuming you can find enough tunes to justify the \$15-per-month cost for a three-month subscription.



**RHAPSODY** can show you even the albums they don't have.



**EMUSIC'S** entire catalog is listed on its site so you can search before you sign up.

Apple should have a winner on its hands.

MusicNet, MusicNow, Pressplay, and Rhapsody all offer a way to burn tunes to CD or download them to a portable player. After all, who wants to pay a \$9-to-\$10-per-month subscription fee so you can pay full price for music? These services are better values if you also plan to take advantage of their radio-like streaming features. Musicmatch doesn't let you burn or download tracks at all, but at \$5 per month, it costs only half as much as the average streaming service.

Streaming songs from a gigantic collection of music can be a powerful draw. RealOne Rhapsody, for example, makes finding your favorite artists and pulling together endless amounts of playlists very easy. And since streaming services have hundreds of thousands of tracks, finding

new music through them is easier than going through an online music store that contains only 30-second preview clips.

EMusic takes a unique approach to downloadable music. It's subscription-based (\$10 per month for a year's subscription or \$15 per month for three months), but once you're a subscriber, you can download as much music as you want from its catalog of independent record labels. The files aren't copy protected, so after you download them, you're free to burn them to CDs or transfer them to MP3 players as you wish. Find one album per month that you'd like to download, and you've already saved money. There are a couple of catches, though: EMusic's selection contains few mainstream artists, so it's not right for everyone. And strictly speaking, the service isn't unlimited—if



you download more than 2000 songs in a month, you may get a nasty e-mail message threatening to cancel your account if you don't scale back your activity.

## SELECTION: HITS AND MISSES

ALTHOUGH the number of songs offered online is growing every day, none of the services I looked at came close to the promise of the celestial jukebox with every song you could possibly want available on demand. Most struggle just to match the terrestrial record store down the street. Complex licensing agreements with record labels and artists mean that it's almost impossible to predict which artists' work will be for sale on any given service.

Well-known songs from the Beatles, Madonna, and the Rolling Stones aren't legally available for download anywhere because those artists haven't jumped into the online music game yet. In addition, the discographies of some artists often have gaping holes. You won't find any Elvis Costello albums from before 1998, or any R.E.M. after 1992, online.

Not that online services offer unimpressive selections. In my file searches, Rhapsody turned in the best results, including some new and little-known artists, as well as preview tracks from upcoming albums. Most of the services provide the same basic selection, except for EMusic, which stocks tracks only from the 900 or so independent record labels it has signed up. None can match the find-

anything-eventually promise of file sharing networks such as Grokster and Kazaa, but the 250,000-plus songs available on even the most sparse of the services I tested is a good value for \$10 per month.

Every service has holes in its collection, but some are up-front about it while others try to camouflage their omissions. The Artist On Demand portion of Music-



**MUSICNOW** is hampered by a sluggish interface, including inconvenient rollovers.

match's MX Platinum makes finding specific tracks nearly impossible—its artist pages don't tell you anything beyond the number of songs it has. Until you start listening to the customized radio station that cycles through titles from the artist, you have no way to know whether it has Matthew Sweet's classic album *Girlfriend* (it doesn't) or just a few b-sides that ▶

## FEATURES COMPARISON

# DIGITAL MUSIC SERVICES: WORTH A LISTEN

NO SERVICE COVERS ALL THE BASES, but some online music sites offer good values and selections.

	SERVICE	Monthly subscription cost	Portable downloads/CD burns	Portable download or burn cost <sup>1</sup>	Download format	Comments
1	<b>Best Buy</b> RealNetworks RealOne Rhapsody ★★★★☆ find.pcworld.com/35735	\$10	No <sup>2</sup> /Yes	\$0.79 (burn only)	3	Offers cheap CD burns and a no-nonsense interface that acts as a reference even when songs aren't available.
2	<b>Best Buy</b> EMusic ★★★★☆ find.pcworld.com/36905	\$15 for 3 months; \$10 for 1 year	Yes/Yes	Included	160-to-256-kbps variable-bit-rate MP3	Preview this eclectic selection before signing up. If you find enough albums you want, a subscription saves you money.
3	Apple iTunes Music Store ★★★★☆ find.pcworld.com/35474	n/a	Yes/Yes	\$0.99	128-kbps AAC	If the PC version's DRM scheme is as good as the Mac version's, this subscription-free service should be popular.
4	Musicmatch MX Platinum ★★★★☆ find.pcworld.com/36908	\$5 (Platinum); \$3 (Gold)	No/No	n/a	n/a	Low cost and an interesting radio-station approach make this streaming-only service an intriguing option.
5	FullAudio MusicNow ★★★★☆ find.pcworld.com/35468	\$10 for unlimited streams and downloads	Yes/Yes	\$0.99	128-kbps WMA	Sluggish navigation, but streams and downloads sound good, and you can purchase tracks at a reasonable price.
6	Pressplay ★★★★☆ find.pcworld.com/36914	\$10 for unlimited streams and downloads <sup>4</sup>	Yes/Yes	\$6 for 5, \$10 for 10, \$19 for 20	128-kbps WMA	Unfortunately, interface inconsistencies make this otherwise attractive service difficult to use.
7	MusicNet@AOL 2.1 ★★★★☆ find.pcworld.com/36911	\$9 for unlimited streams and downloads	Yes/Yes	\$0.99	132-kbps RealAudio 8	Organizing your tunes is tedious, and you can't play downloaded tracks in any other media player.

n/a = Not applicable.

<sup>1</sup> Per track.

<sup>2</sup> You can always rip the track from the CD you burn and then transfer it to a portable player.

<sup>3</sup> Streamed files are cached on your hard drive.

<sup>4</sup> \$14 Deluxe and \$18 Premium plans add five and ten portable downloads or burns per month, respectively.



he's contributed to movie soundtracks.

Fortunately, most of the subscription services offer a free or low-cost trial period before you commit. Use it to make sure your new online music source isn't missing too many of your favorites.

Apple's iTunes store has some exclusive tracks but doesn't go far beyond the selection offered by services like Pressplay, MusicNow, or MusicNet@AOL. The store's commitment-free approach, though, helps make its omissions seem less glaring—more like walking into a favorite record store and finding it doesn't have the album you want that week.

EMusic's unlimited DRM-free download approach makes the files you do find that much more valuable, and unlike most of the other services, it lets you search through its entire catalog *before* subscribing, or even signing up for a trial period. The selection is different from the other services', but there's something for everyone, including classical, jazz, indie rock, hip-hop, and even comedy.

### INTERFACE: CAN YOU FIND WHAT YOU WANT?

ANY TIME you're looking through a collection of more than 200,000 tracks, you're going to need an efficient way to find and organize the songs you want. Unfortunately, this is where many online music services fall down.

Most are fine at simply searching for a title or an artist. If an artist, album, or track doesn't appear in its catalog, the search engine will usually recommend something similar. RealOne Rhapsody deserves



**MUSICMATCH** allows you to choose how often artists appear on your custom radio stations.



special mention for its View All mode, which shows you an artist's entire discography, including albums not available online. This thoughtful addition makes Rhapsody a handy reference even if it doesn't have the song you want; it would be even better, though, if you could make that mode the default view.

The problems start when you try to manage the tunes in your collection. Neither MusicNet@AOL nor Pressplay offers a collapsible Artist/Album view—often the best way to view a large collection. Pressplay has plenty of intriguing ways to find music, such as a historical listing of albums that made *Billboard*'s top 200. But, the list shows *every* track on *every* album that made the top 200—and you can't collapse the songs into albums, which makes for lots of scrolling.

At least MusicNow and Pressplay enable you to organize your collection with capable media player apps like Musicmatch, WinAmp, and Windows Media Player. Each service offers a plan featur-

ing unlimited downloads of copy-protected files. While you can't burn those songs to a CD or copy them to a portable player without paying a fee, you can

play them through any media player that's able to handle Windows Media Audio files. That capability means you can slot those songs in with the rest of your PC-based MP3 collection as long as you're a subscriber. Copy-

protected downloads from MusicNet, on the other hand, won't play in other programs until you pay for the track.

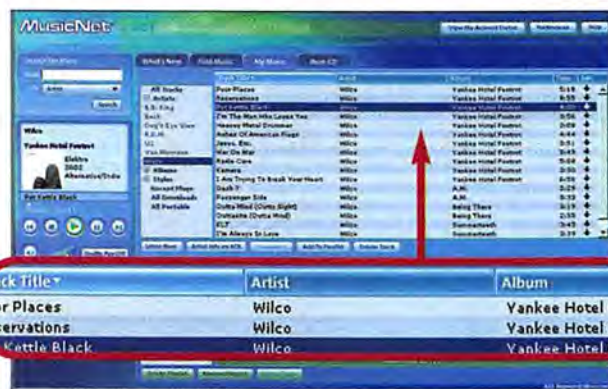
Again, Musicmatch's MX Platinum takes a different approach. Musicmatch's Artist On Demand and Composer On Demand services run through a browserlike interface in the Musicmatch media player. Find a musician or band you like, and you can pull up a radio station that streams not only their music but, if you wish, tunes from related artists as well. You can also add that artist to a custom radio station that you create, and you can specify whether the station plays their songs frequently or only occasionally.

In theory, your personal radio stations can be like the world's largest CD changer on shuffle play. In practice, you never know whether the service will have the best songs by any artist. Still, the related artists I found on the Artist On Demand radio stations were the best of the services I tested. A handy link on the site lets you play your custom radio stations through your browser if for some reason you can't install the player on your PC. (But don't tell your IS department I told you that.)

### AUDIO QUALITY: HIGH FIDELITY?

OF COURSE, the best interface in the world can't rescue streaming audio that sounds like a scratched LP. And any paid download should be held to even higher standards. Fortunately, most of the services I tested were good enough for my ears.

The highest quality streaming set- ▶



doesn't let you sort songs by their track numbers, making it hard to listen to an album in order.



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tings top out between 96 kilobits per second (Pressplay) and 132 kbps (MusicNet@AOL). MusicNet and Rhapsody sounded the best in my streaming tests, but I could still hear some watery-sounding compression artifacts at any of the available bit rates. The artifacts are more pronounced if you're using a slower Net connection, but generally the streaming audio is satisfactory for casual listening.

If copy-protected downloads are available (Musicmatch and Rhapsody don't offer them), they usually sound better than streams. Though Pressplay streams to you at 96 kbps, the 128-kbps WMA files you can download make for significantly better audio. Ideal bit rates depend on the compression scheme, but 128 kbps is usually an acceptable low limit.

EMusic takes home the Grammy for best-sounding paid downloads. Most of its files are stored in a high-quality variable-bit-rate MP3 format that intelligently changes the level of compression from moment to moment depending on the complexity of the song. Most EMusic files end up with an average bit rate in the range of 180 to 210 kbps, at which only the most discerning ears can distinguish the audio from CD quality. iTunes files sound nice as well, in a 128-kbps AAC format (AAC is a newer compression scheme developed by Dolby)—that sounded better to my ears than MP3 or WMA files of a comparable bit rate.

### THE FUTURE'S SO BRIGHT...

IN SHORT, the future is iTunes. The companies behind MusicNet@AOL, MusicNow, Pressplay, and Rhapsody all are planning to debut their own iTunes-like services in the coming months. In particular, Roxio, which purchased Pressplay in June and also owns the Napster trademark, plans to retool the Pressplay service and relaunch it early next year under the Napster name.

Not that everyone is planning big changes. Musicmatch will continue to focus on customized radio stations, while EMusic, which clearly had a good idea to begin with, plans to keep growing

## MOVIE SERVICES

### Blockbusters Through Broadband?

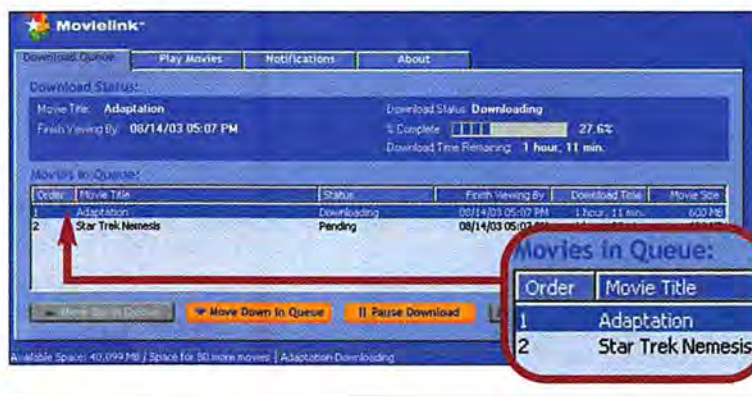
MUSIC isn't the only commodity being traded on file sharing networks. Movies like *The Hulk*, *The Lord of the Rings: The Two Towers*, and *Spider-Man* are zooming around on Kazaa. Legal online movie services have been a long time in coming, but they are available. The question is, are they worth it?

Anticipating increased competition from file sharing, the major film studios have backed two competing services called CinemaNow ([www.cinemanow.com](http://www.cinemanow.com)) and Movielink ([www.movielink.com](http://www.movielink.com)). Each offers a legal way to download movies on a pay-per-view basis. Prices for a movie range from \$3 to \$5.

Downloading the 525MB-to-600MB movies I rented from Movielink took around 2.5 hours over my DSL connection, which is actually pretty quick. Still, each movie you download represents 2 to 3 hours during which your Net connection will essentially be unavailable, so you'll want to schedule your downloads around the times you aren't using your PC. Movielink's download manager program provides some relief, allowing you to pause and resume downloads and to queue multiple movies.

When you finish downloading a movie, you have 30 days to start playing it. Once you click Play, you get a day to watch the movie before it deletes itself from your hard drive. Though the movies appear a notch below VHS quality, they don't look too bad. Still, I'd be hard-pressed to recommend them over Netflix ([www.netflix.com](http://www.netflix.com)) or even your local video store—why spend 2 hours downloading a 90-minute movie?

**MOVIELINK'S** download manager lets you queue up multiple movies and pause and resume downloads.



its network of independent record labels.

Next year should be an exciting time for digital music. Even if all the iTunes clones launch without a hitch, some key questions remain: Will any service accumulate a catalog that truly seems like a limitless collection of tunes? Will independent musicians and record labels be able to promote their songs on these new networks? Will Rhapsody wise up and move U2 out of the "Brit-rock" genre before Bono notices and throws a fit?

And of course there's still the biggest question: Will subscription- and fee-based music services be good enough to become a major part of how we buy and listen to music? We'll have to wait and see on that one. In the meantime, PC users can turn to streaming services like Rhapsody and to download services like EMusic for a taste of guilt-free digital music that's more than a one-hit wonder.

*Eric Dahl is an associate editor for PC World.*





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<sup>2</sup> For a free copy of the standard limited warranty see a reseller where Acer products are sold or write to Acer America Corporation, Warranty Department, P.O. Box 6137, Temple, TX 76503.

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# Three Questions Other Memory Providers Hope You'll Never Ask...

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## Do you actually make the memory you sell?

WARNING! Listen carefully to the answer when you ask this question. Other memory companies claim to manufacture memory, too. What they actually do is assemble the memory chips made by someone else into memory modules. Ask them this: Do you make the chips that go on your memory modules? The chips are the important part, after all.

Crucial is the only memory upgrade supplier that's part of a major DRAM manufacturer, Micron. We actually make the chips that go on the modules.

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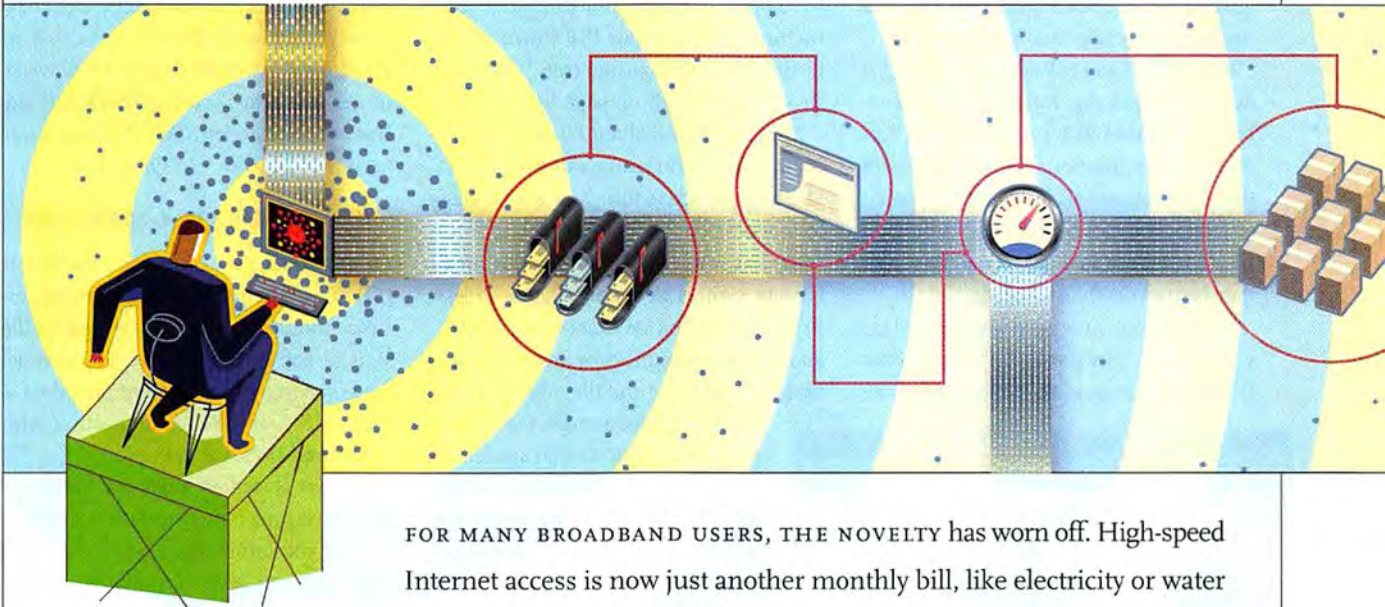
Prices may vary according to specific system requirements. The price listed was valid on 7/7/03 when we sent this ad to the publisher; however, prices may have dramatically increased or decreased since then. Visit the FAQ section of Crucial.com to learn more about why memory prices go up and down.

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# More Broadband for Your Buck

Are you getting all the ISP you pay for? Here's how to make the most of your connection, and what to do if it's time to switch providers.



BY SCOTT  
SPANBAUER

ILLUSTRATIONS BY  
STEVEN LYONS

FOR MANY BROADBAND USERS, THE NOVELTY has worn off. High-speed Internet access is now just another monthly bill, like electricity or water service. But broadband is different from a traditional utility: There's more to good broadband service than eliminating the wait for a dial-up connection, or loading your favorite Web sites in less than 30 seconds. Are you surfing at the speed you deserve? Are you taking advantage of ►



extra features your ISP provides? In short, are you getting your money's worth?

We'll show you how to test your broadband service to make sure you're receiving the speed you're paying for. We'll tell you how to enjoy the full benefit of the services most commonly available with broadband accounts—from multiple free

e-mail in-boxes to Web storage space—that customers rarely or never use. And if you've decided you're fed up with an ISP that can't resolve a nagging problem, we'll tell you what questions to ask as you shop for a new broadband provider, as well as what you need to do to make the transition smooth and (relatively) painless.

## Get the Most Out of Your Broadband

**Check your speed:** Most of the time, you should be able to connect at 75 percent to 80 percent of the top speed available at your location. But a number of factors can affect speed: With DSL, performance drops as distance increases between your modem and the local phone company office. Cable modem service can slow down as more cable users connect to the Internet in your immediate neighborhood. During peak usage times (such as after-dinner hours), both kinds of service may seem slower because network congestion can overload both your ISP and the Web site you're trying to visit.

Most broadband ISPs deliver residential download rates that range from 256 kilobits per second to 1.5 megabits per second; cable connections are typically faster than DSL. Nearly all ISPs limit the speed at which you can send e-mail or upload files to servers to a greater extent than they restrict download speeds.

If you're not sure what level of service you pay for, check your bill or call your ISP. Next, measure the actual speed be-



tween your ISP and your computer. One method is to use your ISP's own speed-testing tool, if it has one (see "Test Your Broadband Speed" on page 130).

Broadband consultant John Navas recommends hand-timing a download test. Use a stopwatch to time how long it takes to download a 3-megabyte or larger file hosted at your ISP. When the download is done, right-click the file, choose *Properties* to determine its exact size in bytes, and divide that number by how many seconds it took to get the file. Multiply that result by 10 for a rough estimate of your megabit download speed.

Test several times and average the results. If you consistently get less than half the speed you pay for, a traceroute tool—such as Sam Spade ([find.pcworld.com/36713](http://find.pcworld.com/36713)), TraceRoute3D ([find.pcworld.com/36677](http://find.pcworld.com/36677)), or VisualRoute ([find.pcworld.com/36716](http://find.pcworld.com/36716))—can tell you if the problem originates with your ISP. Traceroute utilities display a bread-crum trail of the path that data takes from your PC to any

other on the Internet, checking how quickly each router responds. If the problem persists, and a traceroute shows a slow router hosted by your ISP, call your provider for repair service.

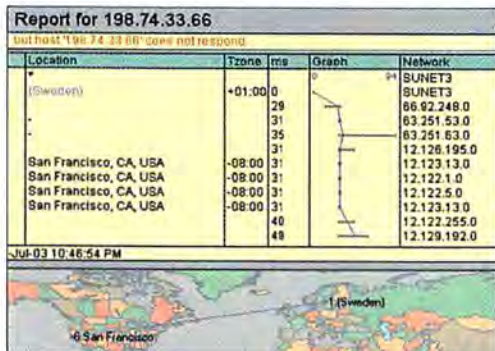
**Shop around:** Many DSL providers limit basic account speeds, and charge more for faster connections. This has sparked a price war among the largest providers, which now offer basic, no-frills plans at rates as low as \$25 a month. If you only check e-mail and want to surf occasionally, consider a cut-rate DSL account.

**Tweak it up:** Often, you can snap sluggish connections out of their torpor by power-cycling your cable or DSL modem (unplug it for a few seconds, then plug it back in) and your home gateway or router (if you use one). But you shouldn't have to power-cycle repeatedly to maintain an acceptable level of performance. Slowdowns can also be the result of incorrect networking settings in your operating system. Out of the box, Windows XP usually handles a broadband connection's high-speed data flow pretty well, but all versions of Windows can benefit from a small tweak to get the best results. Check out the Navas Cable Modem/DSL Tuning Guide ([find.pcworld.com/36539](http://find.pcworld.com/36539)) for tips.

### USE YOUR EXTRA FEATURES

ALONG WITH THE connection itself, your ISP provides other essential Internet services: bonus e-mail addresses, online file storage, software, and more. You may get these services from different providers—AOL, MSN, and Yahoo all partner with broadband ISPs, for example.

**Make use of multiple mailboxes:** You probably have your e-mail situation in hand, but did you know that many broadband ISPs give you several mailboxes? Most services let you create three to five e-mail addresses for a single account. That lets you separate business from pleasure by using a different address for each purpose. You can even offer the extra mailboxes to family members or coworkers (and shut down mail accounts at other ISPs you might be paying for).



VISUALROUTE software displays the location of a sluggish Internet connection on a world map.







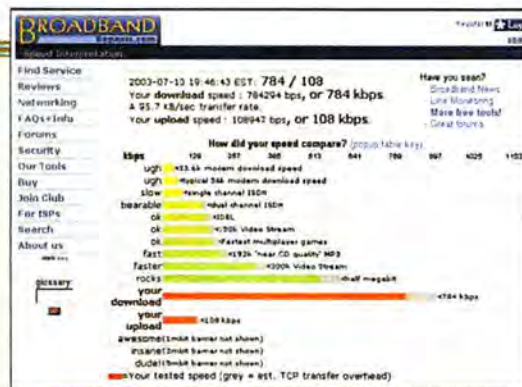
## Test Your Broadband Speed



**HOW FAST IS** your connection, really? That depends. Your PC and the ISP that connects it to the Internet are only part of the route that data travels between here and there. Broadband analyst John Navas says that hand-timed tests provide the best measure of your broadband performance, but you can still get a good thumbnail sketch of your connection speed by collecting the results of automatic tests from different sources. Always run a test from the location closest to your home.

Broadband provider Speakeasy.net

([www.speakeasy.net/speedtest](http://www.speakeasy.net/speedtest)) can test your download speed from any of the company's locations in major cities nationwide. DSLReports ([find.pcworld.com/35984](http://find.pcworld.com/35984)) tests both downstream and upstream speeds between your PC and one of two sites in California. And PCWorld.com's own Tools page ([find.pcworld.com/35987](http://find.pcworld.com/35987)) offers partner PC Pitstop's Internet speed test from servers in California. Run each of the tests multiple times at different times of day, and average the results. For more links to sites



**SOME BANDWIDTH** testing tools compare your download speed results with those of other users.

where you can run speed tests and make speed tweaks to your PC, peruse Eric Arnold's great big list of bandwidth testing sites ([find.pcworld.com/36383](http://find.pcworld.com/36383)).

Outside of these groups, which probably account for the bulk of the data flowing through Usenet, thousands more groups are dedicated to every conceivable topic, from user reviews of power tools, organized by manufacturer, to TV show fan clubs. You can check out newsgroups using any copy of Outlook Express, or with a free news reader like Forté's Free Agent ([find.pcworld.com/35978](http://find.pcworld.com/35978)).

If you don't see a newsgroup that you used to get through an earlier ISP, ask your new provider to carry it; Comcast, for example, has a newsgroup (attbi.newsgroup.requests) dedicated to such requests. If your ISP still won't carry a newsgroup you want to use, you can sign up for third-party services (such as AllTheNewsgroups.com), which charge a small monthly fee but provide unfettered access to the entire Usenet universe.

**Think dynamic:** When you sign up for broadband service, you may be given a choice between a dynamic IP address—which will change occasionally—or an unchanging, static IP address. You might think a static IP address is better, because serious Web-heads want them (static IPs make hosting servers easier, for instance) and ISPs often charge extra for the privilege. In many cases, however, even advanced broadband users can take ad-

vantage of the less-expensive dynamic address, with no loss of functionality.

If you run file, game, or Web servers through your broadband connection, for example, you may not need to switch to a service offering a static IP address: Sites like DynDNS.org will let you distribute a single, unchanging domain name to users, who can then find you no matter what your IP address is on a given day.

### BE CAREFUL OUT THERE

**Know your terms of service:** A router creates a network of PCs and can connect them all to the Internet. But even though many broadband service contracts specify that you may connect only one PC at a time to the network, as long as you don't invite an ISP representative into your home or office, the provider can do little to determine what is installed behind your router.

If you plan to violate your terms of service and install more than one PC, you're taking a chance. At the very least, don't expect to receive technical support from your broadband provider. At worst, you may lose your service altogether.

But if you want to throw caution to the wind, many routers do offer a useful feature for cloning your MAC interface address, allowing all the PCs within a local area network to appear (to the

outside world) as just a single computer.

**Use a firewall/router:** Most residential broadband services provide a modem, an ethernet cable, and setup instructions—but hardly any information about security. If you don't have a firewall, your computer is a sitting duck. (Visit [find.pcworld.com/36563](http://find.pcworld.com/36563) for firewall reviews.) A router can provide additional protection by preventing unwanted Internet scans from reaching your computer.

## How to Shop for Broadband

IF YOUR BROADBAND service starts to look chintzy compared with what your friends and colleagues are getting, you might decide that you're throwing your money away. But when it's time to switch providers, where do you start?

First, know that your choices are limited. Of the hundreds of broadband providers doing business in North America, only a handful are likely to offer service in your neck of the woods. And broadband coverage is certainly not yet universal: Sometimes major suburban—or even urban—areas are broadband-bereft. If you reside in a slow-speed zone that lacks both cable and DSL, you may be limited



to an expensive satellite-based service, or to DSL over ISDN (called IDSL), a costly, up-to-144-kbps version of DSL.

You can save a lot of time shopping for broadband service by asking friends and neighbors what they use. But don't rely solely on word of mouth: Check the phone book and newspaper ads for local services offering introductory pricing. You can also use Web sites—such as BroadbandReports.com, BroadBandBuyer.com, GetConnected.com, and Broadband.com—that promise to help you find broadband Internet service in your area.

With the exception of BroadbandReports.com, however, our informal sampling of these services indicated that they sometimes yield inaccurate and incomplete results. Registered users on BroadbandReports.com rate the providers they use and publish speed-test results, making this site (unlike others) an extended word-of-mouth service.

Just because many companies provide both a high-speed connection and the services (e-mail, news, and server space) that work over it, you don't have to buy everything from the same company. AOL, MSN, and Yahoo provide their consumer-gear services via other companies' broadband connections. If you like AOL's community and interface, for example, you can get it at a reduced rate if you "bring your own ISP." You may be able to find a local broadband ISP that offers great customer service, e-mail, and hosting. The main risk of this approach: Your favorite small, local ISP might go out of business due to competition with the large broadband providers.

### SELECT YOUR SPEED

IF YOU END UP choosing a DSL service (or, in a few cases, a cable service that offers a range of speeds at different prices), you'll need to select how much bandwidth you want. Residential DSL

almost always comes in a flavor called Asymmetric DSL (or ADSL), which offers several tiers of download speeds, ranging from 256 kbps to 1.5 mbps, coupled with 128-kbps upload speeds.

If you routinely download hundreds of megabytes of digitized music, video, or software, you'll see a substantial difference between the slower and faster speeds. If you just surf the Web, use e-mail, and download the occasional streaming video clip, you'll probably be happy with 384-kbps service.

### MIND YOUR CONTRACTS

MANY DSL PROVIDERS require you to sign up for a minimum of one year of service. As long as you don't have to skip town suddenly, this isn't usually a problem—after all, you're switching to what you have determined is currently the best available service you can get in your area. Just be mindful of any early-termination penalties. Cable service providers often let you buy service on a month-to-month basis, with some companies offering discounts for yearly contracts.

Of course, a large number of broadband users already have lots of experience with switching ISPs. That's because many have had two or three previous service providers go out of business or get swallowed up by a competitor.

Now, broadband providers seem to have moved into a second phase of battle—fierce competition over prices. As broadband becomes more mainstream, DSL providers in particular are willing to slash prices to grab market share.

That competition is a market dynamic you can use to your advantage. Knowing how to get the most from your current broadband service, and how to shop for a new one, puts you in the driver's seat. ■

*PC World Contributing Editor Scott Spanbauer writes the Internet Tips column.*



## Countdown to Switching ISPs

CHANGING FROM one broadband ISP to another doesn't have to be a nightmare if you take the right steps.

**T-minus six weeks:** Start looking for a new service. Contact your existing ISP to find out its e-mail and Web site forwarding policies, and what you need to do to disconnect.

**T-minus four to five weeks:** Order the new service; determine your new e-mail and Web site addresses.

**T-minus one week:** Call to confirm that the installer is still planning to show up at the appointed time. Inform frequent e-mail correspondents of your new e-mail and Web site addresses, and the changeover date.

**T-minus three days:** Make sure that you have copies of any important files (such as Web pages) that you stored on your current ISP's servers.

**T-minus one day:** Disconnect all wireless or wired networks from the PC that will connect to the new service.

**B-Day (Broadband Day), before installation:** Disconnect your current broadband modem, if you have one.

**B-Day, after installation:** Plug in the new broadband modem and any networking hardware. Reconfigure your e-mail program to receive mail from your old service, and to send and receive mail using the new service.

**B-Day plus one:** Test all Internet applications to make sure they work with the new service. Send a reminder to contacts about your new e-mail address. Upload Web pages or other files to the new ISP's servers.

**B-Day plus seven:** Evaluate your new service's speed. If you're switching from a dial-up account and your broadband service is working well, ask your dial-up provider to discontinue service and to forward messages to your new e-mail in-box.



# Productive & Professional in the SOHO

With upwards of 50 million US workers operating at least part-time from a small office/home office (SOHO), it is only natural that questions arise about how productive such workers are, compared with central office workers. Absent any hard data, we have only speculation.

However, there is a rising tide of opinion that the flexibility and convenience of the SOHO coupled with technology innovations offer at the very least the potential for workers to be more productive—perhaps a lot more productive—than office staff. Making a success of the SOHO route does involve a modicum of self-control (see “Expert Tips” below). And even if you come to work in jeans and a t-shirt, professionalism still counts.

## Looking professional online is easy

If you are among the millions of people running a small business from your SOHO, you want to be sure the outside world looks upon your business favorably. In the old days, a sign of integrity and stability was having your name displayed proudly above your storefront or office. In the age of the Internet, where business is done at the speed of light, a business that projects a strong image is one that has its own per-

sonal domain featured in its email address. This allows you to present your business and yourself in a professional, well-established way that “bill@AOL.com” or “bob@hotmail” just can’t accomplish.

Fortunately, getting your own personal email address today is as fast as it is easy, thanks to the services of Register.com ([www.register.com](http://www.register.com)). You can access

Register.com’s email services on the Web on a do-it-yourself basis. Or you can rely upon any of their highly trained, customer-oriented support staff to help you out. Either way, you can give your business the professional look and feel required today by securing your own unique domain in very lit-

tle time, and at a cost that is both affordable and fair.

In addition to the obvious business benefits of having your own email address and domain, there are many practical considerations. Even a one-person company can now have multiple aliases for sales, marketing, promotions, and so on. With Register.com, you can access your mail via the Web literally anywhere in the world. And as concerns about spam mount, you can have far greater control by gaining the ability to set whatever level of anti-spam protection you want.

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## Expert Tips for Going Solo in the SOHO

Here are a few of what experts agree are the most practical productivity tips for those going it solo in the SOHO.

### ■ Show up on time.

In the SOHO, you must provide your own discipline to get to work on time. Try logging your arrival time for one month. Barring any out-of-office obligations, aim for a 15-minute arrival window.

### ■ Take regular breaks only.

The SOHO does not come equipped with a license to goof off. Accustom yourself to taking a predetermined number of breaks of some reasonable duration.

### ■ Just say “no” to the fridge.

The SOHO is a fine place for a computer, but not for a refrigerator. In the SOHO, it is a constant temptation to leave your

desk for a bite or a drink. Say no, and your productivity (and waistline) will thank you.

### ■ Be the answer man.

Never leave the SOHO with unanswered phone calls or emails in the in-box. You have no admin on which to foist such tasks. The SOHO is a true do-it-yourself shop.





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# TOP 100

EDITED BY REVIEWS STAFF



140

## Top 15 Notebook PCs

Catch a movie: The \$1250 EMachines M5305 desktop replacement is a bargain for a wide-screen portable. The only drawback of this second-place value laptop is mediocre sound.

## Popcorn With Your Portable

### TEST Center

**Wide is in.** EMachines' M5305 is the latest entrant in a small but growing class of wide-screen notebooks, and the first to earn a spot on our *Top 15 Notebook PCs* chart. Credit goes to its relatively low price and solid performance. In recent months, we've looked at a smattering of notebooks with wide-aspect screens—models such as the Dell Inspiron 8500 and Apple's massive 17-inch PowerBook G4—and more models with wide-aspect screens are on the way from Toshiba, HP, and Gateway. With a wide-screen model, you'll get more room to tile Word or Excel windows alongside one another, or to display DVD movies.

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





#### Top 10 DVD Drives

DVD burners from (left to right) Pacific Digital, TDK, Pioneer, and Memorex debut on this month's chart. Taking center stage, the last three can write in multiple formats; the Pacific Digital is an inexpensive single-format burner.

149



#### Top 10 Digital Cameras

Canon's 3.2-megapixel PowerShot A70 comes with manual exposure controls. Also of note is its support for optional telephoto and wide-angle lenses.



#### Top 10 LCD Monitors

Eizo Nanao's new FlexScan L367 earned scores of Very good on both our text and our graphics tests. This model also has built-in speakers, and image adjustment software.

151

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### YOUR GUIDE TO THE TOP 100

EACH MONTH, WE TEST a large number of PCs, printers, monitors, and other products. Only the best products land on the charts, which are refreshed monthly.

Configurations are shown as tested. The overall rating for each product is calculated on a 100-point scale and reflects results from our hands-on evaluations and

performance tests. A 90-point score is exceptional, while one in the high 70s is above average.

For desktops and notebooks, the PC WorldBench 4 score is a measure of how fast a machine can run a mix of common business applications as compared with our baseline machine, a Gateway Select 1200 with a 1.2-GHz

Athlon processor, 128MB of PC133 SDRAM, and a 20GB hard drive. For example, a PC that scores 120 is 20 percent faster than the baseline system. The support policies score represents vendor support policies (not shown on charts). See [find.pcworld.com/15720](http://find.pcworld.com/15720) for additional details on how we compile charts for the Top 100.



## TOP 15 DESKTOP PCs

POWER SYSTEM			Overall rating	Street price (6/20/03)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best BUY</b> ABS Ultimate M5 find.pcworld.com/36536	NEW	92	Average \$2739	Windows XP Home	Outstanding 140	Powerful system has the chart's highest PC WorldBench 4 score and outstanding gaming scores; includes a great speaker set. (★★★★★)
2	Sys Technology Performance 3000+ find.pcworld.com/34112		87	Inexpensive \$2334	Windows XP Professional	Outstanding 136	This swift PC has a nice-sounding six-speaker audio system; an attractive extra is the wireless keyboard. (★★★★★ May 03)
3	Gateway 700X find.pcworld.com/35234		87	Expensive \$3254	Windows XP Home	Good 126	This system's huge amount of storage space and its rewritable DVD drive make it ideal for video editing. (★★★★★ July 03)
4	Dell Dimension XPS find.pcworld.com/36542	NEW	86	Very expensive \$3750	Windows XP Professional	Good 127	Dell's first foray into gaming PCs, this model delivered smooth performance in our game tests; the LCD monitor impressed us. (★★★★★)
5	Dell Dimension 8300 find.pcworld.com/35246		86	Expensive \$3148	Windows XP Home	Good 126	Well-designed Dimension has a roomy interior and comes with a high-end graphics card and plenty of disk space. (★★★★★ July 03)
6	Micro Express MicroFlex 30A find.pcworld.com/34742		86	Inexpensive \$2199	Windows XP Professional	Good 131	Quick and reasonably priced, the MicroFlex 30A includes a large LCD monitor and a graphics card with a TV tuner. (★★★★★ June 03)
7	@Xi Computer MTower 3000+ find.pcworld.com/35651		82	Inexpensive \$1993	Windows XP Home	Very good 133	This speedy system provides ample storage and memory, and carries a very appealing price. (★★★★★ Aug 03)
Percent of overall rating ▶				10 percent	25 percent		
VALUE SYSTEM			Overall rating	Street price (6/20/03)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best BUY</b> ABS Bravado Z280 find.pcworld.com/35636		87	Inexpensive \$1139	Windows XP Home	Very good 127	Unit includes a roomy hard drive and a strong set of Logitech Z-340 speakers for working with digital media. (★★★★★ Aug 03)
2	Compaq Presario S4000T find.pcworld.com/36548	NEW	83	Average \$1358	Windows XP Professional	Good 117	Reasonably priced system has a DVD drive and nice graphics but weak sound. Comes with a good collection of games. (★★★★★)
3	NuTrend Mega 2 find.pcworld.com/34121		82	Very inexpensive \$899	Windows XP Home	Outstanding 129	This system's neat, spacious case gives you plenty of expansion room. (★★★★★ May 03)
4	Micro Express MicroFlex 24A find.pcworld.com/32891		81	Inexpensive \$999	Windows XP Home	Outstanding 131	Still one of the speediest models on the chart, this low-cost machine offers plenty of bang for the buck. (★★★★★ Mar 03)
5	HP Pavilion 764n find.pcworld.com/35642		81	Average \$1410	Windows XP Home	Good 115	Well-equipped budget system carries a fast rewritable DVD drive and a multifunction media card reader. (★★★★★ Aug 03)
6	Polywell Poly 880NF2-2500 find.pcworld.com/34748		80	Inexpensive \$975	Windows XP Home	Very good 125	This low-cost Poly delivers good speed for business apps; the graphics card is somewhat weak for gaming. (★★★★★ June 03)
7	HP Pavilion 775e find.pcworld.com/36545	NEW	80	Expensive \$1659	Windows XP Home	Outstanding 128	Impressive performance, pleasant-sounding speakers, and a media card reader highlight this system. (★★★★★)
8	IBuyPower Value XP Pro find.pcworld.com/35684		79	Very inexpensive \$899	Windows XP Home	Good 119	Budget PC comes with a notably good 19-inch CRT monitor and a media card reader. (★★★★★ Aug 03)
Percent of overall rating ▶				20 percent	20 percent		

Go to [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings.

<sup>1</sup> Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. For more details, see "Your Guide to the Top 100" on page 135.

<sup>2</sup> Total capacity in gigabytes (may represent multiple drives).

BLAZING SPEED AND A POWERFUL set of features earn the home-oriented ABS Ultimate M5 the top spot on the power side of the chart. The Ultimate M5 notched a PC WorldBench 4 score of 140—the best of the Top 15. This system has a unique look, with a green neon light illuminating the interior of its black case, and extras that

include a media card reader and a powerful Logitech Z-680 speaker set that's ideal for DVD movies or games.

Dell's Dimension XPS, at number four, is the company's first PC specifically designed for high-end gaming. The sleek-looking metallic blue system came with



Visit [find.pcworld.com/36560](http://find.pcworld.com/36560) for reviews of all products tested this month and ranked in this chart.

	BASE CONFIGURATION						Extra features *	Graphics quality	Setup and ease of use	Vendor's reliability/ service
	CPU	RAM (MB/type)	Hard drive †	Monitor	Graphics	Case type ‡				
	2.2-GHz Athlon XP 3200+	1024/DDR400 SDRAM	160	19-inch CRT	128MB ATI Radeon 9800 Pro	Midsize tower	Good: DVD+R/RW drive, 16X DVD-ROM drive, media card reader (CF, SD/MMC, SM) <sup>§</sup> , Microsoft Works Suite 2002	Outstanding	Very good	Fair/ Good
	2.167-GHz Athlon XP 3000+	512/DDR333 SDRAM	180	17-inch LCD	128MB ATI Radeon 9700 Pro	Midsize tower	Good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, wireless keyboard and mouse, media card reader (CF, SM) <sup>§</sup> , Corel WordPerfect Office 2002	Outstanding	Good	*/*
	3.06-GHz Pentium 4	512/DDR400 SDRAM	500	18-inch LCD	128MB ATI Radeon 9800 Pro	Tower	Outstanding: DVD-R/RW drive, 48X/24X/48X CD-RW drive, Microsoft Office XP SBE, Pinnacle Studio 8	Very good	Good	Fair/ Fair
	3.06-GHz Pentium 4	1024/DDR400 SDRAM	240	18-inch LCD	128MB ATI Radeon 9800 Pro	Midsize tower	Very good: DVD+R/RW drive, 16X DVD-ROM drive, Microsoft Office XP SBE	Outstanding	Good	Good/ Fair
	3.06-GHz Pentium 4	1024/DDR400 SDRAM	200	18-inch LCD	128MB ATI Radeon 9800 Pro	Midsize tower	Very good: DVD+R/RW drive, 16X DVD-ROM drive, Microsoft Office XP SBE	Very good	Very good	Good/ Fair
	2.167-GHz Athlon XP 3000+	512/DDR333 SDRAM	120	19-inch LCD	128MB ATI All-In-Wonder Radeon 9700 Pro	Midsize tower	Very good: DVD-R/RW drive, 52X/24X/52X CD-RW drive, Pinnacle Studio 8	Outstanding	Good	*/*
	2.167-GHz Athlon XP 3000+	1024/DDR400 SDRAM	120	19-inch CRT	128MB Sapphire Radeon 9700 Pro	Midsize tower	Fair: 12X DVD-ROM and 32X/10X/40X CD-RW combination drive, Lotus Smart-Suite Millennium, Ulead VideoStudio 6	Very good	Good	*/*
	10 percent						10 percent	15 percent	5 percent	25 percent

	BASE CONFIGURATION						Extra features *	Graphics quality	Setup and ease of use	Vendor's reliability/ service
	CPU	RAM (MB/type)	Hard drive †	Monitor	Graphics	Case type ‡				
	1.83-GHz Athlon XP 2500+	512/DDR333 SDRAM	80	17-inch CRT	64MB EVGA E-GeForce Ti 4200	Midsize tower	Very good: DVD+R/RW drive, 16X DVD-ROM drive	Very good	Good	Fair/ Good
	2.8-GHz Pentium 4	512/DDR333 SDRAM	120	17-inch CRT	64MB ATI Radeon 9000	Minitower	Outstanding: DVD+R/RW drive, Microsoft Office XP Professional, Quicken 2003	Very good	Good	Fair/ Poor
	2-GHz Athlon XP 2400+	512/DDR400 SDRAM	60	17-inch CRT	64MB Asus V9180TD (GeForce MX 440-based)	Midsize tower	Good: 16X DVD-ROM drive, 48X/24X/48X CD-RW drive, Corel WordPerfect Office 2002	Fair	Very good	*/*
	2-GHz Athlon XP 2400+	512/DDR400 SDRAM	80	17-inch CRT	64MB Leadtek Win-Fast GeForce2 Ultra	Midsize tower	Fair: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, Ulead VideoStudio 6	Fair	Fair	*/*
	2.67-GHz Pentium 4	512/DDR266 SDRAM	120	17-inch CRT	128MB Asus V8170 (GeForce MX 440-based)	Minitower	Outstanding: DVD+R/RW drive, media card reader (CF, SD/MMC, SM) <sup>§</sup> , Corel WordPerfect Productivity Suite	Fair	Fair	Fair/ Poor
	1.83-GHz Athlon XP 2500+	256/DDR333 SDRAM	80	17-inch CRT	Integrated NVidia NForce2 using main memory	Midsize tower	Good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, Lotus SmartSuite 9.7, Ulead VideoStudio 6	Fair	Good	*/*
	2.167-GHz Athlon XP 3000+	512/DDR333 SDRAM	120	17-inch CRT	Integrated Intel 845G graphics using main memory	Minitower	Very good: DVD+R/RW drive, 40X/12X/40X CD-RW drive, media card reader (CF, SD/MMC, SM) <sup>§</sup> , Quicken 2003	Fair	Good	Fair/ Poor
	2.67-GHz Pentium 4	512/DDR400 SDRAM	80	19-inch CRT	64MB GeForce4 MX 440G	Midsize tower	Good: 52X/24X/52X CD-RW drive, Norton AntiVirus 2003	Fair	Good	*/*
	10 percent						10 percent	10 percent	5 percent	25 percent

† 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).

\* Unless otherwise stated, systems come with a modem and network adapter.

‡ CF = CompactFlash, MMC = MultiMediaCard, SD = SD memory card, SM = SmartMedia.

\* Insufficient data to give a rating.

an impressive 18-inch LCD monitor. This Dell also achieved high marks in our graphics tests; running Unreal Tournament 2003 at a resolution of 1280 by 1024, it delivered the second-fastest frame rates we've recorded to date. Thanks to its ten USB 2.0 ports (two in front and eight in

back), hooking up a multitude of USB-enabled devices to this system is a cinch.

Acer's Veriton 7600G just missed our power list. Its performance on our PC WorldBench 4 tests fell below that of systems on the chart, and we were not impressed with the 17-inch LCD accom-



**ABS ULTIMATE M5 offers speedy performance and great multimedia features.**



panying our unit. It rendered overly dark colors in DVD movies and in games. On the other hand, this business-oriented system does come with network management software and extra security features such as a BIOS-controlled USB lockout. See [find.pcworld.com/36557](http://find.pcworld.com/36557) for a review.

Our value roster hosts two new entrants: the Compaq Presario S4000T and the HP Pavilion 775e. The Compaq is nicely priced for a value system with a large 120GB hard drive and a rewritable DVD drive. We were pleased with this Presario's 17-inch CRT monitor, which displayed bright colors and sharp text. The PC also includes Office XP Professional Edition, another plus. Meanwhile, the HP Pavilion delivered reasonably strong speed in our PC WorldBench 4 tests and offers a front-mounted media card reader. It came with a set of Klipsch

ProMedia 2.1 speakers that produced good sound in movies and vocal tracks.

Two value PCs fell short this month. One was the Amax Power P4 (for a full review go to [find.pcworld.com/36551](http://find.pcworld.com/36551)), an ably equipped \$1995 machine with hard-drive rubber mounts and a quiet power supply—features designed to minimize system noise. Even so, the CPU fan emitted extremely loud and distracting whirs, nearly drowning out the LCD monitor's relatively tiny speakers when we played games and watched a DVD movie. We did appreciate the Power P4's looks, however: Its smooth black case is accented with small blue LED lights.

We also looked at the first PC from ViewSonic, a manufacturer better known for its monitors. Its M2000, equipped with the Windows XP Media Center operating system, has several characteristics

that set it apart—a petite silver case, a big 160GB hard drive, a front-mounted media card reader, and a beautiful 19-inch ViewSonic LCD. Despite the advanced features, it has some limitations: Our system included a wireless keyboard with built-in mouse buttons, but no extra mouse. While the integrated keyboard and mouse decrease clutter and allow you to slouch on the couch to surf the Internet, we found using them to navigate Windows frustrating. And although the three primary control buttons—located in the top corners of the keyboard—were sensitive to the touch, they were not precise when we selected tasks or desktop items such as the Start menu. We also had difficulty using the mouse buttons when playing Return to Castle Wolfenstein. See [find.pcworld.com/36554](http://find.pcworld.com/36554) for a complete review of the M2000. ■

## TECH TREND

# Built-In Media Card Readers Offer More Convenience

THE RAPID SPREAD of digital cameras, PDAs, and MP3 players, almost all of which store information on flash media such as CompactFlash or SD memory card, has prodded desktop and notebook manufacturers to add media card readers to their systems, thereby eliminating one more device from your desk. Readers vary wide-

ly in the number and types of media they support. Before you buy a PC, check whether its built-in reader works with the format you use. Many, but not all, such readers support Sony's Memory Stick, for example. And scarcely any readers as yet support the new XD-Picture Card from Olympus and Fujifilm.



ONE SLOT ON THE HP Pavilion 775e reads CompactFlash cards, and another reads SmartMedia, SD, and Memory Stick.



SONY'S VAIO PCG-V505AX notebook has a built-in card reader as well, but it reads only Memory Stick media.



THE AMAX POWER P4 has four separate, dedicated card readers for CompactFlash, SmartMedia, SD, and Memory Stick.



YOU CAN STORE OODLES of data on these cards; some CompactFlash cards are capable of holding 2GB worth of information.



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use them to concentrate at the office, reduce the whine of neighborhood lawn mowers or watch a movie during your next flight. Or simply relax in peace.

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## TOP 15 NOTEBOOK PCs

POWER NOTEBOOK		Overall rating	Street price (6/30/03)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best Buy</b> IBM ThinkPad T40 find.pcworld.com/34817	89	Very expensive \$3099	Windows XP Professional	Outstanding 124	Price drops \$150 on this lightweight laptop with dual pointing devices, numerous wireless-networking options, and long battery life. (★★★★★: June 03)
2	Toshiba Tecra S1 find.pcworld.com/36074	88	Expensive \$2879	Windows XP Professional	Outstanding 125	Conveniences include dual pointing devices and an SD memory card slot. The unit's battery life is the longest we've recorded thus far. (★★★★★: Aug 03)
3	Gateway 450X find.pcworld.com/35312	88	Very inexpensive \$1803	Windows XP Professional	Very good 117	Plain-looking one-bay notebook offers a great keyboard and has legacy connections. Falls \$96 in price this month. (★★★★★: July 03)
4	Dell Latitude D600 find.pcworld.com/36077	87	Inexpensive \$1986	Windows XP Professional	Outstanding 122	Midweight machine has legacy ports, but unappealing sound and a springy keyboard. Price plunges by \$180. (★★★★★: Aug 03)
5	IBM ThinkPad R40 find.pcworld.com/34181	83	Inexpensive \$2089	Windows XP Professional	Average 107	Well-designed midsize model includes a ThinkLight to illuminate the keyboard; 802.11b Wi-Fi is an extra-cost option. (★★★★★: May 03)
6	Dell Inspiron 8500 find.pcworld.com/35621	79	Average \$2365	Windows XP Home	Average 105	Elegant blue-and-silver notebook has an extrawide screen, but its keyboard feels flimsy. Works with an optional port replicator. (★★★★★: July 03)
7	HP Pavilion Ze5300 find.pcworld.com/36203	<b>NEW</b> 79	Inexpensive \$1974	Windows XP Professional	Average 108	Hefty consumer-oriented all-in-one packs plentiful connections and a rewritable DVD drive. (★★★★★)
Percent of overall rating ▶			15 percent	20 percent		
VALUE NOTEBOOK		Overall rating	Street price (6/30/03)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best Buy</b> Dell Inspiron 500m find.pcworld.com/36080	80	Average \$1616	Windows XP Home	Very good 114	Lightweight unit has an external battery-power gauge and a built-in spring-loaded tab release for removing bay devices. (★★★★★: Aug 03)
2	EMachines M5305 find.pcworld.com/36212	<b>NEW</b> 76	Inexpensive \$1250	Windows XP Home	Very good 109	The wide-format screen is great for both work and watching DVD movies, but the M5305's weak sound was disappointing. (★★★★★)
3	Averatec 3150P find.pcworld.com/36197	<b>NEW</b> 75	Very inexpensive \$1025	Windows XP Professional	Average 94	Thin, light, and wireless ready, this bargain portable is good for the road. It's relatively slow, but fine for basic computing and e-mail. (★★★★★)
4	Amax Elite 6033D find.pcworld.com/35318	75	Expensive \$1795	Windows XP Professional	Very good 115	Unit designed for convenience includes slots for an SD card and a Memory Stick, and an optical drive on the front. (★★★★★: July 03)
5	Dell Inspiron 5100 find.pcworld.com/36083	75	Expensive \$1755	Windows XP Home	Outstanding 117	Distinctive blue-and-silver laptop's hard drive and memory slots are easy to access. (★★★★★: Aug 03)
6	Premio Kaypro A1100 find.pcworld.com/36200	<b>NEW</b> 73	Average \$1409	Windows XP Professional	Good 108	Heavy unit has good sound, a combo drive on the front, a fixed floppy drive, and all legacy ports (parallel, PS/2, and serial). (★★★★★)
7	Micro Express NP1024A find.pcworld.com/35321	73	Average \$1399	Windows XP Professional	Very good 111	A cool bluish-silver lid, dedicated audio controls, and a SmartMedia slot distinguish this unit. (★★★★★: July 03)
8	Sharp Actius MM10 find.pcworld.com/36575	61	Average \$1499	Windows XP Home	Poor 50	This notepad-size model can sync data with a desktop via its docking cradle. It has limited connections and a small keyboard, though. (★★★★★: Aug 03)
Percent of overall rating ▶			20 percent	15 percent		

Go to [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings.

<sup>1</sup> Performance word scores reflect comparisons of PCs in the same category (power or value). For more details, see "Your Guide to the Top 100" on page 135.

<sup>2</sup> Except where noted, all Intel CPUs are SpeedStep chips, which run at a slower speed on battery power. (We performance-test all notebooks plugged in.)

TEST  
Center

IBM'S THINKPAD T40 recaptures power Best Buy status this month, thanks to a \$150 price drop and an upgrade to a DVD-ROM/CD-RW combination drive. Joining the power ranks at number seven, HP's new, portly Pavilion Ze5300 packs a rewritable DVD drive and a FireWire port for making movies on the road. On the value side of

the chart, the Dell Inspiron 500m earns our Best Buy award for its impressive performance and near 4-hour battery life. EMachines reenters the notebook market and takes second place with its new wide-screen M5305, a well-designed portable selling for a modest \$1250. Averatec, a



Visit [find.pcworld.com/36419](http://find.pcworld.com/36419) for reviews of all products tested this month and ranked in this chart.

	BASE CONFIGURATION						Extra features <sup>1</sup>	Overall design	Battery life (hours:min) <sup>4</sup>	Average weight (pounds) <sup>5</sup>	Vendor's reliability/ service
	CPU <sup>2</sup>	Screen (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Multi-purpose bays					
	1.6-GHz Pentium M	14.1	512	80	Touchpad, eraserhead	1	Very good: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in 802.11a/b Wi-Fi and Bluetooth	Outstanding	Outstanding/ 6:23	Light/ 6.2	Good/ Good
	1.6-GHz Pentium M	15	512	40	Touchpad, eraserhead	1	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi, SD memory card slot	Very good	Outstanding/ 6:38	Average/ 7.6	Good/ Fair
	1.5-GHz Pentium M	15	256	40	Touchpad	1	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port, Microsoft Works 2003	Very good	Very good/ 3:49	Average/ 7.4	Good/ Fair
	1.6-GHz Pentium M	14.1	512	40	Touchpad, eraserhead	1	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi, Smart Card reader	Good	Good/ 3:26	Average/ 6.5	Fair/ Fair
	2.2-GHz Pentium 4-M	15	256	60	Touchpad, eraserhead	1	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, FireWire port	Outstanding	Good/ 3:22	Average/ 7.2	Good/ Good
	2.4-GHz Pentium 4-M	15.4 <sup>6</sup>	512	40	Touchpad, eraserhead	1	Very good: DVD+R/RW drive, 16MB USB drive, FireWire port, Quicken 2002 New User Edition, Paint Shop Pro	Very good	Fair/ 2:19	Heavy/ 8.6	Fair/ Fair
	2.8-GHz Pentium 4 <sup>7</sup>	15	512	60	Touchpad	0	Very good: DVD+R/RW drive, built-in 802.11b Wi-Fi, FireWire port, Corel WordPerfect, Quattro Pro 9	Fair	Limited/ 1:40	Heavy/ 9.2	Good/ Poor
	5 percent						10 percent	10 percent	5 percent	10 percent	25 percent

	BASE CONFIGURATION						Extra features <sup>3</sup>	Overall design	Battery life (hours:min) <sup>4</sup>	Average weight (pounds) <sup>5</sup>	Vendor's reliability/ service
	CPU <sup>2</sup>	Screen (Inches)	RAM (MB)	Hard drive	Pointing device	Multi-purpose bays					
	1.3-GHz Pentium M	14.1	256	30	Touchpad	1	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, gigabit ethernet, Corel WordPerfect Productivity Pack	Good	Very good/ 3:54	Average/ 6.4	Fair/ Fair
	1.8-GHz Mobile Athlon XP-M 2200+	15.4*	512	40	Touchpad	0	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, Microsoft Works 2002	Fair	Fair/ 2:49	Heavy/ 7.8	1/ *
	1.4-GHz Mobile Athlon XP-M 1600+	12.1	256	30	Touchpad	0	Fair: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi	Fair	Fair/ 2:50	Very light/ 5.3	1/ *
	2.8-GHz Pentium 4 <sup>7</sup>	15	512	40	Touchpad	1	Very good: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi, FireWire port, Microsoft Works 2003	Very good	Limited/ 1:56	Heavy/ 8.5	1/ *
	2.67-GHz Pentium 4 <sup>7</sup>	15	512	40	Touchpad	0	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi, WordPerfect Productivity Pack	Fair	Limited/ 1:48	Very heavy/ 9.5	Fair/ Fair
	2-GHz Pentium 4 <sup>7</sup>	15	512	40	Touchpad	1	Good: 8X DVD-ROM and 8X/4X/24X CD-RW combo drive	Fair	Fair/ 2:25	Heavy/ 8.8	1/ *
	2.4-GHz Pentium 4-M	14.1	512	40	Touchpad	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in 802.11b Wi-Fi, FireWire port	Fair	Fair/ 2:00	Average/ 7.7	1/ *
	1-GHz Crusoe TM5800	10.4	256	15	Touchpad	0	Fair: external 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in 802.11b Wi-Fi	Fair	Fair/ 2:42	Very light/ 4.2	1/ *
	5 percent						10 percent	10 percent	5 percent	10 percent	25 percent

<sup>1</sup> Word score reflects both listed and unlisted features. Unless otherwise noted, all notebooks have a built-in modem and network adapter.

<sup>2</sup> Unless otherwise noted, all notebooks come with a lithium ion battery.  
<sup>3</sup> Includes computer, AC adapter, power cord, optical drive, and floppy drive (if offered).  
<sup>4</sup> Wide-aspect screen.

<sup>5</sup> Single-speed desktop CPU.  
<sup>6</sup> Insufficient data to give a rating.

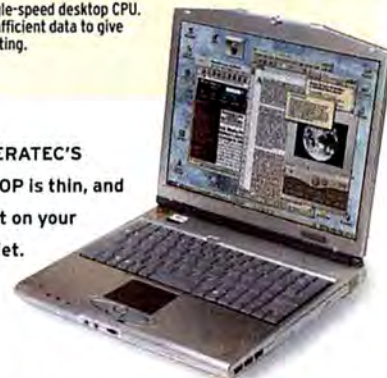
company new to our *Top 100* charts, grabs third place with the 3150P; this \$1025 travel companion weighs just 4.5 pounds (without the power adapter), has a small but workable keyboard, and comes with wireless-networking capabilities.

The final value newcomer is a desktop-

replacement notebook. Premio's Kaypro A1100 strikes a good balance between performance and battery life.

We also tested Sony's chic, lightweight VAIO PCG-V505AX for our value roster this month, but Sony replaced it with the similar V505BX before press time. ■

**AVERATEC'S 3150P** is thin, and light on your wallet.







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## 1U Server



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512MB ECC registered DDR266 SDRAM memory (Up to 12GB)  
2 x 36GB Seagate Cheetah 10,000rpm Ultra320 SCA Hard Drive  
Slim CD-ROM & 1.44MB Floppy drive  
3 x Hot-swap Ultra320 SCA 1" SCSI drive carriers  
Intel® 82546EB Dual Port Gigabit Ethernet Controller  
ATI Rage XL 8MB PCI Graphic Controller  
Onboard Adaptec AIC-7902 dual channel Ultra320 SCSI controller  
1U Rackmount Chassis w/400W power supply  
1 64-bit, 133MHz PCI-X (full length) 1 64-bit, 66MHz PCI (Low Profile)  
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## 2U Server



\*\*\* Black color available

### ZT Department Server X9006

**\$ 1,898.00**

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1 x 36GB Seagate Cheetah 10,000rpm Ultra320 SCA Hard Drive  
Slim CD-ROM & 1.44MB Floppy drive  
6 x Hot-swap Ultra320 SCA 1" SCSI drive carriers  
Intel 82546EB Dual Port Gigabit Ethernet Controller  
ATI Rage XL 8MB PCI Graphic Controller  
Onboard Adaptec AIC-7902 dual channel Ultra320 SCSI controller  
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Total of 6 PCI-X (low profile) Max up to 2 64-bit, 133MHz PCI-X 1X 5.25" Drive bay  
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## 4U Server



### ZT Enterprise Server X9007

**\$ 2,198.00**

Intel® Xeon™ Single Processor 3.06GHz (Dual Ready)  
Intel® E7505 chipset 533FSB Server Board  
512MB ECC registered DDR266 SDRAM memory (Up to 12GB)  
1 x 36GB Seagate Cheetah 10,000rpm Ultra320 SCA Hard Drive  
Slim CD-ROM & 1.44MB Floppy drive  
7 x Hot-swap Ultra320 SCA 1" SCSI drive carriers  
Dual Channel (3+4) SCA backplane provides power, bus termination, with SAF-TE  
Intel 82545EM Dual Port Gigabit Ethernet Controller  
ATI Rage XL 8MB PCI Graphic Controller  
Onboard Adaptec AIC-7902 dual channel Ultra320 SCSI controller  
4U Rackmountable w/Triple Redundant 600W power supply (Can Convert Tower)  
1x 8xAGP Pro 1.5V (1x 64-bit 133MHz PCI-X, 2x 64-bit 100MHz PCI-X, 2x 32-bit 33MHz PCI)  
Microsoft® Windows® Server 2003 Edition (Six Month trial Version)  
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Seagate® 80GB Serial ATA/150 (8MB Cache) 7200rpm Hard Drive  
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Integrated Intel® Extreme Graphics 2 controller  
Pioneer 4x DVD Recordable & 16x DVD-ROM  
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U.S. Robotics 56k V.90 Fax Modem  
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1.44MB Floppy Drive  
Integrated Intel® Extreme Graphics 2 controller  
52x32x52 CD-RW Drive & 16x DVD Drive  
Onboard SoundMAX 4 XL with AudioESP audio subsystem  
Intel® 10/100 LAN  
U.S. Robotics 56k V.90 Fax Modem  
In-win V506 MicroATX Tower Case  
Logitech Internet Keyboard & Optical Wheel Mouse  
Logitech Z-340 3 Piece Speaker System  
Microsoft® Windows® XP Home Edition  
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- 14.1" XGA TFT Display 1024x768 Resolution
- SuperTalent™ 256MB DDR SDRAM
- 40GB Ultra ATA Hard Drive
- 16X10X24X CD-RW / 8X DVD-ROM Combo Drive
- Integrated 10/100 Fast Ethernet LAN
- Integrated V.92 56K Modem
- 1 IEEE 1394 Firewire Port
- 4 USB 2.0 Ports
- Microsoft® Windows® XP Professional
- 5-hr Li-Ion Battery
- 4.9-lb Light Weight
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## TOP 5 PHOTO PRINTERS

Visit [find.pcworld.com/36500](http://find.pcworld.com/36500) for additional reviews.

	PHOTO PRINTER	Street price (6/27/03)	Overall rating	Score/speed for photo (ppm)	Print quality for photos	Cost/number of color cartridges	Comments
1	<b>Best Buy</b> Epson Stylus Photo 900 <b>NEW</b> <a href="http://find.pcworld.com/35444">find.pcworld.com/35444</a>	\$199	84	Fair/ 0.3	Outstanding	\$30/1	<b>FEATURES:</b> 5760-by-720-dpi maximum resolution; banner maximum paper size; parallel and USB 1.1 ports. <b>SUMMARY:</b> Color photos exhibited very smooth gradations and extremely sharp details. Banding, however, made photos printed on plain paper less appealing. Text appeared crisp. (★★★★☆)
2	HP Photosmart 7550 <a href="http://find.pcworld.com/32102">find.pcworld.com/32102</a>	\$300	80	Fair/ 0.3	Very good	\$25/2	<b>FEATURES:</b> 4800-by-1200-dpi maximum resolution; tabloid maximum paper size; CompactFlash, SD, SmartMedia, and Sony Memory Stick slots; preview monitor; two USB 1.1 ports. <b>SUMMARY:</b> Details in a test photo were sharper than in the original image. Inks can last up to 70 years under glass without fading. (★★★★☆ Jan 03)
3	Canon i9100 Photo Printer <b>NEW</b> <a href="http://find.pcworld.com/36230">find.pcworld.com/36230</a>	\$500	80	Outstanding/ 1.5	Very good	\$12/5	<b>FEATURES:</b> 4800-by-1200-dpi maximum resolution; Super B (13-by-19-inch) maximum paper size; USB 1.1 port. <b>SUMMARY:</b> Colors were vibrant, but color gradations appeared a little pixelated. Text was crisp. Photos had sharp details and printed at almost twice the speed of the second-fastest printer here. (★★★★☆)
4	Canon i850 Photo Printer <a href="http://find.pcworld.com/35564">find.pcworld.com/35564</a>	\$150	77	Good/ 0.8	Good	\$12/3	<b>FEATURES:</b> 4800-by-1200-dpi maximum resolution; letter maximum paper size; parallel and USB 1.1 ports. <b>SUMMARY:</b> This fast photo printer is a good choice for budget-minded photographers, but images could be more vivid. Text looked very sharp. Provided excellent all-around performance. (★★★★☆ Jan 03)
5	Canon i70 Color Bubble Jet Printer <a href="http://find.pcworld.com/34334">find.pcworld.com/34334</a>	\$250	76	Good/ 0.7	Very good	\$22/1	<b>FEATURES:</b> 4800-by-1200-dpi maximum resolution; legal maximum paper size; portable; IrDA port (works only with Windows) and USB 1.1 port; direct-connect port for Canon digital cameras. <b>SUMMARY:</b> Portable printer competently output text and photos with excellent detail and accurate color in test images. (★★★★☆ May 03)

**FOOTNOTE:** \* Cost for standard tricolor cartridge; photo cartridge costs \$35. **HOW WE TEST:** Our test image measures 5 by 7 inches, at 2929 by 2092 dpi. Visit [find.pcworld.com/34616](http://find.pcworld.com/34616) for detailed information on how we test photo printers. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** The overall rating for each photo printer is based on output (37 percent), features (20 percent), ease of use (14 percent), speed (10 percent), support policies (7 percent), cost of ink (7 percent), and price (5 percent). See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings.

PHOTO PRINTERS' PRICES CONTINUE to drop, and interesting new features mean you can get more for your money.

This month's Best Buy is the first photo printer we've tested that prints directly onto CDs. In addition to printing glossy photos with very sharp detail and lovely shading and textures, the Epson Stylus Photo 900 prints

onto specially coated CD-Rs and write-once DVD discs. The results don't look as good as printed labels do, though, and feeding discs through the Photo 900 feels a little kludgy. You have to flip open the back of the printer, insert a plastic tray holding the blank disc in place, and then line up the tray with the print rollers.

Epson's CD-printing software doesn't provide many options for creativity—it can bend text around the edges of a CD and has a few basic drawing tools. To create compelling CD art you'd be better off using a more powerful illustration program. Though ink jet-printable CD-Rs and write-once DVDs are readily available online, you can't buy printable CD-RW or

rewritable DVD media yet. We think \$199 is a pretty good deal for such a versatile printer, especially considering the high quality of its glossy photos. However, the Photo 900 wasn't designed to handle basic home-office tasks and doesn't perform quite so well with plain paper. It printed dark, black text, but the edges looked a bit rough in places; narrow parallel lines overlapped; and gray-scale images showed faint but noticeable alternating stripes of orange and blue.

**BIGGER PAPER, HIGHER PRICE**

CANON'S NEW i9100 model offers its own exotic feature: the ability to print on Super B-size (13-by-19-inch) paper.



**THE EPSON STYLUS Photo 900 prints extremely sharp photos with smooth color gradations, though at a slow pace. It also prints onto specially coated CDs and DVDs.**

Using Canon's driver—and plenty of ink—you can blow up an image and split it onto 4, 9, or even 16 sheets, then line up the registration marks and tape the sheets together to form a poster. The ability to print on oversize paper doesn't come cheap, however: Canon charges \$500 for the i9100. On the other hand, the unit printed photos at a ripping 1.5 pages per minute—twice the rate of the next-▶





**TO PRINT DESIGNS** onto a disc, you insert the disc into the back of the Stylus 900 on a dedicated tray (top). The tray exits the front of the printer, bearing the printed disc.

fastest printer on the chart—and produced text at the fair clip of 3.9 ppm, though its characters looked somewhat grayish and rough at the edges. The i9100

generated distinct parallel lines and produced good detail and attractive textures on gray-scale photos, even on plain paper. On glossy paper, photos exhibited vivid color and sharp detail, marred only by blocky transitions in places.

### ADEPT AT PRINTING TEXT

AT THE OTHER END of the price scale comes Lexmark's \$100 P707. Despite its very low cost, the P707 offers four flash-memory readers that between them can accept the CompactFlash, Memory Stick, Microdrive, MultiMediaCard, SD (Secure Digital), and SmartMedia formats. And the card readers do double duty as readers for your PC, since the Lexmark driver lets you download files from memory cards to your system.

The P707 didn't place on this month's Top 5 chart because its images failed to stand up well against others we've seen. Though its photos on glossy paper had attractive, smooth textures, their details weren't as sharp as we've come to expect. In addition, the PC World Test Center clocked the P707's photo output at a mind-



**THE CANON i9100** printed detailed photos with rich colors, and churned them out five times faster than our Best Buy—but it's also the priciest printer on the chart.

numbingly slow 10 minutes per page.

On the other hand, a stronger case can be made for the P707 as a general-purpose printer that also produces photos. That's because it generated text at a very zippy 5.1 pages per minute; the text looked about as sharp and solid as any we've seen from an ink jet printer.

Bargain-hunters should note that the printer comes with color and photo ink cartridges, but does not come with plain black ink that's recommended for text; that cartridge costs an extra \$29. ■

## How the Prints Measure Up

THE PHOTOGRAPHS BELOW were printed at each printer's highest quality settings, on paper recommended by the manufacturer. Our judges looked for rich and accurate colors, sharp details, and smooth color transitions.



Photo at 100%



Photo at 100%



Photo at 100%



Photo at 100%



Photo at 100%



Photo at 300%



Photo at 300%



Photo at 300%



Photo at 300%



Photo at 300%

**THE EPSON Stylus Photo 900** printed photos with vivid colors, sharp details, and smooth color transitions.

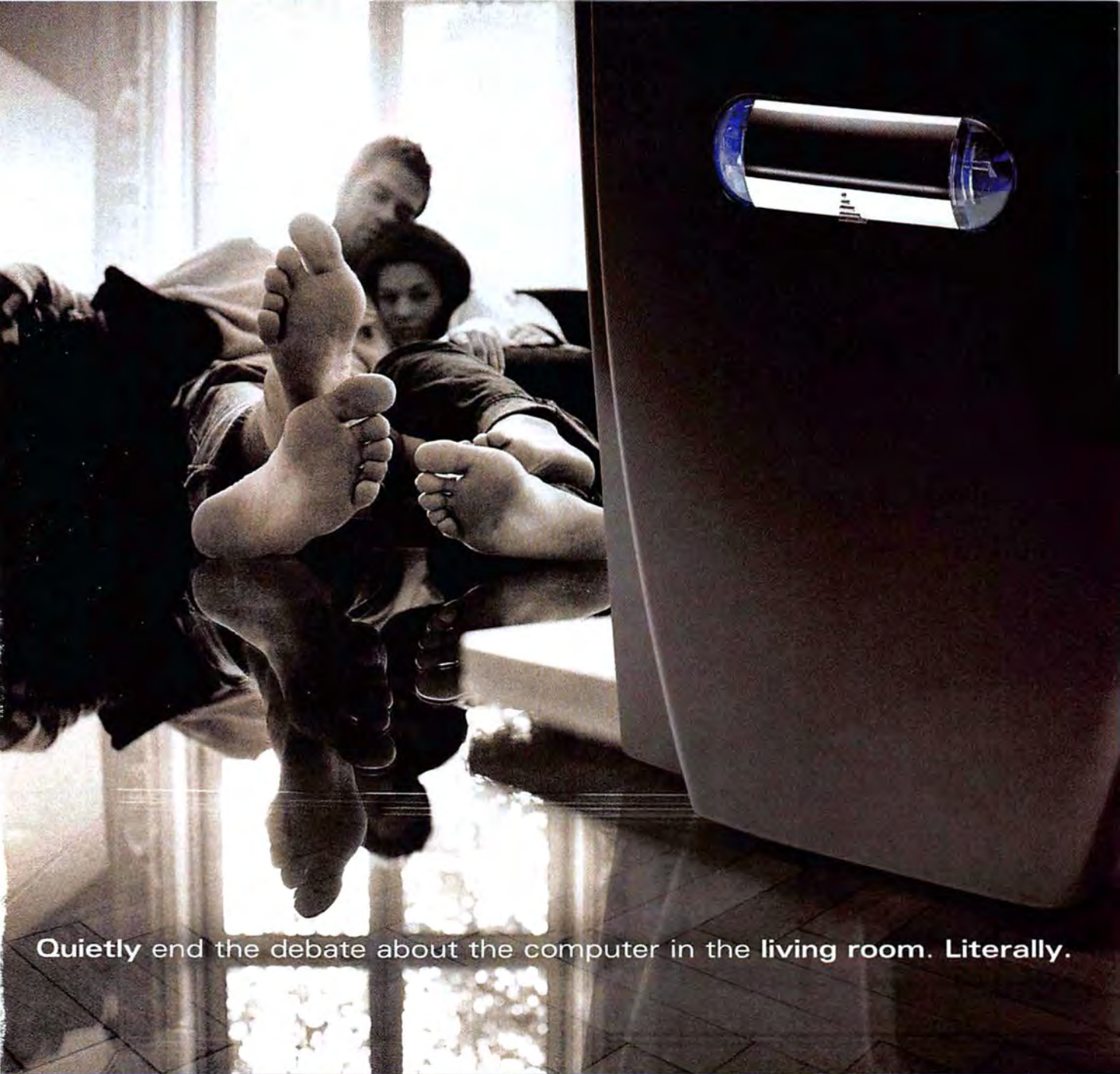
**THE HP Photosmart 7550** printed richly colored photos that, curiously, looked sharper than the original test image.

**CANON'S i9100** printed sharp-looking photos with vibrant colors and smooth textures, but color gradations looked somewhat spotty.

**CANON'S i850** printed attractive photos, though colors weren't extremely vibrant and textures appeared slightly rough.

**THE PORTABLE Canon i70 Color Bubble Jet** printed photos with rich colors and sharp details that rivaled the desktop models' prints.





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# TOP 10 MONITORS

Visit [find.pcworld.com/36566](http://find.pcworld.com/36566) for reviews of all products tested this month and ranked in this chart.

OLD FAVORITES return this month, though newcomers claim four slots. The NEC MultiSync LCD1560M still reigns with the best image quality, but joining it at the top is Sharp's LL-T15G3, a basic model that boasts the lowest price. Having discontinued its 152B and 152T models, Samsung retains a

spot with the 152N, though the new unit posts lower performance scores. Both Eizo Nanao's FlexScan L367 and Planar's PL150M offer high-quality images and integrated speakers, and the Eizo comes with sophisticated adjustment software. Newcomers from Advueu, HP, and Sony miss the chart.

	15-INCH LCD MONITOR	Street price (6/28/03)	Overall rating	Quality of text/graphics	Comments
1	<b>Best BUY</b> NEC MultiSync LCD1560M <a href="http://find.pcworld.com/33005">find.pcworld.com/33005</a>	\$370	94	Outstanding/ Outstanding	<b>FEATURES:</b> 13.6 by 6.5 by 13.6 inches; 9.7 pounds; dual video inputs; tilt, swivel adjustments; TCO'95-compliant; three-year warranty; 24-hour daily toll-free tech support. <b>SUMMARY:</b> This stately coal-black unit shines, thanks to a triple treat of desirable features: rich screen colors, a four-port USB 2.0 hub, and unusually crisp sound from its built-in speakers. (★★★★★ Mar 03)
2	<b>Best BUY</b> Sharp LL-T15G3 <a href="http://find.pcworld.com/36389">find.pcworld.com/36389</a> <b>NEW</b>	\$280	93	Very good/ Very good	<b>FEATURES:</b> 13.3 by 5.7 by 12.3 inches; 8.4 pounds; analog video input; tilt adjustment; three-year warranty; 24-hour daily toll-free tech support. <b>SUMMARY:</b> Plain white monitor grabs attention for its low price and solid image quality. Offers advanced, but somewhat confusing, on-screen controls. A Mode button on the bezel allows you to toggle through three color-setting presets. (★★★★☆)
3	Compaq TFT 1520 <a href="http://find.pcworld.com/32921">find.pcworld.com/32921</a>	\$350	92	Very good/ Very good	<b>FEATURES:</b> 13.9 by 8.2 by 15.6 inches; 10.3 pounds; dual video inputs; tilt, height, pivot adjustments; three-year warranty; 24-hour daily toll-free tech support. <b>SUMMARY:</b> This model's panel can pivot 90 degrees into portrait mode, a plus for viewing Web pages or legal documents. In our tests it was better at displaying graphics than text. Judges especially liked its bright rendering of photographs. (★★★★☆ Mar 03)
4	NEC MultiSync LCD1560NX <a href="http://find.pcworld.com/34676">find.pcworld.com/34676</a>	\$340	91	Very good/ Very good	<b>FEATURES:</b> 13.6 by 6.5 by 13.6 inches; 8.2 pounds; dual video inputs; tilt adjustment; TCO'95-compliant; three-year warranty; 24-hour daily toll-free tech support. <b>SUMMARY:</b> Affordably priced for a monitor with dual inputs, the LCD1560NX displayed graphics slightly better than it did text. It lacks the USB 2.0 hub and speakers of its sibling, the LCD1560M. Icons for the control buttons are hard to see. (★★★★☆ June 03)
5	Cornea MP503 <a href="http://find.pcworld.com/34694">find.pcworld.com/34694</a>	\$290	89	Very good/ Outstanding	<b>FEATURES:</b> 15.1 by 2.5 by 14.1 inches; 5.1 pounds; analog video input; tilt adjustment; three-year warranty; 10.5-hour weekday toll-free tech support. <b>SUMMARY:</b> The model's unique easel-style stand allows for greater-than-average tilt adjustment. Colors looked deep but a bit dark on some test photos. Screens of Word and Excel documents showed sharp, focused text. (★★★★☆ June 03)
6	Samsung SyncMaster 152N <a href="http://find.pcworld.com/36401">find.pcworld.com/36401</a> <b>NEW</b>	\$329	88	Good/ Good	<b>FEATURES:</b> 13.4 by 6.9 by 13.9 inches; 7.5 pounds; analog video input; tilt adjustment; TCO'95-compliant; three-year warranty; 24-hour daily toll-free tech support. <b>SUMMARY:</b> Basic black monitor has a thin bezel and a built-in power supply. On-screen controls are easy to use. The bundled CD includes color-adjusting software and an excellent manual in HTML format. (★★★★☆)
7	Eizo Nanao FlexScan L367 <a href="http://find.pcworld.com/36386">find.pcworld.com/36386</a> <b>NEW</b>	\$389	88	Very good/ Very good	<b>FEATURES:</b> 12.8 by 6.8 by 13 inches; 8.2 pounds; dual video inputs; tilt, height adjustments; three-year warranty; 8-hour weekday toll-free tech support. <b>SUMMARY:</b> This thin-bezel monitor is available in black or gray, is height-adjustable, and provides basic speakers. Eizo's bundled Screen Manager Pro software allows you to adjust the display from your PC via a USB connection. (★★★★☆)
8	Dell UltraSharp 1504FP <a href="http://find.pcworld.com/32930">find.pcworld.com/32930</a>	\$379	88	Very good/ Very good	<b>FEATURES:</b> 13.7 by 6.8 by 14.1 inches; 8.3 pounds; dual video inputs; tilt, swivel adjustments; TCO'95-compliant; three-year warranty; 24-hour daily toll-free tech support. <b>SUMMARY:</b> This gray unit displayed bright and realistic colors, and sharp text. Horizontal viewing angles are narrower than those of other monitors, and you get no height adjustment capability. (★★★★☆ Mar 03)
9	Sony SDM-X52 <a href="http://find.pcworld.com/32933">find.pcworld.com/32933</a>	\$429	87	Very good/ Very good	<b>FEATURES:</b> 15.4 by 7.8 by 14.1 inches; 10.6 pounds; dual video inputs; tilt, height adjustments; three-year warranty; 24-hour daily toll-free tech support. <b>SUMMARY:</b> In our tests this stylish flat-panel monitor displayed colors with realistic richness and depth, and it rendered fonts on business documents evenly. The built-in speakers, however, produced thin sound at all volume settings. (★★★★☆ Mar 03)
10	Planar PL150M <a href="http://find.pcworld.com/36407">find.pcworld.com/36407</a> <b>NEW</b>	\$300	86	Very good/ Very good	<b>FEATURES:</b> 13.3 by 6 by 12.7 inches; 7.2 pounds; analog video input; tilt adjustment; three-year warranty; 11-hour weekday toll-free tech support. <b>SUMMARY:</b> In addition to fine image quality and a very wide viewing angle, this silver-bezel display provides integrated speakers. Its clever base folds flat against the back of the monitor to form a VESA-standard plate for wall mounting. (★★★★☆)

**FOOTNOTES:** \* 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. † Go to [find.pcworld.com/35954](http://find.pcworld.com/35954) for details. **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](http://www.displaymate.com)). See [find.pcworld.com/34613](http://find.pcworld.com/34613) for testing details. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Overall rating is based on text and graphics quality (20 percent each), price (25 percent), features and ease of use (20 percent), and support (15 percent). Monitors are TCO'99-compliant unless otherwise noted. For LCDs, the entire screen area is visible. Dimensions (given as width by depth by height) include the base. See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings.



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MSI 865PE NEO2-LS  
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AGP/SATA/A&L/ATX  
Motherboard



**D512M333SO** **BUY**

Samsung 512MB PC2700  
DDR33 Memory



**HD-800BB** **BUY**

Western Digital Caviar  
80GB 7200RPM 2MB Hard  
Drive



**DVDRW1300A** **BUY**

NEC ND-1300A Dual  
DVD+RW/+R DVD-RW/-R  
(16x/10x/40x CDRW)



**DL-DI614+** **BUY**

D-Link AirPlus 614+  
Wireless Cable/DSL Router



**BQ-FP747** **BUY**

BenQ FP747 17inch LCD  
Monitor (Beige)



**MP3MUV0128** **BUY**

Creative Labs NOMAD  
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**SO\_DSC-P10** **BUY**

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# TOP 10 DVD DRIVES

TOP 100

TEST  
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Visit [find.pcworld.com/36860](http://find.pcworld.com/36860) for reviews of all products tested this month and ranked in this chart.

THREE DUAL-FORMAT (DVD-RW and DVD+RW) burners, from Memorex, Pioneer, and TDK, debut this month. Two place at the top of the chart, dethroning the reigning dual-format champ, Sony's DRU-510A. The third dual-format drive, Pioneer's DVR-A06, almost didn't make the cut; this

model suffered from surprisingly slow performance on our rewritable DVD tests (both DVD+RW and DVD-RW) due to its bundled software's write-verification pass (which can't be disabled). Also this month, we see one drive—a single-format model—drop below the \$200 mark: Pioneer's DVR-A05.

	REWRITABLE DVD DRIVE	Street price (7/3/03)	Overall rating	Performance	Write speed/rewrite speed	Comments
1	<b>Best BUY</b> TDK Indi DVD 440N <b>NEW</b> <a href="http://find.pcworld.com/36668">find.pcworld.com/36668</a>	\$300	86	Very good	4:04/7:56 4:20/13:00 <sup>1</sup>	<b>FEATURES:</b> Internal IDE drive, 4X/2X DVD-R/W, 4X/2.4X DVD+R/W, 16X/10X CD-R/RW, 2MB buffer; Roxio DVD Builder, Easy CD & DVD Creator 6, Drag-to-Disc 6, PhotoSuite Lite, and DVD Max; TDK AudioCentral; 10.5-hour daily toll-free support. <b>SUMMARY:</b> Great performance and strong support policies (including excellent documentation) highlight this dual-format drive. (★★★★☆)
2	<b>Best BUY</b> Memorex DVD+/-RW Dual-X1 <b>NEW</b> <a href="http://find.pcworld.com/36671">find.pcworld.com/36671</a>	\$270	86	Very good	4:39/7:14 4:48/8:47 <sup>1</sup>	<b>FEATURES:</b> Internal IDE drive, 4X/2X DVD-R/W, 4X/2.4X DVD+R/W, 16X/10X CD-R/RW, 2MB buffer; Roxio DVD Builder 1.1, Easy CD & DVD Creator 6.1, Drag-to-Disc 6.1, VideoWave Movie Creator 6, PhotoSuite 5 SE, and DVD Max Player; 9-hour weekday toll-free support. <b>SUMMARY:</b> Dual-format model outperforms TDK's Indi DVD 440N on DVD+RW. Includes a versatile software bundle. (★★★★☆)
3	Pioneer DVR-A05 <a href="http://find.pcworld.com/32642">find.pcworld.com/32642</a>	\$190	84	Very good	6:43/36:27	<b>FEATURES:</b> Internal IDE drive, 4X/2X DVD-R/W, 16X/8X CD-R/RW, 2MB buffer; Roxio Easy CD Creator Basic 5.3, Pinnacle InstantWrite 4, ArcSoft ShowBiz, Sonic MyDVD 4, Sonic CinePlayer; 10.5-hour weekday toll-free support. <b>SUMMARY:</b> The least-expensive model on the chart, this drive shaves \$60 off its street price. Includes both DVD editing and authoring software. (★★★★☆ Feb 03)
4	Toshiba SD-R5112 <b>NEW</b> <a href="http://find.pcworld.com/36683">find.pcworld.com/36683</a>	\$250	82	Very good	4:21/9:14	<b>FEATURES:</b> Internal IDE drive, 4X/2X DVD-R/W, 16X/10X CD-R/RW, 2MB buffer; CyberLink PowerDirector Pro 2.5, CyberLink PowerDVD XP 4, Pinnacle Instant CD/DVD 7, VOB InstantWrite; 11-hour weekday toll-free support. <b>SUMMARY:</b> Good performer overall, but this single-format drive is sluggish on rewritable performance. Drive comes with separate discs to install each app. (★★★★☆)
5	Sony DRU-510A <a href="http://find.pcworld.com/35495">find.pcworld.com/35495</a>	\$315	82	Very good	6:51/4:40 7:43/8:43 <sup>1</sup>	<b>FEATURES:</b> Internal IDE drive, 4X/2X DVD-R/W, 4X/4X DVD+R/W, 24X/16X CD-R/RW, 8MB buffer; Sonic MyDVD 4, Veritas RecordNow DX 4.6 and DLA 3.57, Veritas Simple Backup, CyberLink PowerDVD, ArcSoft ShowBiz; 12-hour weekday and Saturday toll-free support. <b>SUMMARY:</b> Lightning-fast drive for burning DVD+RW discs using packet writing—if you can find 4X DVD+RW media. (★★★★☆ Jul 03)
6	Plextor PX-504A <b>NEW</b> <a href="http://find.pcworld.com/36686">find.pcworld.com/36686</a>	\$250	82	Very good	4:03/8:17	<b>FEATURES:</b> Internal IDE drive, 4X/2.4X DVD+R/W, 16X/10X CD-R/RW, 2MB buffer; Roxio DVD Builder, Easy CD Creator 5 DVD Edition 5.3, DirectCD 5.3, and PhotoSuite 5 LE; CyberLink PowerDVD; Retrospect Backup; 11-hour weekday toll-free support. <b>SUMMARY:</b> Excellent DVD+R performer, but lags on DVD+RW. Software bundle includes backup utility and image editor. (★★★★☆)
7	Hewlett-Packard DVD Writer Dvd300i <a href="http://find.pcworld.com/34454">find.pcworld.com/34454</a>	\$250	82	Very good	3:59/8:44	<b>FEATURES:</b> Internal IDE drive, 4X/2.4X DVD+R/W, 16X/10X CD-R/RW, 2MB buffer; ArcSoft ShowBiz DVD 1.3, Veritas RecordNow 4.56 and DLA 3.59, Veritas Simple Backup, CyberLink PowerDVD; 24-hour daily toll-free support. <b>SUMMARY:</b> This model is the fastest we've tested so far at authoring a DVD movie, and one of the few drives to include backup software. Price falls \$50. (★★★★☆ May 03)
8	Pacific Digital 4X DVD+R/+RW Burner <b>NEW</b> <a href="http://find.pcworld.com/36689">find.pcworld.com/36689</a>	\$240	81	Very good	4:17/6:59	<b>FEATURES:</b> Internal IDE drive, 4X DVD+R, 2.4X DVD+RW, 16X/10X CD-R/RW, 2MB buffer; Roxio DVD Builder 1.1, Easy CD & DVD Creator 6.1, and Drag-to-Disc 6.1; InterVideo WinDVD 4; 9-hour weekday toll-free support. <b>SUMMARY:</b> This single-format model is a good value—if you don't require copious documentation (the included manual is inadequate and thin). Lacks video editing software. (★★★★☆)
9	Alera Technologies DVD-R Quad Cruiser <a href="http://find.pcworld.com/33680">find.pcworld.com/33680</a>	\$390	80	Very good	7:11/52:41	<b>FEATURES:</b> External USB 2.0 drive, 4X/2X DVD-R/W, 10X/8X CD-R/RW, 2MB buffer; Ulead DVD MovieFactory 2 SE, Ahead Nero Express 5.5 and InCD 3.51, Ahead Nero Vision Express, CyberLink PowerDVD; 10-hour weekday toll-free support. <b>SUMMARY:</b> Though pricey, this external (USB 2.0 only) model can easily be shared among multiple systems. (★★★★☆ Apr 03)
10	Pioneer DVR-A06 <b>NEW</b> <a href="http://find.pcworld.com/36692">find.pcworld.com/36692</a>	\$280	77	Good	6:16/2:44:14 6:26/1:46:59 <sup>1</sup>	<b>FEATURES:</b> Internal IDE drive, 4X/2X DVD-R/W, 4X/2.4X DVD+R/W, 16X/10X CD-R/RW, 2MB buffer; Ulead DVD MovieFactory 2 SE, DVD PictureShow 2 SE, VideoStudio 7 SE, and DVD Player; Ahead Nero Express 5.5; SAI WriteDVD 5; 10.5-hour weekday toll-free support. <b>SUMMARY:</b> Hardware defect management offers extra data protection—but stretches rewrite times into hours, not minutes. (★★★★☆)

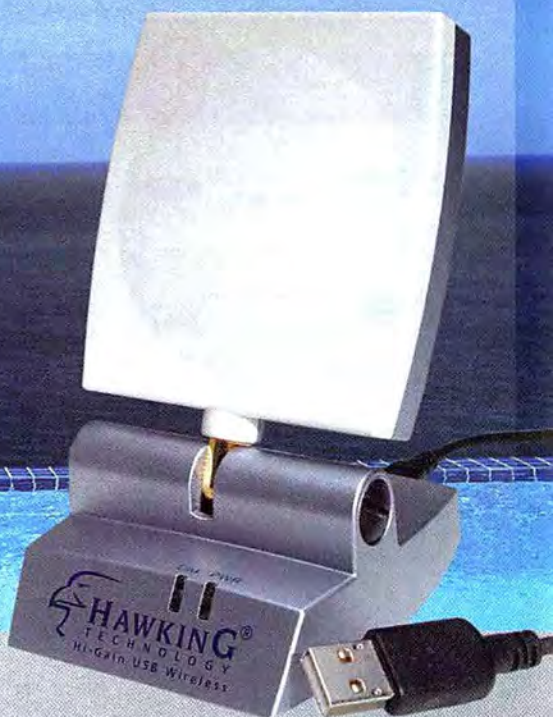
<sup>1</sup> Results are for DVD+R/RW, then for DVD-R/RW. **HOW WE TEST:** We test drives under Windows XP Home on PCs with 1.67-GHz Athlon XP 2000+ CPUs and 512MB of DDR SDRAM, using the DVD authoring, mastering, and packet-writing software supplied by the vendor, and media from the vendor or Verbatim. Some vendors may change drive suppliers midstream; our results reflect the configuration tested at time of review. **CHART NOTES:** Write speed is the time (in minutes:seconds) to write two 10-minute video files to DVD; rewrite speed, the time (in minutes:seconds) to format a blank rewritable DVD disc and to copy 1.18GB of data to the disc. Overall rating is based on performance (35 percent), price (25 percent), features (15 percent), ease of installation (15 percent), and service and support (10 percent). All drives listed have buffer underrun protection and a one-year warranty. See [find.pcworld.com/10850](http://find.pcworld.com/10850) for details on PC World's Star Ratings.



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# TOP 10 DIGITAL CAMERAS

TOP 100

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Visit [find.pcworld.com/36698](http://find.pcworld.com/36698) for reviews of all products tested this month and ranked in this chart.

FINE IMAGING, A LONG LIST of exposure controls, and a great price propel Canon's new 3.2-megapixel PowerShot A70 to the top of our chart. It's a rare sub-\$500 camera that offers optional telephoto and wide-angle add-on lenses. Also debuting this month, Samsung's 4-megapixel Digimax V4 match-

es the Canon's breadth of creative controls but costs \$150 more for an extra 0.8 megapixel of resolution. Olympus's Stylus 400 Digital and Fujifilm's F410 missed the chart. Both are small, simple, and elegantly designed, but expensive. The Stylus adds a nice touch: It's designed to be weatherproof.

	CAMERA: UNDER \$500	Street price (7/7/03)	Overall rating	Image quality	Ease of use	Battery life/ shots	Comments <sup>1</sup>
1	<b>Best BUY</b> Canon PowerShot A70 <b>NEW</b> <a href="http://find.pcworld.com/36512">find.pcworld.com/36512</a>	\$300	82	Very good	Good	Good/ 319	<b>FEATURES:</b> 3.2-megapixel resolution, 16MB CompactFlash media, 35mm to 105mm focal range, video recording with audio, 11.1 ounces. <b>SUMMARY:</b> Bargain price for a relatively advanced point-and-shoot model; has an extensive complement of manual controls and takes optional add-on lenses. (★★★★☆)
2	<b>Best BUY</b> Olympus C-4000 Zoom <a href="http://find.pcworld.com/30476">find.pcworld.com/30476</a>	\$450	82	Outstanding	Good	Outstanding/ 700	<b>FEATURES:</b> 4-megapixel resolution, 16MB SmartMedia card, 32mm to 96mm focal range, video recording (no audio), 14 ounces. <b>SUMMARY:</b> Inexpensive for an advanced camera, the C-4000 Zoom blends great image quality, manual exposure settings, and a long battery life. Menus can be confusing. (★★★★☆ Nov 02)
3	Nikon Coolpix 3100 <a href="http://find.pcworld.com/36065">find.pcworld.com/36065</a>	\$350	81	Good	Very good	Very good/ 480	<b>FEATURES:</b> 3.2-megapixel resolution, 16MB CompactFlash media, 38mm to 115mm focal range, video recording (no audio), 6.9 ounces. <b>SUMMARY:</b> One of the smallest Nikon units is also one of the easiest to operate; it has a huge selection of shooting aids for the casual photographer. (★★★★☆ Aug 03)
4	Kodak EasyShare DX6340 <a href="http://find.pcworld.com/36089">find.pcworld.com/36089</a>	\$330	81	Good	Very good	Outstanding/ 911	<b>FEATURES:</b> 3.1-megapixel resolution, 16MB internal memory and SD slot, 36mm to 144mm focal range, video recording with audio, 9.7 ounces. <b>SUMMARY:</b> The 4X optical zoom on this stylish model is longer than most. The camera docks directly onto a small, optional Kodak printer. (★★★★☆ Aug 03)
5	Olympus C-740 Ultra Zoom <a href="http://find.pcworld.com/36059">find.pcworld.com/36059</a>	\$499	80	Very good	Good	Outstanding/ 1219	<b>FEATURES:</b> 3.2-megapixel resolution, 16MB XD-Picture Card media, 38mm to 380mm focal range, video recording (no audio), 14.3 ounces. <b>SUMMARY:</b> The C-740 Ultra Zoom cleverly packs a 10X optical zoom lens in a relatively compact camera. Its images were among the best we've seen from a sub-\$500 model. (★★★★☆ Aug 03)
6	Nikon Coolpix 4300 <a href="http://find.pcworld.com/32000">find.pcworld.com/32000</a>	\$450	79	Outstanding	Fair	Fair/ 277	<b>FEATURES:</b> 4-megapixel resolution, 16MB CompactFlash media, 38mm to 114mm focal range, video recording (no audio), 10.1 ounces. <b>SUMMARY:</b> The fairly lightweight Coolpix 4300 takes wonderful shots and is easy to hold with one hand, but its multilayered menus make using its advanced features difficult. (★★★★☆ Jan 03)
7	Canon PowerShot S400 Digital Elph <a href="http://find.pcworld.com/35324">find.pcworld.com/35324</a>	\$499	79	Very good	Very good	Fair/ 214	<b>FEATURES:</b> 4-megapixel resolution, 32MB CompactFlash media, 36mm to 108mm focal range, video recording with audio, 7.6 ounces. <b>SUMMARY:</b> This elegantly designed, ultracompact model takes great shots and sports a sturdy stainless-steel body, but it lacks manual controls and has relatively short battery life. (★★★★☆ July 03)
8	Samsung Digimax V4 <b>NEW</b> <a href="http://find.pcworld.com/36593">find.pcworld.com/36593</a>	\$450	79	Good	Good	Very good/ 439	<b>FEATURES:</b> 4-megapixel resolution, 32MB SD media, 38mm to 114mm focal range, video recording with audio, 7.6 ounces. <b>SUMMARY:</b> The compact Digimax V4 has few programmed scene modes (they're useful for casual photographers) but has many creative controls, including a full manual-exposure setting. (★★★★☆)
9	Fujifilm FinePix 3800 <a href="http://find.pcworld.com/32450">find.pcworld.com/32450</a>	\$400	79	Good	Good	Very good/ 546	<b>FEATURES:</b> 3.24-megapixel resolution, 16MB XD-Picture Card media, 38mm to 228mm focal range, video recording with audio, 13.8 ounces. <b>SUMMARY:</b> The FinePix 3800 has a longer optical zoom and better battery life than most models on the chart; styled like a single-lens reflex camera, it's relatively bulky. (★★★★☆ Feb 03)
10	Sony Cyber-shot DSC-P72 <a href="http://find.pcworld.com/36020">find.pcworld.com/36020</a>	\$330	78	Good	Very good	Very good/ 462	<b>FEATURES:</b> 3.2-megapixel resolution, 16MB Memory Stick media, 39mm to 117mm focal range, video recording with audio, 9.1 ounces. <b>SUMMARY:</b> One of the few cameras we've seen with USB 2.0 for faster image transfers; this unit's compact size and easy-to-use controls make it a fine family camera. (★★★★☆ Aug 03)

**FOOTNOTE:** <sup>1</sup> Resolutions are expressed in effective pixels, focal range is identified as 35mm equivalent, and camera weights include batteries. **HOW WE TEST:** To gauge picture quality, we take a series of shots, with and without flash, at 640 by 480 resolution and at the camera's highest resolution. We photograph a complex still life and a mannequin to see how well each camera captures details and subtle colorings such as skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores; we then average those scores. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. **CHART NOTES:** Overall ratings are based on price (25 percent), picture quality (20 percent), ease of use (15 percent), features (20 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings.





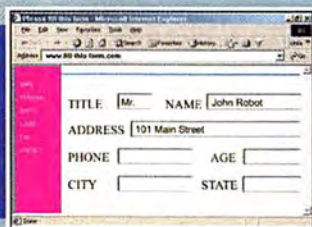
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# MORE REVIEWS

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URL at the top of each chart (for example, go to [find.pcworld.com/35993](http://find.pcworld.com/35993) for the *Top 10 Color Laser Printers* chart). Next month we'll look at multifunction printers, 17-inch LCD monitors, and digital cameras priced at under \$500.



DELL'S 19-INCH LCD, the UltraSharp 1901FP, is fully adjustable, with a tilt-and-swivel screen. You can also change the screen's height as needed, whether for ergonomics or to accommodate rotating the screen to a portrait orientation.

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6 Nikon Coolpix 4300 <a href="http://find.pcworld.com/32000">find.pcworld.com/32000</a>	6 Minolta-QMS Magicolor 2300 DeskLaser <a href="http://find.pcworld.com/33926">find.pcworld.com/33926</a>	6 NEC AccuSync LCD9V <a href="http://find.pcworld.com/35783">find.pcworld.com/35783</a>	6 Samsung SpinPoint SP8004H <a href="http://find.pcworld.com/36131">find.pcworld.com/36131</a>
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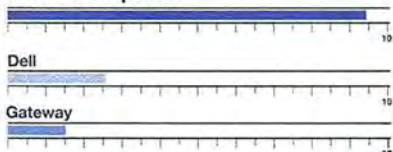
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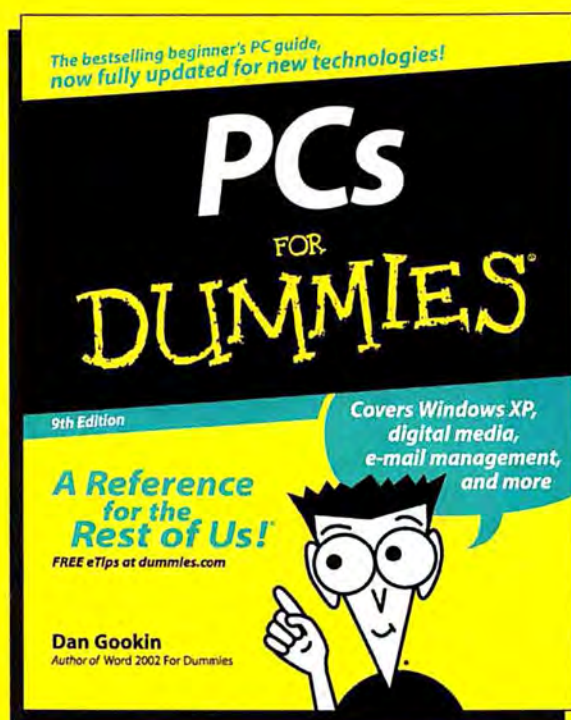
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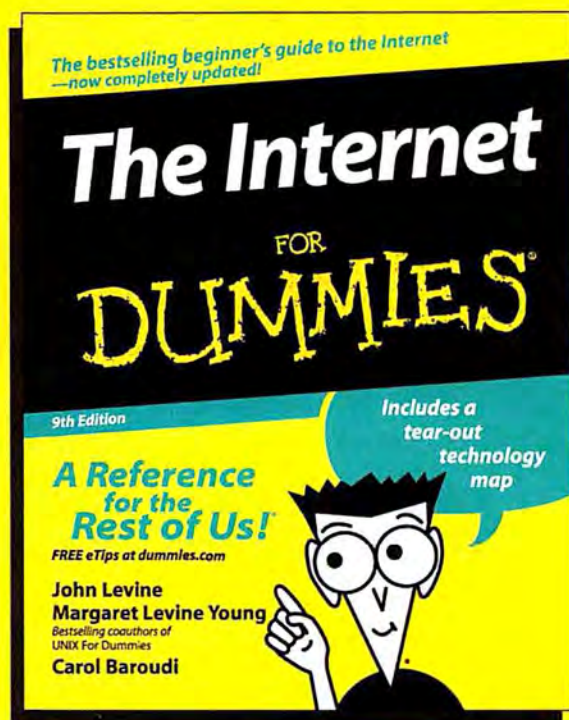
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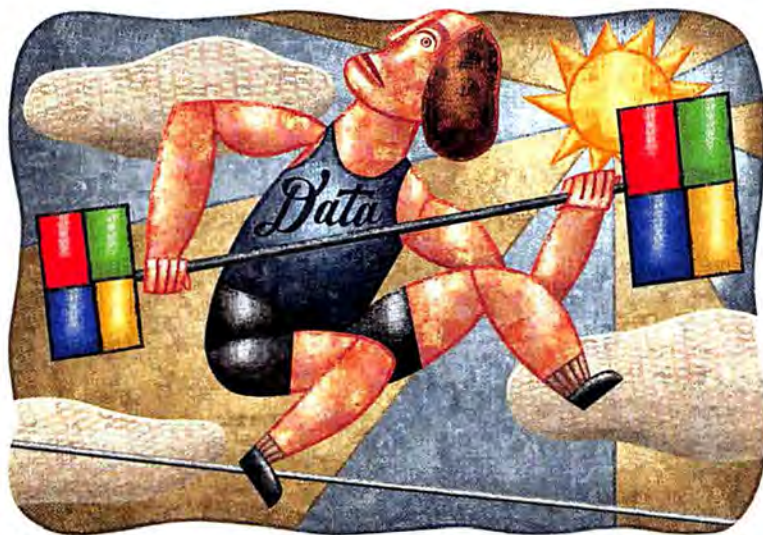
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# HERE'S HOW

EDITED BY MICHAEL S. LASKY, DENNIS O'REILLY, AND ERIC DAHL



## ANSWER LINE

LINCOLN SPECTOR

### How to Reinstall Windows Without Losing Your Data

OVER TIME, WINDOWS loses stability. If you keep a computer for more than two years, at some point you're going to have to bite the bullet and reinstall Windows from scratch. But contrary to popular belief, you won't have to reformat your hard drive (with one exception, discussed below). The bad stuff you need to get rid of is all in your Windows folder.

Before you begin, gather your Windows and application CD-ROMs. Back up your data files (just to be safe), and then clear

two days off your calendar. If everything goes smoothly, you can reinstall Windows in a few hours. But you have to assume something will go wrong: You may not be able to find a necessary CD, or data won't be where you thought it was, or something will simply refuse to work.

There's a difference between a repair reinstall and a complete reinstall. Though a repair (also called a refresh) will let you keep your current settings, a complete reinstall will give you a truly fresh version

of Windows. Repairs are fast and easy, but they don't fix anywhere near as many problems. The instructions below are for total reinstalls, except where noted.

#### YOUR VENDOR'S RESTORE CD

MOST COMPUTERS ship with a vendor-specific restore CD rather than with a Microsoft Windows CD-ROM. (If your PC came with a Microsoft Windows CD, or if you bought a retail copy of Windows, skip to the section for your version.)

Some restore CDs give you all the options of a full Microsoft Windows CD, but with better instructions and the convenience of having all the right hardware drivers. Others can do nothing except reformat your hard drive and restore it to the condition it was in when you bought the PC. (This case is the exception I mentioned above that requires a reformat.)

If your restore CD is reformat-only, back up your data files to a network or a removable medium before reinstalling Windows. If you use Windows 98 or Me, back up C:\My Documents, plus the folders inside C:\Windows discussed in the 98/Me section below. If you have Windows 2000 or XP, back up C:\Documents and Settings. Also back up any other folders in which you store your data files.

#### WINDOWS 98 AND ME CDs

THESE WINDOWS VERSIONS keep some important data inside your soon-to-be-erased Windows folder, so you need to copy several of its subfolders to another location. Right-click *My Computer* and select *Explore*. Double-click the C: drive icon (in Me, you may then have to click *View the entire contents of this drive*). Right-click in the right pane and select *New Folder*. Name the new folder **oldstuff**.



## 156 ANSWER LINE

A complete reinstall cures Windows' creeping decrepitude—without losing your data; sudden reboots revisited.

## 160 WINDOWS TIPS

The one-click way to check disks for errors; the pros and cons of Pro and Home; make windows transparent.

## 164 STEP-BY-STEP

Upgrade to a Serial ATA drive to overcome the data bottlenecks of its slower parallel ATA predecessors.

## 166 INTERNET TIPS

Set your browser to stop all Internet risks; stronger wireless security with WPA; go to Bat for safer e-mail.

## 168 HARDWARE TIPS

Stop people from getting into your PC by applying a boot password; Smartmon gives you a heads-up on drives that are ready to go bad.



166



FIGURE 1: MOVE THESE FOLDERS from your Windows folder to 'oldstuff' prior to your OS reinstallation.

Go to the Windows folder (you might have to click *View the entire contents of this folder*), hold down **<Ctrl>**, and select the following subfolders: *All Users*, *Application Data*, *Desktop*, *Favorites*, *Local Settings*, *Profiles*, *SendTo*, and *Start Menu*. If you don't see them all, select **View • Folder Options** (**Tools • Folder Options** in Me), click the **View** tab, select **Show all files**, and click **OK**. (If you still don't see them all, don't worry about it.) Press **<Ctrl>** and drag the folders to **C:\oldstuff** (see **FIGURE 1**).

Restart Windows with a start-up disk in your floppy drive. (To make a start-up floppy, insert a disk, select **Start • Settings • Control Panel**, double-click **Add/Remove Programs**, click **Startup Disk • Create Disk**, and follow the prompts.) At the Startup Menu, select **Start computer with CD-ROM support**. While the drivers load, insert your Windows CD-ROM.

Unless you're doing a repair reinstall, type the command **c:\windows\command\deltree /y c:\windows** and press **<Enter>**.

Deleting your old files could take time, but the **/y** switch suppresses confirmation prompts, so take a break.

When you're back at the A: prompt, type **x:setup**, where **x** is your CD drive letter (it's likely one letter past what it usually is in Windows, so if it's D: in Windows, it's probably E: here). Press **<Enter>** and follow the prompts.

Once you're back in Windows, reinstall your graphics card driver. If you have Windows set up for more than one user, you'll also have to recreate each account. Select **Start • Settings • Control Panel •**

**Users** to do so. It's important that the user names match those in the old installation. If you're not sure, open Windows Explorer and navigate to **C:\oldstuff\profiles**. There you'll find a folder for each registered user name (see **FIGURE 2**). Don't worry about passwords. Log off and log back on as each user. When you're done, log off and back on one more time, but instead of choosing a user name and a password, press **<Esc>** to enter Windows without being a specific user.

Select **Start • Programs • MS-DOS Prompt** (in Windows 98) or **Start • Programs • Accessories • MS-DOS Prompt** (in Windows Me). Type **xcopy c:\oldstuff\\*. \* c:\windows /s /h /r /c** and press **<Enter>** (if you want to know what the **xcopy** switches do, enter the command **xcopy /?**). When **xcopy** asks if it should overwrite a file, press **a** for **All**.

When **xcopy** is through, reboot and log on (as a particular user, if necessary). Open **My Documents** to make sure all your personal files are where they belong, including your Internet Explorer favorites and your custom Start menu shortcuts.

Now skip ahead to "Finishing the Job."

## WINDOWS 2000 AND XP CDs

**BOOT YOUR COMPUTER** with your Windows CD-ROM inserted. When you get the 'Press any key to boot from CD' message, do so. (If you don't see that message before Windows starts, restart Windows, press the key you're prompted to enter for your PC Setup program, and change the boot order so your CD drive is first.)

At the 'Welcome to Setup' screen, press **<Enter>**. The R (repair) option takes you to the Recovery Module, which is useful if Windows won't boot, but it's no help with a reinstallation. Soon you'll be told that there's already a Windows installation on the computer. Press **r** for a repair reinstall or **<Esc>** to begin a complete, destructive one. For a complete restore, select your C: partition and press **<Enter>**. When you get the warning that says an operating

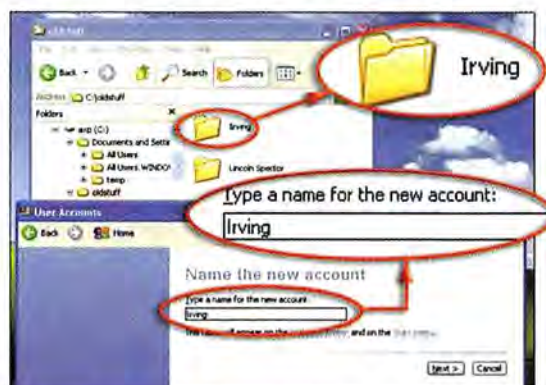


FIGURE 2: AFTER YOU REINSTALL Windows XP, re-create your user accounts with the same names you had before.



system is on that partition, press **c**. When you are asked your partition preference, select *Leave the current file system intact (no changes)*. When you're told that a Windows folder (or Winnt folder for Windows 2000) already exists, press **I** ('ell') to delete it and create a new one. Follow the series of prompts. When the installation program asks for your name, enter **temp**.

Once the installation is complete, your system will reboot into Windows, and you'll be logged on as user Temp. If the screen is difficult to read, reinstall your graphics card driver.

If you are reinstalling Windows XP, skip to "For Both Windows XP and 2000."

If you're reinstalling Windows 2000, log off as Temp and back on as Administrator. Now log off and on again, this time as Temp. Open Windows Explorer and navigate to **C:\Documents and Settings**. One of the subfolders will be named Administrator. Another will be named something like Administrator.computername.

Select **Start>Programs>Accessories>Com-**

mand Windows Explorer and make sure your data files are where they belong. Then go to Control Panel's Users and Passwords applet and delete the user Temp before skipping to "Finishing the Job."

## FOR BOTH WINDOWS XP AND 2000

REOPEN WINDOWS Explorer. Select your **C:** drive (you may have to click *Show the contents of this folder*). Right-click in the right pane and select **New>Folder**. Name the new folder **oldstuff**. In the left pane, choose the *Documents and Settings* folder. It should have subfolders for each user from the previous install, plus one for Temp and a few others. Move the folders for your previous user names to oldstuff.

Select **Start>Control Panel>User Accounts** (**Start>Settings>Control Panel>Users and Passwords** in Windows 2000). Create an account for each user who was registered before the reinstall. Be sure to use the exact names. They are the same names as the folders you just moved to oldstuff (as shown in **FIGURE 2**). In Windows XP, at

least one user must have administrator privileges.

Log off and back on as each user, before logging back on as Temp. Make sure that you select **Log Off** and not **Switch User** at Windows

XP's Log Off dialog box (this isn't an issue in Win 2000).

Log on as Temp, select **Start>Programs>Accessories>Command Prompt** (in XP, **Start>All Programs>Accessories>Command Prompt**), type **xcopy c:\oldstuff\\*.\* "c:\documents and settings" /s /h /r /c**, and press **<Enter>**. Press **a** when asked if you want to overwrite a file. Log off Temp and log on to each restored account to make sure everyone's documents and data are where they belong. Log on as an administrator and run Control Panel's User Accounts applet again to remove the user Temp.

## FINISHING THE JOB

NOW YOU'VE GOT Windows going, but not much else. You may have to reinstall your printer, sound card, and so on. Luckily, if a driver for the gadget came on your

## QUICK TIP

### More on Sudden Reboots

READER ROBERT MAZZEO of Royersford, Pennsylvania, points out that the "Sudden Reboots" tip in my July column ([find.pcworld.com/36503](http://find.pcworld.com/36503)) missed three common causes of sudden computer reboots. A bad power supply, a faulty video card or driver, and a failing RAM chip are often the source of these boots out of the blue. Also, if you follow the column's suggestion to use a can of compressed air to clean out your computer's insides, wait at least 2 hours before turning your system back on.

Windows or vendor restore CD, it was probably reinstalled automatically.

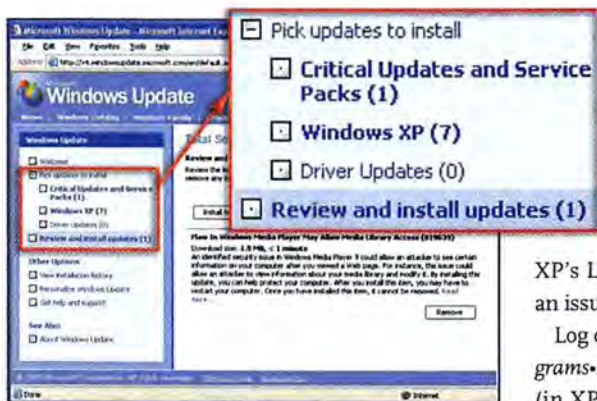
You'll have to reinstall your applications to reintroduce them to Windows. Some of their settings will not be changed by the reinstallation, but those that were stored in the Registry were wiped out.

Once your Internet connection is running again, browse to [windowsupdate.microsoft.com](http://windowsupdate.microsoft.com) and download all critical updates for your version (see **FIGURE 3**). Then visit the sites of your hardware vendors to update your drivers.

After the reinstall, some of your data may not show up where it should. Search for it in both your Application Data and oldstuff folders, and see if you can move it to the folder in which Windows or your apps are looking for it. If you find a folder called *Identities* with two subfolders whose names are long and indecipherable, try moving the contents of one to the other and see if your data reappears.

You've probably guessed that the final step is deleting the **c:\oldstuff** folder—and the Administrator folder in Windows 2000. Make this the very last step, however. Wait a couple of days, weeks, or even months until you're confident that all of your needed files are accessible. ■

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**FIGURE 3: BROWSE TO Microsoft's Windows Update site after you finish your reinstall.**

mand Prompt. Type **cd "\documents and settings"** and press **<Enter>**. Then type **xcopy administrator\\*.\* administrator.computername /s /h /r /c**, replacing *computername* with the last part of that folder's name (after "Administrator.") in Documents and Settings. Now press **<Enter>**, and when you're asked about overwriting files or folders, press **a** for All.

If you have any users on the old installation besides Administrator, continue with the "For Both Windows XP and 2000" section below. Otherwise, open



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# WINDOWS TIPS

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**AUTOMATE DRIVE  
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**PROS AND CONS OF  
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**NEW OPTIONS FOR  
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## Check Your Disks for Errors, With a Single Click

**Windows 2K XP** LAST FEBRUARY I described how to automate hard-disk scans in Windows 98 and Me. Several readers have written to ask for the lowdown on automatic disk scans in Windows 2000 and XP. You can create a shortcut and automate disk scans in these operating systems, though doing so takes a little work and know-how.

Unlike previous Windows versions, 2000 and XP won't let you fix errors as you check a disk whose files are in use. Windows can override this in some cases (as I describe below). But checking your Windows drive while Windows itself is running is out of the question: Windows simply asks whether you want to schedule the process to occur the next time you restart your computer.

**The Windows approach:** If you're new to Windows 2000 or XP, you may have difficulty finding the error-checking feature at all, since the ScanDisk icon doesn't appear in the System Tools menu as it does in other Windows versions. To get to this feature, double-click *My Computer* or open an Explorer window, right-click the icon for the drive you want to check, and choose *Properties*. (Alternatively, you can open *Properties* by <Alt>-double-clicking a drive icon or by selecting it and pressing <Alt>-<Enter>.) Click the *Tools* tab, and under "Error-checking", click *Check Now* (see **FIGURE 1**). For many drives, that button is misnamed, if you choose to fix file system errors; when you tell the utility to begin, instead of "checking now" it will ask to schedule the scan at the next restart.

In the Check Disk dialog box, select your options and click *Start*. If

you leave both check boxes empty, the scan will begin immediately, as it will only be checking the disk and not fixing any errors it finds. If you mark one of the check boxes, the program may say that you need to restart your PC before the process can begin. If that's okay, click *Yes*. If it isn't, try the shortcut approach described below. To schedule several disks for error-checking the next time you reboot, repeat the steps above for each drive.

**The shortcut approach:** If you prefer not to open *Properties* for every drive that needs checking—and then futz with various tabs, buttons, and prompts—you can

launch the error-checking process from a shortcut icon, complete with the settings you use most often. You may have to answer prompts in some cases, but this technique entails a lot less clicking.

To create a batch file that launches the Chkdsk program, click *Start*•*Programs* (All Programs in XP)•*Accessories*•*Notepad*, and type **chkdsk** followed by a space, the letter of the drive you want to check, and a colon (for example, **chkdsk d:**).

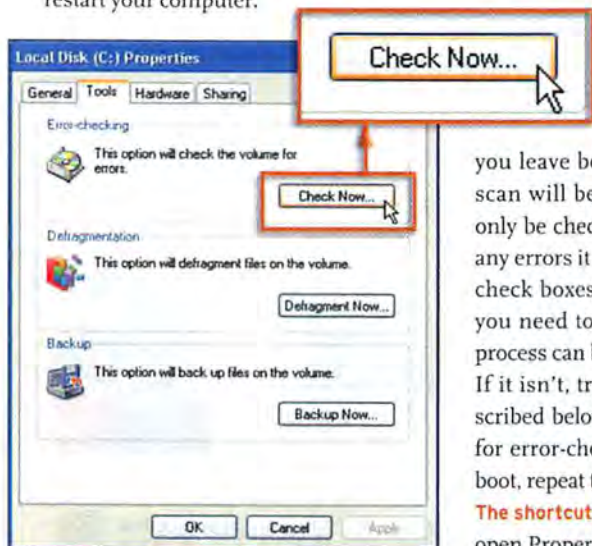
Add to this line the appropriate switches for the options you want, separated by spaces. Among the most useful switches is **/f**, which has the same effect as the *Automatically fix file system errors* option in the Check Disk dialog box described earlier. If the drive you're checking is already in use, you can add the **/x** switch to allow Windows to lock the drive for its exclusive use while it performs the error check (a feature you get only by employing this technique). You won't be able to save files to that drive until the error check is complete, at which time everything returns to normal. Unfortunately, even with the **/x** switch, you can't run Chkdsk on a Windows drive. Windows will ask if you want to schedule the procedure for the next reboot, just as in the previous method. Take it (enter **y**) or leave it (enter **n**).

### COMMAND AND CONTROL

TO MAKE A batch file that always gives the same reply to this prompt, use the pipe symbol (**|**) to send a **y** (for yes) or **n** (for no) to the command on the same line. The full command would look something like this: **echo y|chkdsk c: /f /x**. Naturally, your drive designation and chosen switches may vary. And you should replace the **y** with an **n** if your answer is always no.

To keep the command prompt window from closing after the program executes your batch file, add a final line consisting of a single word: **pause**. When you launch your batch file, the pause command will hold the command prompt window open so you can see any messages or spot problems. When you're satisfied that all is well, press any key to close the window.

After formulating your command line, test it in a command prompt window. Choose *Start*•*Programs* (All Programs ▶



**FIGURE 1: WINDOWS 2000 and XP hide error checking in your Disk Properties dialog box.**



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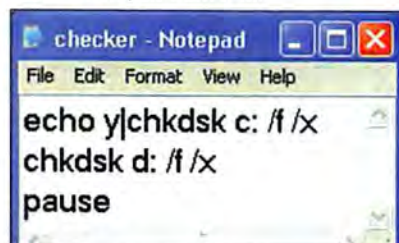


in XP)•Accessories•Command Prompt to open such a window. This is also a good place to learn about additional Chkdsk switches: Type **chkdsk /?** and press **Enter** to get the full scoop. Add the switches and commands you prefer to the command line (above the word *pause*).

If you want your batch file to check more than one disk, press **<Enter>** at the end of your first command line, and type another command that designates a different drive. Repeat these steps for each drive that you want your batch file to check (see **FIGURE 21**).

Finally, choose *File • Save As*, navigate to the folder where you store your batch files (or to the Windows folder), and give the file a name like **"checker.bat"** (be sure to include the quotation marks so your text editor won't add its default .txt extension). To launch the disk-check command from the Start menu, locate and select the batch file in Explorer. Use the right-mouse button to drag the file to the Start button, and pause until the menu appears. Drag the file to the submenu of your choice. When the file is over the desired spot, release the mouse button and choose *Create Shortcut(s) Here*. From now on, when you want to check your disks for errors, just choose your new command from the menu.

**The scheduled approach:** Now that you've created a batch file for checking your disks, automating the process is simple. Choose *Start•Programs (All Programs in XP)•Accessories•System Tools•Scheduled Tasks*. Double-click the *Add Scheduled Task* icon. Click *Next* in the Scheduled Task Wizard dialog box, and then click the *Browse* button to locate your batch file. Select the file and click *Open*. Follow the remaining prompts in the Scheduled Task Wizard to make the disk checking occur when you want it to.



**FIGURE 2: AUTOMATE ERROR checking on any or all drives with a simple batch file.**

## STAY HOME OR BE A PRO?



**Windows** XP Professional and Home can run on nearly any PC manufactured in the last few years. These days, most new systems come with XP Home installed (because it's cheaper). But is that the version of Windows XP you want? If you use Windows in your business or consider yourself a PC hobbyist, leave Home alone.

As its name suggests, XP Professional is designed for business and power users. If you take your XP Pro laptop to work or school, you should have no difficulty connecting the system to a secure network. XP Home users may not be able to do this, or the connection may require you to install special software (contact your network administrator) or accept less-stringent security. XP Pro supports offline files, which means that you can work on documents stored on the network even when your computer isn't connected (for example, if you take your laptop on the road). The offline copies of the files automatically synchronize with the network versions when you restore the connection; not so with XP Home. XP Pro's Remote Desktop feature lets you see and work with another PC's Windows desktop (and its apps and documents) via a network or Internet link. XP Home has the software for connecting to an existing shared XP Pro desktop, but it can't share its own desktop remotely.

Security is another reason to go with XP Pro. That version supports the NT file system (NTFS), so you can encrypt folders for greater privacy. If XP Home users want to password-protect a folder, they must adopt a workaround like the one described in last month's *Windows Tips* column ([find.pcworld.com/35900](http://find.pcworld.com/35900)). XP Pro also provides more-secure access to network resources (drives, folders, and files).

People who love to customize and take control of their computer will prefer XP Pro's Group Policy Editor for tweaking myriad system settings. And Pro's Automated System Recovery feature restores your machine from a backup when problems occur. XP Home doesn't even offer

## WINDOWS TOOLBOX

## Power Menu Gives Your Apps New Versatility

**SAY YOU WANT** to place on your screen a reminder message that's transparent, so other application windows remain visible. Or suppose you want to keep a program that you rarely interact with running all the time, but you'd rather have its minimized icon in the system tray (the area



of the taskbar by the clock) than in the Quick Launch toolbar. Or maybe you just want to give a sluggish application full access to all of your computing power.

These are some of the many functions you'll find as options on almost any Control menu (the icon in the upper-left corner of your application window) when you use the multifaceted Power Menu utility, which is the creation of Thong Nguyen (also known as "Tum"). Even if you need just one or two of these features, check Power Menu out—after all, it's free. The transparency effects work only in Windows 2000 and XP. Go to [find.pcworld.com/35906](http://find.pcworld.com/35906) to download a copy.

the Windows Backup utility as an option.

Before you buy a PC, ask which version of XP you're getting on your system. Don't go with XP Home just to save a few bucks (XP Pro can add \$60 to \$100 to the price of a system). But if your new PC is exclusively for home, and you aren't concerned about the lack of security and customizing features, take the Home road. Just don't say I didn't warn you. ■

Send Windows-related questions and tips to [scott\\_dunn@pcworld.com](mailto:scott_dunn@pcworld.com). We pay \$50 for published items. Visit [find.pcworld.com/31607](http://find.pcworld.com/31607) for more Windows Tips. Scott Dunn is a contributing editor for PC World.





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## STEP BY STEP

STAN MIASTKOWSKI

## Boost Your Hard-Drive Speed With Serial ATA

NEXT-GENERATION hard drives that use the new Serial ATA interface are now becoming widely available. SATA marks the first radical change in hard drives in a decade. Existing parallel ATA drives transfer data concurrently on multiple parallel wires within an 80-wire cable. In contrast, SATA drives transfer data at high speeds over a thin 7-wire cable. The interface is a cousin to FireWire and USB 2.0, which also use thin serial cables.

Serial ATA drives offer several advantages over parallel drives, not the least of which is speed. The maximum data transfer rate (or burst rate) for most parallel drives is 100 to 133 megabytes per second. Drives using the first generation of the SATA interface can reach 150 MBps.

By 2007 that rate will climb to 600 MBps.

The thin cables Serial ATA drives use also allow cooling air to flow more freely within PC cases, and since you hook up only one drive per SATA connector, there are no jumpers to worry about.

Motherboards are starting to ship with Serial ATA connectors, and the drives will soon be common in off-the-shelf systems. In the meantime, if you want to add an SATA drive to your computer as a second drive for data storage, you'll need an add-in card (\$50 to \$100). You'll also need Windows 98 SE or above. Earlier versions of Windows don't support SATA.

Note, however, that SATA drives used with add-in cards or with motherboards having a separate SATA controller chip

## THE TOP DOWN

**Benefits:** Easier-to-install hard drives deliver higher performance with the right motherboard.

**Costs:** Drives, \$175 to \$225; add-in cards, \$50 to \$100

**Tools required:** Phillips screwdriver, anti-static wrist strap (recommended)

**Expertise level:** Intermediate

**Time required:** 45 to 60 minutes

**Drive vendors:** Maxtor ([www.maxtor.com](http://www.maxtor.com)), Seagate ([www.seagate.com](http://www.seagate.com)), Western Digital ([www.westerndigital.com](http://www.westerndigital.com))

**Card vendors:** Adaptec ([www.adaptec.com](http://www.adaptec.com)), Addonics ([www.addonics.com](http://www.addonics.com)), High-Point Technologies ([www.highpoint-tech.com](http://www.highpoint-tech.com)), Promise Technology ([www.promise.com](http://www.promise.com)), SiIG ([www.siig.com](http://www.siig.com)), Soyo ([www.soyousa.com](http://www.soyousa.com))

are limited to the 133-Mbps speed of the PCI bus. Full-speed SATA requires a motherboard with SATA support in its core logic. Currently, motherboards based on Intel 865 and 875P (Canterwood) chip sets support full-speed Serial ATA. ■

Stan Miastkowski is a PC World contributing editor. Contact him at [stan\\_miastkowski@pcworld.com](mailto:stan_miastkowski@pcworld.com). Visit [find.pcworld.com/31676](http://find.pcworld.com/31676) for past Step-By-Step columns.

## PARALLEL ATA VERSUS SERIAL ATA: THE INSIDE STORY

Parallel ATA: 40-pin data connector (80-wire cable); maximum cable length of 18 inches



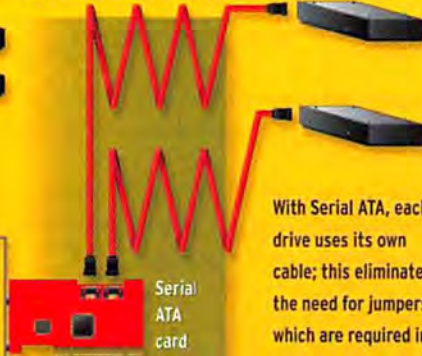
Serial ATA: 7-pin data connector and cable; maximum cable length of 1 meter

Parallel ATA two-drive setup



Motherboard

Serial ATA two-drive setup



With Serial ATA, each drive uses its own cable; this eliminates the need for jumpers, which are required in a parallel setup.

Rear of parallel ATA: jumpers for master, slave, and cable select



Rear of Serial ATA: no jumpers





## INSTALLING A SERIAL ATA DRIVE IN AN EXISTING PC USING AN ADD-IN CARD

### 1 Install the Serial ATA card:

Turn off your computer, unplug it, and open the case. Use an antistatic wrist strap to avoid damaging components. Find a free PCI slot and remove the slot cover. Insert the card and fasten it with the screw.



### 2 Connect the cables to the drive:

Plug the Serial ATA data cable into the connector on the drive; it attaches only one way. All SATA drives have a new type of power connector; some also include the older, standard-size power connector. If your drive has only the new type of connector, you'll need to use an adapter (included with most SATA drives and add-in cards) to hook it up.



### 3 Install the drive:

Find a free 3.5-inch drive bay inside the case and install the Serial ATA drive in it, using the screws provided. If you must use a 5.25-inch drive bay, you'll need an additional adapter mount, which is usually included in the drive kit. If you have to unhook any cables in order to reach the drive bay, mark their positions with masking tape so that you can reattach them when you're done.



### 4 Hook up the cable to the add-in card:

Plug the other end of the SATA data cable into one of the add-in card's connectors.

It doesn't matter which connector you use. If you unhooked any cables to install the drive in Step 3, reconnect them now. Then close the cover and plug your computer back into an AC outlet.



### 5 Install the software:

Turn on your PC. If you're running Windows 98 SE or Me, the Add New Hardware Wizard will appear before Windows starts. Choose the option labeled *Search for the best driver for your device (98 SE)* or *Automatic search for a better driver (Me)*.

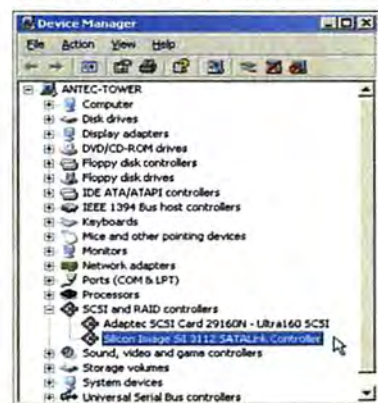
In Windows XP, the Found New Hardware Wizard will appear after the operating system starts. In the opening screen, choose *Install the software automatically*.

Insert the floppy disk or the CD-ROM that came with your Serial ATA add-in card, and then follow the on-screen directions to install the drivers.



### 6 Make sure the installation works:

Before you go any further, make sure that the drivers are installed correctly and that the operating system recognizes the drive. To access Device Manager in Windows 98 SE or Me, go to *Start\*Settings\*Control Panel*, open the *System* icon, and click the *Device Manager* tab. In Windows XP, go to *Start\*Control Panel*, open the *System* icon, choose the *Hardware* tab, and click the *Device Manager* button.



If you see a yellow exclamation point in an entry under the *SCSI Controllers* section (this is how Windows "sees" the Serial ATA controller), the add-in controller isn't working correctly. In Windows 98 SE or Me, search for 'hardware troubleshooter' under *Start\*Help* and follow the directions. In Windows XP, right-click the entry for the SATA controller, choose *Properties*, and then click the *Troubleshoot* button.

### 7 Partition and format your new drive:

Before you can use your new Serial ATA drive for data, you'll need to prepare it for data. The easiest way is to use the software that comes with the drive. Run the program and follow the directions. Alternatively, a third-party utility such as PartitionMagic ([www.powerquest.com](http://www.powerquest.com)) can do the job.





# INTERNET TIPS

SCOTT SPANBAUER

## Play It Safe With the Right Browser Security Settings

THE POP-UP AD epidemic is irritating—and it's a security threat. The ads, which are Web pages, may contain dangerous programs or scripts; they can hijack your home page or install adware that sprouts more pop-ups. In fact, a booby-trapped pop-up could even steal or delete your data, or install a dialer to seize your Internet connection and reroute it to a dollars-per-minute 900 number. To eliminate these hazards in Internet Explorer, you must check settings for ActiveX controls; in Netscape, Mozilla, or another browser, you must change a JavaScript setting.

For Internet Explorer users, the dangerous code in pop-up pages often appears as an ActiveX control that presents itself for your approval before downloading (see **FIGURE 1**). Though it looks similar to many safe browser plug-ins that you may have accepted from reputable sites in the past (it may be signed with a certificate, even), the sneaky control actually installs software that displays ads on your PC.

IE can download ActiveX controls and run them much as any other program runs on your PC. By default, IE is config-

ured to ask your permission before downloading and running an ActiveX control from the Internet. If you or anyone else using the computer has changed those settings, however, unwanted programs could launch automatically.

To check your security settings in IE, choose *Tools•Internet Options*, click the *Security* tab, select the *Internet* zone, and confirm that the 'Security level' slider is set to Medium. This setting instructs IE to block the controls that aren't signed with a certificate, and to prompt you for approval before launching ActiveX controls.

If you share the computer with children (or with adults who download first and ask questions later), set the slider to High. This blocks ActiveX content, Java and JavaScript code, and file downloads. Note that disabling these features may cause reliable Web sites not to work as expected—or at all—in your browser.

Because they support Java and JavaScript instead of ActiveX, the most recent versions of IE competitors Netscape, Mozilla, and Opera are safer. But they are not immune to scripting shenanigans.

The default security settings in Mozilla and Netscape—Java enabled, and JavaScript enabled for Web pages but not for e-mail—are sensible. If you want to block the many unscrupulous Web sites from changing your home page, however, simply disable JavaScript altogether: Choose *Edit•Preferences*, expand the *Advanced* category, select *Scripts & Plugins*, uncheck *Navigator* under 'Enable Java for', and click *OK*. If

you'd like to do the same in Opera, select *File•Quick Preferences* and then uncheck *Enable JavaScript*. As with the high security settings of Internet Explorer, you'll find that disabling JavaScript reduces functionality at certain Web sites.

Finally, when you've finished tweaking your browser's security settings, visit one of the many browser security-check Web sites. Scanit ([bcheck.scanit.be/bcheck](http://bcheck.scanit.be/bcheck)) and Qualys ([browsercheck.qualys.com](http://browsercheck.qualys.com)) will point out any chinks in your browser's armor and suggest a fix.

### TIGHTEN UP WI-FI WITH WPA

IF YOU USE a wireless network, it's likely susceptible to intrusion from neighboring or drive-by snoops. One reason for this is the weak Wired Equivalent Privacy encryption that most wireless cards and routers use. The Wi-Fi Alliance ([www.wi-fi.net](http://www.wi-fi.net)) has replaced WEP and its shortcomings with a stronger standard: Wireless Protected Access.

Wireless-networking vendors plan to release WPA driver and firmware updates for many, if not most, of their existing products by summer's end. Go to [find.pcworld.com/35804](http://find.pcworld.com/35804) to download Microsoft's WPA update for Windows XP. ■

Send your questions and tips to [nettips@spanbauer.com](mailto:nettips@spanbauer.com). We pay \$50 for published items. Go to [find.pcworld.com/31523](http://find.pcworld.com/31523) for more Internet Tips. Scott Spanbauer is a contributing editor for PC World.

### SAFE E-MAIL WITH THE BAT

THOUGH MICROSOFT has done much to safeguard Outlook and Outlook Express against e-mail worms and macro viruses, the programs are *still* vulnerable, because of their integration with Internet Explorer. RITLABS claims that its program, The Bat, sidesteps these vulnerabilities by using its own page-rendering engine to display HTML messages. The Bat costs \$25 for students, \$35 for private individuals, and \$45 for businesses; download a 2.4MB, fully functional, 30-day trial version from [find.pcworld.com/35807](http://find.pcworld.com/35807) to see whether the e-mail safety it offers is worth the extra bucks.



**FIGURE 1:** AVOID DRIVE-BY adware by declining suspect downloads when prompted.



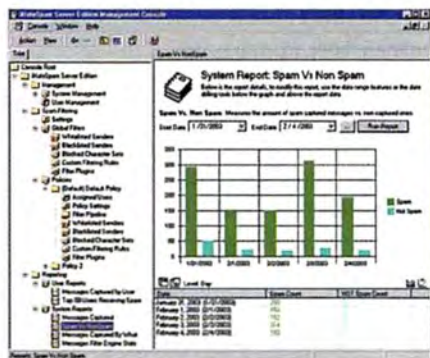
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# HARDWARE TIPS

KIRK STEERS

## Boot Passwords Put Your PC Under Lock and Key

THINK YOUR DATA is safe behind a Windows password? Think again. Unless you've changed the defaults, anyone can boot your PC from a floppy disk or CD-ROM and plunder the paths of your hard drive like Winona Ryder at a day-after-Christmas sale. To *really* keep your files safe, password-protect boot-up itself so that your PC boots only with your authorization. No one else will be able to access your machine's floppy drive or CD-ROM drive, and hence they'll have no backdoor access to your hard drive.

To enable the boot-up password (aka user password, system password, power-on password, and other names), open your PC Setup program by pressing the key you're prompted to enter when your machine first starts (before Windows loads)—usually <Delete>, <F1>, or <F2>.

Look on Setup's main menu for User Password, Security Settings, or a similar menu selection (see **FIGURE 1**). When prompted, enter your password of choice, but type carefully—resetting a lost or for-

gotten boot-up password is no picnic. (Note that some PCs allow you to add a Setup password to prevent unauthorized access to the Setup program itself. Consult your motherboard manual to see if this feature is available on your system.)

Many motherboards have a switch, or jumper, to reset the boot-up password if you need to do so. Unplug your PC, open the case, and reposition the jumper. To avoid frying your system's delicate circuitry with charges from your body, always use an antistatic wrist strap, or otherwise ground yourself, before entering the PC's case.

If there's no jumper on your motherboard for resetting the password, look for a switch that resets your entire Setup program. This clears the boot-up password, but it also erases your other settings. Restore them by rebooting your system, reentering Setup, and selecting *Restore Default Settings* or a similar option (in Figure 1, the restore option is Load Optimized Defaults). Motherboard and PC vendors sometimes make their own optimizing adjustments to the settings, however, so to ensure that you can return to your PC's previous Setup configuration, copy your settings or take photos of each Setup screen before resetting. If you use a digital camera, print the photos—you won't have access to them if they're stored on a PC you can't start up.

If neither of these password-override options works, remove the small CMOS battery on the motherboard. With no bat-

tery, the CMOS clock/calendar chip that holds the Setup program (in addition to the date and time, of course) will lose all its settings. If your battery is removable (check your manual), take it out for *at least* an hour to discharge the CMOS chip.

You may be able to avoid opening your PC by visiting the Web site of your system or motherboard manufacturer to see if you can download a flash BIOS upgrade for your motherboard. The upgrade not only eliminates the password, but it may also update your BIOS to a newer version. Remember: Always read and follow BIOS upgrade instructions *to the letter*.

### PC LOCKDOWN

KEEPING YOUR DATA safe also means keeping people out of your PC's case. Boot-up passwords can be disabled, and it's not difficult to remove a hard disk, copy its contents, and replace it with no



**FIGURE 1: TO SET YOUR BOOT-UP PASSWORD**, select this or a similar option on your PC Setup program's main menu.

sign of tampering. The \$30 CoverLock from Secure-It ([find.pcworld.com/36662](http://find.pcworld.com/36662)) will help keep intruders out.

For your next notebook, consider one with the TheftGuard BIOS-based security system from Softex and BIOS maker Phoenix Technologies. TheftGuard tracks and disables a notebook when it first connects to the Internet after being reported stolen, and it's impervious to hard-drive reformat. TheftGuard-enabled systems are expected in late 2003 or in 2004. ■

Go to [find.pcworld.com/31511](http://find.pcworld.com/31511) for past Hardware Tips columns. Send your tips and questions to [kirk\\_steers@pcworld.com](mailto:kirk_steers@pcworld.com). We pay \$50 for published items. Kirk Steers is a PC World contributing editor.

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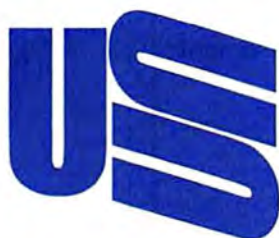


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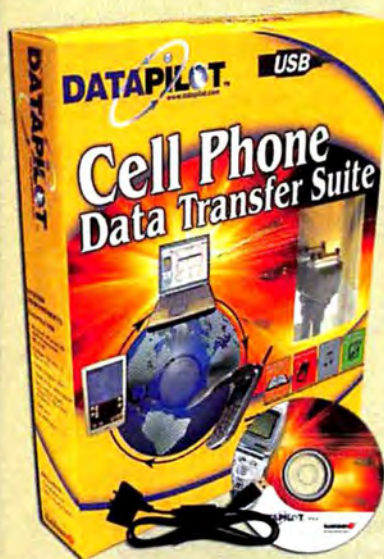


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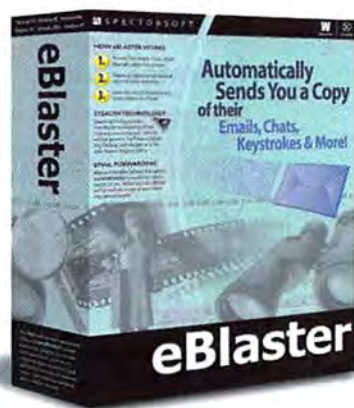
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STATE OF MICHIGAN  
IN THE CIRCUIT COURT FOR THE COUNTY OF WAYNE  
IN RE: NEW COM INC                      CASE NO. 98-838563 CP  
JUDGE JAMES J. RASHID

**SUMMARY NOTICE OF CLASS ACTION SETTLEMENT**

TO: ALL PERSONS WHO PURCHASED NEWCOM PRODUCTS WITH A PROMISE, REPRESENTATION, OR UNDERSTANDING THAT A REBATE WOULD BE PAID, AND WHO PROPERLY SUBMITTED THE NEWCOM REBATE DOCUMENTS ACCORDING TO THE TERMS OF THE REBATE AGREEMENT AND WHO DID NOT THEREAFTER RECEIVE THE REBATE FUNDS AS PROMISED.

YOU ARE HEREBY NOTIFIED, pursuant to Rule 3.501 et seq. of the Michigan Rules of Court and an Order of the Court dated November 19, 2001, that a settlement on behalf of the Class (described above) has been proposed. A hearing will be held upon the Proposed Settlement before the Honorable James J. Rashid, Wayne County Circuit Court, State of Michigan in the Coleman A. Young Municipal Center, Courtroom 1111, Two Woodward Avenue, Detroit, Michigan 48226-3413 to determine whether the proposed settlement of the Class claims against Newcom, Inc., Aura Services, Inc., Steven Veen, Harry "Zvi" Kurtzman, Sultan Khan, Asif Khan, Deutsche Financial Services Corporation, Best Buy Co., Inc., Circuit City Stores, Inc., CompUSA and Staples, Inc. (the "Defendants") should be approved by the Court as fair, reasonable, and adequate.

Named Plaintiffs Kerry Morgan, Don Girard, Frederick Jorgensen, and Lamont Klecot, Jr., have brought this suit on behalf of all similarly situated people, alleging claims against the Defendants for breach of contract, negligence, violation of the Michigan Consumers Protection Act, and/or various equitable theories. The Plaintiffs claim that the Defendants wrongfully failed and/or refused to pay rebates to persons who purchased Newcom products with a promise, representation, or understanding that a rebate would be paid, and who properly submitted the Newcom rebate documents according to the terms of the rebate agreement and who did not thereafter receive the rebate funds as promised. The Defendants deny that any of them have committed any violation of law or any wrongdoing or that the Defendants have any liability with respect to the Plaintiffs or on behalf of the Plaintiff Class, but have concluded that it is desirable that this action be settled. If the proposed Settlement is approved, Participating class members may be entitled to receive certificates for the reduction of the price of computer-related products.

IF YOU ARE A MEMBER OF THE CLASS DESCRIBED ABOVE, YOUR RIGHTS WILL BE AFFECTED AND YOU MAY BE ENTITLED TO PARTICIPATE IN THE SETTLEMENT. Any member of the class has the right to be excluded from the action by submitting to Plaintiffs' class counsel by October 26, 2003 a written election to be excluded. Any member of the class may intervene in the action.

You may receive additional information and the full printed Notice of Settlement of Class Action, which includes a more detailed description of the settlement, including information about scheduled hearing dates and your rights to participate in, opt out of, intervene, or object to the settlement, by contacting Plaintiffs' Class Counsel, Macuga & Liddle, P.C. by writing, calling or accessing the website:

**REBATE SETTLEMENT ADMINISTRATION**  
P.O. Box 43157  
Detroit, MI 48243-0157  
(313) 259-6347  
[www.rebatesettlement.com](http://www.rebatesettlement.com)

In order to share in the settlement, you will be required to submit a Proof of Claim to the Settlement Administrator which must be received by October 26, 2003. A Proof of Claim may be obtained from the Settlement Administrator at the above address, phone number, or Internet site.

IF YOU ARE A CLASS MEMBER, AND THE SETTLEMENT IS APPROVED AT OR AFTER THE SETTLEMENT HEARING, YOU WILL BE BOUND BY THE FINAL ORDER AND JUDGMENT OF THE COURT UNLESS YOUR REQUEST FOR EXCLUSION IS RECEIVED BY THE SETTLEMENT ADMINISTRATOR BY October 26, 2003.

**PLEASE DO NOT CONTACT THE COURT OR THE CLERK'S OFFICE FOR INFORMATION; CONTACT ONLY PLAINTIFF CLASS COUNSEL AT THE ADDRESS CONTAINED IN THIS NOTICE.**

**BY ORDER OF THE COURT HON. JAMES J. RASHID**





## Copyright Law: Ignore at Your Own Peril

I HAPPEN TO OWN DOZENS of copyrights, so I can't pretend to be a disinterested observer on the subject of theft of intellectual property. PCs have made piracy simple and rampant, and when self-promoting law professors and journalists who should know better take aim at the copyright

system that has helped make American creativity the most vibrant, diverse, and exportable in the world, I see red. In my book, if you're stealing copyrighted content or "sharing" it with the world—and I'm not talking about copying tracks from a music CD you paid for to your own MP3 player—you're doing more than just violating the law. You're also undermining a foundation of our culture.

As Bill Gates howled when users traded copies of his first PC software product before it was even released, many people seem to believe that software, being intangible, is without value, yet they consider hardware (whether a computer, the pages of a book, or a shiny CD)

worth paying for. That's nuts. Software—by which I mean all forms of content—is usually the only reason for the hardware's existence. And those who create the content deserve to be paid.

Alas, the pirate's life keeps getting easier. In the age of vinyl, taping a 1-hour LP took an hour, but today you can duplicate a 1-hour CD in minutes. Broadband makes downloads almost as snappy.

The simplicity of larceny leads to exquisitely moronic rationalizations. Would-be populists cry that illicit downloading is a way of protesting the pittance many artists receive from the sale of their CDs; by that logic, it's okay to steal cornflakes since the farmer gets such a small cut. Sophists maintain that they wouldn't have to steal if record companies sold more music online; so if your supermarket does not deliver, you're presumably free to swipe steaks. Then there's the "I have to take a whole album when I want only one song" whine. That's like

saying that it's fine to steal a hamburger patty if McDonald's won't sell the meat separately from the bun.

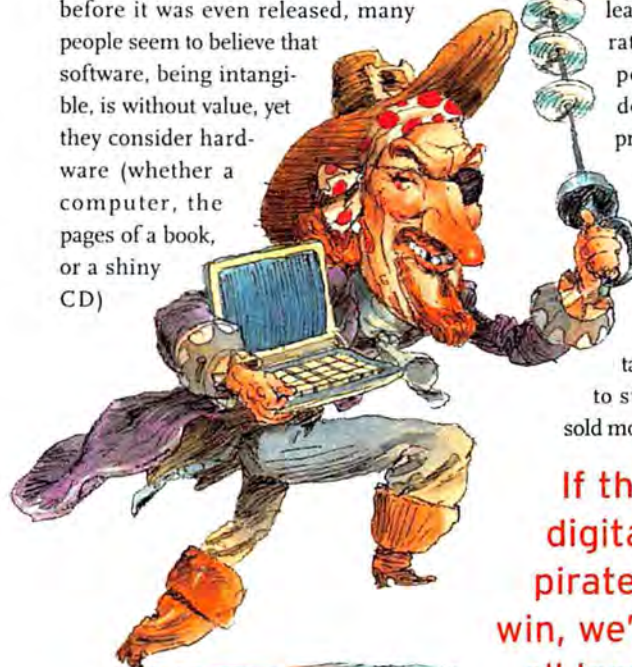
Copyright offers plenty of legal ways to enjoy content for free. You can borrow a copy from a friend or the library. You can check out excerpts on legitimate Web sites. You can tape it off the air.

But piracy has consequences. The *Wall Street Journal* has detailed how pirates have crippled the Philippine film industry; Salon.com has shown how they have damaged the Mexican music business. Content creators here won't let that happen without a fight. If illicit copying keeps increasing, all consumers will be treated as thieves, with ever more annoying walls of copy protection between them and the entertainment they want.

No scheme is hackproof, though, and copyright holders can't possibly go after every infringer. So all that ultimately stands in the way of unlawful copying is personal ethics. Somehow, people have come to think that it's ethical to steal.

And if pilfering persists and pirated content drives out the real thing, expect hardworking artists to look for vocations that pay. Classic content will be free for the swiping, but most new stuff will be the product of well-meaning amateurs—songs like the one that drove you out of an oompah bar in Germany, books about your neighbor's cute parakeet, and movies that star the boors you avoid on public-access cable. Enjoy! ■

Visit [find.pcworld.com/31595](http://find.pcworld.com/31595) to see additional columns by Contributing Editor Stephen Manes. He has written about technology for two decades.



**If the digital pirates win, we'll all lose.**



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Thank goodness,  
**it only looks  
expensive.**

**Dell** | Home/Small Business

### Inspiron™ 1100 Notebook

#### Notebook Essentials – Budget-Friendly

- Intel® Pentium® 4 Processor at 2.20GHz\*
- 14.1" XGA TFT Display
- 128MB Shared™ DDR PC2100 SDRAM
- 20GB Ultra ATA Hard Drive
- 24x CD-ROM Drive
- Integrated Intel® Extreme Graphics
- Integrated Stereo Sound
- 96Whr Li-Ion Battery (12-Cell)
- Internal Fax Modem and NIC Included
- Windows® XP Home Edition
- WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included†
- 1-Yr Limited Warranty,\* 1-Yr Mail-In Service

**\$949**

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E-VALUE Code: 18319-D80809m

**Introducing the Inspiron 1100 notebook.** It's hard to take your eyes off this stylish little number. And its beauty isn't only skin deep. Inside you'll find an Intel® Pentium® 4 processor clocking speeds up to 2.20GHz! That kind of performance never goes out of style. But its most stunning feature? Check out the price. And, of course, it's backed by Dell's award-winning service and support. Order one today and soon you'll be creating quite a stir.

#### CNET Editors' Choice Award

Inspiron 1100 Notebook<sup>13</sup>  
– April 2003



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## Dell | Small Business Desktops

### NEW Dimension™ 2400 Desktop

#### Economical, Essential Technology Desktop

- Intel® Pentium® 4 Processor at 2.20GHz
- 256MB Shared® DDR SDRAM
- 40GB (7200 RPM) Ultra ATA/100 Hard Drive
- Integrated Intel® 3D Extreme Graphics
- 48x/24x/48x CD Burner
- Integrated Audio
- Integrated 10/100 Ethernet
- Windows® XP Home Edition; WordPerfect® Productivity Pack
- 1-Yr Limited Warranty; 1-Yr On-Site Service¹
- Monitor Not Included

**\$599** as low as **\$16/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S50805y

#### Recommended upgrades:

- 80GB (7200 RPM) Ultra ATA/100 Hard Drive, add \$60
- NEW 15" E151FP Flat Panel Display, add \$280

### NEW OptiPlex™ 160L Desktop

#### Network-Optimized, Value Business Desktop

- Intel® Pentium® 4 Processor at 2.20GHz with 400MHz Front Side Bus
- 512MB Shared® DDR SDRAM
- 40GB (7200 RPM) Hard Drive
- Integrated Intel® Extreme Graphics
- 48x/24x/48x CD Burner
- Integrated 10/100 NIC
- Windows® XP Professional
- 1-Yr Next Business Day On-Site Service¹
- Monitor Not Included

**\$699** as low as **\$19/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S30806a

#### Recommended upgrades:

- 3-Yr Next Business Day On-Site Service¹, add \$149
- Dell® E171 Flat Panel Monitor, add \$429

### NEW Dimension™ 4600 Desktop

#### Exceptional Performance Desktop

- Intel® Pentium® 4 Processor at 2.66GHz
- 256MB Dual-Channel DDR SDRAM
- 80GB (7200 RPM) Ultra ATA/100 Hard Drive
- 64MB DDR NVIDIA® GeForce4 MX™ Graphics Card
- 48x/24x/48x CD Burner with DVD Combo Drive
- Integrated Audio
- Integrated Intel® PRO 10/100 Ethernet
- Windows® XP Home Edition; WordPerfect® Productivity Pack
- 1-Yr Limited Warranty; 1-Yr On-Site Service¹
- Monitor Not Included

**\$799** as low as **\$22/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S50807y

#### Recommended upgrades:

- 3-Yr Limited Warranty; 3-Yr On-Site Service¹, add \$149
- NEW 19" 1901FP HAS Flat Panel Display, add \$740



## Dell | Small Business Notebooks

### NEW Inspiron™ 5100 Notebook

#### Mobility and Performance

- Intel® Pentium® 4 Processor at 2.40GHz
- 14.1" XGA TFT Display
- 256MB DDR PC2100 SDRAM
- 30GB Ultra ATA Hard Drive
- 16MB DDR ATI® MOBILITY™ RADEON™ 7500 AGP 4X Graphics
- Fixed Internal 8x DVD Drive
- Internal Modem and NIC Included
- Windows® XP Home Edition; WordPerfect® Productivity Pack with Quicken® New User Edition
- 1-Yr Mail-In Service

**\$1069** as low as **\$29/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S80810c

#### Recommended upgrade:

- Windows® XP Professional, add \$79

### NEW Latitude™ D500 Notebook

#### Small Business Value Notebook

- Featuring Intel® Centrino™ mobile technology
- Intel® Pentium® M Processor at 1.30GHz
- Intel® PRO Wireless 2100 802.11b 11Mbps¹ Mini-PCI Wireless Card
- 14.1" XGA TFT Display, 128MB Shared™ DDR PC2100 SDRAM
- 20GB Ultra ATA Hard Drive
- Integrated Intel® Extreme Graphics Up to 64MB Shared™ System Memory
- Internal Modem and NIC Included
- Windows® XP Home Edition; 1-Yr Mail-In Service

**\$1099** as low as **\$30/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S70810

#### Recommended upgrades:

- Windows® XP Professional, add \$60
- 3-Yr Next Business Day On-Site Service¹, add \$298

### NEW Inspiron™ 600m Notebook

#### Thin and Light

- Featuring Intel® Centrino™ mobile technology
- Intel® Pentium® M Processor at 1.30GHz
- Intel® PRO Wireless 2100 802.11b 11Mbps¹ Mini-PCI Wireless Card
- 14.1" XGA TFT Display
- 256MB DDR PC2100 SDRAM
- 30GB Ultra ATA Hard Drive
- 32MB DDR ATI® MOBILITY™ RADEON™ 9000 AGP 4X Graphics
- Modular 8x DVD-ROM Drive
- Internal Modem and NIC Included
- Windows® XP Home Edition; WordPerfect® Productivity Pack with Quicken® New User Edition
- 1-Yr Mail-In Service

**\$1349** as low as **\$37/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S80813



## Dell | Servers and Workstations

### PowerEdge™ 400SC Server

#### Entry-Level Value Server

- Intel® Celeron® Processor at 2GHz
- Upgradeable to Intel® Pentium® 4 Processor at 3.20GHz with 800MHz Front Side Bus
- 128MB 266MHz ECC DDR SDRAM (Up to 4GB)
- 40GB (7200 RPM) IDE Hard Drive
- Upgradeable to 240GB of Internal Hard Drive Storage
- Embedded Intel® PRO Gigabit™ NIC
- 1-Yr 24x7 Dedicated Server Phone Tech Support
- 1-Yr Next Business Day On-Site Service¹
- Small Business Pricing

**\$399** E-VALUE Code: 18320-S20803g

#### Recommended upgrades:

- PowerConnect™ 2016 16-Port Ethernet Switch, add \$89
- Power Vault 100T-TR40 Internal Tape Back-Up, add \$399
- System Including Windows® Server 2003, now \$1199

### NEW PowerEdge™ 1600SC Server

#### Reliable, High-Performance Server

- Intel® Xeon™ Processor at 2GHz
- Dual Intel® Xeon™ Processor Capable (Up to 3.06GHz)
- 128MB 266MHz ECC DDR SDRAM (Up to 4GB)
- 36GB (10K RPM) SCSI Ultra320 Hard Drive
- Upgradeable to 876GB of Internal SCSI Hard Drive Storage
- Embedded Intel® PRO Gigabit™ NIC
- Six PCI Slots (2-64/100MHz, 2-64/66MHz, 2-32/33MHz)
- 1-Yr 24x7 Dedicated Server Phone Tech Support
- 1-Yr Next Business Day On-Site Service¹
- Small Business Pricing

**\$699** as low as **\$19/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S20806g

#### Recommended upgrades:

- Hot-Swap Hard Drive Capability, add \$100
- PowerConnect™ 2124 24-Port + 1GB Ethernet Switch, add \$299

### Dell™ Precision™ 360 Workstation

#### NEW Affordable, Scalable Performance Workstation

- Intel® Pentium® 4 Processor at 2.40GHz with 800MHz Front Side Bus
- 512MB Dual-Channel DDR SDRAM
- 80GB (7200 RPM) IDE Hard Drive, 48x CD Burner
- 128MB NVIDIA® QuadroFX 500 AGP 8X Graphics
- Integrated Intel® PRO 1000MT Gigabit™ NIC
- Windows® XP Professional; Mini-Tower Chassis
- Lifetime 24x7 Dell Precision™ Dedicated Tech Support
- 3-Yr Next Business Day On-Site Service¹
- Monitor Not Included

**\$1099** as low as **\$30/mo.** (46 pmts.²)  
E-VALUE Code: 18320-S40810a

#### Recommended upgrades:

- 3-Yr Same-Day 4-Hour (5x10) On-Site Service¹, add \$199
- 17" Dell UltraSharp™ 1703FP Flat Panel Monitor, add \$499

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## Dell | Home Desktops

### Dimension™ 2400 Desktop

#### Affordable Technology System

- Intel® Pentium® 4 Processor at 2.20GHz with 400MHz Front Side Bus
- 128MB Shared® DDR SDRAM at 333MHz
- 40GB Ultra ATA/100 Hard Drive (7200 RPM)
- 17" (16.0" v.i.s., 27dp) E773 Monitor
- Integrated Intel® 3D Extreme Graphics
- 48x CD-RW Drive
- Integrated Audio
- Altec Lansing® ADA215 Speakers
- 56K Data Fax Modem; Integrated 10/100 Ethernet
- Windows® XP Home Edition, WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included\*
- 1-Yr Limited Warranty; 1-Yr At-Home Service\*

**\$699** Ask about No Payments for 90 Days for well-qualified customers\*  
E-VALUE Code: 18320-D50806m

### Dimension™ 4600C Desktop

#### Exceptional Performance / Small Design

- Intel® Pentium® 4 Processor at 2.40GHz with 533MHz Front Side Bus
- 256MB Shared® Dual Channel DDR SDRAM at 333MHz
- 40GB Ultra ATA/100 Hard Drive (7200 RPM)
- 15" E151FFB Flat Panel Display
- Integrated Intel® Extreme Graphics 2
- 24x CD-ROM Drive
- Integrated 5.1 Audio with Dolby® Digital Capability\*
- Altec Lansing® ADA215 Speakers
- 56K Data Fax Modem; Integrated 10/100 Ethernet
- Windows® XP Home Edition, WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included\*
- 1-Yr Limited Warranty; 1-Yr At-Home Service\*

**\$999** Ask about No Payments for 90 Days for well-qualified customers\*  
E-VALUE Code: 18320-D50809n

### Dimension™ 8300 Desktop

#### Cutting-Edge Performance

- Intel® Pentium® 4 Processor with HT Technology at 2.60GHz with 800MHz Front Side Bus
- 256MB Dual Channel DDR SDRAM at 400MHz
- 80GB Ultra ATA/100 Hard Drive (7200 RPM)
- 19" (18.0" v.i.s., 24dp) M992 Monitor
- 64MB DDR NVIDIA® GeForce4 MX® Graphics Card with TV-Out
- 4x DVD/CD Burner (DVD+RW/+R) Drive with CD-RW
- Integrated 5.1 Audio with Dolby® Digital Capability
- Altec Lansing® ADA745 4.1 Surround Sound Speakers with Subwoofer
- 56K Data Fax Modem; Integrated Intel® PRO 10/100 Ethernet
- Windows® XP Home Edition, WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included\*
- 1-Yr Limited Warranty; 1-Yr At-Home Service\*

**\$1599** Ask about No Payments for 90 Days for well-qualified customers\*  
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## Dell | Home Notebooks

### Inspiron™ 1100 Notebook

#### Notebook Essentials, Budget-Friendly

- Intel® Celeron® Processor at 2GHz
- 14.1" XGA TFT Display
- 256MB Shared® DDR PC2100 SDRAM
- 20GB Ultra ATA Hard Drive
- 8x DVD-ROM Drive
- Integrated Intel® Extreme Graphics
- Integrated Stereo Sound
- 96Whr Li-Ion Battery (12-Cell)
- Internal Fax Modem and NIC Included
- Microsoft® Windows® XP Home Edition
- WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included\*
- 1-Yr Limited Warranty; 1-Yr Mail-In Service

**\$899** Ask about No Payments for 90 Days for well-qualified customers\*  
E-VALUE Code: 18320-D80808m

### Inspiron™ 5100 Notebook

#### Perfect Balance of Performance and Price

- Intel® Pentium® 4 Processor at 2.40GHz
- 14.1" XGA TFT Display
- 512MB DDR PC2100 SDRAM
- 30GB Ultra ATA Hard Drive
- 24x CD-RW/DVD Combo Drive
- 16MB DDR ATI® MOBILITY™ RADEON® 7500 AGP 4X Graphics
- Integrated Stereo Sound
- 96Whr Li-Ion Battery (12-Cell)
- Internal Fax Modem and NIC Included
- Microsoft® Windows® XP Home Edition
- WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included\*
- 1-Yr Limited Warranty; 1-Yr Mail-In Service

**\$1279** Ask about No Payments for 90 Days for well-qualified customers\*  
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### Inspiron™ 5150 Notebook

#### Enhanced Performance

- Intel® Pentium® 4 Processor at 3.06GHz
- 15" SXGA+ TFT Display
- 512MB DDR PC2700 SDRAM
- 40GB Ultra ATA Hard Drive
- 24x CD-RW/DVD Combo Drive
- 32MB ATI® MOBILITY™ RADEON® 9000 AGP 4X Graphics
- Integrated Stereo Sound
- 96Whr Li-Ion Battery (12-Cell)
- Internal Fax Modem and NIC Included
- Windows® XP Home Edition
- WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included\*
- 1-Yr Limited Warranty; 1-Yr Mail-In Service

**\$1699** Ask about No Payments for 90 Days for well-qualified customers\*  
E-VALUE Code: 18320-D80816m



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System reviewed included 2GHz Celeron processor, 256MB DDR SDRAM, 30GB hard drive, and DVD optical drive. \*Dolby Digital sound is only available if you order a DVD drive factory-installed. \*Monthly payment based on pre-rebate price for 48-month 60 Days Same As Cash QuickLoan with 48 payments at 9.99% interest rate. Your interest rate and monthly payment may be same or higher, depending on your creditworthiness. If you do not pay the balance within 60 days of the QuickLoan Commencement Date (which is five days after product ship), interest will accrue during those first 60 days and a documentation fee may apply. OFFER VARIES BY CREDITWORTHINESS OF CUSTOMER AS DETERMINED BY LENDER. Minimum transaction size of \$500 required. Maximum aggregate financed amount for paperless acceptance not to exceed \$25,000. If your order exceeds \$25K, a Dell Financial Services rep will contact you to process your documentation. Taxes, fees and shipping charges are extra and may vary. Not valid on past orders or financing. QuickLoan arranged by CIT Bank to Small Business customers with approved credit. \*Up to 64MB of system memory may be allocated to support system graphics, depending on system memory and other factors. \*Between 32 and 64MB of system memory may be allocated to support graphics, depending upon system memory size and other factors. \*This term indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not constitute actual operating speed of 1GB/sec. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required. \*Disks burned with this drive may not be compatible with some existing drives and players; using DVD+R media provides maximum compatibility. Dell, the stylized E logo, E-Value, Dimension, Inspiron, Latitude, OptiPlex, PowerEdge and Dell Precision are trademarks of Dell Computer Corporation. Intel Inside, the Intel Inside logo, Intel Centrino, the Intel Centrino logo, Intel Xeon, Pentium, and Celeron are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft, MSN and Windows are registered trademarks of Microsoft Corporation. ©2003 Dell Computer Corporation. All rights reserved.



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## Dimension™ 4600 Desktop

### Exceptional Performance

- Intel® Pentium® 4 Processor at 2.40GHz with 533MHz Front Side Bus
- 256MB Dual Channel DDR SDRAM at 333MHz
- 40GB Ultra ATA/100 Hard Drive (7200 RPM)
- 17" (16.0" v.i.s., 27dp) E773 Monitor
- 64MB DDR NVIDIA® GeForce4 MX™ Graphics Card with TV-Out
- 4x DVD/CD Burner (DVD+RW/+R) Drive with CD-RW
- Integrated 5.1 Audio with Dolby® Digital 5.1 Capability
- Altec Lansing® ADA215 Speakers
- 56K Data Fax Modem, Integrated Intel® PRO 10/100 Ethernet
- Microsoft® Windows® XP Home Edition
- WordPerfect® Productivity Pack with Quicken® New User Edition
- 6 Months of America Online® Membership Included<sup>1</sup>
- 1-Yr Limited Warranty<sup>2</sup>; 1-Yr At-Home Service<sup>3</sup>

**\$999**

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E-VALUE Code: 18318-D50809

### Recommended upgrade:

- 19" 1901FP Dell UltraSharp™ Digital Flat Panel Display, add \$640

The NEW Dell Dimension 4600 desktop: Exceptional performance, incredible value. With options like an Intel® Pentium® 4 processor with HT Technology at up to 3.20GHz and loaded with dual channel memory, the Dimension 4600 delivers the enhanced performance you need for high-end graphics and multimedia applications. Eight USB 2.0 ports ensure that you can add a wide variety of peripherals and upgrades as well. And every machine is backed by Dell's award-winning service and support. Choose the system that gives you the power you want, at a price you can't resist – the NEW Dell Dimension 4600.

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