

Which **CELL PHONES** Take the Best Photos?

**TABLET PC** Reality Check

100  
mag

# PCWORLD

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**Big LCD Screens,**  
Skinny Prices: Lab  
Tests of 12 Models



Bogus Web Deals on  
**Digital Cameras:**  
Don't Get Burned



Hot **Wireless Net**  
Gear—and Tricks  
to Make It Do More

**50**  
**TIMESAVERS**  
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SECURITY  
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ENTERTAINMENT  
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**MOST**



**USEFUL**



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**EVER**





#### > **hp iPAQ™ 1910 Pocket PC**

- Intel® PXA 250 XScale processor 200 MHz
- Color TFT Display 240x320: 65,536 colors
- 16MB NANDFlash ROM; 64MB SDRAM
- Integrated SD memory card slot
- Microsoft® Pocket PC 2002
- Removable Battery
- 1-Year Worldwide Limited Warranty<sup>1</sup>

**\$299**

#### > **Compaq iPAQ™ 3950 Pocket PC**

- Intel® PXA 250 XScale processor 400 MHz
- Color TFT Display 240x320: 65,536 colors
- 64MB NANDFlash ROM; 64MB SDRAM
- Integrated SD memory card slot
- Integrated Bluetooth Wireless
- Microsoft® Pocket PC 2002
- 1-Year Worldwide Limited Warranty<sup>1</sup>

**\$499**

Lease for \$16 a month\*\*

*Your day-to-day business runs on PCs, but you can expand your capabilities with help from HP printers and the iPAQ™ Pocket PC family.*



#### > **hp deskjet 3820 color printer**

- Up to 4800 optimized dpi\*\*\*
- On-screen ink-level indicator, cancel button
- Up to 12 ppm rich black text and up to 10 ppm color
- Space-saving design with fold-up paper tray

**\$99**

#### > **hp officejet v40xi all-in-one**

- Affordable all-color printer, fax, scanner and copier
- Up to 1200 optimized dpi
- Up to 8 ppm rich black text and up to 7 ppm color

**\$179**

#### > **hp deskjet 450ci mobile printer**

- Mobility, flexibility and convenience
- Stunning results with up to 4800 optimized dpi\*\*\*
- Up to 9 ppm rich black text and up to 8 ppm color

**\$299**

#### > **hp LaserJet 1200 printer**

- Personal printer, optional copy and scan capabilities
- Up to 1200 optimized dpi\*\*\*
- 15 ppm rich black text

**\$399**



#### > **hp tc2120**

- Intel® Celeron® processor 1.80 GHz
- 128MB DDR SDRAM
- Embedded Gigabit NIC
- 40GB ATA 7200rpm IDE Hard Drive<sup>4</sup>
- Embedded, dual-channel U/33/66/100 IDE controller
- 1-Year Worldwide Limited Warranty<sup>1</sup>

**\$649**

Lease for \$20 a month\*\*

#### > **hp ProLiant ML310**

- Intel® Pentium® 4 processor 2 GHz
- 128MB Total PC2100 Registered ECC DDR SDRAM Memory (1x128MB) included
- Integrated Dual Channel Ultra ATA-100 IDE Adapter with Integrated ATA RAID 0, 1, & 1+0
- 40GB ATA 7200rpm Drive 1\*\*
- Compaq NC7760 PCI Gigabit Server Adapter (Integrated/Embedded)
- SmartStart & Insight Manager
- 1-Year Worldwide Limited Warranty<sup>1</sup>

**\$1,111**

Lease for \$34 a month\*\*

#### > **hp ProLiant ML350 G3**

- Intel® Xeon™ processor 2 GHz
- 256MB Total PC2100 Registered ECC DDR SDRAM Memory (1x256MB) included
- Integrated Dual Wide-Ultra3 SCSI Adapter
- 6x1" Hot Pluggable Hard Drive Bays
- 18.2GB Pluggable Ultra3 SCSI 10,000rpm Universal Hard Drive
- Compaq NC7760 Gigabit Auto Switching Network Controller (Embedded)
- SmartStart & Insight Manager
- 3-Year Worldwide Limited Warranty<sup>1</sup>

**\$1,978**

Lease for \$60 a month\*\*

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For a limited time, make no payments for 90 days on purchases made before January 31, 2003!<sup>1</sup> Visit us at [www.hp.com](http://www.hp.com) for additional, specially priced desktops and notebooks.

### HP recommends Microsoft® Windows® XP Professional for Business.

Prices shown are HP direct prices; reseller and retailer prices may vary. Prices shown are subject to change and do not include applicable state and local sales tax or shipping to recipient's destination. Photography may not accurately represent exact configurations priced. <sup>1</sup>For hard drives, GB=billion bytes. <sup>2</sup>48X Max CD-ROM Drive data transfer rates may vary from 6750 Kbps to 7800 Kbps. <sup>3</sup>Certain restrictions and exclusions may apply. For complete warranty details, call 1-800-345-1518 (U.S.). <sup>4</sup>Lease products are available through Hewlett-Packard Financial Services Company (HPFSC) to qualified commercial customers in the U.S. and are subject to credit approval and execution of standard HPFSC documentation. Monthly lease payments are based on 48-month lease term with a fair-market-value, end-of-term option and do not include taxes, fees or shipping charges. Lessee





### > **Compaq Evo N1020v Notebook Bundle with Port Replicator & Carrying Case**

- Intel® Pentium® 4 processor 2 GHz
- 14.1" TFT XGA Display
- 256MB DDR SDRAM
- 30GB SMART Ultra ATA Hard Drive\*
- DVD-ROM Drive
- ATI Radeon IGP 340M Integrated UMA 4X
- AGP Graphics with 32MB DDR SDRAM Shared
- JBL Pro Speakers
- Integrated Mini PCI 56K V.92 Modem<sup>††</sup>
- Integrated 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty<sup>‡</sup>
- Port Replicator & Carrying Case

**\$1,399**

Lease for \$43 a month\*\*

### > **Compaq Evo N800v Notebook Bundle with Port Replicator & Carrying Case**

- Mobile Intel® Pentium® 4 Processor - M 1.80 GHz
- 15" TFT XGA Display
- 256MB DDR SDRAM
- 30GB SMART Ultra ATA Hard Drive\*
- DVD-ROM Drive
- ATI Mobility Radeon 7500 (64 bit graphics video) with 32MB DDR SDRAM
- JBL Pro Speakers
- Integrated Mini PCI 56K V.92 Modem<sup>††</sup>
- Integrated 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty<sup>‡</sup>
- Port Replicator & Carrying Case

**\$1,549**

Lease for \$47 a month\*\*

### > **Compaq Evo N1020v**

- Intel® Pentium® 4 processor 2.40 GHz
- 15" TFT XGA Display
- 256MB DDR SDRAM
- 40GB SMART Ultra ATA Hard Drive\*
- DVD/CD-RW Drive
- ATI Radeon IGP 340M Integrated UMA 4X
- AGP Graphics with 32MB DDR SDRAM Shared
- JBL Pro Speakers
- Integrated Mini PCI 56K V.92 Modem<sup>††</sup>
- Integrated 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty<sup>‡</sup>

**\$1,799**

Lease for \$55 a month\*\*

### > **Compaq Evo N800v**

- Mobile Intel® Pentium® 4 Processor - M 2 GHz
- 15" TFT XGA Display
- 256MB DDR SDRAM
- 40GB SMART Ultra ATA Hard Drive\*
- DVD/CR-RW Drive
- ATI Mobility Radeon 7500 (64 bit graphics video) with 32MB DDR SDRAM
- JBL Pro Speakers
- Integrated Mini PCI 56K V.92 Modem<sup>††</sup>
- Integrated 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty<sup>‡</sup>

**\$1,829**

Lease for \$56 a month\*\*

### > **Compaq Evo N610c**

- Mobile Intel® Pentium® 4 Processor - M 2 GHz
- 14.1" TFT SXGA Display
- 256MB DDR SDRAM
- 40GB SMART Ultra ATA Hard Drive\*
- DVD/CD-RW Drive
- ATI Mobility Radeon 7500 (64 bit graphics video) with 32MB DDR SDRAM
- Compaq Premier Sound™ Enhanced Stereo Audio System
- Integrated Mini PCI 56K V.92 Modem<sup>††</sup>
- Integrated 10/100 NIC
- Microsoft® Windows® XP Professional
- 3-Year Worldwide Limited Warranty<sup>‡</sup>

**\$1,999**

Lease for \$61 a month\*\*

### > **Compaq Evo N800v**

- Mobile Intel® Pentium® 4 Processor - M 2.20 GHz
- 15" SXGA+ Display
- 256MB DDR SDRAM
- 60GB SMART Ultra ATA Hard Drive\*
- DVD/CR-RW Drive
- ATI Mobility Radeon 7500 (64 bit graphics video) with 64MB DDR SDRAM
- JBL Pro Speakers
- Integrated Mini PCI 56K V.92 Modem<sup>††</sup>
- Integrated 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty<sup>‡</sup>

**\$2,349**

Lease for \$71 a month\*\*



has the option to purchase the equipment at the end of the lease term at its then fair market value (FMV). Customer may defer lease payments for three months from lease-start date, followed by 15, 21, 33 or 45 monthly payments on any lease with either fair-market-value, \$1 or 10% end-of-lease, term-purchase option. Offer valid on all transactions less than \$50,000 through 1/31/03. HPFSC reserves the right to change or cancel this program at any time without notice. Some product restrictions may apply. Other fees and restrictions may apply. \*\*Offer valid on direct purchases from the HP Small and Medium Business Store and only with purchase of select bundles. Offer available from 11/1/02 through 1/31/03 or while supplies last. Limited order quantities. Offer subject to change. Promotion void where prohibited or restricted by law. HP reserves the right to modify or withdraw this promotion at any time. †ITU V.90/V.92

SMALL AND MEDIUM BUSINESS

› If what you do is important,  
what you do it on is important.



› **Compaq Evo D310  
Microtower with 17" Monitor**

- Intel® Pentium® 4 processor 2 GHz
- 256MB PC2100 DDR SDRAM
- 40GB Ultra ATA Hard Drive\*
- 48X Max CD-ROM Drive†
- Integrated Intel® Extreme AGP Graphics
- Integrated AC97 Audio Premium Internal Speaker
- Integrated Intel® PRO 10/100 NIC
- Microsoft® Windows® XP Professional
- Microsoft® Office® XP Small Business with Publisher 2002
- 1-Year Worldwide Limited Warranty‡
- S7500 17" CRT Monitor

**\$899**

Lease for \$28 a month\*\*

*Every product on these pages is designed and built to meet the demands of business. Well-known reliability and performance come standard, thanks to testing in real-live business environments. Not surprisingly, our seasoned service and support team is very familiar with workplace-related questions. It all adds up to technology that does its job so you can do yours.*





➤ **Compaq Evo D310v Microtower with 17" Monitor**

- Intel® Celeron® processor 1.70 GHz
- 128MB PC2100 DDR SDRAM
- 20GB Ultra ATA Hard Drive\*
- 48X Max CD-ROM Drive†
- Integrated Intel® Extreme AGP Graphics
- Integrated AC97 Audio Premium Internal Speaker
- Integrated Intel® PRO 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty‡
- S7500 17" CRT Monitor

**\$599**

Lease for \$19 a month\*\*

➤ **Compaq Evo D310v**

- Intel® Pentium® 4 processor 1.80 GHz
- 256MB PC2100 DDR SDRAM
- 40GB Ultra ATA Hard Drive\*
- 48X Max CD-RW Drive†
- Integrated Intel® Extreme AGP Graphics
- Integrated AC97 Audio Premium Internal Speaker
- Integrated Intel® PRO 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty‡

**\$699**

Lease for \$22 a month\*\*

➤ **Compaq Evo D310 Microtower**

- Intel® Pentium® 4 processor 2.40 GHz
- 256MB PC2100 DDR SDRAM
- 40GB Ultra ATA Hard Drive\*
- 48X Max CD-ROM Drive†
- Integrated Intel® Extreme AGP Graphics
- Integrated AC97 Audio Premium Internal Speaker
- Integrated Intel® PRO 10/100 NIC
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty‡

**\$799**

Lease for \$25 a month\*\*

➤ **Compaq Evo D510 Ultra Slim Desktop with 17" Monitor**

- Intel® Pentium® 4 processor 1.90 GHz
- 256MB PC2100 DDR SDRAM
- 20GB Ultra ATA Hard Drive\*
- Integrated Intel® Extreme AGP Graphics
- Integrated AC97 Audio Premium Internal Speaker
- Integrated Intel® PRO 10/100 NIC
- Microsoft® Windows® XP Professional
- 3-Year Worldwide Limited Warranty‡
- S7500 17" CRT Monitor

**\$849**

Lease for \$26 a month\*\*

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

- Intel® Pentium® 4 processor 2 GHz
- 256MB PC2100 DDR SDRAM
- 40GB Ultra ATA Hard Drive\*
- Integrated Intel® Extreme AGP Graphics
- Integrated AC97 Audio Premium Internal Speaker
- Integrated Intel® PRO 10/100 NIC
- Microsoft® Windows® XP Professional
- 3-Year Worldwide Limited Warranty‡
- 15" TFT Monitor

**\$1,099**

Lease for \$34 a month\*\*

➤ **hp xw4000 Workstation**

- Intel® Pentium® 4 processor 2.40 GHz
- 80GB Ultra ATA 100 (7200rpm)
- 256MB DDR SDRAM
- nVidia 200NVs Graphics Controller
- 16X DVD/CD-RW Drive
- Integrated Hardware Brick
- Integrated xw4000/xw6000 Docs US
- Integrated xw4000 QRCD
- Microsoft® Windows® XP Professional
- 1-Year Worldwide Limited Warranty‡

**\$1,194**

Lease for \$37 a month\*\*

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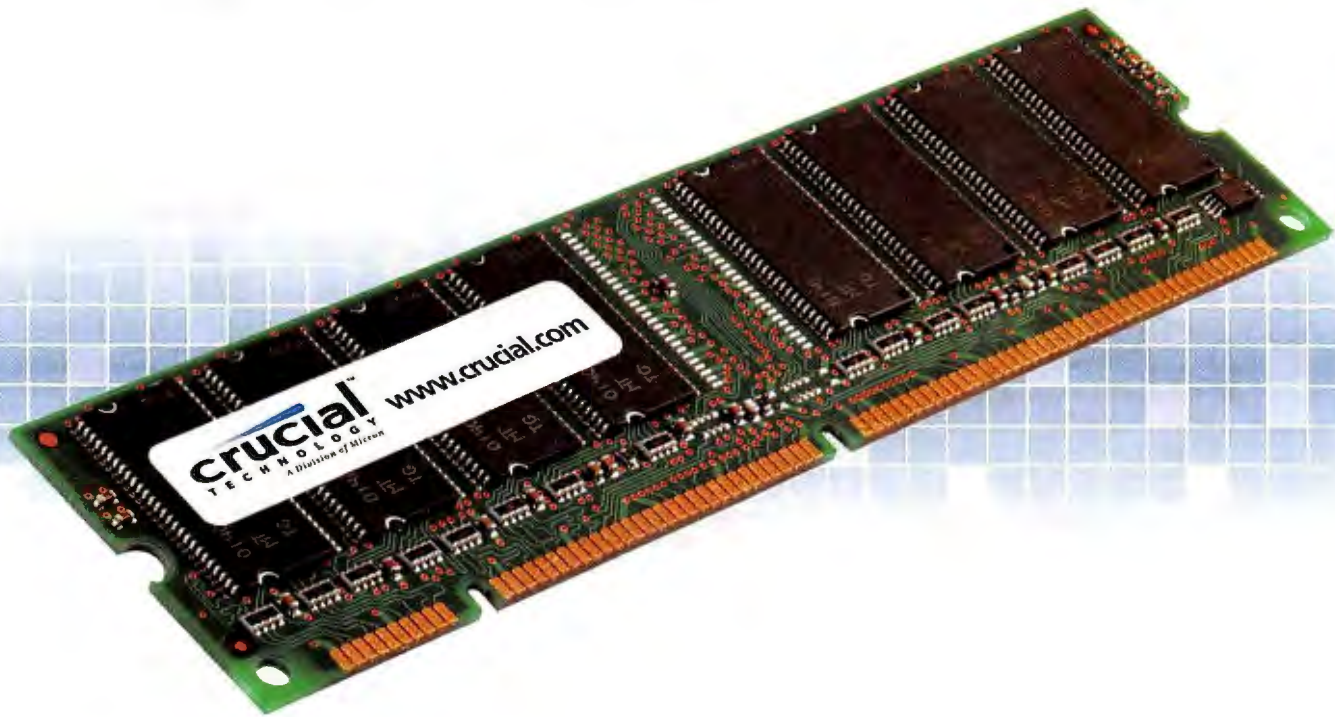
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multiple users

Under attack from hackers!

ived virus-infected macro

security patch

Forgot password

**Managing desktop security can be challenging.  
That's why there's Windows XP and Office XP.**

Recognize any of those issues? Or, perhaps, all of them? We thought so. Many of these issues can be related to your legacy desktop software; fortunately, many of them can be addressed by features in Microsoft® Windows® XP Professional



Microsoft

Wants to encrypt a memo

Needs access to HR, not accounting

Wants to encrypt everything

Needs to make a VPN connection

and Microsoft Office XP Professional. Want specific examples? The Group Policy feature in Windows XP Professional lets you define related user groups and then easily assign security settings to the group as a whole. Office XP Professional

offers Macro Virus Protection, which lets you easily configure applications to help prevent users from running the macro attachments that most viruses use. Want more reasons to upgrade? Visit [microsoft.com/desktop](http://microsoft.com/desktop)





www.BenQ.com



## An LCD like you've never seen. Or heard.

The new BenQ FP591 embodies revolutionary thinking on enjoyment. Next-generation technology drives a fast 16 ms response time enabling dynamic screen motion for DVD, gaming, standard applications or even TV. The super-bright display and extra-high contrast delivers stunning colors and pictures. Video is embraced by SRS® sound processing technology for enjoying high-quality stereo surround sound. A host of additional features and a contemporary case, make the FP591 the centerpiece of any space.



### BenQ FP591

#### The Next-Generation 15" LCD Display

- Stylish ultra-slim modern design
- 16 ms signal response time for dynamic screen motion
- Dual stereo speakers with SRS® surround sound
- Ultra-high 500 cd/m<sup>2</sup> brightness
- 450:1 contrast ratio for extraordinarily clear, sharp picture quality
- Dual D-Sub analog and DVI-D digital signal support
- Digital Photo Frame displays digital camera pictures directly (optional)

For more information, visit [www.BenQ.com/2003/PCWorld-FP591](http://www.BenQ.com/2003/PCWorld-FP591)

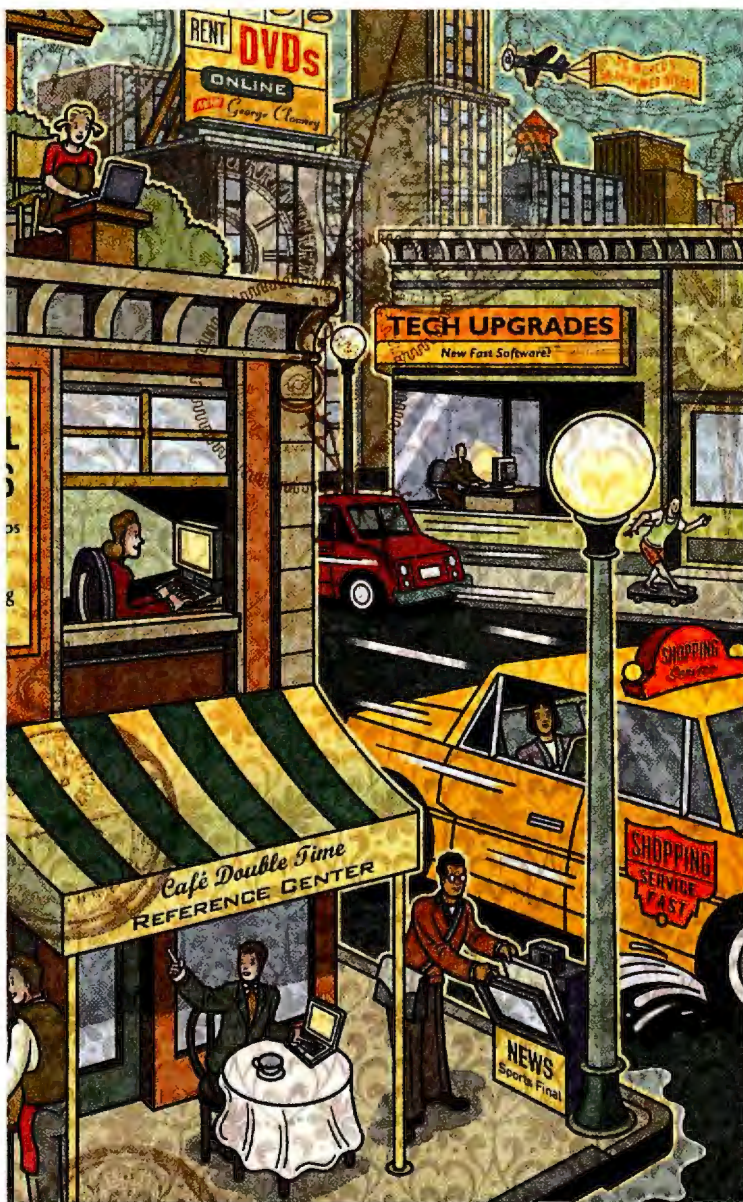
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# BenQ

Enjoyment Matters





## COVER STORY

### 80 Really Useful Sites for Really Busy People

We've collected 50 of the best online pages, services, and tools so you can find flight-delay updates, track that late package shipping on any of 56 carriers, sign up for out-of-town sports events, get your phone number off telemarketing lists, use your wireless phone to comparison shop for the best prices, and much, much more—fast.

Cover Illustrations by Peter Hoey



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# PC WORLD

FEBRUARY 2003  
VOLUME 21 ♦ NUMBER 2  
AOL KEYWORD: PCWORLD  
WWW.PCWORLD.COM

## FEATURES

### NETWORKS

#### 92 Wireless Networks That Do More

The technology is ripe and prices are great, so it's time to get serious about wireless networking. We help you choose the right gateway and make sure it runs trouble-free.

### LCD MONITORS

#### 109 MonsterVision LCDs

Not too long ago, big flat panels were hideously expensive. These days, however, a typical 19-inch LCD costs under \$1000. Our Test Center rounded up 14 new models and found two Best Buys that really shine.

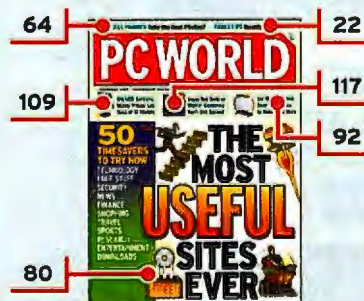


### WEB SHOPPING

#### 117 Camera Confidential

Tempted by an online vendor's ultralow prices for consumer electronics? We found that some sweet-looking deals come with big bottom lines and huge hidden hassles.

## ON THE COVER





The Stylistic® ST4000 Tablet PC Is Here.



**AFTER 12 YEARS OF DESIGNING, TESTING  
AND IMPLEMENTING PEN COMPUTERS,  
OUR TABLET PC IS HERE.**

### **12 YEARS AWAY FROM ORDINARY.**

Don't expect our Tablet PC to be like all the rest. It's powered by the latest Intel® processor. Runs any Windows application. Thrives with or without a keyboard and slips effortlessly into our optional Tablet Dock for desktop duty. It's thin, it's light, it's flat. In short, it's everything 12 years of experience said it could be: The most natural, mobile and productive PC anyone has ever seen.



The Stylistic® ST4000 is powered by an Ultra Low Voltage Mobile Intel® Pentium® III Processor 800MHz – M which supports Enhanced Intel® SpeedStep® Technology.

**Fujitsu recommends Microsoft® Windows® XP Professional for Mobile Computing.**



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### DOWNLOADS

**Defrag RAM and Hard Drives**  
These tools boost performance  
without breaking the bank.  
[find.pcworld.com/32852](http://find.pcworld.com/32852)

### REVIEWS

**Best Graphics Boards**  
Cards featuring the ATI Radeon  
9700 chip blast onto our chart.  
[find.pcworld.com/32855](http://find.pcworld.com/32855)

## COMING UP IN MARCH

NEXT MONTH brings the 20th anniversary edition of *PC World*.  
**Hidden Talents:** We discover 20 surprising things a PC can do.  
**Stuff We Love:** We select a score of the most innovative technology

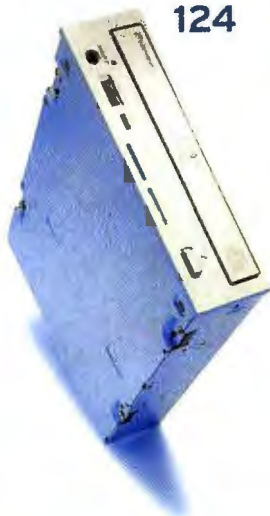
products for 2003 and beyond.  
**Top Tools:** The 20 utilities your computer shouldn't be without.  
**PC-Free:** Our fearless author attempts to go 20 consecutive days without using a computer.



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## NEWS & TRENDS

- 22** Tablet Test Drive  
We lab-tested six new Tablet PC models and then gave several to interested users to see how well these machines fulfill real-world business needs.
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- 30** Tool Copies DVD Movies  
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## HERE'S HOW

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Make custom disk-maintenance shortcuts; tile or cascade windows quickly; print a font sampler.
- 144** Internet Tips  
Remove spam (and only spam) from your in-box; prevent Windows Messenger from launching.
- 146** Step-By-Step  
Install a PCI card in your system to add speedy FireWire or USB 2.0 ports for your peripherals.
- 148** Hardware Tips  
Use a setup utility to tune your PC; keep your CD-RW drive dust-free; hardware resources.
- 150** Answer Line  
Diagnose Windows shutdown problems; configure a notebook for home and office networks.

CDW: If it's in technology, it's probably in our warehouse

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TOSHIBA



EPSON

SimpleTech

SHARP  
FROM SHARP BIZ-IDEA  
COMPUTER PRODUCTS

APC  
Legendary Reliability



Hard drives sold separately



## hp ProLiant DL360 G2 series server

- ▶ 1.4GHz Intel® Pentium® III processor
- ▶ Memory: 256MB std., 4GB max.
- ▶ Up to 145.6GB hot-pluggable hard drive capability

- ▶ Integrated Smart Array controller
- ▶ Two 10/100 Ethernet adapters

**\$1979.49**

CDW 362823

## Sun Blade™ 150 Series Workstation

- ▶ 650MHz Sun UltraSPARC® III processor
- ▶ Memory: 256MB
- ▶ 40GB hard drive
- ▶ 48X Max CD-ROM drive
- ▶ 10/100 Ethernet
- ▶ Solaris™ 8 operating system



Monitor sold separately



**\$1995.00**

CDW 420683

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## Cisco Catalyst 2950SX-24

CISCO SYSTEMS  
Authorized Reseller



- Managed rack-mountable switch with data security protection
- 24 10/100BASE-TX ports
- Two 1000BASE-SX fixed-configuration, wire-speed ports
- Easy to install and manage using the Cisco Cluster Management Suite

**\$1639.90**

CDW 410104

## Compaq Evo N610c Notebook

**COMPAQ**  
brought to you by hp



- 1.8MHz Mobile Intel Pentium 4 Processor-M
- Memory: 256MB
- 30GB hard drive
- 8X Max DVD-ROM drive
- 56Kbps modem
- 10/100 Ethernet
- 14.1" TFT active-matrix display
- Windows® XP Professional

**\$1999.95**

CDW 401738

## Canon Office Color Printer N1000

**Canon**



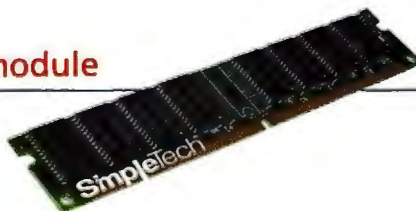
- Resolution: 2400 x 1200 dpi
- Print speed: 20 ppm black, 18 ppm color
- RAM: 24MB
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## FEATURED THIS MONTH

### Our Guide to New Products and Services Covered in This Issue

CAMERA-ENABLED CELL PHONES from Motorola, Nokia, and Sanyo are among the dozens of new products we examine this month. A full list of the newcomers follows, along with each item's star rating, if any (some models are preproduction units or otherwise ineligible for a rating). Visit [find.pcworld.com/10860](http://find.pcworld.com/10860) for more on *PC World's* Star Ratings.



#### DESKTOP PCs

- 126 ABS Awesome 3330 ★★☆☆☆
- 126 ABS Bravado 2240 ★★☆☆☆
- 128 ABS Sensation 1300 ★★☆☆☆
- 70 Alienware Navigator Pro ★★★★★
- 128 Compaq Evo D310 Microtower ★★☆☆☆
- 128 Dell Dimension 2350 ★★☆☆☆
- 126 Dell Dimension 4550 ★★☆☆☆
- 126 Dell Dimension 8250 ★★☆☆☆
- 128 FreewayTech Innovation A7000 ★★☆☆☆
- 126 Gateway 500X ★★☆☆☆
- 126 Gateway 700XL ★★☆☆☆
- 126 Micro Express MicroFlex 28A ★★☆☆☆
- 70 Sony VAIO PCV-W10 ★★☆☆☆

#### NOTEBOOK PCs

- 66 Apple PowerBook G4 ★★★★★
- 130 Compaq Evo N410c ★★☆☆☆
- 130 Compaq Evo N610c ★★☆☆☆
- 130 Gateway 450X ★★☆☆☆
- 66 Toshiba Satellite 5205-S704 ★★☆☆☆

#### WIRELESS GATEWAYS

- 92 3Com 3CRWE52196 ★★☆☆☆
- 92 Actiontec GEU404000-01 ★★☆☆☆
- 92 Belkin F5D6231-4 ★★☆☆☆
- 92 D-Link AirPlus DI-614+ ★★★★★
- 92 Linksys BEFW11S4 Version 2 ★★☆☆☆
- 92 Microsoft MN-500 ★★☆☆☆
- 92 NetGear MR814 ★★☆☆☆
- 92 Proxim Orinoco BG-2000 ★★☆☆☆
- 92 SMC Barricade Plus SMC7004WFW ★★☆☆☆
- 92 Zoom ZoomAir IG-4165 ★★☆☆☆

#### LCD MONITORS

- 109 AOC LM914 ★★☆☆☆
- 109 Dell UltraSharp 1900FP ★★☆☆☆
- 32 Hitachi CML174 ★★☆☆☆
- 109 Hitachi CML190B ★★☆☆☆
- 109 Iiyama Pro Lite 4821DT-BK ★★☆☆☆
- 109 KDS USA Radius Rad-9 ★★☆☆☆
- 109 NEC MultiSync LCD 1920NX ★★☆☆☆
- 109 Planar PL191M ★★☆☆☆
- 109 Samsung SyncMaster 191T ★★☆☆☆
- 109 Sceptre Technologies X9S-Naga ★★☆☆☆
- 32 ViewSonic VG170m ★★☆☆☆
- 109 ViewSonic VX900 ★★☆☆☆

#### LASER PRINTERS

- 133 IBM Infoprint 1120n ★★☆☆☆
- 133 Lexmark W812 ★★☆☆☆
- 133 Minolta-QMS PagePro 1250W ★★☆☆☆
- 133 Oki Data B8300n ★★☆☆☆
- 133 Xerox Phaser 4400/N ★★☆☆☆

#### REWITABLE DVD DRIVES

- 134 Alera DVD+R Cruiser DVDRW6002 ★★☆☆☆
- 134 Aopen DVRW2412PRO ★★☆☆☆
- 134 Pioneer DVR-A05 ★★☆☆☆
- 134 Toshiba SD-R5002 ★★☆☆☆

#### INPUT DEVICES

- 74 Genovation Optical Mouse Keypad ★★☆☆☆
- 74 Gyration Ultra Cordless Optical Mouse ★★☆☆☆

#### MP3 PLAYER

- 72 Creative Labs Nomad Jukebox Zen ★★☆☆☆

#### DIGITAL CAMERAS

- 72 Canon PowerShot G3 ★★☆☆☆
- 136 Fujifilm FinePix 3800 Zoom ★★☆☆☆
- 136 Fujifilm FinePix A303 ★★☆☆☆
- 136 HP Photosmart 320 ★★☆☆☆
- 136 Konica Digital Revio KD-400Z ★★☆☆☆
- 136 Nikon Coolpix 3500 ★★☆☆☆
- 136 Toshiba PDR-2300 ★★☆☆☆

#### PDAs & OTHER HANDHELDS

- 76 AlphaSmart Dana ★★☆☆☆
- 135 Casio Cassiopeia BE-300 ★★☆☆☆
- 34 HP IPaq Pocket PC H5450 ★★☆☆☆
- 135 Palm Tungsten T ★★☆☆☆
- 135 Sony Clie PEG-NX70V ★★☆☆☆
- 135 Toshiba Pocket PC E335 ★★☆☆☆
- 135 Zayo USA A600 PPC ★★☆☆☆

#### CELL PHONE/CAMERA HYBRIDS

- 64 Motorola T720i ★★☆☆☆
- 64 Nokia 3650
- 64 Sanyo 5300 ★★☆☆☆

#### HOME THEATER PROJECTOR

- 34 Phillips LC6231 ★★☆☆☆

#### SOFTWARE & UTILITIES

- 68 2nd Story Software TaxAct 2002 Deluxe
- 30 321 Studios DVD X Copy
- 68 H&R Block TaxCut Platinum ★★☆☆☆
- 57 High Criteria Total Recorder ★★☆☆☆
- 68 Intuit TurboTax Premier 2002 ★★☆☆☆
- 57 Tenebril GhostSurf Pro ★★☆☆☆

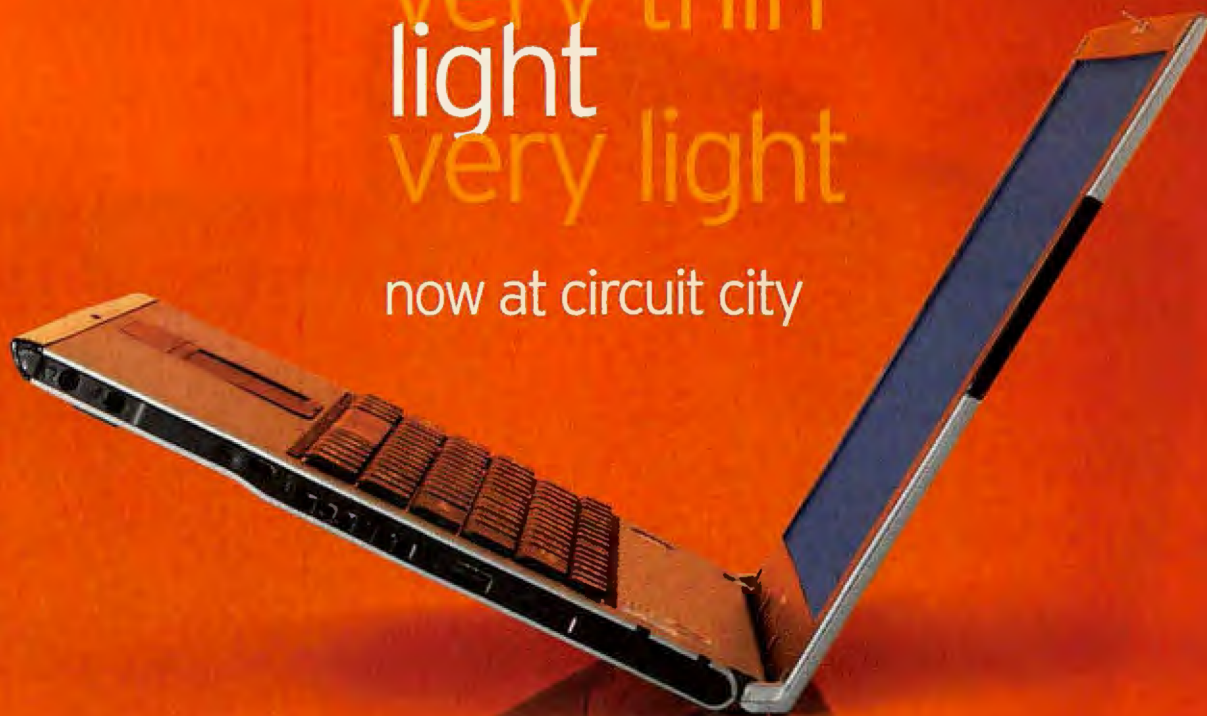






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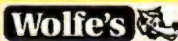
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# UP FRONT

KEVIN MCKEAN

## The Revolution Will Be Televised

Or, how computers may dictate what's ahead for movies, music, and TV.

CONVERGENCE, AS YOU PROBABLY know, is the currently fashionable term for the way the computer, telecommunications, and entertainment industries keep stepping on each others' toes. It's a poor term, because new devices rarely evolve by throwing together existing technologies.

More often, they "radiate" instead—meaning that several new gadgets arise from one successful old one. And today, the old technology that is radiating the most promising new gear is—surprise!—the PC itself.

Consider HP's Media Center 883n ([find.pcworld.com/31319](http://find.pcworld.com/31319)), which was built expressly for entertainment. Introduced just a few months ago, this sleek black-and-silver machine records TV on its hard disk; plays DVDs, games, and music; and can be operated by remote control. Within a couple of years, you'll be able use a remote on the TV in your bedroom to command a computer like this one in another room to record and play back television programs via high-speed wireless adapters.

Stand-alone PVRs (personal video recorders), better known by their TiVo and Sonicblue ReplayTV brand names, are little more than specialized computers mated with a TV instead of a monitor. They download a program guide from the Web to make it bonehead-simple to find and record the shows you want.

Speaking of monitors, if you happen to have a high-definition computer display, you can buy a product like ViewSonic's NextVision 6 ([find.pcworld.com/32858](http://find.pcworld.com/32858)) for under \$400 and watch HDTV at a fraction of the cost of a new HDTV.

On the audio front, several products are emerging that will distribute digitally recorded music over ethernet or wireless

choices in entertainment technology.

Of course, the entertainment industry is fighting hard to control these developments. The ease with which computers create and duplicate digital audio files, for example, set off one of today's great legal battles over copyright law. And the film and television industry fear software like DVD X Copy, from 321 Studios ([321studios.com](http://321studios.com)), that lets you use a DVD burner to make backup copies of DVD films.

My hunch is that the entertainment lawyers will win most of the early skirmishes. As I write this column, the last assets of Napster—the file-sharing service that went bankrupt after losing in court last year—are going up for auction a few miles south of our offices.

In the long run, though, the computer industry will keep coming up with better, cheaper, and more convenient ways to enjoy movies, music, and TV. And that will create an irresistible economic force that is likely to transform those industries forever. In my view, the word *convergence* doesn't capture the violence of the impending collision; *coup* would be more like it. And it's interesting that the main force driving this revolution is an old device, not a new one, that only a year or two ago many technology pundits had declared dead. ■

Kevin McKean ([kevin\\_mckean@pcworld.com](mailto:kevin_mckean@pcworld.com)) is editorial director of PC World.



networks; look for announcements from Cd3o and other companies within the next couple of months. This means an end to carting CDs around. You simply store your songs on a PC, and then play them back through standard audio equipment elsewhere in your office or home.

### BASIC ECONOMICS

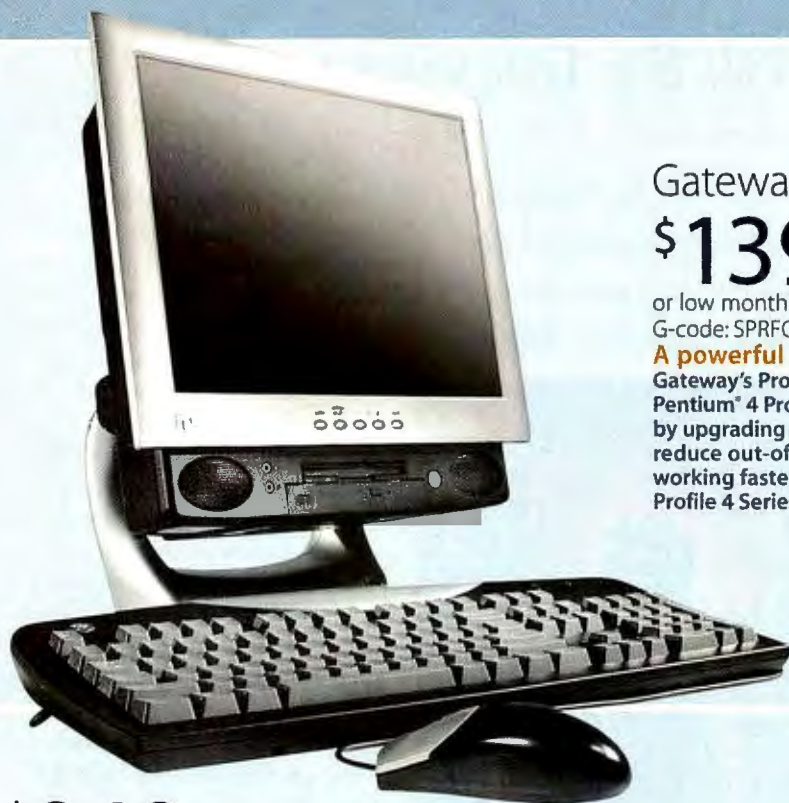
WHETHER ANY OF these devices will catch on in the marketplace remains to be seen. But one thing is sure: During good times and bad, buyers have proved willing to open their wallets for exciting new

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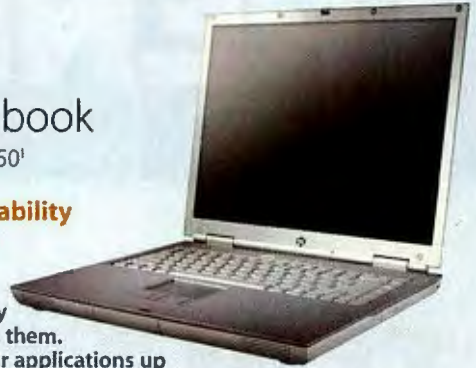
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# NEWS & TRENDS

EDITED BY RAMON G. McLEOD

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34 WELL-PRICED HOME THEATER PROJECTOR

## TABLET TEST-DRIVE

WE TURN TO OUR LAB AND TO REAL-WORLD USERS FOR THE VERDICT ON MICROSOFT'S AMBITIOUS EFFORT TO POPULARIZE PEN-BASED COMPUTING. **BY YARDENA ARAR**

**TEST Center** THEY HAVE finally arrived. A couple of years after Bill Gates demonstrated an early prototype—and a couple of months after the celebrity-sprinkled Broadway launch—Tablet PCs are real, shipping products.

But do they really make life simpler for people who attend lots of meetings and record their notes on pad and paper? Do they fulfill Gates's dream of paper-killing machines for businesspeople on the go? Or are they simply niche products like their pen-based computer predecessors?

To take a hard look beyond the hype, we gathered shipping units running Windows XP Tablet PC Edition from six vendors: Acer, Fujitsu, HP, Motion Computing (now in

partnership with Gateway), Toshiba, and ViewSonic. The fully outfitted devices ranged in price from \$2197 to \$2814 (see "Tablet Tally: No One Model Has It All," page 24, for more detail). The systems came in two basic styles: a slate-and-docking-station combo (the Fujitsu, HP, Motion Computing, and ViewSonic models), and a convertible notebook (the Acer and Toshiba units).

We lab-tested all six for performance and battery life, and sent several to business users to get real-world feedback.

Our findings: These units represent a promising start to a technology with great potential—if not for widespread mainstream use, at least for a significant (and increasing)



"I'm pretty positive on it. The only downside would be having to carry extra batteries."

ROB DORTING, Burlington, Iowa

Account representative, Fortune 500 consumer products company

Tablet PC tested: Acer TravelMate C102Ti

PHOTOGRAPH: MICHAEL GIRARD





**"I love it. I think it's awesome."**

**KYMI ARMOUR MATHESON, San Francisco**  
 Senior product manager, Addamark Technologies  
 Tablet PC tested: Fujitsu Stylistic ST4000

number of mobile workers who regularly take notes and prefer handwriting to typing.

The devices aren't perfect. The ultra-low-voltage Pentium or Transmeta Crusoe chips in most of these systems aren't fast (though they're comparable to subnotebooks' CPUs). And like other portables, tablet PCs get warm with extended use. Price and battery life concerns may deter prospective buyers, and some features—notably handwriting recognition—simply aren't ready for prime time. But the units' ability to use handwritten input holds great appeal for some people who aren't deskbound.

#### TAKE NOTE

"I LOVE IT. I think it's awesome," reported Kymi Armour Matheson of the \$2796 slate-style Fujitsu Stylistic ST4000 that she tried out at the San Francisco offices of Addamark

Technologies, a small start-up company. Matheson, whose job as product manager involves a lot of meetings and some travel, is a former user of Apple's pioneering pen-based Newton, and normally works on a Dell laptop.

She especially appreciated Journal, a utility included with XP Tablet PC Edition that lets you save searchable images of handwritten notes. She found she could take meeting notes on the Fujitsu, instead of having to use pen and paper, and then quickly dock it on its station for more desktop-like use.

"It does everything my laptop does—and it's lighter," Matheson said. She also found the CPU fan agreeably quiet.

Matheson did notice some drawbacks, though they were not severe enough to dampen her enthusiasm for the product. She noted that the unit did not connect to the office's

wireless network as consistently as did the notebook she typically uses. And while she liked the slate format overall, she thought Fujitsu should have included a better means of propping up the tablet independently of the docking station for times when she's on the road with just a keyboard (Fujitsu is working on this problem, a spokesperson said).

Despite having enjoyed the Newton's handwriting recognition features, Matheson did not use the ones in Windows XP Tablet PC Edition extensively. She found handwriting-to-text conversions on the fly (via the Tablet Input Panel) inaccurate, and she didn't want the distraction of trying to fix mistakes during meetings.

#### ON THE ROAD

ROB DORTING, a Burlington, Iowa-based account representative for a Fortune 500 consumer products company, felt that the handwriting recognition wasn't accurate enough to bother with either. But he heartily endorsed the \$2199 Acer TravelMate C102Ti he tried while visiting some of the 16 chain stores he monitors.

Like Matheson, Dorting especially liked the Journal feature. As he went through each store, he was "noting items I need to go to the store director about," he said. "Normally, I'd just take a legal pad."

In Dorting's opinion, the tablet would be an even more useful productivity tool if his company ported some of its customized apps to the OS. Currently, he has to create voluminous reports and checklists on paper and then mail them to his company—a time-consuming process that would be streamlined if he could ►

#### IN BRIEF

##### Product Pipeline

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##### RUGGED AND WIRELESS:

Designed for true road warriors, Itronic's GoBook II laptop integrates support for up to three wireless networks concurrently. Its die-cast magnesium housing can withstand rain, snow, wind, dust, fire, shock, vibration, and chemical exposure. Shipping in early 2003 with a 1.7-GHz Pentium 4 processor, the GoBook II supports 802.11b, Bluetooth, and wireless WAN technologies. The notebook also has a durable outdoor touch screen, a NiteVue keyboard, and a scary suggested retail price of \$4495. [find.pcworld.com/32744](http://find.pcworld.com/32744)





"I felt like I had a warm, expensive Etch A Sketch. When I made a mistake, I wanted to pick it up and shake it.... [I]t's really fun, but I don't find it particularly useful, especially at the price point."

KAREN KAJMO, Needham, Massachusetts, product manager. Tablet PC tested: Motion Computing M1200

walk store aisles with a tablet in hand that already contained the proper electronic forms.

He had criticisms, too. Windows XP's voice recognition technology, even after training, worked poorly when he tried to dictate memos. And since he's often on the road for several hours a day, he said he would have appreciated a longer battery life (in our tests, battery life for the Acer was 2 hours, 54 minutes).

Still, Dorting decided, "For what I do, it would be really helpful, and it would save a lot of time and money.... You can justify the price pretty easily."

Not all of our testers agreed. Karen Kajmo, a Needham, Massachusetts-based product manager, said she needs to type, format, and distribute meeting notes to coworkers. But the handwriting-to-text

conversion was not accurate enough for her, so the Motion Computing M1200 (\$2814 including docking station and

referring to the natural tendency of Tablet PCs to heat up. "When I made a mistake, I wanted to pick it up and



HP'S COMPAQ Tablet TC1000 on its keyboard swivel-stand (left, docking station not shown); Fujitsu's Stylistic ST4000 shown docked.

CD-RW/DVD combo drive) she tried wasn't useful.

"I felt like I had a warm, expensive Etch A Sketch," Kajmo said of the slate-style unit,

shake it.... My general impression is that it's really fun, but I don't find it particularly useful, especially at the price point."

Pediatrician Sheena Apun of Babylon, New York, said that she would have difficulty justifying the cost of a tablet for her private practice even though she enjoyed using Hewlett-Packard's Compaq Tablet PC TC1000 (\$2197 including docking station and CD-ROM drive) to take and organize notes, mostly from telephone calls. "I like it, but not enough to purchase one for my own use," she said. She added that for her practice, it's easier to maintain patient files on paper.

Still interested in tablet-shopping? The wide range of available designs gives you some real choices.

The more work you do away from the desk where you'd keep a docking station, the more you might find a convertible handy. Though you

## FEATURES COMPARISON

### TABLET TALLY: NO ONE MODEL HAS IT ALL

TABLET	Price <sup>1</sup>	CPU	RAM/hard drive	Diagonal screen size/Weight (slate or notebook only)	Included features	PC WorldBench 4	Battery life (hours: minutes)
Acer TravelMate C102Ti ★★★★☆ find.pcworld.com/32780	\$2199	800-MHz ULV Pentium III-M	256MB/30GB	10.4 inches/3.3 lb	CD-ROM (via USB 1.1)	75	2:54
Fujitsu Stylistic ST4000 ★★★★☆ find.pcworld.com/32786	\$2796	800-MHz ULV Pentium III-M	512MB/20GB	10.4 inches/3.3 lb	Docking station with DVD/CD-RW combo drive (\$150 less for CD-ROM only), portfolio case, keyboard, and mouse	85	3:26
HP Compaq Tablet PC TC1000 ★★★★☆ find.pcworld.com/32783	\$2197	1-GHz Transmeta Crusoe TM5800	256MB/30GB	10.4 inches/2.7 lb	Docking station with CD-ROM drive, carrying case, USB keyboard and mouse	59	3:34
Motion Computing M1200 ★★★★☆ find.pcworld.com/31691	\$2814	866-MHz ULV Pentium III-M	512MB/20GB	12.1 inches/3.3 lb	Desktop stand, docking station, DVD/CD-RW drive (via FireWire), hard cover, keyboard with touchpad	88	3:18
Toshiba Portégé 3505 ★★★★☆ find.pcworld.com/32789	\$2499	1.33-GHz Pentium III-M	512MB/40GB	12.1 inches/4.2 lb	DVD-ROM (via PC Card)	86	3:29
ViewSonic Tablet PC V1100 ★★★★☆ find.pcworld.com/32792	\$2376	866-MHz ULV Pentium III-M	256MB/20GB	10.4 inches/3.4 lb	Docking station with CD-ROM drive, keyboard, and mouse	82	2:41

<sup>1</sup> All units priced with Wi-Fi (802.11b) options included.



can bring a keyboard to attach to a slate when you travel, you're more likely to run into problems propping it up.

HP's Compaq tablet skirts this problem cleverly by building a swivel stand onto its keyboard. This enables its slate to behave like a convertible notebook.

Unfortunately, however, the Compaq's 1-GHz Transmeta chip makes it significantly slower than the other machines here, most of which are powered by 800-MHz or 866-MHz ULV mobile Pentium III CPUs. On the other hand, the HP unit's battery life was a respectable 3 hours, 34 minutes—the highest (by 5 minutes) of the six tested devices.

The batteries in the Fujitsu and Toshiba units lasted nearly as long, with the Motion Computing tablet trailing them by about 10 minutes. The Acer and ViewSonic tablet PCs died the soonest, at 2 hours, 54 minutes and 2 hours, 41 minutes, respectively.

## POWER ENOUGH

IN GENERAL, we found that our review units performed on a par with comparable subnotebooks, scoring from 59 (the Crusoe-based HP) to 88 (Motion Computing's M1200) on our PC WorldBench 4 test suite of business applications. The only exception was the 1.33-GHz P-III-M-based Toshiba, which performed below average for its CPU class.

But for the same price as one of the units we tested—

\$2100 to \$2800, including such basic accessories as a keyboard, an optical drive, and (for the slates) a docking station—you could buy a heavier,



**SLATES LIKE** ViewSonic's Tablet PC V1100 (left) and Motion Computing's M1200 have separate keyboards and docking stations for use at a desk.



**TOSHIBA'S PORTÉGÉ 3505 (left) and Acer's TravelMate C102Ti** look like typical subnotebooks, but screens fold back for slate-like use.

conventional notebook with better performance. By way of comparison, the top-ranked models on the power side of our February *Top 15 Notebook PCs* chart—all based on 1.2-GHz Pentium III-M to 2.2-GHz mobile Pentium 4 chips—cost about the same as or slightly less than the tablets here, and earned PC WorldBench 4 scores of 94 to 103.

Some ergonomic and design weaknesses distinguish certain tablets. On the slate side, the Motion Computing docking station is the only one that lacks a built-in optical drive or drive bay. You choose between various FireWire-based external drives. And the

ViewSonic device's docking station doesn't allow you to pivot the display to landscape mode—a drawback for people who want a more conventional desktop experience when the unit is docked.

Of the notebooks, the Acer looks and feels like a classic ultralight (3.3 pounds) subnote, while the Toshiba takes on nearly a pound of additional weight to incorporate a larger screen and keyboard as well as a 1.33-GHz Pentium III-M, the most powerful chip in any tablet to date.

Our slate users had no complaints about their tablets' carrying weight, which except for the Toshiba hover in the vicinity of 3 pounds. But if weight is a concern, consider waiting for NEC's 2.1-pound Versa LitePad slate, due this spring.

Some industry experts believe many individuals and companies will hold off on tablets anyway, at least for a while: Gartner's Dataquest division has projected worldwide tablet sales in 2003 of just 425,000, or 1.2 percent of the entire notebook market. But by 2007, Dataquest predicts, pen-enabled systems (with or without keyboards) will account for about a third of notebook sales.

For now, few PC buyers may be able to justify the expense of a tablet. But as features are refined, new tablet-

## IN BRIEF

### Did You Know?

**2.78 MILLION** DESPITE the continuing struggles of the PC industry, sales of computers to the public sector—schools in particular—reached an all-time high of 2.78 million units in the third quarter of 2002. That's a whopping 20.9 percent increase over the same quarter in the year 2001.

### Product Pipeline

**BETTER WEB E-MAIL:** Web-based e-mail providers such as Hotmail and Yahoo provide their service free, but you must view ads when you access your in-box. Start-up Kobo.biz bets that you'll willingly pay \$40 a year for an ad-free Web e-mail account that is easy to navigate. You can share 50MB of storage among up to five addresses, and if your in-box fills up, the service will float you a 25MB loan to prevent incoming messages from bouncing. [find.pcworld.com/32747](http://find.pcworld.com/32747)



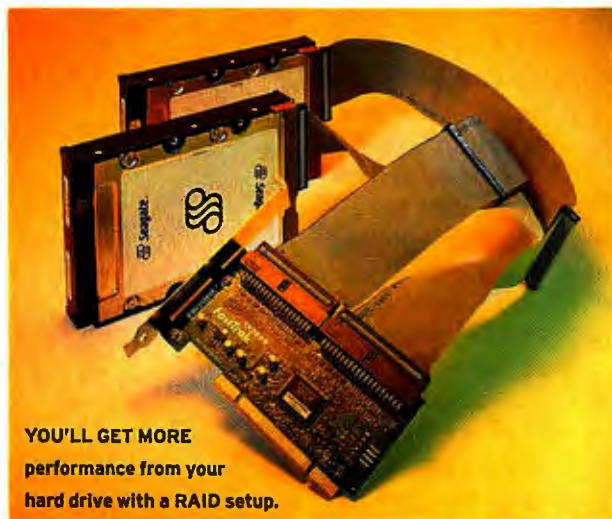
optimized software appears, and the price premium versus conventional portables declines (as Gartner believes may happen in two to three years), tablets could make sense for many contemplating a notebook purchase. ►



## UPGRADES

# HARDWARE BOOST FOR HARD DRIVES

IN PC WORLD'S TESTS, RAID TECHNOLOGY PROVES ITS METTLE ON THE DESKTOP.



YOU'LL GET MORE performance from your hard drive with a RAID setup.

ONCE RESERVED for servers and high-end workstations, RAID technology for linking multiple hard drives is gaining favor with PC users looking to improve performance affordably. Tests by *PC World* show they're on to something: Two RAID-connected drives completed some tasks in 40 percent less time than one drive of the same type.

RAID (Redundant Array of Independent Disks) technology comes in many flavors, but two are finding desktop popularity, thanks in part to low-priced add-in PCI cards and to some system vendors (such as Alienware, Falcon Northwest, and Polywell) that offer PCs with the technology. RAID Level 1, or mirroring, writes all data to two drives at once, ensuring the information survives if one drive fails. More popular with performance buffs is RAID Level 0, or striping, which interleaves data

between two drives to create a double-size drive with about twice the effective throughput.

## NUMBERS UP

TO MEASURE the real-world performance boost striping provides, the PC World Test Center tested pairs of 7200-rpm IDE ATA hard drives from three vendors. Each

drive had 80GB of storage and a 2MB cache; all were tested with Promise Technology's \$109 (list) FastTrak TX2000 ATA RAID card. (With standard RAID cards, you must use same-size drives.) Expect Serial ATA RAID cards when more Serial ATA drives hit the market in early to mid-2003.

We tested each solo drive using the IDE adapter on the test PC's motherboard; then we linked each pair of matching drives to the Promise card and ran the tests again. In our Copy Files and Folders test, Maxtor's \$149 (list) DiamondMax Plus 9 finished first, with 118 seconds (solo) and 80 seconds (striped drives)—about 32 percent less time. Seagate's \$105 (street) Barracuda ATA V drive was slower than the Maxtor, but completed the test in 42 percent less time with RAID than it did solo, dropping from 174 to 101 seconds.

Western Digital's \$129 (list) Caviar WD800BB drive was tops in our Copy Large Files

test, completing it in 83 seconds solo and in 76 seconds striped, or about 8 percent less time. Again the Seagate improved most dramatically with RAID, plunging from 151 seconds to 84 seconds—about 44 percent speedier.

Despite also boosting scores slightly in the Photoshop and Quicken tests, RAID didn't get top marks in all our measures. In most cases, our file-find and Corel Photo Paint tests took more time with RAID, though typically by a scarcely perceptible 5 percent or less.

RAID doesn't offer across-the-board benefits, but it improves performance significantly, particularly on slower drives and for disk-access-heavy functions. So if you get a second drive, consider buying a RAID card, too. And if speed is a priority in your next PC, see RAID-friendly vendors like those mentioned above, or mainstream vendors such as Gateway in coming months.

—Tom Mainelli ►

## TEST REPORT

### NEED THE SPEED? RAID DELIVERS

HARD DRIVE	Drive configuration	Copy files and folders (seconds)	Copy large file (seconds)	File find (seconds)	Photoshop 6 (seconds)	Quicken (seconds)	Corel Photo Paint (seconds)
Maxtor DiamondMax Plus 9 <a href="http://find.pcworld.com/32669">find.pcworld.com/32669</a>	Single	118	94	267	105	648	159
	Two drives in RAID 0	80	79	279	97	644	162
Seagate Barracuda ATA V <a href="http://find.pcworld.com/32672">find.pcworld.com/32672</a>	Single	174	151	274	124	645	163
	Two drives in RAID 0	101	84	278	116	644	170
Western Digital Caviar WD800BB <a href="http://find.pcworld.com/32675">find.pcworld.com/32675</a>	Single	152	83	259	117	650	162
	Two drives in RAID 0	93	76	273	104	643	161



**HOW WE TEST:** We measure how long it takes to copy 1.3GB of data (first as one large file and then as a number of folders and files) from one location on the drive to another, how long it takes to do a find-file operation in Windows, and how long it takes to open a 105MB file in Adobe Photoshop 6 and to perform a number of operations. We also time the running of Quicken and Corel Photo Paint tests excerpted from PC WorldBench 4, *PC World's* application-based benchmark. In all cases, shorter times are better. All tests are carried out on a Dell Dimension 8200 with a 2-GHz Pentium 4 CPU, running Windows XP. For single-drive tests, we used the integrated Ultra ATA/100 interface. For the RAID tests we used Promise Technology's FastTrak TX 2000 RAID adapter. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



SONY



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Professionals from all walks of life rely on Sony displays for their livelihood. Designers depend on the amazing image detail and rich color reproduction.  Business owners rely on the crisp text and wide viewing angles of Sony Flat Panel LCDs. Financial analysts and traders prefer the slim bezel and easy wall or arm mounting options for multi-screen large viewing applications. Professors and students count on the legendary picture quality of Sony's Emmy®-winning\* FD Trinitron® CRT displays. What do all of these professionals have in common? A need for top quality, reliability, performance and value. With a wide selection of sizes and features, Sony has the ideal display for you and your business – from the hard-working StylePro™ Series to the powerful DeluxePro™ Series to the highly specialized PremierPro™ Series. See for yourself. To find the ideal display to match your business needs, see "How to Choose a Display" at [www.sony.com/idealdisplay](http://www.sony.com/idealdisplay).

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## CONSUMER ALERT

# TOOL COPIES DVD MOVIES

## 321 STUDIOS CHALLENGES HOLLYWOOD, DMCA WITH RELEASE OF DVD X COPY.

HOLLYWOOD says that burning a backup of your *Austin Powers in Goldmember* DVD is illegal, and it builds in copy protection to stop you. But a small firm denies kinship to Dr. Evil just because it markets software that lets anyone with a rewritable DVD drive make an exact copy of a commercial DVD.

321 Studios' \$100 DVD X Copy is the first product to let users dub an entire DVD movie onto a blank DVD. In our trials, we saw that the copy even includes the menus, special features, and enhanced audio.

The Motion Picture Association of America argues that such products violate the 1998 Digital Millennium Copyright Act, which bans providing information or tools to evade copy-control technology, including the Contents Scramble System that's used on DVD media.

But Robert Moore, president and founder of 321 Studios, says users have a fair-use right to make personal backup copies of DVDs they buy. "We are offering for the first time a tool that allows you to exercise that consumer right," he says.

### NO DMCA VIOLATION?

TO APPEASE its Hollywood critics, 321 Studios has built its own copy protection into its software. The program inserts electronic controls into the DVD copies to prevent them

from being duplicated further. It embeds a digital watermark capable of tracing a movie file transmitted over the Internet back to the software's licensed owner—pointing the finger at peer-to-peer file sharers (reg-



THE \$100 DVD X Copy lets you burn a backup of a DVD movie.

istration is required when you install DVD X Copy). In addition to the federal disclaimer, it inserts another disclaimer at the beginning of each recorded DVD, telling viewers that the disc is a backup copy intended for personal use only.

Moore claims that DVD X Copy doesn't break the CSS code on DVD movies. Rather, it intercepts the video and audio stream after a DVD player has decrypted CSS to show the movie. Because it doesn't interfere with the disc's encryption, he argues, it does not run afoul of the DMCA.

The assertion that consumers' fair-use rights supersede the DMCA is debatable, since the DMCA provides no exemption for fair use, says

copyright-law expert Evan Cox, a partner in the Covington and Burling law firm in San Francisco. If DVD X Copy does indeed manage to copy a DVD without breaking CSS, however, it may present "an interesting legal challenge" for anyone who argues DVD X Copy violates the DMCA, Cox adds.

321 Studios is no stranger to controversy. It preemptively sued nine major Hollywood studios to certify that its older DVD Copy Plus software, which transfers movies to CD, does not run afoul of the DMCA.

The MPAA recently responded with a counter suit, which alleges that both DVD Copy Plus and DVD X Copy violate the DMCA. It seeks to halt sale of the products and wants all profits made on sales as recovery of damages. Both cases were unresolved as of press time.

### ON SALE NOW

WHILE the lawsuit is pending, sales of DVD X Copy will likely continue. It should be at stores such as CompUSA and Fry's, or for download at [www.dvdxcopy.com](http://www.dvdxcopy.com). It works with all rewritable DVD formats. 321 Studios also distributes it via other firms, such as Triton Technologies, which bundles it with Triton DVD+RW Viper Drives (internal unit, \$349; external model, \$449).

In our trial of one such Triton drive, we easily copied the *Panic Room* DVD in about an hour. The one notable snag:

## IN BRIEF

### Tidbyte

**GATEWAY'S GRID:** To put its nearly 8000 networked PCs to work, the cow-loving PC builder is now selling grid-computing services. By tapping the unused processing power of the PCs in its retail stores, Gateway offers customers the supercomputer-level powers required by complex life-science and financial services companies.

### Did You Know?

**65 PERCENT** ACCORDING to a recent survey, about 65 percent of Net users spend 10 minutes or more a day dealing with e-mail spam. About 37 percent of respondents get 100 junk messages a day, and 63 percent get 50 or more.

Movie DVDs hold more than 4.7GB of data, so we couldn't fit the movie on a rewritable DVD—we needed two discs. (DVD-RAM drives have 9.4GB discs, but the format is incompatible with many DVD players.) You don't lose scenes and you can preview and set the break point, but video stops and starts abruptly. Still, we ended up with an exact copy of the movie, including special features. We also found that, as claimed, DVD X Copy did not let us copy the backup—though another app bundled with Triton's drive did.

Its legality may be in question, but DVD X Copy certainly works. If you have a DVD burner and movies you'd like to make backups of, you may want to get it—while you can.

—Tom Spring ►



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## MONITORS

## VIDEO-FRIENDLY LCDs?

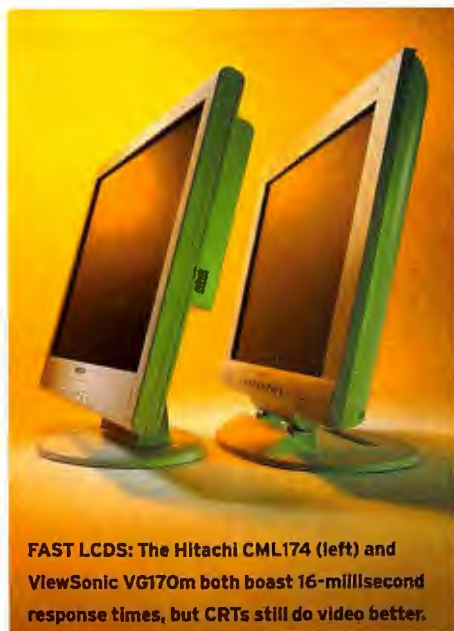
## DISPLAYS WITH FAST RESPONSE TIMES STILL CAN'T MATCH CRTs FOR GAMES, MOVIES.

DEDICATED GAME fanatics will eagerly spring for the latest technology in every part of their PCs save one: the monitor. They scoff at LCDs because CRTs are superior for displaying movement in action-intensive games. But BenQ, Hitachi, LG, Philips LCD, Planar, Sony, ViewSonic, and others are bringing out faster LCDs designed to narrow the gap with CRT displays on games, videos, and other action apps.

Most current LCDs (including those in our roundup on page 109) have a response time—the length of time it takes to turn their pixels on and off—of 25 milliseconds, or roughly 40 frames per second. Newer LCDs boast a 16-millisecond response, which translates into slightly more than 60 fps—the magic number for producing fluid movement in video games. Response time on CRT monitors, however, is several orders of magnitude faster than on even the fastest LCDs.

To test the new technology, we viewed the fast-action CD-ROM game *Return to Castle*

*Wolfenstein* and the DVD of *Star Wars: Episode II Attack of the Clones* on two shipping 17-inch, 1280-by-1024 LCDs with a rated response time of 16 milliseconds: a \$680 Hitachi



**FAST LCDs:** The Hitachi CML174 (left) and ViewSonic VG170m both boast 16-millisecond response times, but CRTs still do video better.

CML174 and a \$610 ViewSonic VG170m. We ran the same tests on a Sony CRT and a Planar LCD with a standard 25-millisecond response time.

Under casual observation, all four monitors did a good job. But after scrutinizing *Attack of the Clones*, we noticed that when Obi-Wan Kenobi quickly turned his head from side to side in one scene, his face blurred ever so slightly on

the 25-millisecond LCD, a bit less on the Hitachi and the ViewSonic, and not at all on the CRT. In *Return to Castle Wolfenstein*, fine textures on stone walls and in smoke looked more distinct on the CRT than on either LCD, but the differences were slight.

Blurring was a more pronounced problem when we tried to scroll through a Web page. On all three LCDs, text streaked and pictures flickered, though slightly less on the Hitachi and ViewSonic. The CRT handled the task almost flawlessly.

## FUZZY NUMBERS

ONE PROBLEM may be the way response times are reported. The 16-millisecond response refers to the time required to turn a pixel all the way on and all the way off. To produce fine color shadings, however, a pixel is only partially turned on. Switching between these so-called gray states can take two to three times longer than turning pixels on or off.

Another caveat: These first fast LCDs use relatively simple twisted nematic (TN) pixel technology, which does not match the color quality and viewing angles of in-plane switching (IPS) and multi-domain vertical alignment. So if speed isn't a concern, you might want to spend your display dollars on a slower but better quality LCD.

## IN BRIEF

## Product Pipeline

**TABLET PC MOVING DAY:** Nobody enjoys moving data to a new PC, and jumping from a desktop or notebook to a new tablet PC could be even more of a hassle. Early adopters looking for an easier way should check out Mobile Automation's Mobile Migration Manager. The software lets you migrate user profile data, documents, and PC settings wirelessly, making the switch to a Tablet PC as painless as possible. [find.pcworld.com/32750](http://find.pcworld.com/32750)

## Downloads

Head to [find.pcworld.com/32738](http://find.pcworld.com/32738) to locate these files.

## TOP 5

- 1 Ad-aware 5.83** 872KB  
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- 2 Pop-Up Stopper 2.9** 442KB  
Eliminate irritating pop-up windows with this free program.
- 3 Sygate Personal Firewall 5.0 Build 1150** 5.1MB  
Secure your sensitive files from invaders striking from both inside and outside your network.
- 4 Internet Download Manager 3.07** 1.16MB  
Improve your download speed and avoid an impatient ulcer.
- 5 FreeRAM XP 1.22** 517KB  
Is your PC acting sluggish? Free up RAM with this tool.

LG.Philips has announced that it will offer a 16-inch IPS LCD module in 2003, and NEC-Mitsubishi has technology for 12-millisecond LCDs. Sweta Dash of display research firm ISuppli/Stanford Resources anticipates that LCD response times should drop below 7 milliseconds in two or three years. Stay tuned.

—Sean Captain ►

## Hitachi CML174

★★★★☆

Hitachi

Street: \$680

[find.pcworld.com/32705](http://find.pcworld.com/32705)

## ViewSonic VG170m

★★★★☆

ViewSonic

Street: \$610

[find.pcworld.com/32708](http://find.pcworld.com/32708)



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## SECURITY

# A TRULY PERSONAL PDA

## BUILT-IN FINGERPRINT READER ENABLES BIOMETRIC SECURITY FOR IPAQ H5450.

TALK ABOUT HAVING a personal touch: HP's new IPaq Pocket PC H5450 is the first mainstream personal digital assistant to offer biometric security via a built-in fingerprint reader.

The reader is a small, thin, unobtrusive strip beneath the navigation button on the newly streamlined IPaq case.

### IPaq Pocket PC H5450

Hewlett-Packard

Street: \$699

★★★★☆

[find.pcworld.com/32528](http://find.pcworld.com/32528)

To use the reader, you must first train the included software to recognize the print of at least one of your fingers (HP recommends training it to recognize two fingers so you have a backup).

Training with a preproduction unit took about 20 minutes because the software rejected my first attempts to scan in a print of my index finger. But once the device accepts seven out of eight consecutive attempts, you are permitted to "enroll" that digit and designate it either as the



sole acceptable form of identification or in combination with a typed password. When I tried to log in using an enrolled finger, the device usually granted me access within at most three attempts. (You can set the device to do a data-destroying hard reset after a user-specified number of unsuccessful log-in attempts.) More important, it shut out all others, which might justify its admit-

tedly steep \$699 price tag for some security-minded users.

The H5450 also boasts built-in Wi-Fi and Bluetooth adapters; a Secure Digital media slot; a removable, rechargeable battery; and a fast 400-MHz Intel XScale CPU. Overall, the H5450 is a top-of-the-line PDA for executives who are willing to pay top dollar for security and connectivity.

—Yardena Arar

## PROJECTOR

# GOOD PRICE FOR HOME THEATER STAR

## QUIET SUB-\$2500 PROJECTOR DELIVERS QUALITY IMAGES.

PHILIPS' LC6231 is an extremely quiet LCD home theater projector with a breakthrough price. At \$2495, it is less costly than most home theater projectors; but even so, its image quality approaches that of the DLP-based, World Class Award-winning In-Focus ScreenPlay 110, which is priced twice as high.

DLP projectors normally have better contrast and less pixelation than LCD projectors, which excel at color and sharpness. Pixelation is less of an issue in new LCD models.



The LC6231 achieves its default 16:9 screen aspect ratio via three 858-by-484 (WVGA) panels. That setting is perfect for movies, and it's easily adjustable to a 4:3 ratio for TV. The HDTV-compatible unit also accepts component, composite, and S-Video inputs.

In tests using S-Video, the

LC6231 exhibited slightly more ghosting than did the ScreenPlay 110 on images of extremely dark objects against light backgrounds. Contrast on the LC6231 was slightly worse, and its image seemed less smooth—but a bit more precise, with better color.

The LC6231's 1000 ANSI-

lumen lamp is rated for 6000 hours, three times that of typical 1000 ANSI-lumen-rated projectors. Yet the LC6231's lamp costs only \$300—\$80 less than the ScreenPlay 110's lamp. The LC6231's barely audible, 27-decibel fan is quieter than the ScreenPlay's.

If not quite in the ScreenPlay's league, the LC6231 is a serious alternative to plasma and other big-screen TVs costing twice as much or more.

—Ramon McLeod ■

### Philips LC6231

Philips

List: \$2495

★★★★☆

[find.pcworld.com/32576](http://find.pcworld.com/32576)



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## \$2999

### Gateway™ 42" Plasma Digital TV

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- 16:9 wide-screen aspect ratio
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- Ultrathin (less than 4" deep), wall-mountable
- Remote control, tabletop stand
- 1-Year Limited Warranty<sup>2</sup>
- Delivery, installation and service plans available<sup>3</sup>
- Picture-in-picture and picture-on-picture



## \$2799

### Gateway® Tablet PC

- 12.1" XGA TFT Active-Matrix Display
- Intel® Pentium® III Processor 866MHz
- 256MB SDRAM
- 40GB Hard Drive
- Flex Docking Station
- External DVD/CD-RW Combo Drive
- External Mobile Keyboard with Touchpad
- Microsoft® Windows® XP Professional Tablet PC Edition<sup>4</sup>



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AOL Keyword: Gateway

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# The Latest and Greatest

[www.gateway.com/digitalzone/music](http://www.gateway.com/digitalzone/music)

## Digital music solutions

Only Gateway can offer a Music PC that includes thousands of pre-loaded songs from top-selling artists. The Gateway 500s Music PC featuring the Intel® Pentium® 4 processor was designed with digital music in mind. With storage for over 1800 CDs of encoded music, it includes everything you need to turn your PC into the ultimate ripping, mixing and CD-burning machine. Get the most out of your digital music experience by adding an Archos 15 Recorder or Creative Nomad MuVo (shown below).<sup>5</sup>



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### Gateway® 500S Music PC

- Intel® Pentium® 4 Processor 2.00GHz
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- 40GB Music Vault Drive with 2000 songs and 90 days pressplay<sup>7</sup> Service
- 40X/12X/48X CD-RW Drive
- 15" LCD Flat Panel Display
- Microsoft® Windows® XP
- Sound Blaster Audigy with FireWire<sup>8</sup>
- Boston Acoustics® BA745 Speakers with Subwoofer
- CD Creator Pack



**\$9999**

### Creative® NOMAD® MuVo™ MP3 Player/USB Drive

- Incredibly easy to use – no software or cables required!
- Ultracompact and extremely lightweight
- Up to two hours of skip-free music playback
- Doubles as a USB drive that can hold 64MB of pictures, documents or presentations

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### Archos® Recorder 15GB MP3 Jukebox

This palm-sized MP3 Jukebox doubles as a voice recorder

- Holds up to 250 CDs worth of music
- Simple drag and drop operation – no software required!
- Realtime encoding from line-in or built-in microphone
- Can also store documents, pictures or data



[www.gateway.com/digitalzone/video](http://www.gateway.com/digitalzone/video)

## Digital video solutions

The 700s Movie Creator PC featuring the Intel® Pentium® 4 processor has all you need to make your own DVD movies, including IEEE 1394 FireWire interface and cables to connect a digital video camcorder, large hard drive for video storage, award-winning Pinnacle® Studio Version 8 movie-making software, DVD/CD recorder and blank media and CD Stomper® kit to make your own video CD and DVD movies. To complete your digital video experience, purchase a Canon Digital Video Camcorder so you can transfer your old home footage from analog camcorder into the PC and mix it into your new movies.<sup>5</sup>



**\$1499**

or as low as \$42 per month for 48 months at 14.9% APR<sup>6</sup>

### Gateway 700S Movie Creator PC

- Intel® Pentium® 4 Processor 2.40GHz w/512K L2 Cache
- 256MB RDRAM<sup>8</sup>
- 80GB 7200RPM Hard Drive
- DVD-RAM/-R/-CD-RW Drive
- 15" LCD Flat Panel Display
- Microsoft® Windows® XP
- Sound Blaster Audigy Audio with IEEE 1394 FireWire
- Boston Acoustics BA745 Speakers with Subwoofer
- Movie Creator VCD/DVD



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with PC purchase

### Canon® ZR45

Digital Video Camcorder

- 18X optical, 360X digital zoom
- Color night-shooting mode
- Image stabilizer
- 8MB memory card for digital photos
- \$599.99 regular price



**\$79999**

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(\$999.99 regular price; \$899.99 after \$100 Canon mail-in rebate)

### Canon Elura 40

Digital Video Camcorder

- Four shooting modes: digital video, digital photo, XGA (1024 x 768 pixels) photos, motion JPEG
- 8MB memory card for digital photos
- \$899.99 regular price
- One of the smallest camcorders in the industry

**\$9999**

with PC or digital camcorder purchase

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- 1394 FireWire cables
- Blank CD and DVD media and CD/DVD Stomper Pro Kit

- Capture, Create and Share digital movie book and CD training<sup>9</sup>
- \$199.99 regular price





[www.gateway.com/digitalzone/photopro](http://www.gateway.com/digitalzone/photopro)

**\$1298**

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## Gateway® 500S Photo PC

- Intel® Pentium® 4 Processor 2.00GHz
- 256MB DDR SDRAM
- 80GB 7200RPM Hard Drive
- 48X/24X/48X CD-RW Drive
- VX930 19" color monitor (18" viewable)
- Microsoft® Windows® XP
- Integrated Audio
- GCS 300 speakers
- Gateway Mid Tower Case
- 10/100 Ethernet
- Survive and Thrive Training<sup>9</sup>
- Dazzle 6-in-1 reader
- Adobe Photoshop Elements 2.0

## Digital photo solutions

Gateway's 500S Photo PC system featuring the Intel® Pentium® 4 processor is tailor-made for managing and storing your photos — from the 6-in-1 card reader to the huge 80GB hard disk and color-accurate monitor, to the little details like the included Adobe® Photoshop® Elements 2.0 software. Accept no substitutes; a real Gateway Photo PC along with a photo printer and digital camera for real photographers.



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lab-quality images



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**Minolta® DiMAGE F100**  
Four-megapixel quality in  
a compact camera



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**Canon® Powershot G3**  
Digital Camera  
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advanced features, easy operation



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Gateway recommends Microsoft® Windows® XP.

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or as low as \$42 per month for 48 months at 14.9% APR\*

## Gateway® Profile® 4x

The all-new Gateway Profile 4X all-in-one PC

- 17" TFT LCD Display
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- 256MB DDR SDRAM
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- 1-Year Limited Warranty<sup>2</sup>



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## Gateway 700XL

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- 128MB ATI Radeon 9700G AGP Graphics
- 400GB Mass Storage
- 19" LCD Flat Panel Display
- Gateway Tower
- Floppy Drive
- 48X CD-RW
- DVD-RAM/R/CD-RW Drive
- Sound Blaster Audigy Audio with IEEE 1394 FireWire<sup>®</sup>
- Boston Acoustics® BA7900 5.1 Speaker Solution
- 56K Voice Modem<sup>12</sup>
- 10/100/1000 Ethernet
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- Wireless Optical Mouse
- 1 Year America Online<sup>®</sup> internet access (creation of new account required)<sup>11</sup>
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- Microsoft® Windows® XP Home Edition
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## Gateway 400s Notebook

- 15" XGA TFT Active-Matrix Display
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- Integrated DVD/CD-RW Combo Drive
- Internal V.92 56K Modem<sup>12</sup> and 10/100 Ethernet
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AOL Keyword: Gateway



# LETTERS

LETTERS@PCWORLD.COM

## DELL'S TECHNICAL SUPPORT

## LIVING WITH THE BIG GORILLA

## WILL THAT NEW APP INSTALL?



### LOOKING FOR SERVICE

I WORKED for Dell in its Nashville call center for a while in 2002, so I'd like to comment on the article "You Call This Service?" [December].

One reason for Dell's diminishing service scores is Dell's policies. Dell staffs the tech support department through a temp agency. Techs have to work through this agency for at least 90 days before they have an opportunity to be hired by Dell—and then only if they can meet Dell's unreasonable metrics and if Dell has "the business need" at the time. Far more temps than Dell employees are in the call center, and a clear division exists between those who are "Dell badged" and those who are not. This leads to poor morale among the tech support staff.

Technicians are told that Dell strives for first-call resolution. But they must do it in an average time of 18 minutes and some seconds. This isn't easy, given Dell's policy of making it difficult for a technician to dispatch a piece of hardware. I can't tell you how many times I would know that a customer's problem was a faulty modem, but before I could dispatch a new one I'd have to put the customer through an hour (or more) of software troubleshooting.

*Bill Burnette, Nashville*

**Editor's note:** *PC World* received this response from Dell to Mr. Burnette's letter:

Temporary employees receive less than 10 percent of our technical support inquiries. Dell hires to demand to keep customer costs low. Its support technicians are instructed to satisfy customers regardless of whether calls exceed average call-length goals. Our parts-dispatch process ensures that incorrect parts aren't sent and that alternative solutions are considered, saving our customers time and limiting disruption of PC activities. Our customer support teams are consistently rated best in our industry.

*Todd Penner, Director*

*U.S. Consumer Customer Technical Support*

HAVING WORKED in the past for the two largest package-delivery services, I've often wondered how many PCs are dead on arrival due to handling in transit. I've seen computer and monitor boxes of all sizes pushed, thrown, dropped, kicked, and bounced—regardless of the "fragile" or other wording on boxes. I bought a Dell computer because the company's

PCs seem to take the handling better than most. If companies would only reinforce their packaging material—for any item—it would save much grief down the road.

*D. T. Waughtal, Phoenix*

### PAX MICROSOFTIA, PRO AND CON

WORST. EDITORIAL. EVER ["The Uneasy Reign of Pax Microsoftia," *Up Front*, December]. There's no supporting evidence for anything you assert, just a lot of, "Gee, everyone hates Microsoft now; too bad."

We really have no idea what the world would be like if Microsoft had never monopolized the PC software business. Who can say what great start-up would have changed all our lives if not crushed under that juggernaut? Who knows how good or bad the software world would be without Microsoft's monopoly?

*Nick Kallster, Sacramento, California*

FEW PROGRAMMERS still remember the (not so) good old days when every PC brand required its own software. Programming back then was a nightmare—▶

### LETTER OF THE MONTH

## Sites Are Blocking Ad Blockers

A DISTURBING new trend is popping up, so to speak, on the Web. I've been running an ad blocker for a few months now, to great effect in blocking every piece of unwanted nonsense Web sites try to throw at me. But recently, Amazon.com began to crash every time I performed a search, and Honda's automobile Web site would not even come up. Other sites, mostly big corporate ones, acted similarly. I discovered that after disabling the feature that blocks ads (banners or skyscrapers, pop-ups, and animation), all these dysfunctional sites were suddenly happy again.

More specifically, some sites wouldn't work unless I disabled either animation blocking or pop-up blocking. Evidently, code is now in place that renders a growing number of sites useless unless all ad-blocking software is disabled.

This is a bad sign. What these companies are saying, in effect, is that if we want to browse their Web sites and potentially spend money there, we must agree to look at ads. This is no different than being barred from entering a store until you've listened to a salesperson's pitch.

*Jim Kelly, Albuquerque, New Mexico*



like trying to produce separate brands of gasoline for every make of car.

My original Typing Tutor program was written in BASIC with line numbers, and published by both Microsoft and IBM. Subsequent versions for more than a dozen PC platforms each required specialized code—and a highly skilled programmer to make the conversion.

Windows gives commercial software writers a common voice, without which we could not begin to create the vast assortment of products available today.

*Dick Ainsworth, Ridgeway, Wisconsin*

### INSTALLATION QUANDARIES

THE DECEMBER *Full Disclosure* ["Installation: Easy? No, Queasy!"] was right on. Whenever I get a new upgrade disc, I immediately face unanswered questions: Is this CD-ROM a massive patch, or is it a complete reissue? Will it try to remove the old release? Will it preserve the personal files that I built with the old release? Does

it give me the option of retaining the old release? And what will happen if I attempt to install this software on an upgraded or new machine?

*Amos Fisher, Graham, North Carolina*

AS A PROGRAMMER, I must argue that the problem of software installation is threefold: (1) Most users are clueless; the installer *must* make assumptions or the app will be installed wrong. (2) The number of possible combinations of hardware components, software (including the OS), and installed bases outnumbers the atoms in the universe. (3) Knowing that the user will (hopefully) see the installation process only once but the app itself daily, programmers invest their precious time where it will be seen most.

*John Klein, Dallas*

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 JANUARY'S "Two CPUs in One?" (*News and Trends*), the Roxio VideoWave 1.5 test results on page 28 are mislabeled; the listed DivX results are for AVI files, and the MPEG-1 results are for MPEG-2 files. The results for DivX are as follows: Dell Dimension 8250, 72 seconds with hyperthreading enabled and disabled; 3-GHz P4 Falcon Northwest Mach V, 82 seconds enabled and disabled; Gateway 700XL, 81 seconds enabled and disabled; Athlon XP 2800+ Falcon Northwest Mach V (no hyperthreading), 83 seconds; and Dual 2.8-GHz Xeon XI MTower DPR, 71 seconds disabled and 72 seconds enabled.

Also, in multitasking test 1, the listed times are accurate, but Musicmatch 7.2 ran in the background, and Nero Burning ROM 5.5 ran in the foreground.

PC World regrets the errors.

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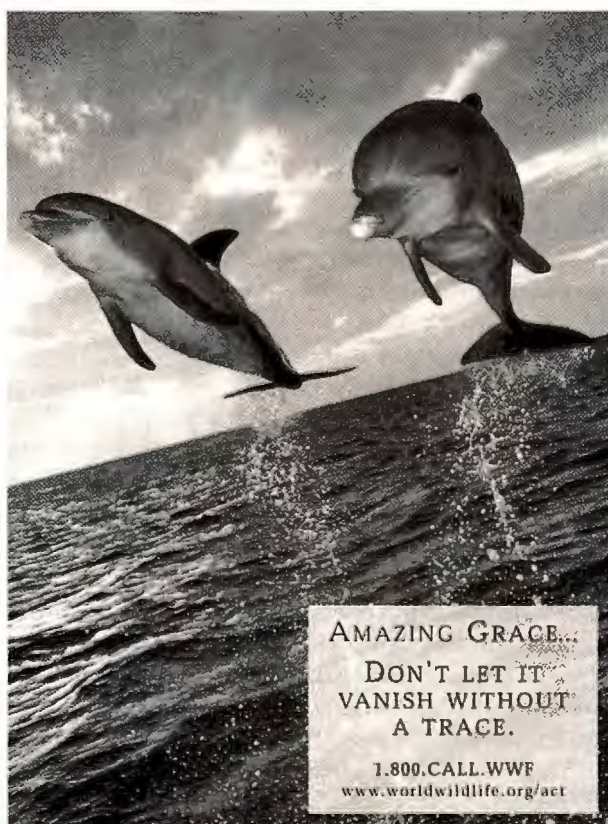
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# Dupe the Snoops

*Don't want to share  
that memo with your  
seatmate? Would you  
rather keep your  
emails to yourself?  
Here's how.*

**Does it ever seem to you as if your fellow travelers on airplanes and trains have an indecent fascination with whatever is displayed on your notebook's screen?**

Maybe your seatmate is bored. Maybe he forgot to bring reading material for the trip. Or maybe his interest in the memo you're writing stems from the fact that his brother-in-law works for your competitor.

In truth, it doesn't matter whether you're writing a memo on the Washington shuttle, playing Solitaire in your cubicle, or drafting a merger and acquisitions letter in the corner office: Your data deserves to remain off-limits to unauthorized readers. And passwords are not a deterrent, because even the most sophisticated passwords will not protect your confidential data from prying eyes once it is displayed onscreen.

The problem is compounded by today's crystal-clear notebook screens, which make it easy and inviting for someone to snoop. And snoop they do. A survey by the *Wall Street*

*Journal* reports that many of the 62 percent of travelers who carry and use a laptop while on the road say they see a sharp increase in the number of seatmates blatantly eyeing their screens. Whether the snoopers have actually increased in number, or whether travelers simply have a heightened awareness of security in the wake of alerts issued by law-enforcement agencies, the need for increased caution and protective strategies is more important than ever.

## En Garde

Security experts say that most breaches that result in an unauthorized person gaining access to confidential data come from user neglect rather than technology failures. That's because users who tend to focus on

their own productivity see security as intrusive and time-consuming. Consequently, they tape their passwords to the underside of their keyboards, use "password" as their password, or just select "remember my user name and password" when a program offers that option.

Fortunately, there's an affordable and easy-to-use solution: 3M's Privacy Filters ([www.3M.com/computer-filters](http://www.3M.com/computer-filters)). Non-blurring and distortion-free, they're easy to attach, mounting onto your notebook or your display's screen using small plastic tabs or a hidden adhesive mounting system. How do they work? 3M's patented microblouver technology functions like tiny vertical window 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.

Since the Privacy Filter is an always-on, passive device, it requires no action from you beyond the initial five-second installation. 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. And although you can readily detach the filter—for instance, if you choose to share information with a small group—there's little reason to remove it, since it's lightweight and can stay in place when the notebook is closed.

As added benefits, 3M's Privacy Filter shields your computer monitor screen from scratches and fingerprints and spares your vision by reducing screen glare. That means when it's not protecting your data, it's protecting you.



**With 3M's  
Privacy Filters, the  
screen appears dark  
to a nearby snoop.**

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**Protect your work at the office, too.** Protect your confidential documents at the office with 3M Privacy Filters for desktop computers. 3M Privacy Filters are assembly-free, fit most computer monitors and are also available with an anti-radiation feature.

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### Smart technologies

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Rapid Response	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Thin Frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No Touch Auto Adjust	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LiquidView Software	No	Yes	No	No	Yes	Yes	Yes	No
Multimedia	No	No	No	Yes	No	No	Yes	No
Vacation Switch	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cable Management	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Input Interface Connectors	VGA	VGA	DVI-D & VGA	DVI-D & VGA	VGA	DVI-D & VGA	DVI-D & VGA	DVI-D & VGA





# PLUGGED IN

STEVE FOX

## Gaga Over Google Games

Plus: 3G goes slow, grid computing takes flight, and Bluetooth gets useful.



### 1 Games Google Plays

**The Buzz:** Don't tell me you use Google only to search for Web sites. If so, you're missing out on a procrastinator's paradise. Think you're up for a Google-fight ([www.googlefight.com](http://www.googlefight.com))? Enter two names (as in *Bush* and *Gore*, or *Eminem* and *M&Ms*), click 'Make a fight', and see which entry "wins," based on the number of search results the engine returns. Want to Googlewhack ([www.googlewhack.com](http://www.googlewhack.com))? Just compose a two-word query that yields only one Google result (tough, believe me). Or check out Googlism ([www.googlism.com](http://www.googlism.com)), where you supply a keyword (your hometown, your name, the name of your ex) and see what "opinions" emerge, as culled from search results.

**Bottom Line:** The real game is staying employed after your boss realizes you're spending your days discovering Google-whacks like "demisemiquaver svengali."

### 2 3G Fizzling

**The Buzz:** It's a phone, it's a gaming device, it's a portal to pricey mobile services. Oh, wait, I misspoke: It's a bust. 3G—the coming high-speed standard that was supposed to turn your everyday wireless phone into Superphone—has hit

the Kryptonite skids. Japanese phone giant DoCoMo recently revealed that it has signed up a paltry 320,000 3G subscribers. If 3G isn't soaring in phone-crazed Japan, it won't be taking off in the United States anytime soon. **Bottom Line:** 3G in the U.S. might just stand for "going, going, gone."

### 3 Girding for Grids

**The Buzz:** The catchphrase du jour is grid computing, a bit of techie wizardry that puts the power of multiple networked computers to work on a single task. You may know about SETI@home ([setiathome.ssl.berkeley.edu](http://setiathome.ssl.berkeley.edu)), which borrows regular folks' computer time to analyze raw celestial data for signs of intelligent life in the universe. Butterfly.net is flying high with its grid-based, massively multiplayer games. Gateway is creating a grid from nearly 8000 PCs in its stores and offering it to groups that need processing punch. IBM, meanwhile, is throwing \$5 billion in R&D at grid computing to develop "e-business on demand"—a means of selling comput-

ing power on tap, utility-company style.

**Bottom Line:** If memory serves, IBM launched a little thing called the PC a few years back. It's about time for an encore.

### 4 Bluetooth Finds a Niche

**The Buzz:** Bluetooth always held such promise. The short-range wireless technology would connect devices, facilitate voice and data communications, ensure world peace, and whiten your teeth. Yet despite some headsets, phones, and other ho-hum gizmos, Bluetooth has largely remained a solution in search of a problem. Now it may have found its place: the Microsoft Wireless Optical Desktop for

Bluetooth, a keyboard-and-mouse combination that truly makes sense. No wires, no muss, no fuss.

**Bottom Line:** World peace remains elusive.

In the meantime, I can always use a better wireless mouse. ■



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

### What Does .com Stand For?

**COMPANY?** *Communications?* Nope. The designation .com is short for *commercial*, and it dates to 1984, when the Internet was still called ARPANET. Back then, Jon Postel and Joyce Reynolds spelled out seven top-level domains (.com, .net, .org, .edu, .gov, .mil and .arpa). Given their three-



letter nod to commercial enterprise, it seems clear that Postel and Reynolds knew that ARPANET wouldn't remain the exclusive playground of academic and government types. But it's unlikely they could have envisioned that the term *dot com* would become a hallowed entry in the lexicon.



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# CONSUMER WATCH

ANNE KANDRA

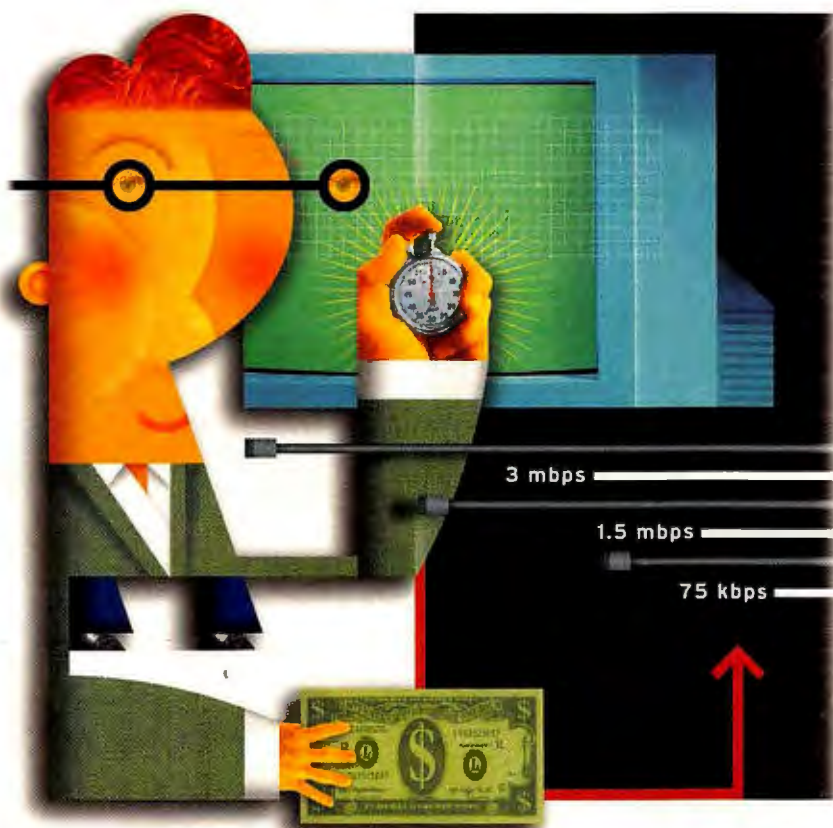
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**PRIVACY WATCH: PRO-  
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**ON YOUR SIDE: PC  
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## Fast, Cheap Net Access? It's Possible

Even if you don't want to pay for broadband—or can't get it—there's hope.



"ONCE YOU'VE USED IT, you'll never go back!" "It's a whole new Internet!" "Staggering speed!" Are you as tired as I am of gushing clichés from broadband service providers and the endorsements of their speed-seduced subscribers? I find this especially rankling, because frankly, I don't need convincing. I'd love to be careening around the Web at 1.5 megabits a second. But neither cable Internet access nor DSL has yet found its way to my neck of the woods, and I don't want the expense or hassle of setting up a satellite connection. So I'm forced to keep

plodding along—generally at around 36 kbps—until something faster shows up.

But most people aren't in the same predicament I am. About 70 percent of all U.S. households already have access to cable, DSL, or fixed wireless. But only about 13 percent of American households are actually using broadband. Why? Many dial-up users simply don't want to pay up to \$60 a month to turbocharge their connection—at least not at home.

It's easy to see why some folks are holding back. After all, who's going to shell out \$600 or more a year just to browse

Amazon.com faster? If you use the Net at home primarily for sending and receiving e-mail, paying bills, and maybe checking the occasional movie listing, sticking with your trusty dial-up connection probably makes sense. But if you work from home at least once a week, send and receive file attachments regularly, or download streaming audio, video, or MP3s—or if you simply want to save time doing your online tasks—you need more bandwidth.

If you'd like a faster connection, but either you can't get one or you've decided it's not worth the extra dough, help is out there: Cheaper versions of broadband are available, as well as ways to boost the speed of dial-up browsing.

### THE SPEED YOU NEED

MOST CABLE companies now offer what many DSL providers have for years: "tiered" pricing, which essentially charges you according to your connection speed—the faster the service, the more you pay (see [find.pcworld.com/32255](http://find.pcworld.com/32255)).

AT&T Broadband, for example, offers three flavors of cable service (though not all are currently available in every market the company serves). The priciest of the three provides 3-mbps download speed for \$83 a month, the standard service offers 1.5-mbps downloads for \$46 a month, and the cheapest one has 75-kbps downloads for \$27 a month—not much more than dial-up accounts. Coincidence?

Hardly. Sarah Eder, a spokesperson for AT&T Broadband, says that the company decided to offer its customers tiered pricing in an effort to entice dial-up users. "What we hope to see is customers trying cable at the low end, and then ►



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upgrading to the next level," Eder explains.

Other cable companies, including Adelphia and Cox, also offer tiered pricing plans. Similarly, DSL provider SBC offers no fewer than six different residential packages, ranging in price from \$43 to \$160 a month for download speeds from 384 kbps to 6 mbps.

How much speed is enough? It has a lot to do with the kind of Internet user you are. If you mostly browse information and shopping sites, and you just want faster-loading Web pages and the convenience of an always-on connection, cheap broadband is probably sufficient. If you use the Internet to access streamed music or video, you need a fatter pipe. And if you're constantly downloading—and more important, uploading—large files, you probably need to pay extra for a service that provides fast data transfer in both directions (many relatively inexpensive broadband accounts offer much faster download than upload speeds).

Considering taking the plunge for cheap broadband? Be sure to check the details of what sounds like a great deal: Increasingly, broadband service companies offer attractively low teaser rates for the first few months of service that may double after the initial period.

Tiered pricing may be great news if you're already wired, but what if you live in one of the little towns that broadband forgot? Until real broadband choices arrive, you can boost dial-up speed to near-DSL levels—in bursts, at least—using tools you probably have lying around the house already (or can download in less than half an hour).

#### BOOSTING DIAL-UP

**FIRST, A FEW SIMPLE TIPS:** If you subscribe to e-mail newsletters and news alerts, make sure that you receive the text versions, not bulky, slow HTML editions. You should also install a good ad-blocking application such as AdSubtract Pro to

cut down on bandwidth-hogging clutter.

Still making too many trips to the coffee pot while your browser churns away? A slate of "browser boosters" from companies like Ascentive, Artera Group, and Propel promise to advance your dial-up connection to near-broadband levels. Most of these tools are affordable (\$5 to \$10 a month), easy to install, and at least somewhat effective.

These programs use many of the same tricks to speed browsing, such as routing your Internet connection through company servers and caching frequently visited sites, optimizing your connection settings, stripping out ads, and compressing graphics. I used Artera Group's Turbo for a while. I found the speed to be inconsistent; it was blazingly fast on some sites, but it was even slower than my regular dial-up connection on others. One of my colleagues, Senior Reporter Tom Spring, had better luck using these programs, and that difference is not particularly ►



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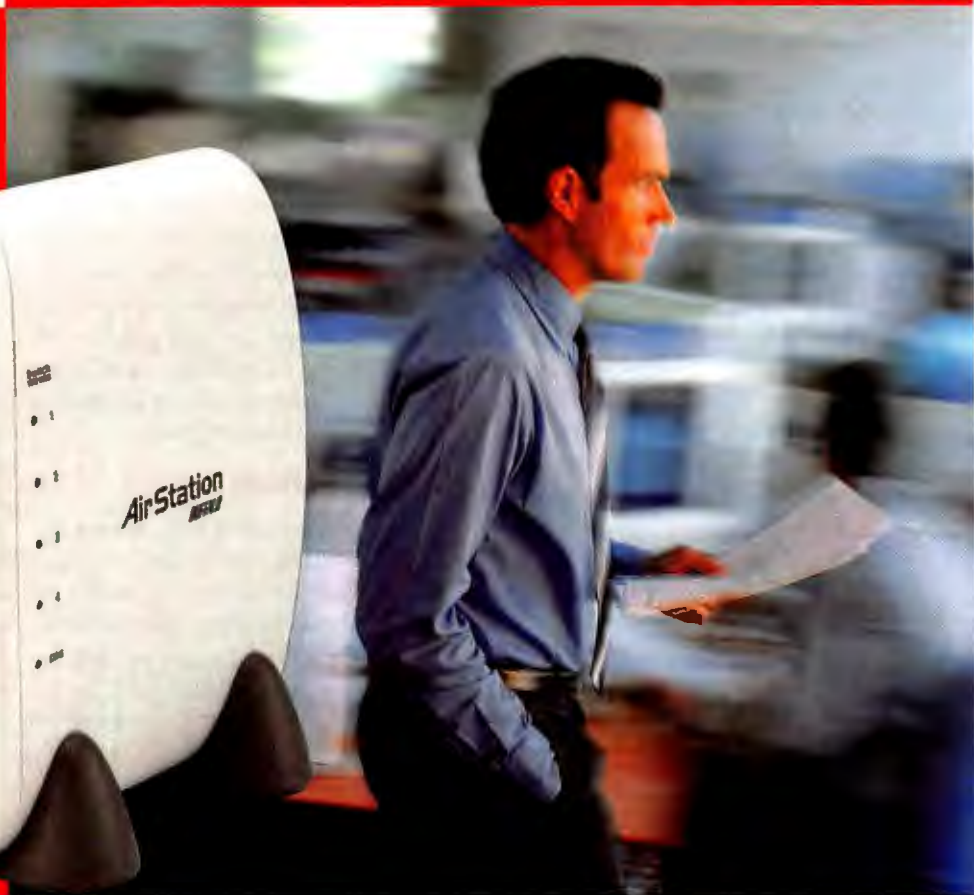
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## PRIVACY WATCH

## Privacy in a Very Small Package

THESE DAYS, almost every store that sells PCs has a section dedicated to the newest must-have gadget: those ubiquitous keychain-size USB storage devices that can hold from 16MB to 2GB of data. But USB drives are more than a storage phenomenon. The tiny devices can enhance your privacy as well.

For example, if you want to keep your e-mail messages on a shared computer away from prying eyes, you can install and run your e-mail application on a USB drive and store all its mail folders there, making it a cinch to secure all your correspondence when you go.

Or you can use privacy-enhancing software installed on a USB drive to make the applications you use on your desktop more private. Imagine LAN ([www.imaginelan.com](http://www.imaginelan.com)) came out with one of the first of these programs, the \$19 P.I. Protector (no, Magnum isn't involved—the *P.I.* in this case stands for Personal Information).

The application routes Internet Explorer's cookies, its history and favorites files, and even the browser's cache onto your USB drive, ensuring that no one can look at your Web-browsing history

without having access to your USB drive. You simply pop in your drive and run the P.I. Protector program.

USBDrive Professional ([usbdrive.com](http://usbdrive.com)) sells a suite of four applications, some with very direct uses in protecting your privacy. The apps raise the price of USBDrive devices by \$20.

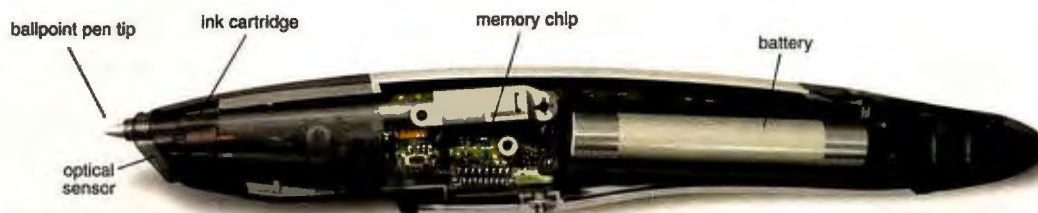
One of the programs, USB Secure ZIP, encrypts and compresses documents. USB Lock turns the drive itself into a key. When you remove the drive, the software locks down your PC for a period ranging from 10 minutes to 24 hours, which is helpful if you have sensitive documents on a work computer. The only way to unlock the computer before the time limit expires is to put the same USBDrive device back in place. Finally, USB Mail imports your PC's default e-mail client settings and gives you a basic, password-protected user interface to your e-mail in-box.

With the exception of USB Mail, whose interface is a little too spare for most users, all these programs are useful, and they provide powerful privacy protection that fits in the palm of your hand.

—Andrew Brandt



ILLUSTRATION: GORDON STUDER



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surprising—how much they help will depend on your system and what kind of browsing you do. (Head over to [find.pcworld.com/32801](http://find.pcworld.com/32801) to read Tom's review.)

I admit it: I have an incurable case of broadband envy. As much as I'd love to snub my cable company for making me wait so long, I know that when it finally offers broadband Internet service in my area, I'll be one of the first to sign up. Until then, I'll keep trying some of the other dial-up-accelerating software. But I'll shuffle the cable company's bill to the bottom of the pile. If I have to wait, the company can wait, too. ■

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).

## ON YOUR SIDE

## PC Speed-Up Slows Reader Down

I SWALLOWED THE HOOK and downloaded a \$40 program called Insider PC Secrets, which was written by Daniel Sanderson of Sanderson Publications. The Web site, [www.doublepcspeed.com](http://www.doublepcspeed.com) (which I got to from a link at CoolOnlineProducts.com), had the usual promises, testimonials, and money-back guarantees to increase my system's performance. After going through some of the "lessons" and "tweaks" in the program (most of which were free applications that come with a Windows system), the so-called enhancements didn't improve the efficiency or speed of my computer—they actually slowed it down. The ad says that unsatisfied customers can get a refund. However, I've been unable to get my money back.

Cary A. Jones, Ocean City, Maryland

*On Your Side responds:* Since CoolOnlineProducts.com and DoublePCSpeed.com do not list any phone numbers, I e-mailed their customer service addresses. After several automated responses from CoolOnlineProducts, I finally received a message from Tom Ngo, a customer support agent, who said that the company would provide a refund. Sanderson also wrote back after a lengthy delay, saying his "company and products are 100 percent genuine. We have nothing to hide and we issue refunds immediately." But in a later e-mail, Sanderson said Jones's refund must come from CoolOnlineProducts.

Think twice about purchasing any product from a Web site that does not supply a valid phone number and postal address.

—Grace Aquino

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- CD-ROM Optional
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- 56K v.90 Data/Fax Modem
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- Smart Card Reader
- Full Size Pen

Acer recommends Microsoft® Windows® XP Professional for Mobile Computing

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[www.minolta-qms.com](http://www.minolta-qms.com)





# HOME OFFICE

STEVE BASS

## Not-So-Stupid Browser Tricks

These seven utilities make tooling around the Web safer, faster, and more fun.

MY DOCTOR JUST told me I suffer from a bad case of Utilitus Addictus. And judging from e-mail messages you send me, you're afflicted, too. There's no known cure—so why not enjoy the malady by digging into some Internet tools that have become staples of my home office?

Broken Web site links in e-mail messages drive me batty—and pasting the link into the browser address bar gets me nowhere. So I copy the link to the Clipboard and grin while Sells Brothers' Url-Run strips it clean and sends it to my browser's address field. Download the free program to your desktop, and drag and drop it to your Quick Launch bar to give yourself immediate access to this gem. Get it at [find.pcworld.com/32036](http://find.pcworld.com/32036); or if you use Outlook, go to [find.pcworld.com/32039](http://find.pcworld.com/32039) for a free plug-in version.

### SNIPPING'S A SNAP

GREAT GUY that I am, I make an effort to be considerate—at least when sending e-mail—by using SnipURL.com, a free site that trims long URLs to 13 characters. Add the snipped URL to your e-mail, and when the recipient clicks it, the site invisibly sends them to the lengthy link. For easy access, I attached the SnipURL icon to my Internet Explorer toolbar (go to the site and drag and drop the 'Snip This' link to IE, Netscape, or Opera).

I was nearly at my wit's end trying to deal with Internet Explorer's intermittent inability to open as a maximized window. Then reader Bryan Villarin of Temple City, California, informed me about Jonathan Dahl's IE New Window Maximizer,

a nifty tool that does just what it claims. But this free utility goes one step farther by doing a pretty decent job of blocking pernicious pop-up ads, too. Swing by [find.pcworld.com/32042](http://find.pcworld.com/32042) to grab a copy.

Too many Web sites expect me to fill out lengthy forms with information that I don't want to share. Instead, I use a free JavaScript called a bookmarklet (yep, it's a real word) to fill in every field with *anonymous*. Other bookmarklets do such things as jumping backward three pages, silencing the music on a Web page, and resizing the current window to become full-screen. To get the field-filling one for your PC, point your browser to [find.pcworld.com/32024](http://find.pcworld.com/32024) and drag the AutoFill Anonymous bookmarklet link into your Favorites list or into the Links portion of your browser's toolbar.

If you consider completing Web forms a waste of time, download Siber Systems' AI RoboForm, which enters canned data into forms automatically. Browse to [find.pcworld.com/32027](http://find.pcworld.com/32027) to find out more about it, or download the program at [find.pcworld.com/32030](http://find.pcworld.com/32030) sight unseen.

I get a kick out of Tenebril's \$40 Ghost-

Surf Pro, a one-stop privacy tool for Internet addicts. The program lets me surf anonymously, covering my Internet tracks from my ISP as well as from the sites I visit. It blocks ads, keeps spyware from reporting on me, and tells me what data is entering and leaving my browser. GhostSurf Pro is packed with features, but it's pretty easy to learn (I got a handle on it



after only a couple of days of fiddling). Download a trial version at [find.pcworld.com/32045](http://find.pcworld.com/32045) and see for yourself.

Total Recorder is my last pearl. It's a \$12 program from High Criteria that lets me record audio from Windows Media Player, RealPlayer, or other players, and save the resulting sound as an MP3 file. I can snatch radio interviews (by Terry Gross of National Public Radio's *Fresh Air*, for instance) for playback on my MP3 player. The \$36 Pro version even lets me schedule everything from opening NPR's site to starting and saving the recording.

At [find.pcworld.com/32033](http://find.pcworld.com/32033) you can get the five freebies and trial versions of the two shareware programs. Have a neat utility I missed? Let me know about it. And watch for more tools in my upcoming online newsletter; go to [find.pcworld.com/25821](http://find.pcworld.com/25821) to sign up. Now I have to go download some fresh Terry Gross. ■

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

## Gaping Holes in Internet Explorer

Keep up with the latest security cracks in Microsoft's browser—if you can.

PLUGGING HOLES in Internet Explorer is a perpetual whack-a-mole exercise—as soon as Microsoft patches one hole, the bad guys (or avid security researchers) expose new ones. Late in November, a massive security flaw in Internet Explorer prompted Microsoft to pump out a fix. On the heels of that patch, the company had to take care of six other, separate holes—and then a seventh one, two weeks later.

At about the same time, RealNetworks came under fire and patched three security problems in its RealOne Player that may affect its older RealPlayer program as well.

But first, IE's biggie: If you use IE 5.01, 5.5, or 6, make sure you fix the major hole involving IE's "Data Access Components," which let your browser talk to databases over the Internet, and which re-



trieve and return data to IE. If you click a malicious link, the vulnerability could allow an attacker to send too much data to your browser, causing one or more of the Data Access Components to fail. After that, theoretically, the offender could execute any code on your PC. If your system runs Windows XP, you're already protected. If it doesn't, head to [find.pcworld.com/32420](http://find.pcworld.com/32420) to get the details, as well as the link to Microsoft's fix.

Despite releasing Service Pack 1 for IE 6 last October and following up with a slew of other standalone fixes, Microsoft has rolled out two more cumulative patches. The first cumulative patch deals with six holes, but you're better off installing the second cumulative patch, as it handles those six vulnerabilities and a seventh one. The worst flaw could

enable an Internet peeper to have a gander at data that you've stored on your PC.

Not every version of Windows is in danger of being hacked, but IE versions 5.01 through 6 are affected by six holes, while the seventh flaw affects IE 5.5 and 6. The situation gets complicated. Visit [find.pcworld.com/32573](http://find.pcworld.com/32573) to discover whether your versions of Windows and IE are vulnerable, and to grab a link to the newer cumulative patch.

that anyone using RealPlayer 8 or earlier versions upgrade their program to RealOne Player version 2. Jump to [find.pcworld.com/32426](http://find.pcworld.com/32426) for more details and for the update to fix your player. Alternatively, within the player, select **Tools • Check for Update**. ■

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

#### Office SP Improves

MICROSOFT posted an update to Service Pack 3 for Office 2000. The original SP3 introduced problems for Outlook users trying to view attachments. See [find.pcworld.com/32432](http://find.pcworld.com/32432) for the fix.

#### Outlook Update

LAST MONTH, I reported on a clash between Outlook 2002 and Office XP SP2 (go to [find.pcworld.com/32591](http://find.pcworld.com/32591) for details). Microsoft subsequently added the fix to its downloads library. Visit [find.pcworld.com/32423](http://find.pcworld.com/32423) for a link to Microsoft's patch.

### BUGGED?

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

### MICROSOFT PATCHES A PATCH

LAST SUMMER, Microsoft fixed a glitch in Windows 98, 2000, Me, and XP that involved Microsoft-issued digital certificates, which help verify the authenticity of users, e-mail messages, and Web sites. Recently, however, the UK National Infrastructure Security Co-ordination Centre ([www.niscc.gov.uk](http://www.niscc.gov.uk)) notified Microsoft that the earlier patch didn't completely seal up the hole; in fact, a smart attacker could still drive a truck through it. A bad guy could create a fake, secondary certificate that could let a Web site masquerade as an online store where you shop frequently. Go to [find.pcworld.com/32429](http://find.pcworld.com/32429) for Microsoft's detailed explanation and for its updated version of the patch.

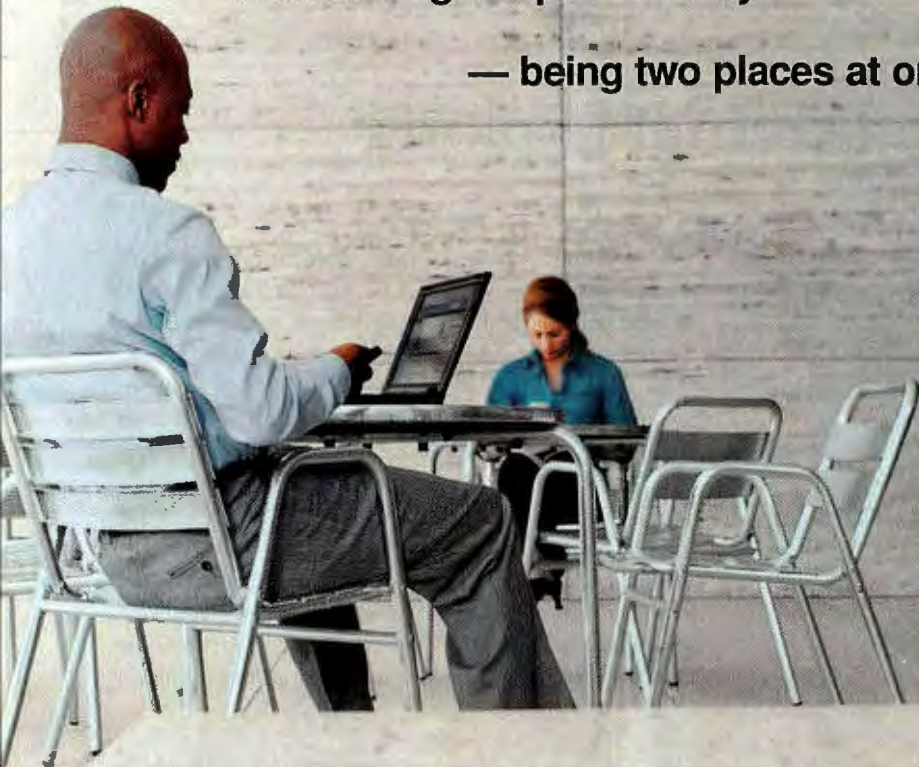
### GET REAL?

THE THREE RealNetworks security defects endanger RealOne Player version 1. At press time, the company was not able to confirm whether earlier versions of the program (RealPlayer) are also susceptible. The potential attack would allow an invader to run arbitrary programs on a user's machine. A company spokesperson recommended



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These model numbers achieved eTesting Labs, Inc.'s BatteryMark 4.01 Battery Run-down Time of at least the times shown above. This test was performed without independent verification by eTesting Labs, Inc., eTesting Labs, Inc., makes no representations or warranties as to these test results. BatteryMark is a trademark of Ziff Davis Publishing Holdings, Inc., an affiliate of eTesting Labs, Inc., in the U.S. and other countries. A description of the environment under which the test was performed is available at [ibm.com.pc.wireless/batterymark.html](http://ibm.com.pc.wireless/batterymark.html). 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. 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### Customize Yours:

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with system purchase (#W9B710B) \$499

### ServicePac® Service Upgrade<sup>4</sup>

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### Distinctive Features:

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### System Specifications:

- Intel Pentium® 4 processor 1.80GHz
- 128MB DDR SDRAM • 40GB hard drive
- Modem and Integrated Ethernet • CD-ROM
- Intel Extreme Graphics
- Microsoft® Windows® XP Home Edition
- 1-yr parts and onsite labor limited warranty<sup>5</sup>

**\$599**

▶ NavCode™ 831161U-M482

With Microsoft® Office XP Small Business \$728

### Customize Yours:

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with system purchase (#15FTTB1) add \$349

### ServicePac® Service Upgrade

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Next Business Day Response (#54P1861) \$132

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With optional IBM data migration kits, transferring your configurations and personal settings to your new system has never been easier.

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IBM 128MB PC2100 DDR SDRAM Memory Upgrade	(#31P8376)	\$50
IBM 256MB PC2100 DDR SDRAM Memory Upgrade	(#31P8377)	\$100
HP ScanJet 3500c	(#22P8668)	\$104.99
Targus DEFCON Authenticator with USB Hub	(#31P8762)	\$119.99
Lexmark Z65 Color Jetprinter (with system purchase)	(#W7LEX65)	\$119.99
IBM UPS 675	(#33L3478)	\$159
Iomega Zip 750MB External USB 2.0 Drive	(#22P7099)	\$174.99
HP Officejet D135 All-in-One (USB only)	(#31P7627)	\$499.99

Smallest NetVista desktop without compromise

## IBM NetVista S42

### Distinctive Features:

- Uses up to 64% less space than traditional IBM desktop chassis
- Access Support — Downloadable automated solution to help resolve common computer problems

### System Specifications:

- Intel Pentium® 4 processor 2.40GHz
- 256MB DDR SDRAM • 40GB hard drive
- Integrated 10/100 Ethernet • CD-ROM
- Microsoft® Windows® XP Professional
- 3-yr parts and onsite labor limited warranty<sup>6</sup>

**\$999**

▶ NavCode™ 831941U-M482

With Microsoft® Office XP Small Business \$1,128

### Customize Yours:

Smartdisk USB Floppy Diskette Drive (#31P7647) \$49.99

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4-yr onsite/9x5/4-hr Response (#69P9162) \$250

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### Distinctive Features:

- Diagnostic LEDs, Automatic Server Restart® and Predictive Failure Analysis® help to improve uptime
- IBM Director Software — Recipient of PC Magazine's Editors' Choice award on October 1, 2002

### System Specifications:

- Intel Celeron® processor 1.80GHz
- 256MB DDR memory std/2GB max<sup>7</sup>
- 40GB UATA 100 EIDE hard drive std/480GB max
- Hot-swap drive bay models available
- 5 available slots/6 available bays
- Integrated Gigabit Ethernet
- Available IBM Remote Supervisor Adapter
- Toolless lower chassis with optional 4U rack mounting
- 1-yr parts and onsite labor limited warranty<sup>8</sup>

**\$599**

▶ NavCode™ 848093X-M482

(does not include operating system, may not include other features)

20/40GB TR7 IDE Internal Tape Drive<sup>9</sup> (#48P7042) \$549

### ServicePac® Service Upgrade

3-yr onsite/9x5/4-hr Response (#69P9510) \$348

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# NEW PRODUCTS

EDITED BY ANNE B. MCDONALD

## Smile, You're on Cell Phone Camera!

TAKE QUICK SNAPS AND E-MAIL THEM WITH THESE WIRELESS PHONES, BUT DON'T COUNT ON THE PHOTOS TO BE KEEPERS.



PHONE/CAMERA COMBOS: (from left) Sanyo's 5300, Nokia's 3650, and Motorola's T720i.

### WIRELESS PHONES

THOUGH WIRELESS data services let you surf the Web and send and receive text and graphics messages, people haven't yet made widespread use of these services.

The latest camera-enabled phones could change that: Imagine being able to snap a vacation photo and instantly e-mail it to a friend or relative. At the very least, these versa-

tile phones certainly offer a novel way of communicating.

I looked at three models: Motorola's **T720i**, which features an attachable camera, and at Nokia's **3650** and Sanyo's **5300**—each with an integrated camera. Like many of today's mobile phones, all three are compact and light. The shipping Motorola and Sanyo are clamshell models; the preproduction Nokia I saw

is a standard handset. While all are suitable for quick shots, don't expect the picture quality of standard, megapixel-range cameras.

### SO-SO SNAPSHOTS

IN GENERAL, the two phones with cameras built into the handset delivered better-looking snaps than did the \$300 Motorola with its attachable, external camera.

The pictures captured by the Nokia 3650 (expected to cost less than \$400), and the \$400 Sanyo 5300 looked reasonably bright but a little grainy. A few of the Sanyo's shots suffered from a yellowish tinge, while some Nokia photos had color artifacts and looked blurry. The Motorola's pictures were crisp enough, but tended to be dark overall.

Part of the problem is the low-capture resolution of each of these cameras: The Nokia and the Sanyo offer 640 by 480 pixels. The Motorola captures only a quarter as much detail—just 320 by 240 pixels.

You can't view images at their highest resolution on

### 3650

Nokia

(Preproduction unit, not rated)

Photos are bright but blurry.

List: Less than \$400 (est.)

[find.pcworld.com/32720](http://find.pcworld.com/32720)

### 5300

Sanyo

★★★★☆

Bright photos, but some have a yellowish tinge.

List: \$400

[find.pcworld.com/32627](http://find.pcworld.com/32627)

### T720i

Motorola

★★★★☆

Photos are dark overall.

List: \$300

[find.pcworld.com/32633](http://find.pcworld.com/32633)



**64 CELL PHONE CAMERAS**

Motorola T720i, Nokia 3650, Sanyo 5300

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AlphaSmart Dana

**FEATURES COMPARISON****Say Cheese: Camera-Enabled Wireless Phones**

PHONE	List price	Highest photo resolution (pixels)	File size range (kilobytes)	Phone display resolution (pixels)	Wireless carrier
Motorola T720i and digital camera *	\$300	320 by 240	10 to 23	120 by 160	T-Mobile
Nokia 3650	Under \$400 (est.)	640 by 480	30 to 60	176 by 208	Not announced at press time
Sanyo 5300	\$400	640 by 480	20 to 50	132 by 176	Sprint

\* T-Mobile sends the camera attachment after you apply for a rebate.

any of the handsets, which display even fewer pixels than their cameras capture (see the chart). Of the three phones, the Nokia 3650 and Sanyo 5300 have the better displays; they were adequately bright, and each has a good screen size. In contrast, the Motorola T720i's display was dark and inadequately backlit, making it hard to read in bright sunlight. Its display also updated an image incredibly slowly when I aimed the camera in picture-taking mode. The Sanyo's camera, unlike those on the other units, is paired with a flash—useful for lighting dark indoor shots.

**IT'S ALL IN THE SERVICE**

AFTER YOU TAKE the photos, you need to send them. The key ingredient in making these phones a success is their wireless service plans—with-

out which the photo-capture feature is almost useless.

T-Mobile is the exclusive carrier for the Motorola T720i phone and its digital camera module. The Nokia 3650 uses the GSM network that is supported by AT&T Wireless, Cingular, and T-Mobile, but at press time Nokia had not announced a carrier. The CDMA-based Sanyo 5300 is offered exclusively by Sprint.

Overall, I found T-Mobile's

service easier to use than Sprint's. And the Motorola phone's menus are intuitive and easy to follow: Simply select the photos you want to send, type in the e-mail addresses, and boom—you instantly share your shots.

However, with the Sanyo phone, my recipients received a link to Sprint's Vision Web site in their e-mail message instead of an attached photo. Still, the phone is relatively

easy to use, and Sprint offers three sending options: E-mail pictures directly from the phone; send the photos to another Sprint Vision-enabled phone; or upload them to the Vision home page, where you may organize the photos and e-mail them as well.

**PHONE BASICS**

ALL THREE phones come with the bells and whistles necessary for making calls quickly and easily. For example, each handset features voice-activated dialing, one-touch access to voice mail, and phone books that store hundreds of contacts.

Because of the exclusive agreements the phone makers have with the carriers, you may not have a choice in the camera-enabled phone you buy. If you don't require a lot of detail in your photos, any of these phones will do just fine.

—Grace Aquino ►

**QUICK PICS TO SEND; FEW PIXELS FOR PRINTS**

PHOTOS TAKEN with (from left) the Nokia 3650, Sanyo 5300, and Motorola T720i are ideal for e-mailing or displaying on a phone's small LCD screen, but not good enough for quality prints.



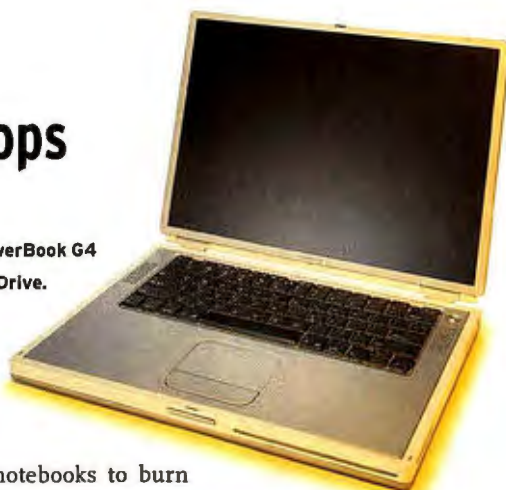
# DVD-Burning Laptops

## NOTEBOOKS

**TEST** TAKE NOTE: The first laptops with recordable DVD drives are here. I looked at shipping versions of Apple's **PowerBook G4** and Toshiba's **Satellite 5205-S703**. Outfitted with DVD-R/-RW drives, these laptops are serious rivals to desktop PCs.

The \$2699 Satellite contains a 1X DVD-R/-RW drive that also functions as an 8X DVD-ROM drive and a 16X/10X/24X CD-RW drive. The \$2999 PowerBook features Apple's SuperDrive—a combination 1X DVD-R/-RW drive, 6X DVD-ROM drive, and 8X/4X/24X CD-RW drive. Granted, both drives are slower than those found in most desktops, but each worked just as promised when I employed

APPLE PowerBook G4 with SuperDrive.



the two notebooks to burn video files in my informal tests.

The PowerBook G4 comes with a more robust software package: It includes iMovie, an easy-to-use movie-creation program, and iDVD, a program for burning the final movie on the SuperDrive. The Satellite ships with Panasonic's MotionDV package, which is a little harder to work with than Apple's iDVD.

The PowerBook also has a slight edge in looks: It's dressed in stylish burnished titanium and measures just an inch thick when closed. But it's the PowerBook's wide-angle screen that sets it apart: Measuring 15.2 inches, the screen has a native resolution of 1280 by 854, perfect for DVD playback or viewing big spreadsheets. At 5.5 pounds, the PowerBook is an ideal travel companion, and it also has a DVI port for

connecting it to a digital display—a first on a notebook.

The Toshiba holds its own, however, with a head-turning marine-blue case. Its screen is a comparatively modest 15 inches with a standard aspect ratio, but this notebook has its share of extras: Front-mounted audio controls, a handy front-mounted LED battery gauge, a Secure Digital slot, and booming sound. At 7.8 pounds, however, it's harder to lug around.

Both units have 60GB hard drives, built-in Wi-Fi (802.11b) for wireless networking, and FireWire (IEEE 1394) ports to import video camera data.

Using a 2-GHz Pentium 4-M processor and 512MB of RAM and running Windows XP Home, the Satellite 5205-S703 scored 104 on PC WorldBench 4—about what we'd expect for its configuration. It also had a great battery life of just over 3 hours.

The PowerBook uses a 1-GHz PowerPC G4 processor and 512MB of RAM; because it runs Mac OS X, we couldn't test it using PC WorldBench 4. It seemed plenty fast while creating and burning video, but felt slightly sluggish in basic tasks.

—Kalpana Narayanamurthi ▶



RECORDABLE DVD DRIVE: Satellite 5205-S703.

### PowerBook G4

Apple

★★★★☆

Wide screen, light weight and a recordable DVD drive make this desktop replacement a winner.

\$2999

[find.pcworld.com/32639](http://find.pcworld.com/32639)

### Satellite 5205-S703

Toshiba

★★★★☆

Big and heavy, but its recordable DVD drive makes it worth the extra girth.

\$2699

[find.pcworld.com/32846](http://find.pcworld.com/32846)

## QUICK TAKES

### New Linux

**Xandros Desktop**, like Lindows-OS and Lycoris Desktop/LX, is a newbie-friendly Linux distribution in search of converts. Sporting a painless installer, Mozilla for Web and e-mail, OpenOffice.org's application suite, and Cross-Over Office (which allows you to install Microsoft Office 97 and 2000), Xandros Desktop is attractive and friendly. However, we'd like it more if it were built atop a newer version of the KDE environment than KDE 2.2. [find.pcworld.com/32726](http://find.pcworld.com/32726)

—Matthew Newton

### Big Sound

IF YOU DON'T like bulky headphones, try Shure's \$99 in-ear **E2c**. The earpieces fit securely inside your ears and totally block outside noise. Sound quality was excellent—better than any earpieces that I've previously used. [find.pcworld.com/32729](http://find.pcworld.com/32729)

—Alexandra Krasne

### IPaq Bargain

HP's **IPaq H1910** competes directly against ViewSonic's



thin-and-light Pocket PC V35 (see review at [find.pcworld.com/32735](http://find.pcworld.com/32735)). The HP H1910 has a street price of \$300, weighs less than

4.5 ounces, and comes with a Secure Digital memory slot and a lovely display—plus, it boasts the new IPaq look (see page 34). [find.pcworld.com/32732](http://find.pcworld.com/32732)

—Yardena Arar



SAMSUNG

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June, 2002
- Samsung ML-1651N ranked at the top of PC World's Corporate Monochrome Laser Printer list.  
February, 2002
- Samsung ML-7300N wins "Bang for the Buck" award from Government Computer News for best performance and value.  
May, 2002

To learn more about Samsung Monochrome Laser Printers,  
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# Least Taxing Software?

## TAX SOFTWARE

DISPLAYS FOR tax-software boxes are sprouting up everywhere you shop. How's a consumer to choose?

I examined shipping versions of H&R Block's **TaxCut Platinum 2002** and Intuit's **TurboTax Premier 2002**, as well as a beta of 2nd Story Software's **TaxAct 2002 Deluxe**. Your decision on which package—and which edition—to buy should be based on how complicated your tax situation is and how much you want to spend for software (see the chart).

Intuit is the leader in both software sales and price in-

creases—for instance, its popular TurboTax Premier and Premier Home and Business products each cost \$10 more than they did last year. And once again, I must take Intuit—and to a lesser extent, H&R Block—to task for its complicated rebate policies that make it difficult for buyers to determine their true bottom line on a software purchase. Thankfully, 2nd Story doesn't play the rebate game.

And the big two tax software companies don't make free e-filing available for most of their products. Remember, you can always snail-mail your

return to save money, though you'll wait longer if you're getting a refund.

That said, all three packages I looked at work well. Intuit's TurboTax Premier 2002 is substantially the same as last year's edition—a good thing. Its calculators and wizards for analyzing taxes on stocks, bonds, and rental property are slightly more comprehensive versions of last year's tools. H&R Block's TaxCut Platinum gains similar improvements, including "Interview Assistants" for rental property and stock and bond investments. Even 2nd Story's TaxAct provides slightly better capital gains report-



CHOICES AROUND this year.

ing and investment advice.

Is the fact that TurboTax Premier is slightly more informative than its competitors worth a price premium? Perhaps for an Intuit Quicken user importing capital gains carryovers or depreciating assets. But a hitch in TurboTax's product activation process, coupled with confusing tech support, turned a prospective 60-second installation into a frustrating hour in my tests. Each of the other two tax apps installed easily in less than a minute.

And you can't use the Intuit software until you activate it by sending the software's product key to the company via the Internet. Intuit then sends back a code that allows you full use of your software on that PC only (the company says the process should take just seconds). Though you may use the activated software on any PC, you may print and file only from the original PC.

TaxCut Platinum gives active investors and data importers functionality nearly identical to TurboTax Premier's—plus one free tax inquiry to an H&R Block professional, a \$20 value.

However, the cheapest solution for those with simple returns is 2nd Story's TaxAct Deluxe Bundle: only \$28.

—Mike Hogan ►

## AT A GLANCE

### Unraveling the Tax Rebate Tangle

PRODUCT <sup>1</sup>		Federal return software <sup>2</sup>	State return software <sup>2</sup>	E-filing fees (federal/ state) <sup>2</sup>	Mail-in rebates <sup>3</sup>
2nd Story Software (find.pcworld.com/32702)	TaxAct 2002 Deluxe	\$10	\$13	Free/\$8	None
	TaxAct 2002 Standard	Free download; \$6 CD-ROM	\$13	\$8/\$8	None
	TaxAct 2002 Deluxe Bundle	\$20	Free	Free/\$8	None
H&R Block (find.pcworld.com/32699)	TaxCut Platinum (★★★★☆)	\$40	\$25	\$15/\$10	\$10 back, \$25 back on state software, \$15 back on one federal e-filing <sup>4</sup>
	TaxCut Standard	\$15	\$25	\$15/\$10	\$5 back <sup>4</sup>
	TaxCut Deluxe	\$25	\$25	\$15/\$10	\$5 back, \$25 back on state software, \$15 back on one federal e-filing <sup>4</sup>
	TaxCut Platinum Home & Business	\$50	\$25	\$15/\$10	\$25 back on state software only, \$15 back on one federal e-filing <sup>4</sup>
Intuit (find.pcworld.com/32696)	TurboTax Premier 2002 (★★★★☆)	\$60	\$30	\$15/\$9	\$10 back, \$30 back for first state software download, \$15 back for one federal and one state e-filing
	TurboTax Basic 2002	\$20	\$30	\$15/\$9	\$15 back for first federal e-filing
	TurboTax Deluxe 2002	\$40	\$30	\$15/\$9	\$10 back, \$30 back for first state software download, \$15 back for one federal e-filing
	TurboTax Premier Home & Business 2002	\$80	\$30	\$15/\$9	\$20 back, \$30 back for first state software download, \$15 back for first federal e-filing

<sup>1</sup> Only shipping product versions reviewed here are assigned star ratings (TaxAct is in beta). <sup>2</sup> List prices. <sup>3</sup> Paperwork must be mailed in.

<sup>4</sup> Coupons good for discounts on other financial software, including Microsoft Money, are included with rebate.





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# The Case of the Incredible Shrinking PCs



SPACE SAVERS from Alienware (left) and Sony.

## DESKTOPS

**LET'S FACE IT:** The average bulky PC tower doesn't always fit where you need it—size- or style-wise. Hence, the ongoing niche market for small and/or attractive PCs.

Tiny used to mean a lack of expandability and upgradability. Nowadays, though, almost any new PC is fast enough for all but the most demanding tasks, while the increasing quality of integrated graphics and sound lessens the need for space-hogging card slots. This makes smaller mainstream PCs more feasible. I looked at two multimedia-focused systems from Alienware and Sony that don't dominate your desktop.

## THE PC FROM BEYOND

ALIENWARE'S \$1999 **Navigator Pro** is proof that fast systems do come in small, albeit pricey, packages. The first to provide Windows XP Media Center Edition in a compact PC, it crams an amazing amount of features into a suitably sci-fi-looking black box that measures only 12 by 7 by 8 inches. Adorning the front for easy access are CompactFlash, Memory Stick, Secure

Digital, and SmartMedia slots; a Pioneer DVR-A04 DVD-RW/-R drive; two USB 2.0 ports and one FireWire port, one headset jack, one microphone port, and one optical audio out. The preproduction box we saw also had plenty of power, courtesy of a 2.66-GHz Pentium 4 CPU, 512MB of 333-MHz DDR SDRAM, and a 7200-rpm 120GB Western Digital hard drive. A monitor and speakers are not included in this price but are available from the company.

The back features two USB 2.0, FireWire, and legacy serial ports, as well as in and out audio ports, a headphone jack, and one ethernet port. And it has two card slots—an AGP slot occupied by a 64MB GeForce4 Ti 4200 graphics card, and a PCI slot filled by an Emuzed Maui PCI PVR TV-tuner card. These PCs have not been benchmarked by our Test Center, but in my hands-

on evaluation, the Navigator Pro was extremely responsive—and booted in a flash.

## YOU LOOK MARVELOUS

SONY'S SLEEK silver-gray, all-in-one **VAIO PCV-W10** may not pack the punch of the Navigator Pro, but it has style for miles. And the system is only 13.15 by 10.28 by 19.17 inches—including the built-in display and fold-down keyboard.

My shipping model's most noticeable feature was its wide-aspect, 1280-by-768-resolution, 1.66:1-ratio LCD screen—perfect for viewing widescreen DVDs played in the PC's side-mounted DVD-ROM/CD-RW combination drive. Resonant integrated speakers flanking the display round out an excellent desktop movie experience.

Though the \$1600 PCV-W10 is easy on the eye and ear, its basic components put it in the lower end of the "fast

## QUICK TAKES

### PC Movie Viewing

DOWNLOADING movies from the Internet to play on your PC sounds promising, but I found using the **Movielink** Web service a bit cumbersome. Downloading a player and a \$3 movie over my DSL took about an hour. You may watch a movie as often as you wish for the rental fee—within 24 hours—though the first time, you must stay connected to the Web long enough to get authorization. The quality of the video I watched, however, was nowhere near as good as the quality of a rented DVD. **find.** [pcworld.com/32519](http://pcworld.com/32519)

—Richard Baguley

enough" scale. The unit's 1.6-GHz Celeron CPU, 512MB of 266-MHz DDR SDRAM, and 60GB hard drive are brawny enough for most tasks, but the integrated graphics system that consumes 32MB of main memory for the video chores could cramp gamers' style.

The PCV-W10 is a legacy-free PC (no parallel or serial ports) with three USB 2.0 and two three-pin i.Link (mini-FireWire) ports, a Memory Stick port, and modem and ethernet ports, plus the usual audio-in/audio-out/headphone jacks. You also get Windows XP and dual Type II PC Card slots that take the place of standard card slots.

The PCV-W10's elegant, space-saving design is classy all the way. And the Navigator Pro is a cleverly designed, small-profile multimedia box. They're each well worth a look, especially if you're short on space and long on cash.

—Jon L. Jacobi ►

### Navigator Pro

Alienware

★★★★☆

An extremely fast, compact, and expensive multimedia machine.

List: \$1999 (PC only)

[find.pcworld.com/32522](http://find.pcworld.com/32522)

### VAIO PCV-W10

Sony

★★★★☆

Elegant, space-saving PC will turn heads, but it is a bit pricey.

List: \$1600

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# Why new PowerStruXure™?

## Why save money, space and time in your data center?

PowerStruXure™

### You no longer need to design your data center using an outmoded approach.

From 1kW to 5MW, APC PowerStruXure™ architecture provides a patent-pending, systematic approach to building data center infrastructure utilizing standardized, pre-assembled components.

#### Lower Costs

PowerStruXure's scalable, modular design lets you build out your capacity only as it's required, optimizing your CapEx.

The simplicity of design lowers OpEx and lessens your dependency on expensive service contracts.

#### Reclaim space

PowerStruXure's rack-optimized design lets you reclaim an average 20% of useable space within your installation that was previously needed for infrastructure equipment.

#### Speed infrastructure deployment

PowerStruXure dramatically accelerates your deployment schedule with configure-to-order

components and a pay-as-you-grow approach. Modular system components are easily replaceable, decreasing repair times.

#### Adapt to unexpected contingencies

With PowerStruXure, there's no need to abandon your previous investment – whether

you need to physically move your data center or adapt to technology refreshes.

#### Vendor-neutral

Best of all, you will never be boxed in by proprietary solutions.

PowerStruXure

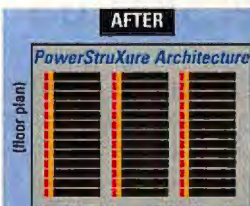
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**Michael Touchstone**  
Manager of Energy Conservation,  
Cox Communications



*Traditional data centers are built out for future capacity and require a large amount of floor space that could be otherwise utilized.*



*PowerStruXure lets you build out capacity only as it's required. Save up to 50% CapEx and 20% OpEx\*, and reclaim an average of 20% usable space.*



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## Tote Thousands of MP3s

### MP3 PLAYER

IF THE SLEEK curves and smooth interface of the Apple iPod make it the Porsche of hard-drive-based MP3 players, then Creative Labs' **Nomad Jukebox Zen** is a Honda Accord: more affordable, blessed with options, and just a little plain, but still zippy enough to make your trip into digital audio enjoyable.

The Zen's \$350 price gets you 20GB of storage—enough for roughly 5000 MP3 files at

128-kbps recording quality (an equivalent Windows iPod sells for \$499). The Zen also plays the smaller Windows Media files and has both a speedy FireWire (IEEE 1394) port and a plodding—but infinitely more common—USB 1.1 port. (The iPod plays just MP3s and offers a FireWire connection only.)

The Zen also looks nice in its sturdy, brushed-aluminum case. While smaller than previous Nomad Jukebox products at about 3 by 4.5 by 1 inches, it's noticeably larger than the media-darling iPod.

Moving music to my shipping Zen for the first time was a slow process, as Creative's



CREATIVE  
LABS  
Nomad Zen.

PlayCenter 3 software would not let me move tracks directly from my favorite PC jukebox, Musicmatch. I had to transfer nearly 8GB of largely 192-kbps MP3 files into PlayCenter 3, and then I moved my 1505 tracks (with album, artist, and track information) into the Zen, which took about 3 hours, 45 minutes.

Navigating the menus via the scroll wheel took a bit of practice. A 3-hour complete recharge of the built-in lithi-

### QUICK TAKES

#### Usenet File Fetcher

NEWSGROUP JUNKIES tired of sifting through thousands of messages for a specific file should consider S&H Computer Systems' fantastic **News Rover 8**. Long adept at searching Usenet, this new \$30 version makes reconstructing large files split over multiple messages as easy as a mouse-click. [find.pcworld.com/32816](http://find.pcworld.com/32816)

—Tom Mainelli

um ion battery netted about 7.5 hours of continuous play time. Audio was strong and clear through included wrap-around headphones.

The Zen is a well-priced package that's worth considering if you want to move into digital audio's fast lane.

—Tom Mainelli

#### Nomad Jukebox Zen

Creative Labs

★★★★☆

Priced right and packed with goodies, and you don't have to buy a FireWire card to use it.

Street: \$350

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## Canon's Feature-Filled PowerShot G3

### DIGITAL CAMERA

IS CANON LATE to the 5-megapixel party by releasing its swanky \$799 **PowerShot G3** with the same 4-megapixel resolution as its predecessor, the PowerShot G2?

Certainly resolution isn't the be-all and end-all for digital

cameras, but it's an important differentiator in a competitive field. And Minolta, Nikon, Olympus, and Sony all offer high-end 5-megapixel cameras—the Olympus C-5050 Zoom, for instance, costs the same as the PowerShot G3.

Perhaps Canon's just fashionably late. The G3 doesn't have the big resolution, but it's a sophisticated camera that takes stunning pictures. One reason for this is that it steps out with upgrades, including a new 12-bit analog-to-digital converter, which is supposed to provide better color

depth than the G2's 10-bit converter. That's important because the older G2, a 2002 World Class award winner, earned the best output scores of any camera we've tested.

The G3 also has a 4X optical zoom lens (up from 3X), a faster maximum shutter speed (1/2000 second versus 1/1000 second), and a more sophisticated flash system with nine different modes—you can even adjust the flash output manually. But fire the flash with the lens at its widest setting, and the lens barrel casts a noticeable shadow in a corner of your images.

Canon says the G3 takes less time to recover between shots than the old model. It's

certainly not lethargic, but other cameras—notably, the Leica Digilux 1 and several Fujifilm units—seem quicker. I wouldn't complain if the G3's zoom were faster, too.

As we went to press, the G3 cost about \$100 more than the G2—about right, given its relatively minor but numerous improvements. The G2 just became a great buy, but I'd think seriously about spending the extra bucks for the G3, whatever the megapixel count.

—Alan Stafford ▶



GREAT PIX but only 4 megapixels: the PowerShot G3.

#### PowerShot G3

Canon

★★★★☆

Takes some of the best pictures of any digital camera, but there's still room for improvement.

Street: \$799

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## Mice That Do Double Duty

### INPUT DEVICES

IF YOU HAVE ever wanted to stand 20 feet from a notebook and use a wireless mouse to run a presentation, or if you have ever needed numeric-keyboard capabilities on your laptop, new mice now shipping from Genovation and Gyration may be the answer.

Gyration's \$79 **Ultra Cordless Optical Mouse** doesn't require a surface to do its pointing

work; instead it moves your PC's pointer in whatever way your hand and wrist move, using the company's patented GyroPoint technology. I found that after a little practice with my shipping model, I could easily move the pointer without ever having to rest the mouse on a surface. However, if you need to make lots of quick movements or do precise clicking in your applica-



TWO  
VERY  
clever mice.

tions, this just isn't the best mouse for you.

But its wireless RF technology means no line of sight to the recharging base station is needed. That, plus the stand-away distance of 25 feet or so from a PC, makes this a great tool for running presentations. And its rechargeable batteries top off whenever the device is in its desktop station.

Now, if you wish your notebook's keyboard offered a numeric keypad, the \$79 **Optical Mouse Keypad** by Genovation

could help you out.

Its translucent plastic cover guards the built-in keypad from accidental presses when you're employing the device exclusively as a mouse. After my trials with a shipping model, however, I have to say this might not be your only mouse, as it's too wide to use comfortably for long stretches. But the convenience of having two functions with one USB connection may make it worthy in a numbers crunch.

—Michael S. Lasky ►

### Optical Mouse Keypad

Genovation

★★★★☆

This notebook mouse also doubles as a numeric keypad.

List: \$79

[find.pcworld.com/32537](http://find.pcworld.com/32537)

### Ultra Cordless Optical Mouse

Gyration

★★★★☆

Point and click without a surface.

List: \$79

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PC Magazine (August 2002)  
NETGEAR Home Networking



ID Magazine (August 2002)  
2002 Design Review  
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CNET (November 2002)  
Editors' Choice  
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ZDNet (November 2002)  
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## Useful Laptop/PDA Hybrid

### PORTABLE DEVICE

ALPHASMART'S \$399 Dana is an affordable and lightweight laptop alternative: A mini-portable with a full-size keyboard, it runs on Palm OS 4.1 and can store 8MB of data or programs, and even more with cards in its two built-in Secure Digital slots.

Think of this unique 2-pound hybrid as a handheld on steroids, combining the convenience of a Palm with some of the power and features of a notebook. Its 560-by-160-pixel touch screen is 7.5 by 2.25 inches (3.5 times larger than most handhelds) and displays 11 lines of 12-point text. That was more than enough

to use the included, full-featured AlphaWord word processing program or QuickSheet spreadsheet package. The slightly raised gray-scale LCD screen—which can be backlit—also rotates from landscape to portrait format to show 42 much shorter lines.

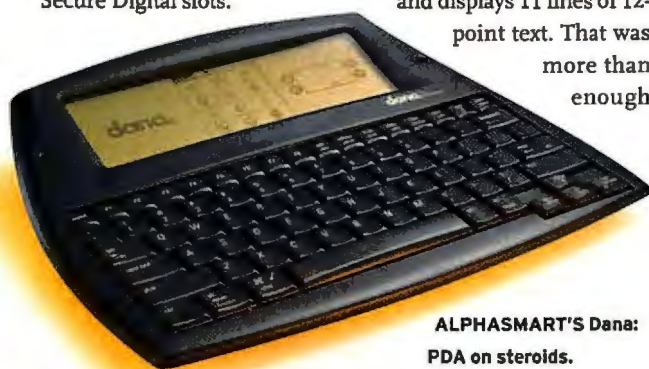
The preproduction model I tried out operated for more than 20 hours with its rechargeable battery pack. And if you don't bring the unit's AC adapter along, you also may use three AAA batteries.

AlphaWord and the basic Palm apps (Date, Address, To Do, and Memo) are tweaked to handle the Dana's entire screen; any other Palm apps you may use fit into a smaller 160-by-160-pixel Palm-style screen that you can call up on

the Dana's larger display.

I found syncing data between the Dana and my PC a one-button snap with the included USB 1.1 cable. One of the Dana's most distinctive features is its ability to act as the PC's keyboard when the two are connected. Even more convenient is its ability to pour the text contents of Dana documents directly into any productivity application currently open on the PC.

—Michael S. Lasky ■



ALPHASMART'S Dana: PDA on steroids.

### Dana

AlphaSmart

★★★★☆

Lightweight Palm OS unit with mini screen and full-size keyboard is clever and affordable.

List: \$399

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PHOTOGRAPH: MARC SIMON

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BY KIM ZETTER ♦ ILLUSTRATIONS BY PETER AND MARIA HOEY



## TECHNOLOGY TIPS & TRICKS



### Decipher Computer Terminology

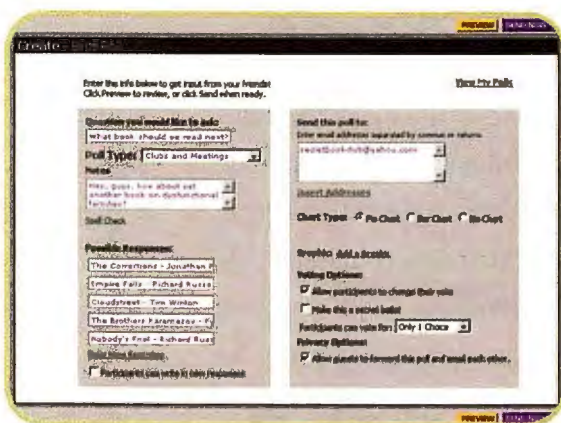
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GOOGLE TOOLBAR saves time by letting you run a search without first pulling up the site.

### Take a Poll for Your Group Events

Evite, which has been around for a while, is still the easiest and cheapest way (it's free) to organize a social or club event and send out e-mail invitations. But it also lets you conduct an online poll. Group members can vote anonymously, and results are tallied and e-mailed to you after the closing date. [www.evite.com/polling](http://www.evite.com/polling)

### Update Your Drivers

Drivers are essential to the smooth operation of your PC and peripherals, but companies are updating them all the time, often rendering the new devices you purchase inoperable without the latest versions installed. Drivers Headquarters' \$30 Driver Detective (see [find.pcworld.com/32444](http://find.pcworld.com/32444)) inventories the drivers already installed on your machine and downloads updates when vendors make them available. [www.drivershq.com](http://www.drivershq.com)

### Search Google in a Flash

Download and install the Google Toolbar, and you can run searches through your Internet Explorer browser without going to the Google page first. The Google Toolbar not only lets you search the Web, but it also helps you search the page you're currently viewing, highlight and unhighlight your search terms on that page, or pull up Google's cached version of the current page. It even translates foreign-language pages. [toolbar.google.com](http://toolbar.google.com)

### Fight Viruses for Free

Symantec's free online virus-scanning service is no secret, but the number of people who still don't know about it surprises us. You should already have

antivirus software installed on your PC; if you don't, you can scan your system from this site. The scan takes 10 to 20 minutes to uncover malicious code on your system, though it won't fix infected files. [www.symantec.com/securitycheck](http://www.symantec.com/securitycheck)

## SMARTER SHOPPING



### Comparison Shop While on the Go

You're buying a gift for Dad when you see a camcorder on sale. With a Wireless Application Protocol-enabled phone, you don't have to leave the store to check prices at other retailers; instead, use the phone to comparison shop through PriceGrabber's Web site tailored for wireless devices. (Note: PriceGrabber operates PCWorld.com's shopping tool.) [www.pricegrabber.com/home\\_wireless.php](http://www.pricegrabber.com/home_wireless.php)

### Find the Best Online Price for Books

Whether you're looking for *Zen and the Art of Motorcycle Maintenance* or *Zen and the Art of Stand-Up Comedy*, this site will scour online bookstores to help you find the best price for new and used titles. [www.bestwebbuys.com/books](http://www.bestwebbuys.com/books)

### Evaluate Products Before Buying

You may think the world of Bose speakers, but what does the world think of them? Before spending \$3000 on a home theater system, discover how past purchasers view the item you're contemplating. ConsumerReview compiles opinions on everything from cars to golf clubs, and each review includes a summary and lists of a product's strengths and weaknesses. [www.consumerreview.com](http://www.consumerreview.com)

### Track Your Package Deliveries

Need to know where that late package from Amazon or eBay is hung up? Pack-track offers a single site for tracking pack-



ages from 56 carriers, including Airborne, FedEx, the United States Postal Service, and UPS. Type in the tracking number, and the site tells you where your package was last seen. [www.packtrack.com](http://www.packtrack.com)

### Monitor Auctions Across the Net

Expand your auction choices beyond EBay with the BidXS auction search engine. BidXS culls listings from more than 500 auction sites, including EBay, to find the best deal on *South Park* lunch boxes or whatever else moves your mouse. You can also run searches on your wireless Net-equipped Palm. [www.bidxs.com/be](http://www.bidxs.com/be)

### Stop Telemarketers From Calling

Everyone is annoyed by them, but few people take action against them. We're talking about telemarketers who call at the dinner hour to hawk their wares. The Direct Marketing Association has an online form to get your number off telemarketing lists. This won't silence all calls (non-DMA marketers will still ring), but it should reduce the number of solicitations. [find.pcworld.com/32501](http://find.pcworld.com/32501)

### Learn About Product Recalls

Let's face it: They just don't make things the way they used to. If it's not exploding gas tanks, it's killer playpens or toxic strawberries. Find out what products have warranted recalls or safety warnings at the FDA's alert archive. The site also includes a link for safety information on medical devices. [www.fda.gov/opacom/7alerts.html](http://www.fda.gov/opacom/7alerts.html)

## NEWS & SPORTS

### Get News Streamed to Your Desktop

Instead of surfing for your news, have it come to you, with the free Desktop News ticker. Download the program, choose from a number of channels—including ABC News, CNN, ESPN.com, InfoWorld, and Salon—and Desktop News will stream headlines to you. Click a headline in the ticker to open the full story in your browser. [www.desktopnews.com](http://www.desktopnews.com)



### Read Global News in One Place

If you want an overview of international news, Google aggregates articles from more than 4000 sources worldwide (including TV and radio Web sites) and organizes them on a clean page, under subject headings. [news.google.com](http://news.google.com)

### Read or Subscribe to a Magazine

Tired of trying to find the magazine you want on a crowded newsstand? Then Magazineboy.com is the site for you. Lists of more than 1600 magazines in a wide range of interests are organized in categories and subcategories. Links take you to the magazine's Web site or to deals on subscriptions. [www.magazineboy.com](http://www.magazineboy.com)

### Follow Basketball Scores on Your Desktop

Don't let work get in the way of play—download ESPN's free Bottomline sports ticker to get current scores and breaking sports news on your PC. Click a news headline or score to get in-depth coverage or statistics behind the scores. [espn.go.com/bottomline](http://espn.go.com/bottomline)

### Get Sports Scores on Your Palm

If you're as anxious as the next sports fan to know when Brett Favre throws another touchdown pass or when the Lakers win another game, ESPN's download for wireless Web-enabled Palms will put you in the action with dynamic scoreboards that tell you a game's current standing. [espn.go.com/wireless/s/palm](http://espn.go.com/wireless/s/palm)

### Read Sports Pages From Out of Town

SportsPages.com aggregates links to hundreds of sports sections and columnists around the country. Follow out-of-state teams or sign up for the Daily Link (\$12 a month) to receive e-mail containing the best sports journalism of the day, including profiles and exclusives from reporters' notebooks. [www.sportspages.com](http://www.sportspages.com)

### Sign Up for Sporting Events

Registering for marathons and bike races can be time-consuming and difficult if they're out-of-town events. Active.com lets you search and register for myriad ►

## BOOKMARKS

# Manage Your FAVORITE LINKS



YOU KNOW YOU bookmarked a terrific site about composting food scraps. But that was three months ago, and now you can't find it in the unwieldy mess of your Favorites folder (in Internet Explorer; Bookmarks in Netscape).

Both Internet Explorer and Netscape let you organize links by creating folders and using some simple sorting functions. But to get the most from your links, your best option is a bookmark management program.

Compass is easy to use and lets you trade bookmarks between browsers ([www.softgauge.com/compass](http://www.softgauge.com/compass)). The \$25 program also lets you search for a link by URL or title, and finds duplicate bookmarks to help streamline your list.

The \$25 Powermarks is more versatile, though less intuitive ([www.kaylon.com/download.html](http://www.kaylon.com/download.html)). Besides having features like those in Compass, it lets you annotate bookmarks, allows you to search for links using keywords, tells you when a bookmarked page has been updated, and searches for dead links. You can also set up a free NetSync account to make your bookmarks accessible from any Net-connected PC.

Among free programs, the graphics-based Visual Marks manager lets you view bookmarks either as text strings or as thumbnail screen shots ([www.6bytes.com/visualmarks.html](http://www.6bytes.com/visualmarks.html)).





ACTIVE.COM PROVIDES a one-stop shop for information about locating and signing up for local sporting events.

sporting events—from turkey trots to triathlons. What's more, the site's Training Bible link lets you plan and track your training progress online. [www.active.com](http://www.active.com)

## MIND YOUR MONEY



### Check a Stock Price

Lycos's Quote.com is one of the best services for streaming real-time NASDAQ quotes to your desktop because it includes market statistics and links to company news and broker records. Quotes for stocks on other exchanges are delayed unless you pay for a subscription. May the market be with you. [finance.lycos.com](http://finance.lycos.com)

### Estimate Tax Payments

Quicken, one of the most trusted sources of tax software, offers a tool from TurboTax that helps you calculate self-employment tax payments. Also included are tools to find your tax savings from home mortgage interest and to help figure capital gains. [www.turbotax.com/taxes/tools](http://www.turbotax.com/taxes/tools)

### Manage Your Roth IRA

Confused by all the rules about tax-exempt Roth IRAs? This site offers the most comprehensive tutorial we've seen. Called Roth IRA 101, it has everything you need to know about Roth accounts presented in manageable bits. The tutorial includes basic rules for opening an

account, handling a spousal Roth IRA, and phasing out a Roth. Read it online or print sections that pertain to you. [www.fairmark.com/rothira](http://www.fairmark.com/rothira)

### Calculate Mortgage Payments

Before you buy a house, check out SmartMoney's mortgage calculator. The tool can determine your monthly mortgage payment and help you figure out the benefit of prepaying a mortgage. Worksheets help you calculate the housing price

that you can afford, and to weigh the benefits of buying over renting. Put a roof over your head without losing the farm. [find.pcworld.com/32456](http://find.pcworld.com/32456)

### Determine Profits From Stock Options

Employees at many companies still have stock options that they're hoping to exercise when the market bulls resume their charge. Although a free membership is required, MyStockOptions.com offers all you need to know about such options and includes a handy calculator to determine the value of your options after taxes. [www.mystockoptions.com/Calculator](http://www.mystockoptions.com/Calculator)

### Plan Your Finances

Though other sites help you sort out your financial future, I Hate Financial Planning uses humor and jargon-free language to take the pain out of the task. It's

especially good for beginners. Track weekly expenses, inventory assets for insurance records, or calculate your net worth with the site's forms, which are available online or in printable PDF versions. A QuickPlan takes you through the steps necessary to reach financial goals. The forms are free, so you have no excuse. [www.ihatefinancialplanning.com/my\\_records](http://www.ihatefinancialplanning.com/my_records)

### Find Out If You Won the Lottery

It's no substitute for a solid financial plan, but it might be worth a try. If the lottery bug has bit you, Yahoo's lottery page has the info you need, with links to results from 39 states, plus Spain and Germany. [lottery.yahoo.com](http://lottery.yahoo.com)

## TRAVEL WITH LESS HASSLE



### Track Flight Arrivals and Departures

Looking for arrival or departure information for a flight whose number you don't know? Flight Arrivals is the one-stop spot to get real-time arrival and departure data for flights and airports around the world (although not every airport is listed). Choose an airline and airport, and get data on flights in your specified time frame. The site's info is updated every 4 minutes. Wireless access will be added soon. [www.flightarrivals.com](http://www.flightarrivals.com)

### Learn the Baggage Rules for Your Airline

Every airline has different policies for baggage limits, lost-luggage reports, and itinerary changes, but the details are often buried in small print on a Web page or an airline ticket. One Travel's "Rules of the Air" tool provides a place to get all that info quickly. The site lists only U.S.-based carriers, so not all airlines are covered, but the tool is simple to use and the data is easy to read. [find.pcworld.com/32462](http://find.pcworld.com/32462)



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It's so far forward, it's a shame to call it backup.

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is here**

Apparently the word is out everywhere. BrightStor™ ARCserve® Backup is among the most reliable and widely used backup solutions in the world. In fact, hundreds of thousands of people rely on BrightStor ARCserve Backup technology to protect their critical servers. Now we've created BrightStor™ ARCserve® Backup v9, the most advanced version ever. As part of the BrightStor™ line of storage management solutions, BrightStor ARCserve Backup v9 is amazingly powerful yet one of the simplest to use and easiest to install solutions out there. In fact, most users can perform their first backup within 20 minutes of start-up. And that means it's the perfect backup software choice for, well, just about everyone. [ca.com/brightstor/arcserve9](http://ca.com/brightstor/arcserve9)



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### Reserve Airport Parking in Advance

Book discount airport parking before you arrive at a terminal, by using this site. The parking lots, at 54 U.S. airports, are located a few blocks or a few miles from the terminals but offer shuttle service. A recent search found parking for a three-day weekend at San Francisco airport lots for \$37 to \$52. [www.discountairportparking.net](http://www.discountairportparking.net)

### Find a Radio Station for the Road

Why waste time scanning the radio dial for your favorite tunes while you're on the road, when Radio-Locator can help you find a station that plays music you like? You can search for stations throughout the United States or the world by geographical



**TUNE YOUR WEB BROWSER** to [Radio-Locator.com](http://Radio-Locator.com) to look for radio stations anywhere in the United States.

region, radio call letters (in the U.S.), or format (pop, heavy metal, talk radio). You can also download a list of stations for any region to your PDA, using the free Avant-Go software. [www.radio-locator.com](http://www.radio-locator.com)

### Get Weather Reports Worldwide

Weather.com can deliver travel weather alerts to your Web-enabled cell phone. Just input your itinerary and get alerts for cities across the globe. Alerts arrive via e-mail or wireless text messaging two days before your departure and 3 hours before takeoff. [www.weather.com/services/phone.html](http://www.weather.com/services/phone.html)

### Look Up What Shots You Need

Before embarking on a trip to another country, get health information from the

Centers for Disease Control and Prevention. The CDC lists needed vaccinations, water precautions, and other health advice you should consider before you depart. [www.cdc.gov/travel](http://www.cdc.gov/travel)

### Learn a Foreign Language

You may not be able to learn a foreign language on the fly, but through this site you can master a few crucial words to help you ease through the airport in Paris, find a hotel room in Istanbul, or avoid an international incident in Moscow. Though its many pop-up ads can be annoying, the site has words in 80 languages, and by using a free audio program you can hear pronunciation for some of them. [www.travlang.com/languages](http://www.travlang.com/languages)

### Obtain Foreign Visas

Travisa's online visa application page can help you obtain visas to more than 160 countries and expedite your passport renewals. Not every country will let you apply online, but the site provides a postal address and phone number for embassies that require conventional mail or in-person applications. [www.travisa.com/visa1b.htm](http://www.travisa.com/visa1b.htm)

## LEISURE, LIFESTYLE, LAUGHS



### Find a Concert Near You

For info about musicians touring your area, there's no better tool than the concert search engine at Pollstar. You can search by artist, city, or venue to find dates for concerts (rock, pop, jazz, blues, and more) around the world. Listings are updated daily with color-coding to indicate newly added or changed appearances. [www.pollstar.com](http://www.pollstar.com)



**POLLSTAR'S CONCERT** search engine lets you search by artist, city, or venue to find your favorite live music.

### Track New CD Releases

Every Tuesday, record companies bring new music CDs to the market—often with little fanfare for artists who don't merit a publicity campaign. Ice Magazine provides an extensive list of CD release dates each month for performers of all genres, from Busta Rhymes to Michael Bolton. [www.icemagazine.com](http://www.icemagazine.com)

### Stay on Top of DVD Releases

If you're looking for information on when new DVDs will be available at your local store, The Digital Bits keeps track of those dates in its Upcoming Cover Art section. The site also posts news about upcoming DVDs, reviews new discs, and answers frequently asked questions about the DVD format. [www.thedigitalbits.com/articles/upcomingart.html](http://www.thedigitalbits.com/articles/upcomingart.html)

### Get Movie Listings on Your PDA

Moviefone lets you check show times and purchase advance tickets on your PC. But it's also great for getting such services through your Web-capable Palm VII (or Palm V with an OmniSky wireless modem installed) or through certain Net-enabled phones. Search movies by title or location, read reviews, get driving directions to the theater, or buy tickets—all while you're on the go. [www.moviefone.com/help/wirelessmain.adp](http://www.moviefone.com/help/wirelessmain.adp)

### Download Free Music

Don't let the demise of Napster get you down; you can still obtain cost-free and copyright-free tunes through your PC. ►





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**The ultimate recordable DVD solution from the leader in digital media.**

If you demand the best in DVD recording, we have three reasons why Memorex is exactly what you're looking for: performance, compatibility and trust. First of all, our internal DVD +RW/+R ReWritable Drive offers the industry's fastest recording rates, writing +RW and +R discs at 2.4x speed and reading DVD-ROM at 8x. What's more, our +RW formats allow you to edit your videos without having to rewrite the entire DVD—an enormous time-saver. Plus, our intuitive software makes the whole formatting process quick and easy. Secondly, our +RW and +R DVDs provide maximum compatibility. So whether you capture video, save

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with most computers and home DVD players. Finally,

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past ten years. So if you're truly serious about digital video, log onto [www.memorex.com](http://www.memorex.com). Because Memorex recordable DVD is everything you're looking for.



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Audiogalaxy's Satellite is one of the best file-sharing programs for getting legal music—it accesses more than 800,000 music files and offers several download settings. Note: The free version of this program contains the Gator adware plug-in. [www.audiogalaxy.com/satellite/](http://www.audiogalaxy.com/satellite/)

### Find Out What's on TV

There is never a TV program guide around when you need one. Well now you can get program listings easily through your PC. Just type in a zip code and your method of TV service (cable, satellite dish, or broadcast antenna), and you'll get listings of programs showing in your area. And when you come back, the site remembers your choices. [www.tvguide.com/listings/setup/localize.asp](http://www.tvguide.com/listings/setup/localize.asp)



SKIMAPS.COM HAS trail maps and snow conditions for ski resorts from Stowe and Mt. Snow to Whistler Blackcomb.

### Locate Ski Runs

Hankering to ski this year but don't know where to find the best runs? SkiMaps.com offers trail maps for resorts around the world, plus information about lift-ticket prices and accommodations. It includes maps for snow regions in countries such as the United States, Scotland, Spain, Switzerland, and even Australia. How about a Down Under winter wonderland in July? [find.pcworld.com/32447](http://find.pcworld.com/32447)

### Reserve a Campsite

Arrange a cross-country camping trip by using this site to reserve tent grounds or a cabin in any of more than 100,000 camp-

sites across the U.S. You can also apply for canoeing permits, as well as hunting and fishing licenses, and the site includes a handy camping checklist and trail maps to help you plan activities once you arrive. [www.reserveamerica.com](http://www.reserveamerica.com)

## READY REFERENCE

### Read E-Book Classics

Nothing promotes the Net's "information wants to be free" philosophy quite like Project Gutenberg. The site offers free downloads of more than 6000 electronic books in ASCII format, an eclectic selection ranging from fairy tales of the Brothers Grimm to the writings of Winston Churchill and William Shakespeare. A

worldwide network of mirror sites ensures you'll get your downloads quickly. [find.pcworld.com/32480](http://find.pcworld.com/32480)

### Make an International Phone Call

Type in the country you're calling from and the country you wish to reach at the Embassy-World search engine site, and it will tell you what you need to dial to place that call. The site

also links to 700 residential and business phone directories, with the relevant directories listed on the results page. [find.pcworld.com/32483](http://find.pcworld.com/32483)

### Calculate Postage

Don't go postal over long lines at the post office. Avoid the crowds and the window that closes just as you reach the head of the queue by calculating postal rates (including overseas mailings), looking up zip codes, or purchasing stamps—online. Stamps arrive in three to five business days with a \$1 fee for shipping and handling. You can also preorder commemorative stamps before they're available at post offices. [www.usps.com/ncsc](http://www.usps.com/ncsc)



### Research Public Records

Every state has different rules about what records the public can access. This site offers links to thousands of records, categorized by geographical region and subject. You can find links to records about foreclosures, professional state licenses, property reports, missing-person databases, and college alumni lists, among others. [www.searchsystems.net](http://www.searchsystems.net)

### Sort Out Valid Health Concerns

Some pretty far-fetched stuff can make its way into your in-box, so check the facts before you join the rumor mill. The CDC's list of hoaxes can help you determine what you should take note of and what you should ignore. Poisonous perfume samples sent through the mail? That's just a hoax. Ditto those reports about tainted Coca-Cola and Pepsi. [www.cdc.gov/hoax\\_rumors.htm](http://www.cdc.gov/hoax_rumors.htm)

### Take the Guesswork Out of Foreign Postal Addresses

Postal conventions vary widely from country to country. Wondering if you should place the street number before the apartment number, or vice versa when you're mailing a package to Italy? This site's guide to international postal addresses sorts out confusing postal rules, codes, and abbreviations. [www.columbia.edu/kermit/postal.html](http://www.columbia.edu/kermit/postal.html)

Kim Zetter is a contributing editor for PC World.

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## PerfectDisk "is blindingly fast"

*Microsoft® Certified Professional Magazine, November 2002*



### **PerfectDisk® 2000 Version 5. (Shades not included.)**

Microsoft® Certified Professional Magazine also said stuff like, "In all cases, the results were superb" and "...installing and using PerfectDisk is simple."

PerfectDisk defrags disks quickly and totally; one pass, done. Fact is, there's just no other product faster, more accurate or more complete. And, PerfectDisk is the only defragmentation solution on the market that's Windows 2000 certified for servers and workstations.

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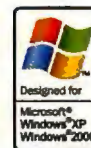
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**Now there's a lighter way to grab it and go with Dell's thinnest, lightest notebook.** The ultra-portable, ultra-sleek Latitude X200. Starting at 2.8 lbs. and .8" thin, it takes working on the road to a new level. This lightweight stunner places a premium on mobility with an optional wireless LAN connection and detachable media base for greater flexibility when you're out of the office. Customized just the way you need it with an Ultra-Low Voltage Mobile Intel® Pentium® III Processor-M and backed by Dell's award-winning service and support, the Dell Latitude X200 is great for working on the road. As long as the person next to you stops asking to check it out.

## Dell | Small Business

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- Intel® Celeron® Processor at 1.20GHz
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- 20GB\* Ultra ATA Hard Drive
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- Modular 24x CD-ROM/Floppy Drive
- Internal Modem and NIC Included
- Internal Wireless-Ready Antenna
- Windows® XP Home Edition
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**\$1099** as low as **\$32/mo.**, (46 pmts.)\*  
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### Latitude™ C400 Notebook

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- Windows® XP Professional
- 3-Yr Mail-In Service

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### Latitude™ C640 Notebook

#### Network-Optimized Mobility Notebook

- Mobile Intel® Pentium® 4 Processor-M at 2GHz
- 14.1" XGA Active Matrix Display
- 128MB DDR PC2100 SDRAM (up to 1GB)
- 20GB\* Ultra ATA/100 Hard Drive
- 32MB DDR AGP 4X ATI® Radeon™ Video
- Modular 24x CD-ROM/Floppy Drive
- Internal Modem and NIC Included
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- Windows® XP Professional
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#### Recommended upgrades:

- 8x DVD-ROM, add \$129
- 3-Yr CompleteCare™ Accidental Coverage\*, add \$169

### Latitude™ X200 Notebook

#### Thinnest, Lightest Notebook at .8" thin and 2.8 lbs.\*

- Ultra-Low Voltage Mobile Intel® Pentium® III Processor-M at 800MHz
- 12.1" XGA Active Matrix Display
- 128MB Shared™ PC133 SDRAM
- 30GB\* Ultra ATA/100 Hard Drive
- Intel® 830M Integrated Graphics up to 48MB (Shared\*) SDRAM
- Internal Modem and NIC Included
- Internal Wireless-Ready Antenna; External 24x CD-ROM
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# Wireless Networks

# That Do More

SMC Networks Barricade  
Plus 2.4 GHz Wireless  
Cable/DSL Broadband  
Router SMC7004WFW



D-Link AirPlus DI-614+  
Enhanced 2.4 GHz  
Wireless Router



Linksys Wireless Access  
Point Router BEFW11S4  
Version 2





# WANT TO SHARE CONNECTIONS, DEVICES, AND ENTERTAINMENT? HERE'S WHAT TO BUY AND HOW TO USE IT SECURELY AND RELIABLY.

**GOT THE NETWORKING BUG?** Whether you plan to set up a wireless network or have one in place already, our networking guide is for you. You'll find a truckload of tips to raise an existing network to a more-sophisticated level.

Whether it ties together an office or a house full of computers, your network is only as good as what you can make it accomplish. We discuss the best ways to share existing resources, like your printer. We show you how to add oomph to your network's performance—and how to repel in-

truders from your wireless turf. You'll find easy fixes for common networking snags. And we provide tips on how to turn your network into a lean, mean, entertainment system.

If you haven't bought your networking equipment yet—or you're thinking of upgrading to wireless—turn to page 97 for our review of ten leading gateways. Based on testing conducted by the PC World Test Center, our report evaluates each wireless product, with special emphasis on ease of use and reliability.

## WHAT'S INSIDE OUR NETWORKING GUIDE

### Tips and Tricks

- 93** Share Your Devices
- 94** Enhance Performance
- 95** Answers to Common Network Problems
- 96** Secure Your Network
- 96** Create an Entertainment Center

### Gateway Reviews

- 98** Gateway Features Comparison
- 104** Notes From the PC World Test Center

By Eric Knorr  
& Becky Waring

## Make the Most of Your Network



**SHARE YOUR DEVICES >>>>** Though sharing Internet access is the most obvious reason to set up a network, the bene-

fits of sharing devices are equally clear. Windows lets you share printers, scanners, modems, and drives—no more clambering up and down the stairs, floppy in hand, to open files on the one computer that's attached to a printer. In addition, allowing multiple users joint access to various drives on your PC enables you to share files easily. You're out of luck, however, if you want to share other devices such as cameras or MP3 players: Windows gives these units no way of exposing themselves to other computers on the network. That will change over the next few years, according to Microsoft product manager Greg Sullivan. The Universal Plug and Play Forum is developing connectivity and control standards for other types of devices (see [upnp.org](http://upnp.org) for more information).

**SHARE YOUR PRINTER:** You probably enabled the whole network to share printers connected to individual computers when you first set it up. If you didn't do this—or

if you recently installed a new printer that you want to share across your network—both Windows XP and Windows 2000 make the process easy: Begin by selecting *Start•Printers and Faxes* (or *Start•Settings•Printers* in Win 2000); then right-click the printer name, select *Sharing*, and choose *Shared As* or *Share this Printer*. In either Windows 98 or Windows Me, right-click *Network Neighborhood*, select *Properties*, and click the *Enable file and printer sharing* button. Note, however, that you will need to have printer drivers on hand for every version of Windows you have running. Make sure you have a Windows 98 driver so that the printer can connect to your Win 98 PC, an XP driver so that the printer can work with the Windows XP machine, and so on.

**SHARE YOUR DRIVE:** In Windows XP or 2000, the first step in sharing folders or drives is to right-click the folder or drive in My Computer and choose a *Sharing...* menu option. The details vary with ►



every Windows version. (Of course, you need to decide at the outset whether you want to restrict the shared options or whether you're willing to leave every computer on the network exposed.) See the chart at right for a quick reference.

When selecting folders to share, you can password-protect folders and assign different access rights to different users, if you like. A sensible network administrator will recommend creating a specific folder on each PC for shared documents, rather than opening up whole drives to the network (even if you have a firewall).

**SHARE YOUR DIAL-UP:** Do you have a backup plan in case your vital broadband connection goes down? If you're willing to endure a rather tedious process, you can share your dial-up connection. Visit [find.pcworld.com/32237](http://find.pcworld.com/32237) for instructions.

## HERE'S HOW

### Give Others Access to Your Folders

ENABLING OTHERS ON THE NETWORK to open folders on one computer should be easy, but it's not terribly intuitive, partly because the commands vary with different versions of Windows. As you right-click the folder or drive you want to open up to others, in Windows XP, select *Sharing and Security*; in Windows 2000, Me, and 98, choose *Sharing*. After that, you're free to determine the type of access.

OPERATING SYSTEM	Sharing options	
	To allow read access...	To allow write access...
Windows XP <sup>1</sup>	Under 'Network Sharing and Security', click <i>Share this folder on the network</i> .	Under 'Network Sharing and Security', click <i>Allow network users to change my files</i> .
Windows 2000	Select <i>Share this folder</i> , click the <i>Permissions</i> button, and check the box next to <i>Read</i> .	Select <i>Share this folder</i> , click the <i>Permissions</i> button, and check the box next to <i>Write</i> .
Windows 98/Me	Choose <i>Share As</i> , and check the box next to <i>Read Only</i> .	Choose <i>Share As</i> , and check the box next to <i>Full</i> .

<sup>1</sup> In Windows XP Professional, this method requires that simple file sharing be enabled. Click the *Sharing and Security* option on the folder's right-click menu, and select *Start+Control Panel+Folder Options*. Click the *View* tab, and at the bottom of the 'Advanced settings' make sure the *Use simple file sharing (Recommended)* check box is selected.



## 2 ENHANCE PERFORMANCE >>>> Wireless networking is

simple in theory: Just install a wireless network adapter in each

computer and forget about drilling holes and running cable. When you deal with equipment based on the 802.11b (or Wi-Fi) standard, unfortunately, the reality often falls short of claimed specifications. Your network will have a limited range—you've probably experienced a decrease in speed at a certain distance from an access point. That's why you must adjust the location and configuration of your wireless setup to obtain the best possible performance, range, and reliability. Follow our advice and your connection will be faster across longer distances—and you'll have fewer dropped connections.

**PICK THE BEST LOCATION:** The farther your wirelessly networked computer is from a wireless access point—and the greater the number of solid objects that stand in the way—the slower your connection will be. To optimize your network's speed and range, position your wireless access point at least a few feet above the floor and away from metal objects, particularly large appliances like refrigerators. Though most manuals for networking products tell you to position the access point in the middle of the coverage area, it's often bet-

ter to identify the locations where you expect to use a computer and put the access point where it will be in a direct line of sight (or close to it) to as many of those places as possible. Don't waste time worrying about "dead spots" if no one is likely to use a computer there. Once your network is up and running, even slight changes in your wireless network card's

point coverage overlaps, the adapter will latch on to the strongest signal.

**CHANGE CHANNELS:** The crowded 2.4-GHz spectrum that 802.11b uses can be susceptible to interference in some instances, but the 5-GHz spectrum of 802.11a (802.11b's speedier successor) is largely interference-free. Depending on the configuration of your home or office, Microwave ovens, 2.4-GHz cordless telephones, power lines, Bluetooth devices, and quirky light fixtures—not to mention

Keep the antenna on your access point vertical at all times, rather than fiddling with it as you would with rabbit ears.

position (say, a shift in the orientation of your laptop as you recline on the couch) may dramatically improve throughput or even restore a dropped connection.

For larger areas—or areas with many obstructions—your only option may be to shell out the cash for multiple access points. If you go this route, you'll find that setup is easy: Simply make sure that the access points have identical settings. Virtually all wireless network adapters support "roaming": In areas where access

pesky neighbors who have their own Wi-Fi wireless network—can quash throughput or force dropped connections under some circumstances.

Experimenting with Wi-Fi channels often solves the problem—especially if you discover that your neighbors are using the same channel for their network. The 83-MHz-wide 802.11b band is divided into 11 channels, each one 22 MHz wide. As a result, only channels 1, 6, and 11 don't overlap one another. To change



from the default channel, you must delve into the setup software for your wireless access point and for each wireless network card, and reset them all to the same, new channel (the procedures vary from manufacturer to manufacturer). Note that 802.11a devices have far more flexibility, with 12 nonoverlapping channels. Businesses sometimes choose 802.11a just because it lets them deploy multiple, adjacent networks without interference (the fact that it's nearly five times faster than 802.11b doesn't hurt either).

**BOOST YOUR SIGNAL:** Performance, range, and reliability in wireless networking all hinge on the quality of the signal. The cheapest measure you can take is to keep the antenna on your access point vertical at all times, rather than fiddling with it as you would with old-fashioned rabbit ears on a TV (manufacturers say that pushing the antenna into a horizontal position is not a good idea). Beyond this, adding an extra-cost antenna to your network adapter, access point, or both can improve your signal quality significantly. Add-on antennas for laptop PC Cards cost around \$30 and may give your network access a lift. Note, however, that extra-cost antennas are available only for 802.11b access points. Strict FCC regulations govern 802.11a signal strength; 802.11a access points usually come already configured to transmit at levels right at the legal limit.

Antennas for Wi-Fi access points typically cost between \$40 and \$120, and they come in a wide range of shapes and sizes. If you want to increase the signal strength for a computer at the outer edge of an access point's range, a low-cost directional antenna such as the \$99 Siemens SpeedStream 6dBi Wireless Directional Antenna or the \$30 D-Link DWL-R60AT Indoor 6dBi Microstrip Antenna offers you the biggest boost for the buck. Unfortunately, however, the signal will weaken a little bit in the various directions that the antenna *doesn't* face. To crank up reception strength in all directions, try an omnidirectional antenna such as D-Link's \$39 Air DWL-R60AT or \$100 ANT24-0401 4dBi (both mount on the ceiling). ▶

## Q & A

# Answers to Common Network Problems

**QUESTION:** *I installed the software that came with my wireless card. Why is the software so buggy? I'm running Windows XP, which is normally very stable.*

**ANSWER:** Some installation routines don't make it clear that you may not need to install software for your wireless network adapter under Windows XP, since XP comes with all the software required for many wireless cards. In fact, the software you installed may well have been written for an earlier version of Windows. If you're having trouble, uninstall the software and use Windows XP's own wireless utility. To find the utility, select *Start>Control Panel>Network Connections*, right-click your wireless connection (which should be identified by the name of your wireless network card), and select *Properties*. Click the *Wireless Networks* tab to reveal XP's options.

**QUESTION:** *I can't get my router to connect to my broadband Internet service, and my broadband provider says that it will only explain how to hook up my broadband modem to a single computer. What do I do?*

**ANSWER:** At first, meekly submit and have your ISP help you set up the connection to your PC. In most cases, you'll need to install the ISP's proprietary software on your PC to navigate to a secure page, obtain a password for logging on, and complete registration chores. During this process, the ISP may grab the unique Media Access Control address of your PC's LAN card to ensure that your computer alone will use the account. While you're talking to tech support, ask for your ISP's preferred and alternate DNS (Domain Name Server—a PC that, for instance, translates your request for [www.pcworld.com](http://www.pcworld.com) into a request for 65.220.224.30). Write the DNS digits down along with the password.

Next, determine the MAC address of the computer you used to log on (see "Secure Your Network" on page 96 to find out how to do this). Now you can set up your router. One of the first options you'll encounter will be "MAC address cloning," which is where you should type in the MAC address of your log-on PC. The router will most likely also require your password, the provider's DNS settings, and the provider's domain name (for instance, "bigpipe.net"), after which it should have all the information it needs to connect. Naturally, if your agreement with your provider stipulates that you may connect only one PC, you might be courting trouble if you hook up an entire network.

**QUESTION:** *What's the best way to back up all the data on my network?*

**ANSWER:** Use a big external hard disk that has a FireWire or a USB 2.0 connection. You could use CD-RW, tape, or rewritable DVD for backup—but who wants to toil like a 19th-century clerk, scribbling labels and filing away discs or cartridges? A fat new drive will cost a couple of bucks per gigabyte, at most, and it will do its job for a long time without any intervention from you. And if the computer it's attached to dies, you can easily move the external drive to another machine on your network.

As for backup software, use the program that came with your copy of Windows. Windows XP Backup is particularly good, because it can create copies of data files while applications are using them, so you don't need to wait until off-hours to perform backups (and the hard drive's speed will minimize any impact on performance). Two tips: First, Windows XP Backup is not installed by default in Windows XP Home—to install it manually from the Windows XP CD-ROM, navigate to the `\valueadd\msft\ntbackup` folder and double-click *Ntbackup.msi*. Second, for Windows XP Backup to work, the folders you want to back up must be shared (see "Share Your Drive" on page 93) and must appear in the My Network Places list on the computer doing the backing up.



### 3 SECURE YOUR NETWORK >>>> Many people are surprised to discover that the default security setting for wireless networks is often no security at all, leaving your network open to hostile hackers or to freeloaders who want to pirate your broadband connection. Unfortunately, no perfect security solution exists today, although this is supposed to change with the adoption of the new IEEE security standard known as 802.1x. It will take a while for 802.1x to trickle down to products, though. The standard is designed to allow authentication of wireless users against a remote server (the spec should be final by the time you read this). In the meantime, go with a manufacturer that adds proprietary security, and buy your hardware exclusively from the same company to ensure that everything works together. Also, you can take steps now to encourage hackers to look elsewhere for a network that's less secure.

**USE SMART IDENTIFIERS:** First, just as you should in your passwords, mix numbers and letters in your wireless network's Service Set Identifier, which every wireless device on your network uses to log in. (At the very least, don't use the default!) Most wireless setup software makes changing the SSID easy. Next, implement Wired Equivalent Privacy, the data privacy mechanism used for wireless networking (check your Wi-Fi manuals for instructions). Virtually all wireless networking devices now support 128-bit WEP, which is more secure than 64-bit WEP. Both flavors remain hackable, however, so consider WEP a deterrent, not a fail-safe barrier. Many people settle on 64-bit WEP, notwithstanding its poorer security, because 128-bit WEP can degrade performance by as much as 50 percent, especially when you use older equipment. Visit [find.pcworld.com/32246](http://find.pcworld.com/32246) for more details about WEP, including tips on creating passwords that are hard to decipher.

**ENABLE MEDIA ACCESS CONTROL ADDRESS FILTERING:** Doing this greatly increases the level of sophistication required to hack into your network. The MAC address is the unique numeric identifier for your

network adapter. Turn on the filter, and only computers that have the MAC addresses that you specify can connect. Of course, this requires you to determine the MAC address of each client. In Windows XP or 2000, select *Start>Run*, type `cmd`, and press **<ENTER>** to open a command window. Type `ipconfig /all`, press **<ENTER>**, and look for the Physical Address number for that client's connection. In Windows 98 or Me, select *Start>Run*, type `winipcfg`, and press **<ENTER>** to display, among various other things, the Adapter Address. Write down either the Physical Address

or the Adapter Address (both of these are alternate terms for "MAC address").

A dedicated hacker may be able to sniff out a MAC address and "spoof" your network into thinking that one of your PCs is connecting. The only truly secure option is to set up a virtual private network, which impenetrably encrypts wireless (and wired) connections. Software-based VPNs degrade performance, and they're devilishly difficult to configure, even though Windows XP and 2000 come with VPN clients. But new, low-cost VPN routers offer better performance and easier configuration (you don't even need VPN client software). All major router manufacturers now sell them.

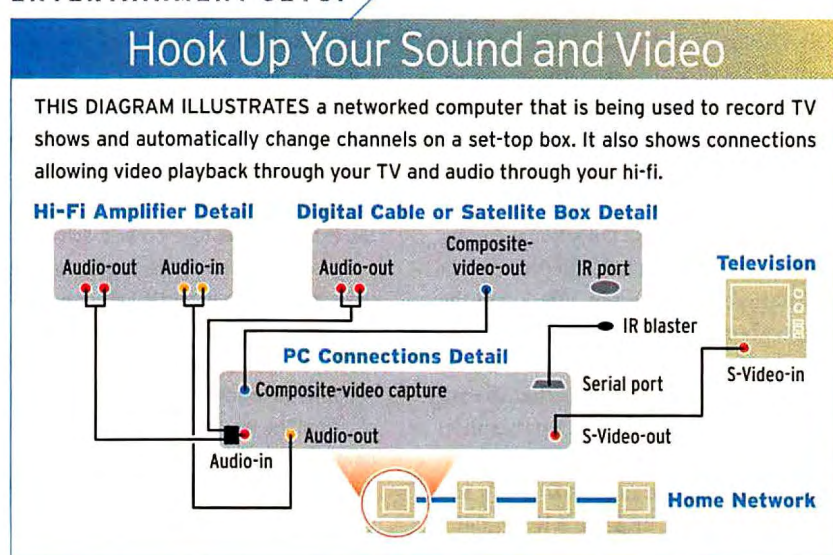
### 4 CREATE AN ENTERTAINMENT CENTER >>>> With a little effort, you can stretch your network a bit and turn it into an audio

and video hub, to share recorded programs and music across your network.

**SHARE YOUR SAVED TV SHOWS:** You say you like the idea of a TiVo-style personal video recorder, but you don't want to pay for the service? Consider SnapStream, a \$50 software PVR that lets you record TV shows on your hard drive. Afterward, you can play the recordings on any device attached to your network—though to play recordings made in the highest quality

mode, you'll need an 802.11a, 802.11g (another new standard, faster than but compatible with 802.11b), or wired network connection, since 802.11b is too slow to cut it. You'll need to have lots of storage available—a half-hour of near-VHS-quality video, for instance, eats 155MB of space. In addition, SnapStream requires a TV tuner card (about \$50) so the software can change channels automatically in accordance with your record-

#### ENTERTAINMENT SETUP





ing schedule. We found version 2.0 of SnapStream to be awkward and buggy, but version 3.0 (which we tested in beta form) looks promising. Visit [find.pcworld.com/32402](http://find.pcworld.com/32402) to purchase a copy.

Remember that tuner cards work only with broadcast or analog cable TV. To control the set-top boxes that come with digital cable and satellite TV, SnapStream drives a device known as the Actisys IR Blaster (\$25 with cables); when correctly configured by you, the IR Blaster can change the channels on your set-top box. To record, you'll need to run a cable from the analog video output of your set-top box to a video capture device (either a capture card or an external USB 2.0 device).

If you don't want to watch video recordings on a computer screen, you'll need a graphics card or laptop with a composite video-out or (far better) an S-Video-out connector. The cables that you'll need to link with your TV are easy to find, as are composite-to-S-Video converters, if you need one. Typically, you set your TV's channel selector to 00 to accept external video input. Because neither composite nor S-Video connections transfer audio, you'll need to run those cables separately (see "Hook Up Your Sound and Video" on the opposite page).

**MAKE THE AUDIO CONNECTION:** To play all the MP3 files you've collected, you need to hook your computer to your audio system. Fortunately, that's easy: Sound cards (and laptops, too) typically come with a 0.125-inch stereo-out jack for headphones. Electronics stores like RadioShack and Circuit City carry cables with a 0.125-inch plug on one end and two RCA connectors on the other end that plug into the line-in jacks on your audio amplifier. In our informal tests, MP3 files sounded acceptable with a garden-variety Creative Labs SoundBlaster Live sound card connected to a hi-fi. If you hear analog noise, use heavily insulated cables—such as Monster Cables—to squelch it. For better sound, try upgrading to a fancy sound card like Creative Labs' Sound Blaster Audigy 2 (head over to [find.pcworld.com/32585](http://find.pcworld.com/32585) to read a hands-on review).

## Wireless Gateways: No Strings Attached

**IF YOU'VE BEEN WAITING** for wireless to come of age before installing a home network or upgrading your current wired setup, wait no

longer. Today's reliable, affordable, and fast wireless gateways make it easier than ever for average PC users to link several computers in a home or small office.

Thanks to manufacturers' enthusiastic participation in the Wi-Fi Alliance's certification program, you can be confident that the Wi-Fi equipment you buy will be compatible with all other such equipment—on your local network or anywhere else that wireless networks are in place.

We tested ten 802.11b gateways intended for homes and small offices. Besides offering wireless connections, every product offers from one to four ethernet ports as well as a port for your cable or DSL modem. This lets you easily share broadband Internet access among all your computers without having to set up one PC as an always-on "Internet connection sharing" server. And to protect your network from prying eyes and hacker attacks over the Internet, each has a built-in firewall.

Our three top picks are the D-Link AirPlus DI-614+, the Linksys Wireless Access Point Router BEFW11S4 Version 2, and the SMC Networks Barricade Plus SMC7004WFW. The DI-614+ has a special 22-mbps mode that delivers up to twice the transfer rate of the other gateways when connected to compatible D-Link client adapters (find out more about these on page 106). Of the nine 11-mbps products, the Linksys and SMC gateways offer the best combination of speed and range, and they provided the most reliable connections. All three of our Best Buys have excellent firewall and hardware features, and all were easy to set up.

Wireless gateways now cost less than \$100, and prices for wireless interface cards—whether PC Cards for notebooks, internal PCI cards for desktops, or external USB adapters for any computer—are about \$69 and dropping. All ten gateways have the same basic functionality, but they differ in key ways in their installation and setup, hardware design, firewall ►

D-Link AirPlus  
DI-614+  
Enhanced  
2.4 GHz Wireless  
Router



Linksys  
Wireless Access  
Point Router  
BEFW11S4  
Version 2



SMC Networks  
Barricade Plus  
2.4 GHz Wireless  
Cable/DSL  
Broadband  
Router  
SM7004WFW



**Best  
BUY**

THE CLEAR CHOICES ARE the D-Link, Linksys, and SMC gateways. The D-Link AirPlus DI-614+ turned in top performance, had excellent firewall features, and set up easily. The Linksys and SMC units stood out among the 11-mbps contingent, with the SMC a particularly good choice if wired connection speed is important to you and WEP isn't. The D-Link and Linksys models are true bargains at \$99 each, especially considering that they include Wi-Fi cards, Internet routers, firewalls, and ethernet switches.



features, and performance. See the features chart below and the performance chart on page 102 for more details.

With simpler setup, more reliable connections, faster performance, and lower prices, it's getting harder and harder to say no to wireless home networks.

### EASY FROM THE GET-GO

THE SETUP WIZARDS that come with every wireless gateway make installation easy, though setting up a nonstandard connection, such as a link to a virtual private network, can be a headache. The wizards assume that you already have a working Internet connection on one computer; some setup programs copy your network information automatically from your PC to the gateway, making setup nearly transparent. Others require you to write down certain information, such as the static IP address your ISP assigned to you, and ask you to enter it manually later in the setup

Actiontec  
Wireless-Ready  
Cable-DSL Router  
GEU404000-01



process. The 3Com, D-Link, NetGear, Proxim, and SMC gateways have their own installation wizards, and the other devices use Windows wizards.

Connecting the hardware is as simple as unplugging the modem cable from your computer, plugging it into the gateway, and linking the gateway back to the PC, via either an ethernet cable or a wireless adapter. You configure the gateway by giving it details about your ISP connection. Though you can go completely wireless from the start, it's usually easier

to set up the gateway to link to a PC via a wired ethernet connection first and configure the wireless links later. That way you can make sure your Internet connection works before complicating the network with wireless links. In the event of problems, every vendor except Proxim and Zoom offers toll-free technical support 24 hours a day, seven days a week.

All ten of the gateways we tested support dynamic IP address, static IP address, and PPPoE (Point to Point Protocol over Ethernet) connections, as well as Media Access Control address cloning. Your network may need MAC address cloning because many cable modem companies and other ISPs record the unique MAC address of your computer's LAN card and permit that address to have only one connection. By cloning this address, the gateway is able to take the place of your LAN card and communicate with your ISP's servers directly. ►

### FEATURES COMPARISON

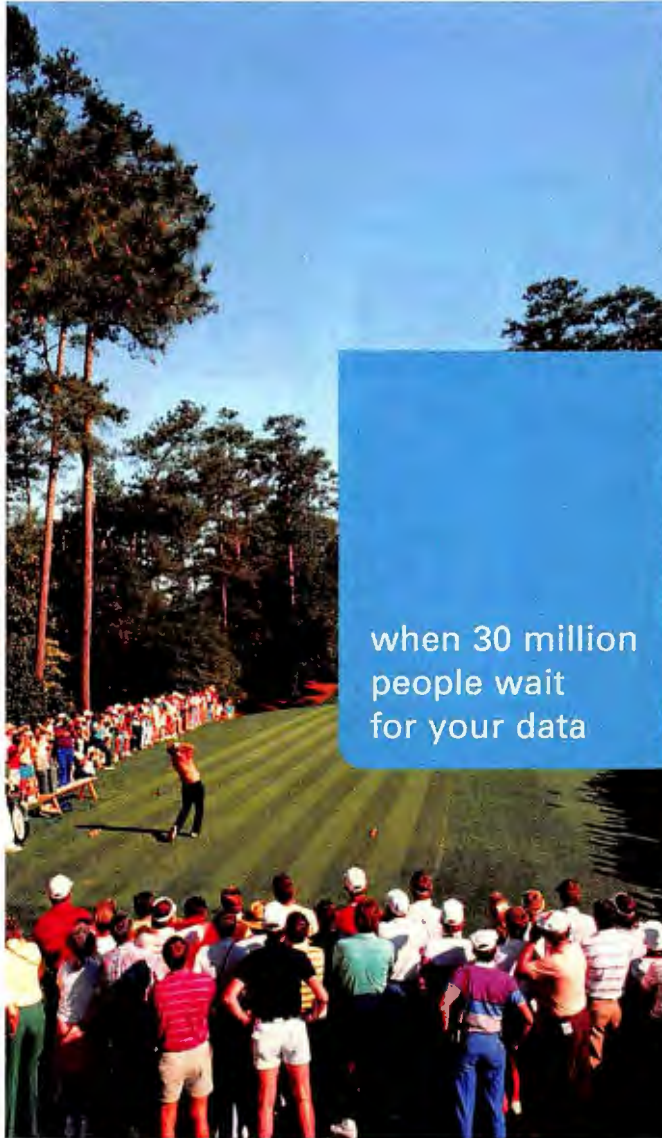
## WIRELESS GATEWAYS: MORE FUNCTIONAL AND AFFORDABLE

GATEWAY	Street price (12/13/02)	Warranty	External antenna design	Web access control?	Comments
3Com 3CRWE52196 ★★★★☆ find.pcworld.com/32600	\$130	Limited lifetime	Two small antennas	Yes	Lacks reset button (you must connect WAN port to LAN port to reset).
Actiontec GEU404000-01 ★★★★☆ find.pcworld.com/32603	\$105	One year	PC Card antenna	No	Includes USB 1.1 port for backup modem, USB 1.1 port for PC connection, and PC Card slot for wireless card.
Belkin F5D6231-4 ★★★★☆ find.pcworld.com/32606	\$129	Lifetime	Two small antennas	Yes, via IP and MAC address filtering	Includes uplink port for connecting ethernet hub.
<b>Best BUY</b> D-Link AirPlus DI-614+ ★★★★☆ find.pcworld.com/30003	\$99	Three years	Two small antennas	Yes, via IP and MAC address filtering; also URL and domain blocking, port filtering	Supports 256-bit WEP encryption in addition to 64- and 128-bit encryption.
<b>Best BUY</b> Linksys BEFW11S4 Version 2 ★★★★☆ find.pcworld.com/30001	\$99	One year	Two small antennas	Yes, via IP and MAC address filtering; also port filtering	Includes uplink port for connecting ethernet hub; firewall supports Stateful Packet Inspection, ZoneAlarm Pro, and PC-cillin.
Microsoft MN-500 ★★★★☆ find.pcworld.com/32609	\$110	Two years	One small antenna (plus an internal one)	Yes, via MAC address and client filtering	Does not support remote administration.
NetGear MR814 ★★★★☆ find.pcworld.com/32615	\$90	Three years	One large antenna	Yes; also content filtering and use logging, user blocking, port filtering	Jetson-style silver box includes optional vertical stand.
Proxim Orinoco BG-2000 ★★★★☆ find.pcworld.com/29999	\$125	One year	Internal antenna	Yes	Supports custom Media Access Control addresses.
<b>Best BUY</b> SMC Barricade Plus SMC7004WFW ★★★★☆ find.pcworld.com/32621	\$180	90 days, plus limited lifetime if you register the product in 30 days	Two large antennas	No	Bump on top of the box makes the unit unstackable.
Zoom ZoomAir IG-4165 ★★★★☆ find.pcworld.com/32624	\$177	One year	Two small antennas	Yes	Has one serial COM port for dial-up and ISDN connections; includes parallel printer port. You must install PC software.





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# › Home improvement.



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All of the gateways we tested can be configured manually via Web-browser setup screens. You can set some of the Actiontec GEU404000-01 gateway's firewall and wireless features via browser-based screens, but it relies on a simple Windows utility to change basic network-access settings. Even more troublesome, the product's browser-accessible features are not password-protected, so anyone on your network can get at them.

Once your gateway is hooked up to the Internet, you set up your wireless connections by installing drivers and plugging in wireless adapters. (Thanks to Windows XP's built-in Wi-Fi support, you may not need to install special drivers for that OS.) Once the hardware and software are in place, you scan the airwaves for your gateway and connect your PC to it in two clicks. We had no problems connecting to any of the gateways with three different client cards, suggesting that Wi-Fi compatibility problems are a thing of the past.

Make sure that your gateway's firmware is up to date before you configure it. You can upgrade the firmware of the gateways we tested via downloadable patches. Once things are up and running, you probably

Belkin Wireless Cable/DSL Gateway Router F5D6231-4



Microsoft Broadband Networking Wireless Base Station MN-500



won't need to change your setup unless you get a new ISP or you want to activate some special firewall features (see page 104 for more on firewall configuration).

### THE PORT REPORT

SOME GATEWAYS HAVE sexy-looking cases (we really like the Belkin and Microsoft designs, and NetGear and Zoom deserve honorable mention). Appearances aside, though, your gateway should have clear and informative indicator lights, and well-positioned antennas and ports. The Linksys light show leads the way: Its gateway comes with sets of three flashing lights for each of the four ethernet ports (to indicate an active link, data being uploaded or downloaded, and ongoing self-diagnosis), in addition to power, WAN,

and wireless-connection indicators. These lights help you diagnose almost any network problem easily. The other gateways have just one light per ethernet port.

Most of the gateways use dual antennas that you can adjust both vertically and horizontally to obtain the best reception. Some of the single-antenna units (like the Microsoft MN-500) have a second antenna built into the case. Positioning the gateway perpendicular to walls and ceilings lets signals pass straight through them instead of at an angle, and thereby avoids increasing the walls' effective thickness (see page 94 for additional information on antenna range).

Most of the products have four 10/100 ethernet ports, though the Actiontec and the Proxim Orinoco BG-2000 have ▶

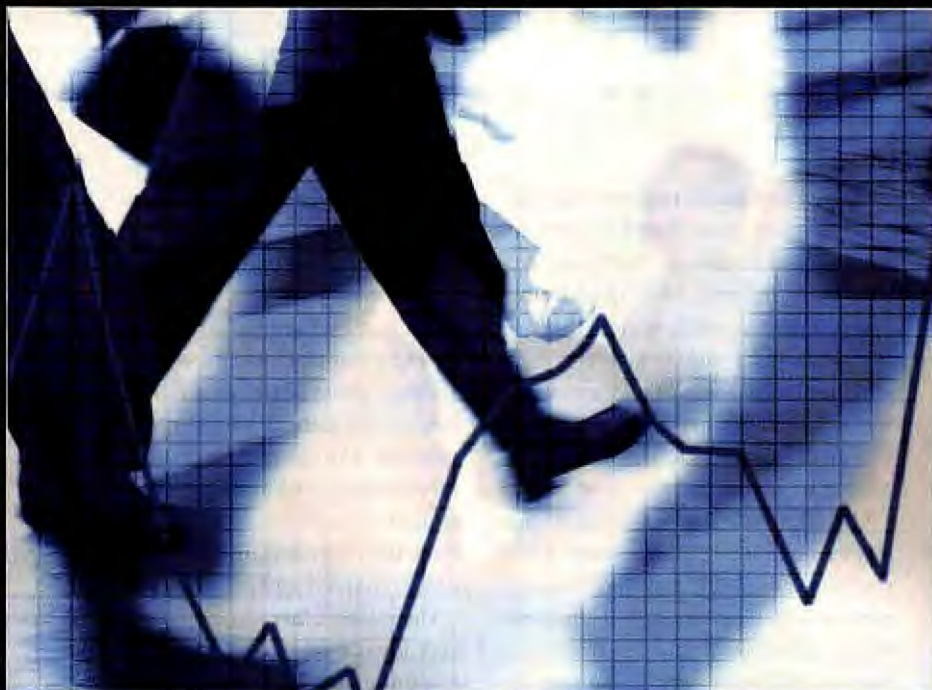
## GATEWAY RESULTS

### D-LINK OUTPACES THE WIRELESS COMPETITION

GATEWAY	Maximum data transfer rate (mbps)	Wireless, No WEP			Wireless, 128-bit WEP			Ethernet		
		Download (mbps) <sup>1</sup>	Upload (mbps)	Ping (ms)	Download (mbps) <sup>1</sup>	Upload (mbps)	Ping (ms)	Download (mbps) <sup>1</sup>	Upload (mbps)	Ping (ms)
3Com 3CRWE52196	11	2.6	2.8	5	2.4	2.6	5	6.3	6.5	2
Actiontec GEU404000-01	11	3.7	4.8	3	3.7	4.6	3	7.1	8.7	0
Belkin F5D6231-4	11	3.1	3.3	4	3.1	3.3	4	6.6	6.4	2
D-Link AirPlus DI-614+	22	6.4	6.5	2	6.2	6.6	2	17.7	16.6	0
Linksys BEFW11S4 Version 2	11	3.5	3.7	4	3.4	3.7	4	8.0	6.2	1
Microsoft MN-500	11	3.0	3.0	5	3.0	2.9	6	6.6	6.5	2
NetGear MR814	11	3.5	3.5	4	3.5	3.5	4	6.4	6.6	1
Proxim Orinoco BG-2000	11	4.8	5.0	3	3.6	3.7	3	7.1	7.4	1
SMC Barricade Plus SMC7004WFW	11	4.8	4.7	2	3.3	2.3	3	28.3	26.5	0
Zoom ZoomAir IG-4165	11	4.2	3.3	4	4.1	2.8	4	6.6	5.2	2

See "Wireless Clouds Can Fog Reception" on page 104 for an explanation of our gateway tests. <sup>1</sup> Higher is better. <sup>2</sup> Lower is better.





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only one (Zoom's ZoomAir IG-4165 has two such ports, and SMC's Barricade Plus has three). You'll have to add an ethernet switch if you need to link more computers via wire than the gateway has ports to accommodate. The Belkin F5D6231-4 and the Linksys BEFW11S4 simplify that task by including an uplink port for connecting to another network (as an alternative to the first ethernet port).

The Zoom gateway we reviewed adds a printer port for print serving, and a serial port for dial-up and ISDN connections; the latter can be handy if your broadband connection goes down. D-Link and some of the other vendors offer models containing print servers at an additional cost.

### SECURITY BUILT IN

ALMOST ALL OF THE gateways come with WEP switched off as the default setting, and they provide blank or generic passwords for modifying gateway settings. Though this makes setting up the gateway easier, after it's working you should immediately change the password on the router from the factory default, enable WEP, and create a list of authorized users for your wireless network. Otherwise your network is a sitting duck to anyone passing by with a Wi-Fi card.

Hardware firewalls are included in all ten of the gateways we tested. Such hardware is generally more reliable and easier to use than a software firewall like Zone Labs' free ZoneAlarm or Internet Security Systems' \$40 BlackICE PC Protection. For example, you can set a hardware firewall so that your network does not even seem to exist to hackers; it accomplishes this by turning off responses to "ping" requests and closing all ports to incoming

traffic not specifically requested by you.

All the gateways we tested support network address translation (NAT), a scheme that hides internal LAN IP addresses from the outside world. Some of the products add stateful packet inspection (SPI), which looks at each packet and determines whether it looks like a denial-of-service or other attack. The Linksys and SMC gateways we tested support SPI.

Virtual private network support provides yet another layer of security. Many companies use VPNs to provide their employees with access to their internal networks and servers from home or while on the road. All the gateways in our roundup support VPN, but check with your IT manager to confirm that it's the right type of VPN for your organization's network.

Among the available flavors of VPN are IPSec, PPTP, and L2TP.

To play online games with several clients on your network, or to open more than one VPN tunnel at once, you need a gateway that supports these functions. Some of the products we tested support only one net game or VPN connection at a time. The SMC gateway we tested is a premium model with multiple-client VPN support; that's why it costs \$180—\$80 more than the company's regular model. (Prices change rapidly in this market.)

There's one other way to get unsecured apps to work over the Internet. All but the Proxim gateway let you set up a DMZ (short for *demilitarized zone*), in the form of a computer that is completely exposed to the Internet. You should avoid this ►

### LAB NOTES

## Wireless Clouds Can Fog Reception

### TEST Center

WHILE WE WERE EVALUATING gateways in the PC World Test Center, we discovered that the performance of a wireless network can be greatly affected by the presence of other wireless networks in the vicinity.

Before you install a wireless network, determine which of the 11 channels the other wireless networks in your area use; this may involve asking the people running them or looking up settings in each product's setup program. Make sure your channel is at least three settings up or down from any other channel in use nearby.

**THE DOWNLOAD AND UPLOAD TESTS:** We conducted both tests via wired and wireless connection. For the wireless test, the client was within 3 feet of the gateway. Our setup emulated a client connecting through the gateway to an ISP, but instead of using an actual ISP, we used another PC acting as a server. That way our bandwidth wasn't limited by the ISP. We measured the maximum throughput of the connection through the gateway by transferring a 50MB file. We used Windows XP's built-in FTP client to transfer the files in both directions. Though all the products had more throughput than is typically available over a broadband connection, the throughput was about half the rated maximum for the gateways, indicating the overhead caused by network address translation and other filtering operations performed on the data going through the gateways.

**THE PING TEST:** This shows the response time of one packet of data going from the client through the gateway to the server. The test indicates how much the gateway will slow down a connection, by measuring the wait time (or latency) it adds between when the signal is sent and when it is received. There was a little variation here, but all the times were pretty low, which tells us that the gateways don't add much latency.

**NO WEP VS. 64- AND 128-BIT WEP:** We tested all the gateways with Wireless Encryption Protocol data security enabled at both 64 bits and 128 bits. Some of the units, such as the SMC Barricade Plus, took a big performance hit when we turned on WEP; others weren't affected at all. Most of the units showed no difference between 64- and 128-bit WEP, and those that did had only a tiny difference.

—Elliott Kirschling





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arrangement in most cases, but if you want to use a public Web server to run an online game on a stand-alone machine (with no personal data on it), DMZ is probably the easiest solution. In many cases, you can create a virtual server that exposes only certain ports, satisfying your gaming needs without opening your entire computer to the world. See page 96 for more network security tips.

### SPEED MATTERS, BUT...

FOR WIRELESS GATEWAYS, the most important aspect of performance is not necessarily speed. Anyone who has used a Wi-Fi-equipped notebook knows that signal strength—your card's ability to receive Wi-Fi data under various conditions—is critical. Signal strength degrades as you move away from the gateway, and so does performance. The 802.11b standard specifies a nominal transfer rate of 11 mbps, which is plenty for most broadband connections. As you start to lose the signal, however, the standard's transfer rate drops dramatically—to 5.5 mbps, 2 mbps, and then 1 mbps. (Real-world throughput is about half these rates.)

The true measure of gateway performance is a combination of throughput and range, which is how far you can stray from the gateway and still get a good signal. Some of the fastest gateways in our tests had relatively poor range.

The test results on page 102 show each gateway's maximum wireless throughput when it is placed right next to the client computer, where the signal is strongest. Here, the D-Link gateway was the star,

Proxim  
Orinoco  
BG-2000



Zoom ZoomAir IG-4165 Wireless Internet Gateway + Cable/DSL/ISDN Router



3Com  
OfficeConnect  
Wireless  
Gateway  
3CRWE52196



thanks to its special 22-mbps Plus mode, a feature of the product's new Texas Instruments chip set. Expect other gateway vendors to adopt the TI chip set. To get the most out of 22-mbps mode, all client computers on the network need 22-mbps cards, though even 11-mbps clients will show somewhat improved throughput when used with the D-Link gateway.

As the performance chart shows, wireless speed drops a little when you turn on WEP encryption, though you should not

let this deter you from using it. Throughput will drop dramatically when several users access the gateway simultaneously. The card in the gateway has a fixed bandwidth that all the client cards must share. Here, the D-Link has a decided advantage if all its clients use 22-mbps adapters.

We tested the gateways' range with an internal Mini-PCI card built into a Toshiba Portégé notebook, and with an Orinoco Gold PC Card in the same Portégé. We measured the signal strength from about 30 feet and through several walls. The Mini-PCI card exhibited much lower signal strength than the Orinoco card did. The Linksys and Zoom gateways established the strongest connections, while the Actiontec, D-Link, Proxim, and SMC devices were not far behind.

Combining these results with those for throughput and reliability of connection, we rated the D-Link, Linksys, Proxim, and SMC gateways highest in overall wireless performance. Despite some good numbers here and there, the Actiontec and Zoom units failed some file transfer tests, encountered problems establishing connections, and had other reliability issues. The Microsoft gateway had the second-slowest wireless performance in our download test. The NetGear MR814 was about average in all our wireless tests. The 3Com and Belkin units had the lowest overall performance scores.

In our wired ethernet performance tests, the D-Link and SMC gateways finished far ahead of the pack, with the Actiontec and Linksys products earning honorable mention. If you perform a lot of file transfers over your wired network (perhaps you have a Web server or you back up files from one hard disk to another), this feature should rate high in your decision making. If you rarely perform wired file transfers, a gateway's wireless performance will be more important. ■

*Eric Knorr is a freelance writer based in San Francisco. Becky Waring is a freelance writer based in Berkeley, California. Testing was done by Elliott Kirschling, senior performance analyst in the PC World Test Center.*

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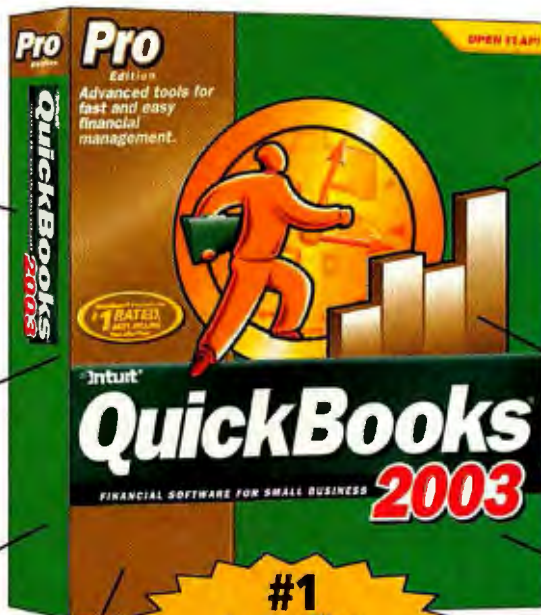
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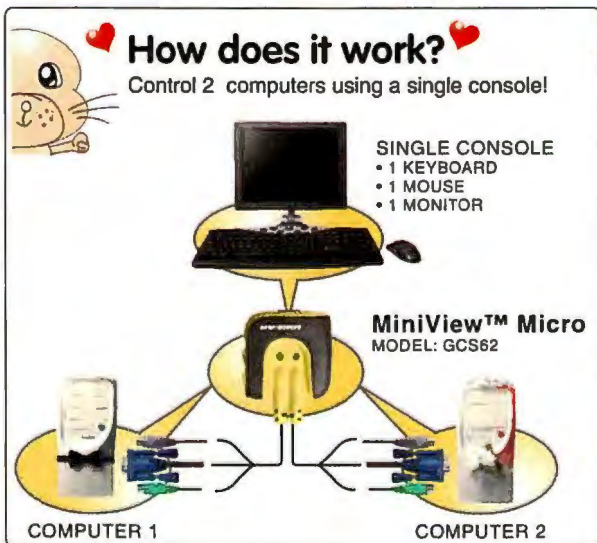
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## DESPITE PREDICTIONS, just over a year ago, of shortages and threats that they would become more expensive, LCD monitors generally have sharply lower price tags. Entry-level 15-inch models have fallen the fastest, but like King Kong slipping off the

Empire State Building, prices for larger screens are now plummeting. Most 19-inch models sell for under \$1000, and some for as low as \$699. Furthermore, prices may continue to drop in the first part of 2003. But is quality falling as well?

To find out, *PC World* collected 19-inch LCDs from 14 vendors, examining super-size screens from AG Neovo, AOC, Dell, GEM, Hitachi, Iiyama, KDS USA, NEC-Mitsubishi, Planar, Princeton Graphic Systems, Samsung, Sceptre Technolog-

gies, ViewSonic, and WinBook. We found that image quality was generally quite good across the board. Besides displaying supersharp text, many of the LCDs approached the quality of CRTs when displaying color images and motion.

After a very close competition, we chose two Best Buys for their combination of price, performance, and features. The Samsung SyncMaster 191T is a sexy LCD with a narrow silver bezel; the ViewSonic VX900 has a thicker silver frame that

includes integrated speakers. Both have top-notch image quality, wide viewing angles, and generous tech support.

### GOOD LOOKERS

MOST OF THE 14 monitors we reviewed delivered similar image quality. Our judges noted some differences after viewing a series of text and graphics screens side by side, however. We conducted all tests at the monitors' native resolution of 1280 by 1024 pixels, using digital (DVI) input—which we've found to provide better image quality—whenever possible. The WinBook Display C1900 (which missed our Top 10 chart) has only an analog input, but the other monitors offer both DVI and analog—which is handy. While DVI is common on new graphics cards, most older PCs (and new ones with integrated graphics) provide only analog.

### FEATURES COMPARISON

## TEST Center Large and Luminous LCDs

	19-INCH LCD MONITOR	Overall rating <sup>1</sup>	Street price (11/23/02)	Comments
1	<b>Best BUY</b> Samsung SyncMaster 191T <a href="http://find.pcworld.com/32363">find.pcworld.com/32363</a>	86	\$950	High image-quality scores, the widest viewing angle, and easy-to-use controls earned this model the top spot. It comes with color-adjustment software but no other extras, such as USB ports, audio ports, or speakers. (★★★★☆)
2	<b>Best BUY</b> ViewSonic VX900 <a href="http://find.pcworld.com/32369">find.pcworld.com/32369</a>	82	\$920	The VX900 has unique touch-sensitive menu controls and, in our tests, had the second-widest viewing angle. It includes passable built-in speakers, but lacks height adjustment and swivel. (★★★★☆)
3	Sceptre Technologies X9S-Naga <a href="http://find.pcworld.com/32366">find.pcworld.com/32366</a>	81	\$699	This unit proves that low cost doesn't mean low performance. But in an industry where three-year warranties are de rigueur, Sceptre's one-year coverage is skimpy. (★★★★☆)
4	Planar PL191M <a href="http://find.pcworld.com/32357">find.pcworld.com/32357</a>	81	\$800	One of the lower-cost entries, Planar's PL191M is a good performer with a simple but attractive design, available in either black or white. It has a fairly narrow horizontal viewing angle, however. (★★★★☆)
5	Dell UltraSharp 1900FP <a href="http://find.pcworld.com/32336">find.pcworld.com/32336</a>	81	\$899	The 1900FP is a safe buy. It's moderately priced, offers solid image quality, comes with the most important features, and has top-notch support policies. It also has a stylishly thin silver bezel. (★★★★☆)
6	AOC LM914 <a href="http://find.pcworld.com/32333">find.pcworld.com/32333</a>	81	\$765	This model has above-average image quality and impressive built-in speakers for a very competitive price, but lacks some basics such as a swivel base, height adjustment, and TCO ergonomic certification. (★★★★☆)
7	KDS USA Radius Rad-9 <a href="http://find.pcworld.com/32351">find.pcworld.com/32351</a>	80	\$775	This is the monitor to beat for producing clear, sharp text; its graphics quality was also exemplary. The three-year warranty doesn't include the backlight, which is warrantied for only one year. (★★★★☆)
8	NEC MultiSync LCD 1920NX <a href="http://find.pcworld.com/32354">find.pcworld.com/32354</a>	80	\$950	Wonderfully clear text and graphics are the 1920NX's strong points, but it skimps on features (it lacks a DVI cable, for example). We found equally good monitors with more bundled extras and lower prices. (★★★★☆)
9	Iiyama Pro Lite 4821DT-BK <a href="http://find.pcworld.com/32348">find.pcworld.com/32348</a>	80	\$1058	The Pro Lite has everything—except a low price. Demanding users won't be disappointed with this stellar, feature-rich monitor, but thrifty buyers can find basic LCDs for less. (★★★★☆)
10	Hitachi CML1908 <a href="http://find.pcworld.com/32342">find.pcworld.com/32342</a>	78	\$970	Hitachi's first-rate screen earned the highest cumulative score in our image-quality tests. But aside from a swivel base, few bells and whistles come with this fairly expensive LCD. (★★★★☆)

See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on *PC World's* Star Ratings.

<sup>1</sup> Overall rating is based on image quality (40 percent), price (25 percent), features (20 percent), and support policies (15 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.





**Best BUY** THE LITHE  
SAMSUNG  
SyncMaster 191T  
rotates from land-  
scape to portrait  
orientation.

first place for graphics and second place for text; but its scant extra features and its relatively steep price brought it to tenth place.

Our judges noted a few exceptions to our test units'

generally high overall performance: The analog-only WinBook Display C1900 was the least impressive, finishing near the bottom in both our text and image tests. In addition, the AG Neovo S19 scored low on our text tests. The unit sports a hard protective glass that's intended to soften rough edges and reduce glare. However, it caused distracting reflections and made text appear slightly blurred, keeping the S19 off our chart.

The costlier models, such as Iiyama's entry, were a tad better on graphics and generally bundled more-enticing features. For instance, the Iiyama's screen pivots 90 degrees from a wide landscape to a tall portrait orientation—convenient for ►



**Best BUY** THE  
STURDY  
VIEWSONIC  
VX900 sports  
a slick silver bezel  
and integrated speakers.

Some models we tested, such as the Samsung SyncMaster 191T and the Iiyama Pro Lite 4821DT-BK, were a shade better than others at reproducing lifelike colors. And some, like the bargain-priced KDS Radius Rad-9 and the AOC LM914, were slightly better with text. The Hitachi CML190B had the best overall image quality, taking

Quality of text/graphics	Horizontal viewable angle (in degrees) <sup>2</sup>	Features and specifications <sup>3</sup>	Support policies
Very good/ Outstanding	167	<b>Outstanding:</b> Digital and analog input; 16.4 by 8.2 by 17.7 inches, 13 pounds; 40-watt maximum power draw; TCO '99 compliant; tilt, pivot, height adjustment; 500:1 contrast ratio; color-adjusting software	Three-year warranty; 24-hour daily toll-free support
Very good/ Very good	159	<b>Good:</b> Digital and analog input; 17.4 by 7.1 by 18.7 inches, 16.7 pounds; 60-watt maximum power draw; TCO '99 compliant; tilt adjustment; 600:1 contrast ratio; built-in speakers	Three-year warranty; 24-hour daily toll-free support
Very good/ Very good	126	<b>Good:</b> Digital and analog input; 16.8 by 9.5 by 16.9 inches, 16.4 pounds; 56-watt maximum power draw; TCO '99 compliant; tilt, swivel adjustment; 500:1 contrast ratio; built-in speakers; two-port USB 1.1 hub	One-year warranty; 9-hour weekday toll-free support
Very good/ Very good	108	<b>Good:</b> Digital and analog input; 16.9 by 9.3 by 16.8 inches, 15.4 pounds; 50-watt maximum power draw; TCO '95 compliant; tilt adjustment; 500:1 contrast ratio; built-in speakers; two-port USB 1.1 hub	Three-year warranty; 11-hour weekday toll-free support
Very good/ Very good	153	<b>Good:</b> Digital and analog input; 16.4 by 8.2 by 17.2 inches, 15.4 pounds; 40-watt maximum power draw; TCO '99 compliant; tilt, swivel adjustment; 500:1 contrast ratio	Three-year warranty; 24-hour daily toll-free support
Very good/ Very good	123	<b>Good:</b> Digital and analog input; 17 by 7.8 by 17.3 inches, 15.2 pounds; 65-watt maximum power draw; tilt adjustment; 700:1 contrast ratio; built-in speakers	Three-year warranty; 11-hour weekday toll-free support
Outstanding/ Very good	118	<b>Good:</b> Digital and analog input; 17.7 by 9.6 by 17.9 inches, 20.5 pounds; 50-watt maximum power draw; tilt, swivel adjustment; 500:1 contrast ratio	Three-year warranty; 10-hour weekday toll-free support
Very good/ Very good	123	<b>Good:</b> Digital and analog input; 17.1 by 8.1 by 16.7 inches, 17.6 pounds; 38-watt maximum power draw; TCO '99 compliant; tilt, swivel adjustment; 500:1 contrast ratio	Three-year warranty; 24-hour daily toll-free support
Very good/ Outstanding	119	<b>Very good:</b> Digital and analog input; 16.9 by 9.5 by 16.3 inches, 19.8 pounds; 100-watt maximum power draw; TCO '95 compliant; tilt, swivel, pivot, height adjustment; 600:1 contrast ratio; four-port USB 1.1 hub; Image-adjusting software; optional speakers	Three-year warranty; 12-hour weekday toll-free support
Outstanding/ Outstanding	120	<b>Good:</b> Digital and analog input; 17 by 9.3 by 17.6 inches, 14.3 pounds; 54-watt maximum power draw; TCO '95 compliant; tilt, swivel adjustment; 500:1 contrast ratio	Three-year warranty; 12-hour weekday toll-free support

<sup>2</sup> As determined by the PC World Test Center. Vendor-specified viewing angle may differ, as each vendor uses its own measurement procedure.

<sup>3</sup> Dimensions are listed as width, depth, and height. All specifications supplied by vendor.  
<sup>4</sup> One-year warranty on backlight.



viewing full pages. The Princeton SENERgy 981, the Samsung SyncMaster 191T, and the WinBook Display C1900 also have pivoting screens, though WinBook doesn't bundle software for switching the screen orientation. (You can buy it separately for about \$50.) The AOC, GEM, Planar, Princeton, Sceptre, ViewSonic, and WinBook monitors we tested include integrated speakers. And the Iiyama, Planar, and Sceptre LCDs have USB 1.1 hubs for plugging in peripherals.

### CRT SUBSTITUTE?

LCDs TYPICALLY BEAT CRT monitors for text quality and screen brightness. But historically they have fallen short in their ability to clearly display moving images (such as scrolling text, video, or action

games) and faithfully reproduce color. Screen quality has been steadily improving, however, so we decided to revisit the old CRT-versus-LCD battle. For our comparison, we set two models with high image-quality scores, the Hitachi and the Iiyama, against two highly rated 19-inch CRTs from NEC-Mitsubishi and Sony.

An LCD monitor's pixel response time (sometimes called its redraw rate) determines how many frames it can display per second. Lower response times minimize streaking and ghosting effects in moving images. All of the LCD monitors we tested offer a quick 25-millisecond (ms) redraw rate. As we were finishing our review, some vendors announced new LCD models with 16-ms response times. (See "Video-Friendly LCDs?" on

page 32 for our first look at these screens.)

We did not detect clear differences between the LCDs and the CRTs in displaying the DVD movie *Star Wars Episode II: Attack of the Clones*, and we saw only slight motion artifacts (blurriness or jagged images) on the LCDs while watching the game *Return to Castle Wolfenstein*. But in a simple test that simulated scrolling through a Web page, the LCDs lagged noticeably in redrawing text and fine graphics, producing a blurry effect.

We were most surprised when we compared color photographs displayed on the LCDs and CRTs. Despite the general wisdom that CRTs perform better, we found the views from the two monitor types to be quite similar, though the CRT images appeared a bit richer and more saturated.

### LCD VS. CRT

## A Tale of Two Screens

LCDs AND CRTs DIFFER in more respects than simply size and weight. Here are some examples from our comparison tests.

**1** Text edges look sharper on LCDs, and brightness levels are typically about twice as high. However, an LCD's square pixels may create a sawtooth appearance on diagonal lines—as in the arms of the letters A or V. CRTs, in comparison, have round pixels that may produce smoother diagonals but also result in slightly fuzzy text.

**2** While colors are not as bright on CRTs, they tend to be richer. Also, CRTs can capture a broader spectrum of colors. A casual user may not notice the difference, but graphics professionals do. And any user can see that brightness and color on LCDs change when the screen is viewed from an angle.



LCD: Hitachi CML190B



CRT: Mitsubishi Diamond Pro 930SB



(See "A Tale of Two Screens" on the opposite page for details of our comparison.)

Most graphics professionals probably would not share our enthusiasm for LCDs, though. For example, Tim Holmes, a graphic-design veteran currently with Ogilvy PR, thinks LCDs suffice for Web design and photo editing but not for designing print art, in which the colors on screen must match as closely as possible what will appear on paper. At present, LCDs simply can't display as broad a color spectrum as CRT monitors can, though several vendors predict that better backlight technology will erase this deficit within the next couple of years.

### SIDELONG GLANCES

ANOTHER LONG-STANDING problem of LCDs is their limited angle of view. Unlike CRT monitors' images, which appear nearly the same from any angle, the color, brightness, and contrast of LCDs' images degrade somewhat when you view them from the side. This is a concern for high-end graphics professionals, who can't tolerate images changing even slightly if they move their heads from one side to the other. It can also be annoying for people sitting to the side of an LCD during a group presentation.

For all the models we reviewed, the vendors specified a 170-degree arc—both horizontally and vertically—in which image quality remains acceptable. Using our own measure of the horizontal arc, however, we found notable differences among monitors. (For details, see "The Angle on LCD Monitors" at right.)

### READING FINE PRINT

WHEN COMPARISON SHOPPING, look at warranties in particular. Most vendors in our review provide a three-year warranty on all parts, but Sceptre and WinBook offer just one-year warranties. KDS has a three-year warranty on most parts but covers the backlight for only one year.

Also check the vendor's policy on dead pixels, which are stuck in either the on or off position and appear as tiny, distracting dots. Two or three should not be a ►

## LAB NOTES

# The Angle on LCD Monitors



SENIOR PERFORMANCE ANALYST Jeff Kuta sizes up the angle of view.

### TEST Center

YOU SEE AN LCD'S brightest light and truest colors only when you are positioned directly in front of it. Brightness, and therefore contrast, falls off and colors change as you move to the side (horizontally) or up and down (vertically)—eventually reaching a point where you can no longer discern the image. Low-cost LCDs extend the viewing range by using a diffusion film on the glass to spread the light over a wider angle. More-expensive technologies, such as in-plane switching and multidomain vertical alignment, change the arrangement of liquid crystals to increase viewing angle.

Monitor vendors employ sophisticated equipment to measure angle of view. They do not use identical methods, however, so numbers from assorted companies may not be comparable. To roughly gauge how the LCDs in this review compare to each other, the PC World Test Center devised a simple test with help from Raymond Soneira of DisplayMate Technologies ([www.displaymate.com](http://www.displaymate.com)). You can download DisplayMate's monitor-testing software, select "Gray-scale Linearity Check," and test your monitor yourself.

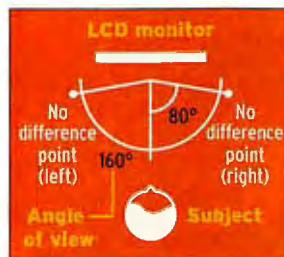
The test takes advantage of a simple fact about LCDs: Bright pixels vary much more with viewing angle than dark pixels do. DisplayMate illustrates this with a screen showing two gray rectangles: a "dithered" one, consisting of alternate fully white and black pixels, and another that is uniformly gray. The difference in brightness is easy to see when you view the monitor head-on. As you move to the side, the difference tapers off until, eventually, the two rectangles appear identical. To calculate the angle of view, we placed each monitor on a turntable and rotated it until the two rectangles reached the "no difference" point.

Because we use this measurement method, our viewing angle numbers are not directly comparable to those that monitor vendors publish.

However, the dissimilarities among products in our measurements (the angles ranged from 108 to 167 degrees) do illustrate how viewing angle varies for the monitors in this review, despite their all having the same vendor-specified horizontal viewing angle of 170 degrees.

HORIZONTAL angle of view measures the full sweep from left to right.

—Sean Captain





problem, unless they are in the center of the screen. But a larger number, or several clumped together, can be irritating. Vendors have varying policies on how many dead pixels constitute a defective panel. Two have very simple philosophies: AG Neovo doesn't tolerate any dead pixels, and Iiyama allows buyers to return a monitor for any reason—period. Others have more-complex guidelines. AOC, for instance, will replace a defective panel with two nonfunctioning pixels less than 10mm apart, with five nonfunctioning pixels on either a white or dark background, or with eight in any location. We found dead pixels on the GEM, Hitachi,

KDS, Sceptre, and WinBook displays, but in each case the number was too small to easily notice, and it was within the vendors' allowed range of defects.

### YOUR EYES HAVE IT

WE RECOMMEND that you try to see the monitor for yourself, before you buy. Checking out models in a store can be helpful, but keep in mind that they are often hooked up to low-quality video signals and placed under different lighting than you likely have in your office or home. If possible, try to find a monitor maker or a retail store with a liberal return policy, so you can try

the LCD in your own setting before committing to the purchase. When it comes to choosing the monitor you will be staring at for the next few years, your eyes will be the ultimate judge. ■

*Roy Santos is a freelance technology writer based in Berkeley, California. Seán Captain is a senior associate editor for PC World. Jeff Kuta, senior performance analyst, designed and oversaw testing. Special thanks to Raymond Soneira, president of DisplayMate Technologies, for help in designing our angle-of-view testing.*

## ENTERTAINMENT

# Games and Movies on LCDs

IF YOU BUILD AN LCD FOR ENTERTAINMENT, will they watch? And will it look any different? To find out, we examined Sony's SDM-V72W Personal Entertainment Display, designed for games and movies, and compared it to Apple's Cinema Display for graphics professionals and to the general-purpose Iiyama Pro Lite 4821DT-BK.

The \$1000, 17-inch SDM-V72W ([find.pcworld.com/31226](http://find.pcworld.com/31226)) boasts a wide 16:9 aspect ratio and 1280 by 768 resolution (most desktop monitors have a 4:3 aspect ratio). To evaluate it, we watched *Star Wars Episode II: Attack of the Clones* and played the game *Return to Castle Wolfenstein*. The monitor displayed reasonably accurate details, even in fast-paced scenes, though we saw some grain-

iness. Its

horizontal viewing

angle was excellent (180 degrees, by our measurement). Our main gripe was the tight vertical viewing angle: Looking at the screen from about 20 degrees below produced horrid colors, so slouching while you watch movies or play games could be a problem.

Iiyama's 4821DT-BK held its own against the Sony monitor; it even offered a better vertical viewing angle. Differences in video performance were barely noticeable, though you don't get the Sony's wide aspect ratio (or its beefy built-in speakers).

For about \$1500 more, Apple's 22-inch Cinema Display ([find.pcworld.com/32840](http://find.pcworld.com/32840)) gives users a huge 16:10 screen. Though this monitor was designed primarily for use with Macs, it was

superior to other LCDs, especially on fast-action sequences, when we attached it to our PC test system. (Apple will not disclose the monitor's rated pixel response time, but it appears to be quite sprightly.) It's a worthy choice as an entertainment display, at least for folks with fat wallets.

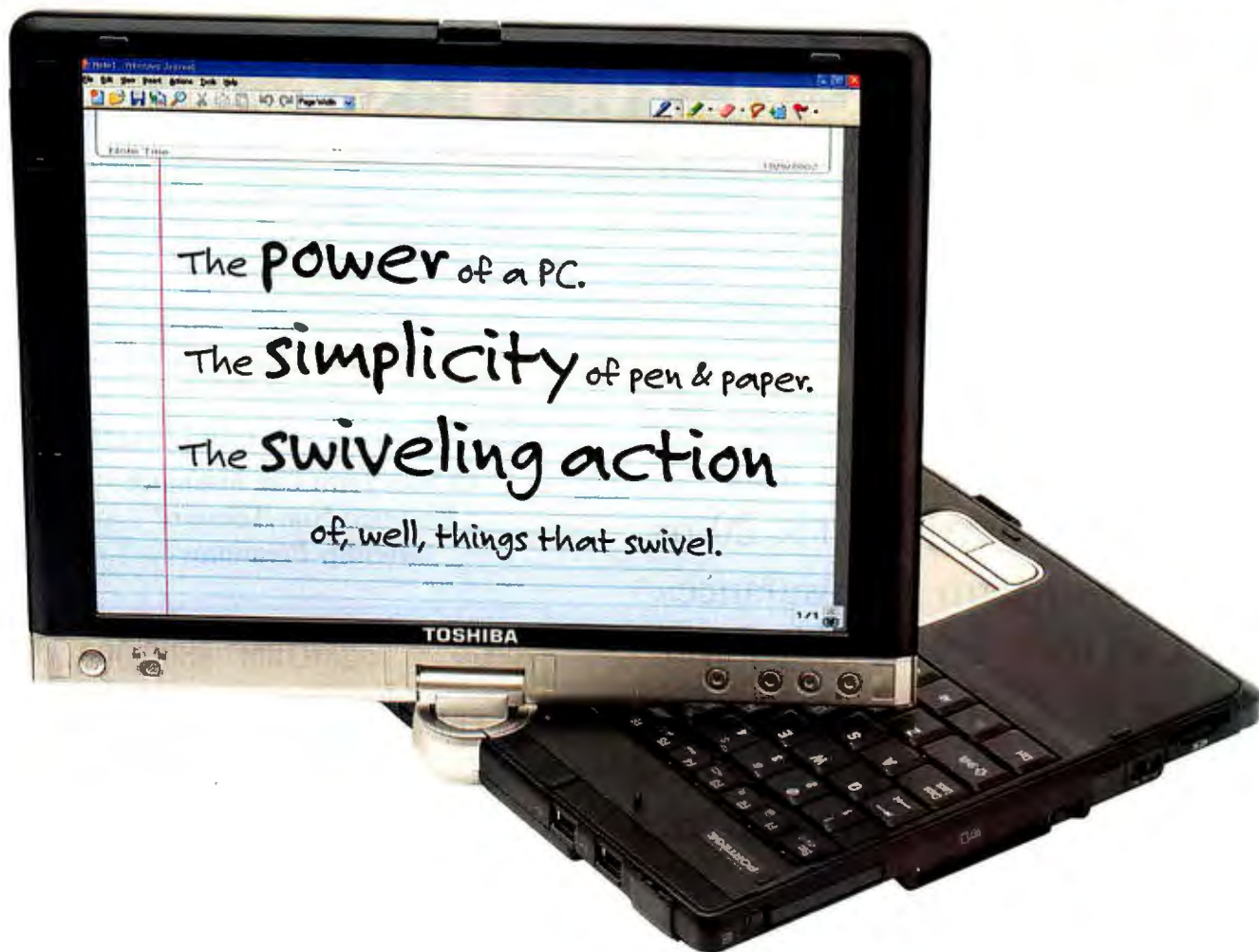
—Roy Santos



SONY'S WIDE-SCREEN LCD sports powerful integrated speakers, offers easy access to key controls, and provides oodles of video and audio inputs.







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\*\* Based on a comparison of rates at certain ages for comparable products from several life insurance companies comprising a 15% term life market share (2000, A.M. Best).



We're outside a shabby storefront in the Flatbush section of Brooklyn, New York. There's no name on the weather-beaten awning. The glass door is covered on the inside with cardboard and bears only a number: 2922. A guy in a leather jacket stands

WEB BUYER BEWARE: OUR UNDERCOVER SHOPPING EXPEDITION REVEALED DOUBTFUL DEALS, PADDED PRICES, AND PUSHY SALESPeOPLE. HERE'S HOW TO AVOID GETTING BURNED.

BY DANIEL TYNAN & TOM SPRING

# Camera Confidential

on the sidewalk talking into a cell phone. We tell him we want to buy a camera. He leaves and goes in the store. Then a stocky fellow wearing a Yankees cap and a blue parka comes out and introduces himself as Jason. "Whatever you need, we got," he says. "Any digital camera you like. What are you looking for?"





We say we want something good but inexpensive. He rings the buzzer. A pair of eyes peers through a peephole cut into the cardboard; the door opens. Jason leads us to a dingy room where another young man sits in front of a computer, eating Reddi Wip straight from the can. "Trying to quit smoking," he explains.

Phones ring constantly. People in the room smoke and talk on their cells. Jason disappears behind a heavy wooden door in the back of the room and returns with two cameras, a Nikon Coolpix 5000 and a Canon PowerShot S45. He says he'll sell us the

shopping online and by phone at Broadway and at six other dealers in the New York area that sell over the Web. Our findings: While prices are tempting, the hassles can be incredible. Most stores gave us an aggressive sales pitch for pricey accessories, charged excessive shipping-and-handling fees, and in some cases took weeks to issue refunds for stuff we returned.

## FOCUS-POCUS

VISIT ANY SHOPPING search engine (such as DealTime, MySimon, PriceGrabber, or PCWorld.com's Product Finder, which is powered by PriceGrabber), type in the name of a camera, and sort the results by price. You'll find dealers offering cameras at hundreds of dollars below retail prices. But when you buy one from the heaviest discounters, you may encounter tactics designed to get you to spend more than you intended—or to walk away with less than you had in mind.

In our investigation, we bought from seven dealers that advertise cameras, printers, and other devices at extremely low prices: 1 Stop Camera & Electronics ([www.1stopcamera.com](http://www.1stopcamera.com)), Bilibi ([www.bilibi.com](http://www.bilibi.com)), Broadway Photo ([www.bwayphoto.com](http://www.bwayphoto.com)), Cambridge Camera ([www.cambridgeworld.com](http://www.cambridgeworld.com)), CCI Camera City ([www.cccameracity.com](http://www.cccameracity.com)), IbuyDigital.com ([www.ibuydigital.com](http://www.ibuydigital.com)), and RegencyCamera.com ([www.regencycamera.com](http://www.regencycamera.com)).

We had two shoppers attempt to purchase a camera at each dealer—one through the dealer's Web site, the other over the phone. One shopper played the part of a naïve consumer who would be easily swayed by a sales pitch; the other was a hard-nosed buyer who insisted on getting a camera and nothing else, at the advertised price. We also visited the physical locations of three stores and talked to the salespeople. At every store, the naïve shopper was persuaded to buy expensive accessories (such as lens filters and memory cards), while in several cases the hard-nosed buyer walked away with nothing but grief.

## CHEAP-BUT AT A COST

THE NEWS WAS NOT ALL BAD. IbuyDigital gave us a deal on a Fujifilm camera without a heavy sales push, and Bilibi took our returns without a fight. But our experience at the other stores was far from positive. At 1 Stop Camera, Broadway Photo, and CCI Camera City, we encountered aggressive sales pitches, steep shipping charges, and difficult returns. CCI made us wait six weeks before refunding \$1075 for one of our purchases, and RegencyCamera abruptly disappeared without issuing a \$900 refund. (At press time, RegencyCamera's phones and Web site were out of service.) At Cambridge Camera, we found an Olympus Camedia C-4040 priced at \$430 (nearly \$300 less than street price) that was out of stock when we tried to order it and was still unavailable more than eight weeks later as we went to press.

Here are the more egregious sales practices that we ran into, although not at every merchant:

**Bait and stuff:** Sure, a dealer will sell you that Nikon Coolpix for hundreds of dollars under list price, provided you let the sales-



Canon for \$525 and the Nikon for \$690 (\$300 below list price).

"This PowerShot is so new it's not even available in the U.S. yet," he says. (As we went to press, the Canon S45 just became available in the United States.) The writing on the box is in Japanese, and the camera manual is a photocopy and stapled together. We tell Jason we're interested, but first we need to get some cash. "Cash is always best," he says.

This is the headquarters of Broadway Photo, which sells millions of dollars' worth of electronics each year. It's one of dozens of online shops—many of which are within a few miles of Broadway's warehouse—that advertise great deals on digital cameras.

Are these deals for real? To find out, we went undercover,



**“What’s wrong with making money? Everybody’s in this business to make money. You have to *do your best to sell* stuff.”** —John Silver, manager, 1 Stop Camera

person stuff your basket with overpriced accessories. (See “Real Deals vs. Raw Deals” on page 122.) And even if you place an order on the Web, the sales reps still get you on the phone, ostensibly either to confirm your purchase or to check your shipping address. If you refuse the extras, the camera you wanted may suddenly be out of stock.

“They suck you in with a really low price, then pile on the accessories,” says a New York camera retailer (not involved in our investigation) who prefers to remain anonymous. “The sales guys work on commission and have a minimum price they have to meet. Half of what they make above that minimum is theirs to keep. So if they don’t screw you, they don’t get paid.”

John Silver, manager of 1 Stop Camera & Electronics, defends his company’s aggressive sales practices as a normal part of doing business. “What’s wrong with making money?” Silver asks. “Everybody’s in this business to make money. You have to do your best to sell stuff.”

Broadway’s site advertised a Minolta Dimage 7i for just \$599—\$400 below list. When our naïve buyer called, he was also sold a steeply priced “starter kit” with a wide-angle lens, filters, an extended warranty, a battery charger case, and an extra memory card. The camera (a U.S. model) and the accessories arrived in three days. Total price: \$1550, including shipping and handling.

When our hard-nosed buyer attempted to buy the same cam-

era at Broadway Photo for \$599 without any accessories, he was told that that price was for an “international” (code word for gray-market) version that was out of stock, and that he’d have to wait from 5 to 14 weeks for it. (See “Anatomy of a Hard Sell” on page 121.) As we went to press, 10 weeks later, we still had not received the camera or been charged for it.

Broadway’s explanation: Our naïve buyer probably was “upgraded to the domestic version” after getting the accessory kit, says company spokesperson Albert Cohen. He says many cameras on Broadway’s site are imports (though we could find no indications of this on the site), and that the company may wait for enough orders for an imported camera before ordering it.

On average, our naïve buyer was sold \$463 of mostly overpriced accessories per transaction. On top of that, some of the vendors we shopped at charged steep shipping-and-handling fees. For example, next-day shipping for a 4-pound camera package costs \$75 at CCI Camera City, \$70 at Bilibi, and \$60 at Ibuy-Digital, versus \$12 at CDW, another online shop.

**Gray-market goods:** One reason these cameras are so cheap is that some are so-called gray-market goods, products that manufacturers intend to be sold cheaply in countries other than the United States where prices are lower due to differences in exchange rates and in what the market will bear. But instead of heading to the destination country, the gray-market goods ►

## GOTCHA WATCH

### Five Sales Tactics to Look Out For

Some electronics dealers will advertise temptingly low prices to lure you into buying. But are the prices for real? Whether you’re shopping for a camera or any other PC-related product, you’d be wise to exercise caution when confronted by any of these practices.

TACTIC	Description	Warning sign	Countermeasure
Bait and stuff	Items—usually overpriced accessories—are piled onto your purchase.	<b>Stripped box:</b> Standard accessories—such as batteries, cables, software, or memory card—are removed and sold at jacked-up prices. <b>Off-brand items:</b> No-name accessories are marked up.	Know what comes with the product. Beware of any accessory you’ve never heard of. Filters should cost between \$40 and \$60. Optional lenses should range from \$130 to \$150.
Gray-market goods	Items that makers intend to sell overseas are rerouted to the United States.	<b>Messy manual:</b> The documentation is a photocopy, written in a foreign tongue, or missing. <b>International model:</b> If a dealer’s site describes a camera as an “international” or “import” model, it’s most likely a gray-market product.	Ask the dealer if the camera comes with a U.S. warranty—most gray-market models do not. Also ask if all connections will work in the United States.
Obligatory sales call	The dealer e-mails or phones you to “confirm” your order, and then tries to persuade you to buy accessories.	<b>Sleazy sales:</b> A salesperson will typically say that the store is having a sale on all camera accessories that day. Guess what? The “markdowns” are probably offered almost every day.	If you’re not comfortable with the sales pitch, hang up and shop with a different store.
Pricey shipping	Some dealers overcharge for shipping, handling, and insurance.	<b>Nonrefundable handling fee:</b> The store charges a percentage of the purchase price instead of a standard rate or weight-based fee for shipping and handling. <b>Hefty insurance:</b> The vendor charges a percentage of the purchase price for insurance. This fee is nonrefundable.	Get a bottom-line price that includes shipping, handling, taxes, and other fees before you buy. Remember: Cameras are expensive but light. Additional insurance is not required; tell the vendor that you want to opt out.
Seals of approval	Dealer tries to look legit by displaying seals from sources like BBB, BizRate.com, and Gomez.	<b>Bogus logos:</b> The seals of approval may be out of date, illegitimate, or based on such loose standards that almost anyone can get them.	Don’t assume the seals are genuine. Click every seal of approval that you find on the dealer’s Web site. Are the links active, and do they lead to a legitimate source?



**"A number of Brooklyn store owners are related....When you go down to the store, you find the same people working there." —Herbert Keppler, Popular Photography**

are rerouted to the United States. Selling gray-market cameras is legal, provided they're identified as such, but buying one is generally not a good idea. You may end up with manuals and on-screen menus in another language, incompatible video ports, or AC adapters set to the incorrect voltage. Worse, most camera manufacturers (including Canon, Nikon, Olympus, and Sony) won't honor a gray-market warranty in the United States. If the product breaks, you're stuck.

We encountered gray-market cameras at a few of the dealers we investigated. Some, like CCI Camera City, marked them on their site as "international" models. Others, like Broadway Photo, apparently did not. However, none of the cameras we purchased and ultimately received were gray-market models.

**Follow-up calls:** Think you can avoid this ugly process by ordering on the Web? Think again. When we attempted to buy cameras online from the seven stores, we usually received e-mail messages or phone calls asking us to "confirm" our order. When we got on the phone with a salesperson, nearly every one gave us a heavy sales pitch to buy accessories. The exceptions were IbuyDigital (which didn't pressure us into buying extras) and Cambridge Camera (where the cameras we shopped for were consistently out of stock). Steven Rablaux, manager of Cambridge Camera, says "products go in stock, they go out of stock. It doesn't mean we don't have it."

Even if you refuse the upsell, you may not be in the clear. Kevin Sowers, an operating engineer for Equity Office (a real estate

investment trust) in California, thought he'd snagged a great deal for his company when he purchased a \$300 Sony Mavica MVC-FD75 from CCI Camera City's Web site. CCI Camera City called back to confirm the order when Sowers was away from his office, and persuaded a coworker to buy an additional battery pack and carrying case—even though those items came standard with the camera—adding a quick \$75 to the bill.

"I called Camera City and said, 'What's the deal here?'" recalls Sowers. "They played stupid and ignored me. Since then I discovered I could buy the same camera at Wal-Mart for \$300 plus tax. Boy, do I feel stupid."

CCI Camera City's spokesperson Ronnie Shy says a salesperson called Sowers because his billing and shipping addresses were different. Shy also admits that reps often use the follow-up call as an opportunity to sell more accessories. "It's just salesmanship," he says. "I don't see any problem with it."

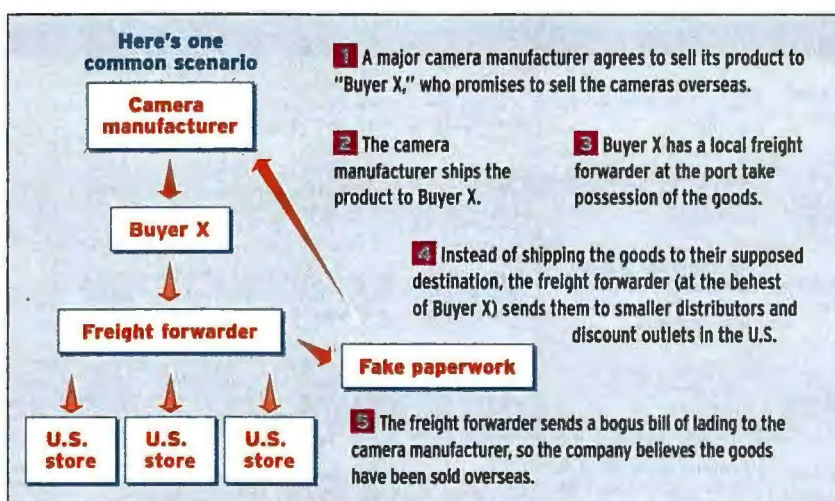
If you have problems with your purchase, you may find returning it can be even harder. Our camera-return experiences were a mixed bag. At 1 Stop Camera and Bilibi, we were bounced from one person to another, stranded on hold, or never connected to anyone who could authorize our returns. Broadway Photo and CCI Camera City tried very hard to keep us from returning the products. Even after we repeatedly said we wanted to return the stuff, CCI bargained with us for 20 minutes, offering to toss in free accessories, to swap the camera for a better one at the same price, and to slash the \$1353 total price by as much as \$365.

## FOLLOWING THE TRAIL

### How Gray-Market Goods End Up in U.S. Stores

GRAY-MARKET GOODS—commonly cigarettes, pharmaceuticals, and electronics such as computers and digital cameras—are items that are meant to be sold somewhere other than the United States but find their way to U.S. store shelves. They get there in various ways, but most often through diverted shipments.

Selling such goods isn't illegal, if the seller discloses that the products are gray. To learn more about how the gray market works, we interviewed Michael Kessler, a private investigator in New York who has run sting operations for several Fortune 500 companies to catch gray-market and counterfeit dealers.





## THE SEARCHERS

MANY SHOPPERS FIND camera dealers through online pricing engines. In our tests, the Brooklyn-based dealers almost always had the lowest prices on the cameras we wanted. But how can you be certain that vendors are reputable? Search services investigate consumers' complaints, and in some cases evict sellers.

"We've removed merchants we felt were not suitable," says Kamran Pourzanjani, PriceGrabber's president. Some were removed for poor service and late shipments, but "we really focus on cases where the stores have been less than scrupulous, such as those that use bait-and-switch tactics."

PriceGrabber's site indicates that the company has removed 18 of the 615 merchants it has ever listed. All but one of those eliminated were New York-based electronics dealers, including 1 Stop Camera, Cameratopia, Pricelt4less (which operates from the same address as Bilibi), and RegencyCamera.

DealTime has removed merchants for violating its guidelines, says David Epstein, senior vice president. And CNet's MySimon has evicted stores as a result of shoppers' complaints, says senior VP Kevin McKenzie; he says most came from "a big community of merchants in the Brooklyn area that sell digital cameras."

Nearly all shopping engines provide merchant ratings from shoppers, but such ratings may not be gospel. When we bought from IbuyDigital on two separate occasions, the company's sales reps offered us a free shipping upgrade, from standard to overnight, if we gave the shop a five-star rating. The reps, however, did not provide details on where we had to post our glowing remarks. Despite our not posting any rating, one of our packages was still delivered overnight and the other a few days later.

IbuyDigital salesperson Randy Marks says "we're just asking customers, if everything is satisfactory, to remember us when they go online. It doesn't mean you have to do it, or that we're not going to upgrade your shipping if you don't."

DealTime and PriceGrabber analyze submissions to their sites to prevent stores from posting their own positive reviews. But even these precautions are easily circumvented. For example, if a merchant's rating gets too low—or if it's removed from a site—the owners can start up another store under a different name.

"A number of these Brooklyn store owners are related to each other," says Herbert Keppler, longtime publishing director of *Popular Photography* in New York. Keppler says his magazine tries to mediate complaints about dealers advertising in its pages, and has removed some dealers that would not abide by its code of ethics. But family connections make the stores nearly impossible to shut out for long. "Say we kick out a dealer," says Keppler. "The store reorganizes, changes its name, and puts a relative or unknown business associate in as president. How are you going to trace that? Even the bank can't trace it. When you go down to the store, you find the same people working there."

Our research turned up many connections among some of the New York camera dealers. For instance, IbuyDigital, DBuys, ►

## ON THE PHONE

### Anatomy of a Hard Sell

I CALLED BROADWAY PHOTO about the Minolta Dimage 71 camera because the site advertised a great deal. The posted price was \$599—hundreds less than the price at better-known Web sites. But instead of getting a bargain, I got sworn at—and no camera. Here's a summary of my 30-minute call:

The salesperson, who told me his name was Bahout, said the Dimage was in stock and would come with a 16MB memory card, USB and video cables, a manual, and a one-year U.S. war-

ranty. He said that the camera would ship the next day, and I'd get it in about a week.

I asked about accessories. Bahout started trying to sell me extras: a rechargeable battery and charger, filters, memory cards,

a card reader, and a case. Then the trouble began.

**Tom Spring:** That all sounds great, but all I want is the camera.

**Bahout:** Are you trying to pull some kind of bull\*\*\*\* with me? You led me to believe that you were going to purchase all these accessories, and now you are pulling this bull\*\*\*\* on me?

**TS:** Huh?

**Bahout:** I was kind enough to throw all of those extras in there because you were buying the U.S. version. For [\$599] you will only get the international model.

**TS:** What extras are you talking about?

Bahout explains he was giving me the 16MB card, USB and video cables, instruction manual, and one-year U.S. warranty for free only because he thought I was going to buy a bunch of other accessories. (According to Minolta's site, all the items Bahout described as gifts come standard with the Dimage 71.)

Bahout tells me that unless I spend \$270 on accessories, I'll receive an imported model of the Dimage.

**Bahout:** You are not going to be able to use it.

**TS:** I must be able to use the international version.

**Bahout:** Yes. But you still need cables and software and batteries. [Annoyed] Why are you tricking me? You led me to believe one thing and now you're switching.

I tell Bahout I want to pay no more than \$599 for the camera, even if that means getting an imported version. He takes my billing information, but when I ask how I can track the shipment, Bahout scoffs. It could take up to three and a half months for my camera to arrive, he says.

As I write this, ten weeks later, I still haven't received the camera—but Broadway hasn't charged me.

—T.S.





# ACCESSORIES COMPARISON

## Real Deals or Raw Deals?

ADVERTISED PRICES for accessories, such as filters, lenses, and memory cards, tended to be higher at the seven stores we evaluated than at mainstream retailers like Wolf Camera. Here are the prices from the vendors' Web sites:

PRODUCT	Average price from the dealers <sup>1</sup>	Wolf Camera's price <sup>1</sup>
Crystal Optics 28mm 3-Piece Filter Kit	\$166	\$40
2X Telephoto Converter Lens	\$228 <sup>2</sup>	\$150 <sup>2</sup>
128MB CompactFlash Memory Card	\$153	\$90

<sup>1</sup> As of 12/16/02. <sup>2</sup> All but one store sold a Crystal Vision Titanium High Resolution 2X Telephoto Lens, comparable to a Nikon TC-E2 Telephoto Converter sold at Wolf.

and CentralDigital all list the same address and the same fax number on their Web sites. PriceIt4Less's site says its gift certificates can be redeemed at Bilibi; CCI Camera City and Royal Camera's sites list the same address. And 1 Stop Camera and DigitalNetShop's sites list the same fax numbers.

Even the authorities seem frustrated. For example, the New York Department of Consumer Affairs has received more than 100 complaints about Cambridge Camera, most of them citing failure to deliver goods or to refund money in a timely fashion, says Assistant General Counsel Nancy Brown. But Cambridge, which has been in business for decades, has resolved every grievance that has been reported to the DCA, says Brown.

As we went to press, the DCA said it was preparing a notice of hearing that, if filed, would accuse Cambridge and AAA Camera (another New York dealer) of being "problem vendors." The DCA "is looking at revoking their licenses [to sell electronics at retail]," says spokesperson Dina Improtta. Cambridge Camera's Rablaux declined to comment on the DCA's charges.

Lisa Polk, an accountant for PC maker Custom Fit in Virginia, has her own grievances against AAA. In September 2001, Polk says, Custom Fit paid AAA nearly \$10,000 for nine Nikon Coolpix cameras, three other cameras, and flash attachments.

Two months later, only seven Coolpix cameras arrived at Custom Fit, she says. Polk was surprised to discover that the manuals and boxes were written in Japanese. Because they were gray-market models, Nikon would neither honor the \$100 manufacturer's rebate for each camera nor provide any support.

"I got livid and called AAA to complain, but its reps wouldn't do anything to make it right," Polk says. Around six months later the other two Nikons arrived, she says, but Custom Fit was still out nearly \$4000 for the unclaimable rebates, as well as for the other cameras and flash accessories, which had yet to arrive.

So Polk contacted the Better Business Bureau, the Federal Trade Commission, the U.S. Postal Inspector's Office, and the New York State Attorney General's office. In April 2002, AAA Camera refunded \$2678. But Polk says AAA still owes \$943.

Polk estimates she's called AAA over a hundred times in the past two years, without success. "We'll probably never get the rest of our money back from these people," she says.

AAA store manager Larry Watson says Custom Fit ordered nine gray-market Coolpix cameras. But AAA didn't have gray-market models in stock at the time, so the company sent U.S. models. He says the amount Custom Fit claims AAA owes them is the difference between the gray market and U.S. models.

The New York State Attorney General's office has received complaints about the dealers we investigated—except for Bilibi and IbuyDigital—but has forwarded most of them to the DCA, which has jurisdiction to follow up, says spokesperson Brad Maione. The DCA has no authority over stores that sell strictly via the Web or mail order; the U.S. Postal Inspector's office has that authority but declines to comment on its investigations.

Like the shopping engines, local licensing authorities have difficulty determining who really controls each store, or whether different stores are connected—which makes enforcement more difficult, the DCA's Brown says. "You really can run a business in America and hide under someone else's name."

## BIG APPLE BLUES

CONSUMERS AREN'T THE only ones hurt by aggressive sales tactics. Other vendors can get undercut by seemingly low prices or tarred with guilt by geographical association. For example, Adorama and B&H Photo, also located in New York City, receive rave reviews from consumers but feel the pinch.

"We get calls from customers, [saying] 'How come you're selling this for such a price when I get it so much cheaper over there?'" says Henry Posner, director of sales and training for B&H Photo. "But those prices aren't real."

Posner emphasizes that consumers need to look at more than just the price. Always ask the seller if the camera comes with a U.S. warranty. Know what you're buying and what it comes with. Check the included accessories at the manufacturer's Web site, or call the maker's product information line.

A dealer "may strip the box of included items, such as a memory card, battery, and cables, and sell them separately," says Olympus spokesperson Sally Smith Clemens. "Nothing is more important than becoming an educated shopper before you buy, so you can be sure you're really getting what you paid for."

Web shopper Sowers agrees. "You need to make sure you know exactly what you're getting before you buy it," he says. "And if anybody calls you back to sell you extras, just say no." ■

*Daniel Tynan is a contributing editor and Tom Spring is a senior reporter for PC World. Senior Associate Editor Grace Aquino also contributed to this story.*



# hw=wh

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Lab-tested rankings of the best in PCs,  
peripherals, and upgrade components

# TOP 100

EDITED BY THE REVIEWS STAFF

## INSIDE

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### Top 10 Printers

Minolta-QMS's PagePro 1250W wins the small-office Best Buy spot on our monochrome laser printers chart. It produces dark, easily legible text, though some of its gray-scale images lacked detail.

## New Intel CPU Promises More Power

### TEST Center

**Two systems using** Intel's new 3.06-GHz Pentium 4 processor—a Dell Dimension 8250 and a Gateway 700XL—make their way onto the *Top 15 Desktop PCs* chart this month. With the CPU comes Intel's hyperthreading technology, which the company says can significantly boost a system's performance under specific circumstances. However, neither the Dell nor the Gateway performed substantially faster than previous versions that used slower chips.

The *Top 100* hosts a new entrant this month—*Top 10 Rewritable DVD Drives*, which debuts in place of our usual *Top 10 CD-RW Drives* chart.

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

PHOTOGRAPHS: MARC SIMON



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**Top 10 PDAs**

Palm scores the Best Buy on both the basic and advanced sections of the chart this month. The \$99 Zire (left) suits modest needs, while the \$499 Tungsten T is for power users.



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**Top 10 Rewritable DVD Drives**

The Pioneer DVR-A05 lands in the second spot, earning a Best Buy. It's the first model we've tested using new 4X DVD-R and 2X DVD-RW discs, and it's the fastest drive on the chart.

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**Top 15 Desktop PCs**

Gateway's 700XL (left) and Dell's Dimension 8250 both use a 3.06-GHz Pentium 4 processor, but only the Dell wins a Best Buy.

**YOUR GUIDE TO THE TOP 100**

EACH MONTH WE TEST a large number of PCs, printers, monitors, and other products. Only the best products land on the charts, which are refreshed monthly.

System configurations are shown as tested. The overall rating for each product is calculated on a 100-point scale and reflects results from our hands-on evaluations

and performance tests. A 90-point score is exceptional, while one in the 70s is above average.

The PC WorldBench 4 score is a measure of how fast a PC can run a mix of common business applications as compared with our baseline machine, a Gateway Select 1200 with a 1.2-GHz Athlon processor, 128MB of PC133

SDRAM, and a 20GB hard drive. For example, a PC that scores 120 is 20 percent faster than the baseline system. The policies score is based on vendor support policies (not shown on charts). Please see [find.pcworld.com/15720](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 (11/15/02)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best BUY</b> Dell Dimension 8250 find.pcworld.com/32546	NEW	89	Very expensive \$3158	Windows XP Home	Good 123	Replaces last month's Best Buy, but faster CPU boosts overall speed only minimally; 18-inch LCD shows gorgeous images. (★★★★☆)
2	Polywell Poly 875VF-2800 find.pcworld.com/31970		85	Expensive \$2795	Windows XP Home	Outstanding 130	Pricey unit delivers exceptional speed and, with dual 120GB hard drives, massive storage; however, its LCD is unimpressive. (★★★★☆ Jan 03)
3	ABS Awesome 3330 find.pcworld.com/32549	NEW	85	Inexpensive \$2039	Windows XP Home	Good 124	Quick system performed especially well in our gaming graphics tests; includes two hard drives in a RAID array. (★★★★☆)
4	Sys Technology Performance 2800 find.pcworld.com/30758		83	Average \$2565	Windows XP Professional	Outstanding 129	Second-fastest PC on the chart has a CompactFlash and SmartMedia card reader and a sharp-looking LCD monitor. (★★★★☆ Nov 02)
5	IBM NetVista A30p find.pcworld.com/31262		82	Inexpensive \$2159	Windows XP Professional	Fair 119	System offers a high-quality CRT monitor. Cramped interior has limited room for expansion. Price plummets by \$554. (★★★★☆ Dec 02)
6	Gateway 700XL find.pcworld.com/32552	NEW	82	Very expensive \$3499	Windows XP Home	Fair 119	High-priced, nearly over-the-top configuration includes a huge LCD, two 200GB hard disks, and a cordless keyboard and mouse. (★★★★☆)
7	Gateway 500X find.pcworld.com/30770		82	Inexpensive \$2089	Windows XP Home	Fair 117	Fine speed and good mix of components make this a cheap video editing model, but the LCD monitor displayed smudgy text. (★★★★☆ Nov 02)
Percent of overall rating ▶			90 percent	75 percent			
VALUE SYSTEM			Overall rating	Street price (11/15/02)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best BUY</b> ABS Bravado 2240 find.pcworld.com/32555	NEW	85	Inexpensive \$1109	Windows XP Home	Very good 121	The successor to last month's Best Buy ABS, this model has a high-end graphics card; its monitor's text quality was lacking. (★★★★☆)
2	Dell Dimension 4550 find.pcworld.com/32558	NEW	81	Average \$1479	Windows XP Home	Good 116	Model has a solid balance of overall performance, price, and features, yet it delivered lackluster results on our graphics tests. (★★★★☆)
3	Compaq Presario 6000 find.pcworld.com/31322		80	Inexpensive \$1152	Windows XP Home	Good 106	A low price and software such as Pinnacle Studio 7 (for video editing) make this PC a good deal. (★★★★☆ Dec 02)
4	Micro Express MicroFlex 28A find.pcworld.com/32561	NEW	79	Average \$1399	Windows XP Professional	Outstanding 129	Top-notch performer at a relatively low price. Its bundled graphics drivers produced poor results on our gaming tests. (★★★★☆)
5	Gateway 500X find.pcworld.com/32564	NEW	78	Average \$1619	Windows XP Home	Fair 104	A great deal for a system with a high-quality 18-inch LCD monitor. The computer's performance was mediocre, however. (★★★★☆)
6	NuTrend Centra 2 find.pcworld.com/30749		78	Inexpensive \$1145	Windows XP Home	Good 117	Low-cost machine wrings impressive performance from a 2.26-GHz Pentium 4 processor and a 64MB graphics card. (★★★★☆ Nov 02)
7	Polywell Poly 884RF-2600 find.pcworld.com/31982		78	Average \$1599	Windows XP Professional	Very good 124	Strong performer with an adequate 15-inch LCD monitor; the system's interior could be easier to navigate. (★★★★☆ Jan 03)
8	Sys Technology Performance 2000+ find.pcworld.com/31280		78	Inexpensive \$1257	Windows XP Home	Good 119	Fast, basic system offers plenty of room for upgrades. Monitor and sound quality are unimpressive. (★★★★☆ Dec 02)
Percent of overall rating ▶			80 percent	60 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 125.

<sup>2</sup>Total capacity in gigabytes (may represent multiple drives).

A NEW PC TOPS THE POWER SIDE of the chart this month, and if it looks familiar, it should: Our current Best Buy is from the same Dell Dimension 8250 line as last month's top pick, this time with a faster processor inside. Souped-up and pricey—over \$3100—it comes with an impressive mix of high-end components, including

a 200GB hard drive, an 18-inch LCD, a 4X DVD+RW/+R drive, and a 128MB ATI Radeon 9700 Pro graphics card.

The upgraded Dimension 8250 is one of two systems on the chart using Intel's latest CPU, the 3.06-GHz Pentium 4. If you're looking for a significant boost in



Visit [find.pcworld.com/32117](http://find.pcworld.com/32117) 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				
	3.06-GHz Pentium 4	512/ PCI066 RDRAM	200	18-inch LCD	128MB ATI Radeon 9700 Pro	Midsize tower	Very good: 16X DVD-ROM drive, DVD+RW/+R drive, V.92 modem, network adapter, Microsoft Office XP Small Business Edition	Very good	Very good	Good/ Fair
	2.8-GHz Pentium 4	512/ DDR400 SDRAM	240	18-inch LCD	128MB Gainward GF4 TI 4600	Midsize tower	Good: DVD-RW/+R drive, V.90 modem, network adapter	Outstanding	Good	+/
	2.25-GHz Athlon XP 2800+	1024/ DDR400 SDRAM	160	19-inch CRT	128MB ATI Radeon 9700	Tower	Fair: 16X DVD-ROM drive, 48X/24X/48X CD-RW drive, V.92 modem, network adapter	Outstanding	Good	Fair/ Good
	2.8-GHz Pentium 4	512/ PCI066 RDRAM	80	18-inch LCD	64MB Leadtek WinFast A170 DDR T	Midsize tower	Very good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, memory card reader, Corel WordPerfect Office 2002	Good	Good	+/
	2.8-GHz Pentium 4	512/ DDR266 SDRAM	120	17-inch CRT	128MB GeForce4 TI 4200	Midsize tower	Good: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, V.90 modem, network adapter, Microsoft Works Suite 2003, Lotus SmartSuite Millennium	Very good	Fair	Good/ Fair
	3.06-GHz Pentium 4	512/ PCI066 RDRAM	400	19-inch LCD	128MB ATI Radeon 9700	Tower	Outstanding: DVD-RAM/-R drive, 48X/24X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Office XP Small Business Edition, Pinnacle Express	Outstanding	Very good	Fair/ Fair
	2.53-GHz Pentium 4	512/ DDR266 SDRAM	120	17-inch LCD	128MB GeForce4 TI 4200	Midsize tower	Very good: DVD-RAM/-R drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Works Suite 2003, Pinnacle Studio 7, Quicken 2002	Very good	Good	Fair/ Fair
	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				
	2-GHz Athlon XP 2400+	512/ DDR400 SDRAM	60	17-inch CRT	128MB GeForce4 TI 4200	Midsize tower	Good: 16X DVD-ROM drive, 48X/12X/48X CD-RW drive, V.92 modem, network adapter	Very good	Fair	Fair/ Good
	2.67-GHz Pentium 4	256/ DDR333 SDRAM	60	19-inch CRT	64MB GeForce4 MX 420	Midsize tower	Good: 16X DVD-ROM drive, 48X/24X/48X CD-RW drive, V.90 modem, network adapter	Fair	Very good	Good/ Fair
	1.8-GHz Athlon XP 2200+	256/ DDR266 SDRAM	80	17-inch CRT	64MB MSI G4MX420-T	Minitower	Very good: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Works 6, Pinnacle Studio 7	Fair	Good	Fair/ Poor
	2.8-GHz Pentium 4	512/ PCI066 RDRAM	120	17-inch CRT	64MB Gainward GeForce4 TI 4200	Midsize tower	Good: 16X DVD-ROM drive, 32X/12X/48X CD-RW drive, V.90 modem, network adapter	Poor	Good	+/
	2.4-GHz Pentium 4	512/ DDR266 SDRAM	80	18-inch LCD	128MB GeForce4 MX440G	Midsize tower	Very good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Works Suite 2003	Fair	Good	Fair/ Fair
	2.26-GHz Pentium 4	256/ PCI066 RDRAM	80	17-inch CRT	64MB Leadtek WinFast A170 DDR T	Midsize tower	Fair: 16X DVD-ROM drive, V.92 modem, network adapter, omnidirectional microphone, Corel WordPerfect Office 2002	Fair	Very good	+/
	2.13-GHz Athlon XP 2600+	512/ DDR400 SDRAM	82	15-inch LCD	64MB Leadtek WinFast A250	Midsize tower	Good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter	Very good	Good	+/
	1.67-GHz Athlon XP 2000+	256/ DDR333 SDRAM	60	19-inch CRT	64MB Leadtek WinFast A170 DDR T	Midsize tower	Good: 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Corel WordPerfect Office 2002	Fair	Good	+/
	10 percent						10 percent	10 percent	5 percent	25 percent

<sup>1</sup> Vertical cases are towers (over 20 inches), midsized towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches).

<sup>2</sup> Insufficient data to give a rating.

processing speed, however, you may be disappointed. This new Dimension's performance isn't appreciably faster than that of its 2.8-GHz predecessor: On our PC WorldBench 4 tests, this 8250 scored 123, improving upon the 2.8-GHz version by a scant 2 points. That minor advance is

in line with what we've seen on PCs that use the 3.06-GHz CPU (see "Two CPUs in One?" at [find.pcworld.com/32756](http://find.pcworld.com/32756)).

The other 3.06-GHz system this month, Gateway's 700XL (in sixth place), logged a 119 on PC WorldBench 4—just 2 points better than its 2.53-GHz sibling, the ►



**HIGH-END GRAPHICS:** The video card of the ABS Bravado 2240 yields great graphics.



## TOP 5 PCs UNDER \$900

	SYSTEM		Overall rating	Street price (11/15/02)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best BUY</b> ABS Sensation 1300 find.pcworld.com/32651	NEW	82	Average \$899	Windows XP Home	Outstanding 120	The top performer in this category, this model is one of three PCs on the chart that don't use integrated graphics. (★★★★☆)
2	Compaq Evo D310 Microtower find.pcworld.com/32654	NEW	75	Average \$874	Windows XP Professional	Good 108	A stylish chassis with matching 15-inch CRT and a relatively large hard drive distinguish this trim business system. (★★★★☆)
3	FreewayTech Innovation A7000 find.pcworld.com/32657	NEW	74	Inexpensive \$769	Windows XP Home	Very good 115	Attractively designed PC with a great price for its speed and features; the case has plenty of expansion room. (★★★★☆)
4	Gateway 300X find.pcworld.com/32660		74	Average \$859	Windows XP Home	Fair 94	Overall performance was mediocre, and integrated sound was lackluster. (★★★☆☆ Dec 02)
5	Dell Dimension 2350 find.pcworld.com/32663	NEW	73	Average \$879	Windows XP Home	Good 104	Compact case limits upgrade options, but the system has six USB 2.0 ports for adding external peripherals. (★★★★☆)
Percent of overall rating ▶				15 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 125.

<sup>2</sup> Total capacity in gigabytes (may represent multiple drives).

500X, which ranks seventh. The \$3499 700XL we looked at shipped with a 19-inch LCD and a whopping 400GB of storage.

### UNDER-\$900 PCs

THIS MONTH, *Top 5 PCs Under \$900* is our rotating specialty-desktops chart. In past issues we evaluated entertainment PCs and corporate PCs; you can find recaps of these charts on the next page.

The concept of buying a PC for under \$900 is alluring—especially if you're on a tight budget or looking for a simple sec-

ond PC. So what can you expect from a system that costs eight bills and change, as most of the ones we tested do? Plenty of processing horsepower and storage for basic computing tasks (such as e-mail, word processing, or spreadsheet number crunching), but generally anemic graphics; action gamers should look elsewhere.

A typical system on our budget chart includes a 17-inch CRT monitor, integrated graphics, two optical drives, and low-end, 2.1-channel speakers—sufficient for minimal audio needs, like playing MP3s.

We awarded the Best Buy in this category to the ABS Sensation 1300, an \$899 system with a winning combination of performance and components. Equipped with a 1.8-GHz Athlon XP 2200+ CPU, this model outperformed all others on the chart (and a few power models on our regular chart) with a remarkable PC WorldBench 4 score of 120. It was one of two systems—the FreewayTech Innovation A7000 being the other—to include both DVD-ROM and CD-RW drives, and it has an ample 60GB hard drive.

### COST CONCESSIONS

YOU EXPECT TO make some compromises if you buy an under-\$900 system. But the trick is in deciding where those compromises will be—performance, storage, display, expansion options, or all of the above if the price goes low enough. For instance, the \$400 Microtel Sysmar151 we tested, available only from Wal-Mart's Web site, turned in snail-like performance in our benchmark tests and had a paltry 10GB of storage and only a CD-ROM drive; still, if you spend 90 percent of your PC time on the Internet and managing e-mail, it's perfectly adequate.

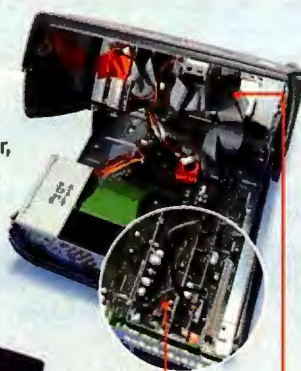
One of the most obvious ways PC vendors trim costs is by using slower processors, which in turn typically deliver slower performance. As a group, our cheap PCs had less-impressive overall performance than those on our power and value

## A Tale of Two Chassis

CASE DESIGN is one area where vendors shave costs on low-priced systems, which frequently are smaller, have a more difficult-to-access chassis, and contain less-powerful components (which means that you're more likely to want to upgrade later). Two PCI slots may be plenty in a loaded system like the Dell Dimension 8250, but not in a budget PC like the Dimension 2350.

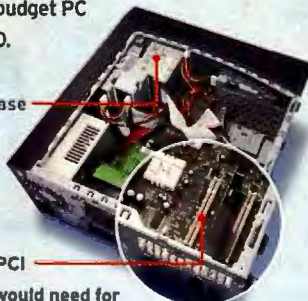
The 2350's minitower case has fewer USB ports, no FireWire ports, and no room to add drives.

The 2350 has only two PCI slots—one of which you would need for upgrading graphics, since it also lacks an AGP slot.



The larger, easy-open 8250 case has two free PCI slots, and comes with great AGP graphics.

You can add four drives; plus, the case has eight USB 2.0 ports and one FireWire port.





Visit [find.pcworld.com/32648](http://find.pcworld.com/32648) 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 (GB) <sup>1</sup>	Monitor	Graphics	Case type <sup>2</sup>				
1.8-GHz Athlon XP 2200+	256/DDR400 SDRAM	60	17	64MB GeForce4 MX 440	Midsized tower	<b>Outstanding:</b> 16X DVD-ROM drive, 48X/12X/48X CD-RW drive, V.92 modem, network adapter, Corel WordPerfect Office 2002	Fair	Good	Fair/Good
2.4-GHz Pentium 4	256/DDR266 SDRAM	40	15	64MB GeForce2 MX 400	Minitower	<b>Very good:</b> 48X/12X/48X CD-RW drive, network adapter, Corel WordPerfect Office 2002	Poor	Very good	Fair/Poor
1.67-GHz Athlon XP 2000+	512/SDRAM	40	17	64MB ATI Radeon 7000	Minitower	<b>Very good:</b> 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter	Poor	Good	+/+
1.8-GHz Pentium 4	256/DDR266 SDRAM	60	17	Integrated Intel 845G using main memory	Midsized tower	<b>Very good:</b> 48X/24X/48X CD-RW drive, V.92 modem, network adapter, Microsoft Works Suite 2003	Poor	Good	Fair/Fair
2A-GHz Pentium 4	256/DDR266 SDRAM	30	17	Integrated Intel 845G using main memory	Minitower	<b>Very good:</b> 24X-48X CD-ROM drive, 40X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Office XP SBE	Poor	Good	Good/Fair
10 percent						10 percent	10 percent	10 percent	25 percent

<sup>1</sup> Vertical cases are towers (over 20 inches), midsized towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches).

<sup>2</sup> Insufficient data to give a rating.

## TOP 5 CORPORATE PCs

[find.pcworld.com/32114](http://find.pcworld.com/32114)

**1 Best BUY** Compaq Evo D510 Convertible Minitower  
[find.pcworld.com/32009](http://find.pcworld.com/32009)

**2** Dell OptiPlex GX260  
[find.pcworld.com/30191](http://find.pcworld.com/30191)

**3** Gateway E-6000  
[find.pcworld.com/32012](http://find.pcworld.com/32012)

**4** IBM NetVista M42  
[find.pcworld.com/32015](http://find.pcworld.com/32015)

**5** MicronPC ClientPro 325  
[find.pcworld.com/32018](http://find.pcworld.com/32018)

From the January 2003 Issue

desktop PC charts—though, with most scoring over 100 on our PC WorldBench 4 test, their speed is still more than satisfactory for most computing applications.

For cheap PCs, all vendors shave costs in graphics. Half of the systems we considered for this chart use graphics chip sets integrated onto the motherboard—typically Intel's 845G chips with its Extreme Graphic technology. Unlike AGP graphics boards, Intel's graphics chips use some of your PC's main memory, saving the expense of faster, pricier dedicated graphics RAM. That's fine for common graphics-oriented activities, such as photo editing, Web surfing, or playing DVD movies on your PC, but it's insufficient for higher-end gaming. Only the ABS Sensation 1300, which had a dedi-

cated graphics card, survived our gaming tests (Unreal Tournament 2003 and Return to Castle Wolfenstein) intact, earning an overall gaming score of Fair.

The FreewayTech and the Compaq Evo D310 Microtower, along with all of the systems using integrated graphics, struggled through both games, turning in excruciatingly slow frame rates—essentially making the games unplayable—and earning a score of Poor. On the Microtel Sysmar151, Return to Castle Wolfenstein was reduced to the speed of a slide show.

Some, but not all, budget systems with integrated graphics also have an open AGP slot, permitting you to upgrade to a faster graphics card; exceptions in the group we tested included the Dell Dimension 2350 and the Gateway 300X.

Processors and graphics aren't the only components that vendors will skip on to achieve low prices. For example, only two systems—the ABS and the Gateway—came with even a 60GB hard drive; by contrast, five of the seven value systems on our standard chart ship with 80GB or larger hard drives. And two systems—the Compaq and the Microtel—came bundled with 15-inch monitors (though it's worth noting that the Sys Technology TaskMaster 1800+, which just missed the chart, had a 19-inch CRT).

You might also feel (or hear) the pinch of an under-\$900 PC in sound quality. The systems that included speakers had

only 2.1-channel speaker sets. Other contenders, such as the Compaq and the Gateway, relied on the monitor's built-in speakers; but those can't handle bass notes and aren't suitable for much beyond a voice chat or listening to streaming newscasts from the Web.

Expansion options are another common limitation of budget PCs. Vendors often use case designs with fewer drive bays for adding extra hard drives or removable-media drives, and fewer slots for adding PCI cards or memory. (See *Tech Trend* on the previous page for more.)

The bottom line about rock-bottom systems: While many of these PCs will do fine for general tasks, don't leap without looking. It might pay to buy a beefier PC up front, rather than upgrade later. ►

## TOP 5 ENTERTAINMENT PCs

[find.pcworld.com/31025](http://find.pcworld.com/31025)

**1 Best BUY** Gateway 700XL  
[find.pcworld.com/30746](http://find.pcworld.com/30746)

**2 Best BUY** Xi Computer 4286 MTower  
[find.pcworld.com/30779](http://find.pcworld.com/30779)

**3** Alienware Aurora DDR  
[find.pcworld.com/30278](http://find.pcworld.com/30278)

**4** Falcon Northwest Mach V  
[find.pcworld.com/30764](http://find.pcworld.com/30764)

**5** Voodoo Computers Egid Obsidian Black  
[find.pcworld.com/30776](http://find.pcworld.com/30776)

From the November 2002 Issue



## TOP 15 NOTEBOOK PCs

POWER NOTEBOOK		Overall rating	Street price (11/15/02)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best BUY</b> IBM ThinkPad T30 find.pcworld.com/29898	87	Average \$2499	Windows XP Professional	Good 95	Two-spindle machine has dual pointing devices and integrates Bluetooth and Wi-Fi (802.11b) networking. Price drops \$450. (★★★★☆ Sept 02)
2	Gateway 600XL find.pcworld.com/31847	86	Average \$2419	Windows XP Home	Very good 103	Huge desktop replacement features a jumbo screen and keyboard. It can hold two optical drives, three batteries, or three hard drives. (★★★★☆ Jan 03)
3	Dell Inspiron 8200 find.pcworld.com/31832	86	Average \$2259	Windows XP Home	Good 95	Desktop replacement unit has FireWire (IEEE 1394) port and a high-resolution screen; could have better audio-shortcut button design. (★★★★☆ Jan 03)
4	Compaq Evo N610c find.pcworld.com/32228	85	Inexpensive \$2149	Windows XP Professional	Very good 101	Funky silver Wi-Fi (802.11b) module and dual pointing devices enhance this square black laptop. (★★★★☆)
5	MicronPC TransPort GX3 find.pcworld.com/29897	84	Inexpensive \$2200	Windows XP Professional	Good 94	A fingerprint reader and a keyboard with loud but impressively deep-traveling keys highlight this stylish blue-and-silver laptop. (★★★★☆ Sept 02)
6	Compaq Evo N410c find.pcworld.com/32249	84	Average \$2385 *	Windows XP Professional	Very good 101	Ultraportable fits the standard connections into a 3.8-pound package. A USB 1.1 port on the back of the screen connects wireless modules. (★★★★☆)
7	Toshiba Satellite Pro 6100 find.pcworld.com/31829	84	Average \$2499	Windows XP Professional	Very good 100	All-black box has built-in wireless and a modular bay that can accommodate an optical drive or a second battery. Price falls \$100. (★★★★☆ Jan 03)
Percent of overall rating ▶		15 percent	20 percent	25 percent	30 percent	
VALUE NOTEBOOK		Overall rating	Street price (11/15/02)	PC WorldBench 4 performance score <sup>1</sup>	Faster	Comments
1	<b>Best BUY</b> Dell Inspiron 4150 find.pcworld.com/31142	82	Average \$1647	Windows XP Home	Very good 98	For an extra \$20, this average performer ships with a keychain-size 16MB USB 1.1 storage drive, in lieu of a floppy drive. Drops \$130. (★★★★☆ Dec 02)
2	Gateway 450X find.pcworld.com/32231	81	Average \$1599	Windows XP Home	Good 95	One-bay laptop offers great, easy-to-use keyboard and a combination drive. (★★★★☆)
3	IBM ThinkPad R32 find.pcworld.com/31145	80	Average \$1699	Windows XP Professional	Good 94	This lightweight model has a modular bay, as well as a spacious screen and a comfortable keyboard. (★★★★☆ Dec 02)
4	Toshiba Satellite 1905-S301 find.pcworld.com/31154	80	Average \$1799	Windows XP Home	Very good 98	Battery lasted a whopping 4 hours, 11 minutes. Snazzy design includes integrated Wi-Fi and front-mounted audio controls. (★★★★☆ Dec 02)
5	Micro Express NP1020A find.pcworld.com/31841	78	Average \$1499	Windows XP Professional	Very good 103	A cool bluish-silver lid, dedicated audio controls, and a SmartMedia slot highlight this one-bay unit. (★★★★☆ Jan 03)
6	Gateway 600X find.pcworld.com/27221	77	Expensive \$1929	Windows XP Professional	Good 94	This very heavy notebook has an excellent screen and keyboard, and it can hold up to three batteries or drives. (★★★★☆ July 02)
7	Amax Elite 6400W find.pcworld.com/30800	76	Expensive \$1959	Windows XP Professional	Very good 101	Sleek, one-bay notebook comes with a SmartMedia slot and an optical drive conveniently located on the front. (★★★★☆ Nov 02)
8	Sharp Actius GP20 find.pcworld.com/31844	74	Average \$1899	Windows XP Home	Outstanding 109	Chunky desktop replacement comes with four USB 1.1 ports and both Secure Digital and SmartMedia card slots. Price sheds \$100. (★★★★☆ Jan 03)
Percent of overall rating ▶		20 percent	25 percent	30 percent	35 percent	

Go to 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 125.

<sup>2</sup> Except where noted, all Intel CPUs are SpeedStep chips, which run at a slower speed on battery power.  
<sup>3</sup> In gigabytes.

OUR POWER AND VALUE NOTEBOOK Best Buys, from IBM and Dell, respectively, hold steady for a third straight month.

Of the four new notebooks we tested, three made the chart. The lightweight Compaq Evo N610c, number four on the power list, is a Pentium 4-M-equipped revamp of the earlier Evo N600c. The refreshed model's

battery life is an hour briefer, but performance is somewhat better, and the \$2149 price improves on the N600c's \$2449 tag.

The N610c's ultraportable sibling, the 3.8-pound (without a docking station) Evo N410c, landed in sixth place on the power list. The N410c is a little pricier than the



Visit [find.pcworld.com/32234](http://find.pcworld.com/32234) for reviews of all products tested this month and ranked in this chart.

	BASE CONFIGURATION						Extra features *	Overall design	Battery life (hours:min) ‡	Average weight (pounds) ‡	Vendor's reliability/ service
	CPU †	Screen (inches)	RAM (MB)	Hard drive †	Pointing device	Multi-purpose bays					
	1.8-GHz Pentium 4-M	14.1	256	40	Touchpad, eraserhead	1	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in modem and network adapter, SmartSuite Millennium	Outstanding	Average/ 2:30	Light/ 6.7	Good/Good
	2.2-GHz Pentium 4-M	15.7	512	40	Touchpad	2	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2002	Outstanding	Good/ 3:02	Very heavy/ 9.9	Good/Fair
	2-GHz Pentium 4-M	15	256	40	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2002	Outstanding	Average/ 2:23	Heavy/ 9.3	Fair/Fair
	2-GHz Pentium 4-M	14.1	256	40	Touchpad	1	Average: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in modem and network adapter	Very good	Average/ 2:04	Light/ 6.6	Fair/Poor
	1.8-GHz Pentium 4-M	15	256	40	Touchpad	1	Very good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office XP Small Business Edition 2002	Outstanding	Average/ 2:36	Average/ 8.0	†/†
	1.2-GHz Pentium III-M	12.1	256	30	Touchpad	2	Average: 8X DVD-ROM drive, built-in modem and network adapter	Outstanding	Average/ 2:04	Average/ 7.2	Fair/Poor
	2-GHz Pentium 4-M	15	512	60	Eraserhead	1	Average: 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in modem and network adapter	Very good	Poor/ 1:53	Average/ 7.8	Good/Fair
	5 percent						10 percent	10 percent	5 percent	10 percent	25 percent

	BASE CONFIGURATION						Extra features *	Overall design	Battery life (hours:min) ‡	Average weight (pounds) ‡	Vendor's reliability/ service
	CPU †	Screen (inches)	RAM (MB)	Hard drive †	Pointing device	Multi-purpose bays					
	1.8-GHz Pentium 4-M	14.1	256	30	Touchpad, eraserhead	1	Very good: 8X DVD-ROM and 20X/10X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2002	Outstanding	Average/ 2:57	Average/ 7.2	Fair/Fair
	1.7-GHz Pentium 4-M	15	256	30	Touchpad	1	Very good: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2002	Very good	Average/ 2:57	Average/ 7.4	Good/Fair
	1.8-GHz Pentium 4-M	14.1	256	30	Eraserhead	1	Good: 8X DVD-ROM drive, built-in modem and network adapter, Lotus SmartSuite Millennium	Outstanding	Average/ 2:58	Light/ 6.7	Good/Good
	2A-GHz Pentium 4 †	15	256	40	Touchpad	0	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in modem and network adapter, SmartSuite Millennium	Average	Very good/ 4:11	Very heavy/ 9.8	Good/Fair
	2-GHz Pentium 4-M	14	512	40	Touchpad	1	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combo drive, built-in modem and network adapter	Average	Average/ 2:29	Average/ 7.7	†/†
	1.7-GHz Pentium 4-M	15.7	512	40	Touchpad	2	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in network adapter, Microsoft Works 2002	Outstanding	Average/ 2:43	Very heavy/ 9.8	Good/Fair
	2-GHz Pentium 4-M	14.1	256	30	Touchpad	1	Average: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Works 2002	Very good	Average/ 2:25	Average/ 7.3	†/†
	2A-GHz Pentium 4 †	15	256	40	Touchpad	0	Average: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in modem and network adapter	Average	Average/ 2:02	Very heavy/ 9.5	†/†
	5 percent						10 percent	10 percent	5 percent	10 percent	25 percent

\* Word score reflects both listed and unlisted features.

† Unless otherwise noted, all notebooks come with a lithium ion battery.

\* Includes computer, AC adapter, power cord, floppy drive, and optical drive.

† Insufficient data to give a rating.

\* Price includes cost of laptop, docking station, wireless module, and optical drive.

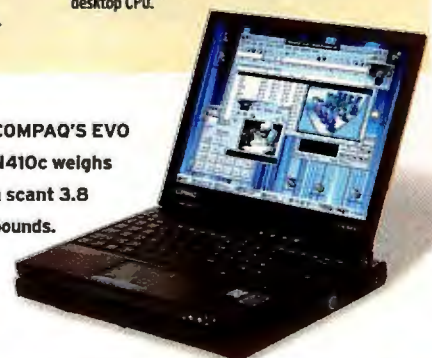
\* Single-speed desktop CPU.

N610c (it costs \$2385 with a docking station and optical drive), but it can act as a travel laptop or, when you add its docking station, as a capable desktop replacement. The docking station that came with our review unit included two modular bays.

On the value list, our third newcomer,

Gateway's 450X, climbed into the number two spot. This 1.7-GHz Pentium 4-M-equipped laptop thus earns a higher ranking on the chart than did a similar 450X with a 1.8-GHz Pentium 4-M that we looked at in October—thanks mostly to its better performance. ▶

COMPAQ'S EVO N410c weighs a scant 3.8 pounds.







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# TOP 10 PRINTERS

Visit [find.pcworld.com/32417](http://find.pcworld.com/32417) for reviews of all products tested this month and ranked in this chart.

NOW IS A GREAT TIME to replace that cartridge-eating clunker of an office printer with a faster, more efficient model—such as one of the new monochrome laser printers that arrive on the chart this month. Our top small-office laser printer—

the Minolta-QMS PagePro 1250W—costs a mere \$199, and its text pages run about 3 cents apiece. Four new units earn spots on the corporate side, including the number four Lexmark W812, which offers an optional Wi-Fi port. ►

SMALL-OFFICE LASER		Street price (11/25/02)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/graphics	Comments
1	<b>Best BUY</b> Minolta-QMS PagePro 1250W <a href="http://find.pcworld.com/32414">find.pcworld.com/32414</a> <b>NEW</b>	\$199	91	12/6	Outstanding/ Fair	<b>FEATURES:</b> Rated 17 ppm. Standard 8MB of RAM, 1200-by-1200-dpi maximum resolution, 150 sheets input, 100 output. <b>SUMMARY:</b> Windows-only printer outputs dark, clean text, but its gray-scale images looked too dark and lacked detail. Minolta offers an optional 20-sheet face-up output tray for \$20 to reduce thick-paper curling. (★★★★☆)
2	Brother HL-1850 <a href="http://find.pcworld.com/30101">find.pcworld.com/30101</a>	\$499	75	10/5.6	Very good/ Good	<b>FEATURES:</b> Rated 19 ppm. Standard 16MB of RAM, 2400-by-600-dpi maximum resolution, 350 sheets input, 150 output. <b>SUMMARY:</b> With fast print speeds and an optional third input tray, this is a viable choice for a small workgroup. An ethernet card for another \$200 makes it networkable. Output looked clean and text legible even at small sizes. (★★★★☆ Oct 02)
3	Lexmark E320 <a href="http://find.pcworld.com/17421">find.pcworld.com/17421</a>	\$299	72	12.2/6.6	Very good/ Good	<b>FEATURES:</b> Rated 16 ppm. Standard 4MB of RAM, 1200-by-600-dpi maximum resolution, 150 sheets input, 100 output. <b>SUMMARY:</b> The E320 printed graphics faster than any other 5000 printer on our chart, and its price is competitive. But while text looked crisp and even, gray-scale images were too dark and lost detail. (★★★★☆ Feb 02)
4	Minolta-QMS PagePro 1250E <a href="http://find.pcworld.com/30102">find.pcworld.com/30102</a>	\$299	71	10.3/5.4	Good/ Fair	<b>FEATURES:</b> Rated 17 ppm. Standard 16MB of RAM, 1200-by-1200-dpi maximum resolution, 250 sheets input, 100 output. <b>SUMMARY:</b> Prints from the 1250E looked somewhat dark—a serious liability only for graphics. Photos lacked detail and looked blocky, but text and line art appeared reasonably clear. A 500-sheet paper feeder is a \$149 option. (★★★★☆ Oct 02)
5	HP Laserjet 1200 <a href="http://find.pcworld.com/17405">find.pcworld.com/17405</a>	\$399	70	11.7/3	Very good/ Good	<b>FEATURES:</b> Rated 15 ppm. Standard 8MB of RAM, 1200-by-1200-dpi maximum resolution, 260 sheets input, 125 output. <b>SUMMARY:</b> Two PCs can share the 1200, one connected to the parallel port and the other to the USB port. Or you can put the printer on an ethernet network for an extra \$200. (★★★★☆ June 01)
CORPORATE LASER		Street price (11/25/02)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/graphics	Comments
1	<b>Best BUY</b> Xerox Phaser 4400/N <b>NEW</b> <a href="http://find.pcworld.com/32405">find.pcworld.com/32405</a>	\$1850	83	17.8/6.5	Outstanding/ Good	<b>FEATURES:</b> Rated 26 ppm. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 550 sheets input, 100 output. <b>SUMMARY:</b> Prints near-perfect text. Gray-scale graphics looked nice, but were grainy and lacked some detail. You can boost memory to 128MB for \$919, add a 10GB hard drive for \$500, or put in a duplexer for \$329. (★★★★☆)
2	Brother HL-2460N <a href="http://find.pcworld.com/30103">find.pcworld.com/30103</a>	\$1000	82	16.1/6.9	Very good/ Fair	<b>FEATURES:</b> Rated 25 ppm. Standard 16MB of RAM, 2400-by-600-dpi maximum resolution, 600 sheets input, 500 output. <b>SUMMARY:</b> Versatile workgroup model offers plenty of paper-handling options, including a \$400 duplexer and up to three additional paper trays. Text looked evenly weighted and attractive, if a little light. (★★★★☆ Oct 02)
3	IBM Infoprint 1120n <b>NEW</b> <a href="http://find.pcworld.com/32408">find.pcworld.com/32408</a>	\$1387	81	11.8/3.3	Very good/ Good	<b>FEATURES:</b> Rated 20 ppm. Standard of 16MB RAM, 1200-by-1200-dpi maximum resolution, 350 sheets input, 250 output. <b>SUMMARY:</b> IBM offers multifunction options to add address book, image processing, copy, fax, and network scanning abilities. A 20,000-page high-yield cartridge is also available. (★★★★☆)
4	Lexmark W812 <b>NEW</b> <a href="http://find.pcworld.com/32396">find.pcworld.com/32396</a>	\$2089	81	19.8/10.5	Very good/ Good	<b>FEATURES:</b> Rated 26 ppm. Standard 16MB of RAM, 600-by-600-dpi maximum resolution, 400 sheets input, 250 output. <b>SUMMARY:</b> Text appeared dark and evenly spaced in our tests. Allows wireless printing via an optional Wi-Fi (802.11b) port. You can add paper capacity, in the form of a 250-sheet drawer, for \$225. (★★★★☆)
5	Oki Data B8300n <b>NEW</b> <a href="http://find.pcworld.com/32399">find.pcworld.com/32399</a>	\$2200	78	28.2/4.8	Outstanding/ Fair	<b>FEATURES:</b> Rated 45 ppm. Standard 32MB of RAM, 600-by-600-dpi maximum resolution, 500 sheets input, 500 output. <b>SUMMARY:</b> Prints beautiful, sharp text, though a couple of fonts were squeezed together. Gray-scale images appeared dark and blocky. You can opt for a \$950, 1500-sheet tray that accommodates tabloid-size paper. (★★★★☆)

**HOW WE TEST:** Visit [find.pcworld.com/32417](http://find.pcworld.com/32417) for our test methodology; see [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings. <sup>1</sup> Tested with an extra 32MB of RAM; price includes the additional memory. <sup>2</sup> Tested with an additional 16MB of RAM; price includes the extra memory and an ethernet card.



## TOP 10 DVD DRIVES

Visit [find.pcworld.com/32666](http://find.pcworld.com/32666) for more information on products ranked in this chart.

PIONEER'S DVR-A05—the first drive we tested with the new 4X DVD-R and 2X DVD-RW media—takes second place on this month's chart. The Sony DRU-500A (which was tested with 2X DVD-R and 1X DVD-RW media) earns the top spot.

Another newcomer on the chart, the \$265 Toshiba SD-

R5002, can write to DVD-R and DVD-RW discs. The Alera DVD+R Cruiser is a fairly standard external USB 2.0 drive that comes with an excellent software bundle: Its Ulead DVD production suite includes video editing software, 3D graphics and titling software, and an image editing program. ►

	REWRITABLE DVD DRIVE	Street price (12/2/02)	Overall rating	Performance/support policies	Write speed / rewrite speed *	Comments
1	<b>Best Buy</b> Sony DRU-500A <a href="http://find.pcworld.com/31409">find.pcworld.com/31409</a>	\$340	86	Very good/ Very good	8:38/7:48 11:56/23:39 †	<b>FEATURES:</b> Internal drive, 4X DVD-R, 2X DVD-RW, 2.4X DVD+R, 2.4X DVD+RW, 24X CD-R, 10X CD-RW, IDE interface, 8MB buffer; * Sonic MyDVD 4, Veritas RecordNow DX 4.5, Veritas DLA, ArcSoft ShowBiz, CyberLink PowerDVD; 12-hour weekday and Saturday toll-free support. <b>SUMMARY:</b> The first drive to support both -RW and +RW formats. Fast, and comes with an extensive software bundle. (★★★★☆ Dec 02)
2	<b>Best Buy</b> Pioneer DVR-A05 <a href="http://find.pcworld.com/32642">find.pcworld.com/32642</a> <b>NEW</b>	\$310	85	Very good/ Good	6:43/36:27	<b>FEATURES:</b> Internal drive, 4X DVD-R, 2X DVD-RW, 16X CD-R, 8X CD-RW, IDE interface, 2MB buffer; * Sonic MyDVD 3.1, Veritas RecordNow DX 3, Veritas DLA, CyberLink PowerDVD; 10.5-hour weekday toll-free support. <b>SUMMARY:</b> The first drive we've tested with 4X DVD-R and 2X DVD-RW discs is the fastest DVD-RW drive on the chart. (★★★★☆)
3	Toshiba SD-R5002 <a href="http://find.pcworld.com/32645">find.pcworld.com/32645</a> <b>NEW</b>	\$265	85	Good/ Good	8:25/16:19	<b>FEATURES:</b> Internal drive, 2X DVD-R, 1X DVD-RW, 16X CD-R, 10X CD-RW, IDE interface, 2MB buffer; * CyberLink PowerDirector 2.5 Pro DE, VOB InstantCD/DVD-InstantDisc, VOB InstantCD/DVD-InstantWrite, CyberLink PowerDVD; 9-hour weekday toll-free support. <b>SUMMARY:</b> With good performance, fast CD-ROM access, and a bargain price, this would be a good drive for general use. (★★★★☆)
4	Memorex DVD+RW+R Internal ReWritable Drive <a href="http://find.pcworld.com/31421">find.pcworld.com/31421</a>	\$260	84	Good/ Fair	9:06/7:33	<b>FEATURES:</b> Internal drive, 2.4X DVD+R, 2.4X DVD+RW, 10X CD-R, 10X CD-RW, IDE interface, 2MB buffer; * Sonic MyDVD 3.5, Ahead Nero Express 5.5, Ahead InCD 3.3, CyberLink Power DVD, ArcSoft ShowBiz; 9-hour weekday toll-free support. <b>SUMMARY:</b> A good, no-frills internal drive with a satisfactory software bundle and the lowest price on the chart. (★★★★☆ Dec 02)
5	Philips DVDRW 228 <a href="http://find.pcworld.com/31418">find.pcworld.com/31418</a>	\$300	84	Good/ Very good	9:05/7:30	<b>FEATURES:</b> Internal drive, 2.4X DVD+R, 2.4X DVD+RW, 4X CD-R, 4X CD-RW, IDE interface, 2MB buffer; * Sonic MyDVD 3.5, Ahead Nero Express 5.5, Ahead InCD 3.3, CyberLink PowerDVD; 11-hour daily toll-free support. <b>SUMMARY:</b> This drive performs adequately and its price has fallen \$90 this month, but the software bundle is basic. (★★★★☆ Dec 02)
6	Alera DVD+R Cruiser DVDRW6002 <a href="http://find.pcworld.com/32579">find.pcworld.com/32579</a> <b>NEW</b>	\$490	83	Very good/ Fair	6:57/7:51	<b>FEATURES:</b> External drive, 2.4X DVD+R, 2.4X DVD+RW, 10X CD-R, 10X CD-RW, USB 2.0 interface, 2MB buffer; * Ulead DVD Production Suite, Ahead Nero Express 5.5, Ahead InCD 3.3, CyberLink PowerDVD XP; 10-hour weekday toll-free support. <b>SUMMARY:</b> Expensive, but the software bundle for burning DVDs is much more comprehensive than most. (★★★★☆)
7	Aopen DVRW2412PRO <a href="http://find.pcworld.com/32582">find.pcworld.com/32582</a> <b>NEW</b>	\$300	82	Good/ Good	8:17/7:29	<b>FEATURES:</b> Internal drive, 2.4X DVD+R, 2.4X DVD+RW, 12X CD-R, 10X CD-RW, IDE interface, 2MB buffer; * MediaStream NeoDVD Standard 4, Ahead Nero Express 5.5, Ahead InCD 3.3, Ulead VideoStudio 6, CyberLink PowerDVD; 12-hour weekday toll-free support. <b>SUMMARY:</b> A moderately priced DVD+RW drive with a good software bundle. (★★★★☆)
8	LaCie D2 DVD-RW U&I <a href="http://find.pcworld.com/31433">find.pcworld.com/31433</a>	\$429	80	Good/ Good	10:07/10:14	<b>FEATURES:</b> External drive, 2X DVD-R, 1X DVD-RW, 8X CD-R, 4X CD-RW, FireWire and USB 2.0 interface, 2MB buffer; * Sonic MyDVD 3.5, Roxio Easy CD Creator, Roxio DirectCD, DVDIt LE 2.5.3, Intervideo WinDVD; 12-hour weekday toll-free support. <b>SUMMARY:</b> A tough but attractive case and both FireWire and USB 2.0 interfaces make this drive ideal for sharing among several PCs. (★★★★☆ Dec 02)
9	Pacific Digital DVD Burner U-30116 <a href="http://find.pcworld.com/31442">find.pcworld.com/31442</a>	\$299	79	Fair/ Good	21:28/17:18	<b>FEATURES:</b> Internal drive, 1X DVD-R, 2X DVD-RW, IDE interface, 1MB buffer; * MediaStream NeoDVD Standard 4, Ahead Nero Express 5.5, Ahead InCD 3.3, ArcSoft ShowBiz, Intervideo WinDVD; 9-hour weekday toll-free support. <b>SUMMARY:</b> A reasonably priced DVD-RAM and DVD-R drive with a comprehensive software bundle. (★★★★☆ Dec 02)
10	Panasonic LF-D521 <a href="http://find.pcworld.com/31415">find.pcworld.com/31415</a>	\$350	78	Good/ Good	10:47/11:13	<b>FEATURES:</b> Internal drive, 2X DVD-R, 1X DVD-RW, 2X DVD-RAM, 12X CD-R, 8X CD-RW, IDE interface, 2MB buffer; * Sonic MyDVD 3.5, BHA B's Recorder Gold Basic 5, BHA B's Clip 5; 8-hour weekday toll-free support. <b>SUMMARY:</b> One of the new breed of multifunction drives that support DVD-RAM and DVD-RW. Offers plenty of flexibility for both video and data use. (★★★★☆ Dec 02)

**HOW WE TEST:** We tested rewritable DVD drives under Windows XP Home on PCs with 1.67-GHz Athlon XP 2000+ processors and 512MB of DDR SDRAM. To test each drive, we used the DVD video authoring, mastering, and packet-writing software supplied by the vendor. We used media supplied by the vendor or media supplied by Verbatim. All drives come with a one-year warranty unless otherwise noted. See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings. \* Time (in minutes:seconds) to write two 10-minute video files to DVD. Does not include rendering, transcoding, or other preparation time. † Time (in minutes:seconds) to format a blank rewritable DVD disc combined with time to copy 1.18GB of data to the disc. Due to their quick formatting, which formats only enough space to complete the write, DVD+RW drives get much faster results. ‡ Results are for DVD+R/DVD+RW and then for DVD-R/DVD-RW. \*Drive uses buffer underrun protection.



# TOP 10 PDAs

TOP 100

TEST  
Center

Visit [find.pcworld.com/32741](http://find.pcworld.com/32741) for reviews of all products tested this month and ranked in this chart.

MODELS FROM PALM claim both Best Buy spots on our Top 10 PDAs chart this month—an unusual feat. The Tungsten T sports a trendy metallic-blue finish and a unique section on the bottom that slides out to expose the Graffiti handwriting

input area. The Zire, a no-frills Palm unit, grabs first place on our basic PDAs list on the strength of its \$99 price. It's an excellent choice for buyers looking for a simple organizer to keep track of contacts, memos, and to-do lists. ►

ADVANCED PDA			Street price (12/6/02)	Overall rating	Features/ ease of use	Comments
1	<b>Best Buy</b> Palm Tungsten T <a href="http://find.pcworld.com/32459">find.pcworld.com/32459</a>	NEW	\$499	94	Average/ Very good	<b>FEATURES:</b> Palm OS 5, 16MB internal memory, 2-by-2-inch active screen area, <sup>1</sup> 320-by-320-pixel resolution, Secure Digital card expansion slot, lithium polymer battery, 5.6 ounces. <b>SUMMARY:</b> Well-priced metallic-blue model features easy-navigation buttons and a Graffiti area hidden under a retractable panel, plus voice-recording capabilities. (★★★★★)
2	Toshiba Pocket PC E335 <a href="http://find.pcworld.com/32468">find.pcworld.com/32468</a>	NEW	\$399	93	Good/ Good	<b>FEATURES:</b> Pocket PC 2002, 64MB internal memory, 2-by-3-inch active screen area, <sup>1</sup> 240-by-320-pixel resolution, Secure Digital card expansion slot, lithium polymer battery, 6.2 ounces. <b>SUMMARY:</b> Sleek unit has solid construction, a sensitive navigation button, and voice-recording capabilities. Its power button could be bigger, though, and its LCD isn't as sharp as other models' screens. (★★★★☆)
3	Zayo USA A600 PPC <a href="http://find.pcworld.com/32471">find.pcworld.com/32471</a>	NEW	\$550	88	Good/ Good	<b>FEATURES:</b> Pocket PC 2002, 64MB internal memory, 1.8-by-2.3-inch active screen area, <sup>1</sup> 320-by-240-pixel resolution, Secure Digital card expansion slot, lithium polymer battery, 4.9 ounces. <b>SUMMARY:</b> Unit resembles the Toshiba E335 in form and function. The navigation button is less responsive than others, and the active screen area is slightly smaller. Its speakers have subpar sound. (★★★★☆)
4	Sony Clie PEG-NX70V <a href="http://find.pcworld.com/32474">find.pcworld.com/32474</a>	NEW	\$600	86	Good/ Very good	<b>FEATURES:</b> Palm OS 5, 16MB internal memory, 3-by-2-inch active screen area, <sup>1</sup> 320-by-480-pixel resolution, Memory Stick expansion slot, lithium polymer battery, 8 ounces. <b>SUMMARY:</b> Brushed-magnesium PDA has an LCD screen that swivels 360 degrees, and a built-in camera for low-res photos and video recording. Image quality on screen looks colorful and crisp. (★★★★☆)
5	HP IPaq Pocket PC H5450 <a href="http://find.pcworld.com/32477">find.pcworld.com/32477</a>	NEW	\$699	80	Very good/ Good	<b>FEATURES:</b> Pocket PC 2002, 64MB internal memory, 2.3-by-3-inch active screen area, <sup>1</sup> 240-by-320-pixel resolution, Secure Digital card expansion slot, removable lithium polymer battery, 7.3 ounces. <b>SUMMARY:</b> Pricy model looks attractive and comes with fingerprint security, plus built-in Wi-Fi and Bluetooth. Extras include a backup battery and an ample software bundle. (★★★★☆)
BASIC PDA			Street price (12/6/02)	Overall rating	Features/ ease of use	Comments
1	<b>Best Buy</b> Palm Zire <a href="http://find.pcworld.com/32507">find.pcworld.com/32507</a>		\$99	87	Limited/ Limited	<b>FEATURES:</b> Palm OS 4.1, 2MB internal memory, 2-by-1.4-inch active screen area, <sup>1</sup> 160-by-160-pixel resolution, no expansion slots, lithium ion battery, 3.8 ounces. <b>SUMMARY:</b> Least-expensive and lightest model here. Top-mounted USB port handles syncing functions. Unit lacks a backlight, and the active screen area is small. Ideal for anyone in need of a simple, easy-to-use organizer. (★★★★☆ Jan 03)
2	Handspring Visor Neo <a href="http://find.pcworld.com/21563">find.pcworld.com/21563</a>		\$160	86	Average/ Average	<b>FEATURES:</b> Palm OS 3.5.2, 8MB internal memory, 2.2-by-2.2-inch active screen area, <sup>1</sup> 160-by-160-pixel resolution, Springboard expansion slot, two AAA batteries, 5.4 ounces. <b>SUMMARY:</b> Reasonably priced, but its expansion options are expensive. Bright backlight helps the 16-shade gray-scale screen look sharp in ambient and outside light. Red translucent case is a plus. (★★★★☆ Apr 02)
3	HandEra 330 <a href="http://find.pcworld.com/21564">find.pcworld.com/21564</a>		\$275	86	Very good/ Very good	<b>FEATURES:</b> Palm OS 3.5.2, 8MB internal memory, 2.9-by-2.2-inch active screen area, <sup>1</sup> 240-by-320-pixel resolution, Secure Digital card and CompactFlash expansion slots, four AAA batteries, 5.9 ounces. <b>SUMMARY:</b> Pricy compared with newer models, this basic PDA offers plenty of expansion options and crisp image quality. Unit uses a serial cable for syncing operations. (★★★★☆ Apr 02)
4	ViewSonic Pocket PC V35 <a href="http://find.pcworld.com/32510">find.pcworld.com/32510</a>		\$299	85	Very good/ Good	<b>FEATURES:</b> Pocket PC 2002, 64MB internal memory, <sup>1</sup> 2.7-by-2-inch active screen area, <sup>1</sup> 240-by-320-pixel resolution, Secure Digital card expansion slot, removable lithium ion battery, 4.2 ounces. <b>SUMMARY:</b> This unit offers a relatively thin profile and a screen with bright colors and a large viewable area. Inexpensive compared with other Pocket PC PDAs. (★★★★☆ Jan 03)
5	Casio Cassiopeia BE-300 Pocket Manager <a href="http://find.pcworld.com/32513">find.pcworld.com/32513</a>	NEW	\$150	85	Good/ Limited	<b>FEATURES:</b> Windows CE OS, 8MB internal memory, 1.6-by-2.5-inch active screen area, <sup>1</sup> 240-by-320-pixel resolution, CompactFlash expansion slot, lithium ion battery, 6.5 ounces. <b>SUMMARY:</b> Bulky PDA handles basic functions and offers sharp LCD quality. The interface is tricky to use, and the headphone jack is inconveniently placed under the case's bottom section. (★★★★☆)

**HOW WE TEST:** Visit [find.pcworld.com/32741](http://find.pcworld.com/32741) for our test methodology; see [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings. <sup>1</sup> The area where information can be displayed, excluding any fixed area for inputting. <sup>2</sup> Approximately 28MB of internal memory is used by the operating system and preinstalled applications. Other devices use less.



## TOP 10 DIGITAL CAMERAS

Visit [find.pcworld.com/32567](http://find.pcworld.com/32567) for reviews of all products tested this month and ranked in this chart.

**GET MORE FOR LESS:** This month's roster of digital cameras under \$500 is dominated by 3- and 4-megapixel models, with only a pair of cheaper 2-megapixel units in the lower reaches. The first cameras to use the new XD-Picture Card memory cards debut, with the Fujifilm FinePix 3800 Zoom coming in

at second place and the company's FinePix A303 finishing at seventh. This new type of memory card (see [find.pcworld.com/32570](http://find.pcworld.com/32570)) is smaller and faster than other kinds. It is also a little more expensive: A 128MB XD-Picture Card costs about \$80, while a similar CompactFlash card costs \$50. ►

	CAMERA: UNDER \$500	Street price (12/2/02)	Overall rating	Image quality	Ease of use	Battery life/shots	Comments <sup>1</sup>
1	<b>Best BUY</b> Olympus C-4000 Zoom <a href="http://find.pcworld.com/30476">find.pcworld.com/30476</a>	\$475	82	Outstanding	Good	Outstanding/700	<b>FEATURES:</b> 4-megapixel resolution, 16MB SmartMedia card, 32mm-96mm focal range, USB and video output, 14 ounces. <b>SUMMARY:</b> Relatively inexpensive for an advanced camera, the C-4000 blends great image quality, manual exposure settings, and a long battery life. Menus can be confusing. (★★★★☆ Nov 02)
2	<b>Best BUY</b> Fujifilm FinePix 3800 Zoom <a href="http://find.pcworld.com/32450">find.pcworld.com/32450</a> <b>NEW</b>	\$380	81	Very good	Good	Outstanding/546	<b>FEATURES:</b> 3.24-megapixel resolution, 16MB XD-Picture Card, 38mm-228mm focal range, USB and video output, 13.8 ounces. <b>SUMMARY:</b> The 3800 has a longer zoom and battery life than most models, and is styled like a single-lens reflex camera. The image quality was only slightly behind that of the C-4000. (★★★★☆)
3	Nikon Coolpix 3500 <a href="http://find.pcworld.com/32465">find.pcworld.com/32465</a> <b>NEW</b>	\$335	80	Very good	Good	Fair/203	<b>FEATURES:</b> 3.2-megapixel resolution, 16MB CompactFlash media, 37mm-111mm focal range, USB output, 7.4 ounces. <b>SUMMARY:</b> The rotating LCD allows for self-portraits and keeps the lens out of harm's way when not in use, while the intuitive buttons and menus make this camera easy for beginners to operate. (★★★★☆)
4	Olympus D-550 Zoom <a href="http://find.pcworld.com/30839">find.pcworld.com/30839</a>	\$299	79	Outstanding	Fair	Very good/398	<b>FEATURES:</b> 3-megapixel resolution, 16MB SmartMedia card, 36mm-100mm focal range, USB and video output, 11.6 ounces. <b>SUMMARY:</b> This bulky camera takes sharp, evenly exposed photos and adds a few extra features, such as the ability to take panorama shots. A \$50 price cut this month. (★★★★☆ Oct 02)
5	HP Photosmart 720 <a href="http://find.pcworld.com/30494">find.pcworld.com/30494</a>	\$299	78	Very good	Fair	Good/306	<b>FEATURES:</b> 3.18-megapixel resolution, 16MB internal memory and Secure Digital media slot, 34mm-102mm focal range, USB and video output, 12.1 ounces. <b>SUMMARY:</b> Large, relatively heavy model lacks a macro mode, and the controls feel slow, but it takes nice-looking photos. (★★★★☆ Nov 02)
6	Konica Digital Revio KD-400Z <a href="http://find.pcworld.com/32435">find.pcworld.com/32435</a> <b>NEW</b>	\$449	77	Outstanding	Very good	Fair/177	<b>FEATURES:</b> 4-megapixel resolution, 16MB Memory Stick media and Secure Digital media slot, 39mm-117mm focal range, USB and video output, 7.3 ounces. <b>SUMMARY:</b> This camera achieved the highest image-quality scores on the chart, but the documentation is rather poor and the battery life is very short. (★★★★☆)
7	Fujifilm FinePix A303 <a href="http://find.pcworld.com/32453">find.pcworld.com/32453</a> <b>NEW</b>	\$350	76	Very good	Good	Good/353	<b>FEATURES:</b> 3.24-megapixel resolution, 16MB XD-Picture Card, 38mm-114mm focal range, USB output, 7 ounces. <b>SUMMARY:</b> The A303 packs a lot into a small, lightweight package, with above-average image quality, easy-to-use controls, and battery life that would be more than sufficient for most users. (★★★★☆)
8	Olympus C-720 Ultra Zoom <a href="http://find.pcworld.com/30899">find.pcworld.com/30899</a>	\$499	75	Fair	Fair	Outstanding/1100	<b>FEATURES:</b> 3-megapixel resolution, 16MB SmartMedia card, 38mm-320mm focal range, USB and video output, 14.7 ounces. <b>SUMMARY:</b> The longest battery life we've seen in a digital camera and an 8X optical zoom are offset by the lack of manual focus. Image quality could be better. (★★★★☆ Nov 02)
9	Toshiba PDR-2300 <a href="http://find.pcworld.com/32486">find.pcworld.com/32486</a> <b>NEW</b>	\$199	75	Poor	Good	Fair/184	<b>FEATURES:</b> 2-megapixel resolution, 8MB internal memory and Secure Digital media slot, 36mm-108mm focal range, USB and video output, 11.7 ounces. <b>SUMMARY:</b> An affordable, compact camera, but its image quality was less than impressive and its battery life was shorter than that of most other models on the chart. (★★★☆☆)
10	HP Photosmart 320 <a href="http://find.pcworld.com/32441">find.pcworld.com/32441</a> <b>NEW</b>	\$150	74	Poor	Fair	Outstanding/621	<b>FEATURES:</b> 2.06-megapixel resolution, 8MB internal memory and Secure Digital media slot, 38mm focal length, USB output, 7.2 ounces. <b>SUMMARY:</b> The cheapest camera on the chart has no optical zoom, offers lackluster image quality, and has limited built-in memory, though you can add more through the SD card slot. (★★★☆☆)

**HOW WE TEST:** Each camera's overall rating is based on price (25 percent), picture quality (20 percent), ease of use (15 percent), features (20 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. To gauge picture quality, we take a series of shots, with and without flash, at 640 by 480 resolution and at the camera's highest resolution. We photograph a complex still life and a mannequin to see how well each camera captures details and subtle colorings such as skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores; we then average those scores. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See [find.pcworld.com/10860](http://find.pcworld.com/10860) for details on PC World's Star Ratings. <sup>1</sup> Resolutions are expressed in effective pixels, focal range is identified as 35mm equivalent, and camera weights include batteries.



# MORE REVIEWS

MISSED AN ISSUE OF *PC World* or passed your copy along to a friend? Here's a recap of other *Top 100* topics from previous issues. To read reviews of the products ranked on these *Top 10* charts, go online and type in the *PC World* Find-It URL

at the top of each chart (for example, go to [find.pcworld.com/32069](http://find.pcworld.com/32069) for products on the *Top 10 19-Inch CRT Monitors* chart). Next month we'll look at ink jet printers, 15-inch LCD monitors, MP3 players, and digital cameras over \$500. ■



**THE RADEON 9700 PRO**  
Is the first graphics card  
manufactured by  
Crucial Technology.

**EASY TO OPERATE** with just  
one hand, the Nikon Coolpix  
4300 also takes great  
photographs.



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1 <b>Best BUY</b> Samsung SyncMaster 957mb <a href="http://find.pcworld.com/30926">find.pcworld.com/30926</a>	1 <b>Best BUY</b> TDK 48X VeloCD <a href="http://find.pcworld.com/31757">find.pcworld.com/31757</a>	1 <b>Best BUY</b> Leadtek WinFast A250 Ultra TD-MyVIVO <a href="http://find.pcworld.com/31796">find.pcworld.com/31796</a>	1 <b>Best BUY</b> Nikon Coolpix 4300 <a href="http://find.pcworld.com/32000">find.pcworld.com/32000</a>
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From the January 2003 Issue	From the January 2003 Issue	From the January 2003 Issue	From the January 2003 Issue





# PC AMERICA: INVENTORY MANAGEMENT AT POINT OF SALE

[www.pcamerica.com](http://www.pcamerica.com)

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

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

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



## PC AMERICA

Things finally turned around at the Windmill once Edelmann deployed PC America's Cash Register Express (CRE 2000), a Windows-based POS program that works with ordinary PCs and peripherals, as well as barcode scanners, receipt printers, and pole displays (which show charges at the checkout counter). Now all of the Windmill's cashiers can use touch screens and barcode scanners to enter orders and update inventory. And setting up CRE 2000 could not be easier, says Edelmann. "PC America did



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

an excellent job pulling all of the hardware together initially. But the great thing about their software is that I can grab any component I want off the shelf and throw it together in no time. This is one slick program."

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

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

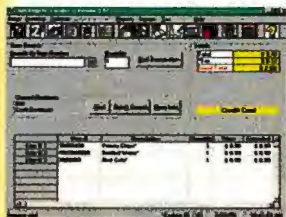
CRE 2000's couponing feature promises retailers an excellent route to a crucial dimension in retail sales. "Repeat business is the most important aspect of any business," says PC America's president, Howard Gosman. "With this addition to our POS package, we are giving our customers a quick and easy-to-use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





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All PC America Software requires Microsoft Windows. The software was written in Visual Basic using Microsoft Access Files. The source code is available.

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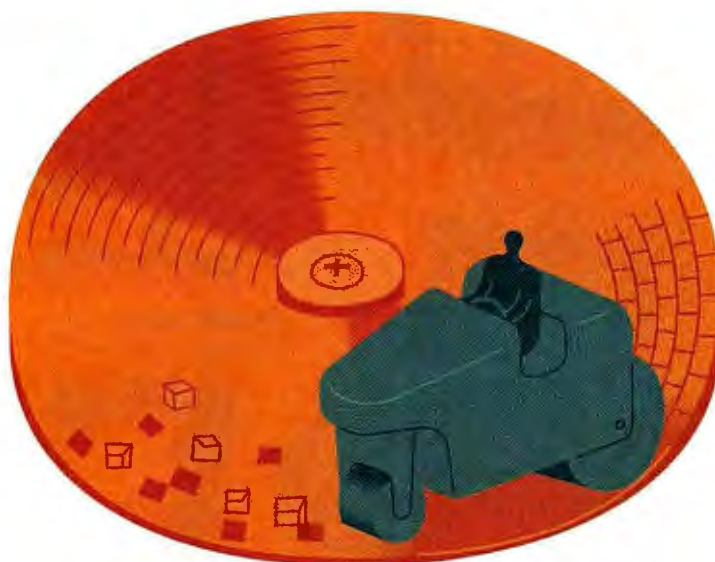
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# HERE'S HOW

EDITED BY MICHAEL S. LASKY, DENNIS O'REILLY, AND ERIC DAHL



## WINDOWS TIPS

SCOTT DUNN

### Simplify Disk Maintenance With Custom Shortcuts

**Windows ME** IF YOU regularly use Microsoft's ScanDisk and Disk Defragmenter utilities, you are probably tired of futzing with dialog box options each time you use the tools. You can avoid this trouble by adding a few command-line parameters and switches to the appropriate shortcuts. Then, the next time you want to check a disk for errors or defragment a drive, just choose the tool from the menu and the rest is automatic. You can also create multiple

shortcuts with different command-line options for different purposes—for example, one that prompts you before fixing errors and another that doesn't.

To make ScanDisk and Disk Defragmenter more automatic, right-click the *Start* button and choose *Open* or *Explore*. Locate and select the ScanDisk or Disk Defragmenter shortcut (by default they reside in Start Menu\Programs\Accessories\System Tools). If you want to make a copy of the shortcut, simply click and

hold the right mouse button to drag the icon to the location of your choice; then select either *Copy Here* or *Create Shortcut(s) Here*. Next, press <Alt>-<Enter> to open the icon's Properties sheet. Click the *Shortcut* tab and then click at the end of the command line in the Target box.

For a ScanDisk shortcut, type a space and then the letter of a drive you want scanned, followed by a colon, as in `c:`. Repeat for any other drives you want to check. To scan all local (nonnetworked and nonremovable) hard drives, skip the drive-letter parameters and instead type the switch `/a` (don't forget that every option you add to the command line should be preceded by a space). If you want to make ScanDisk start and stop without prompting you beforehand, enter the `/n` switch in the command line.

Even if you use the `/n` switch, ScanDisk may stop to report errors. If you don't want such information, start ScanDisk and check *Automatically fix errors*. You'll have to click *Start* and run ScanDisk at least once to make this setting stick. Finally, if you want ScanDisk to run in Preview mode—that is, to find errors but not to fix them—use the `/p` switch. Be aware, however, that Preview mode can be misleading because it gives the illusion that errors are corrected when in fact they are not. When you're finished, you might have a command line that looks similar to this: `c:\windows\scandiskw.exe c: d: /n` (see FIGURE 1). This example would instruct the utility to check drives C: and D: and then automatically exit when finished.

For the Disk Defragmenter shortcut, you can type individual drive letters (include the colon) into the Target command line, the same as you do for ScanDisk; to defragment all nonnetworked hard drives,



**140 WINDOWS TIPS**

Use your keyboard to tile or cascade open windows; print a sampler of all your fonts; position icons permanently.

**144 INTERNET TIPS**

Fight spam head-on with e-mail filters tailored to various types of junk mail; a free firewall that uses the clock.

**146 STEP-BY-STEP**

Say bye-bye to your parallel and serial ports, and hello to high-speed USB 2.0 and FireWire connections.

**148 HARDWARE TIPS**

Make sure your system's BIOS is running at its best; the safe way to clean a CD-RW drive; slow down for old apps.

**150 ANSWER LINE**

Get to the bottom of Windows shutdown problems; set your notebook to switch easily between home and office networks; customize the Places Bar in Windows and Office dialog boxes.

simply type the switch `/all`. If you want to defragment only to ensure that each file is stored contiguously on the disk, and not to consolidate free space, use `/u`. On the other hand, if you want free space consolidated without defragmenting files, type `/q`. If you want both file defragmenting and free-space consolidation, `/f` is the switch to enter (note that `/u`, `/q`, and `/f` are mutually exclusive; use only one). To make Disk Defragmenter start and end without asking for settings or displaying messages, use `/noprompt`. Finally, if you want to see only the small (default) Defragmenter window, type `/concise`; otherwise, type `/detailed` to see the disk map that symbolizes the defragging process. Type only one of these last two—or use neither to obtain the default (concise) view. Your resulting command line might read `c:\windows\defrag.exe /all /f /noprompt` if you want to defragment all local hard drives and consolidate free space on them, without user interaction, in the default view.

## MANAGE OPEN WINDOWS VIA SHORTCUTS OR KEYBOARD

### ALL Versions

IT'S GREAT THAT Windows lets us open several application and folder windows simultaneously, but it can be tough to manage all the windows competing for screen space. Fortunately, Windows provides some relief: Right-click the taskbar and choose an option to tile windows vertically or horizontally, or to cascade them (which arranges all nonminimized windows in an overlapping stack). Don't like the result? Right-click the taskbar again, and choose *Undo Tile* or *Undo Cascade*.

You may find it faster to tile or cascade windows from your keyboard, or to give each of these commands its own Quick Launch or other toolbar icon. You can do so with a suitable one-line script.

Open Notepad or another text editor, and type the line `(new ActiveXObject("Shell.Application")).CascadeWindows()`. Choose *File>Save As*. Navigate to an appropriate directory and type a name like "Cascade.js"; include the quotation marks so Notepad won't tack on its default .txt file extension. Click

*Save*. To test the script, open Explorer and locate the icon for the file you just saved. When you double-click it, the open windows on your desktop should cascade.

To create scripts that will tile your open windows horizontally or vertically, repeat the steps outlined above but replace *CascadeWindows()* with *TileHorizontally()* or *TileVertically()*. Save each of these variations as its own separate .js file.

If you want to have quick access to your scripts, use the right mouse button to drag the files from the Explorer window

and drop them into an appropriate submenu of the Start menu, onto the Quick Launch toolbar, or onto another toolbar. When you release the mouse button, select *Create Shortcut(s) Here*. Henceforth, you now tile or cascade all nonminimized windows just by clicking your shortcuts.

Note that if your comput-



**FIGURE 2: CUSTOMIZE QUICK Launch Icons and tool tips to easily spot the one you need.**

er associates JavaScripts with Notepad or another text editor, it won't run the script. To fix that, after you've placed the shortcut into your menu or toolbar, right-click the shortcut and choose *Properties*. Make sure the Shortcut tab is in front, and click the beginning of the Target text box. Type `wscript.exe` and a space. Click *OK*.

If you want to tile or cascade windows with a keyboard shortcut, you must place the shortcut icon either on the desktop or in a menu within the Start menu hierarchy. (I put all such shortcuts in a menu called 'Keyboard Shortcuts' so I can easily find them and change them later.) Right-click the shortcut icon and choose *Properties*. Make sure the Shortcut tab is in front. Click in the 'Shortcut key' box and press your desired keys. Windows forces you to have at least two modifier keys (from among <Ctrl>, <Shift>, and <Alt>) unless you press a function key or a key on the numeric keypad. Be aware that the keystrokes you choose will no longer work in any Windows application. Click *OK* and you're done. If you later decide to eliminate the keyboard shortcut, simply ▶



**FIGURE 1: MAKE CUSTOM SCANS via the command line of the ScanDisk shortcut.**



come back to this dialog box, click in the 'Shortcut key' box, and press <Backspace>. Then click OK and restart Windows.

If you launch your scripts from the Quick Launch toolbar, you'll probably want to give them distinctive icons so you can recognize them quickly. If you don't have any appropriate icons, you can use a shareware icon editor to make your own. One (admittedly basic) freeware tool is Gary Hodder's Icon Editor 2.1; browse to [find.pcworld.com/31904](http://find.pcworld.com/31904) to get it.

After you create and save your icon files (or find an existing icon that suits you), right-click one of the shortcuts in the Quick Launch toolbar and choose *Properties*. With the Shortcut tab in front, click *Change Icon*. Click *Browse*, select your icon file, and then click *Open*. With the icon selected in the dialog box, click OK twice. Repeat these steps for each of your toolbar icons. To give each Quick Launch icon a meaningful tool tip, right-click it and choose *Rename*. Type the text you want to see when you hold your pointer over the button (see FIGURE 2). Click OK.

From now on, whenever your windows get unruly, press one of your shortcut keys or click one of your Quick Launch icons. If you change your mind about the result, you can undo the new window arrangement by pressing <Ctrl>-Z immediately afterward. Note that the undo key-stroke will not work if the last active appli-

cation uses <Ctrl>-Z for its own purposes; the alternative method is to right-click the taskbar and select *Undo Cascade*.

## MAKE A FONT SAMPLER BOOK

**ALL Versions** CHOOSING THE BEST fonts for your document is an important way to convey the right message and get the eye-catching look you want. You can preview fonts either by applying them to text in your document or by double-clicking the font files in the Fonts folder to open a window with font information and sample text. If you find these approaches too time-consuming, however, maybe what you need is a printed collection of your fonts.

Fortunately, making a font sampler book is easy. To print samples of your Windows TrueType fonts, choose *Start>Settings>Control Panel* and double-click *Fonts* (in XP, use *Start>Control Panel*, select *Switch to Classic View* if you're in Category view, and open *Fonts*). Hold down <Ctrl> and click each font you want to include in your font sampler book. Right-click one of the selected items, and choose *Print* (see FIGURE 3). At this point, you'll have to click *Print* or *OK* and *Done* a bazillion times to confirm the print command and close the preview windows.

When you finish, put your font samples into a binder that you can leaf through the next time you're looking for the right font. As you add and remove fonts from your computer, be sure to add or remove their pages to keep your sampler up-to-date.

If you have PostScript fonts, add them to your sampler. Adobe Type Manager is required if you want to use, view, or print PostScript Type 1 fonts in Windows 9x or Me, or Adobe's Multiple Master fonts in any Windows version. Go to [find.pcworld.com/31910](http://find.pcworld.com/31910) to download the free version, ATM Light. (The Deluxe version can also print TrueType font samples.) After installing ATM, open it and click the *Fonts* tab. Choose the fonts you want in your sampler, right-click one of the highlighted items, select *Print>Sample Sheets*, and click OK in the print dialog box.

In Windows 2000 and XP, you don't need ATM to manage Type 1 fonts. You should see them in the Fonts Window

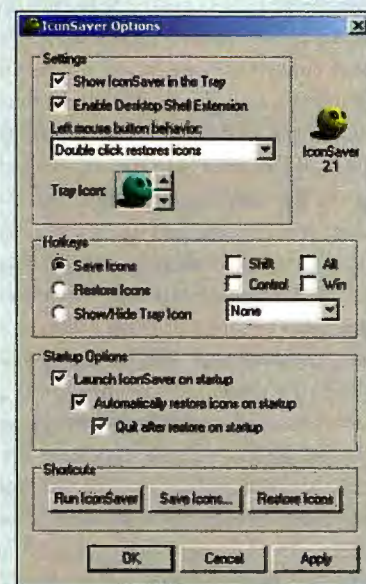


FIGURE 3: PRINT A SAMPLER of your commonly used fonts for quick reference.

## WINDOWS TOOLBOX

### Keep Those Desktop Icons in Line

DO YOU HAVE TROUBLE keeping your desktop icons arranged the way you want? This can be a problem if you change your screen resolution regularly—or if your PC has a screen saver that changes it automatically. IconSaver can preserve the icons precisely the way you arrange them, and it can store separate



arrangements for each screen resolution. You can also set IconSaver to automatically restore icons to their positions anytime the screen resolution changes. And finally, you can customize keyboard shortcuts for saving and restoring icons, among other options. IconSaver works with all versions of Windows from 95 on. After 30 days, you need to register, but don't worry: It's only \$5. Go to [find.pcworld.com/31916](http://find.pcworld.com/31916) and check it out.

along with your TrueType fonts. If you have some that aren't visible there, locate their .pfm files on your hard drive, select the files, and drag them to the Fonts window to install them.

Send Windows-related questions and tips to [scott\\_dunn@pcworld.com](mailto:scott_dunn@pcworld.com). Windows Tips pays \$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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# INTERNET TIPS

SCOTT SPANBAUER

TAKE AOL OFF  
YOUR GUEST LISTTRY OUT SYGATE'S  
FREE FIREWALLSAY GOODBYE TO  
WIN MESSENGER

## Wage War on Spam With Old Tools and New Filters

NO, IT'S NOT JUST YOU. The volume of junk e-mail is spiraling out of control. Don't be ashamed if now you actually receive more spam than regular messages. Your e-mail program's built-in junk mail filter and third-party tools such as Cloudmark's SpamNet and McAfee's SpamKiller trap a lot of unsolicited garbage, but they're far from perfect.

the spam cluttering my in-box and know that the messages moved to my spam folder don't contain an urgent note from an editor offering me work.

What's a spam-beleaguered person to do? I say filter it yourself. All of the most popular e-mail programs let you create multiple filters that examine each incoming message, then flag or move those that meet your definition of spam. Because you control the filters, you can test how well they work, make modifications, control the order in which they run, and remove those that don't work the way you want. It sounds complicated, but it's not. Start simply by creating one filter, and then tweak it until it works just right. Once it does, add another one.

A good way to start is with a filter that centers on the most common criterion—the contents of the To: field. Much of the spam you receive is not addressed to you personally, which is an easy characteristic to check for. Here are the steps for creating such a filter in three popular e-mail programs.

**Outlook 2002:** Click *File•New•Folder* to create a folder to store spam. Name it **Spam**, **Junk Mail**, or the epithet of your choice, and click **OK**. Next, choose *Tools•Rules Wizard*, click the **New** button, and click **Next**. Uncheck *from people or distribution list*, check *where my name is not in the To box*, and click **Next**. Click the *specified* hyperlink in the 'rule description' field at the bottom of the wizard window, navigate to the spam folder you created, click **OK**,

and then click **Next** to move on to the list of exceptions to your rule. Check *except where my name is in the Cc box* and, optionally, *except if from people or distribution list* and *except if sent to people or distribution list*. If you decide to use either of the latter two conditions, click their *people or distribution list* links in the rule description field to add addresses that you know aren't sources or destinations of spam, such as newsletter or mailing list subscriptions. (The addresses must be in your Outlook contacts list.) Click **Next**, give the rule a name if you want to, and then click **Finish** to create the rule.

**Outlook Express 6:** Create a spam destination folder (*File•New•Folder*), name it **Spam** (for example), and click **OK**. Next, choose *Tools•Message Rules•Mail*, and click **New**. In the Conditions list box, scroll to and check *Where the To or CC line contains people* and, optionally, *Where the From line contains people*. Click the resulting *contains people* link in the Rule Description box, and fill in your e-mail addresses, mailing lists, newsletters, and other known non-spam sources or destinations as appropriate. After entering these addresses, click the *Options* button, select *Message does not contain the people below*, and then click **OK** twice. Finally, check *Move it to the specified folder* in the Actions list box, click the *specified* link in the Rule Description box, and click **OK** twice to save the rule.

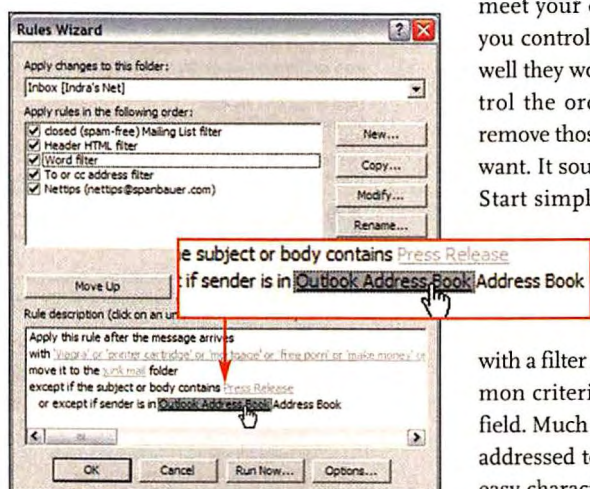


FIGURE 1: FINE-TUNE YOUR SPAM filters by adding exceptions to the filter rule.

These programs (and others like them) sometimes commit the spam filter's mortal sin—moving nonspam to a junk mail folder. The problem isn't that the mail is gone (it's not), it's that you must frequently comb through all of the messages identified as spam to be sure you're not deleting important personal mail. To me, this nullifies the spam software's main benefit—saving time. I'd rather have a lit-

## REMOVE AOL INTRUSIONS

**ALERT READER** Dr. David H. Jameson of Chappaqua, New York, noticed after installing AOL Instant Messenger on his PC that the program's installer had the cheek to add an AOL Web site to Internet Explorer's trusted list. This is like a parking attendant who makes copies of your keys while you dine. AOL is granting itself remote access to your computer, which is a violation of your trust. Hey, AOL! Get a clue! To remove the entry in IE 6, choose *Tools•Internet Options•Security*, select *Trusted Sites*, and click the *Sites* button. Select *http://free.aol.com* in the Web sites list, click the *Remove* button, and then click **OK** twice to slam shut AOL's backdoor into your PC.



**Mozilla 1.x/Netscape 7.x:** Create a spam folder (*File•New•Folder*), give the folder a name, and then choose *Tools•Message Filters*. Click *New*, and enter a name for the filter; then select *to* or *CC* in the first drop-down list of criteria, and choose *doesn't contain* in the second list.

Type your e-mail address in the last field on the line. Click *More* to enter additional filter criteria (such as other e-mail accounts and known source or destination addresses of mailing lists and newsletters). Choose *Move to folder*, select the spam folder that you just created in the last drop-down lists, and then click *OK* twice to save the filter.

## TWEAK YOUR FILTER

AFTER CREATING the filter, inspect the contents of your new spam folder. You'll undoubtedly find that a few pieces of non-spam ended up in your junk e-mail net. Before dragging them back to the in-box, be sure to add the messages' *To:* or *From:* addresses, as appropriate, to your filter. To avoid deleting nonspam messages sent to you via the blind carbon copy (bcc) field, add known sender addresses to your list of exceptions (if your program supports exceptions). Some programs, including Outlook, allow you to check to see whether the sender is in your address book, ensuring that nonspam sent to you via bcc will stay in your in-box (see **FIGURE 1**). After a few days or weeks of testing and revising, you should have a filter that catches spam, and only spam.

You'll notice that you still have a lot of spam in your in-box. To block the rest of this junk mail, you'll need to create a few more rules. One of the most obvious is a rule that snares messages containing typ-

ical spam terms in the Subject line (the most common seem to be 'Viagra', 'mortgage', and several others that we can't print). Collect the spam that your first rule doesn't block for a few days or weeks, note the most frequently used words or phrases in the spam messages' Subject lines (ones that aren't commonly used in nonspam messages), and then create a second rule that moves these messages to your spam folder. As with the first rule, monitor the results and refine the rule before you create any additional rules.

Because a lot of junk mail messages arrive as garish Web pages, another way to minimize the onslaught is to filter out HTML-format e-mail. In this filter, search for messages with headers containing the words 'multipart/alternative', or 'text/html'. If you have a case-sensitive e-mail program (Outlook is), you may want to search for 'Multipart/Alternative', 'Text/HTML', and other variations as well.

To avoid missing important nonspam messages, unsubscribe from any HTML-format e-mail lists or newsletters you receive, and then subscribe again to the text-only versions. You may have a few friends who enjoy sending you HTML-format e-mail. No problem—just add them and any newsletters you want to receive in HTML format to your exceptions list.

## STOP WINDOWS MESSENGER

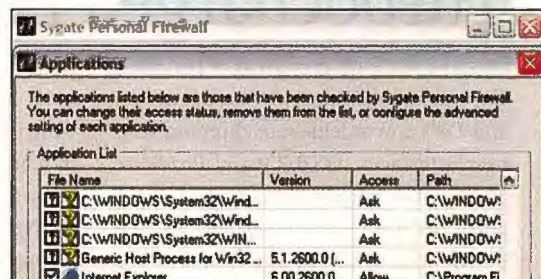
IN LAST APRIL'S "Super Windows Secrets" feature ([find.pcworld.com/31334](http://find.pcworld.com/31334)), PC World's Scott Dunn explained how to edit the Windows Registry to prevent XP's Windows Messenger from starting automatically when Windows loads. Unfortunately, as readers like Allen Watts of Greenwood, Indiana, discovered, running Outlook Express, MSN Explorer, and other Microsoft Internet apps launches Windows Messenger all over again and restores the Registry command that makes the program start at each log-on.

Fortunately, as Watts points out, there is a simple—and permanent—solution. If you never want Messenger to start, just locate the Messenger folder inside your

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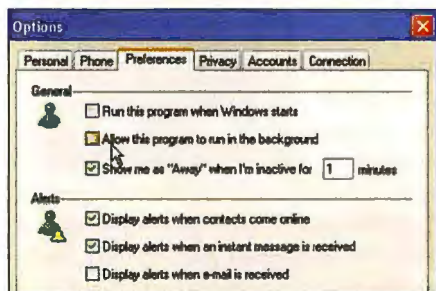
SYGATE'S PERSONAL FIREWALL PRO 5 tied ZoneAlarm Pro 3.1 for best firewall in our July security roundup, "Protect Your PC" ([find.pcworld.com/27361](http://find.pcworld.com/27361)). And like Zone Labs, Sygate offers a free version—Sygate Personal Firewall 5—that includes the majority of the commercial version's most important features.



Both ZoneAlarm and Sygate Personal Firewall let you decide whether to permit individual apps to connect to the Net—either as clients or as servers—and both programs block incoming and outgoing attacks by hackers and Trojan horse software. But Sygate offers a feature ZoneAlarm doesn't have. In addition to specifying the exact IP addresses and ports a program may use to communicate with the outside world, you can limit when the program may do so, and for how long. For example, you can set Personal Firewall to allow a chat program online for only an hour each day. Visit [find.pcworld.com/30953](http://find.pcworld.com/30953) to get the 4.6MB download.

Program Files folder, select it, press <F2>, rename it something like **Messenger Backup**, and press <Enter>. This will keep the Windows Messenger files around in case you ever want them, but will prevent Windows from figuring out how to launch the program. If you change your mind later, you can rename the folder 'Messenger'. [Editor's note: This tip was contributed by *Windows Tips* columnist Scott Dunn.] ■

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.



**FIGURE 2:** UNCHECK TWO settings on Options' Preferences tab to bid Windows Messenger adieu.



## STEP BY STEP

STAN MIASTKOWSKI

# Add High-Speed Ports for Turbocharged Peripherals

THE LATEST high-performance peripherals—including scanners, external drives, and DV camcorders—are shipping with new interfaces. USB 2.0 and FireWire offer higher speeds than older USB 1.1 ports, and they're hot-pluggable. Only the newest PCs ship with on-board USB 2.0 or FireWire ports, but you can easily add them to a system by inserting a PCI card.

FireWire ports, which mostly work with DV camcorders and external drives, trans-

fer data at up to 400 megabits per second. USB 2.0 is the successor to USB 1.1, which has been a standard for years and has been popular for connecting keyboards, mice, and printers. USB 2.0 can transfer data at rates up to 480 mbps, compared with USB 1.1's 12 mbps.

USB 2.0 peripherals are likely to grow more common, but you'll need FireWire for video editing. A combination FireWire/USB 2.0 add-in card, such as the Adaptec

## THE TOP DOWN

**Benefits:** Hook up high-speed peripherals.

**Cost:** Single-interface cards, \$30 to \$60; dual-interface cards, \$80 to \$100; single-interface cards for laptops, \$100 to \$125

**Expertise level:** Beginner to Intermediate

**Time required:** 30 to 45 minutes

**Vendors:** Adaptec ([www.adaptec.com](http://www.adaptec.com)), ADS Technologies ([www.adstech.com](http://www.adstech.com)), Belkin ([www.belkin.com](http://www.belkin.com)), logear ([www.logear.com](http://www.logear.com)), Keyspan ([www.keyspan.com](http://www.keyspan.com)), Lava Computer Manufacturing ([www.lavalink.com](http://www.lavalink.com)), SIIG ([www.siig.com](http://www.siig.com))

DuoConnect shown in step 1 below, can add both to your PC. For about half the price, you can choose one or the other.

One caveat: You'll need Windows 98 SE or a later version; earlier versions do not support FireWire or USB 2.0. ■

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**1 Install the card.** Turn off your PC, 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 down with the screw.

If your card has a socket for powering USB or FireWire peripherals, find a power supply connector and connect it to the card. If no connectors are free, you'll need to purchase a Y-connector. Replace the cover on the PC and plug it in.



**2 Install the drivers.** Turn on your PC. If you're running Windows 98 SE or Me, the Add New Hardware Wizard will appear before Windows starts. Choose *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 Windows starts. In the opening screen, choose *Install the software automatically*.

All three versions of Windows have built-in drivers for FireWire and basic USB components. Those drivers will be installed automatically; you'll see a number of different messages flash across your screen. (You may be asked to insert your original Windows CD-ROM.) If you're installing USB 2.0 ports, at some point you'll see a message indicating that Windows was unable to find a driver. Insert the driver CD-ROM that came with the board into your drive, and click *Next*. When indicated, click *Finish* and restart your PC.



**3 Install additional software (if any).** Some cards come with additional software, such as video editing applications for FireWire cards. If your package includes any, install it now.



**4 Plug in your peripherals.** Attach your USB and/or FireWire components to the card. You'll normally see a screen pop up as Windows recognizes the drive, camcorder, and so on. Some peripherals require additional drivers. Follow the directions that appear on the screen, or check the manual.



**5 If you have problems:** Check the status of the new add-in board. In Windows 98 SE and Me, go to *Start>Settings>Control Panel*, double-click the *System* icon, and choose *Device Manager*. In XP, go to *Start>Control Panel*, open *Performance and Maintenance* if you're using Category view, double-click the *System* icon, choose the *Hardware* tab, and click *Device Manager*.

If you see entries with yellow exclamation points, run the hardware troubleshooter.

**6 What about your original USB ports?** When you install USB 2.0 ports, the original USB 1.1 ports on the back of your PC will work as before. You can still use them for slower peripherals that don't need USB 2.0.



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# HARDWARE TIPS

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## Tweak Your PC's BIOS Settings the Safe Way

IF WINDOWS IS the happy face your computer projects to the world, then the BIOS is its dark, brooding subconscious. The BIOS—or Basic Input/Output System—is the code for fundamental PC functions, such as retrieving a keystroke from the keyboard or putting a pixel on the screen. This small program works behind the scenes, translating Windows' people-friendly commands into the zeroes and ones understood by your hardware. And like the human subconscious, the BIOS can have a powerful influence on your PC's behavior and performance.

### BIOS THERAPY

AS NEW TECHNOLOGY emerges and old bugs are discovered, computer makers often issue updated BIOS versions that can solve problems and improve performance. Check your PC maker's Web site for updates. But first, make sure you have the version number of your current BIOS; it usually flashes on your monitor right after you turn on your system. (Press the <Pause> key if it flashes too quickly.)

### BRAKE FOR OLD-TIMERS

SOME REALLY OLD software programs just don't work on today's high-speed PCs. If you have a golden oldie that locks up or spits out an error message every time you try to run it, give CPUKiller a try; it's a free, easy-to-use utility that lets you slow down your PC as little or as much as you want. Go to [find.pcworld.com/31928](http://find.pcworld.com/31928) to download your copy.

Updating your BIOS is easy, but you must do it with care. Usually you need only run a small program from a floppy disk. If a problem occurs, however, you can be left with a useless motherboard. So be sure to read all the instructions in the BIOS update's readme file beforehand. And always do *exactly* what the directions say.

If the BIOS is your PC's subconscious, then its Setup utility is the foundation on which you build your PC's character. The utility has user settings to control

hard disks, memory, graphics cards, power saving, USB ports, and other hardware. The program used to come on a disk, but now it's conveniently stored in the same ROM chip as the PC's BIOS, enabling easy access. To open Setup, just press the key (or combination of keys) that you're prompted to enter when the PC starts up. Different BIOS makers use different keys—typically <Delete>, <F1>, or <F10>. Your screen should announce which key or keys to press for Setup just after it displays the BIOS version number. If it doesn't, check your system's documentation.

Because the Setup utility is made by the BIOS maker and is in the same chip as the BIOS, it's often called the BIOS Setup utility. And because it stores its settings in the clock/calendar chip—a comple-

mentary metal-oxide semiconductor, or CMOS, chip—it's also referred to as the CMOS Setup program. (The CMOS chip has its own battery to retain the chip's settings even when the PC is unplugged.)

The Setup utility has an abundance of hardware settings, ranging from the obvious, like one for the time on your PC's clock, to the arcane, such as the number of "wait states" that coordinate the flow of data between the RAM and the CPU.

### FIRST, DO NO HARM

WHEN WORKING with your PC's Setup utility, use the same rule of thumb taught to budding brain surgeons: If you don't know what something does, don't mess with it. Inadvertently changing a wait state or other cryptic setting can slow performance or even cause a system crash.

If you think you may have accidentally changed a setting while working in the Setup utility, play it safe and start over. All

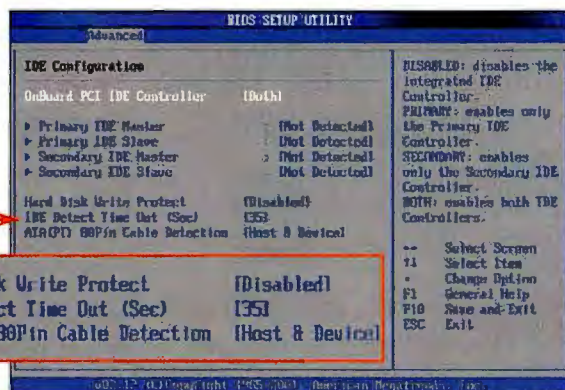


FIGURE 1: A NEW HARD DRIVE may require that you reset the configuration data in your PC's BIOS Setup program.

Setup utilities have a menu choice that lets you exit without saving changes. You may also see a choice for returning the settings to their default values. Ignore this option: If your PC's vendor fine-tuned the system, the BIOS maker's default settings may not be optimal.

Back up your settings before making changes. When the battery that powers the clock/calendar chip dies, your settings die with it. If your Setup utility has a backup option, use it. If not, write your settings down on paper—or press the <Print Screen> key for each screen in the utility (this doesn't always work, however).



## WHAT TO LOOK FOR

**BEFORE YOU START**, read through the user manual that came with your PC or motherboard. Many manuals offer a short explanation of each setting. Settings vary by manufacturer and model, but you should find these on almost all PCs:

### Optimization and compatibility settings:

The Setup utility often contains settings for hardware performance. Sometimes these aren't set optimally at the factory, especially on generic or built-to-order PCs. Scan the entire Setup program. AGP mode settings and DMA settings are good candidates for optimization. These settings are also useful for troubleshooting newly installed hardware: Disabling or lowering a given setting may kick-start a heretofore incompatible graphics card, CD-ROM drive, or other device.

**Hard-disk settings:** You'll find a table, usually on a second or Advanced page and with "IDE" in its title, that lists all the configuration parameters for the EIDE hard drives directly connected to your motherboard. (SCSI hard drives and EIDE hard drives running off an expansion card will have their own configuration programs.) While most PCs made in the last few

A: or B: drive. This is a good setting to check if you're having floppy-drive problems. Some Setup utilities have a separate 'Floppy Read only' security setting that prevents your data from being written to a floppy disk and removed from the PC.

**Boot sequence:** This setting determines where the PC first looks for boot-up instructions. For example: 'A: then C:', 'C: then A:', or 'C:, Zip drive'. To boot from a CD-ROM, Zip, or LS-120 drive, you'll likely have to change this setting.

**Password protection:** If this is enabled, the BIOS will ask for a password before booting up. Be very careful with this one: If you forget the password, you'll have to reset a motherboard jumper or disconnect your CMOS battery, which will cause you to lose all your settings, or you may even have to buy a new motherboard.

**IRQ settings:** If you need an extra IRQ setting for new hardware, you may free one up by disabling an unused feature, such as a serial port, parallel port, or USB port.

**Parallel port settings:** Select the mode that works best for your hardware. ECP or EPP modes can speed up printers and other devices considerably (see FIGURE 2).

**Fan RPM and CPU temperature:** These two critical parameters should be checked periodically to ensure they are functioning properly.

## GO OFFLINE FOR HARDWARE HELP

THE INTERNET IS great for finding answers to hardware questions, but sifting through Web sites looking for trustworthy advice can take a lot of time. (Unless, of course, you go straight to PCWorld.com.) Sometimes the fastest way to get answers is the old-fashioned way: with a good reference book. Here are two of the best.

*Upgrading and Repairing PCs* by Scott Mueller (\$60) is the classic book covering everything you need to know about the PC and quite a bit you likely don't know. If you're looking for an all-around reference, this title's breadth and depth are unbeatable ([www.quepublishing.com](http://www.quepublishing.com) and [www.upgradingandrepairingpcs.com](http://www.upgradingandrepairingpcs.com)).



**FIGURE 3: KEEP YOUR CD-ROM or CD-RW drive dust-free with a blast of compressed air.**

*PC Hardware in a Nutshell* by Barbara Fritchman Thompson and Robert Bruce Thompson (\$40) is a well-written, practical guide to buying and using PCs. It's loaded with real-world advice presented in a concise style that clearly delivers just the information you want, without your having to hunt for it ([www.oreilly.com](http://www.oreilly.com)).

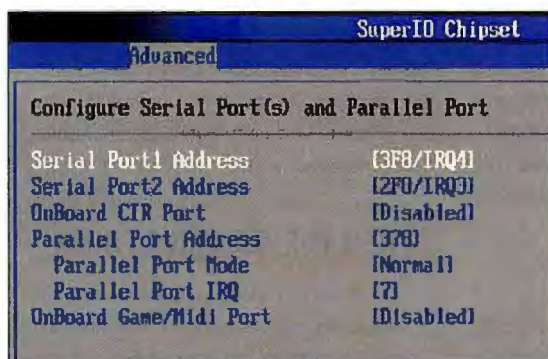
## DIRTY DRIVING

**A WEEKEND** remodeling job left a layer of dust over our whole office, and I'm worried that my CD-RW drive may be dirty. How should clean it?

*Cory Hogan, Fresno, California*

**YOU PROBABLY SHOULDN'T.** The slightest smudge can block or jostle the drive's sensitive laser, so if it ain't broke, don't clean it. If your performance slows, or if your drive is unable to read the media, try a few well-directed blasts from a can of compressed air—available for less than \$10 from computer stores (see FIGURE 3). Be sure to use the plastic straw that comes with the can. And keep the blasts short; extended rushes of air can cause condensation that deposits moisture on the drive's interior. Before using a CD-RW cleaning kit such as Kensington's \$15 Drive Guardian ([www.kensington.com](http://www.kensington.com)), check with the drive maker; some recommend them, but others don't. ■

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.



**FIGURE 2: SETUP OPTIONS MAY affect the performance of printers and other devices using your parallel ports.**

years can seamlessly detect and configure new hard disks, some require manual installation. Read your new disk's documentation on that procedure and use the on-screen options (FIGURE 1 shows an example) to make changes in this table.

**Floppy disk:** This option lets you set the type of floppy drive (3.5-inch, 1.44MB, for instance) that you have designated as your



# ANSWER LINE

LINCOLN SPECTOR

## Why Doesn't My Computer Turn Off Properly?

**?** MY PC USED TO shut down quickly without a problem, but now when I try to exit Windows, my computer hangs or otherwise acts up. How do I fix it?

*Keyon Naghavi, via the Internet*

IF YOU USE Windows 98 SE, there's a patch available that you can download at [find.pcworld.com/31943](http://find.pcworld.com/31943). If you don't use

to let the problem program load automatically every time you turn on your computer, or you can check with the vendor to see whether it has issued a fix or update.

If selective start-up doesn't solve the problem, the underlying cause may be a bad driver. To find out, boot your computer, and—just before the Windows logo

appears—press <F8> to enter Safe Mode. Once there, exit and shut down your computer. If it shuts down properly, and you have already done the Msconfig test, the fault probably lies with a driver. Visit your hardware vendors' Web sites and gather updates for all of your drivers; update them until the problem is solved.

If the problem persists when you exit Safe Mode, your trouble could be due to a BIOS problem. Contact your system vendor to learn whether a BIOS update is available. (See this month's *Hardware Tips*, on page 148, for more on BIOS updates.)

### ONE NOTEBOOK, TWO NETWORKS

**?** HOW CAN I configure my notebook to switch easily between the office network and my home network?

*Deborah Norling, Milpitas, California*

WHETHER YOUR notebook has a built-in ethernet port or uses a PC Card network adapter, your best bet is to run a network-configuration program like J.W. Hance's \$14 NetSwitcher shareware. Go to [find.pcworld.com/31949](http://find.pcworld.com/31949) for a trial version.

Another useful network utility is GlobeSoft's \$36 MultiNetwork Manager shareware. At [find.pcworld.com/31952](http://find.pcworld.com/31952) you can download a trial version of this program.

### CUSTOMIZE OFFICE DIALOG BOXES

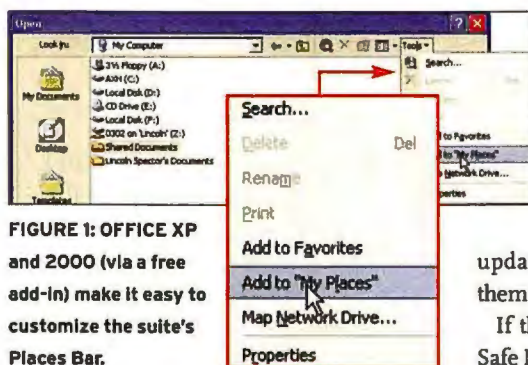
**?** I TRIED CUSTOMIZING my dialog box Places Bar, per your September 2002 column ["Customize Dialog Boxes," [find.pcworld.com/31955](http://find.pcworld.com/31955)], but it doesn't affect the dialog boxes in Word or Excel. How do I change these?

*Gary Smith, Winter Springs, Florida*

THE WINDOWS and Office dialog box Places Bars (both of which were added in the 2000 versions of the programs) look and behave identically. But customizing one doesn't alter the other. Go figure.

If you have Office 2000, you can easily customize the bar with Microsoft's Office 2000 COM Add-In ([find.pcworld.com/31958](http://find.pcworld.com/31958)). Once you've installed the add-in, you can bring up a Set Places dialog box by selecting *Tools•Set Places*.

To add a folder to Office XP's Places Bar, open any Office dialog box with a Places Bar, navigate to and select (but don't open) the desired folder, and choose *Tools•Add to "My Places"* in the upper-right corner of the dialog box (see **FIGURE 1**). Your folder will appear at the bottom of the bar. Right-click any of the Places icons for available options to move or remove them.



**FIGURE 1:** OFFICE XP and 2000 (via a free add-in) make it easy to customize the suite's Places Bar.

98 SE, or if the patch does no good, you'll have to do a little diagnostic testing. Select *Start•Run*, type *msconfig*, press <Enter>, and click the *Startup* tab (if you use Windows 2000, see "Msconfig for Windows 2000 and 95" at [find.pcworld.com/31946](http://find.pcworld.com/31946)). Note any unchecked items on the list.

Now click the *General* tab, and choose *Selective startup*. Uncheck *Load Startup Items*, click OK, and reboot your computer. Shut down Windows and see whether your computer turns off correctly.

If it does, the problem is in something that loads at start-up. Back in Msconfig, click the *Startup* tab, check a listing, click OK, and reboot; then exit Windows and see whether the shutdown problem recurs. Repeat this process with a different listing until you find the culprit. At that point, you have two options: You can decide not

Send questions to [answer@pcworld.com](mailto:answer@pcworld.com). Answer Line pays \$50 for published items. See [find.pcworld.com/31577](http://find.pcworld.com/31577) for more Answer Line columns. Visit Contributing Editor Lincoln Spector's site at [www.thelinkinspector.com](http://www.thelinkinspector.com).

### WAIT FOR THE VIRUS CHECK

DOES YOUR E-MAIL program load when you boot your computer? And does it start downloading your mail as soon as it loads? If so, it might be downloading messages before your antivirus program is ready to check them, which could expose your PC to e-mail viruses. The solution is to instruct your e-mail client not to check for new mail automatically when it loads. In Outlook Express, select *Tools•Options*. On the *General* tab, uncheck *Send and receive messages at startup*. Once you know that your antivirus program is properly protecting you, you can start to download your new messages.





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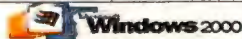
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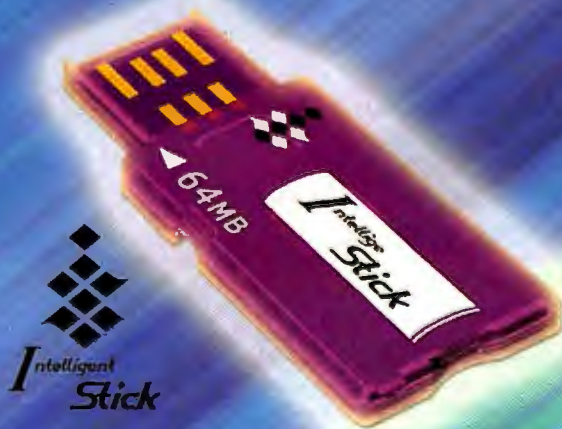
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## LEGAL NOTICE

# IF YOU PURCHASED A SUBSCRIPTION TO THIS OR ANOTHER MAGAZINE, THE FOLLOWING PROPOSED CLASS ACTION SETTLEMENT MAY AFFECT YOUR RIGHTS

This notice describes a proposed nationwide settlement of class action lawsuits relating to magazine subscriptions that has been reached in *In Re Magazine Antitrust Litigation*, 00 Civ. 4889 (S.D.N.Y.) (the "Action"), and preliminarily approved by the U.S. District Court for the Southern District of New York (the "Court").

**PLEASE NOTE THAT THE PROPOSED SETTLEMENT DOES NOT PROVIDE FOR THE PAYMENT OF MONEY OR OTHER COMPENSATION TO THE CLASS MEMBERS BUT INSTEAD SOLELY ADDRESSES CERTAIN INDUSTRY RULES AND PRACTICES THAT WERE DIRECTLY CHALLENGED IN THE ACTION AS BEING UNLAWFUL (SEE "THE CLAIMS IN THE LAWSUIT" SECTION BELOW).**

This announcement is intended to give class members notice under Rule 23 of the Federal Rules of Civil Procedure and the Order of the Court dated September 20, 2002, as modified on September 30, 2002, that a hearing will be held before the Hon. Richard Conway Casey on May 27, 2003 at 11:00 a.m. to determine whether: (a) to certify the proposed settlement class under Rule 23; (b) the proposed settlement of the Action is fair, reasonable and adequate; (c) a final judgment should be entered dismissing the Action with prejudice to the class members; and (d) to approve class counsels' application for attorneys' fees and expenses. The rest of this notice summarizes the terms of the proposed settlement. You can obtain a copy of the settlement agreement, the Consolidated Amended Class Action Complaint (the "Complaint"), and a list of the magazine subscriptions at issue in the Action, at [www.magazine.org](http://www.magazine.org) or by writing to The Garden City Group, Inc., the Administrator of the Notice Program, at Magazine Antitrust Litigation, P.O. Box 9000 # 6041, Merrick, NY 11566-9000 (the "Administrator"). **ANY QUESTIONS AND COMMUNICATIONS REGARDING THIS NOTICE OR THE SETTLEMENT SHOULD BE DIRECTED TO THE ADMINISTRATOR AT THE ADDRESS LISTED ABOVE OR BY CALLING 1-888-210-0118. PLEASE DO NOT CONTACT THE ADMINISTRATOR WITH QUESTIONS REGARDING YOUR CURRENT SUBSCRIPTIONS UNLESS THOSE QUESTIONS RELATE TO THE CLASS ACTION SETTLEMENT.**

**DO NOT CONTACT THE COURT, COUNSEL TO THE PARTIES, PC WORLD OR ANY PUBLISHER REGARDING THIS NOTICE. THE ADMINISTRATOR, WHERE APPROPRIATE, WILL REFER ANY QUESTIONS TO THE APPROPRIATE PERSON.**

### The Claims in the Lawsuit

The Complaint was filed in this Action in or about October 2000, against the Magazine Publishers of America ("MPA"), a consumer magazine trade association, and fourteen magazine publishing companies (the "Publisher Defendants"). The Complaint alleged an agreement among the Publisher Defendants and the MPA to set the minimum price of or maximum discount on magazine subscriptions through the enactment of MPA Guideline 4(a) and/or the collective action among publishers to adhere to the ABC's 50% Rule (as referred to in ¶45 of the Complaint) or the similar Rule of the BPA International pertaining to its definition of "paid circulation." The Complaint asked the Court to eliminate or modify Guideline 4(a) and to award damages that allegedly were suffered by consumers who purchased subscriptions to the Publisher Defendants' magazines.

The defendants have denied the material allegations of the Complaint. The parties have now agreed to settle the Action in its entirety. On September 20, 2002, the Court preliminarily approved the settlement.

### Terms of the Proposed Settlement

In the proposed settlement, the defendants have agreed to do two things: (i) the MPA shall delete in its entirety MPA Guideline 4(a); and (ii) the defendants shall defray the costs incurred in connection with the Action, including the costs of the Notice program involving notifying class members of the terms and conditions of the proposed settlement and the Plaintiffs' actual attorneys' fees and expenses awarded by the Court up to \$1.1 million.

In exchange, the Plaintiffs have agreed that, if the settlement is approved, the Court will enter a judgment dismissing the Action with prejudice, and the named Plaintiffs and all class members who have not duly opted-out of the class will be deemed to be subject to the release in this case, which provides as follows: "As of the date on which the Agreement is Finally Approved, the Publisher Defendants and the MPA . . . shall be completely released, acquitted, and forever discharged, from any and all claims, demands, actions, suits, causes of action, injuries or damages, whether class, individual or otherwise in nature, that Plaintiffs, the Class Members or each of them, in his or her capacity as a

subscriber to a magazine, ever had or now has, in law or equity, under federal or state law, relating to an agreement to set the minimum price of or maximum discount on magazine subscriptions through the enactment of MPA Guideline 4(a) and/or the collective action among publishers to adhere to the ABC's 50% Rule (as referred to in ¶45 of the Amended Complaint) or the similar Rule of the BPA International pertaining to its definition of 'paid circulation.'"

The release also releases class action claims that were previously brought (but subsequently dismissed without prejudice) by a plaintiff in the State Court in San Diego, California, who asserted similar allegations against the defendants albeit based on violations of California state laws. The California action was styled *Coossan v. Hearst Corp., et. al.*, No. GIC 752985. A copy of the Coossan Complaint can be obtained at [www.magazine.org](http://www.magazine.org).

### Who are the Publisher Defendants?

The Publisher Defendants are: Condé Nast Publications, Inc.; Gruner + Jahr Printing and Publishing Company; Hachette Filipacchi Media U.S., Inc. (f/k/a Hachette Filipacchi Magazines, Inc.); The Hearst Corporation; International Data Group, Inc.; Meredith Corporation; Newsweek, Inc.; Primedia, Inc.; Reader's Digest Association, Inc.; Rodale Inc.; Time Inc.; Time4Media, Inc. (f/k/a Times Mirror Magazines, Inc.); TV Guide, Inc. and Ziff-Davis Publishing, Inc.

### Who is in the Class?

Class Members are those persons who purchased a subscription to this publication or to other publications that were published by any of the Publisher Defendants during the period from and including July 1, 1996 up to and including April 15, 2002 (the "Class"). For purposes of determining inclusion in the Class, it does not matter whether you purchased your subscription from one of the Publisher Defendants, or through agents, subagents or other third party marketers. You are not, however, a member of the Class if you did not purchase a magazine subscription within the time period stated above, or if you purchased your magazines only at newsstands.

### Your Right to Object to the Proposed Settlement

You have the right to appear, in person or by counsel, at the hearing on the proposed settlement in order to comment on, or object to, the terms of the proposed settlement, its adequacy or reasonableness and/or the award of attorneys' fees and expenses to class counsel. However, you will only be heard at that time if you first, by May 5, 2003, (a) file with the Court a notice of your intention to appear, which includes the basis for your objection, a statement identifying the magazines to which you subscribed, and the approximate time period of each such subscription; and (b) serve copies of the notice (and all other papers you intend to rely upon) by hand or first class mail on Plaintiffs' co-lead counsel, Bruce E. Gerstein, Esq., Garwin, Bronzaft, Gerstein, & Fisher, LLP, 1501 Broadway, Suite 1416, New York, NY 10036 and H. Laddie Montague, Jr., Esq., Berger & Montague, 1622 Locust Street, Philadelphia, PA 19103, and on Defendants' coordinating counsel, Lawrence I. Fox, Esq. at McDermott, Will & Emery, 50 Rockefeller Plaza, 11th Floor, New York, New York 10020.

### Your Right to Opt-Out of the Settlement

ALTHOUGH YOU HAVE THE RIGHT TO APPEAR AT THE HEARING, YOU HAVE NO OBLIGATION TO DO SO. If you do not wish to participate in or be bound by the proposed settlement, you can exclude yourself (i.e., "opt-out"). To opt out, you MUST send a request for exclusion in an envelope POSTMARKED NO LATER THAN May 5, 2003 to the Administrator of the Notice Program Magazine Antitrust Litigation, P.O. Box 9000 # 6041, Merrick, NY 11566-9000. The request for exclusion must state your full name, the magazine(s) to which you subscribed and the approximate time period of each subscription, and the address to which your magazines were sent. IF YOU DO NOT EXCLUDE YOURSELF, you will be barred from prosecuting any legal action against the MPA or its members and the Publisher Defendants to the full extent of the release set forth in the "Terms of the Proposed Settlement" section above.

### Examination of Papers and Inquiries

For a more detailed statement of the matters involved in the Action, including the Complaint, the settlement agreement, motion papers and certain orders of the Court, you may visit the office of the Clerk of the United States District Court, 500 Pearl Street, New York, New York, during business hours. Copies of the papers relating to the settlement are also available at [www.magazine.org](http://www.magazine.org).





## Why the Future Belongs to the Phone

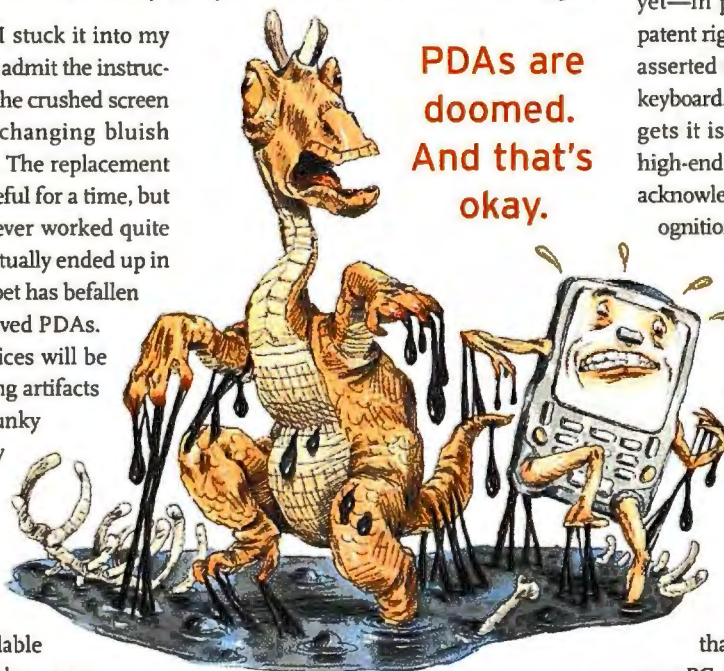
I'VE TESTED DOZENS of PDAs over the years, but the only one I ever bought was the Rex Pro. This little marvel of 1998 technology packed screen and memory into a slim, light package that was actually a PC Card—one I was positive I'd carry everywhere without a second thought.

But a day or two after I stuck it into my wallet—a practice that I admit the instructions warned against—the crushed screen ended up as an ever-changing bluish example of abstract art. The replacement Rex was moderately useful for a time, but its syncing software never worked quite right, and the unit eventually ended up in a drawer—a fate that I bet has befallen many other briefly beloved PDAs.

Eventually these devices will be remembered as amusing artifacts of an era when big, clunky cell phones could barely display a single line of capital letters. Today, new wireless phones have lots of memory, plenty of processing power, and highly readable screens. There should be no reason for you to carry two devices; PDA functions belong in your phone.

This is not to say that PDA makers won't keep trying. Palm, for instance, has slashed prices to \$99 for its stripped-down Zire and put Bluetooth in its wildly overpriced Tungsten T. But once your phone can sync with your calendar and your contact list, the Zire is just one more battery you have to manage. And spending extra for a Bluetooth phone so you can dial it with your Tungsten while performing a three-handed juggling act seems the height of techie ludicrousness. At least more and

**PDAs are doomed. And that's okay.**



more PDAs this year will come with Wi-Fi built in, which should keep them useful for people who use specialized applications and for road warriors who want a quick hit of e-mail with their lattes.

Phone-based or not, PDAs need better software. It's ridiculous that Pocket PCs screw up formatting in Microsoft's own Office files. (DataViz's Palm-based Documents To Go lets you edit complex Office documents and preserve their original look.) Likewise, synchronization needs to improve. At the moment, if you use your Pocket PC to access a POP3 e-mail ac-

count, you can't sync even your sent messages to the Outlook folders on your desktop. That's just plain goofy.

And phone-based or not, PDAs need keyboards. This notion hasn't caught fire yet—in part, I suspect, because of the patent rights that Research In Motion has asserted over its nice BlackBerry thumb keyboard. Interestingly, one company that gets it is Handspring. Every one of its high-end models sports a keyboard. This acknowledgment that block-printing recognition was only a stopgap comes from folks who invented Graffiti.

But whatever happens with software and input options, the march of the PDA to the phone is inexorable. Use T-Mobile's Sidekick or a Handspring Treo for a week, and you'll see. Somebody's not in your contact list? Look 'em up on the Web. For data, you don't need to rely on a page clipper that delivers content no fresher than the last time you synced with your PC. And your e-mail's always current.

The biggest remaining limitations of phone-based PDAs are short-lived batteries and irritating holes in data networks. Manufacturers will address the first problem when they come to the shocked realization that any phone-based device should have a removable battery. And the second? Not even the latest phone/PDA combo can tell me that. ■

Visit [find.pcworld.com/31595](http://find.pcworld.com/31595) for more columns by Contributing Editor Stephen Manes. He has been writing about PCs for nearly two decades.



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#### NEW Mainstream Desktop Solution

- Intel® Pentium® 4 Processor at 1.80GHz
- 128MB Shared<sup>™</sup> DDR SDRAM
- NEW 30GB<sup>†</sup> (7200 RPM) Ultra ATA/100 Hard Drive
- 15" (13.8" v.i.s.) E551 Monitor
- Integrated Intel® 3D Extreme Graphics
- 48x CD-ROM; Integrated Audio
- Harman Kardon HK-206 Speakers
- Integrated 10/100 Ethernet
- Windows® XP Home Edition; WordPerfect® Productivity Pack
- 1-Yr Limited Warranty; 1-Yr On-Site Service<sup>‡</sup>

**\$599** as low as **\$17/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S50105y

#### Recommended upgrades:

- 256MB Shared<sup>™</sup> DDR SDRAM, add \$60
- Windows® XP Professional, add \$60

### Dimension™ 4550 Desktop

#### NEW Advanced Desktop Solution

- Intel® Pentium® 4 Processor at 2GHz
- 256MB DDR SDRAM
- NEW 30GB<sup>†</sup> (7200 RPM) Ultra ATA/100 Hard Drive
- 17" (16.0" v.i.s.) E772 Monitor
- 32MB ATI® RAGE™ Ultra Graphics Card
- 40x/10x/40x CD Burner; Integrated Audio
- Integrated Intel® PRO 10/100 Ethernet
- Windows® XP Home Edition; Works Suite 2003 with Money Standard
- 1-Yr Limited Warranty; 1-Yr On-Site Service<sup>‡</sup>

**\$799** as low as **\$23/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S50107y

#### Recommended upgrades:

- NEW 60GB<sup>†</sup> Ultra ATA/100 Hard Drive, add \$40
- 3-Yr Limited Warranty; 3-Yr On-Site Service<sup>‡</sup>, add \$119

### OptiPlex™ GX260 Desktop

#### Network-Optimized, High-Performance PC

- Intel® Pentium® 4 Processor at 2.40GHz
- 256MB Shared<sup>™</sup> DDR SDRAM
- 40GB<sup>†</sup> (7200 RPM) Hard Drive
- Integrated Intel® Extreme Graphics
- 40x CD Burner
- Integrated Intel® PRO Gigabit<sup>™</sup> Network Connection
- Office XP Small Business and Adobe® Acrobat® 5.0 Bundle; Windows® XP Professional
- 3-Yr Next Business Day On-Site Service<sup>‡</sup>
- Monitor Not Included

**\$999** as low as **\$29/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S30109

#### Recommended upgrades:

- 15" Dell™ UltraSharp™ 1504 Flat Panel Monitor, add \$399
- 3-Yr Same-Day 4-Hour (5x10) On-Site Service<sup>‡</sup>, add \$99



## Dell | Small Business Notebooks

### Inspiron™ 2650 C Notebook

#### Affordable Performance Notebook

- Mobile Intel® Celeron® Processor at 1.50GHz
- 14.1" XGA TFT Display
- 128MB DDR PC2100 SDRAM
- 20GB<sup>†</sup> Ultra ATA Hard Drive
- 16MB DDR NVIDIA® GeForce2 Go™ 100 AGP 4X Graphics
- Fixed Internal 24x CD-ROM Drive
- Internal Modem and NIC Included
- Windows® XP Home Edition; WordPerfect® Productivity Pack with Quicken® New User Edition
- 1-Yr Mail-In Service

**\$899** as low as **\$25/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S80108

#### Recommended upgrades:

- Dell TrueMobile™ 1150 Wireless Networking PC Card, add \$69
- Windows® XP Professional, add \$79

### SmartStep™ 250N Notebook

#### NEW Easy-to-Buy, Pre-Built Notebook

- Intel® Pentium® 4 Processor at 2.40GHz
- 15" Super XGA+ TFT Display
- 512MB DDR PC2100 SDRAM
- 40GB<sup>†</sup> Ultra ATA Hard Drive
- 32MB DDR ATI® MOBILITY™ RADEON AGP 4X Graphics
- Fixed Internal 24x CD-RW/DVD Combo Drive
- Internal Modem and NIC Included
- Windows® XP Home Edition; WordPerfect® Productivity Pack with Quicken® New User Edition
- 1-Yr Mail-In Service

**\$1649** as low as **\$47/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S80116

#### Recommended upgrade:

- 1-Yr CompleteCare™ Accidental Coverage<sup>‡</sup>, add \$99
- External TrueMobile™ 1150 Wireless Networking PC Card, add \$69

### Latitude™ C640 Notebook

#### Network-Optimized Mobility Notebook

- Mobile Intel® Pentium® 4 Processor-M at 2GHz
- 14.1" XGA Active Matrix Display
- 128MB DDR PC2100 SDRAM (Up to 1GB)
- 20GB<sup>†</sup> Ultra ATA/100 Hard Drive
- 32MB DDR AGP 4X ATI® Radeon™ Video
- Modular 24x CD-ROM/Floppy Drive
- Internal Modem and NIC Included
- Internal Wireless-Ready Antenna
- Windows® XP Professional
- 3-Yr Mail-In Service

**\$1449** as low as **\$42/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S70114

#### Recommended upgrades:

- 8x DVD-ROM, add \$129
- 3-Yr CompleteCare™ Accidental Coverage<sup>‡</sup>, add \$169



## Dell | Servers and Workstations

### PowerEdge™ 600SC Server

#### NEW Entry-Level Value Server

- Intel® Celeron® Processor at 1.70GHz
- 128MB 200MHz ECC DDR SDRAM
- Upgradeable to 4GB of Memory
- 40GB<sup>†</sup> (7200 RPM) IDE Hard Drive
- Upgradeable to 480GB<sup>†</sup> of Internal Hard Drive Storage
- Embedded Intel® PRO Gigabit<sup>™</sup> NIC
- Five PCI Expandability Slots (4-64/33MHz, 1-32/33MHz)
- 1-Yr 24x7 Dedicated Server Phone Tech Support
- 1-Yr Next Business Day On-Site Service<sup>‡</sup>
- Small Business Pricing

**\$449** as low as **\$13/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S20104

#### Recommended upgrades:

- Intel® Pentium® 4 Processor at 1.80GHz, add \$100
- System Including Windows® 2000 Server, only \$1249

### PowerEdge™ 1600SC Server

#### NEW Reliable, High-Performance Server

- Intel® Xeon™ Processor at 1.80GHz
- Dual Intel® Xeon™ Processor Capable (Up to 2.80GHz)
- 128MB 200MHz ECC DDR SDRAM (Up to 4GB)
- 18GB<sup>†</sup> (10K RPM) Ultra320 SCSI Hard Drive
- Upgradeable to 438GB<sup>†</sup> of Internal Hard Drive Storage
- Embedded Intel® PRO Gigabit<sup>™</sup> 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 Service<sup>‡</sup>
- Small Business Pricing

**\$899** as low as **\$26/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S20108

#### Recommended upgrades:

- Hot-Swap Hard Drive Capability, add \$100
- PowerConnect 2124™ 24+1 Ethernet Switch, add \$299

### Dell Precision™ 350 Workstation

#### NEW Affordable, Scalable Performance Workstation

- Intel® Pentium® 4 Processor at 2.26GHz
- 128MB Dual-Channel PC1066 RDRAM
- 20GB<sup>†</sup> (7200 RPM) EIDE Hard Drive
- 32MB ATI® RADEON™ VE VGA AGP 4X Graphics
- 48x CD-ROM Drive; Integrated Sound
- Integrated Intel® PRO Gigabit<sup>™</sup> Network Connection
- Windows® XP Professional; Mini-Tower Chassis
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- 3-Yr Next Business Day On-Site Service<sup>‡</sup>
- Monitor Not Included

**\$849** as low as **\$25/mo.**, (46 pmts.<sup>‡</sup>)  
60 Days Same-As-Cash  
E-VALUE Code: 16043-S40108

#### Recommended upgrades:

- 3-Yr Same-Day 4-Hour (5x10) On-Site Service<sup>‡</sup>, add \$199
- 15" Dell UltraSharp™ 1504 Flat Panel Monitor, add \$449

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- 17" (16.0" v.i.s.) E772 Monitor
- 32MB ATI® RAGE™ Ultra Graphics Card
- NEW 48x/24x/48x CD Burner; Integrated Audio
- Integrated Intel® PRO 10/100 Ethernet
- Windows® XP Home Edition; Works Suite 2003 with Money Standard
- 1-Yr Limited Warranty; 1-Yr On-Site Service\*

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E-VALUE Code: 16044-S50108y

#### Recommended upgrades:

- Harman Kardon HK-395 Speakers with Subwoofer, add \$40
- 3-Yr Limited Warranty; 3-Yr On-Site Service; add \$119



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processor at up to 3.06GHz. Not to mention that it's a system that will grow with you, allowing you to easily add software and peripherals as needed. So you get one powerful desktop, built just for you, that's backed by Dell's award-winning service and support. The NEW Dell Dimension 4550, considering everything you're getting, it's a wonder the price doesn't have more zeroes.

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