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TROUBLESHOOTING

FAST RELIEF FOR THE BIGGEST WINDOWS, **HARDWARE & WEB HEADACHES**



HP COMPAQ N1020V NOTEBOOK

\$949

Lease for \$40

Intel® Celeron® processor 1.60 GHz
14.1" XGA TFT Display
256MB DDR SDRAM
20GB SMART Ultra-ATA Hard Drive*
CD-ROM Drive
1.44MB Floppy Drive
ATI Radeon IGP 340M Integrated UMA 4X
AGP Graphics with 64MB DDR SDRAM Shared
Integrated Mini PCI 56K V.92 Modem¹¹
Integrated 10/100 NIC
Microsoft® Windows® XP Professional

HP COMPAQ N1020V NOTEBOOK

1-Year Worldwide Limited Warranty

\$1,449 lease for \$61

Intel® Pentium® 4 processor 2.40 GHz
15" XGA TFT Display
256MB DDR SDRAM
40GB SMART Ultra-ATA Hard Drive®
DVD/CD-RW Drive
1.44MB Floppy Drive
ATI Radeon IGP 340M Integrated UMA 4X
AGP Graphics with 64MB DDR SDRAM Shared
Integrated Mini PCI 56K V.92 Modem¹¹
Integrated 10/100 NIC
Microsoft® Windows® XP Professional
1-Year Worldwide Limited Warranty³



COMPAQ EVO N620C NOTEBOOK

\$1,799

a month.

Mobile Intel® Pentium® 4 Processor 1.40 GHz - M 14.1" TFT XGA Display 256MB DDR SDRAM 40GB SMART Ultra-ATA Hard 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 Modem¹¹
Integrated 10/100/1000 (gigabit) NIC
Microsoft® Windows® XP Professional
3-Year Worldwide Limited Warranty²

COMPAQ EVO N620C NOTEBOOK

\$2,449 Lease for \$103 a month.

Mobile Intel[®] Pentium[®] 4 Processor 1.60 GHz · M

14.1" TFT SXGA Display 512MB DDR SDRAM 60GB SMART Ultra-ATA Hard Drive*

DVD/CD-RW Combo 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 Modem¹¹ Integrated 10/100/1000 (gigabit) NIC Microsoft[®] Windows[®] XP Professional

3-Year Worldwide Limited Warranty[‡]

HP WORKSTATION XW4000 WITH 19" MONITOR

\$1,199

Lease for \$50 a month**

Intel® Pentium® 4 processor 2.40 GHz 40GB Ultra ATA 100 (7200 rpm) 128MB DDR SDRAM nVidia 200NVS Graphics Controller 16X CD-RW/DVD Combo Drive¹¹ Integrated AC97 Audio

Integrated Intel® PRO/100 VM Network

Microsoft[®] Windows[®] XP Professional 3-Year Worldwide Limited Warranty¹ P930 19" Flat CRT Monitor

HP WORKSTATION XW6000

\$1,449 Lease for \$61

Intel[®] Xeon^{1M} processor 2.40 GHz 36GB U320 SCSI Hard Drive (10,000 rpm) 512MB DDR SDRAM

nVidia 200NVS Graphics Controller Integrated Dual Channel Ultra320 SCSI and Ultra ATA/100

48X Max CD-ROM Drive

Integrated AC97 Audio

Integrated Gigabit (10/100/1000) Ethernet Controller

Microsoft® Windows® XP Professional 3-Year Worldwide Limited Warranty

Get even more:

L1825 18" TFT Monitor: Add \$699



0% FOR 24 MONTHS.

For a limited time, get 0% lease rate on qualifying purchases made before July 31, 2003.** Visit us at www.hp.com for additional offers.

Enhance your system.



HP DESKJET 3820 COLOR PRINTER

\$99

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

HP OFFICEJET V40XI ALL-IN-ONE

\$149

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

HP DESKJET 450CI MOBILE PRINTER

\$299

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

HP LASERJET 1300 PRINTER

\$399

High-performance personal printer True 1200 dpi 20 ppm rich black text



iPAQ™ H1910 POCKET PC

\$29999

Extend your desktop's capabilities with the lightest & thinnest iPAQ^{IM} Pocket PC.
Intel® XScale Processor, 200 MHz
64MB SDRAM; 16MB NANDFlash ROM
Removable 900 MAH Battery

iPAQ™ H3950 POCKET PC

\$499

Lease for \$21 a month**

The most powerful & expandable iPAQ[™] Pocket PC with new dazzling display.

Intel[®] XScale Processor, 400 MHz

64MB SDRAM; 32MB StrataFlash ROM

iPAQ™ H5450 POCKET PC

\$699 Lease for a month

Indispensable wireless tool with built-in WiFi, Bluetooth™, & fingerprint security.

Intel® XScale Processor, 400 MHz

64MB SDRAM; 48MB StrataFlash ROM

All iPAQ Pocket PCs above include:

Ultrabright, transflective TFT Display with 65,536 colors — Integrated SD memory card slot (SDIO enabled on h5450) — Microsoft® Pocket PC 2002 — 1-Year Worldwide Limited Warranty[‡]



HP TC2120 SERVER

\$549

Lease for \$23 a month**

Intel® Celeron® processor 1.80 GHz 128MB ECC DDR SDRAM Memory, upgradeable to 4GB

40GB Ultra ATA Hard Drive*

NC7760 Gigabit Network Controller (embedded)

1-Year Worldwide Limited Warranty[‡]

HP PROLIANT ML310 SERVER

\$1,048 Lease for \$44

Intel® Pentium® 4 processor 2.53 GHz 256MB ECC DDR SDRAM Memory, upgradeable to 4GB

40GB Ultra ATA Hard Drive*

NC7760 Gigabit Network Controller (embedded)

ProLiant Essentials Foundation Pack (includes SmartStart^{IM} & Insight Manager^{IM})

1-Year Worldwide Pre-Failure Warranty

HP PROLIANT ML350 SERVER

\$1,938

upgradeable to 8GB

Intel[®] Xeon[™] processor 2.40 GHz 256MB ECC DDR SDRAM Memory,

36.4GB U320 Universal Hard Drive*

NC7760 Gigabit Network Controller (embedded)

ProLiant Essentials Foundation Pack (includes SmartStart™ & Insight Manager™)

3-Year Worldwide Pre-Failure Warranty



small and medium business

Designed to raise performance levels. Not your accountant's eyebrows.

The performance of this Compaq Evo D310 Microtower is expected, but at just \$549, the price certainly isn't. The D310 is designed to do what every small or medium-sized business needs done. Which is practically anything these days. And to make your life easier, the D310 is backed with HP's acclaimed technical service and support. Like the other HP office products pictured here, its engineering is smart, affordable and designed to work with your existing network. So you can rely on it for years to come.



FVO DOLO

COMPAQ EVO D310 MICROTOWER

\$549

Lease for \$23

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 Home
1-Year Worldwide Limited Warranty*



COMPAQ EVO D310V

\$459 Lease for \$20 a month.

Intel® Celeron® processor 1.80 GHz
128MB PC2100 DDR SDRAM
40GB Ultra ATA Hard Drive®
48X Max CD-ROM Drive®
Integrated Intel® Extreme AGP Graphics
Integrated AC97 Audio
Integrated Intel® PRO 10/100 NIC
Microsoft® Windows® XP Home
1-Year Worldwide Limited Warranty®





monitor not included

COMPAQ EVO D510 SMALL FORM FACTOR

\$699

Lease for \$30 a month**

Intel® Pentium® 4 processor 2.26 GHz 128MB PC2100 DDR SDRAM 40GB Ultra ATA Hard Drive* 48X Max CD-ROM Drive*

Integrated Intel® Extreme AGP Graphics
Integrated Intel® Audio

Integrated Intel® PRO/100 VM Network

Microsoft® Windows® XP Professional 3-Year Worldwide Limited Warranty

Get even more:

\$7500 17" CRT Monitor: Add \$150 1501 15" TFT Monitor: Add \$300

Offer ends 6/15/03



manitor not included

COMPAQ EVO D510 SMALL FORM FACTOR

\$799

Lease for \$34 a month**

Intel® Pentium® 4 processor 2.40 GHz 256MB PC2100 DDR SDRAM 40GB Ultra ATA Hard Drive* 48X Max CD-RW Drive* Integrated Intel® Extreme AGP Graphics

Integrated Intel® Audio
Integrated Intel® PRO/100 VM Network
Connection

Microsoft® Windows® XP Professional 3-Year Worldwide Limited Warranty¹

Get even more:

\$7500 17" CRT Monitor: Add \$150 1501 15" TFT Monitor: Add \$300 Offer ends 6/15/03



manitor not included

COMPAQ EVO D510 SMALL FORM FACTOR

\$999

Lease for \$42

Intel® Pentium® 4 processor 2.66 GHz 512MB PC2100 DDR SDRAM 80GB Ultra ATA Hard Drive* 48X Max CD-RW Drive^{‡‡}

Integrated Intel® Extreme AGP Graphics Integrated Intel® Audio

Integrated Intel® PRO/100 VM Network Connection

Microsoft® Windows® XP Professional 3-Year Worldwide Limited Warranty

Get even more:

S7500 17" CRT Monitor: Add \$150 1501 15" TFT Monitor: Add \$300 Offer ends 6/15/03



HP recommends Microsoft® Windows® XP Professional for Business.



Introducing Intel Centrino mobile technology. The new wireless notebook technology designed specifically for the wireless world.

It not only lets you work, play and connect without wires, it enables extended battery life in a new generation of high-performance notebooks that are thinner and lighter.

This is your invitation to unwire your life.

Unwire right now at intel.com.



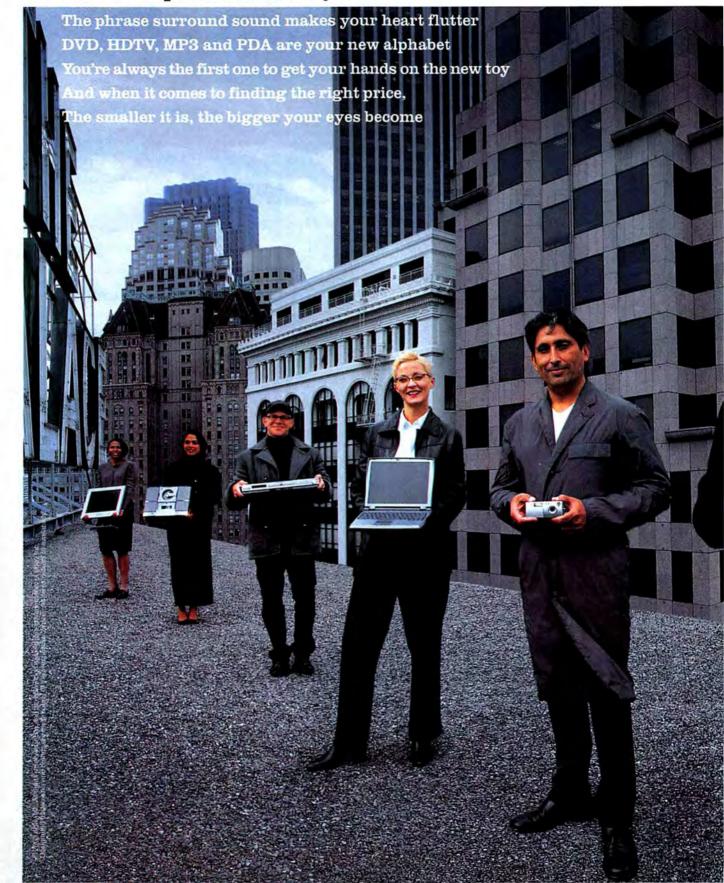


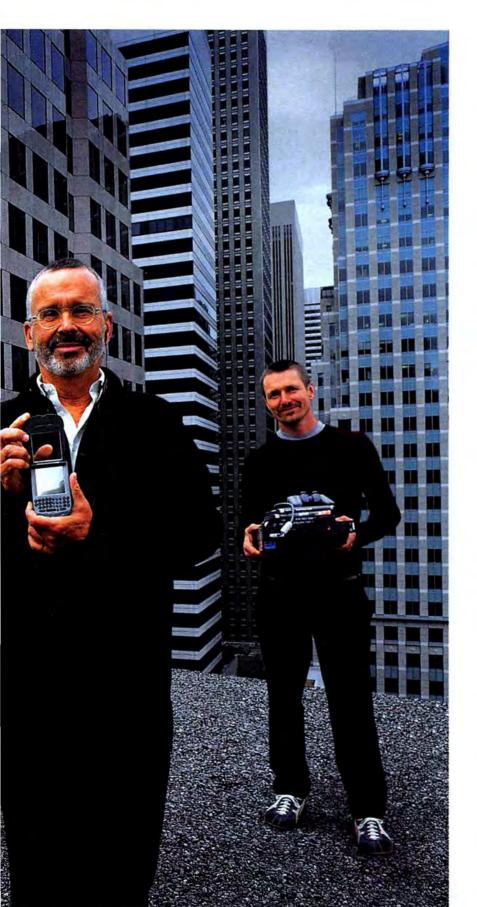






The word plasma excites you





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

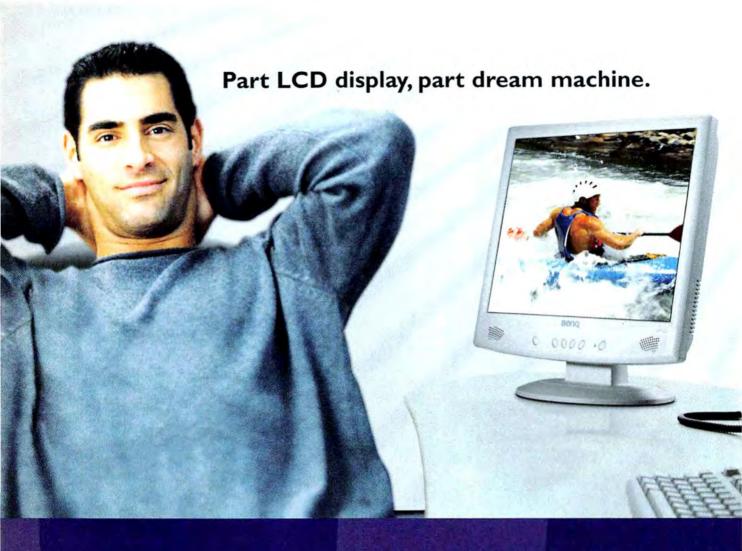
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A+ panel quality delivers colorful, lifelike images. Your computer display is more than a monitor, it's a window to your world. Every BenQ LCD display features an A+ panel inside. That means you're buying

A+ PANEL QUALITY a display that rates near the top of the industry's stringent panel quality ranking standards. Colors are vibrant, images are brilliant, the experience is breathtaking. A lightning fast 16ms response time also means that video playback is

razor sharp and ghost-free – perfect for multimedia and DVD viewing. Backed by a rock solid, three-year warranty, BenQ LCDs are the perfect tools for viewing, reflecting, and dreaming.

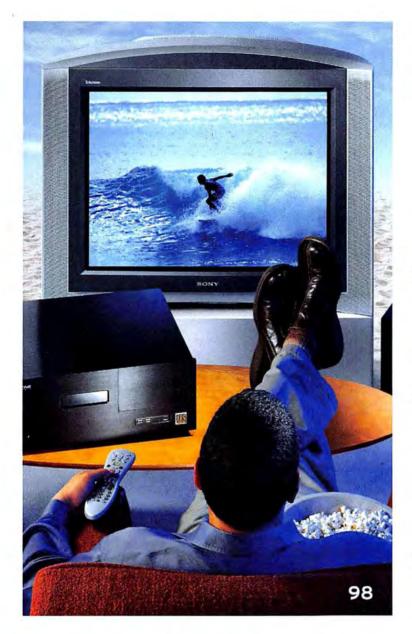
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Benq

Enjoyment Matters



TROUBLESHOOTING SECRETS

86 How to Troubleshoot the Worst PC Disasters

Sometimes things go wrong in a big way. Drives stop working. Files disappear. Network connections die. But don't despair-simply follow these essential troubleshooting tips to recover when the worst that could happen happens. And in case all else fails, we throw in a few unconventional tricks that just might save the day.

Cover graphics by Diego Aguirre



. PCWORLD. COM

FEATURES

PC ENTERTAINMENT

98 The Entertainers

A PC in the living room? How about one that lets you watch DVD movies, view and record TV, and listen to digital music? We look at six home theater PCs, and tell how you can make any system media-savvy.

DO-EVERYTHING PRINTERS

113 Copy Shop in a Box

Multifunction printers turn in the print speeds and quality of a midrange dedicated ink jet-but they also scan, copy, and fax. We look at seven top models.

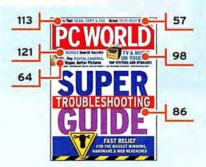


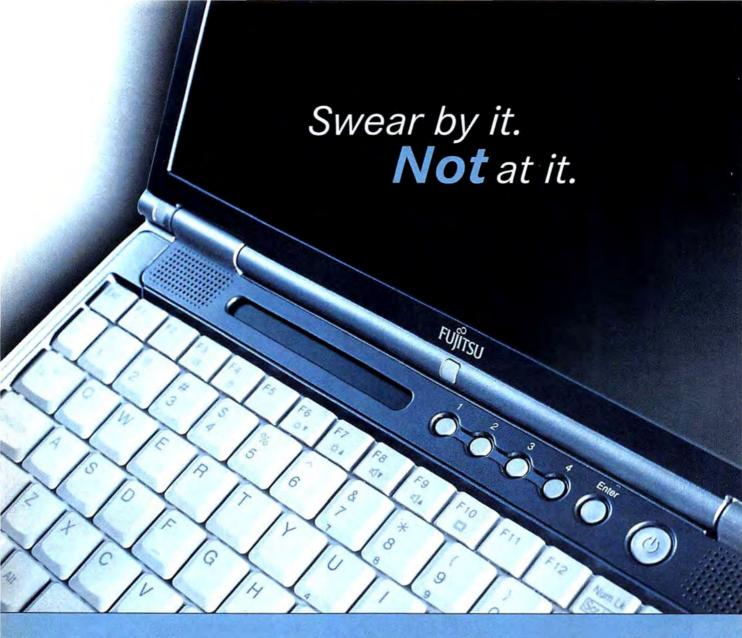
GOOGLE TIPS

121 Maximum Google

Google is probably the most popular-and most powerful-search engine around. We uncover features and tools that can make your Web searches even faster, more accurate, and more enjoyable. Plus, advice on when to consult five top alternative engines.

ON THE COVER





Common Swear Words | Innovative. Reliable. Dependable.

The Fujitsu® LifeBook® S6000 notebook, with Intel® Centrino™ mobile technology, gives you all the power and unwired access you need to work on anything, anywhere. Its super thin and ultra light design lets it easily fit into



your always-on-the-go lifestyle. But what really sets it apart is how we build it. While other notebooks may use contract manufacturers, the LifeBook S6000 notebook is designed, built and tested for mobile users by Fujitsu. With a legendary focus on quality, service and reliability. Which means you'll only swear by it, never at it. To learn why the LifeBook S6000 notebook should be your new system, visit www.fujitsupc.com/swear or call 1.877.372.3473.

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



THE POSSIBILITIES ARE INFINITE

TOP 100

- 128 Digital Cameras in Focus Better lenses, higher prices.
- 130 Top 15 Desktop PCs
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Free Must-Have Utilities Benchmark your CPU, debug Windows, and adjust hidden settings, find.pcworld.com/35252

COMING UP IN JULY

World Class: Our editors pick the year's top products and services systems, gadgets, software, Web sites, and everything in between. Digital Photography: We take a look at the hottest new cameras.

REVIEWS

130

Top 10 DVD Drives
One Best Buy writes to DVD+RW
discs at 4 MBps, its maker says.
find.pcworld.com/35255

and offer advice on organizing, editing, and printing your photos. Antivirus Roundup: We find the best products for killing viruses, plus new tools for detecting and removing spyware from your PC.

NEWS & TRENDS

24 LCD Specs: Useless?

Contrast ratios are a major selling point for LCD monitors—but our tests reveal that vendors' published specs often vary widely from reality.

30 A Fast Bus, but Catch It Later

Intel has released a new chip set with a faster frontside bus. Still, for a real boost in performance, you may have to wait for the next ride.

32 Cool Color Laser for Under \$700

A new laser with the price tag of a high-end ink jet may be one of the best printer deals around.

34 Mystery Web Fees Hit Phone Bills

Some Internet firms may be slipping in charges for services that were never ordered or provided.

36 Product Activation Gains Ground

Antipiracy technology spreads beyond Windows XP to other products—to the ire of consumers.

NEW PRODUCTS

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66 PDA Phone

Samsung SPH-i500

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Adobe Systems Acrobat 6

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NVidia GeForce FX 5200 Ultra and GeForce FX 5600 Ultra

76 SVGA Projectors

Dell 2100MP Projector, Gateway 205
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Adjust the settings for your graphics board and monitor to ensure peak visual performance.

154 Windows Tips

Use Windows' built-in tools to manage the media files overwhelming your PC; say "No to All."

158 Internet Tips

Demolish pop-ups in your browser; lose Turbo-Tax's product activation; make PDF files for free.

160 Step-By-Step

Improve your system's performance by installing more memory—of the kind your PC needs.

162 Answer Line

Completely erase personal information from your hard drive; archive Outlook and Outlook Express e-mail; type euro symbols easily in Word.

D-Link DWL-2000AP

- AirPlus Xtreme G 2.4GHz wireless access point
- Data transfer rates up to 54Mbps
- ▶ Operates in the 2.4GHz frequency for compatibility with existing 802.11b devices
- Features the latest in security to protect sensitive data





Acer TravelMate 800LCi notebook

- 1.3GHz Mobile Intel Pentium M processor
- ▶ Memory: 256MB RAM
- ▶ 40GB hard drive
- ▶ 10X8X24X CD-RW/8X DVD-ROM drive
- ▶ 56K modem
- ▶ 10/100 Ethernet
- ▶ Integrated WiFi" 802.11b wireless
- ▶ 14.1" XGA active-matrix display
- Windows XP Professional









WatchGuard Firebox 500 New

- ▶ Strong Firewall security with powerful application proxies protection for small businesses
- 75Mbps packet filter throughput
- ▶ 5 mobile user VPN clients included (supports up to 50)
- ▶ 1-year LiveSecurity* service included
- Secure remote management





SimpleTech 256MB MPC ClientPro 325

- ▶ 256MB
- DIMM 184-pin form factor
- DDR SDRAM
- ▶ Branded system spec fic solutions
- Supported by unlimited, toll-free technical support



SimpleTech



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







- 25

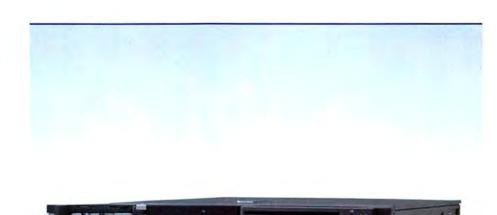
A Elise on

FISON

ingle lech

SHARP





HP ProLiant DL360 G3 rack-mount server



- ▶ 2.4GHz Intel® Xeon™ processor
- Memory: 512MB RAM

Hard drives sold separately

- 24X Max CD-ROM drive
- D 2 x 10/100/1000 Ethernet
- ▶ Smart Array 5i Plus Controller

\$2639.99

MPC ClientPro 325D Series New

- ▶ 2.4GHz Intel® Pentium® 4 processor
- Memory: 256MB RAM
- ▶ 40GB hard drive
- 52X Max CD-ROM drive
- ▶ 10/100 Ethernet
- Windows® XP Professional



\$749.87

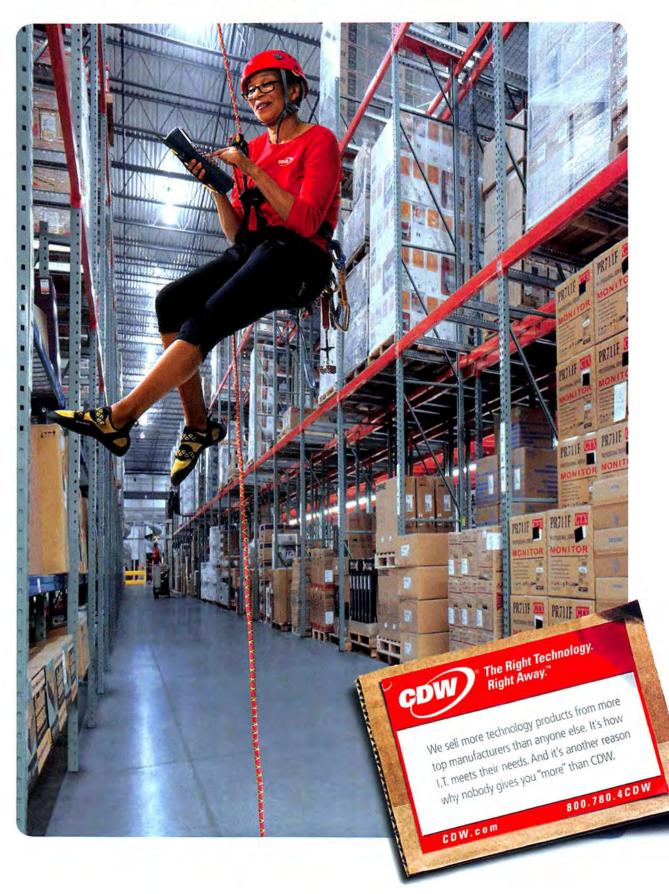
Monitor sold separately



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> 9:32 am. Martha Watson counts over 1,200 name brands in order to justify the word "more" to the legal department.



This Month We Look at Mighty-Mite Digital Cameras, Home Theater PCs, and More

POWERFUL, POCKET-SIZE, 3.2- and 4-megapixel digital cameras and PCs specially designed to function as home theater centers highlight June's slate of newcomers. We also take an extended look this month at 15-inch

LCD monitors, monochrome laser printers, and the new generation of all-in-one multifunction printers. A list of all newly reviewed products and services follows, along with each item's star rating, if any (some are preproduction models or otherwise ineligible for a rating). Visit find.pcworld.com/10860 for more details on PC World's Star Ratings,



DESKTOP PCs

- 130 ABS Awesome 3450 ****
- 130 Gateway 500X ***
- 130 Micro Express MicroFlex 30A
- 130 MPC Millennia 910i Dream ****
- 130 Polywell Poly 880NF2-2500 ****

NOTEBOOK PCs

- 134 CompagPresario 2100T ★★★★☆
- 66 Fujitsu LifeBook S2000
- 134 IBM ThinkPad T40 ****
- 134 Toshiba Satellite 2455-S305 +++
- 134 WinBook X4 ***

TABLET PC

77 NEC Versa LitePad ***

HOME THEATER PCs

- 100 ABS Media Center PC 8500 ***
- 100 Alienware Navigator Extreme
- 100 Cyberpower Media Center PC ***
- 100 Gateway Media Center PC ***
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- 139 NEC MultiSync LCD1560NX ***
- 139 Samsung SyncMaster 152B ***
- 139 ViewSonic VE500 ****

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- 145 Canon PowerShot S50 ★★★★☆
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- 137 Brother HL-5040 ***
- 137 Dell Personal Laser Printer P1500 ***
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- 137 Oki Data B4300 ***
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- 114 HP PSC 2210 ***
- 114 Lexmark PrinTrio X75 ★★★☆☆
- 114 Lexmark X5150 ****

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- 143 ATI All-in-Wonder VE PCI ★★★★☆
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- 74 NVidia GeForce FX 5600 Ultra

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- 141 LG Electronics GCE-8520B ++++
- 141 Samsung SM-348 ****
- 141 Sony CRX220A1 ***

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66 Samsung SPH-i500

INTERNET TELEPHONE

80 Callserve Communications Internet Telephone ***

POWER SUPPLY

82 Antec TrueControl 550 ***

SHREDDER

74 Royal MD100 Media Destroyer

PC VOLUME CONTROL

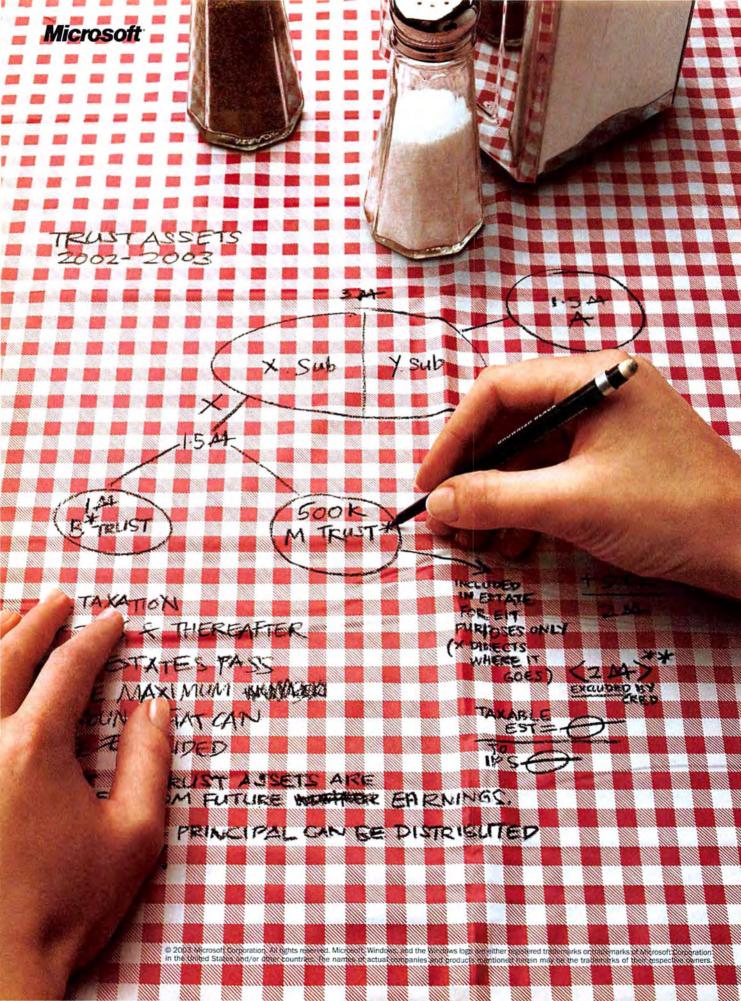
74 GE Audio Hub

FILE CONVERSION SOFTWARE

68 Adobe Acrobat 6 ***

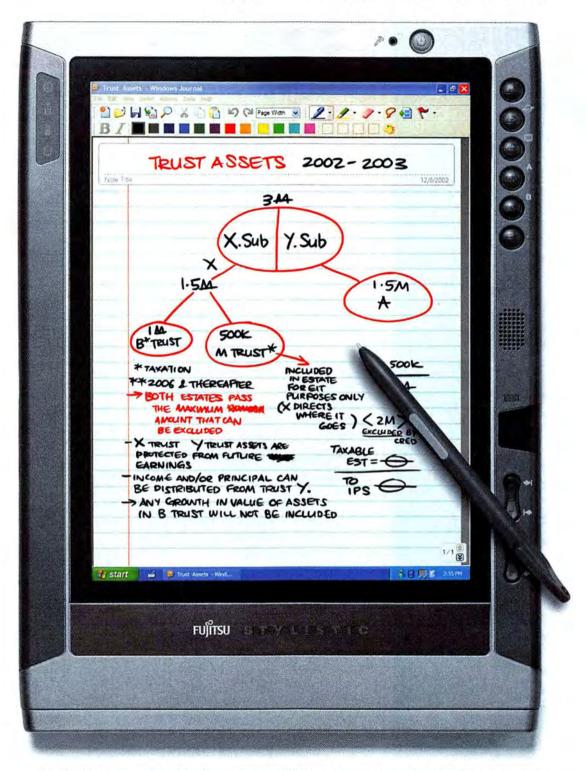
INTERNET DATA MANAGEMENT

57 AskSam 5.1 ***



Be ready. Always and anywhere.

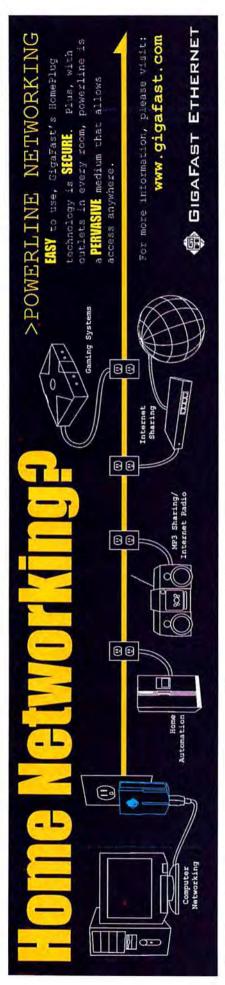
It's a laptop. It's a simple pad and pen. It's a Tablet PC.



You get an idea. You need to get it down. The Tablet PC puts the full power of Windows® XP Professional in a laptop computer that's as simple to use as a pad and pen. You write, draw, scribble, and erase directly on the screen. Plus it runs all of your favorite Windows XP compatible applications. So whether you're in your office or in a cab—the PC is more mobile, versatile, and powerful than

Windows^{XP}
Tablet PC Edition

ever before. For more information, visit microsoft.com/tabletpc



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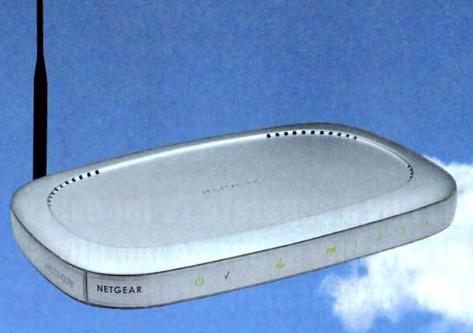
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Rating the Tech Behind the Specs

Buying computing products is a numbers game-but our Test Center can help.

CALL THEM BUZZNUMBERS: the tech specs that vendors pelt you with every time you make a purchasing decision. In theory buzznumbers help you pick the best products. But too often they confound rather than clarify—no matter how experienced a shopper you happen to be.

Will you be any more productive, for instance, if you spring for a 2.8-GHz Pentium 4 PC instead of a 2.66-GHz one? How many ANSI lumens does a projector need to wow an audience? Do your most cherished 35mm photographs deserve a scanner with a full 48 bits of color, or will 42 bits do the job?

The short answer to these buying dilemmas—and countless others—is that they aren't mathematical propositions. Some buzznumbers bear no relation to how real people use tech gear. Others are outweighed by intangibles like the sophistication of a product's software. And specs can't be compared unless vendors use the same yardstick—which they often don't.

Consider the hot commodities known as LCD monitors. One of the principal buzznumbers used in marketing them is contrast ratio—the ratio of a screen's whitest white to its blackest black. All things being equal, the image from a display with a 400:1 contrast ratio should outclass one with a 300:1 ratio. One with a 500:1 ratio should look better still. But do



MONITOR MAVENS Mainelli, Arar, and Kuta with the photometer we used to test LCDs.

the specs help you buy a better monitor?

One of the privileges and pleasures of working at *PC World* is that we can answer such questions. At the suggestion of Senior Associate Editor Seán Captain, we hauled 15 LCDs into our Test Center, where Senior Performance Analyst Jeffrey Kuta measured their contrast ratios. We worked with an independent expert, Raymond Soneira; his DisplayMate utility

(www.displaymate.com) for optimizing image quality has long been a favorite of savvy PC users, including those in our lab.

You'll find the results in "LCD Specs: Useless?" written by Senior Associate Editor Tom Mainelli, on page 24. The news wasn't all bad: Some LCDs delivered a better ratio than their vendors claimed. But others fell short of their official rating by as much as 50 percent; certain units that touted a 500:1 ratio underperformed one that advertised a mere 350:1 spec.

If those findings startle you, join the club: "I emerged with even more respect for our lab," says Senior Editor Yardena Arar, the article's editor, "and even more skepticism for vendor numbers."

Our findings also raised eyebrows at the Video Electronics Standards Association, whose procedures are widely used to rate contrast ratios. VESA plans to revise its tests for more consistent ratings, and will ask manufacturers to label ratings that adhere to its methodology.

In other words, our experiment helped prompt an industry to tighten its standards. That's yet another reason I'm glad to spend my days at *PC World*—and a real victory for everyone who thinks specs should actually mean something.

Harry McCracken (mageditor@pcworld.com) is editor of PC World.



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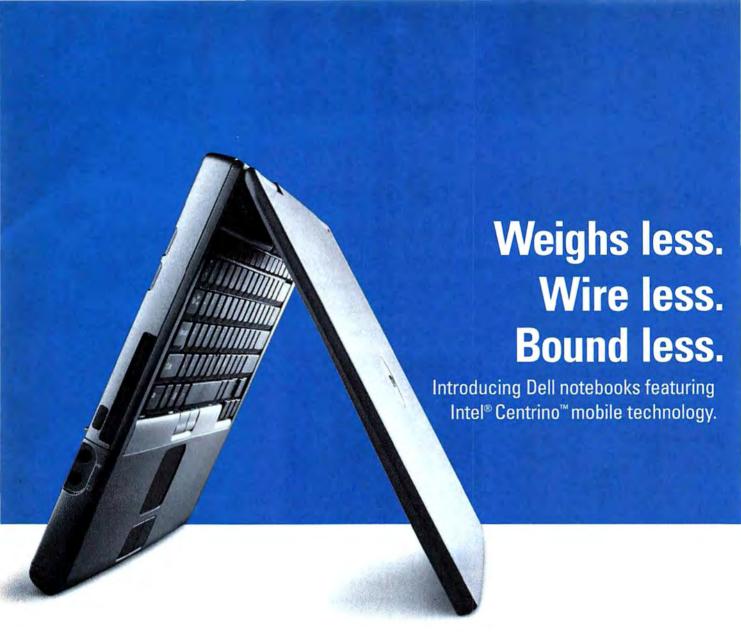
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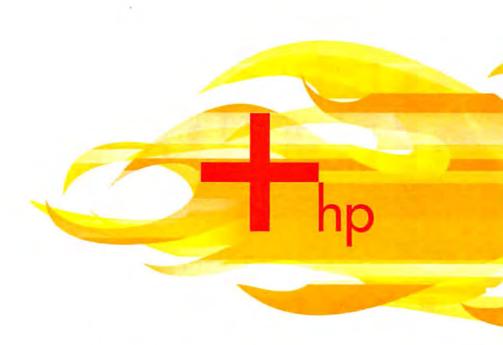
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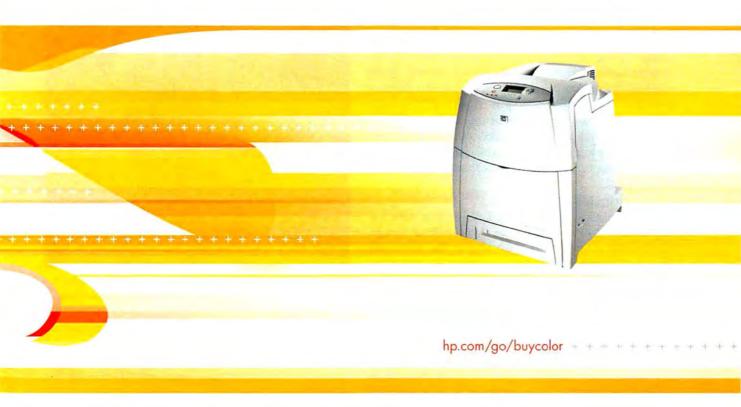






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LCD SPECS: USELESS?

TESTED CONTRAST RATIOS RARELY CONFORM TO VENDORS' SPECS. BY TOM MAINELLI

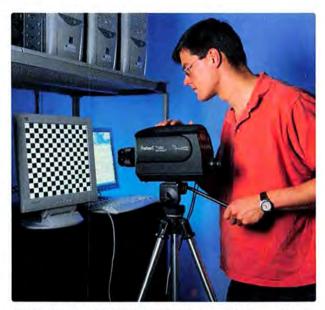
ping for an LCD monitor, high contrast ratio is a selling point vendors love to pitch. But if you rely on this specification, you'll have about as much luck picking a winner as you would if you bet on a racehorse because you liked its name.

Contrast ratio is the ratio of a screen's whitest white to its blackest black. A higher number generally means a better image and easier-to-read text. But PC World Test Center evaluations of 15 LCD units showed that in some cases, actual contrast ratios were below the vendors' specifications—by as much as 50 percent (see the chart "A Study in Contrasts" on page 28).

Most companies actually erred in the opposite direction, with a published contrast ratio that fell below our measured result—something that most people probably would not mind. But since shoppers have no way to tell if the manufacturer has everstated or understated contrast ratio, the specification is essentially useless for comparison purposes.

SPECSMANSHIP

WE FOUND that a major reason for this problem is vague wording in the commonly used VESA (Video Electronics Standards Association) Flat Panel Display Measurement (FPDM) standard that gives vendors considerable latitude in adjusting monitor settings when measuring contrast ratio. But this situation may be addressed soon: At least partly because of *PC World*'s findings, the VESA FPDM committee is already revising the



JEFF KUTA of the PC World Test Center measured contrast ratios of 15 LCD monitors using a sophisticated Photo Research photometer.

standard to provide moredetailed testing instructions.

Still, testing variations alone can't account for the most dramatic differences between our measurements and the published contrast ratios. Some companies don't even use the VESA spec. Others don't do their own testing.

The PC industry is built on specs, and LCDs aren't the first products to have the usefulness of their numbers called into question (see *Up Front*, page 19). With competition in

the LCD market fierce, even a small advantage on paper can mean the difference between making or losing a big sale.

"Some markets buy on specs," explains Todd Fender. senior product manager at NEC-Mitsubishi. "The

government, for example: It would buy one monitor over another if its contrast ratio was 600:1 instead of 599:1."

So important are these figures to a company's bottom line that when NEC-Mitsubishi engineers began to suspect other manufacturers were inflating specs, they tested the competition. NEC-Mitsubishi subsequently filed a lawsuit alleging that rival ViewSonic had damaged it by misstating contrast ratios for certain ViewSonic monitors.

The companies recently settled out of court, and both declined to comment on the case. But to get an idea of how widespread the problem of inaccurate specs was, the PC World Test Center ran a group of LCD monitors we'd recently eval-

uated for our Top 100 charts through a test based upon the VESA standard's instructions.

WILD RESULTS

WE DEVELOPED our tests in collaboration with physicist Raymond Soneira, president of the video diagnostics company DisplayMate Technologies (www.displaymate.com) and a well-known expert in

monitor testing, whose DisplayMate utility we use in our Top 100 monitor tests.

We went to considerable lengths to ensure a level playing field by subjecting all test units to a precise set of adjust-

LAB NOTES

WHAT ABOUT BRIGHTNESS?

BRIGHTNESS OR luminance-typically expressed in candelas per square meter (cd/m2)-is at least as important to

> many LCD buyers as contrast ratio. But in our tests, vendor brightness numbers proved as unreliable as their contrast ratios. More than half the vendors overstated brightness, as measured in our tests

using maximized settings (which vendors typically use for luminance tests).

Vendors measure contrast ratio using full-white and full-black screens, and so did we. But few people actually use their monitors this way, and VESA's standard also calls for separate measurements using a checkerboard pattern, which tends to lower the contrast ratio because light bleeds from white boxes to dark boxes.

Contrast ratios with our 15-by-15 checkerboard (the most granular our test setup permitted) were slightly lower, but we expect that they would have been lower still had we been able to use smaller boxes. However, even this arrangement is nine times more granular than the 5-by-5 pattern that VESA recommends.

> ments designed to standardize the LCDs (see "How We Test" in the chart). To ensure accurate measurements, we borrowed a research-class Pritchard PR-880 photometer from Chatsworth, Californiabased Photo Research (www. photoresearch.com), which develops high-precision electro-optical equipment.

Our findings? Thirteen test

units posted numbers significantly different (by 10 percent or more) from their specifications, and only two LCDsone from ViewSonic, the other from Eizo Nanao-landed within 5 percent of the stated

> number, close enough to be considered accurate. The good news: Nine offered a meaningfully better contrast ratio than listed. The bad news: Four were markedly worse.

Of the vendors for which we found results significantly below their reported contrast ratios, CTX was the worst offender with its \$730, which achieved a contrast ratio of 252:1. 50 percent below its stated 500:1 specification. On the other hand, our test LCD from Dell notched an impressive 892:1 contrast ratio, a whopping 78 percent higher than its stated

500:1 rating.

Note that neither our measured contrast ratio nor the percentage by which a contrast ratio missed its published specification correlated with the display's overall quality as

reflected by its PC World star rating-which is based not only on the LCD's image quality but also on features, controls, warranty, and other factors that are important to a buying decision.

For example, LG's monitor earned four stars even though our tests showed its 405:1 contrast ratio was 10 percent less than the published 450:1.

IN BRIEF

Product Pipeline

PRETTIER PC: Excuse me, is that a PC on your desk? Alienware's new metalliccolored PC cases will leave people wondering. Each case features a new cable man-



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MILLION

the list. And the total dollar loss from the

referred fraud cases rose to \$54 million. That's up from \$17 million in 2001.

Dell's 1702FP, with its 892:1 contrast ratio, still managed only three and a half stars.

Why did so many published contrast ratios differ from our measurements? Even if you believe the vendors overstate their results to try to make their products look better than they are, that wouldn't explain why so many models tested higher than their spec.

SPECS INSPECTED

ONE REASON is that some vendors don't use the VESA test to measure contrast ratio. The standard is voluntary, and the spec's primary author-Edward F. Kelley, a physicist at the National Institute of Standards and Technology's Flat Panel Display Laboratory-says it's not clear how many vendors have adopted it. (Manufacturers don't have to say which standard they use, a situation VESA is seeking to correct for its own standard.)

For example, engineers at CTX haven't been using the VESA standard (though CTX spokesman Daniel Rhodes says the company is joining VESA and will be using its flat panel standard).

Even when vendors do follow the standard, results may vary due to some ambiguity in its wording, which says that testers should adjust an LCD for its intended use "and not optimize [the display] for each measurement separately."

Accordingly, most vendors adjust LCDs for real-world usage before testing. But DisplayMate's Soneira says that others use the wording as a loophole to achieve higher brightness and contrast ratios. "Some manufacturers turn up all of the controls to their maximums and then take their measurements. An LCD is actually unusable that way." Soneira says.

The VESA standard's principal author agrees. "The philosophy of the VESA FPDM was to set up the display as best possible for the intended task, for example in an office," Kelley says. "We never intended to allow anyone to misadjust the display out of its useful operating range. For anyone to interpret the FPDM any differently from that is a sad, sad mistake."

As a result of PC World's tests, Kellev says VESA will change the standard to precisely specify how an LCD should be adjusted for testing.

While we didn't test the monitors involved in NEC-Mitsubishi's lawsuit against ViewSonic, one of the two ViewSonic LCDs we did test exceeded its published contrast ratio slightly while another fell far below it. ViewSonic executives say that they take contrast ratio measurements seriously and use the fullwhite, full-black VESA test. They suggest the monitor that underperformed its contrastratio spec may have used a substandard LCD panel that slipped through the qualitycontrol process at ViewSonic's panel supplier.

Duane Brozek, director of public relations at ViewSonic. says his company's specs are based on "rigorous test- >

BUYING TIPS

THE EYES HAVE IT WHEN YOU'RE LCD SHOPPING

WHEN SHOPPING FOR an LCD, your best bets are to check independent reviews such as PC World's Top 100 (see page 139 for 15inch LCDs or find.pcworld.com/35153 for the 17-inch displays we tested) and trust your own eyes. Here are some buying tips:

- * Size: A 15-inch LCD offers about the same amount of viewable screen as a 17-inch CRT, a 17-inch LCD as a 19-inch CRT, and so on. Ross Young, president of the LCD research firm DisplaySearch, says you should expect to pay \$209 to \$620 for a 15-inch LCD, \$314 to \$815 for a 17-incher, or \$559 to \$994 for a 19-inch screen.
- * Resolution: LCDs operate best at their native resolutionwhich is typically 1024 by 768 for 15-inchers, and 1280 by 1024 for 17-inchers. The higher the resolution, the more data the screen can display at once. However, icons and text can look small if a screen's native resolution is unusually high for its size.
- * Brightness: For multimedia images in a well-lit room, brighter screens are better-say, 300 to 400 cd/m2 (a measure of luminance; see "Lab Notes" on page 25) compared with the 200 cd/m2 (or so) of most mainstream LCDs. But as PC World's tests also called vendor brightness ratings into question, try to test brightness by looking at a blank white page in a word processor set to fill the page.



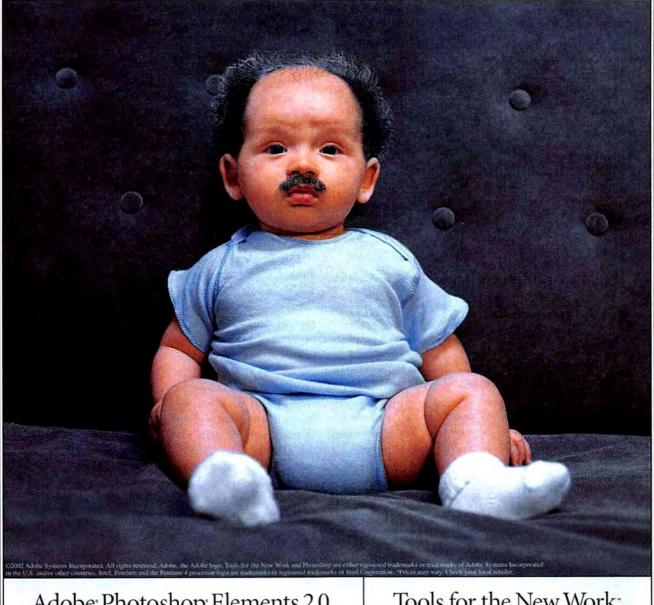
- Viewing angle: If you aren't always looking at your monitor head-on, or if you want several people to see the display simultaneously, you'll want to check out the viewing angle. But here, again, don't trust the specs: Move horizontally and vertically to check for subtle color shifts and loss of contrast.
- Response time: This is the time it takes to turn a pixel on or off, or to change its color. If you plan to use your LCD monitor to watch movies or play games, don't settle for a response time of less than 16 milliseconds. However, note that motion flicker increases on fast-responding LCDs.
- Interface: Most mainstream LCDs have only analog inputs, but for a premium you can find some that also offer a port for digital input, which generally should produce sharper images without requiring adjustment. But using that port also requires a graphics card with a digital-out port and an appropriate cable, and Display-Search's Young says most people are happy with analog.



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ing That's not to say that sometimes something won't slip through, and we'll track down what the issue is here."

ViewSonic's practice of buying LCD modules from thirdparty suppliers, who provide their own specs, is fairly common in the LCD monitor business. But some vendors. including Hitachi and LG Electronics, say they use their suppliers' specs for their finished monitors without testing further-a practice that Soneira and others frown on.

TEST REPORT

A STUDY IN CONTRASTS

TESTED CONTRAST RATIOS varied widely from vendors' specs. but these differences have no relationship to the display's quality as reflected by its PC World star rating.

	Contra	Tested versus			
17-INCH LCD	Tested	Published	published ratio		
Dell UltraSharp 1702FP ★★★☆ find,pcworld.com/19922	892:1	500:1	78% better		
Samsung SyncMaster 172B	590:1	350:1	69% better		
Planar PX171M *** find.pcworld.com/34172	584:1	400:1	46% better		
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Hansol H750 ★★★☆☆ find.pcworld.com/34331	247:1	350:1	29% worse		
ViewSonic VE175 ★★★☆☆ find.pcworld.com/34199	352:1	500:1	30% worse		
CTX \$730 ****fire find,pcworld.com/34160	252:1	500:1	50% worse		

FOOTNOTE: 'Ratio of the luminance of a display's whitest white to that of its TEST Center

blackest black. 'As we went to press, vendor lowered figure, from 500:1. HOW

WE TEST: Tests developed in collaboration with Raymond Soneira of Display
Mate Technologies based on the NIST/VESA FPDM standard with a special gray-scale calibration, and conducted in a dark room. We took measurements with the LCD brightness and contrast set to maximum, and then with settings optimized manually to make the displays look as similar as possible. See find.pcworld.com/35150 for more details. CHART NOTES: "Published" is the vendor's spec; "Tested" is the rating reported by the PC World Test Center.

A finished monitor's contrast ratio can vary from that of its LCD module, Soneira explains. "The values measured depend on the electronics, the factory calibration, and the user adjustments."

NEC-Mitsubishi uses the VESA test, but its unit tested much higher than its listed spec. That's intentional, says Richard Atanus, vice president of product development for NEC-Mitsubishi.

"We state that specification as guaranteed," Atanus explains. "There is no discrepancy and no misleading of the customer."

The bottom line for LCD shoppers? You're better off not putting too much faith in the listed numbers (see "The Eves Have It When You're LCD Shopping," page 26).

Help may be close at hand. When the VESA standard is updated-probably by midyear-vendors who adhere to it will be able to promote their specs as "VESA contrast" and "VESA brightness," which should make them more meaningful for comparisons.

At PC World, however, our monitor ratings depend heavily on "taste tests"-actual evaluations by a jury of human beings who view a variety of text and graphic images on side-by-side displays. We believe that this kind of review is more helpful than one that's based solely on specifications-even those we can measure ourselves.

If you've got your eye on an LCD monitor for which you can't find a review from a trustworthy source, don't be swayed by a sheet of technical specifications: You're better off relying on the evidence of your own eyes.

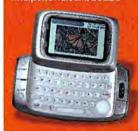
IN BRIEF

Product Pipeline



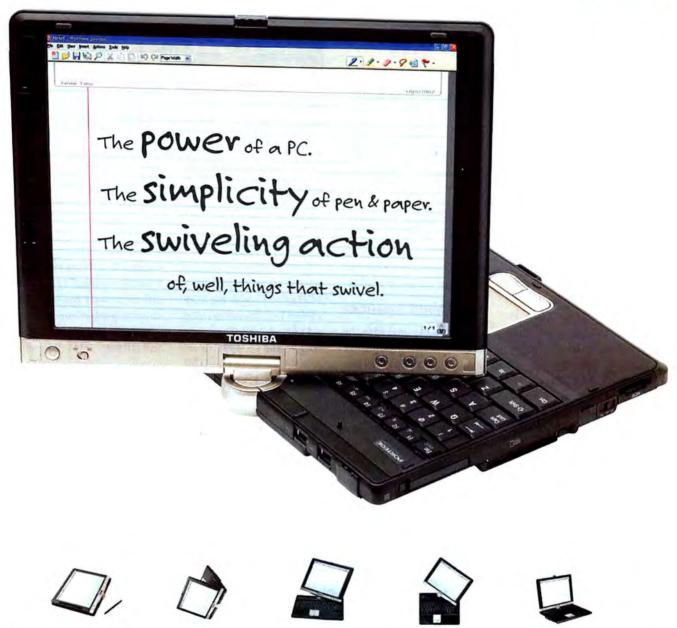
No, you're not seeing things: Auravision's new keyboard really glows. The \$99 EluminX Illuminated Keyboard's internal lighting makes it visible in dim or dark areas. Look for the keyboard to be available in stores soon, find. pcworld.com/35231

PICTURE THIS: Kodak's new EasyShare LS633 digital camera is the first with an organic light-emitting diode, or OLED, display. The technology delivers richer colors and a brighter picture than today's LCDs. This \$400 camera comes with a 2.2inch screen (bigger than the 1.8-inch displays on most digicams), 3.1-megapixel resolution, a 3X optical zoom, 16MB of internal memory, and an SD/MMC slot so you can have additional storage. find.pcworld.com/35228



COLOR MY SIDEKICK: The drool-worthy T-Mobile Sidekick PDA/phone/browser can now deliver images and text in over 65,000 colors. The \$299 unit also has 32MB of built-in memory, twice the storage capacity of its grayscale predecessor, find. pcworld.com/34901





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CHIP SETS

A FAST BUS, BUT CATCH IT LATER

875P CHIP SET OFFERS AN 800-MHz BUS BUT LITTLE PERFORMANCE BOOST, FOR NOW.

INTEL JUST PUT a new bus on the road, but PC users looking for top performance may want to wait and catch a later ride.

Intel's new 875P chip set provides Pentium 4 PCs with an 800-MHz frontside bus and dual-channel DDR400 SDRAM memory-but we saw little performance gain over an older chip set in our lab tests of three of the first new systems, except in a few very demanding applications like AutoCAD. Previously, high-end P4 systems used a 533-MHz frontside bus and RDRAM memory. Note that Intel has also released a 3-GHz P4 to match the new bus.

Meanwhile, AMD Athlon XP 3000+ units remain faster in several tests and less costly than the new P4 machines.

PCs with the new chip set carry no price premium, but if you're an Intel fan, there's another reason to hold off: A big P4 improvement is coming later this year that should take greater advantage of the 875P.

AN 800-MHz GIMMICK?

so what's the deal with the new bus? It's a marketing tool for now, but it helps Intel prepare for the future, says Kevin Krewell, general manager at research firm In-Stat/MDR. Most of today's software does



THREE PCs boasting Intel's new 875P chip set (left to right): the Falcon Northwest Mach V, the Gateway 700XL, and the Dell Dimension 8300.

not push the P4 hard enough to require this bus and its extra bandwidth, he says. (The older 533-MHz bus has a maximum throughput of 4.2GB per second; the 800-MHz one tops out at 6.4 GBps.)

That certainly seemed true in tests of three preproduction 3-GHz P4 PCs with the 875P: a \$2999 Dell Dimension 8300, a \$3845 Falcon Northwest Mach V, and a \$3499 Gateway 700XL, all with 1GB of DDR-400 SDRAM. For comparison, we tested a similarly configured Mach V with a 3.06-GHz P4, a 533-MHz frontside bus, and 1GB of PC1066 RDRAM.

Though the Falcon with the 800-MHz bus ran PC World-Bench 4 fastest with a 127 score, the Falcon with a 533-MHz bus was only 2 points slower, and three previously tested 3.06-GHz P4 PCs with RDRAM averaged 121. Such differences are too small to notice in productivity apps.

However, the 800-MHz bus and DDR400 RAM did seem to yield a noticeable boost in tests that push system and memory strength: the AutoCAD test and the Return to Castle Wolfenstein and Unreal

TEST REPORT

INTEL'S 875P SHOWS LITTLE PICKUP ON MOST APPS

THE NEW CHIP SET impacts demanding games and apps like AutoCAD, but Athlon XP systems maintain a lead on most tests.

SYSTEM	Processor Memory		Feanteida	PC WorldBench 4	Return to		TIME (IN SECONDS) REQUIRED TO RUN TEST OF				
		bus (MHz)	score Faster	Castle Wolfenstein'	Unreal Tournament '	AutoCAD	Music- match 7.1	Premiere 6.0	Photoshop 7.0.1	VideoWave 1.5 (DiVX)	
Dell Dimension 8300 find.pcworld.com/35066	3-GHz Pentium 4	1GB DDR400 SDRAM	800	126	118	219	253	147	247	287	74
Falcon Northwest Mach V find.pcworld.com/35069	3-GHz Pentium 4	1GB DDR400 SDRAM	800	127	122	254	256	148	248	284	83
Gateway 700XL find.pcworld.com/35075	3-GHz Pentium 4	1GB DDR400 SDRAM	800	126	118	238	263	147	227	290	83
Falcon Northwest Mach V find.pcworld.com/35072	3.06-GHz Pentium 4	1GB PC1066 RDRAM	533	125	115	242	265	145	242	288	82
Average of three systems	2.17-GHz Athlon XP 3000+	1GB DDR SDRAM ²	333	136	96	226	226	163	210	281	76
Average of three systems	3.06-GHz Pentium 4	1GB PC1066 RDRAM	533	121	117	213	273	144	259	293	76



FOOTNOTES: 1 Frames per second at 1024 by 768 resolution and 32-bit color depth. 2 One system used DDR333, others DDR400. HOW WE TEST: One Athlon XP 3000+PC ran Windows XP Professional; all others ran Windows XP Home. All P4 PCs were tested with Npc worldsench 4, PC World's applications-based benchmark, as well as other benchmarks. For a complete explanation go to find,pcworld.ocm/35258. Tests developed and conducted by the PC World Test Center. All rights reserved. CHART NOTES: A higher score is better on PC WorldBench 4, Return to Castle Wolfenstein, and Unreal Tournament; on others, lower is better. Best scores are in bold.



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Tournament game tests. For example, the newer Falcon zipped through the AutoCAD test in 256 seconds, beating the comparison Falcon's time of 265 seconds. The Dell finished in just 253 seconds. (All PCs used a high-end ATI Radeon graphics card.)

In most other tests, the new bus made little difference.

Overall, AMD Athlon XP 3000+ systems still come out on top on PC WorldBench 4. They also completed the Auto-CAD and Premiere tests noticeably faster than the P4 units. The new PCs hold a significant lead only in the two games and a Musicmatch test.

As for value, while all three systems deliver high-end components, the Falcon unit appears pricey, even considering it's an enthusiast model that has two 36GB drives in RAID 0, a DVD-RW drive, and topquality Monsoon Planar Media 14 2.1 speakers. A comparable Falcon unit with an Athlon XP 3000+ saves you \$150.

BUYING STRATEGY

THERE'S more to the 875P than bus and memory improvements. It also includes support for gigabit ethernet, Serial ATA hard drives, and two-hard-drive RAID setups. Missing is Rambus memory (RDRAM) support as Intel moves away from this pricey, controversial memory to DDR.

Around the time you read this, Intel plans to ship similar but budget-oriented chip sets, code-named Springdale. These chip sets will allow for 2.4- to 2.8-GHz P4 PCs with the 800-MHz bus, and offer enhanced integrated graphics and Intel's hyperthreading technology, analysts say.

Power desktop users favoring Intel-based PCs may want to wait until the third quarter of this year. Krewell says that's the expected debut for a revamped P4 code-named Prescott (you can upgrade PCs with the 875P chip set to Prescott later if you need to buy Intel systems now). Prescott, likely to launch at 3.4-GHz, will double the P4's Level 2 cache and improve hyperthreading. And Prescott PCs should more fully take advantage of the 875P's higherbandwidth memory and 800-MHz bus, Krewell adds.

—Laurianne McLaughlin

MAGICOLOR 2300W

IN BRIEF

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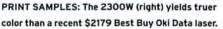
MINOLTA-QMS first introduced the Magicolor 2300DL a couple of months ago at \$799 (find.pcworld.com/33926), marking the first time a networked color laser had dipped under \$800. Now it has a new printer for small and home offices at an even better price: just \$699. And the unit still offers laser speed for text and color graphics, as well as good overall image quality.

Magicolor 2300W

Minolta-QMS

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To achieve its low price, the Magicolor 2300W uses your PC's CPU, rendering images directly from Windows' lowlevel Graphics Device Interface. The printer won't work with a Mac, and it lacks Post-Script or PCL support, though that won't affect documents. It has no ethernet port, so you must use Windows networking or set up a print server to share it. It attaches to a PC by either its USB 1.1 or its parallel port.

We compared the 2300W with our top-rated color lasers. and its print quality impressed us (see print samples). Text looked crisp. Color graphics displayed a few minor artifacts such as misalignment; glossy photos had bright, natural colors, but-like other lasers' photos-had visible dithering and were less sharp than a photo-quality ink jet's output. At 11.5 pages per minute, text speed was on a par with that of much pricier lasers;

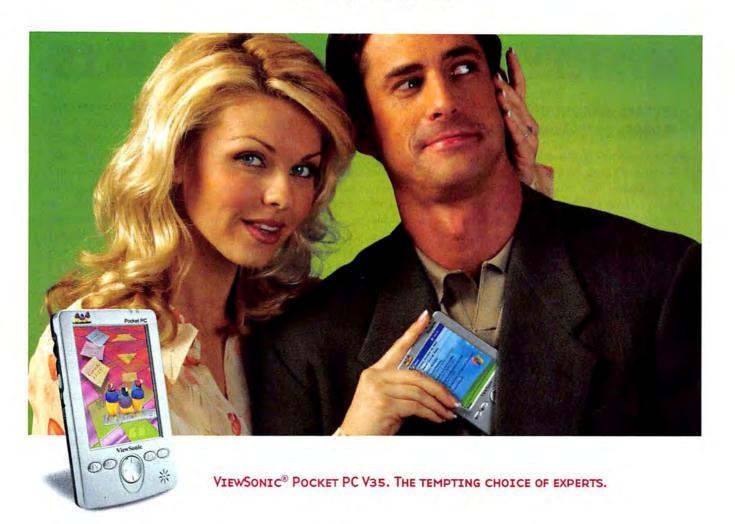
> but at 2.1 ppm on color graphics, it was half as fast as recent Best Buys (see find.pcworld.com/ 35144). Still, if you now use an ink jet for color graphics, the new

2300W will be a nice step up.

HP will offer its own \$799 color laser, the LaserJet 1500, by the time you read this; other vendors may follow. Meanwhile, if you're after a fairly fast, well-priced color printer, consider the 2300W.

—Paul Jasper ■

The Pocket PC to Pick.



The Pocket PC V35 is the hottest handheld available. But don't just take our word for it. It's already winning awards and accolades from leading publications, editors and user groups. That's because it's more than a PDA;

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CONSUMER ALERT

MYSTERY WEB FEES HIT PHONE BILLS

SEVERAL JURISDICTIONS INVESTIGATE REPORTS OF 'CRAMMING' WEB SERVICES.

AFTER CORNELIA Fleming rebuffed a phone pitch for Web services, she thought she'd dodged a bullet. The telemarketer wanted to give her family business a free trial of an online directory listing, Internet access, and a twopage Web site from National Online Services. Fleming says

that she agreed only to accept a mailing about the services.

"I've been burned by offers like these before," Fleming says. Now she feels burned again. While she says that she did not receive the promised information, Massachusettsbased Fleming's Furniture was twice charged \$32 on its Verizon telephone bill by Hold Billing Services, a billing agent for National Online Services, for an Internet directory listing, a two-page Web site at True Yellow Pages, and Internet access.

Fleming is not alone.

Hundreds of small businesses around the country complain of being charged on phone bills for unordered services. Law enforcement officers call it cramming, which means that unauthorized charges are crammed onto a phone bill. (It's a cousin to slamming, wherein long-distance carriers are switched without customer consent.)

Sometimes firms charge for

Internet services without even pitching customers, say state lawmakers and consumers. Connecticut jeweler Geoff Sigg claims that this was his experience. He noticed a small charge from a company called Spoonfull.net on his SBC Communications phone bill last September. For two

Billed on Behalf of Spoonfull.net, Inc.

GEOFF SIGG got a partial refund for unexpected charges on his phone bill (inset, right).

months, he had paid \$4.31 plus taxes monthly to a company he had never heard of.

He discovered Spoonfull.net was billing him to list his store in its Internet directory. But when he tried to access his directory listing, he says, it couldn't be found.

"No sales call, no actual directory listing," says Sigg.

Representatives of Spoonfull.net and National Online Services, both based in Florida. insist they never bill without customer consent. Nonetheless, the business practices of both companies are under scrutiny by several state attorneys general and regulators.

Spoonfull.net is one of four Web services firms operated by the mother-son duo of Mary Lou Farr and Willoughby Farr. One or more of the firms have been sued by state attorneys

> general in Illinois and North Carolina, and two are under investigation in Florida.

> "We would never knowingly bill someone who never signed up for the service," says Willoughby Farr. Mary Lou Farr refused to comment for this story.

> The Missouri attorney general has sued National Online Services and its parent firm Epixtar, charging

(telcos) must work with thirdparty billing agents. Some ISPs and Web service providers work through these independent third parties, called billing aggregators, which deal with the telcos to place charges on phone bills. Once customers pay their bills, the money is routed back through the aggregator (who keeps a cut) to the company that is providing the services.

GRIPES RISE

MAJOR telcos report a jump in customer complaints of phantom tack-on Internet services. such as Web sites, e-mail inboxes, and Net access.

Telcos sometimes take action. BellSouth has implemented guidelines to handle aggregators, says Stephanie Landry, director of billings and collections. Billing firms must provide on request a voice recording or a written or electronic authorization from customers approving

charges, Landry says.

SBC says it stopped Spoonfull.net, Inc. Services and Fees accepting Spoonfull. net charges from its billing agent, Integretel, last year, citing customer complaints.

> Representatives of Spoonfull.net and Epixtar say they are unjustly accused of cramming and are fighting the allegations in several courts.

In March, Illinois Attorney General Lisa Madigan accused both Farrs and two of the companies that they run, Voicenet and Switched Access, of violating Illinois consumer fraud laws. The complaint alleges Voicenet

they placed unauthorized fees on Missouri residents' phone bills. The state cites nearly 70 complaints of unwanted fees.

22 Chanfull

Sigg says he was billed for a third month before the charges stopped. He got refunds for two of the months, and gave up the fight in frustration. National has promised Fleming's Furniture full credit; at press time, Fleming's phone bill had not yet arrived.

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billed an unspecified number of Illinois residents up to \$7 plus taxes monthly for service without customer consent.

A similar case, alleging unauthorized billing of directory service and collect-call phone charges, is pending in North Carolina against Farr-run Switched Access and Directory Access. The Florida Attorney General's office confirms it has begun a formal investigation into possible cramming by Spoonfull.net and Voicenet. The Farrs declined to comment on the allegations.

Missouri Attorney General Jay Nixon filed suit in January against National Online Services, its sibling Liberty Online Services, and parent Epixtar, accusing each company of violating the state's Merchandising Act by charging consumers for unordered services. Iowa's Office of Consumer Advocate is pursuing separate cases against National and Liberty for cramming.

Sheldon Lustigman, an attorney representing Epixtar, denies the cramming allegations. Typically, consumers forget to cancel their service after a free trial period has expired, he says. "Customers have to call and cancel to avoid charges." Lustigman says.

The investigations aren't limited to Iowa and Missouri. Epixtar's 2002 annual report filed with the U.S. Securities and Exchange Commission acknowledges other inquiries "as well as formal proceedings" in several states. Florida's attorney general is also investigating Epixtar.

Despite the phone companies' increased diligence, the telcos say customers are responsible for reviewing their phone bills, just as they are for their credit card statements.

"The bottom line? Always, always check your phone bill," advises Beverly Levy, a spokesperson for SBC.

—Tom Spring

ANTIPIRACY

PRODUCT ACTIVATION GAINS GROUND

ANTICOPY TECHNOLOGY SPREADS FROM WINDOWS AND OFFICE TO TURBOTAX AND BEYOND.

PRODUCT ACTIVATION, the antipiracy technology that drew consumer ire in Windows XP and Office XP, and more recently in Intuit's Turbo-Tax, is spreading to other popular, often-pirated applications.

Symantec is testing product activation in downloadable editions of its flagship Norton AntiVirus 2003 program, with very few reports of problems. If the tests continue to be successful, the technology will begin to appear in other Symantec apps this fall.

Graphics software giant Adobe has already begun using product activation in Australia, but says the technology won't appear in all of its products until the company is sure honest consumers won't be inconvenienced.

Product activation enforces software licenses by limiting installation, usually to just one computer. It generally associates the program's unique product key, entered during installation, with a randomly generated number or a "fin-



gerprint" of the computer's hardware configuration that is then transmitted to the vendor's server. If, on subsequent installations, the product key is paired with a different random number or fingerprint, the user must explain why no license violation has occurred.

The technology certainly inconvenienced some TurboTax customers. In PC World reader mail and posts on Intuit forums, some buyers complained about not being informed that they wouldn't be able to print or e-file returns on more than one computer. Others said initial versions left

the product activation software installed and runninghogging as much as 1MB of RAM-even after TurboTax was removed. At least some people who called tech support got incorrect information.

With an Intuit patch, the program now removes the product activation software when TurboTax is uninstalled, but a pending class-action lawsuit claims Intuit's introduction of the technology was deceptive and negligent.

Steve Mullins, a computerscience graduate student in Bozeman, Montana, had been installing TurboTax on multiple computers for years. This year, however, Mullins was unable to view his tax files on a second computer (which the current edition should have permitted). Intuit's tech support advised him to return the product for a refund, then buy a new copy. "Next year, Tax-Cut," Mullins concludes.

Michael Silver, Gartner vice president and research director, says that since product activation offers no benefit to consumers, "vendors need to ensure that the honest, paying customer has as little pain as possible." But low-hassle approaches usually don't protect products very well.

Jeffrey Tarter, publisher of the software industry newsletter Softletter, says product activation will only succeed for "a few mass-market products where there's almost no competition and huge demand." But that describes only a few titles. "People hate Microsoft," Tarter says, "but everybody still uses Windows."

-Scott Spanbauer

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f the 172 million currently registered Web sites, 99 percent simply do one of two things. They provide information—usually about a person, group, event, or another topic of interest. Or they sell something.

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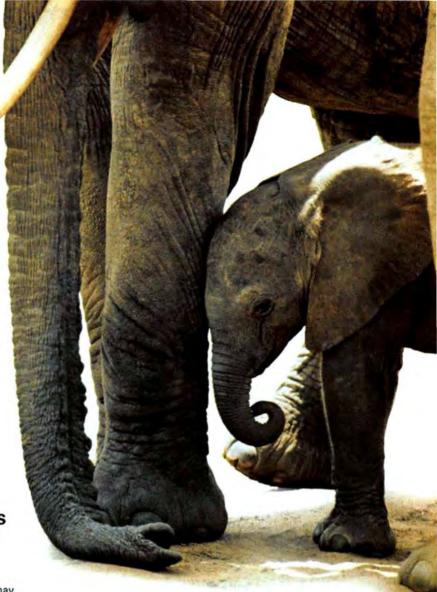
Your Web site should:

- Quickly provide the information, product, or a service your visitors came to find. Remember that people are awash in information, so get to the point. Fast.
- Should be easy to navigate and load in less than 10 seconds.
- Should appeal to the income, intellect, and interests of your visitors.
- Should look the same when viewed in most browsers.

Your Web site should avoid:

- Plastering your name and logo all over. Images and graphic elements should convey information and aid navigation as well as break up blocks of text.
- The tendency to make your pages look like an explosion in a Crayola factory. Use color, animation, and fonts judiciously—otherwise the pages run the risk of confusing your visitors and, what's worse, annoying them.





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LETTERS@PCWORLD.COM

HAVE HANDHELDS **GONE BACKWARD?** MAKERS NEGLECT HOME PROJECTORS BEIGE OR BLACK-IT'S OUR CHOICE



MUSIC COPY PROTECTION: WILL IT BACKFIRE?

I FIND IT APPALLING that music publishers are stooping to new lows to rectify a problem they created by mistrusting their own customers ["Now They're After You: Music Cops Target Users," News & Trends, April]. This issue is not about pirating; it is about industry greed, substandard products, and unfair treatment of customers and of artists (who see exceptionally little profit from CD sales).

Copy protection does not work and, in fact, can be a deterrent for legitimate customers. I well remember a copy protection scare in the early 1980s, when people's data was needlessly erased because they unwittingly used a backup copy of Lotus 1-2-3. In the end, Lotus-and the industry-learned to defend their intellectual property in ways that did not harm their customers. Today software is relatively inexpensive, of higher quality, and often freely distributable as shareware or open source. And software companies are still faring well, last I looked. The same can be said for the movie industry with both VHS and DVD. The music publishing industry is definitely operating on an orthogonal wavelength.

Erik Johnson, Portland, Oregon

A PRIVACY SAFEGUARD

IN APRIL'S Privacy Watch column, the Hamilton County, Ohio, county clerk felt legally obliged to post sensitive information online. Solution: Take the information offline and provide it only upon a submitted request. After all, if I walked into his office I'm sure there'd be a form to fill out and an official would retrieve the information. I highly doubt they'd let me browse the records room as if it were a library. This approach would let the Internet be used as the delivery system, not the information source.

Mark Rolih, Joliet, Illinois

PRODUCT ARROGANCE

APRIL'S "Three Serious Scanners" [New Products doesn't address something I call "product arrogance." This began with software that-without asking permissionconfigured itself to start up at boot.

LETTER OF THE MONTH

Now this attitude extends to decisions on powering up hardware. An Epson printer that I own has no power switchplugged in, it stays on all the time. And recently I returned a Visioneer scanner I had just purchased for the same reason.

But as someone trained as a scientist. I'm frightened: Imagine how much we would hasten environmental disaster if all of our household devices required just a trickle of power 100 percent of the time. Shortsighted? Understatement.

Christian Hart, Ph.D., Los Angeles

SOMETHING WE MISS

I WAS SO HAPPY to see the Psion palmtop included on your "Things We Miss" ["20 Years of Hardware," March]. My heart broke when I accidentally left my Psion Series 5mx in an airliner's seat back. No more flicking open the screen and getting to work in less than 10 seconds; no more watching laptop-lugging, wire-tugging

Can Laptops Survive Desert Storms?

THE MARCH 20th Anniversary issue mentions [in Up Front] that an editor took his laptop through a tropical jungle to see how it would hold up. Has anyone ever tested a laptop in the desert?

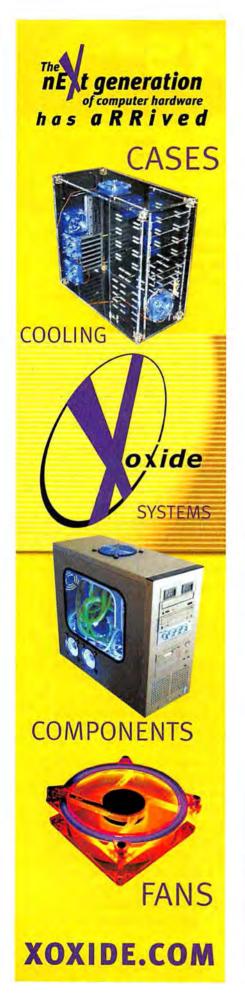
I am in the army and currently deployed to Afghanistan for the second time. My first time here, we lost several laptops, personal and government-owned, to dust and heat. The dust storms are incredible, with the dust getting into everythingeven laptops covered by cellophane or wrapped in towels and put into a locker.

Keypads and touchpads went out, programs deleted themselves, and program and file windows would open without being prompted; in some cases the cursor

would fly about the screen and click icons and open up programs by itself. After returning home, the computers were sent out for a good cleaning, and most keypads and touchpads needed replacing. They then worked fine.

I don't know how your editor's laptop fared in the jungle, but I do have a challenge for PC companies: Send your laptops out here to see how they really stand up to the desert environment. They would then be returned so the companies could see what the insides looked like after many a sandstorm. Perhaps some could then advertise: "Our laptop outperforms theirs, even in an Afghani sandstorm."

Sqt. Dismas Dillree, Afghanistan



passengers nearly break down in tears as I tapped my way through an hour of work on something the size of a glasses case.

How ironic, then, to find the Alpha-Smart Dana in your "20 Products We Love." It has only half the memory, a significantly smaller screen, half the functionality, and more than twice the weight of the 5mx-for the same price. Is this truly technological progress?

Jeremiah McDonnell, Tallahassee, Florida

FOR CHOICE IN COLOR

APRIL'S Top 100 suggests we soon will no longer be able to purchase PCs from computer makers in colors other than charcoal or black ["Bonkers About Beige? Better Act Quickly"]. Too bad for them.

Last year when I tried to order two new beige PCs from Dell for my wife's office, I was told it wasn't possible. A travel agent, she decorates her office in bright, cheerful colors, where black would have been out of place. I purchased the computersin beige-elsewhere.

I have nothing against black or any other color; I am against limiting choice because some designer has a preconceived notion of what everyone wants.

George Childers, via the Internet

THE FATHER OF SPAM

A MARCH "Forgotten Pioneer" item ("20 Years of Online") indicates that only the e-mail address of the original spammer ("THUERK at DEC-MARLBORO") is known. In fact, it was Gary Thuerk, who went from Digital Equipment Corporation to Compag, now owned by HP. That first spam went to federal ARPANET accounts, and he still works for the federal sales team. Gary adds that his "first" is entering the Guinness Book of World Records.

Sharon Clarkson, HP, via the Internet

HOME-FRIENDLY PROJECTORS

THE PROJECTOR industry is leaving many of us behind ["Bright Lights, Big Pictures," April]. Remember those 35mm Kodak-style projectors with a carousel of slides and a screen set up in the living room? Where is the new-age portable projector that can be used standing alone,

with a remote and a slot for a CD-R/RW or DVD so you can flash the pictures on the old living room screen? This would make life better for many home users.

> Francis X. Archibald Hanahan, South Carolina

NO NEED FOR LEGACY PORTS

A CORRESPONDENT in the March Letters says, "Keep your legacy ports and floppy disk drives." Until recently. I would have agreed. But the advent of the flash USB drive (aka pen or thumb drive) makes floppies unnecessary. A 64MB flash USB drive is both media and drive in a thumbsize package: It plugs directly into a USB port, is difficult to damage, and holds more than 40 floppies' worth of data.

Carol Ball, Kinnelon, New Jersey

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

CORRECTIONS

MAY'S Top 5 Photo Printers should have listed the maximum paper size for the HP Photosmart 7550 as legal size.

May's Consumer Watch should have reported that the resolution of highdefinition TVs is 1920 by 1080.

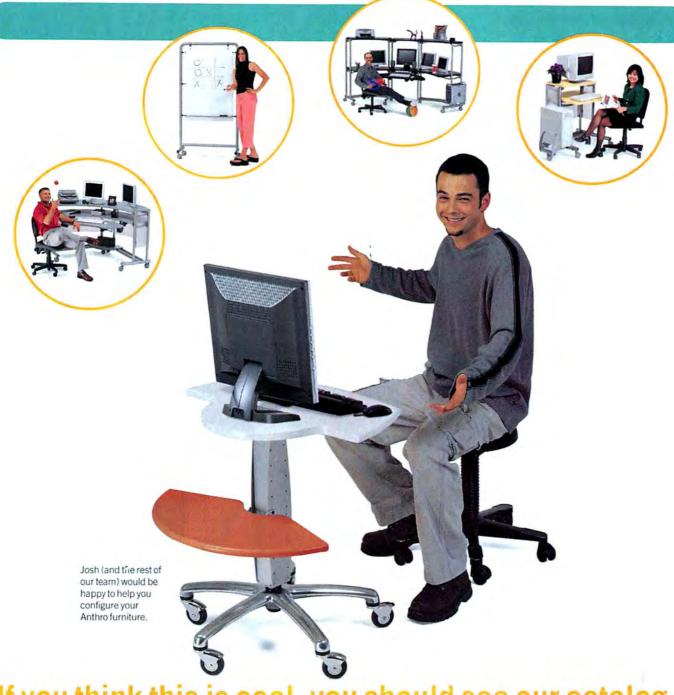
A May Answer Line item on a keyboard shortcut for Excel 2000 and 2002 should have read, "<Ctrl>-<Enter> instead of <Enter> fills preselected cells with copies of the filled active cell."

"Internet Fixes" (April) should have said users of Eudora 4.3 or 5.x (below 5.2) who bought and registered the software more than 12 months previously must pay \$30 to upgrade to Eudora 5.2.

In April's "The Whole Drive Guide." the second sentence of the section "Divide Your Disk" on page 114 should have read, "Each drive contains a table that defines how much and which part of the disk the drive's partitions occupy and which file system each uses."

In March's "20 Products We Love," the Shure E2c earphones should have been listed at \$99.

PC World regrets the errors.



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Identity Scams Plague Career Sites

Plus: McDonald's gets wireless, phones get game, and Everest gets Net.



Scamming the Jobless

The Buzz: Seems unemployment is no longer the worst curse of the unemployed. Scam artists have taken to posting fake job listings to elicit personal information-including bank, credit card, and Social Security numbers-from job seekers who patronize online career sites. Other sleazy opportunists are mining online résumés and selling the data they've swiped. Kevin Mullins of job site Monster.com, however, insists such prac-

tices are "extremely rare" at Monster, as the company scrutinizes all job listings and cuts off access to those caught downloading too many résumés from the site. Bottom Line: The lagging economy has a silver lining: great new jobs, like "Identity Thief" and "Résumé Mining Engineer." Any of you venture capitalists wanna invest in my new site, Mobster.com?

Wi-Fi Meets Fast Food

The Buzz: We knew Wi-Fi was on a roll; apparently it's on a bun as well. Ten McDonald's restaurants in New York are offering 1 hour of free in-store wireless Internet access with the purchase of an Extra Value Meal. Customers can also buy an hour of Wi-Fi for \$3. The chain will reportedly expand its program to hundreds more locations this year.

Bottom Line: McDonald's is all about the eat and run, not the leisurely nosh and surf. Hmmm. Can I get files with that?

I Just Called to Say I Fragged You

The Buzz: Cell-phone-based games are nothing new: Gladiator, Snake, and other crude-looking diversions are wellestablished time-sinks. But Nokia is upping the ante later this year with N-Gage, a hybrid that's part gaming device, part GSM phone. Tricked out with an MP3 player, Bluetooth, and all the fixings, N-Gage is being touted as the Game Boy Advance for grown-ups. With its GPRSenabled network connectivity and 4Kcolor display, the gizmo is well suited for multiplayer games-the kind that eat up those pricey cell-plan minutes in a hurry. Bottom Line: You know who'll like N-Gage even more than gamers? Phone service providers, who'll be raking in cash faster than you can hit the pound key.



The Internet Up There

The Buzz: Thanks to the efforts of Sherpa Tsering Gyaltsen, the 18,000-foot Everest base camp has its very own Internet café as of April 14-approximately 50 years after Sir Edmund Hillary first scaled the world's tallest mountain. The grandson of a Sherpa who accompanied Hillary, Gyaltsen collaborated with techies, an environmental group, and two ISPs in his lofty quest to set up broadband access (up to 128 kbps) via satellite dish. The café itself is a modest affair-basically a well-reinforced tent and several computers. At press time, there were no plans to add on a cappuccino bar.

Bottom Line: Why put an Internet café on Everest? Because it's there.

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

NAGGING QUESTION

Who Invented the :-) Symbol?

THE SMILEY WAS created on September 19, 1982, by computer science prof Scott E. Fahlman. In an online post, he suggested that the

character string :-), when read sideways, could indicate that a comment was not to be taken seriously. But was that really the first "emoticon"? Maybe not. One Kevin MacKenzie probably fabricated the first smiley in a 1979 e-mail. His unadorned -) was sup-

posed to mean "tongue in cheek." Sadly, MacKenzie's brainchild was promptly forgotten. What a difference a colon makes.



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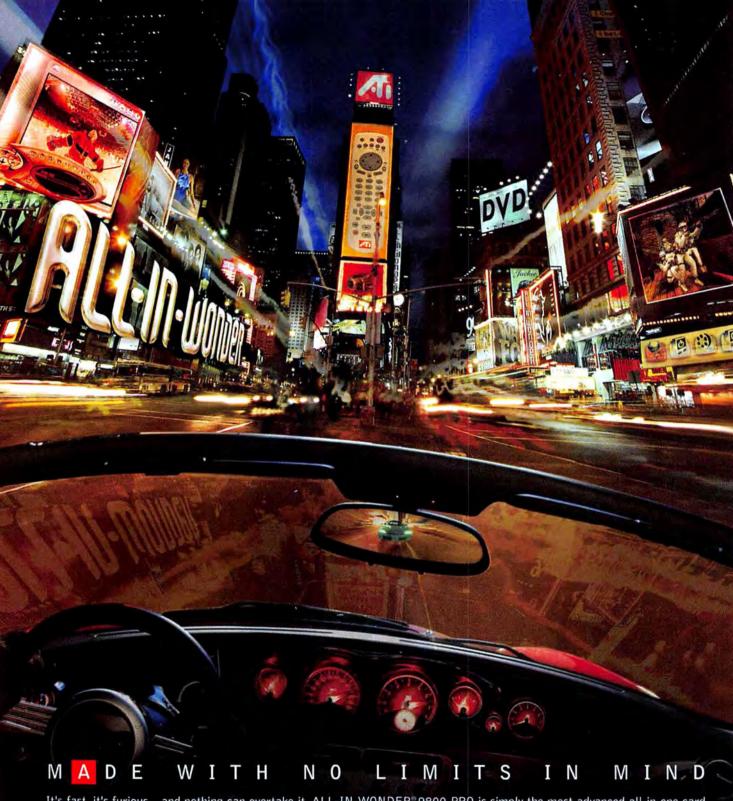


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CONSUMER WATCH

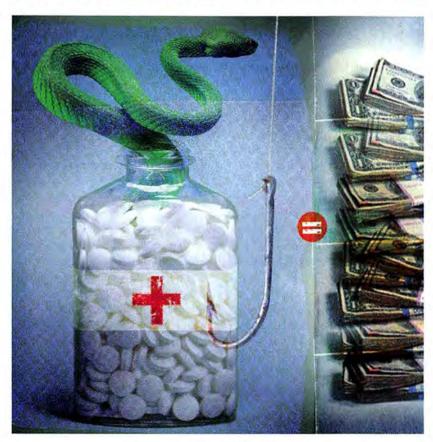
ANNE KANDRA

SEPARATE THE FACTS FROM THE QUACKS

PRIVACY WATCH: ON THE WEB, LIKE IT OR NOT ON YOUR SIDE: RIGHTS SNAG STOPS HOME MOVIE

Avoid Online Snake Oil Sellers

Learn how to find Internet medical advice that won't make you sick.



WHEN TERRY WINCKLER was diagnosed with lymphoma, he naturally wanted to learn as much as he could about the disease. So the newspaper editor, who lives in Alameda, California, went online. "I decided that instead of waiting for someone else to give me information, I'd find it myself," Winckler says.

He found a dizzying collection of Web sites—some based on well-documented medical research, others anecdotal at best. Many touted "alternative" treatments and miraculous cures for virtually any type of ailment—usually for a steep price.

Winckler became increasingly suspicious of these alternative treatment sites, especially the ones that made sweeping claims of cures. "Any site that 'promised' anything set off my B.S. meter," Winckler says. "With cancer, you quickly learn that there are no promises."

False hope is the lure used by many pseudomedical sites, which often target consumers afflicted with serious illnesses such as cancer or AIDS, or from chronic conditions like headaches, arthritis, or back pain. People who respond to the come-ons are typically asked to pay thousands of dollars up front for "treatment fees" and to travel at their own expense to foreign countries for useless—and sometimes even harmful—treatments.

But you don't need a chronic or debilitating disease to get caught in an online health scam. Countless Web hucksters sell fake weight-loss formulas or potentially dangerous dietary supplements for building pro wrestler—style muscles.

And this spring's outbreak of severe acute respiratory syndrome (SARS) triggered a flood of sites making questionable claims that their products would cure the new disease or could protect against it.

THE FEDS STEP IN

FEDERAL AGENCIES are cracking down. The Federal Trade Commission launched Operation Cure-All (find.pcworld.com/34667) in 1999 to educate consumers on how to recognize health fraud.

Since launching the site, U.S. authorities have filed 18 actions against Internet sites for allegedly making unsubstantiated health claims; and the Food and Drug Administration has ramped up its efforts to curtail Internet medical fraud. Earlier this year, federal officials working with authorities in Canada and Mexico shut down a Canadian company charged with luring American cancer patients to Mexico for phony treatments involving magnetic fields. The FTC estimates that hundreds of other sites have shut down after the commission filed suit against them or have excised unproven medical claims from their online literature after receiving advisory letters from the commission.

No amount of government action will eliminate all online quacks, however.

They're notoriously difficult to policenot only because they are so numerous, but because many of them operate overseas, beyond the reach of U.S. laws.

Besides robbing people of time and money, medical fraudsters can mislead critically ill victims into thinking that they're cured; convince them to discontinue other, life-prolonging treatments; or induce them to stop taking precautions that prevent spreading the illness.

Quack sites also introduce risks in the

form of dangerous combinations of drugs and herbs. For example, Saint-John'swort, an herb that some people use to fight depression, has been much touted online as a cure-all even though medical research has shown serious drug interaction risks for HIV/AIDS patients.

Unfortunately, it's not always easy to tell which medical Web sites are peddling cyberplacebos. To gain credibility, some sites imitate medical logos or icons, or include the names of well-known organizations to imply an affiliation with them.

Your best bet in seeking online medical information is to try university-affiliated sites and such well-established medical Web sites as those hosted by the Centers for Disease Control and Prevention (www. cdc.gov), the American Cancer Society (www.cancer.org), the Mayo Clinic (www. mayoclinic.com), Medlineplus (www.nlm. nih.gov/medlineplus), and the National Institutes of Health (www.health.nih.gov).

Also, although no universally recognized Better Business Bureau-style icon is synonymous with trustworthy online medical information, an organization called Health on the Net Foundation (www.hon.ch) has established a set of standards that can help you find sites with medical integrity; for more information, click on the HONcode link at the site.

HERBAL HYPE

BE CAUTIOUS AT SITES that hawk herbal supplements. Though doctors I spoke with disagreed over the precise overall value of these substances, they concurred that many Web sites don't market them responsibly and often associate them with unsubstantiated medical claims.

Similarly, avoid sites that use phrases like "secret remedy" or "astounding breakthrough"-or that blithely bandy about undefined scientific-sounding terms or acronyms such as "oxidative phosphorylation" or "ICHT."

The same rules that define a safe e-commerce site apply to a trustworthy medical site: Look for a Webmaster link and full contact information, including the name of the organization, a physical mailing address, and a phone number.

Once you've identified some credible sites, use them-and the sites to which they link-to become well-grounded in the particular medical condition you're researching. The more you know about the subject, the more adept you'll be at identifying misinformation.

Plenty of resources on the Web can help you learn more about medical fraud. Probably the most comprehensive (and certainly the most opinionated) is Quackwatch.org, which offers a virtual library of articles, plus tips and advice, a discus-

PRIVACY WATCH

When You're Forced Onto the Web

CAN YOU BE COMPELLED to allow your picture and personal information to be posted on the Web? Most people's quick answer would be, "Of course not"; but the truth is, one person can require you to appear on the Net-your boss.

"My boss has decided that he wants pictures and bios posted [on our Web site] of all the employees, including me," a system administrator for a Washington account-

ing firm wrote to us at privacywatch@ pcworld.com recently. "I really don't like the idea of putting my picture and personal info on the Web."

There are valid concerns on both sides of this issue. Employees may worry that their personal information

could find its way into the hands of identity thieves or stalkers, while employers want potential customers or investors to know about the expertise of their staff.

"The basic rule is that employers in the United States can share or disclose personal information about their employees." said Peter Swire, a law professor at Ohio State University who was the federal government's chief counselor for privacy during the Clinton administration. The only exceptions are states with laws specifically prohibiting the disclosures.

Companies may make public an employee's work history with the company and the employee's job duties. Photographs are not out of the question, and sometimes more-personal information, such as an employee's age, may become a part of a company Web site's employee bio.

Workers have expressed a great deal of concern about how their employers use their personal information. The nonprofit Privacy & American Business released a study last year reporting that 85 percent

> of respondents to a survey believed that it was very important for businesses to create an employee privacy policy that is allencompassing-but a modest 38 percent of workers stated that their employer had adopted one.

Of course, numer-

ous companies respect the wishes of employees who do not want to have their face or history splashed on a Web browser. And any firm that pledges to keep your private information confidential is legally bound to honor that pledge, Swire says.

If your employer wants to publish information about you on its Web site and you're not comfortable with the information that will go online, talk about it with a supervisor or a human resources manager. Let's hope the company respects your concerns. If not, your only other option may be to look for another job.

-Andrew Brandt



The world's fastest workgroup color printer has arrived. The Xerox Phaser® 7300. You'd better hang on.

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sion group, medical resources, and even help for those who've been duped.

If you suspect you've been had by a fraudulent medical site, help protect others from falling victim-report the site to the FTC (www.ftc.gov), to your state attorney general (www.naag.org), and to the FDA (www.fda.gov).

We have to protect ourselves from online predators who try to sell false hope to vulnerable people. The best ways to fight back are by educating yourself, learning to recognize deception, and-as cancer survivor Terry Winckler puts it-"leaving your desperation off the keyboard."

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

ON YOUR SIDE

Cut! Glitch Stops Home Movie Maker

MY DELL PC's Movie Studio video capture and editing program (a Dell-packaged version of Roxio's VideoWave) can't capture video from my Sony Hi-8 camcorder. I keep receiving error messages saying that my recorded video is copy-protected material, which it isn't-I recorded it all myself.

On Dell's forums, I found that lots of other people had the same frustration.

Dell sent a technician to my house to replace the PC's video capture card. When the tech finished, he couldn't start the program again. He told me that the issue must be with the software, which was not Dell's responsibility-though I had reported the problem within the 30-day support period for installed software.

Randy Kahn, Los Angeles

On Your Side responds: After I contacted Dell, the company sent another technician to Kahn's house, Dell spokesperson Lionel Menchaca says. The tech tried many options, including having Kahn clean his Hi-8 tapes, updating the driver for the video capture card, and replacing the video capture card again. Finally, Dell's technician installed an updated version of the software, Dell Movie Studio 3, which corrected the issue completely.

If you run into video capture problems, Dell recommends installing the latest driver for the video capture card; replacing the card; or upgrading to the newest version of Dell's Movie Studio software. For more assistance, call Dell's tech support at 800/624-9896 or visit support.dell.com.

-Grace Aquino

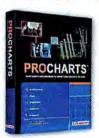
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Helpfulness Is Next to Geekliness

Be your own help desk with these simple tricks and great resources.

I'VE GOT A FAMILY gathering coming up, which means that I'll be cornered by aunts, uncles, and cousins asking me about Registry keys and device drivers. I've been functioning as the unofficial Bass family help desk for years, and I'll bet many of you are in the same boat. I have a truckload of secret sources for all things IT, and some quick and easy tips for managing and dispensing pearls of PC wisdom.

Plenty of Web sites offer great tips on Windows and other PC-related subjects. Many have free message boards, some moderated by experts who answer specific questions. I've tried a number of them, but I look to these tech-help sites time and again for solid advice:

TweakXP.com: This Windows XP site's strengths are its Tweak Network Forum (which contains over 100,000 messages) and its Tweak & Tip Database, which has separate categories for usability, user interface, system performance, Internet, networking, and tons more.

Computing.net: Make the Support Forums your first stop at this site. Expert users offer help to techies-and novices-for 15 different operating systems, including all versions of Windows, as well as help for networking, security, and PDAs.

Tech Support Guy: This Web site has more than 15 very active forums, including ones for hardware, Microsoft Office, and Windows 98. Point your browser to www. helponthe.net to check them out.

BriansBuzz.com: Brian Livingston, Info-World's Windows expert, provides Win-

Find, the Windows Tips Search Engine that lets you search 14 top-rated tech sites (including PCWorld. com) simultaneously.

Sites for IT types: For you technogeeks who salivate for stuff about deciphering hash codes in error messages and other binary challenges, there's The Elder Geek on Windows XP (theeldergeek.com), which features a masterful array of Registry tweaks. Or browse to the WinGuides Network (winguides.com) for more than 500 Registry adjustments that you can use immediately. For \$30, you can download the site's Tweak Manager, which supplies over 1000 Registry alterations. Finally, go to find.pcworld.com/34577 and click

> safely disable to boost your PC's speed. To manage, store, and retrieve all the

> BlackViper.com's Windows XP Services

link. The site's Windows XP Home and

Professional Services Configurations page tells you which XP services you can

> nuggets of data I pick up from the Internet, I use AskSam 5.1, an expensive (\$150) but multitalented research tool. Sometimes 1

type unstructured notes into AskSam,

other times I enter information into one of the program's many forms.

Usually I just drag and drop text from Web sites directly into a blank AskSam page. The program lets me import over 30 file formats, and its indexing makes finding what I've stored easy and nanosecond-fast. Jump to find.pcworld.com/34580 to download a 30-day trial version.



I RECEIVE TONS of e-mail asking for advice. Answering the same questions over and over almost drove me nuts. What gave me a ride back from the brink of insanity? Boilerplates. Most of the questions fall into one of

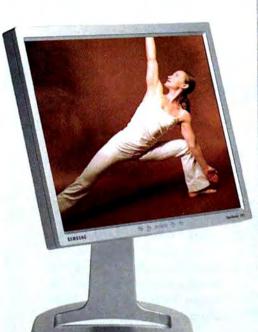
a dozen categories, so I created standard responses for each category that contain enough details to solve specific problems. For instance, I have one for when Mom suspects that she has a computer virus. (She never does; it's a ploy to get me to come over for dinner.) I also have some with tips for making a sluggish computer work faster, one for dealing with shutdown errors, and another for troubleshooting. You're welcome to use them. Head over to find.pcworld.com/34586 to download the text documents, which I've zipped into a single file.

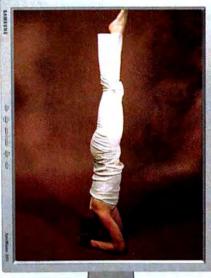
Now let's trade: You send me a list of your favorite help sites, and I'll name more of my choice spots in upcoming online newsletters. Go to find.pcworld.com/ 25821 to sign up.

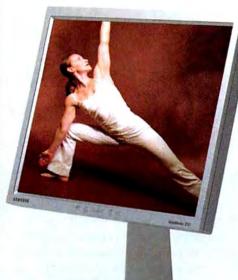
Contributing Editor Steve Bass runs the Pasadena IBM Users Group. Contact him at homeoffice@pcworld.com. Visit find.pcworld. com/31610 for more Home Office columns.











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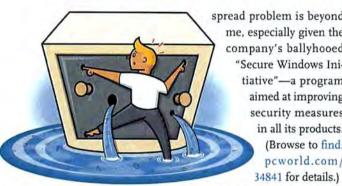




Office DEPOT

Leaky Windows: Keep the Hackers Out

Plus: Take care of performance problems caused by the XP service pack.



IMAGINE finding out that you had left your front door unlocked for half a decadeand didn't know it. Sure, it's an exaggeration; but for Windows 98 users, a certain security hole has been lurking for that long. In fact, this newly discovered flaw affects all versions of Windows from the first edition of Windows 98 (as well as Windows NT) through Windows XP. Microsoft also discovered a separate flaw involving Windows Me PCs.

Why it took Microsoft five vears to catch such a widespread problem is beyond me, especially given the company's ballyhooed "Secure Windows Initiative"-a program aimed at improving security measures in all its products. (Browse to find. pcworld.com/

The first hole involves the scripting engine found in all Windows flavors. A miscreant could decoy you with a boobytrapped HTML e-mail message, or lure you into clicking a contaminated link on a Web page, and exploit a weakness in the scripting engine. Once you click, you run the villain's little script, and-shazam!you've just given the scoundrel all the capabilities that you have on your system.

Visit find.pcworld.com/ 34757 to grab the fix. Your PC is already protected from an email attack exploiting this flaw

if you use either Outlook Express 6 or Outlook 2002 in its default configuration, or if you use Outlook 98 or Outlook 2000 and have installed the Outlook E-mail Security Update (visit find.pcworld.com/ 31973 for this update).

Another option (albeit an extreme one): You could block potential attacks by disabling active scripting in IE-but then portions of legitimate Web sites that use scripting won't function correctly. To disable scripting within IE, select Tools. Internet Options, choose the Security tab, and select the Custom Level button. Scroll down to the settings for Active Scripting and for Scripting of Java Applets, and click the Disable radio buttons.

The second Windows hole, which affects Me's Help feature, could let a sneaky cracker take over your PC-in some cases by just sending you an HTML-formatted e-mail.

Most of the same caveats apply for this Windows Me problem as for the scripting bug. Though you can't prevent an attack simply by resetting IE's security settings, using Outlook Express 6 or Outlook 2002 with the default configurations will protect your PC. And if you use Outlook 98 or 2002 with the Outlook E-mail Security Update, you're in good shape too.

If you don't fall into either

of these camps, however, your PC can be attacked through a tainted e-mail message. Better to be safe than insouciant; go to find.pcworld.com/34778 to download the patch.

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

IN BRIEF

Monitor Recall

IBM IS RECALLING some G51 and G51t 15-inch monitors because of a possible fire hazard. The units were manufactured between June and September 1997, Big Blue says that nobody has been injured. Go to find.pcworld. com/34781 to learn whether your unit is affected.

Flash Alert

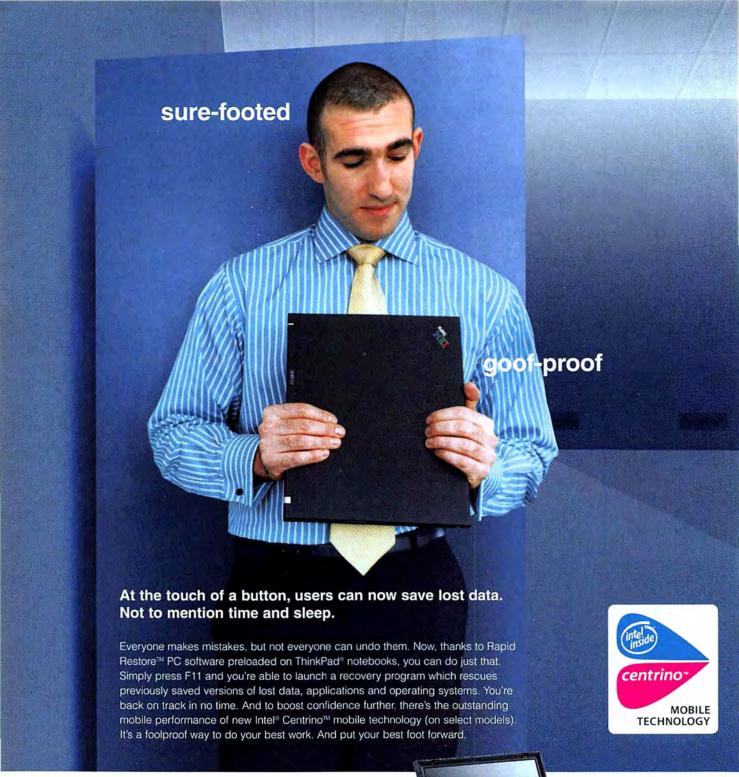
MACROMEDIA discovered a "critical" hole in its Macromedia Flash Player 6 that could let a hacker control your PC. Block the bad guys by getting the latest cumulative security patch. Head to find.pcworld.com/34784 for a link to the download.

BUGGED?

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

PATCH FIXES SLUGGISH XP BEHAVIOR

IN DECEMBER (see find.pcworld.com/32942), I told you that some users were experiencing major performance problems after installing Microsoft's Service Pack 1 for Windows XP. Users' PCs went from blindingly fast to molasses slow, and many users had to uninstall SPI to get their performance back. Now, six months later, the company has admitted that there is a problem and has released a fix. That's the good news. The bad news is that Microsoft hasn't made it easy to get the patch. The company swears that only a handful of you have experienced performance losses, though the e-mail I've received from users indicates otherwise. You must call Microsoft at 800/936-5700 to get the fix.



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- . 14.1" XGA TFT display
- . 32MB Integrated Intel® Extreme Graphics
- . 256MB DDR SDRAM std/1GB max
- · 20GB hard drive
- DVD-ROM
- . Microsoft" Windows XP Professional
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System Specifications:

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- . 12.1" XGA TFT display
- . 16MB ATI Mobility Radeon 7000 4XAGP graphics
- . 256MB DDR SDRAM std/1GB max
- · 40GR hard drive
- . Microsoft* Windows* XP Profess onal
- . 5.5-hr Li-lon battery
- · 3.6-lb travel weight
- · 3-yr system/1-yr battery limited warranty

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ThinkPad Notebook Accessories

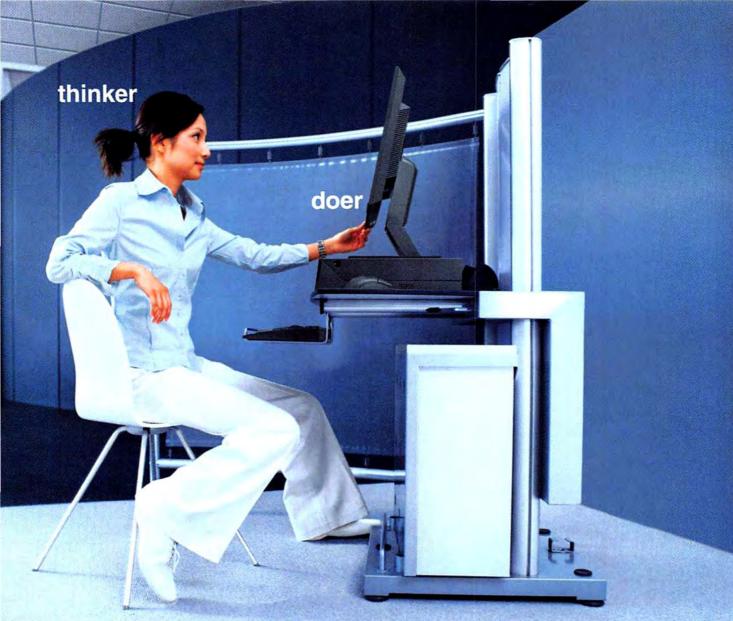
Belkin Travel Surge Protector and retractable phone cord (#22P7127) S20 GemPlus GemPC400 Smart Card Reader from IBM (#31P8901) \$75 Targus DEFCON PC Card Fingerprint Reader (#31P6763) \$175 ThinkPad Port Replicator II (#74P6733) \$179 Lexmark X5150 All-in-One (#22P7149) \$160 IBM Portable USB 2.0 Hard Drive (#09N4211) \$289 with Rapid Restore

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- . Microsoft* Windows* XP Professional
- . 1-yr parts and onsite labor limited warranty'



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- · 40GB hard drive
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- · Integrated 10/100 Ethernet
- · Intel® Extreme Graphics
- . Microsoft* Windows* XP Professional
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Distinctive Features:

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NEW PRODUCTS

EDITED BY ANNE B. McDONALD

Tiny but Mighty Digicams

FEATURES PACKED INTO THESE DIMINUTIVE CAMERAS BELIE THEIR CANDY-TIN SIZES.

DIGITAL CAMERAS

SMALL CAMERAS are like sports cars: They're fun, fast, and full of personality. Now you have additional reasons to consider one—they're more feature-rich than ever.

For example, the new \$499 Canon PowerShot \$400 Digital Elph has 4-megapixel image resolution. Meanwhile, both the \$400 Casio Exilim EX-Z3 and the \$400 Pentax Optio S deliver 3.2 megapixels, and each camera offers specifications that are nearly comparable to the PowerShot S400's such as a 3X optical zoom lens and the ability to capture video—in a smaller package (see the Features Comparison chart on the next page).

Although the various cameras in Canon's Digital Elph line are no longer the smallest full-featured models on the block, they still hold their own. The shipping S400 that I looked at felt very solid—albeit a little heavy—and sported an elegant stainless-steel body. The S400 costs more than the other two units, but it does offer more. In addition to a higher resolution of up to 2272 by 1704 pixels, it has a 32MB CompactFlash card.

ens focusing even with offcenter subjects. Canon also improved the S400's moviemode function: The camera records up to 3 minutes of video with sound, compared with the 30-second capacity of previous Digital Elph models.

The photos I took with the S400 looked good overall. But some colors—especially red—were too warm. In a couple of outdoor photos, contrast was off: Reds and blues looked too bright, while whites and yellows were overexposed. In some shots, my subject's skin tone appeared too pink when it should have been bronze.

LCD ADVANTAGE

OF THE THREE cameras, the Casio Exilim EX-Z3 provides the largest LCD screen, a crisp 2-inch display that provides plenty of viewing and framing area and stays relatively bright even in sunny settings.

The Casio, with its brushedmetal case, has similar features to the Pentax Optio S. In fact, the Exilim EX-Z3 uses Pentax's lens. Other specs the two have in common include the ability to take 30-second, 320-by-240-resolution AVI movies with sound.

Menu systems and control-



64 DIGITAL CAMERAS Canon PowerShot S400 Digital Elph. Casio Exilim EX-Z3, Pentax Optio S

- 66 PDA PHONE Samsung SPH-i500 NOTEBOOK Fujitsu LifeBook S2000
- **68 PDF SOFTWARE** Adobe Systems Acrobat 6 LASER PRINTER Samsung ML-1750
- 74 GRAPHICS NVidia GeForce FX 5200 Ultra and GeForce FX 5600 Ultra DIGITAL CAMERA Minox Digital Classic Camera Leica M3 PC ACCESSORY GE Audio Hub SHREDDER Royal MD100 Media Destroyer
- 76 PROJECTORS Dell 2100MP Projector, Gateway 205
- TABLET PC NEC Versa LitePad
- 80 INTERNET TELEPHONY Callserve Internet Telephone
- POWER SUPPLY



button design vary, however. The Casio's buttons are slightly bigger than the Pentax's, making them easier to use. The Exilim EX-Z3 also starts up quickly, and it allows you to resize, rotate, or invert a photo in the camera.

The quality of the images that my preproduction unit produced was mixed. Most of my outdoor shots were bright, though some appeared a little blurry. In one case, my subject's skin tone looked too yellow. Indoor shots were so-so: the camera tended to lose detail with dark areas and col-

Exilim EX-Z3

Casio

(Preproduction unit, not rated) Large LCD, snappy performance, but no memory card.

Street: \$400

find.pcworld.com/35009

Optio S

Pentax

Innovatively small; tiny control buttons; no memory card.

Street: \$400

find.pcworld.com/35012

PowerShot S400 Digital Elph

Canon

Maintains rock-solid design and improves on terrific features.

Street: \$499

find.pcworld.com/35006

FEATURES COMPARISON

Small Cameras Measure Un

CAMERA	Street price (4/7/03)	Resolution (megapixels)	Optical zoom (35mm equivalent)	Internal memory/ included media	Screen size (diagonal) '	Dimensions (width, height, depth) 1 3.4 by 2.2 by 1.1 2.3 by 3.4 by 0.9	
Canon PowerShot S400 Digital Elph	\$499	4.0	3X (36mm to 108mm)	None/ 32MB CompactFlash card	1.5		
Casio Exilim EX-Z3	\$400	3.2	3X (35mm to 105mm)	10MB/none ²	2.0		
Pentax Optio S	\$400	3.2	3X (35mm to 105mm)	11MB/none ²	1.6	3.3 by 2.0 by 0.8	

² Has slot for Secure Digital/MultiMediaCard media. 'In inches.

ors. These flaws may disappear when the Exilim EX-Z3 becomes final.

You can store images using the camera's 10MB of internal memory. Even so, I'd recommend buying a 32MB Secure Digital card or MultiMedia-Card for around \$35. The Exilim EX-Z3 has a rechargeable lithium ion battery and comes with a USB 1.1 cradle charger. (For a slimmer Exilim-without an optical zoom lenscheck out the \$349 EX-S3.)

CURIOUSLY SMALL

THE OPTIO s is so thin and light, you can pop it inside a metal mint tin. The camera has a ridged aluminum alloy body, small control buttons (such as on/off and an arrow thumbwheel), a tiny optical viewfinder, and a small flash.

People with big hands or stubby fingers may find the lilliputian controls of this Pentax too petite, but I had no

trouble operating a shipping unit. It starts up in just 4 seconds, and its intuitive menu lets you adjust settings such as resolution and white balance. The camera's photos looked good overall, but some colors seemed flat, some light hues (such as yellow and white) appeared overexposed, and one indoor shot was too dark.

The Optio S also includes modes for various shots (such as night scene and panorama assist) and pictures (such as landscape, portrait, and surf and snow). It comes with 11MB of internal memory, a

Secure Digital/MultiMedia-Card slot, a rechargeable lithium ion battery and charger, and ACD Systems' ACDSee photo-organizing software.

GOOD FIT?

WHICH POCKET-SIZE camera is right for you? If you want a solidly built model with lots of pixels, the Canon PowerShot S400 is a good choice. For the smallest and lightest, opt for the Pentax Optio S. For a camera with a nice-size LCD, the Casio Exilim EX-Z3 is the way to go.

-Grace Aquino



NOBODY'S PERFECT: Skin tones in a Canon S400 photo (left) appear too rosy, while colors in a Pentax Optio S shot come out a bit flat.

Sexy Samsung Palm Phone

PDA PHONE

IF THE PERFECT PDA-cell phone hybrid is the mobile communications device you've been waiting for, slow down and take a look at Samsung's SPH-i500. Launched (to start) by Sprint PCS, this svelte new clamshell model is easily the most appealing Palm-based mobile phone I've seen to date-and the device makes few compromises to achieve its slim profile.

Measuring 3.4 by 2.1 by 0.9 inches when shut and weighing just 4.7 ounces, the SPHi500 is only slightly thicker and wider than many current clamshells. And it's not nearly as bulky as the Kyocera 7135 Smartphone, the most recent competing Palm-based

clamshell. One clever innovation that helps the SPH-i500 achieve its small form is the relocation of the Graffiti input area from the lower portion of the main display to the bottom half of the phone, right above the luminescent keypad. That leaves the entire top half of the phone for a smallish (but bright, crisp, and easy-to-read) 160-by-240-pixel, 65,536-color active-matrix screen that my colleagues all admired.

SPH-i500

(Preproduction unit, not rated) Best Palm-cell phone hybrid yet; could use an SD slot. Estimated street: \$500 to \$600 (from Sprint)

find.pcworld.com/34994

The SPH-i500 has 16MB of memory-room for plenty of Palm apps-but no Secure Digital card slot for additional storage, and you might regret this deficiency if you buy the optional camera attachment. Audio quality on phone calls was excellent, but with my preproduction unit I could not test data operations on Sprint PCS's Vision CDMA2000 1X network, which typically offers speeds similar to those of a 56-kbps modem. The phone ran for about three days or so without being recharged.

Another consideration: The phone uses version 4.1 of the Palm OS. No wireless device has yet appeared carrying the newer Palm 5 OS, which supports more powerful processors and other technologies.

PLEASING Palm phone: Samsung's SPH-1500. But if you

want a Palmbased phone hybrid and looks matter, the SPH-i500 is clearly the best yet. Upscale customers will undoubtedly line up for the privilege of paying Sprint the predicted \$500 to \$600 price (with service plan).

-Yardena Arar

Low-Voltage Athlon: Peppy Processing

NOTEBOOK

TEST AMD HAS MADE a name for itself with fast, affordable desktop and consumer notebook processors; now, the company hopes to parlay its low-voltage Athlon XP-M processors into similar success powering thin-andlight notebook PCs.

I looked at one of the first laptops to use one of AMD's new CPUs-a preproduction model from Fujitsu's Life-Book S series, the LifeBook \$2000. This notebook came equipped with a 1.47-GHz Athlon XP-M 1700+ (the top low-voltage Athlon XP-M is an 1800+). Though it couldn't match the dazzling scores we've seen with Intel Pentium M/Centrino-equipped notebooks, the \$2000's PC World-Bench 4 score of 107 trumped those of some slightly heavier 2- and 2.2-GHz Pentium 4-M portables. Lasting 3 hours, 4 minutes, its lithium ion battery held out nicely, too.

The \$2000-configured with 512MB of SDRAM, a 60GB hard drive, built-in Wi-Fi (802.11b), an 8X DVD-ROM drive, a 24X/10X/24X CD-RW combination drive, and the Windows XP Home operating system-costs \$1539; and at 4.3 pounds and 1.4

FUJITSU'S LifeBook S2000.

inches thick, the unit fits right in among its thin-and-light brethren. It has an attractive silvery-blue case and sports a bright 13.3-inch LCD screen. Its combo drive is tucked into a modular bay that also accepts a second lithium ion battery or optical drive (pay another

LifeBook S2000

Fujitsu

(Preproduction unit, not rated) Small, stylish notebook with an AMD Athlon XP-M 1700+ chip. List: \$1539

find.pcworld.com/35015

\$20 to get a USB 1.1 floppy drive, if you need one).

Although it's designed with smaller function and page-

> control buttons, the laptop's keyboard has large, well-spaced keys, which made even my typing fast, smooth, and accurate.

Overall, the Fujitsu Life-Book \$2000 portable should appeal to road hounds who are looking for a basic, welldesigned, and relatively fast alternative to a thin-and-light notebook based on the Pentium 4-M processor.

-Mick Lockey















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Thin Frame	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NaViSet™ (DDC/CI)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No Touch Auto Adjust	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LiquidView Software	No	No	No	Yes	Yes	Yes	No
Multimedia	No	No	Yes	No	No	Yes	No
Vacation Switch	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cable Management	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Input Interface Connectors	VGA	DVI-D	DVI-D	VGA	DVI-D	DVI-D	DVI-D
		& VGA	& VGA		& VGA	& VGA	& VGA



PDF SOFTWARE

WORKGROUPS CAN now get more out of their favorite Microsoft Office applications by using them less. Rather than collaborating on separate files that make up a typical project (a Word press release, an Excel inventory list, and a PowerPoint presentation, for example), simply merge them all in Adobe's \$299 Acrobat 6 Standard PDF-creation software so your coworkers can indicate text edits using the same tools and interface.

Acrobat 6

Adobe Systems

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List: Acrobat 6 Standard, \$299; upgrade, \$99

find.pcworld.com/35000

Many less-expensive programs for converting document files to Adobe's Portable Document Format exist (see find.pcworld.com/35003), but none of them approaches the level of Office integration and the collaboration features available in the genuine article. I looked at a preproduction copy of the software.

Acrobat 6 adds buttons to Internet Explorer for publishing a Web page or an entire site as a PDF file (complete with working links), and to Outlook for attaching a document as a PDF. (The \$449 Acrobat 6 Professional edition adds one-click PDF functionality to Project and some other professional applications.)

To convert a file to .pdf format, simply right-click it in Windows Explorer or any folder window and choose *Convert*



WELCOME ADOBE 6 POP-UPS: Floating toolbars like Commenting (above) put functions you're most likely to need right at your fingertips.

to PDF. Select several files and right-click to see the new Combine in Adobe Acrobat option that joins the files in the order of your choosing. You can apply common headers, footers, and watermarks across the various files.

Acrobat 6's new task-based interface puts the tools you're most likely to use in a given situation—for example, an

append-notes function—on a context-sensitive toolbar. Also new is the ability to accept and reject reviewers' comments in a sender's original file.

Adobe Acrobat 6 is an extremely useful tool for Microsoft Office-based workgroups. If you're not in that category, though, I don't consider it a must-have upgrade.

-Dennis O'Reilly

A No-Frills Laser Printer From Samsung

LASER PRINTER

your home office with a simple, few-frills monochrome laser printer for less than the price of many ink jets? Samsung's \$299 ML-1750 fills this role nicely, offering

reasonably fast printing and sharp text. However, it could not beat the price or speed of our current Best Buy, the \$199 Minolta-QMS PagePro 1250W (see page 137).

Two lights graced the simple front panel on the shipping ML-1750 I looked at: one

> for power and one to alert you that the

printer's tonersaving feature (which lets you print in draft mode) is on. The panel's single

JUST THE BASICS: Samsung's ML-1750 laser printer. button sets the toner-saver and serves as a cancel switch.

The printer includes 8MB of RAM, a 250-sheet input tray, a small manual feed slot, and for connectivity a parallel port and a USB 2.0 port (an optional external 100-mbps print server costs \$130).

Though probably best for a single user in a home office, the ML-1750 printed text at 11.7 pages per minute—close to the SOHO average in this month's *Top 10 Printers* chart. Mixed text and graphics printed at 5.4 ppm, also about average. I was impressed with the ML-1750's crisp and sharp text at its default resolution of 600

by 600 dots per inch. The print quality didn't hold up as well in gray-scale graphics.

Samsung added a few features to a relatively simple printer driver, too, including seven predetermined watermarks so you can imprint labels like "Confidential" or "Draft" on your printout and add overlays such as a header graphic for form letters. It also will print on media as small as 3-by-5-inch card stock.

—Lisa Cekan

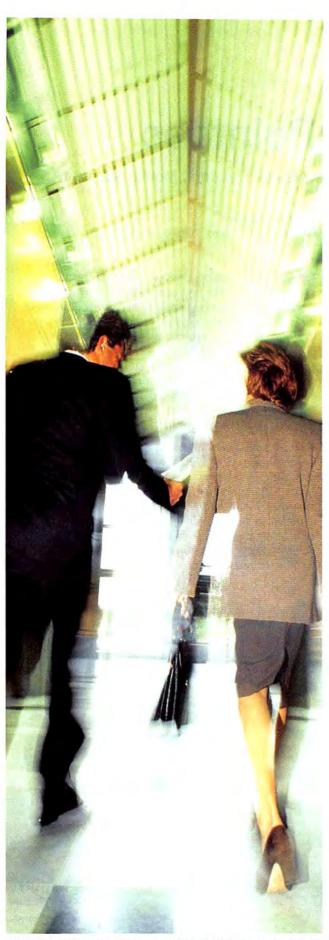
ML-1750

Samsung

This inexpensive laser printer is a decent buy for a solo user.

Street: \$299

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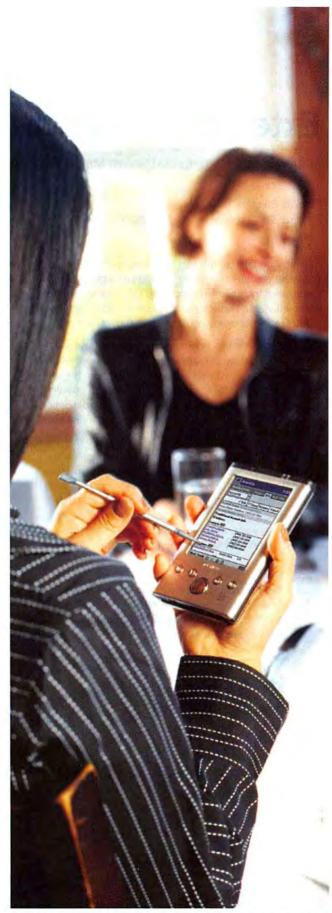
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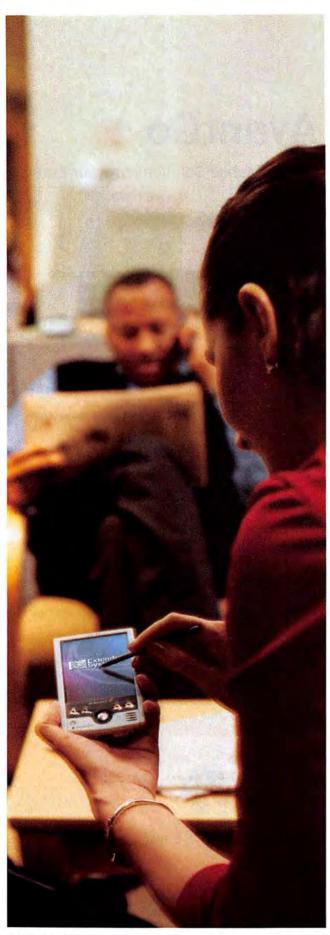
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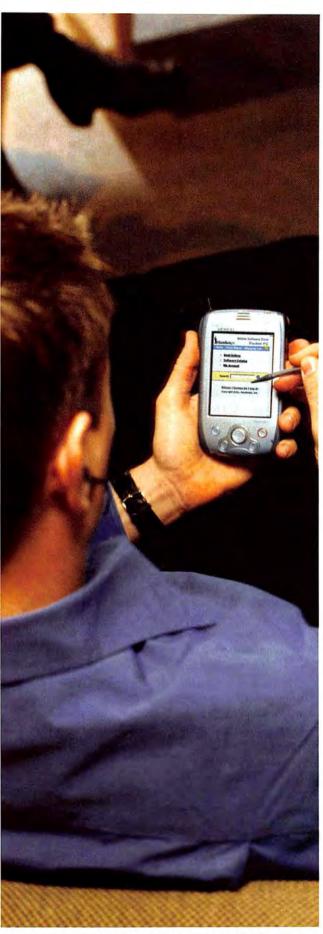
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NVidia Budget Graphics Chips Disappoint

GRAPHICS TEST NVIDIA'S GEForce

FX 5200 Ultra and Center_ GeForce FX 5600 Ultra graphics chips bring DirectX 9-the newest version of Microsoft's application programming interface for rendering 2D and 3D graphics-to the masses. The chips are now showing up in sub-\$150 and sub-\$200 graphics cards, respec-

boards should be available by the time you read this). Both produced largely middling performance, although early drivers may be partly to blame. For example, in our Return to Castle Wolfenstein test, at a resolution of 1600 by 1200 and at 32-bit color depth, the 5200 Ultra board

reached 27

NVIDIA

GRAPHICS:

the 5200 Ultra

(top) and 5600 Ultra.

frames per second-just 2 fps

faster than a shipping 64MB

Asus AGP-V8170DDR card

using the NVidia GeForce4

MX 440 chip, the 5200 Ultra's

predecessor. In contrast to the

5200 Ultra's numbers, a ship-

ping version of a 64MB Vision-

Tek Xtasy card bearing ATI's

Radeon 9100 chip achieved 39

fps (the Radeon chip does not

have DX9 support, however).

The 5600 Ultra didn't fare

much better on the same test.

delivering 30 fps. Meanwhile,

a shipping 128MB AOpen

Aeolus board using the older

GeForce4 Ti 4200 chip hit 46

fps; a shipping 128MB Vision-

Tek Xtasy with ATI's Radeon

NVidia chips were more competitive. At 1024 by 768 resolution and 32-bit color, the 5200 Ultra hit 57 fps and the 5600 Ultra reached 61 fps (compared with 64 fps for each of the ATI cards). The MX 440 card reached 55 fps and the Ti 4200 hit 66 fps.

At the same settings, Unreal Tournament 2003 tests vielded 74 fps for the 5200 Ultra and 134 fps for the 5600 Ultra, compared with 72 fps for the

> 9500 Pro. The MX reached 132 fps.

The NVidia boards also failed to impress in our subjective tests for antialiasing, which smooths jagged edges of on-screen items, creating a more natural-looking image.

best, the Ti 4200 was next, and the 5600 Ultra placed third. In the entry-level chip race, the 9100 squeaked past the 5200 Ultra, and that chip, in turn, surpassed the MX 440.

Though NVidia stumbled earlier with its disappointing high-end 5800 Ultra chip (see find.pcworld.com/34970), the company appeared set to redeem itself with its DX9-ready mainstream products. Judging from these early tests, however, that redemption may have to wait. Budget graphics aficionados will get more oomph from existing NVidia- and ATIbased cards, and even more options are on the way: By the time you read this, replacements for ATI's 9100 and 9500 Pro should be available.

—Tom Mainelli ■

tively. Unfortunately, major DX9 games are not due until later this year, and without those games to make the chips look good. PC World tests show that they aren't particularly impressive.

In our tests, these NVidia chips often failed to beat the aging GeForce4 chips they replace; moreover, they could not outrun comparably priced ATI-based competitors.

We looked at two NVidia reference boards, each carrying 128MB of RAM (shipping

GeForce FX 5200 Ultra: GeForce FX 5600 Ultra

NVidia

(Preproduction cards, not rated) New chips support DX9, but so-so performance is hard to overlook.

Estimated list: FX 5200 Ultra, \$150; FX 5600 Ultra, \$200

9500 Pro chip scored 55 fps. At lower resolutions in the find.pcworld.com/34811

Castle Wolfenstein test, the

9100 and 157 fps for the

440 board hit 56 fps and the Ti 4200 card

Overall, the 9500 Pro scored

QUICK TAKES



THE MINOX Digital Classic

Camera Leica M3-a \$279 working miniature reproduction of a 1950s Leica-weighs a mere 3.2 ounces, fits in the palm of your hand, and takes decent photos. It features 2.1-megapixel resolution and 32MB of internal memory. The optional Minox Classic Camera Flash costs \$199. find.pcworld.com/34988

-Grace Aquino

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-Rex Farrance

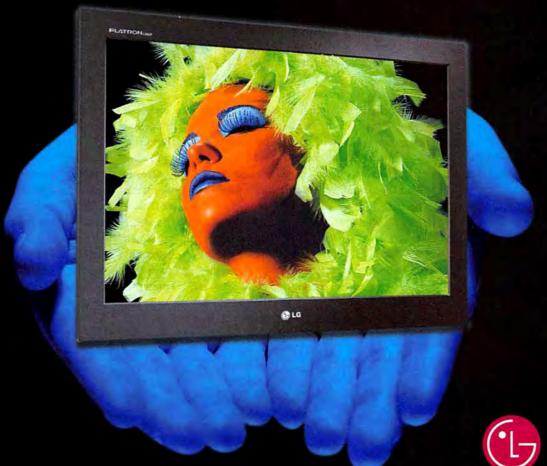
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SECURITY EXPERTS urge businesses to destroy their unneeded sensitive data. Royal's \$130 MD100 Media Destroyer can shred CD-ROMs, compact discs, 3.5-inch floppy discs, and credit cards, as well as up to seven sheets of folded paper at one time. find.pcworld.com/34934

-Michael S. Lasky



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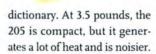
Well-Priced SVGA Projectors

PROJECTORS

PC MAKERS CONTINUE to branch out. Gateway is offering its first digital projector, the \$1399 205—a svelte, 1100-lumen SVGA model. And Dell has released its second, the \$1299 2100MP Projector, which sports a lower price but also a lower resolution (SVGA; 800 by 600) and a lower brightness rating (1000 lumens) than its XGA predecessor.

SVGA-capable projectors can't achieve the same color depth and image quality as higher-resolution XGA (1024 by 768) models. Either type, however, would serve well in small conference rooms.

The Dell 2100MP weighs 4 pounds and feels more sturdily constructed than its competitor. It's also comparatively big and boxy—though it's only about the size of a standard



In my informal tests using default settings, text screens and spreadsheets were slightly sharper with the 2100MP than with the 205 (though neither did well with white text on a dark background). Both units displayed the larger fonts typical of a PowerPoint presentation well, however, and both produced muted colors in still

images. Video images transferred from a stand-alone DVD player via an S-Video connection were adequate-looking.

DELL 2100MP (left)

and Gateway 205.

The projectors come with their own carrying cases, multiple connecting cables, and remote controls (Gateway's larger, ergonomic remote has a built-in laser pointer).

The Dell 2100MP has a slight edge in image quality, but the compact size of the Gateway 205 makes it the better bet for mobile presenters.

-Melissa J. Perenson ■

205

Gateway

(Preproduction unit, not rated) Sleek form makes this model a low-cost presentation tool. List: \$1399

find.pcworld.com/34865

2100MP Projector

Dell

Budget projector offers good image quality and flexible presets. List: \$1299

find.pcworld.com/34868

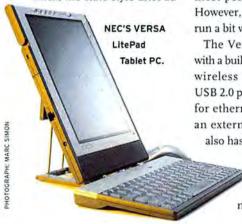


A Light, Potent Tablet PC

TABLET PC

NEC's \$2399 Versa LitePad has a slim design and extremely low weight, but what gives this Tablet PC real punch is its pleasing package of features.

Barely more than 0.5 inches thick, the slate-style LitePad



tips the scales at a feathery 2.2 pounds, making it by far the lightest device to date running Windows XP Tablet PC Edition. The LitePad's 933-MHz Pentium III CPU is adequate for the business applications most people will use it for. However, the Tablet PC does run a bit warm to the touch.

The Versa LitePad comes with a built-in 802.11b/802.11a wireless adapter and three USB 2.0 ports, as well as ports for ethernet, video-out, and an external microphone. It also has a 20GB hard drive,

256MB of memory, and a CompactFlash slot (but not a PC Card slot). Keyboard, mouse, and CD-ROM drive are all included, and they connect via the system's USB 2.0 ports.

In my view, the most critical test of a Tablet PC is how well it lets you take notes by hand during meetings, and on this count, the Versa LitePad was terrific. Writing with a stylus on its 10.4-inch TFT screen was smooth and easy. About the only downside was trying to write while holding it with one hand; I found myself a little concerned that the LitePad might slip out of my grasp.

Battery life always is a consideration with portable PCs. In hands-on testing, the Lite-Pad's battery still had about 20 percent of its power left after 2 hours of continuous use in meetings. After recharging,

battery life dropped to just over an hour when I tested the NEC with a looping .mpeg movie file and the wireless adapter left on (you can turn it off to save power). As for wireless performance, the LitePad did the job as expected on an 802.11b network.

The Versa LitePad should appeal to well-heeled users ready to dump paper and pen for digital note taking on lightweight, convenient hardware.

-Ramon G. McLeod

Versa LitePad

NEC

Slim, light Tablet PC is well accessorized and has appealing extras; runs warm.

List: \$2399

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Get low cost color without raising the cost of your black & white.

Color gets ideas noticed. What gets in the way of that is cost. But now you can move your ideas forward in color with the new Aficio* 1232 Multi-Function Printer. This MFP prints 10 ppm low cost color. And best of all, 32 ppm low cost black and white. So, you only pay for color when you need it. As for the cost of the 1232 itself? Just slightly more than a b/w MFP. All this leaves you with just one more question: How well do you share?





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Web Phone Does the Job

INTERNET TELEPHONY

ITKE ANY TELEPHONE lover, I want crystal-clear reception and complete conversations—without the annoying echoes, dropped sentences, or abrupt terminations that have plagued Web-based phones in the past. Internet Telephone from Callserve Communications seems to have circumvented such snags—and it delivers pretty impressive call quality over a broadband connection.

You prepay for talk time by purchasing units from the U.K.-based service. I started with 2000 units (which cost roughly \$31-the price fluctuates based on exchange rates). Those 2000 units can get you more than 600 minutes of talk time using your PC, depending on how and where you call. If you call outside the United States, connections to cell phones cost more than those to landlines. For example, you pay 3 units (about 5 cents) per minute to Italy or the United Kingdom, but calls to cell phones in the two countries cost 33 cents and 36 cents per minute, respectively.

After downloading the service's free software, you plug a microphone into your PC, type your number into the Internet Phone app, click the "place call" icon, and start

Internet Telephone

Callserve Communications
★★★☆☆

A viable secondary option for long-distance calls, as long as you make them from your PC.
List: Approximately \$31 for 2000 talk-time units (depends on exchange rate)

find.pcworld.com/34982

yakking. The software also keeps track of how and where you're calling.

I tested the service nationally and overseas by using standard PC headset microphones as well as Callserve's \$50 USB Internet Handset and its \$13 Analog Internet Handset. The quality wasn't as good when I used a USB port. Unfortu-



nately, getting the sound finetuned was time-consuming. Initially, I had no problem hearing people, but to at least one listener, I sounded like a distressed fax machine. To change that, I had to futz a bit with volume control and microphone settings. You may use the software to adjust the sound settings, to redial, and to access your call log by clicking the virtual phone's buttons (by the time you read this, the software should also offer a phone book feature).

Anyone who calls landlines abroad regularly can save on long-distance charges by using Callserve's Internet Telephone. But you have to enjoy being online and perched near your PC to use it.

-Aoife McEvoy ■



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A Power Supply You Can Control

POWER SUPPLY

IN THE HIERARCHY of computer components, the power supply-which delivers juice to the motherboard, drives, and other parts that need itgenerally commands slightly more respect than the lowly floppy drive. But smart computer builders and upgraders know that a PC is only as good as the dependable power supply used to run it. For these

TrueControl 550

Antec

Powerful, adjustable power

supply.

Street: \$126

find.pcworld.com/34760

savvy folks, Antec offers the TrueControl 550, with variable voltage outputs and fan speeds.

The shipping unit I looked at was ATX12V compliant and had a whopping 550 watts of total power, plus dedicated circuits for the 3.3- (40 amps max), 5- (24 amps), and 12-volt (24 amps) rails. Geared toward tweakers with big power needs (think multiple hard drives, optical drives, and fans), the unit has a street price of \$126, about \$25 more than comparably powered generic units.

But a no-name power supply doesn't offer the same quality-including a threeyear warranty-or the 5.25inch control panel, which installs in an empty drive bay. Why adjust power settings? Because even good power supplies may wander from their optimum settings, which can impact system stability. Plus, some PCs require a little extra juice. Antec recommends that you use a voltage meter, not your chip set's monitoring tools, to measure output. You can also adjust speeds of the unit's dual fans: Barely audible at lower settings, the fans are louder at higher settings but offer better overall system cooling.

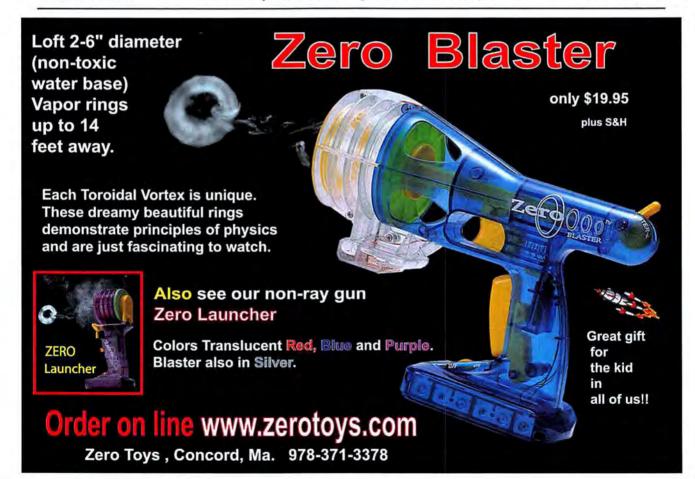
The TrueControl 550 is expensive and has more juice



ADJUST IT: The TrueControl 550 comes with a control panel (top).

and adjustability than the average computer builder needs (Antec also offers less expensive, nonconfigurable units). But if you're building a monster system and you're a stickler for details, this is the power supply for you.

-Tom Mainelli ■



mobileprofessional

DPI to Go

Great printing goes portable with Canon.



Printer shown with optional portable battery kit (PK-51), which must be purchased separately.

■ The i70 offers consumers the speed and print quality of a desktop printer in an incredibly small package. The printer is small enough to fit in your briefcase but capable enough to sit on your desktop.

imple is definitely better. And thanks to rapid advances in imaging technologies, today's light-weight, feature-packed digital cameras have finally attained true "PhD" (Push here, Dummy) ease of use. That accomplished, manufacturers can

concentrate on developing related products to help you transform your images into perfect prints.

One professional outdoor photographer offers a handy hint. She takes all of her pho-

tos at high resolution — 1024×768 , at a minimum. That's because while most of the photos she takes are throwaways—one compelling reason to use a digital camera—she occasionally finds one worth enlarging into a 5×7 inch print. "Try enlarging an image snapped at 640×480 , and you end up with a print that looks like one of grandma's needlepoint cushions," she says.

Another reason she uses digital cameras is because it enables her to review her images in the camera's viewfinder while still on location. Some of those locations are many miles from the nearest town. Until now, on those occasions

when the camera's viewfinder hinted at the possibility of an extraordinary photo, she had to wait to print that image until she could return to her studio. What she really needed was the ability to print images while still on location. Now, she can

ANYWHERE, ANYTIME PHOTO PRINTING

Once you have whittled down the dozens of snapshots from your last session to a handful of keepers, it's time to print them. New photo-quality printers not only make that the easiest part of the process, but they also eliminate the need to have expensive service shops handle your printing.

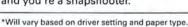
Canon's new i70 portable printer (www.usa.canon.com/consumer) is small enough to fit in your gadget bag and capable enough to sit on your desktop. It incorporates the latest ink-jet technology to create crystal-clear color photos, up to 4800 X 1200 dots per inch (dpi).* With the i70, small size equates to big performance; it delivers an impressive 13 pages per minute in black and 9 pages per minute in color.** Weighing in at just under five pounds, including its optional battery pack, this lightweight powerhouse can easily be carried to a remote location.

One key to realistic prints is a printer's ink-delivery system. High-resolution prints require extremely fine ink droplets to produce true-to-life detail. Canon's Advanced Microfine Droplet Technology™ creates droplets as small

as two picoliters to create ultrarealistic images. (For those of us who are not into super-nanotech, it takes one trillion picoliters to fill a one-liter container.)

Owners of some Canon digital cameras and

camcorders*** get an added bonus: The i70 enables them to link select cameras directly to the printer for instant, on-location printing. Like its technology, Canon's intuitive interface guarantees success—just press the right buttons, and you're a snapshooter.



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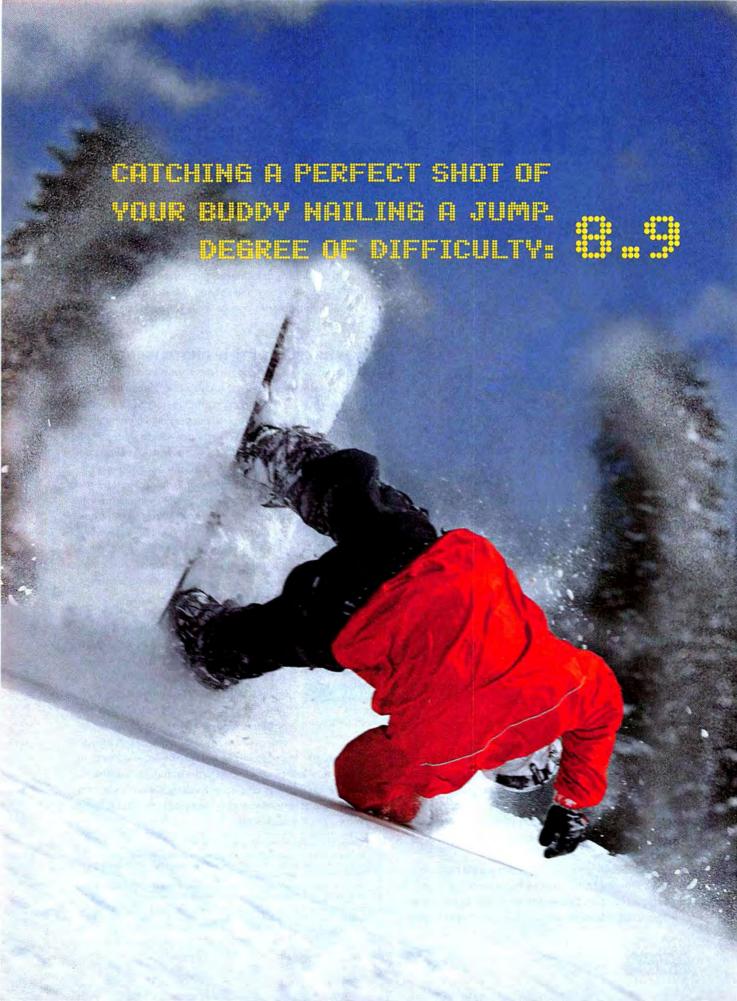
www.usa.canon.com/consumer

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^{**}Print speed based on high-speed draft mode. Print speed will vary depending on system configuration, software, document complexity, print mode, and page coverage.

^{***}For more information on cameras/camcorders featuring Bubble Jet Direct technology, visit www.usa.canon.com/consumer/bubblejetdirect.



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Idow to Iroubleshoot the Worst PC Disasters

Vanishing files? Flaky connections?

Don't panic!

Here's what to do when technology turns evil. WHAT DO YOU DO when your computer suddenly seems possessed? Whether it's satanic software or a hard drive from hell, there are hundreds of vexing problems that can make it devilishly difficult to get anything done.

Don't call for an exorcist just yet. For most people, a little troubleshooting knowledge goes a long way. We'll show

you how to solve puzzling network failures, save devices that were accidentally dropped in water, retrieve mistakenly deleted digital photos, and even revive a dead hard drive by popping it into a freezer.

Not every trick in these pages will work for everyone, but they're worth a shot when things go bad. With a pinch of luck and a bit of skill, you can send those digital demons back to wherever they came from.

BY MICHAEL DESMOND

ILLUSTRATIONS BY JONATHAN CARLSON

Memory Mayhem

DISASTER: You add a stick of RAM, and then your PC comes down with a case of the crashes. Sudden shutdowns, failed boot routines, and mysterious divide-by-zero errors can all be symptoms of a memory upgrade gone bad.

SOLUTION: You can remove the DIMM and go back to the earlier configuration, but if you need the memory capacity, a few things are worth trying.

- 1. Though it's rare, you may have a defective stick of RAM that needs to be replaced. To check, download and run Memtest86 (www.memtest86.com); it stresses and examines RAM to find errors that often don't appear during dayto-day use. We recommend Memtest86 for stress-testing your system immediately after any memory upgrade.
- 2. The two memory modules may have a timing mismatch, which you can work around by using the system Setup utility. As you boot the PC, watch the screen for a message indicating which key to press to access Setup; once you're in your PC's Setup utility, go to the memory settings screen. (You may find these settings under chip set features, but some PC Setup utilities may limit your ability to change memory configuration.) In the memory timings area, check the Column Address Strobe (or CAS) value. If it reads 2, change it to 2.5, then save the settings and reboot. That will add time for both modules to react to inputs from the system, though at a slight cost in responsiveness.
- 3. If that fails, underclock your system bus. In the Setup utility, find the settings for the frontside bus. Depending on your motherboard, you may be able to hand-tune the bus in 1-MHz increments. Drop the bus speed by 10 MHz or so. A caveat: Decreasing bus speed will slow performance.

Notebook Transplant

DISASTER: You dropped your laptop, and now it won't start. How in the world do you retrieve

the data stored on it?

SOLUTION: Fortunately, almost all notebook PC hard drives use a standard pin interface based on the IDE spec. For about \$10, you can purchase a laptop hard-drive adapter that allows you to plug your

notebook hard disk directly into a desktop computer. Once the drive is connected to a working PC, you can apply the full battery of diagnostic and repair tools to the drive-something you can't do on a dead-as-a-doornail notebook. You can find an adapter cable at www.pcconnection.com.

System Crash

DISASTER: Microsoft crows about the reliability of Windows XP, but that doesn't mean programs have stopped crashing altogether. In fact, over the last 48 hours we've watched Microsoft Outlook, the Opera Web browser, and ATI's TV applet crash so hard that they simply refused to start up again. The next time you repeatedly doubleclick a program icon without results, the



FIGURE 1: THREE (COUNT 'EM!) instances of Outlook are quietly chugging along, but there's no sign of it on screen. Time to clean house.

first thing you should suspect is a hung application, regardless of which version of the Windows operating system you use.

SOLUTION: In Windows XP and 2000, right-click the Windows taskbar and click Task Manager on the context menu. Select the Processes tab in the application window, and click the list box column head labeled Image Name to sort the list of running applications by name. Find the application you want to run. In many cases two, three, or more instances will appear, as shown in FIG-URE 1 above. Right-click the offending application and choose End Process. Make sure to click OK to confirm your choice. Repeat these steps until all instances of the program are shut down. Close Task Manager and start the application again.

Unfortunately, Windows 98 and Me don't offer control over running processes. To clear a frozen application, press <Ctrl>-<alt>-<Delete> to bring up the Close Program dialog box. Highlight the application and click the End Task button; you may have to wait several seconds before it takes effect.

LAB NOTES

Optical Drive Dilemma



OPTICAL DRIVES are some of the most problematic

hardware we've seen in the PC World Test Center, says Senior Performance Analyst Elliott Kirschling. "I've seen many fail, and others that have trouble just reading discs."

Sometimes, the operating system will see the CD-RW or DVD-ROM drive, but no amount of fiddling will get the drive to read or write discs.

"Some of this may be caused by dirty lenses," says Kirschling, Here's a fix: Send a shot of compressed air inside the drive to blow dust and other particles off the lens.

In some cases the laser just dies. "It's like a lightbulb, working for a while and then expiring," says Robert Resovich, Plextor's applications engineering manager.

A SIMPLE laptop hard-

drive adapter can help

you walk away from a potential data disaster.

Digital Photo Panic

DISASTER: Uh-oh. You accidentally deleted photos from your digital camera.

SOLUTION: USB-based cameras and memory card readers often allow a computer to access media cards just as it would any other drive. To recover the files, you'll need an undelete program such as UnErase, which is included in Norton SystemWorks 2003, or a stand-alone application like the \$30 Undelete 3 from Executive Software (www.executivesoftware.com).

Here's what to do: Stop-don't use the camera, because you may scramble recoverable data on your memory card. Connect your camera to a PC via the USB cable or place the memory card into a memory card reader.

Instead of using the camera's software to access the card, double-click My Computer. If you see the card represented as a drive in My Computer, you should be able to launch the undelete software, point it to the drive (your memory card), and retrieve the deleted pictures.

Have no such utility? LC Technology's (www.lc-tech. com) \$40 Photorecovery for Digital Media and DataRescue's (www.datarescue.com) \$29 PhotoRescue can salvage images from CompactFlash, Memory Stick, Secure Digital, SmartMedia, and other formats.

Hard-Disk CPR, Part 1

DISASTER: Your hard drive is dying, and you have the parade of error messages and system crashes to prove it. SOLUTION: The drive may be overheating due to high room temperatures or insufficient air flow inside the system case. Make sure nothing is blocking the flow of air through your PC. Turn the computer off and let it cool. If your machine will boot, back up your data. Then follow the steps in the next paragraph to check the disk for filestructure errors and sections that don't hold data reliably.

On the desktop, double-click My Computer, right-click (C:) or Local Disk (C:), and click Properties. Click the Tools tab and then Check Now in the 'Error-checking' area. In Windows 98 and Me, the ScanDisk dialog box will open; choose Thorough and leave 'Automatically fix errors' unselected. In Windows 2000 and XP, the Check Disk dialog box opens; leave its two check boxes unselected. Then in all Windows versions, click Start. If asked, tell Windows to discard any lost file fragments and to fix files.

If your PC won't boot to Windows and you hear your drive spinning, your PC Setup program's disk setting may be incorrect. Look on the drive itself to see if the setting is specified there, or call the drive maker. Restart the system and then enter your PC Setup program by pressing the key that the on-screen directions specify. Verify that the disk setting is correct, then exit Setup.

PC Survival Kit

ANYONE WHO HAS worked with computers knows there is a veritable universe of useful tools, utilities, and Web sites for managing system trouble. Here are a few items that can keep you prepared.

TOOLS

A set of small Phillips (1) and standard (2) screw-

drivers are a must for adding and removing components. Also consider a Torx driver (3) (which has a starshaped head) for screws on harddrive enclosures. Needle-nose pliers (4) and tweezers (5) are useful for setting jumpers and getting at hardto-reach items. A lint-free cloth (6) lets you clear dirt and grime from ink jet printheads and card connections without leaving behind fibers. Consider a small paintbrush for cleaning tight spaces. Compressed air (7) clears gummed up fans and



vents, revives blinded optical drives (see "Optical Drive Dilemma" on the previous page), and improves data connections. Electrical contact cleaner solution (8) cuts through grime and corrosion to improve electrical conductivity-just the thing for cleaning an old device. A handheld vacuum (9) lets you suck dust and pet hair out of less-accessible places.

SOFTWARE

Symantec's \$100 Norton SystemWorks 2003 (www.

symantec.com) packs hard-disk, backup, anti-

virus, system recovery, and other tools. Vcom's \$60 SystemSuite (www. v-com.com) is another great option. Disk utilities are must-haves for recovering from drive failures. The most capable stand-alone disk packages (as opposed to suites mentioned above) include Ontrack's \$199 EasyRecov-

ery DataRecovery (www.ontrack.com) and the

\$299 Winternals Disk Commander (www.winternals.com).

WEB SITES

Caught without a boot disk? Find another computer, go

to www.bootdisk.com, and download what you need pronto. At www.tweakxp.com, you'll find

BOOTDISK.COM Tweak com

useful utilities, bug reports, and a host of tips and fixes for Windows XP. And if you head to www.hardforums.com, an adjunct to the Hardocp.com site frequented by tech-obsessed users, you'll find forums that can offer a lot of insight into a wide range of troubleshooting topics, as well as helpful solutions.

Hard-Disk CPR, Part 2

A dead drive may mean a faulty IDE cable is connected to it. Replace or swap the cable with a working one. If that doesn't work, try one of a variety of data-recovery utilities, including the \$100 Norton SystemWorks 2003 (www.symantec.com), the \$199 Ontrack EasyRecovery DataRecovery Edition (www. ontrack.com), or the \$299 Winternals Disk Commander (www.winternals. com). If you prefer not to use a data-recovery utility, consider the advice at right in "Deep C: Salvage." If all of these options fail, then you'll have to purchase a new hard drive.



Deep C: Salvage

DISASTER: Your drive died and went to heaven. How can you retrieve your files?

SOLUTION: Given the cost of storage these days (80GB for under \$100), the cheapest solution is to replace your dead hard drive and then restore your system to its previous state with your backup. What, no backup? You can try services like Ontrack's Data Recovery Center (www.ontrack.com). Though pricey (typically over \$100 to recover a single drive's data), it's effective. Winternals' \$399 ERD Commander 2002 (www.winternals.com) is another costly yet outstanding utility; it boots your PC directly from a CD-ROM, and its Windows-like interface makes it easy to use.

Here's a last-gasp trick for copying data from a drive that won't read or spin: Place the disk in a Ziploc freez-

er bag and pop it into the freezer for an hour. Seriously. Cooling the disk can subtly change the geometry of the head and platters, enabling the drive to pick up data for a brief period of time. Make sure you have a new hard disk installed, as well as mirroring software like Norton Ghost ready to make a one-shot transfer of the old disk's contents.

Still no luck? Here's your final-albeit slim-hope: Use a Torx driver (a screwdriver with a star-shaped head) to remove the cover from the hard drive and then give the drive heads a gentle tap. Hook the drive to your system (yes, with the top off) and see if you can access the disk.

Death by Dial Tone

DISASTER: Dropped connections, busy signals, and slow page loads can leave dial-up modem users feeling like second-class citizens on the Internet. We can't make ISPs install more modems, but we can offer tweaks that may eliminate being tossed offline. SOLUTION: Call waiting may be a source of dropped connections. You can suppress it by adding a code (often *70; check your phone book) at the start of each dial-up string. In Windows 98 and Me, open Control Panel and Telephony to see this setting.

In XP and 2000, open Control Panel and Phone and Modem Options (XP users may need to click Printers and Other Hardware in Control Panel's Category view). Select your modem and click Edit to see the call-waiting feature in the General tab.

For all Windows versions, activate the To disable call waiting, dial check box as shown in FIGURE 2, and select the appropriate code from the drop-down list (or type it into the box).

Programmed timeouts can also disconnect you from the Net. Windows XP, for instance, allows 20 minutes of idle time before kicking you offline. You can lengthen or even remove that time limit. Open Control Panel's Internet Options, click the Connections tab, and double-click your connection. Click the Dial-up settings' Advanced button (in Me, click Properties, and select the Dialing tab). Uncheck the Disconnect if idle for box (Enable idle disconnect in Me), then make sure that 'Disconnect when connection may no longer be needed' is unchecked. Click OK. In 2000 and XP, click Properties, then select the Options tab. In the drop-down list called 'Idle time before hanging up', choose never to disable time-



FIGURE 2: YOU'LL NEED TO DIG to turn off call waiting for your modem dial-up sessions, but it will be worth the effort.

outs. Some ISPs enforce timeouts-no amount of Windows tweaking will help. Alternatively, download Keep It Alive (available at find.pcworld.com/35033) to periodically create modem traffic and keep links active. Note, however, that using this utility may violate your ISP contract.

Crummy Ink Jet Printouts

DISASTER: Your printer starts producing jagged, blurry, or even smudged prints.

SOLUTION: Nailing down the culprit can be tough. Here are things to try before you call the manufacturer. Run a test print after each step to see if your efforts succeed.

1. The printhead on your cartridges could be clogged with ink. Your printer driver likely includes a cartridge-cleaning routine, which you can access from your printer's Properties dialog box. Click Start-Printers

(Printers and Faxes in XP), right-click your printer icon, and then click Properties. Most printer drivers will present a button that says something like 'Clean Cartridge'. Run this routine and see if it resolves the problem.

2. For poor-looking pages that feature misaligned colors and blacks, faulty calibration may be the cause. Try to calibrate the printer from the printer's Properties dialog box. Find the button that says 'Calibrate Printer' and run the routine.

3. If calibration fails, try physically opening the printer case and reseating the ink jet cartridges; one or more could have become loose. Follow your printer's manual to see how to fully remove and reseat each cartridge.

4. Old drivers or those unqualified by Microsoft for newer versions of Windows can degrade output. Printing problems that crop up after you install new drivers likely stem from the drivers themselves. In this case, go to the

vendor's site and download a qualified driver made specifically for your model.

5. Your printer's cartridges may be the issue. Over time, they can pick up dust or fibers that streak the wet ink as the head moves across the page. Use a lint-free cloth and distilled water to clear gunk off the cartridges.

6. Recycled and refilled cartridges are a frequent source of trouble. Consider switching to new cartridges from the printer vendor for a time.

Problem Solvers: Ten Ways to Stop Disasters Before They Start

1. TREAT YOUR PC RIGHT: Check your PC case every couple of weeks for dust buildup at the vents and fan holes. Also open the PC at least twice a year to clear out dust and debris that inevitably gets sucked inside. You'll prolong fan life and greatly

reduce the risks of overheating your PC.

2. BACK UP YOUR DATA: Invest in a rewritable DVD drive or a second hard disk-it'll let you back up data conveniently and fast. You can also use Microsoft Backup to create System State backups with all your Registry and system settings. Someday, you'll thank us.

3. DO ROUTINE DISK MAINTENANCE: Windows' built-in utilities can perform routine surface scans and file defragmentation. You'll catch potential problems early, protect files from errors, and even improve performance.

4. DON'T FLY BLIND: Use Motherboard Monitor

(mbm.livewiredev.com); it can read the input from temperature sensors built into a computer's motherboard, CPU, and hard drive to warn of an impending meltdown. It also monitors fan activity to alert you if a cooling fan fails.

5. ACTIVATE WINDOWS SYSTEM RESTORE: This terrific utility for Windows Me and XP (98 lacks a similar program) takes a complete snapshot of your system's state before every significant Registry change. Should a software or hardware upgrade go bad, System Restore acts like a time machine to return Windows to its last working configuration. You can also perform manual or scheduled restores. Click Start • Programs (All Programs in XP) Accessories System Tools System Restore, and follow the wizard. For Windows 2000, use Backup (on the System Tools menu) to create backups, and if necessary to restore System State information (click the plus sign under 'What to restore' to find the appropriate System State check box).

6. GET AN UNINTERRUPTIBLE POWER SUPPLY: A UPS

(about \$60) acts as a backup electrical supply, allowing your computer to weather power outages. It also serves as a surge suppressor and line conditioner to shield components from spikes and dips in current.

7. PLAY IT SAFE: Beta drivers (beta meaning "not yet final") can create all sorts of problems. If you opt to get the latest leaked beta driver for your graphics card, you should also download and store on your hard disk a Microsoft-verified driver.

8. KEEP WINDOWS UPDATES COMING: As ridiculous as it may seem to patch Windows

every three days, some updates are critical for keeping other people out of your PC. Check updates as they arrive, and be sure to immediately install any that resolve a significant security issue. 9. BUY AN ANTIVIRUS PROGRAM: The app runs in the background to screen incoming/outgoing traffic and clear infections. Download the latest virus profiles to keep protection current. 10. USE COMMON SENSE: You can avoid a lot of potential virus exposures simply by being careful. Don't open every e-mail attachment you receive. If an attachment from a known source seems odd or suspicious, verify the message with the sender before you open it. Also be wary of Web sites you visit, since malicious sites can attempt to run nefarious Java, HTML, or ActiveX

code on your computer.

-M.D.

Background App Sneak Attack

DISASTER: You install a media player and notice a new icon in your system tray, but then your PC slows down and an application even crashes.

SOLUTION: Background utilities loading themselves at start-up can sometimes do a lot more harm than good. This is where the Windows System Configuration Utility (in 98, Me, and XP) comes in handy. The program lets you zero in on self-starting applets such as media players. (Unless an IT administrator controls certain aspects of the PC, you should be able to access this utility.)

Select Start. Run, type msconfig in the Run dialog box, and press (Enter). Click the Startup tab, and in XP, click the border that appears between the Command and Location column headers and drag it to the right until you can read the contents in that column. Look through the list of start-up items for ones you don't recognize, as shown in FIGURE 3 (and while you're at it, uncheck boxes for duplicated items or commands). Examine the command for each unknown item for

clues to its identity (for example, though 'qttask' may seem cryptic, QuickTime users will recognize a command that includes '\QuickTime\ qttask.exe').

Still can't figure out some of them? Track down these sneaky apps by clicking Start. Search or Start-Find

to locate the .exe file referenced in the command (remember to search system folders and hidden folders, too). Rightclick the file and select Properties. Click the Version tab, if it exists, to see if the data there helps. For DLLs, search for the name (up to the comma) that follows the RUNDLL command and use the same steps as for the .exe files to find clues to what each DLL does. Finally, it couldn't hurt to search the Internet for an item that won't identify itself. Uncheck the items that you want Windows to pass over

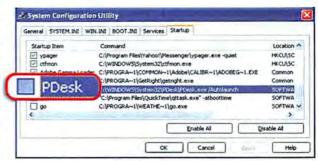


FIGURE 3: DON'T LET SNEAKY UTILITIES push you around. Use the Windows System Configuration Utility to disable applications that might be destabilizing your system.

the next time it starts, and then click OK.

For more-severe start-up problems, use the System Configuration Utility to load only the basic services and devices that Windows needs to run (in XP), or choose which items to load at start-up (in 98 and Me). On the General tab, click the Diagnostic Startup radio button and click OK.

Windows 2000 doesn't include this utility. Download it at find.pcworld.com/ 35222, extract the two msconfig files from the zipped folder, and place them in your system's winnt\system32 folder.

LAB NOTES

Do You Smell Something Burning?



THE PC WORLD TEST CENTER has seen it allfaulty hard drives, fading graphics on monitors, power surges, you name it. But when the analysts

smelled something burning from a test PC, they were alarmed.

The system's CPU overheated because its heat sink fell off during shipment. Like most people, we don't look inside a PC as soon as it arrives. First, the analysts run a virus scan, then they back up the system. Next, they open the PC case and poke around inside.

If you encounter a similar problem, Senior Performance Analyst Elliott Kirschling advises you to unplug the PC as soon as you smell

something or see smoke. Although your first instinct might be to grab a fire extinguisher (or head for the nearest exit), that is necessary only if the machine is actually on fire.

With a scorched CPU, the computer is useless. If your PC is under warranty, call the manufacturer. Describe the situation to a technician and ask about your options (such as replacing the PC).

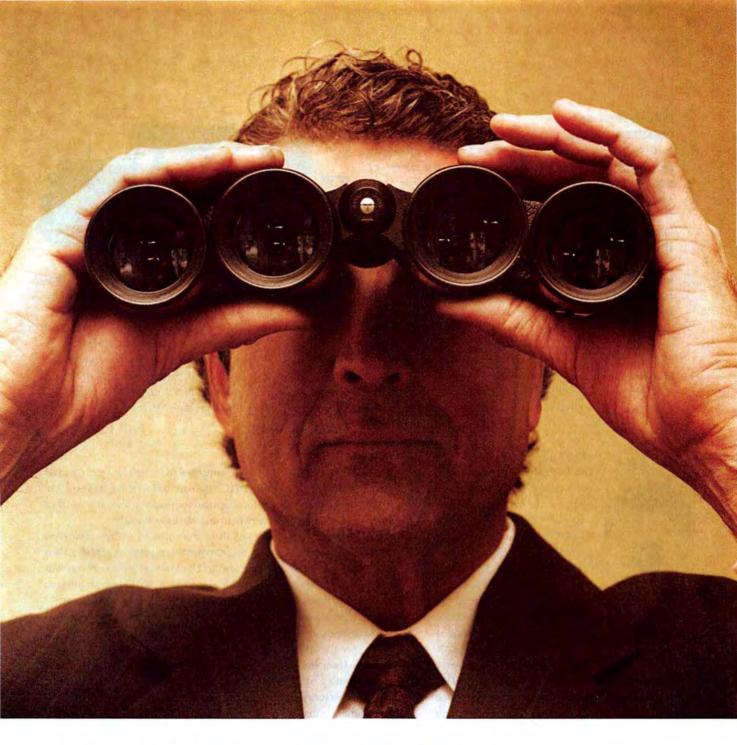
If the system is no longer under warranty, check inside the PC. Open the case to see if the heat sink is still properly in place on the CPU; if it isn't, the chip may have burned. Look for scorch marks on the processor to confirm that that's what happened. If so,

> replace the CPU and hope the motherboard is okay; there's no easy way to determine this until you rule out the processor.

> If, however, the heat sink is in place, try to find the source of the burning smell. The problem may be an inoperative power supply; if that's the case, replace it. Warning: Do not open the power supply-it may give off a very dangerous electric shock.

Even if you've replaced the power supply or the CPU, other components may also have been damaged; replacing one part won't necessarily fix the PC. For example, the graphics card or hard drive could also stop working. This scenario is especially likely after a power surge-sometimes even if you have a surge suppressor (or UPS) already installed. -Grace Aquino





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Water Rescue

DISASTER: You just dropped a phone or Pocket PC into the sink-it's time to kiss your hardware good-bye. Or is it?

SOLUTION: 1. Pull the item out of the water and remove (and toss) its batteries to prevent a short circuit. (If the battery is integrated, trapped water will probably short out the device.) For desktop PCs caught in a flood, being plugged in-even with the power off-is enough to fry the motherboard. The good news: Many floods are accompanied by power outages that could spare your system. That said. you should remove the CMOS battery from your desktop PC. Consult motherboard or system manuals for directions.

2. Open the device and expose the interior (see "PC Survival Kit" on page 89

for helpful tools). Gently shake out the water: remove peripherals. Use a soft rag to clean off dirt or mud.

3. Use distilled water-a gallon or more for a PC-

to thoroughly rinse components, particularly metallic leads and wired connectors. Distilled water cleans salts and minerals that hamper good connections. Avoid soaking display screens.

4. Dab the device dry with a soft cloth and set it out for 24 hours in a dry, warm place. Apply electrical contact cleaner solution to leads to break down dirt and



improve contact. Remove each wired connector from its port, clean leads of both, and reconnect them.

5. Reassemble the device, insert a new battery, and test. For PCs, replace the power supply if it got soaked and install a new CMOS battery. Also plan to replace spinning media drives-if they got wet, they'll probably fail soon.



CD WON'T play? Try other types.

Radio Silence

DISASTER: CD burners let you roll your own compilation music discs, but the discs won't play in your car's CD player.

SOLUTION: You can try a couple of things to coax some tunes out of that reluctant player. First, reduce the write-speed setting in your CD-writing software (some drives may go down only to 8X or 4X, but others allow recording at the slow yet more accurate 1X speed). Audio CD players are far

less tolerant of bit-level errors than are CD-ROM drives. Slowing the burn rate may also produce cleaner discs that stand a better chance of working in your home or car stereo.

Next, make sure you use write-once CD-R media, which have higher reflectivity than rewritable CD-RW media, making them easier for audio players (including car stereos) to read.

If you're already using CD-Rs, try swapping media types. Not all discs are the same; in fact, some are quite poor. You may encounter quality discrepancies even among media from the same company-and within the same spindle of discs. If one vendor's media doesn't work (for example, a green-colored, cyanine-based disc or a bluecolored, azo dye-based CD), try another type (such as a gold-colored, phthalocyanine-based disc).

Network Catastrophe

DISASTER: Home networks are supposed to be trouble-free. Once all your systems are tuned to the DHCP (Dynamic Host Configuration Protocol) server and configured for sharing resources, you should be set. But when the LAN goes dark, be patient and work toward a fix.

SOLUTION: Open a Command Prompt window by clicking Start-Programs (All Programs in XP), typing command, and pressing (Enter). Then type ping, a space, and the name or exact IP address of another PC on your LAN. Press (Enter), and you should see 'Reply from' lines with times in milliseconds scroll up the screen, indicating that the network is fine.

The culprit may be that the other machine isn't granting you access, or an overzealous software firewall (such as ZoneAlarm) is barring the gates. Make sure the other system is properly configured to recognize access attempts from your user account. If you have a firewall, lower the local security setting sufficiently to allow PCs on the network to see each other.

A 'Request timed out' message indicates that you've provided an incorrect address or that the network isn't working. (You could try to hail networked PCs through Network Neighborhood, but pinging is much faster.)

Many home networks use hardware firewalls that act as DHCP servers for assigning IP addresses to PCs on the network. If that component is down, it could foil your connection. From the command prompt, type ipconfig /all (add a space followed by |more to prevent text from scrolling off the top of the screen) and press <Enter>. Under 'Ethernet adapter Local Area Connection' it should say Yes under DHCP Enabled. An IP address should be listed next to DHCP Server. If not, your DHCP firewall may be on the blink; make sure that it is on and that all its connections are solid.

Finally, check the network hub. Thrown circuit breakers or loose power cords can cause a home-network outage. Make sure network cables are firmly set, and that your PC's network card is seated properly.

Michael Desmond is a freelance writer based in Colchester, Vermont,



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from the games are your own problem.

MICHAEL GOWAN PHOTOGRAPHS BY MARC SIMON

MOST ORDINARY PCS ARE BIG AND BOXY—and they have no business inhabiting a spot in your living room. But new home theater PC systems are designed to serve as digital entertainment hubs, marrying the latest hardware and software to provide DVD and digital music playback, photo slide shows, TV, and video recording capabilities. Many of these computers sport the same look as your other components, with physical dimensions that fit nicely into an entertainment cabinet.

New mediasavvy PCs aim to replace your TV, VCR, and stereo. We test six models-plus upgrades that turn any PC into a living-room powerhouse.



The home theater concept isn't entirely new; you can even upgrade a current PC to make it an entertainment hub (see our tips starting on page 104). But Microsoft has given the idea a push with Windows XP Media Center Edition, a superset of Windows XP with a launcher interface that lets you control the PC's DVD player, music application, photo viewer, digital video recorder (DVR) application for recording TV shows, and TV program guide. The interface's large text is easy to see from your couch or desk chair.

A PC IN EVERY LIVING ROOM?

MICROSOFT CREATED Media Center PCs for college students and urbanites who live in cramped quarters that don't have room for a computer, a television, and a home theater system. PC vendors have a different vision, however. In fact, every vendor participating in our review said its system was designed for the living room.

For this review, we tested six home theater PCs. Four of the systems ran Windows XP Media Center Edition: ABS's \$1799 Media Center PC 8500. Alienware's \$2900 Navigator Extreme, Cyberpower's \$1753 Media Center PC, and Gateway's \$2114 Media Center PC (which cannot be purchased without a display). Except in the case of the Gateway, we priced each system without a monitor, because vendors said their systems were designed to work with a television.

Other systems offer functionality similar to that of Media Center systems but use custom packages. We looked at the \$2999 SleekLine 2800AV from PC Power & Cooling and the \$2300 VAIO PCV-RZ26G from Sony. The VAIO uses Giga Pocket software for TV viewing, and a VAIO Media Player for music, digital video, and photos. The SleekLine 2800AV uses an ATI Radeon 9700 All-In-Wonder Pro graphics card and ATI's Multimedia Center software for TV viewing and recording, Cyber-Link's PowerDVD for playing movies, and Windows Media Player for music.

To help the computers fit more comfortably in the living room, ABS, Cyberpower, and PC Power & Cooling wrapped their models in stereo component-like cases. Whereas the SleekLine 2800AV is slim-only 2.25 inches high-the ABS and Cyberpower PCs are a bit bulkier than your average stereo receiver, though they'll fit into a living-room entertainment cabinet better than a typical tower would. Alienware's Navigator Extreme is small, boxy, and cubic, which may make it difficult to integrate with stereo components. Gateway and Sony opted for traditional tower cases, which would look outof-place in most living rooms but would probably work fine if you're using them in a small apartment or dorm room.

If you're looking to inject some computer power into your home theater, ABS's Media Center PC 8500 performed the best in our tests and earns a Best Buy. although the model we tested had no rewritable DVD drive. PC Power & Cooling's SleekLine 2800AV offers high-end hardware, but its speakers were far too difficult for us to configure. Sony's VAIO has the necessary processing power and applications to work well as a digital video editing and photo viewing machine, but its hard-to-use software, lackluster sound, and lack of a channel guide mean it can't compete as a home theater PC.

HOME THEATER TESTS

WE PERFORMED a series of living-room usability tests and scored each system's performance on DVD, TV, music, and

FEATURES COMPARISON

HOME THEATER PCs: WORTHY OF A SPOT IN YOUR

Entertainment systems come in a range of shapes, sizes, and configurations, and they offered very different performance in our tests.

HOME THEATER PC	Street price (without monitor, 3/21/03)	Case type	Features			
Best ABS Media Center PC 8500 BUY **** find.pcworld.com/34928	\$1799	Stereo- like	2.8-GHz Pentium 4 CPU, 512MB of DDR333 SDRAM, NYidia GeForce4 MX 440, Creative Labs Sound Blaster Audigy 2 sound card, Creative Inspire 6.1 6660 speakers, 16X DVD-ROM drive, 48X/24X/48X CD-RW drive, 120GB hard drive			
Alienware Navigator Extreme ★★★☆☆ find.pcworld.com/34943	\$2900	Cube	3.06-GHz Pentium 4 CPU, 1GB of DDR333 SDRAM, NVIdia GeForce4 Ti 4600, Integrated sound, Klipsch Promedia GMXD-5.1 speakers, 16X DVD-ROM drive, DVD-R/RW drive, 180GB hard drive			
Cyberpower Media Center PC ★★本章: find.pcworld.com/34955	\$1753	Stereo- like	2.53-GHz Pentium 4 CPU, 512MB of DDR333 SDRAM, NVidia GeForce4 Ti 4200, Creative Labs Sound Blaster Live 5.1 SB0220 sound card, Creative Inspire 4.1 speakers, 16X DVD-ROM drive, 120GB hard drive			
Gateway Media Center PC	\$2114 2	Tower	2.66-GHz Pentium 4 CPU, 256MB of DDR333 SDRAM, NYIdia GeForce4 MX 440, Creative Sound Blaster Audigy sound card, Boston BA745 speakers, DVD-R/RW/RAM drive, 120GB hard drive			
PC Power & Cooling SleekLine 2800AV *****: find.pcworld.com/34961	\$2999	Stereo- like	2.8-GHz Pentium 4 CPU, 512MB of DDR333 SDRAM, ATI All-In-Wonder 9700 Pro, Creative Labs Sound Blaster Audigy 2 sound card, Logitech Z-680 speakers, DVD-RW drive, 120GB hard drive			
Sony VAIO PCV-RZ26G	\$2300	Tower	3.06-GHz Pentium 4 CPU, 1GB of DDR333 SDRAM, NVidia GeForce4 MX 440, 16X DVD-ROM drive, DVD-R/RW/+R/RW drive, 16X/10X/32X CD-RW drive, 160GB hard drive			

FOOTNOTES: Lacks documentation. With monitor, a required purchase. HOW WE TEST: We tested systems by playing two DVD movie scenes, watching and recording live TV, listening to MP3s and CDs, and displaying photos, scoring each PC on performance and emphasizing general ease of use. We ran PC WorldBench 4 to test speed. Setup and documentation scores were based on how easy a system was to put together and on the quality of vendor documentation. We also assigned scores for the noise each system generated.



COMPONENTS (from left): Cyberpower Media Center PC, PC Power & Cooling SleekLine 2800AV, ABS Media Center PC 8500.

photo display tasks, emphasizing general ease of use. We hooked up each PC to a 36-inch Sony FD Trinitron Wega KV-36FV300 television through its S-Video connection; though the Sony TV has a DVI interface, most televisions offer only an S-Video interface. For DVD image and sound quality tests, we played the Star Wars: Episode I pod racer scene and the Moulin Rouge can-can scene. For music quality, we listened to swing tunes from Squirrel Nut Zippers, industrial music from Nine Inch Nails, trippy guitar riffs from Pink Floyd, and jazz piano from Brad Mehldau. We also watched live and recorded TV, and tested each of the PCs' photo album

software. If the system had a rewritable DVD drive, we burned a disc. In addition, the PC World Test Center ran PC World-Bench 4 on all six units to evaluate their performance on common business tasks, and we checked their graphics performance on a computer monitor.

During testing, we also listened to the noise each system generated. We heard the Navigator Extreme's loud fans, even with the volume on music tracks turned up, while the SleekLine 2800AV was the quietest system-it was barely audible.

Our conclusion: Every PC did one or two things quite well, but none could

completely supplant a home theater system without upgrades. For example, none can replace a cable set-top box, and none offer highdefinition TV decoding. All of the home theater PCs in this roundup lack a radio tuner, though you can connect any of them to your stereo simply by running a

cable from the line-out jack on the computer's sound card to the peripheral.

AN EASIER-TO-USE WINDOWS

WINDOWS XP MEDIA Center Edition's clean interface works well, for the most part. Setting it up is easy, and the functional remote control that came with all of the Media Center models helped us forget we were using PCs. With all the media applications accessible from one location, watching TV and operating the digital video recorder feels like using a single application. In contrast, on the non-Media Center PCs you feel a disconnect between watching live TV and recording it-you have to switch applications, instead of getting everything in

ENTERTAINMENT CABINET?

ABS's Media Center PC 8500 performed the best overall, but the PC lacks a rewritable DVD drive.

Operating system	PC WorldBench 4 score	Setup and documentation	DVD quality	Sound quality	Noise level	TV image quality	DVR ease of use
Microsoft Windows XP Media Center Edition	125	Very good	Very good	Very good	Audible	Very good	Very good
Microsoft Windows XP Media Center Edition	120	Fair	Fair	Outstanding	Loud	Good	Very good
Microsoft Windows XP Media Center Edition	118	Fair¹	Good	Fair	Audible	Very good	Very good
Microsoft Windows XP Media Center Edition	115	Very good	Very good	Fair	Audible	Very good	Very good
Microsoft Windows XP Professional	123	Fair	Very good	Outstanding	Very quiet	Good	Good
Microsoft Windows XP Home	121	Fair	Fair	Fair	Quiet	Fair	Fair

one place with one touch of the remote.

But we do have a few gripes with Windows XP Media Center. For starters, it doesn't let you tweak settings on your speakers, sound card, or other hardware; to do that, you have to exit the Media Center launcher, put down the remote, pick up your mouse and keyboard, and go to the Windows XP Control Panel. Another: If your home theater PC is hooked up to a TV using S-Video, the Windows interface (including items on the Desktop and most application interfaces) will look blurry; the icons and text will quickly give you a headache. During testing, Media Center crashed once during audio tests and once when we started a DVD. This highlights our biggest concern: Putting a PC in the living room means dealing with reliability and maintenance issues when you don't necessarily expect it. No one wants to be rebooting when Barry Bonds steps up to the plate to hit his 700th home run.

While much of the software we tested was simple enough to figure out, setting up some of the hardware was not. Gateway's Media Center PC had ample and easily digested documentation. But despite our poring over the included documentation for the PC Power & Cooling SleekLine 2800AV, the system's complex sound connections prompted two phone calls to the vendor and considerable headscratching in setting up its speakers; we learned that we had to connect the speakers to the digital-out port on the PC.

To test the systems on normal PC applications, we ran PC WorldBench 4 tests. We found that speed differences among the systems weren't extreme. At the front of the pack was ABS's Media Center PC 8500, with a score of 125, followed by PC Power & Cooling's SleekLine, with a score of 123-akin to similarly configured systems we've tested. Gateway's systemcarrying a 2.66-GHz Pentium 4 processor, a skimpy 256MB of memory, and a low-end GeForce4 MX 440 graphics cardbrought up the rear with a score of 115.

LOOK AND FEEL

THREE DIFFERENT INTERFACES

THE HOME THEATER PC interfaces from Sony, Microsoft, and ATI offered three different menus to access TV, DVD, music, pictures, and settings. Microsoft's Media Center Edition was by far the easiest to use, making us forget at times that we were using a PC.



THE MENU ON Sony's VAIO PC was relatively straightforward, but we didn't like the omission of a TV program guide. Its "Click to DVD" software, however, was the easiest option for burning recorded TV to DVD.

MICROSOFT'S Windows XP Media Center Edition offered the easiest-touse interface of the three: DVD, TV, music, and the photo album were all accessible from a central location with a click of one button on the remote.





PC POWER & COOLING'S SleekLine 2800AV takes advantage of ATI's Multimedia Center software. However, with only a launcher bar that sits on the desktop, this option made made us feel like we were using a PC.

HOME THEATER PC IN A BOX

MOST OF THE SYSTEMS we reviewed delivered crisp, clear DVD video: The fast action and digital effects of the pod racer scene in Star Wars: Episode I looked sharp, while the vibrant colors of Moulin Rouge popped from the screen. The Alienware Navigator Extreme, however, produced a blurry image on the television, despite our installing two patches, one from Microsoft, and one from Alienware. The company says it is still working to address the problem, which it attributes to video driver bugs. (Our test movies looked crisp when we used the Navigator Extreme with a computer monitor, however.)

The SleekLine 2800AV, the VAIO PCV-RZ26G, and the Navigator Extreme all include a DVI connection and produced startlingly clear images when we connected them to the Sony TV's DVI port.

Once we got the SleekLine 2800AV's



sound system set up, its Creative Sound Blaster Audigy 2 sound card and Logitech Z-680 6.1-channel speakers

blew us away. The combination reproduced the rumble of the pod racers at high volume without distortion and made elements of the Moulin Rouge can-can scene discernable that we hadn't heard since the movie was in the theater.

At the other end of the scale, the VAIO came with two weak, basic PC speakers and a low-end Yamaha AC-XG sound card that was ill equipped to handle our DVD tests because-unlike the 32-bit Sound Blaster card—it was a 16-bit sound card. For its part, Gateway's 2.1-channel sound didn't offer any surround-sound options.

Playing digital music is another important function of a home theater system. With a good sound card and speakers, these PCs can become your home sound system as well. Windows Media Center makes it easy to access music files, but you can't rip a track to MP3 or WMA from it, nor can you burn a CD; to do that, you have to use a separate application.

WHO NEEDS TIVO?

THE RECEPTION of these systems' TV tuners is only as good as the signal feed. Almost all of them can record shows as a TiVo would (except that they don't learn your viewing habits). Using a PC also gives you the ability to burn recordings to DVD or add another hard drive.

TWO TOWERS AND A BOX (from left): Sony VAIO PCV-RZ26G, Gateway Media Center PC, and Alienware Navigator Extreme.

> On the VAIO, we could watch television only while using the PC's Giga Pocket application, and we had to change settings each time to get S-Video to work. With other models, we just connected the PC and television, and the PC recognized the TV as a computer monitor (the Gateway required a minor tweak).

Setting up the Windows Media Center preferences for television viewing was fairly simple. The free program guide generates an easy-to-use interface for browsing or recording shows. PC Power & Cooling's SleekLine 2800AV uses ATI's Multimedia Center software for television and video recording; its included Gemstar TV guide was nowhere near as easy to use or as attractive as the Media Center one. An update to ATI's Catalyst driverswhich should be available as you read this-will incorporate a new version of Multimedia Center, 8.1, with a much slicker interface and many other improvements. Our VAIO, on the other hand, did not have a program guide loaded on it, limiting the system's immediate usefulness as a video recorder. (You can download a free one called IEPG, however.)

Setting up the Windows Media Center recording feature is far easier than programming your VCR, and easier than ATI's or Sony's offerings as well. You >

FUTURE FEATURES

MEDIA CENTER WISHLIST

WE LIKE MANY THINGS about Microsoft's first version of Windows XP Media Center Edition but believe it could use some improvements-which may be included in the next iteration.

More PC options: Right now only a few vendors produce PCs based on Windows XP Media Center. That will soon change, with Media Center notebooks aimed at residents of small apartments and dorm rooms. Microsoft says that Media Center notebooks from Toshiba and Alienware may be available by the time you read this.

And Dell spokesperson Lionel Menchaca says the company will come out with Media Center PCs by year's end. He cites Microsoft's strict hardware requirements as one reason why Dell is waiting to release its Media Center system. Updated versions of the Media Center OS will support more hardware.

But home theater PCs aren't limited to using the Windows operating system. Online retailer Idot.com has released one based on the LindowsOS Linux distribution; prices for that model will start at a mere \$329, with limited hardware.

FM tuner: Joe Belfiore of Microsoft's EHome Division says that a radio tuner is a common request, and that future Media Center PCs will probably offer it.

Multiroom control: If you're playing a song in one room, you can't rewind it from a networked Media Center PC in another room-yet. Microsoft will offer this software soon. Sony already offers a RoomLink receiver that connects to your stereo or TV and allows you to access files from a PC in another room. This option requires a separate \$200 piece of hardware, though.

record a show in Media Center by clicking the show's name and pushing the record button on the remote, or by using the program guide to schedule a recording. All of the PCs pause or rewind live TV. However, none of the systems let you record one program while you watch another live show (though you can watch a recorded show while you record a live one).

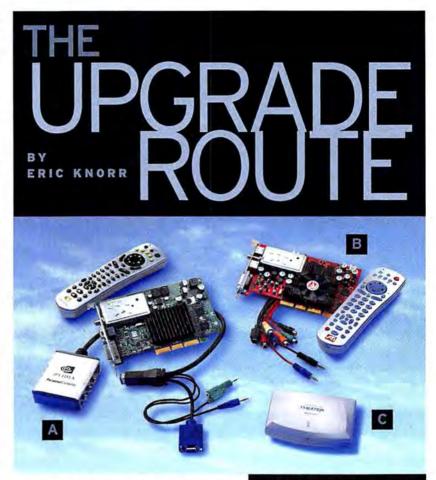
At Media Center's highest recording quality, recorded shows appeared a bit fuzzy and didn't look as good as live TV. With ATI's DVR, on the other hand, capture quality was excellent when we set it to record at "DVD" quality. (By default it records at a lower bit rate, which degrades picture quality.) The VAIO displayed a fuzzy live-television signal, with ghosting, and its recorded shows reflected those image-quality problems.

Once you've recorded shows to your hard drive, you can burn them to DVD for archiving. Burning a DVD on a Windows Media Center PC-if it has a rewritable DVD drive-requires that you exit the Media Center application and use the DVD software bundled with the system. On Gateway's Media Center PC, we burned a DVD with InterVideo WinDVD 4 Creator about as easily as we could burn a CD. The VAIO featured "Click to DVD" software, the easiest option here for burning recorded TV-but the Sony was the slowest in producing a finished disc.

NOT READY FOR PRIME TIME

EACH UNIT we reviewed would need a hardware or software change before we'd put it in our living room entertainment cabinets. You can overcome some of the shortcomings, however-such as a subpar sound card or lackluster speakers-by upgrading when you buy. It will also help to buy a rewritable DVD drive and a 5.1channel surround-sound card with a digital 5.1- or 6.1-channel speaker set. If you're not in the market for a new PC, you can upgrade your existing system to function as a home theater PC.

Michael Gowan frequently writes about digital entertainment for PC World.



A MEDIA CENTER PC sounds like a compelling proposition—a device that can capture and play back digital audio **UPGRADES: NVidia Personal** Cinema graphics board (A), ATI All-In-Wonder 9700 Pro (B), M-Audio Sonica Theater sound card (C).

and video, acting as either a digital-entertainment hub for your existing home theater or an all-in-one PC-based home theater for a small room.

But you don't need to buy a Media Center PC to take advantage of all

that digital media goodness. If your current PC has at least a 500-MHz processor and 128MB of RAM, it can probably do the job with some upgrades. Add a TVtuner card and some software to any fairly capable PC, and you'll have a computer that can rival almost any Media Center machine. The only thing you won't have is Microsoft's Media Center OS. That's okay, though: Several software packages offer similar large-screen interfaces for recording TV and managing digital media.

One thing you will have is some leftover

cash-you'll probably spend much less to upgrade a PC than you would on a new Media Center system. And while upgrading can be a very complex process, it's the best way to get an audio/video setup with exactly the right mix of hardware, software, and consumer electronics.

Digital video recording is probably the most compelling element of the home theater PC puzzle, but it's not all you must consider. You'll need the right balance of high-quality sound hardware and speakers, plenty of storage space, and >







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a convenient means of selecting and controlling media. Depending on how you plan to use your PC, you may want to consider upgrading each of these elements.

GET YOUR GRAPHICS GOING

CREATING A MEDIA-CAPABLE machine starts with graphics hardware. Your home theater PC needs to be multitalentedable to record The Simpsons, and then play it back on your television. Plus, you'll occasionally want to view a Web page or Word document. A home theater PC's graphics system must handle several tasks, such as capturing video and tuning in TV signals, as well as displaying video on a high-definition or analog TV set.

First, check your graphics card for an analog video, or TV-out, port. The port usually comes in one of two types, S-Video or composite video, and sometimes both. S-Video produces somewhat sharper images than composite video, and all but the cheapest TVs take S-Video input.

If your graphics board has a TV-out port and you're otherwise happy with your graphics performance, you can simply add a separate \$50 PCI or USB TV tuner, such as Hauppauge's PCI-based WinTV Go (find.pcworld.com/35084) or ATI's TV Wonder VE (find.pcworld.com/35087), to tune in and capture analog video. For \$50, you're looking at a bare-bones card that captures audio in mono only. More-

A home theater PC's graphics system must handle capturing video and tuning in TV signals.

expensive cards come with a remote control and include support for stereo audio capture. If you have satellite service or digital cable, however, you'll need the ability to change channels on your set-top box automatically-which requires a device known as an IR blaster that emulates the remote controls for consumer electronics. DVR software maker SnapStream sells an IR blaster as an accessory for \$25.

Buyers looking for a new graphics card can turn to several products that pack a TV tuner onto a standard board. ATI's All-In-Wonder line features such boards built around several of the company's graphics chips, from blazingly fast models like the \$399 All-In-Wonder 9800 Pro (find.pcworld.com/35090) down to the \$129 All-In-Wonder VE (find.pcworld. com/34724). Graphics boards based on NVidia's Personal Cinema (find.pcworld. com/35093) can also do the job.

Once the hardware's ready, you need to install and configure your DVR software. We like SnapStream PVS 3 (find.pcworld. com/35081), a popular DVR software package that sells for \$80 plus \$5 per month for the program guide, but there are several other options, including Inter-Video's WinDVR 2 (find.pcworld.com/ 35096), ATI Multimedia Center, and NVidia Personal Cinema PVR. Most TVtuner cards ship with DVR software included. If you choose to install a different program, make sure it supports the tuner or capture device you've purchased.

If you're a stickler for video quality and if you can receive HDTV broadcasts through an antenna, digital cable, and/or satellite setup-you might try a digital TV-tuner card. One of the best is the \$399 Telemann HiPix DTV-200, which decodes and records HDTV signals. But this technology is so new, we recommend it only for the fearless, especially since helpful software like SnapStream isn't compatible with digital TV tuners yet.

CRTs, LCDs, AND TVs, OH MY!

A STANDARD PC monitor works fine for a dorm room or a small apartment, but it won't do to have your friends and family gathered around the old 15-inch CRT for your classic-Seinfeld marathon. Fortunately, hooking your PC up to your living room TV is usually fairly easy.

MINIMUM SPECS

UPGRADE CHECKLIST: HOME THEATER PCs

HERE'S A LIST of what you need to turn your PC into a full-featured home media center.

COMPONENT	Minimum	If you	Then consider upgrading with		
Video	A graphics board with TV-out;	have a graphics board with TV-out	USB or PCI TV-tuner card, \$50-\$100		
video	TV-tuner or video-capture card	don't have a graphics board with TV-out	all-in-one graphics board with TV tuner, \$129-\$399		
Sound card	A sound card with digital out	plan to hook up to a home theater receiver	standard card with digital out, \$50-\$80		
Sound Card	A sound card with digital out	plan to use your PC as a home theater setup	high-quality, DVD-Audio-capable sound card, \$100-\$200		
Speakers	None if PC is connected to a home theater	plan to use your PC as a home theater setup	5.1-speaker set, \$100-\$400		
Storage	80GB	have an 80GB or larger hard disk	rewritable DVD drive, \$200-\$400		
Storage	OUGS	have a smaller hard disk	above option plus 80GB to 250GB hard disk, \$90-\$300		
DVR software	Bundled with TV tuner	aren't happy with your tuner's DVR software	SnapStream or comparable third-party application, \$80		
Remote control	a la	have a digital set-top box	IR blaster for set-top box control, \$25		
Remote Control	n/a	plan to use your PC in the living room	RF remote, \$49; wireless keyboard and mouse, \$80-\$150		



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Our internal drive lets you write DVD +RW and DVD+R formats at 2.4x speed, read DVD-ROM at 8x speed and burn CDs at 12x (CD-R) and 10x (CD-RW).



Maximum compatibility

Memorex +RW and +R formats offer unparalleled compatibility, so you can be confident that your DVD videos, work files and other data can be shared with friends, co-workers and family.



With most TVs, you'll have to settle for an interlaced 480-line image driven by your graphics card's TV-out connection. That's fine for watching recorded TV programs, but the screen image may look pretty fuzzy when you're computing. In that case, you may want to opt for two displays: the existing TV for home theater and perhaps a 15-inch LCD for Web surfing, e-mailing, and configuring.

If you already have an HDTV-capable set or you're thinking about getting one, you might not need a separate monitor because a wide range of sharper display settings will be available to you. For more information on choosing and hooking up an HDTV-ready monitor, see "Computing on the Big Screen," below.

SOUND POSSIBILITIES

ANY HOME THEATER worth its salt needs at least five speakers, including a subwoofer for complete DVD surround sound and perhaps some occasional bigscreen gaming. The best way to do it if you're looking at a living-room setup is to run your PC's sound out to a home theater receiver using a digital audio connection. In that case, almost any sound card with a coaxial or optical Sony/Philips Digital InterFace (S/PDIF) output on the PC side will do. The \$70 Sound Blaster Audigy (find.pcworld.com/35099) from Creative Labs will work just fine.

If you don't plan to hook up your PC to a receiver, you might not get enough wattage for living-room home theater. A good sound card and powered speaker set, however, can fill a small- to medium-size room with good-quality sound. Among sound cards, one of the best values is Creative Labs' Sound Blaster Audigy 2 (find. pcworld.com/35102), which sells for about \$120. If you hate opening your PC, consider M-Audio's Sonica Theater

HIGH-DEFINITION

COMPUTING ON THE BIG SCREEN

WE'LL ALL NEED HIGH-DEFINITION TVs once broadcasters eventually move to digital TV, so a home theater PC project provides the perfect excuse to start looking at sweet high-res big screens. And if computing in your living room is a priority, the increased resolution of HDTV-ready sets will greatly enhance the experience.

The best and most expensive display would be a 32-inch or larger HDTV-capable monitor that can serve both as a home theater screen and as a monitor you can use across the room with a wireless keyboard. If price is no object, get an HDTV monitor that features 720 progressive scan (720p), which in HDTV lingo means 720 lines of noninterlaced vertical resolution. That is, the lines are scanned sequentially on each pass, creating a sharper image than the interlacing method of scanning every other line per pass. With

720p and the right graphics card settings, you'll get an image close to the crisp 1024 by 768 resolution of PC monitors. On the other hand, you'll save considerable cash by choosing an HDTV monitor that tops out at 480p or 1080i (the i stands for interlaced) instead. This usually results in a cramped 640 by 480 desktop resolution, though you may be able to tweak your graphics card to

HDTV DISPLAYS have a dizzying array of video connectors. Here's how to sort them out.

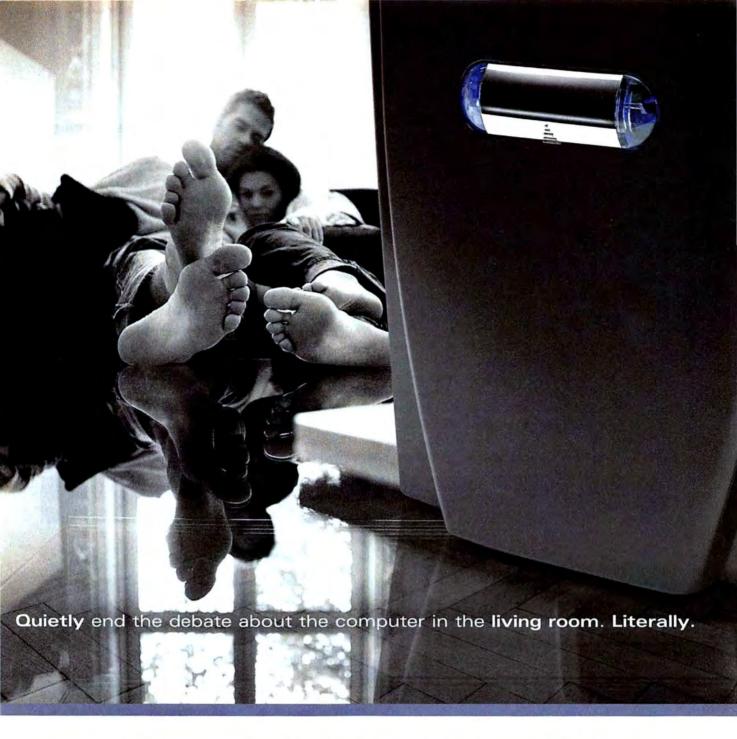
- A Composite video: Standard connector that delivers the worst quality.
- B S-Video: Slightly better than composite.
- C DVI connector: Convenient, high-quality, high-definition connector.
- D Component video: Typical hi-def connection.

display 1920 by 1080 interlaced. The resulting image quality can vary widely depending on the monitor you're using.

A \$30 shareware program called PowerStrip, from EnTech Taiwan (www.entechtaiwan.com), can increase your odds of success by providing endless tweaking options for most graphics cards. Also consider asking a boutique home theater shop if you can bring your PC in and try out HDTV displays to make sure your settings work.

As for connecting an HDTV-ready display, the best case is that both your HDTV monitor and your graphics card have a digital video interface connector, so you can simply run a DVI cable between them. Otherwise, your only HDTV input will probably be a component-video (often labeled YPrPb) connector; several graphics boards have optional VGA-to-component-video adapters.







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Now that's worth coming home to. That's *the power of you*. To view our full line of products, visit us online at www.antec-inc.com.















(find.pcworld.com/35105), an impressivesounding external \$99 sound card that connects to your system via USB port.

You have an abundance of choices for PC-based home theater speakers. Logitech's \$300 Z-680 5.1 speaker set (find. pcworld.com/33260), for example, can pump out sound that rivals most hometheater-in-a-box systems. Less-expensive surround speaker sets such as Creative's \$99 Inspire 6.1 6600 (find.pcworld.com/ 35108) are also available.

REMOTE CONTROL

UNLESS YOU LIKE the idea of keeping a wired mouse and keyboard on your coffee table, you're going to want a better way to control your living-room PC. Many TVtuner cards come with a remote that's capable of controlling DVR software. SnapStream, for example, has an optional \$30 remote that's preprogrammed to

work with it. ATI's All-In-Wonder and NVidia's Personal Cinema cards also have optional, preprogrammed remotes.

Of course, you'll probably want to use your remote to control other software as well. The \$49 ATI Remote Wonder (find. pcworld.com/35111) is one of the most popular units around. It's an RF remote, which means that you don't need to be in line of sight of the receiver for it to work. Unfortunately, it's not very programmable. That's where Girder (find.pcworld. com/35117), a \$5 shareware package, comes in: With a certain degree of diligence, you can use it to remap the capabilities of the ATI Remote Wonder and other remotes, so you can get exactly the couch-potato control you want.

A wireless keyboard and mouse combo like Logitech's \$100 Cordless Elite Duo (find.pcworld.com/35120) can provide more-traditional control without wires.

STORING YOUR RECORDINGS

NOTHING CHEWS up disk space like video. Recording TV in DVD quality requires about 2.4GB per hour. If you drop down to VHS quality at roughly 500MB per hour, you'll lose a bit of quality, but a 250GB drive (Maxtor and Western Digital sell 250GB models starting at \$350) will let you store a lot of video.

If you want to play that video back in another room, we recommend a DVD-RW or DVD+RW drive. Their write-once DVD-R and DVD+R formats are compatible with most current DVD players. Sony's \$300 DRU-500AX (find.pcworld. com/35126) writes to both DVD-RW and +RW formats, burns CDs, and is a current PC World Best Buy.

Eric Knorr is a California-based freelance writer covering PC technology.

THE NO-UPGRADE ROUTE

KEEP THAT PC OUT OF THE LIVING ROOM!

OKAY, SO A PC IN THE FAMILY ROOM isn't for everyone. Fortunately, there are plenty of ways to bring digital audio and video to your home theater setup without dragging a tower system into the same room. TiVo (www.tivo.com) is the classic example: You pay \$250 for 40 hours of TV recording space plus about \$13 a month (or \$299 for the life of the machine). No fuzzy tuner cards, no quirky software, no ugly PC in the living room.

Pricier new devices like Toshiba's \$1500 RD-X2 (find.pcworld.com/ 35129) and Panasonic's \$1000 DMR-HS2 (find.pcworld.com/35132) pair a hard drive with a DVD burner to offer unlimited-storage digital recording, though neither features a program guide.

A number of new products extend TiVo-like panache to PC audio. With a box tailored for your living room, you can access MP3s kept on networked PCs elsewhere in the home. TiVo itself has added this feature as a \$99 option. On the higher end, Onkyo's ethernetnetworkable Net-Tune receivers (find.pcworld.com/35135) have their own LCD interfaces, which display song lists and Internet radio stations organized with Net-Tune Central software installed on a host PC. A basic 15-watt-per-channel model costs \$400; a highpowered THX Select 7.1-channel home theater receiver costs \$1500.



Want wireless access to PC content? We've taken a look at three options: the CD30 CD30'S \$249 C300 (left) and Onkyo's \$500 Net-Tune NC 500 (right).

C300 Network MP3 Player (find.pcworld.com/35138), the HP Digital Media Receiver EW5000 (find.pcworld.com/34208), and the Prismiq MediaPlayer (find.pcworld.com/34031). Each offers 802.11b connections and requires jukebox software installed on a remote PC. The \$249 CD30 is the guirkiest, with an interface that combines a remote control with text-to-speech (imagine Stephen Hawking saying "Christina Aguilera"). The \$300 HP and the \$250 Prismig hook up to your TV and provide video-driven interfaces for accessing songs and photos. The Prismig even lets you stream video from your PC-but at 802.11b speeds, the video quality is unimpressive.



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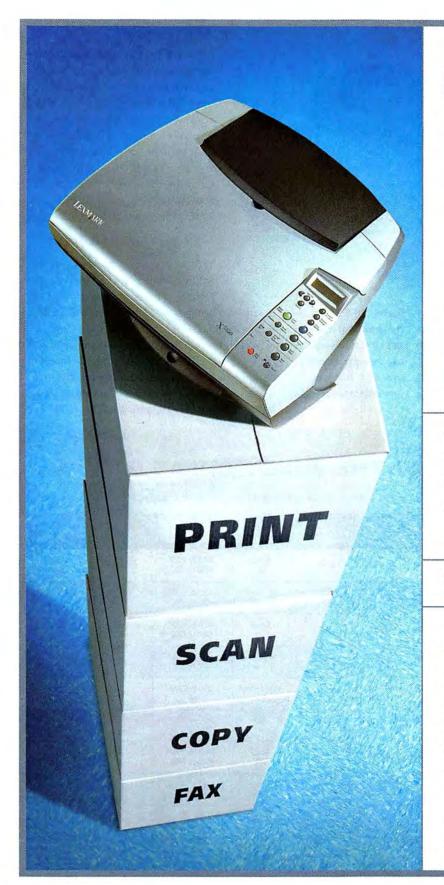
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2002 DIMA winnier of "Innovative Digital Product"



COPY SHOP

New multifunction printers also scan, copy, and fax-all for the price of an ordinary model. But which ones do the job right?

BY ROY SANTOS PHOTOGRAPH BY STEPHEN SWINTEK

Your next printer may have multiple personalities. For years multifunction printers have saved scarce office space, but the latest all-in-ones print as well as general-purpose printers do, at comparable prices. MFPs can't match the output and functionality of a photo printer or stand-alone scanner, but for standard office tasks they fit the bill. >

THE MFPS TESTED BY the Center PC World Test Center for this roundup range in price from \$100 for Lexmark's PrinTrio X75 to \$699 for the HP LaserJet 3330mfp. We also tested Brother's MFC-4420c, Canon's MultiPass MP730, Dell's A940, HP's PSC 2210, and Lexmark's X5150. All seven products have remarkable versatility: They can print, scan, copy, and send and receive faxes. Besides testing the speed and quality of the unit's printing, scanning, and copying, we examined their fax capabilities, add-on software, and other features designed to improve office productivity.

Our Best Buy, the Lexmark X5150, offers top allaround speed and functionality at an affordable price. The X5150 scanned the fastest and did fairly well in each area (though its scanning quality was judged merely Fair). Fittingly, our MFP of choice is noteworthy for its overall functionality rather than for its performance on any specific task.



Brother MFC-4420c

The smallest of the seven MFPs in this roundup was also the slowest, but its print and scan output were better than average.

The HP PSC 2210 combines solid performance with good-quality output and an outstanding software bundle, but it costs three times as much as our lowest-cost MFP. Still, its versatility makes it a worthwhile investment for a small or home office. We were also pleased with the quality of the Canon MultiPass MP730's prints and scans in our tests, particularly its stellar text prints and color output.

AN EXPLODING MARKET?

THE INCREASING POPULARITY of MFPs may be part of a larger trend toward combo devices, as reflected in

the rise of cell phones with added camera and PDA features. Amber Shore, a printer-industry analyst at market research firm ARS, says manufacturers are vying to fulfill tech consumers' desire for several functions in one machine. Shore adds that higher-end photo or laser printers will always have a niche simply because general-purpose MFPs

FEATURES COMPARISON

MULTIFUNCTIONS AT THE JUNCTION: AS GOOD AS

TODAY'S MULTIFUNCTION PRINTERS rival single-purpose printers in price and performance, but their scanning and photo printing lag

	MULTIFUNCTION PRINTER	Street price (4/01/03)	Overall rating	Interface	Print speed (text/graphics, in pages per minute)	Print quality for text/color graphics	Maximum print resolution: black and white/color (dpi)	Scan speed (color/ b&w) in seconds per document	Scan quality (color/black and white)	
1	Best Lexmark X5150 BUY ★★★☆ find.pcworld.com/35021	\$150	94	USB 2.0	6.5/0.7	Good/ Fair	4800 by 1200/ 4800 by 1200	40/29	Fair/ Good	
2	Canon MultiPass MP730 ★★★☆☆ find.pcworld.com/35018	\$399	78	USB 1.1	6.6/1.3	Very good/ Very good	4800 by 1200/ 4800 by 1200	75/25	Very good/ Good	
3	Dell A940 ★★★☆☆ find.pcworld.com/35024	\$139	75	USB 2.0	6.4/0.4	Good/ Fair	4800 by 1200/ 4800 by 1200	40/29	Fair/ Good	
4	HP PSC 2210 ★★★☆☆ find.pcworld.com/35027	\$300	74	USB 1.1	3.6/0.6	Very good/ Very good	4800 by 1200/ 4800 by 1200	120/56	Very good/ Very good	
5	HP LaserJet 3330mfp ★★★☆☆ find.pcworld.com/35030	\$699	72	USB 1.1, parallel	12.0/2.2	Outstanding/ Fair	1200 by 1200/ n/a	89/52	Fair/ Good	
6	Brother MFC-4420c *** find.pcworld.com/35036	\$249	70	USB 2.0	2.8/0.5	Fair/ Good	2400 by 1200/ 2400 by 1200	66/33	Very good/ Very good	
7	Lexmark PrinTrio X75 ★★★☆☆ find.pcworld.com/35039	\$100	62	USB 2.0	3.5/0.3	Good/ Fair	2400 by 1200/ 4800 by 2400	69/31	Good/ Good	
	on 1320 Color Bubble Jet Printer **** Find.pcworld.com/32105	\$50	n/a	USB 1.1, parallel	4.7/0.7	Good/ Good	2400 by 2400/ 2400 by 1200	n/a	n/a	
	on Perfection 1660 Photo *** Ind.pcworld.com/31166	\$149	n/a	USB 2.0	n/a	n/a	n/a	41/14	Very good/ Very good	

CHART NOTES: Overall ratings are based on the following weights: 25 percent for image quality, 20 percent for performance, 20 percent for features, 15 percent for price, 10 percent for ease of use, and 10 percent for support. Scans were of a 2-by-2-inch color photo at 1200 dpi and a black-and-white text document at 300 dpi, except that the reference Epson Perfection 1660 Photo scanned a page of line art at 300 dpi. All units but the HP LaserJet 3330mfp have color ink jet printers; all use flatbed scanners. Italicized entries are reference single-purpose products. n/a = not applicable.

don't produce the high-quality prints and razorsharp documents that users have come to expect for their photos and for professional publications.

Except for the HP LaserJet 3330mfp and possibly the Canon, these MFPs lack the paper handling and other advanced printer features that workgroups of more than two or three people require. For a home office or a single user, however, they're fine alternatives to individual devices.

The print engines in all-in-ones tend to lag about a generation behind the engines in stand-alone alternatives. For example, our Best Buy color ink jet printer, the \$50 Canon i320, prints text at 4.7 pages per minute and graphics at 0.7 ppm, which is faster than both the \$300 HP PSC 2210 (3.6 and 0.6 ppm, respectively) and the \$249 Brother MFC-4420c (2.8 and 0.5 ppm, respectively). Though the prints from the color ink jet MFPs we tested won't end up in a photography gallery, they'd look good in a family photo album or in a small-business newsletter. (The HP LaserJet 3330mfp is the only monochrome laser–based product in this group.)

Multifunction printers are getting cheaper, >



STAND-ALONE DEVICES?

Visit find.pcworld.com/35042 for reviews of all products tested.

around performer, though it was somewhat slower than our Best Buy.

behind that of their freestanding counterparts.

Maximum optical scanning resolution	Tested black-and- white copying speed (seconds per page)	Copy quality	Fax type	Additional features	Comments
600 by 2400	30	Good	PC-based	Abbyy FineReader OCR software	Optional network interface card facilitates device sharing; software detects most apps automatically.
1200 by 1200	13	Good	Stand-alone	Card-direct interface for printing digital photographs; supports various popular digital camera memory cards; automatic document feeder	Three-color ink cartridges; 150-sheet input tray; no manual-feed slot; fax from Word and other apps.
600 by 2400	30	Good	PC-based	Abbyy FineReader OCR software; 24/7 toll-free tech support	No drivers for Windows 98 or Me; print window has a link to Dell's site for ordering ink cartridges.
1200 by 1200	32	Good	Stand-alone	Telephone cord; sample media pack; 24/7 toll-free tech support	Two-color ink cartridges; photo index system makes it easy to print photos without the aid of a PC.
600 by 600	19	Very good	Stand-alone	250-sheet media input tray, priority input tray; automatic document feeder; fax guide; telephone cord; 24/7 toll-free tech support	Largest of the MFPs in this roundup, standing 20 inches tall; memory expandable from 32MB to 96MB.
600 by 2400	27	Fair	Stand-alone	Telephone cord	Three-color ink cartridges; no manual-feed slot; no cropping or preview for scanned documents.
600 by 1200	40	Fair	PC-based	Abbyy FineReader OCR software	EconoMode saves toner; unit also has power- saving mode and a 250-sheet input tray.
n/a	n/a	n/a	n/a	n/a	Was number one Best Buy ink jet printer in March 2003.
1600 by3200	n/a	n/a	n/a	a/a	Was Best Buy small-office scanner in May 2003.

HOW WE TEST: Go to find.pcworld.com/35243 for a full description of our test methodology.

too. Whereas the average price of the trio of color ink jet MFPs tested in our February 2002 roundup was about \$366, the average price of the six MFPs

with color ink jet printers in this review comes in at less than \$225.

The trend toward more-advanced features at lower prices that we've observed in printers for the past several years applies to MFPs as well. Low-cost MFPs such as Lexmark's PrinTrio X75 are pressuring Canon, HP, and other vendors to lower the prices of their existing models and to introduce lowend units. We rated the X75's print quality for text as Good and for graphics as Fair; it also scored Fair for copy quality. The X75's low price encouraged us to accept the quality of its out-

put, which is lower than we would normally expect to obtain from a device equipped with a dedicated black-ink cartridge. Nevertheless, going for the rockbottom price represents a false economy; for just \$40 or \$50 more, you can get a much better product.

There's another noticeable change as well: The latest multifunction printers are far less bulky than their predecessors. Brother's MFC-4420c-the smallest MFP in our roundup, at less than 16 inches wide by 18.5 inches deep by about 5 inches high, and the lightest at a lithe 17.5 pounds-will help keep your workspace tidy. Most of the devices stand 10 to 13 inches tall. At almost 20 inches tall, the HP LaserJet 3330mfp towers over the other six machines-but it has two input trays, with a total paper capacity of 250 pages, while all the other models tested have only one input tray.

Note that last month's reviews of the Brother MFC-4420c and the Lexmark X5150 (find.pcworld.com/ 35240) focused on photo printing.

THE PRINT SCORECARD

BEST Canon MultiPass MP730 WORST Brother MFC-4420c. Lexmark PrinTrio X75

IN OUR PRINT TESTS the Canon MultiPass MP730 came out on top thanks to its great-looking photo prints, which showed rich, accurate

colors and details. Judges also gave it high marks for clean-looking and well-formed text and line art. HP's PSC 2210 was next best for print quality, both color and black-and-white. The low-priced Lexmark



Canon MultiPass

Top-notch performance and good-quality print and scan output make this MFP a good choice for the well-heeled.



The PC maker joins the multifunction printer fray with a serviceable and affordable entry.



X5150 and Dell A940 make satisfactory budget choices, producing generally good prints across the board. Not surprisingly, black-and-white docu-

> ments from HP's monochrome LaserJet 3330mfp were a cut above anything else we saw. But a photo that we printed on it lacked detail (and of course, color); the 3330mfp can't print on photo paper.

The LaserJet 3330mfp printed much faster than the other machines we looked at, reflecting its laser printer engine and its 32MB of on-board memory. Of the products we reviewed, it's the only one that has enough speed, paper capacity, and connectivity options to handle the document-processing needs of a workgroup. The next-swiftest printer overall was Canon's MultiPass MP730; the slow-

est of the bunch were the Brother MFC-4420c (for text) and the Lexmark PrinTrio X75 (for graphics). The LaserJet 3330mfp comes with a parallel-port link (though we tested it using its USB 1.1 port). The parallel port provides yet another option for sharing the LaserJet in a small workgroup.

THE SCAN REPORT

BEST HP PSC 2210

WORST Dell A940, Lexmark X5150

NONE OF THE multifunction printers we looked at can match dedicated scanners in graphics quality. If you need a scanner to digitize documents for storing, copying, or faxing, an MFP will deliver goodenough results. But if you want to capture photos or other art for reproduction, we recommend that

you get a stand-alone flatbed scanner.

In general, the more quickly an MFP scanned, the lower was the quality of its output-a phenomenon we've observed to a lesser extent with dedicated scanners. The Dell A940 and the Lexmark X5150 had the second-best scores in almost every scanning-speed test, and both scanned a 4-by-5-inch color print at 100 dpi in about 40 seconds. They slid to the bottom of the chart, however, when it came to the quality of that scan; they earned just 6.6 points out of a possible 28 from our panel of judges.

Slow scans may give busy office workers pause, but users who want high quality will find that it's time well spent. The HP PSC 2210, for instance, scanned our 100-dpi color test print in 120 seconds-several seconds longer than the average time-but our judges deemed it the best for scan quality. The Brother MFC-4420c earned top scores for text scan quality, but the device ranked fifth in monochrome scanning speed.

HP's PSC 2210 recorded the slowest times in our

scanner tests, and the company's Laser-Jet 3330mfp was next slowest (at 89 seconds for our color print). The PrinTrio X75 did surprisingly well in the speed contest, placing fourth, with a scan quality of Good. Judges rated the X5150 and A940 Fair for color scan quality.

All of the MFPs in this roundup contain a flatbed-style scanner (which requires you to lift a lid to place your document on a glass), although the Canon MP730 and HP LaserJet 3330mfp have automatic document feeders as well. A flat scanning glass works well for most tasks-and it provides the only way to

scan pages in books or magazines-but an ADF comes in handy when you're scanning lots of documents at once, or when you want to scan a sheet that's longer than the scanning glass. The seven multifunction printers we tested have a built-in advantage over most dedicated scanners available in the same price range: All of the MFPs provide legalsize scanning areas. In contrast, dedicated scanners with legal-size scan beds tend to be expensive.



HP LaserJet 3330mfp The only laser-based MFP in this roundup is the best choice for

workgroups.

THE TOP COPIERS

EEST HP LaserJet 3330mfp WORST Lexmark PrinTrio X75

FOR SMALL AND HOME offices, the copying function may prove to be a multifunction printer's killer

> app. Sure, you can generate copies if you have separate scanners and printers, but MFPs make copying as easy as pushing a button-and you don't have to bother with turning on two devices or fiddling with driver settings.

> Of the seven multifunction printers we tested, Canon's MP730 was the fastest copier, duplicating a black-andwhite page in less than 13 seconds. That's about 6 seconds faster than the expensive HP LaserJet 3330mfp. In the middle of the pack were the Brother MFC-4420c, Lexmark X5150, Dell A940, and HP PSC 2210, which turned in an

average copying time of roughly 30 seconds. The PrinTrio X75 took last place in a crawl, at a bit more than 40 seconds. The LaserJet 3330mfp led the group in our copy-quality test. The units receiving the lowest marks for copy quality were the Lexmark PrinTrio X75 and the Brother MFC-4420c.

These devices won't meet the needs of a busy office that generates hundreds of photocopies a day-for one thing, all of them have an upper

AS GOOD AS STAND-ALONES?

NOT LONG AGO, you wouldn't have expected the samequality prints and scans from a multifunction device that you get from a dedicated printer or scanner. But in just the last year, the quality gap separating all-in-ones from their single-purpose counterparts has narrowed.

The photo print output of the Canon MP730, which we deemed the best of the seven MFPs in this roundup. is similar in quality to the company's i320 Bubble Jet, our Best Buy color ink jet printer, although the MP730 costs several hundred dollars more. There's not much of a drop-off in quality to the Lexmark X75's photo output, which we judged the worst of the seven MFPs tested. The scan tests tell another story, however, Neither the best MFP scanner (the HP PSC 2210) nor the worst (the Dell A940) can approach the scanning quality of our Best Buy scanner, the Epson Perfection 1660.

-Dennis O'Reilly

BASELINE BEST WORST Canon MP730 Canon i320 Bubble Jet Lexmark X75 Epson Perfection 1660 HP PSC 2210 Dell A940

FineReader kept columns, tables, and other formatting in the original documents intact. The OCR programs included with the other MFPs were light versions of full-featured packages. Like printers, low-cost MFPs can cost you plenty in replacement ink and toner cartridges. Black-ink cartridges for the six ink jets cost from

than the other software we looked at. In addition,

\$14 for the Canon MP730 to \$35 for the Dell A940. Cartridge life depends on print resolution and on whether you print text or graphics. HP's LaserJet 3330mfp laser printer uses relatively expensive-but longer-lasting-toner.

Color-ink cartridges cost a few dollars more than their black-ink counterparts, and they generally yield fewer pages. The Brother MFC-4420c and the Canon MP730 use separate cyan, magenta, and yellow cartridges that cost about \$13 each. The Dell A940, HP PSC 2210, and Lexmark X5150 and PrinTrio X75 use tricolor cartridges that cost about \$30 to \$35. In addition, the PSC 2210 takes a separate photo cartridge that you can use in place of the standard black cartridge; the three colors of dye-based ink it contains increase the range of shades the device can print, and they adhere better to photo paper. Again, the number of pages these cartridges are rated to produce ranges from 275 to almost 500, but your mileage will vary depending on your output resolution.

Dell and HP tied for the highest scores in tech support; both companies offer 24-hour help, including weekends. Most of the vendors offer to send you

> another unit quickly (usually the next business day) if your machine stops working during the warranty period, though this policy is subject to change.

> Finally, like most printers, these MFPs lack the necessary USB cable to connect to a PC. Expect to spend another \$15 to \$20 for the cable, if you don't already have one.

> With MFPs becoming cheaper, smaller, faster, and more functional, the general-purpose printer may be an endangered species.

Roy Santos is a freelance writer who lives in Berkeley, California. Dennis O'Reilly is a senior associate editor for PC World.

limit of 99 copies per job. But small businesses and home offices should find the speeds to be at least satisfactory for their needs, and they should be delighted with the devices' convenience.

AND FAX TO BOOT

ALL SEVEN OF THE MFPs we tested include fax capabilities: The Brother MFC-4420c, Canon MP730, HP LaserJet 3330mfp, and HP PSC 2210 have faxes that work without a PC, while the Dell A940, Lexmark PrinTrio X75, and Lexmark X5150 require your PC's modem to send and receive fax documents. We did not formally test fax quality or speed.

If you do a lot of faxing, get an MFP with stand-alone fax capability. All four devices with built-in faxing use a standard fax keypad and control buttons. The automatic document feeders on the Canon MP730 and HP LaserJet 3330mfp let you fax several pages with the push of a single button. Without an ADF, the user scans each page into memory and then faxes them all. Color faxing requires a color-capable fax on the receiving end.

Fax capability isn't cheap: The four MFPs with built-in faxing are the highest-priced devices in our roundup. If you don't mind turning on your PC to send or receive faxes, the low-cost Dell A940 and Lexmark X5150 or PrinTrio X75 are worthy alternatives. They use their own fax software along with your PC's modem. Unlike built-in faxing, software-based faxing can accommodate as many pages as your PC's memory can hold. On the other hand, PC-based faxing requires an analog phone line in addition to any broadband Internet connec-

tion that your computer may use. MFP ACCOUTREMENTS

ALL OF THE MFPs in our roundup have optical character recognition. which turns faxes and scanned documents into editable text. The OCR software bundled with these devices is generally serviceable; but in our informal tests, the Abbyy FineReader engine that is part of the Dell A940's driver offers the best character recognition (it's also

included with the two Lexmark MFPs). FineReader worked seamlessly with Microsoft Word 2002 and made fewer character-recognition mistakes

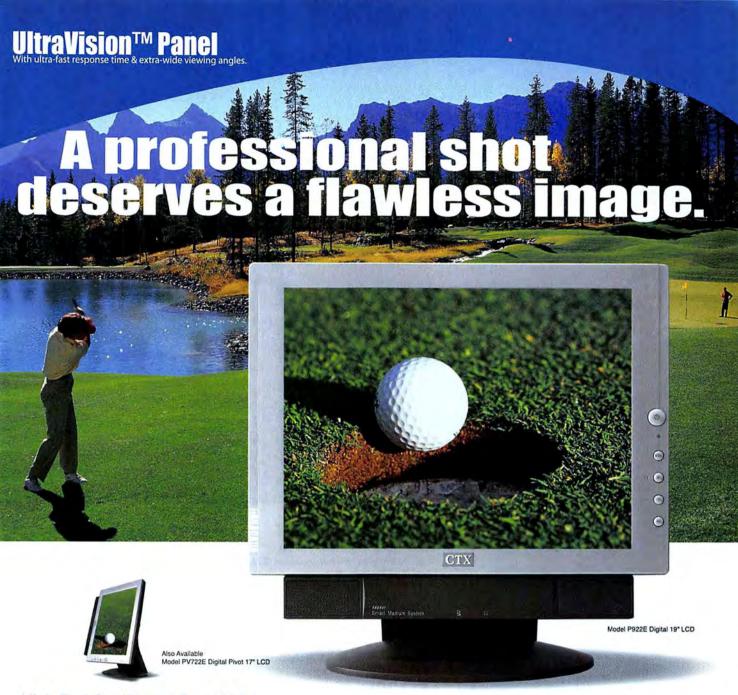


HP PSC 2210 This MFP may be slower than the competition, but the quality of its prints and scans is worth waiting for.

Lexmark PrinTrio X75

The least-expensive multifunction printer in our roundup is somewhat slow, but its text prints and scans were surprisingly good.





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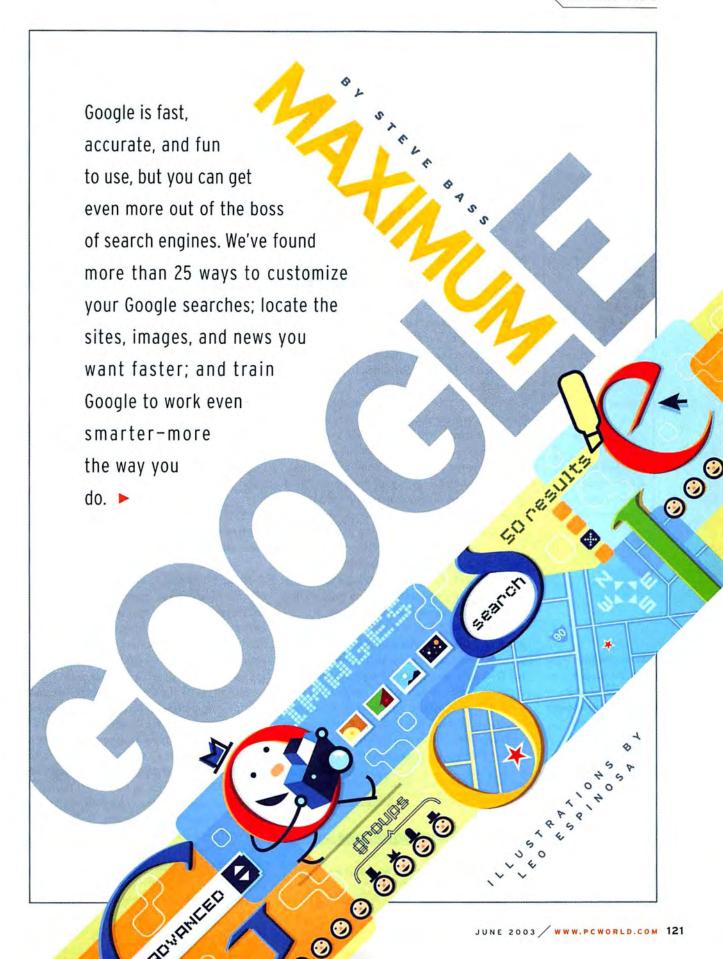
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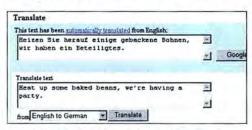
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Google, is graphically sparse, so it responds to search re-

quests with blazing speed. It's also hot on the heels of Google with News, Pictures, Video, Audio, and FTP file tabs. AlltheWeb is smart, too. For example, Advanced Search (under Video) lets you specify whether you want streamed or downloadable files, and in which video file format.

ILOR (www.ilor.com/searchilor.lor) simplifies

the task of keeping track of links while

searching. Let your cursor hover over any link on a page of ILor's search results, and up pops the Lorlinks menu, which contains various handy tools. One tool sticks links into a pop-up box for your convenience (you can e-mail the links to a buddy later, for example). Another tool adds the saved links to your Favorites list.

 PROFUSION (www.profusion.com) allows you to search within 22 broad



categories, including legal, living, career, technology, science, and travel. ProFusion's Alerts feature notifies you by e-mail when a designated page changes or when new

results appear for search queries you specify. TEOMA (www.teoma.com) enhances typical search results by



"refinements"-search terms that you might logically use to narrow a search. For example, if you search on the word "airplane," Teoma provides links to popular radio-controlled airplane hobby sites, with refinement links to "airplane tickets," "paper airplane," and even "Jefferson Airplane."

VIVISIMO (www.vivisimo.com) breaks down



search results into category clusters, enabling you to

quickly choose the most valuable URLs. If you search on "scuba," for example, Vivisimo builds a left pane with subcategories such as magazines, equipment, and islands. You can also search any of 30 specific sites or portals, including CNN, the New York Times, and EBay.



TO HUNT through the Directory fast, search for "Beatles" (say), and click the results page's Directory tab. You'll get fewer, morefocused results.

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Control 2 to 512 PCs or servers from a single keyboard, monitor and mouse console with Tripp Lite KVM Switches!



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KVM Switches! Not only will you be able

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and electricity costs, eliminate
unnecessary clutter and improve
productivity by avoiding unnecessary

movement between consoles.

Tripp Lite's 8-port rackmount KVM Switch is full featured vet economically priced.

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- Desktop models also available in 2 and 4-port configurations
- * When used with optional adapters, sold separately.



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IF A SPECIFIC group relates to your search, Google will tell you so, listing it immediately below the vellow line that says "Related groups."

Google's Preferences link, scroll down to SafeSearch Filtering, and select Use Strict Filtering.

- GRAB AN OPINION There's no better place to find out what others think-about pretty much anything-than on Google Groups, an archive of Usenet discussion group posts. But you can easily find yourself overwhelmed by huge numbers of results. Narrow your search by using Google's Advanced Groups Search page (find.pcworld.com/ 34859), and change the Message Dates drop-down to something more manageable—say, past year.
- GET MORE RESULTS If you're faced with too few search results, it's time to use Google's "Similar Pages" link and check whether Google's "repeat the search with the omitted results included" option is included at the bottom of the page. In many cases, you can glean enough information to make that search (or the next one) successful.
- VIEW IN HTML Google often lists Adobe PDF files in results. To browse the contents of these without opening Acrobat Reader, click the View as HTML link. The presentation isn't always pretty,



IF YOU DON'T remember an entire quotation, you can stitch it together with asterisks. Each asterisk stands for one missing word in the sentence or phrase.

but you can get a quick look at the text to help you decide whether to download the whole kaboodle.

DRILL DOWN WITH WILD-CARD SEARCHES To find a phrase or quote, you don't have to know the entire line. Wrap a portion of the quote that you know in quotation marks; to get better results, add related words, like the speaker's name.

Contributing Editor Steve Bass writes the Home Office column and runs the Pasadena IBM Users Group. Contact him at homeoffice@pcworld.com.

SEARCH CONTROVERSY

The Curse of the Cache: Is Google's Memory Too Good?

AFTER A MESSY DIVORCE, the last thing Diane K. Jensen wanted to be reminded of was her husband-or the online business that they used to run together from their home in Sarasota, Florida.

Unfortunately, she continued to receive customer inquiries more than six months after she asked her ISP to take down the site. Jensen blames Google, where she can still find parts of her old site preserved in the cache. Google's cache servers store entire Web pages and sites.

"I was going through a very traumatic experience; and each time I got an e-mail, it would remind me of what I was-and still am-going through," she says.

The cache is one of the favorite tools of many Googlers because it lets them browse archived Web pages that may have changed recently or that were hosted on servers that subsequently went offline.

But not everyone wants retired pages to stay in the cache. Weeks after September 11, 2001, Webmasters for the nation's utilities and mass transit agencies removed sensitive Web pages, fearing that terrorists might use the information to attack those facilities. Months later, visitors found the pages in Google and on other caching sites.

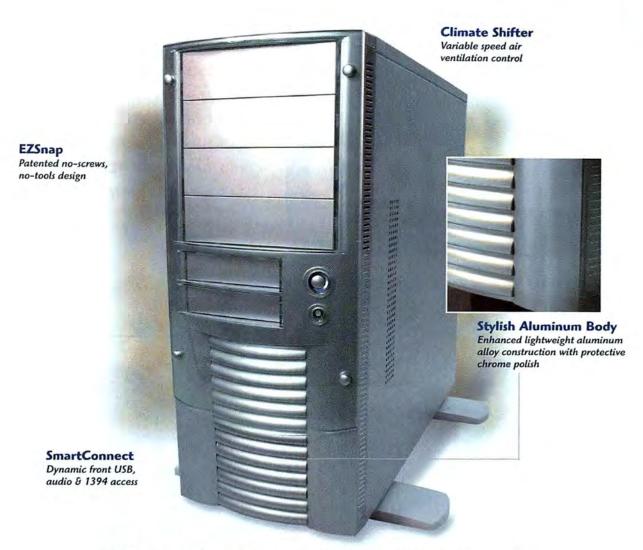
When businesses find their copyrighted data illegally published on the Web, it's not enough to go after the site; they must also ask Google to remove any reference to it, including links on other sites, from its cache. Google has received nearly a hundred such requests, according to the Chilling Effects Clearinghouse (www.chillingeffects.org).

A Google spokesperson says that old pages drop out of the cache every four to six weeks. Jensen's site may have staved in the cache longer because her Web hosting service removed only a few pages from the site, so the site still looks active.

Caching isn't just a Google headache. In fact, experts cite the Way Back Machine (www.archive.org) as a bigger problem. That site lets you view snapshots of whole Web sites, year by year, and it never deletes the files that it stores in its cache.

RECENT IMPROVEMENTS to the back end of Google's cache make it easier for you to remove your pages from Google's cache, or to prevent their being stored:

- To have Google drop your entire Web site, one or more pages, or just snippets from its cache, visit Google's Remove Content page (find.pcworld.com/34730), where you can learn how to remove pages from the cache or to prevent Google from caching sites.
- To stop a page from being cached, add <META NAME="googlebot" content="noarchive"> in the <HEAD> section of the HTML files (see find.pcworld.com/34733 for more details).
- Another method to eliminate Web pages from Google's cache is to replace the pages you don't want cached with blank pages in the same location and with the same file name. When Google next updates the cache for that page, it will store the blank files.



Featherweight Fortress

AOpen Lightweight & Rugged Aluminum Cabinets

More than just a box. AOpen's high-lustre aluminum alloy cabinets don't just look cool, they are cool! Their exclusive Climate Shifter 3-speed fan technology delivers perfect operating temperatures at your finger tips. Plus with SmartConnect you get quick access to USB, 1394 and audio connectors neatly hidden behind the front panel. And for hardcore DIYs, AOpen's EZSnap tool-less and screw-less technology provides effortless installation and removal of front/side panels, drives and add-on cards—making upgrades a snap! Extreme innovation and value—from the innovators at AOpen.

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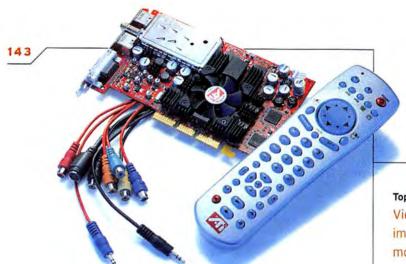


Digital Cameras: More Lens, More Bucks

digital SLRs. But the simpler, smaller Canon PowerShot S50 still takes great shots.

Most of the contenders for our Top 10 Digital Cameras chart of models costing \$500 or more—including Canon's second-place, 5-megapixel PowerShot S50—use fixed zoom lenses. Singlelens reflex digital cameras cost more, but most accept multiple lenses from ultra-wide to ultra-telephoto. One digital SLR, the Canon EOS 10D, snagged the seventh spot; it lets you swap lenses, plus it has a 6.3megapixel image sensor and true through-the-lens (TTL) viewing. A less expensive option: The Olympus E-20N in the ninth spot has TTL viewing and a 5-megapixel sensor, but it doesn't offer interchangeable lenses.

Freelance writers Dan Littman, Mick Lockey, and Carla Thornton, and PC World reviews editors Richard Baguley, Tracey Capen, Seán Captain, Rebecca Freed, 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.



Top 10 Graphics Boards

ATI's All-In-Wonder 9700 Pro includes a remote control that works with the card's integrated TV tuner so you can surf channels while surfing the Web. It also carries cables and ports for connecting almost any type of video device.

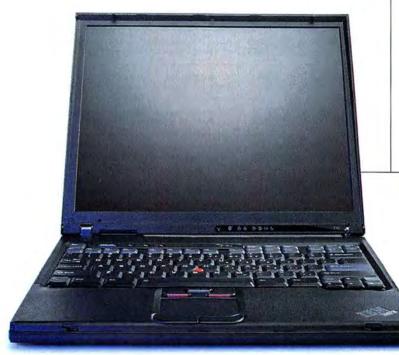
Top 10 Monitors

ViewSonic's \$289 VE500 posted the best image-quality scores for the money on this month's chart of 15-inch LCD screens.



Top 15 Notebook PCs

The IBM ThinkPad T40 achieved the fastest PC WorldBench 4 mark of any portable we have tested to date, and yet it's still fairly light by notebook standards.



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 support policies score is based on vendor support policies (not shown on charts). Please see find. pcworld.com/15720 for additional details on how we compile charts for the Top 100.

TOP 15 DESKTOP PCs

	POWER SYSTEM	Overall rating	Street price (4/4/03)	PC WorldBench 4 performance score ' Faster	Comments
ı	Best ABS Awesome 3450 BUY find.pcworld.com/34736	90	Very inexpensive \$1929	Windows XP Very good Home 133	The second-fastest system this month, the 3450 has an innovative pewter case with a handle and a power switch mounted on top. (★★★☆)
	Sys Technology Performance 3000+ find.pcworld.com/34112	86	Average \$2803	Windows XP Outstanding Professional 136	Fastest PC on the chart has a powerful sound system. CD-RW drive gets an upgrade, and price drops by \$192 this month. (★★★☆ May 03)
	Micro Express MicroFlex 30A find.pcworld.com/34742	86	Inexpensive \$2190	Windows XP Very good Professional 131	Reasonably priced and quick, the MicroFlex 30A includes a large LCD monitor and a multimedia graphics card. (★★★がは)
	ABS Awesome 3340 find.pcworld.com/32549	84	Inexpensive \$1999	Windows XP Fair Home 124	The 3340 has abundant speed for business applications and performed especially well in our gaming graphics tests. (★★★ケ☆ Feb 03)
,	Polywell Poly 880NF2-2700 find.pcworld.com/32900	83	Very inexpensive \$1965	Windows XP Good Home 128	This unit earned high scores in 3D graphics, but the monitor's text quality was disappointing. Price falls \$324 this month. (★★★★ Mar 03)
,	MPC Millennia 910i Dream find.pcworld.com/34745	77	Very expensive \$3499	Windows XP Fair Professional 122	Loaded system is well equipped for working with digital media; but for a power PC, its speed running business apps was so-so. (★★★☆)
,	Polywell Poly 7205G-3000 find.pcworld.com/34157	76	Average \$2390	Windows XP Fair Professional 123	Though stocked with high-end components, this PC delivered only modest speed and came with a mediocre monitor. (★★★☆ May 03)
	Percent of overall	rating >	10 percent	25 percent	
_					
	VALUE SYSTEM	Overall rating	Street price (4/4/03)	PC WorldBench 4 performance score ' Faster	Comments
-	VALUE SYSTEM Best ABS Awesome 3380 BUY find.pcworld.com/34118	Overall rating	Street price (4/4/03) Expensive \$1749	PC WorldBench 4 performance score ' Faster Windows XP Outstanding Home 132	Comments This value screamer beat all but the fastest power systems in our speed tests. It also posted top-end graphics scores. (オオオポ May 03)
1	Best ABS Awesome 3380	rating	Expensive	performance score ' Faster Windows XP Outstanding	This value screamer beat all but the fastest power systems in our speed
	Best ABS Awesome 3380 BUY find.pcworld.com/34118 Micro Express MicroFlex 24A	rating 85	Expensive \$1749 Very inexpensive	windows XP Outstanding Home 132	This value screamer beat all but the fastest power systems in our speed tests. It also posted top-end graphics scores. (************************************
3	Best ABS Awesome 3380 GUY find.pcworld.com/34118 Micro Express MicroFlex 24A find.pcworld.com/32891 Gateway 500X	85 81	Expensive \$1749 Very inexpensive \$999	Windows XP Outstanding Home 132 Windows XP Outstanding Home 131	This value screamer beat all but the fastest power systems in our speed tests. It also posted top-end graphics scores. (************************************
3	Best ABS Awesome 3380 BUY find.pcworld.com/34118 Micro Express MicroFlex 24A find.pcworld.com/32891 Gateway 500X find.pcworld.com/34739 Polywell Poly 880NF2-2500	85 81 80	Expensive \$1749 Very inexpensive \$999 Average \$1484 Inexpensive	Windows XP Outstanding Home 132 Windows XP Outstanding Home 131 Windows XP Good Home 117	This value screamer beat all but the fastest power systems in our speed tests. It also posted top-end graphics scores. (************************************
3 4	Best ABS Awesome 3380 BUY find.pcworld.com/34118 Micro Express MicroFlex 24A find.pcworld.com/32891 Gateway 500X find.pcworld.com/34739 Polywell Poly 880NF2-2500 find.pcworld.com/34748 Freeway Gaming Predator PI440-R	85 81 80 78	Expensive \$1749 Very inexpensive \$999 Average \$1484 Inexpensive \$1100 Average	Windows XP Outstanding Home 132 Windows XP Outstanding Home 131 Windows XP Good Home 117 Windows XP Good Home 125	This value screamer beat all but the fastest power systems in our speed tests. It also posted top-end graphics scores. (************************************
3 4	ABS Awesome 3380 LLY find.pcworld.com/34118 Micro Express MicroFlex 24A find.pcworld.com/32891 Gateway 500X find.pcworld.com/34739 Polywell Poly 880NF2-2500 find.pcworld.com/34748 Freeway Gaming Predator PI440-R find.pcworld.com/34193 CyberPower XP 8000 Dream	85 81 80 78	Expensive \$1749 Very inexpensive \$999 Average \$1484 Inexpensive \$1100 Average \$1399 Very inexpensive	Windows XP Outstanding Home 132 Windows XP Outstanding Home 131 Windows XP Good Home 117 Windows XP Very good Home 125 Windows XP Very good Home 126	This value screamer beat all but the fastest power systems in our speed tests. It also posted top-end graphics scores. (************************************
1 2 3 4 5 6 7	Best ABS Awesome 3380 BUY find.pcworld.com/34118 Micro Express MicroFlex 24A find.pcworld.com/32891 Gateway 500X find.pcworld.com/34739 Polywell Poly 880NF2-2500 find.pcworld.com/34748 Freeway Gaming Predator PI440-R find.pcworld.com/34193 CyberPower XP 8000 Dream find.pcworld.com/33539 Polywell Poly 884RF-2600	85 81 80 78 78	Expensive \$1749 Very inexpensive \$999 Average \$1484 Inexpensive \$1100 Average \$1399 Very inexpensive \$999 Average	Windows XP Outstanding Home 132 Windows XP Outstanding Home 131 Windows XP Good Home 117 Windows XP Very good Home 125 Windows XP Very good Home 126	This value screamer beat all but the fastest power systems in our speed tests. It also posted top-end graphics scores. (************************************

Go to find.pcworld.com/10860 for details on PC World's Star Ratings.

SYSTEMS POWERED BY AMD's new Barton processor, the Center 2.167-GHz Athlon XP 3000+, cap this month's power PCs list. Barton processors have twice the Level 2 cache (512KB) of earlier Athlon XP CPUs, and this upgrade seems to provide a boost. Running our benchmark, PC WorldBench 4, nearly all of the XP 3000+ PCs we've

tested have outscored systems that use AMD's non-Barton 2.25-GHz Athlon XP 2800+, which has a faster clock speed.

New Barton systems from ABS and Micro Express join the number two Sys Performance 3000+, which remains the fastest PC in the Top 15. Leading the power

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 129.

² Vertical cases are towers (over 20 inches), midsize towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches).

Visit find.pcworld.com/34787 for reviews of all products tested this month and ranked in this chart.

		ВА	SE CON	FIGUR	ATION					Vendor's
	CPU	RAM (MB/type)	Hard drive (GB)	Monitor	Graphics	Case type ²	Extra features '	Graphics quality	Setup and ease of use	Vendor's reliability/ service
	2.167-GHz Athlon XP 3000+	1024/ DDR400 SDRAM	120	19-inch CRT	128MB Sapphire Radeon 9700 Pro	Midsize tower	Fair: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, Microsoft Works 7	Very good	Very good	Fair/ Good
	2.167-GHz Athlon XP 3000+	512/ DDR333 SDRAM	180	17-inch LCD	128MB ATI Radeon 9700 Pro	Midsize tower	Good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, wireless keyboard and optical mouse, memory card reader, Corel WordPerfect Office 2002	Outstanding	Good	4/4
	2.167-GHz Athlon XP 3000+	512/ DDR333 SDRAM	120	19-inch LCD	128MB ATI All-In- Wonder Radeon 9700 Pro	Midsize tower	Very good: DVD-R/RW drive, 52X/24X/52X CD-RW drive, Pinnacle Studio 8	Outstanding	Good	4/*
	2.25-GHz Athlon XP 2800+	1024/ DDR400 SDRAM	160°s	19-inch CRT	128MB ATI Radeon 9700	Tower	Fair: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, Microsoft Works Suite 2003	Very good	Good	Fair/ Good
	2.17-GHz Athlon XP 2700+	512/ DDR333 SDRAM	160°	19-inch CRT	128MB Leadtek WinFast A250 Ultra	Midsize tower	Very good: DVD-R/RW drive, 52X/24X/52X CD-RW drive	Very good	Good	4,
	3.06-GHz Pentium 4	1024/ DDR333 SDRAM	240*	17-inch LCD	128MB NVidia GeForce4 Ti 4600-based	Midsize tower	Outstanding: DVD-R/RW/+R/RW drive, 48X/24X/48X CD-RW drive, Zip 750 drive, scanner, Microsoft Office XP Pro, Pinnacle Studio 8.3.12	Very good	Very good	4.
	3.06-GHz Pentium 4	512/ DDR266 SDRAM	160°	19-inch CRT	128MB NVidia GeForce4 Ti 4600-based	Midsize tower	Fair: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, Lotus SmartSuite 9.7, Cyberlink Power Director 2.1, Motocross Mania game, no modern	Very good	Fair	44.
			10 p	ercent			10 percent	15 percent	5 percent	25 percent
		BAS	SE CON	FIGUR	ATION	0.000				No. of the last
	CPU	RAM (MB/type)	Hard drive (GB)	Monitor	Graphics	Case type ²	Extra features ³	Graphics quality	Setup and ease of use	Vendor's reliability/ service
	2.25-GHz Athlon XP 2800+	512/ DDR400 SDRAM	120	19-inch CRT	128MB ATI Radeon 9700 Pro	Midsize tower	Good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, Corel WordPerfect Office 2002	Very good	Very good	Fair/ Good
	2-GHz Athlon XP 2400+	512/ DDR400 SDRAM	80	17-inch CRT	64MB Leadtek GeForce2 Ultra	Midsize tower	Good: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, Ulead VideoStudio 6	Fair	Fair	44.
	2.53-GHz Pentium 4	512/ DDR333 SDRAM	80	17-inch LCD	128MB MSI MS-8860	Midsize tower	Good: 16X DVD-ROM and 48X/24X/48X CD-RW combo drive, Microsoft Works Suite 2003, Pinnacle Expression 2, Quicken 2003 New User Edition	Good	Very good	Fair/ Fair
	1.83-GHz Athlon XP 2500+	256/ DDR333 SDRAM	80	17-inch CRT	Integrated NVidia NForce2	Midsize tower	Good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, Lotus SmartSuite 9.7, Ulead Video Studio 6	Fair	Good	4.
	2.8-GHz Pentium 4	512/ PC1066 RDRAM	80	17-inch CRT	64MB NVidia GeForce4 MX 440	Tower	Very good: 16X DVD-ROM drive, 52X/24X/52X CD-RW drive, OpenOffice.org suite, Peachtree First Accounting 2003, Ouicken 2003 New User Edition	Good	Fair	4/*
	2.4-GHz Pentium 4	512/ DDR333 SDRAM	80	19-inch CRT	128MB ATI Radeon 9000 Pro	Midsize tower	Good: 16X DVD-ROM drive, 48X/16X/48X CD-RW drive, Corel WordPerfect Office 2002	Fair	Fair	4.
	2.13-GHz Athlon XP 2600+	512/ DDR400 SDRAM	1605	15-inch LCD	64MB Leadtek WinFast A250	Midsize tower	Good: 16X DVD-ROM drive, 48X/16X/48X CD-RW drive, Lotus SmartSuite 9.7	Very good	Good	4.
	2-GHz Athlon XP 2400+	256/ DDR266 SDRAM	60	17-inch CRT	Integrated S3 ProSavage8	Minitower	Good: 16X DVD-ROM drive, 40X/16X/48X CD-RW drive, Microsoft Works 7 and Money 2003	Poor	Very good	Good/ Fair
77.77	No. of Contract of		The same of the sa	A COLUMN				STATE OF THE PARTY OF	THE RESERVE TO BE SHOWN	CAN HOLD WITH COM

Unless otherwise stated, systems come with a modem and a network adapter.
*Insufficient data to give a rating.

10 percent

10 percent

group, ABS's Awesome 3450 posted one of the highest PC WorldBench 4 scores we've recorded. Equipped with a Sapphire Radeon 9700 Pro graphics card, it also produced some of the fastest frame rates we've seen on Unreal Tournament 2003.

The number three power spot goes to

Micro Express's Barton-based MicroFlex 30A, which scored 131 on PC WorldBench 4 and has a rich set of features. Its ATI All-In-Wonder Radeon 9700 Pro graphics card delivers top-tier frame rates and provides a TV tuner and TiVo-like video recording capabilities. A 19-inch LCD



5 percent

THE AWESOME 3450 from ABS takes the power Best Buy with speed and style.

⁵ Total capacity of two hard drives with RAID.

Another well-equipped multimedia PC, the number six MPC Millennia 910i Dream Machine, has two Serial ATA hard drives in a RAID configuration and comes with a scanner. But at \$3499, "Dream" appropriately describes this system.

The Barton processor debuts on the value side in the Polywell Poly 880NF2-2500. Powered by a 1.83-GHz Athlon XP 2500+ processor, it posted a respectable PC WorldBench 4 score of 125-just beating the score of an older Polywell, the number seven Poly 884RF-2600, which carries an earlier-generation 2.13-GHz Athlon XP 2600+ chip. The other value newcomer, Gateway's Pentium 4-based 500X, offers a nice 17-inch LCD monitor and a DVD-ROM and CD-RW combination drive. For more on the latest combo drives, see "Tech Trend" below and our Top 10 CD-RW Drives chart on page 141.

NEW INTEL SYSTEMS COMING

THOUGH AMD dominates the news this month. PCs with new Intel chips will follow soon. At press time Intel announced a new system chip set, the 875P (codenamed Canterwood), which offers an 800-MHz frontside bus (up from 533 MHz), support for 400-MHz DDR RAM, a Serial ATA controller, and gigabit ethernet networking. For details and test results, see our News & Trends story "A Fast Bus, But Catch It Later" on page 30. Soon Intel should release another chip set, codenamed Springdale, that supports an 800-MHz bus and 400-MHz DDR RAM, and promises better integrated graphics.

Manufacturers are upgrading to the 875P chip set, which explains why some systems that made our power chart last month, such as Dell's Dimension 8250 and Gateway's 700XL, vanished. Dell will

	TOP 5 PCs UNDER \$900
	find.pcworld.com/34307
1	Best Dell Dimension 2350 find.pcworld.com/34109
2	NuTrend Mega 2 find.pcworld.com/34121
3	Gateway 300S find.pcworld.com/34127
4	Polywell Poly 880NF2-2000 find.pcworld.com/34154
5	Freeway Innovation A7000 find.pcworld.com/32657

use the 875P in its Dimension line, starting with two new models: the 8300 and an enthusiast PC called the XPS. Gateway is building an 875P-based version of its 700XL, and MPC plans to use the new chip set in its Millennia 900i series.

From the May 2003 issue

TECH TREND

Can You Get It All in One Drive?

ALREADY DE RIGUEUR in the confined spaces of notebook PCs, DVD-ROM/CD-RW combination drives are migrating into desktop systems-especially into small PCs (such as Gateway's 300 series models) that have just one optical drive bay. Also, combos are generally a bit cheaper than separately purchased CD-RW and DVD-ROM drives.

Opting for a combo drive used to mean sacrificing speed, especially on recordable CD functions. That's changing, however. The newest DVD-ROM/CD-RW combo drives, such as the LG Electronics GCC-4480B and the Samsung SM-348 on our Top 10 CD-RW Drives chart (page 141), are rated at 16X (DVD-ROM read) and 48X/24X/48X (CD-R write/CD-RW write/CD-ROM read)-only a step behind today's fastest CD-RW drive speeds of 52X/24X/52X. (The effective speed difference is negligible, and media for 52X drives is currently hard to find.)

Adding a DVD-ROM/CD-RW combo drive is a smart move if your system has just one optical drive bay and you're ready to replace your CD-RW, DVD-ROM, or CD-ROM drive. And if you have an older or low-end system with only a CD-ROM or DVD-ROM drive, adding a combo model to a spare bay and keeping the old drive will make disc-todisc CD copying easier. Also, consolidating drives lets you free up a bay for another device, such as a memory card reader.

COMBO PHOBIA

DESPITE the recent advances, old biases against combination drives appear to persist among PC vendors. Most of the desktop systems we test have separate CD-RW and DVD-ROM drives; and some companies, including ABS Computer and EMachines, don't even offer a combo-drive option for their desktop lines. According to an ABS spokesperson, customers have not been requesting combo models.

But other vendors are embracing the high-speed products. The Gateway 500X we reviewed this month, for example, has an optional 16X DVD-ROM and 48X/24X/48X CD-RW combo drive that comes standard on Gateway's budget-priced 300S and 300X PCs. Dell and Sys Technology offer fast combo drives, too.

Should you need to archive large

amounts of data or to store video, consider the ultimate combo model-a rewritable DVD drive that writes one or more DVD formats, reads DVD-ROMs, and provides CD-R and CD-RW functions (albeit at slower ratings, typically topping out at 24X/10X/32X). But even with one of these drives installed, you might want to put a DVD-ROM/CD-RW combo unit in the second bay, as it will give you better CD-RW performance and will provide a handy place to test discs you've burned in your rewritable DVD drive.





Intel® Pentium® 4 Processor with HT Technology 3.06GHz 533 FSB and 512KB Advanced Transfer Cache Intel® 845MP+ ICH3M Chipset Motherboard 512MB PC-2100 DDR SDRAM

NEW! 15.0" UltraXGA+ Enhanced TFT Active Matrix LCD NEW! ATI® Mobility RADEON™ 9000 PRO 128MB DDR with Dual-View Display Monitor and TV-out

NEW! 60GB 5400RPM Ultra ATA100 Hard Drive

High-Performance Heatsink-Cooling System Removable 3.5" Floppy Drive 1.44MB Removable 24X/10X/24X CD-RW/8X DVD Combo Drive Sound Blaster® PRO Compatible with Wavetable 5.1 3D Surround Sound with S/PDIF Digital Output Front Panel Audio DJ CD Player Allows CD Play While System is On or Off One Type II PCMCIA Slot Four USB 2.0 Ports and One IEEE 1394 Port Infrared Wireless Fast IR Interface NEW! Wireless 802.11a+b Mini-PCI Card

10/100Mb Ethernet LAN and 56K Modem Dimensions: (H) x (W) x (D): 1.7" x 13" x 11.4" Weight: 7.6lbs. without battery Exclusive Metallic Majestic Blue Chassis Exclusive 120-Watt A/C Adapter

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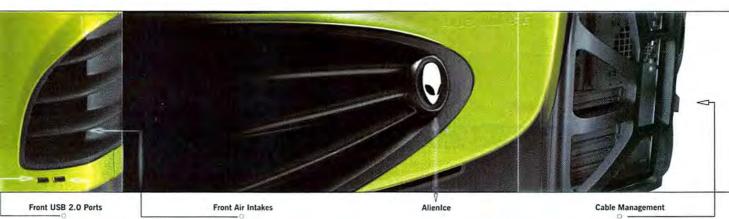








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TOP 15 NOTEBOOK PCs

	POWER NOTEBOOK	Overall rating	Street price (3/21/03)	PC WorldBench 4 performance score ' Faster	Comments		
1	Best IBM ThinkPad T40 BUY find.pcworld.com/34817	88	Very expensive \$3249	Windows XP Outstanding Professional 124	Lightweight laptop has superlong battery life, dual pointing devices, and three flavors of built-in wireless: Bluetooth, 802.11a, and 802.11b. (★★★★*)		
2	Toshiba Satellite 2455-S305 find.pcworld.com/34820	87	Inexpensive \$1999	Windows XP Very good Home 117	This notebook's eye-catching case colors, Secure Digital slot, and DVD burner should please creative professionals. (★★★が会)		
3	IBM ThinkPad R40 find.pcworld.com/34181 85		Inexpensive \$2149	Windows XP Good Professional 107	Well-designed midsize model includes a ThinkLight to illuminate the keyboard in dim lighting; 802.11b Wi-Fi is an extra-cost option. (★★★☆ May 03)		
	Gateway 600X find.pcworld.com/31847		Inexpensive \$2040	Windows XP Good Home 103	Huge desktop replacement features a jumbo screen and keyboard. It can hold up to two optical drives or three batteries. (★★★オロ Jan 03)		
,	Toshiba Satellite 5205-S703 find.pcworld.com/32819		Average \$2499	Windows XP Good Home 104	Good-looking, great-sounding, beefy laptop delivers top-notch speed and lets you record DVDs. (木木木宗 Mar 03)		
,	Compaq Evo N610c find.pcworld.com/32228		Inexpensive \$1924	Windows XP Average Professional 101	A funky silver wireless module on the lid and dual pointing devices highlight this square black laptop. (************************************		
7	Gateway 600XL find.pcworld.com/34214	82	Average \$2499	Windows XP Good Professional 107	This wireless-ready desktop replacement boasts a supersize screen and keyboard; like the 600X, it has two flexible modular bays. (★★★☆ May 03)		
	Percent of overa	II rating >	15 percent	20 percent			
	Land Children	Overall	Street price	PC WorldBench 4	2000		
	VALUE NOTEBOOK	rating	Street price (3/21/03)	performance score	Comments		
1	VALUE NOTEBOOK Best Compaq Presario 2100T BUY find.pcworld.com/34823	rating 82	(3/21/03) Inexpensive \$1024	Windows XP Very good Home 102	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (★★★オポ)		
1	Best Compaq Presario 2100T	rating	Inexpensive	Windows XP Very good	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (★★★オポン)		
1 2	Best Compaq Presario 2100T BUY find.pcworld.com/34823 Compaq Evo N1015v	rating 82	Inexpensive \$1024 Very inexpensive	Windows XP Very good Home 102	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (************************************		
1 2 3	Compaq Presario 2100T BUY find.pcworld.com/34823 Compaq Evo N1015v find.pcworld.com/32834 Compaq Presario 3005US	82 78	Inexpensive \$1024 Very inexpensive \$849	Windows XP Very good Home 102 Windows XP Average Home 90	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (★★★☆) Relatively thin notebook has a good-size screen as well. A stylish Wi-Fi modul sits on the lid. (★★★☆ Mar 03) Large, conservative desktop replacement offers a so-so keyboard but acres of display space on its 16-inch screen. Price drops \$221. (★★★☆ Apr 03)		
1 3	Compaq Presario 2100T GUY find.pcworld.com/34823 Compaq Evo N1015v find.pcworld.com/32834 Compaq Presario 3005US find.pcworld.com/33764 Averatec 3120X	78 77	Inexpensive \$1024 Very inexpensive \$849 Average \$1478 Very inexpensive	Windows XP Very good Home Yery good Home	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (★★★★☆) Relatively thin notebook has a good-size screen as well. A stylish Wi-Fi modul sits on the lid. (★★★☆ Mar 03) Large, conservative desktop replacement offers a so-so keyboard but acres of display space on its 16-inch screen. Price drops \$221. (★★★☆ Apr 03) Affordable metallic-gray ultraportable comes with a built-in DVD-ROM/CD-RW		
1 2 3	Compaq Presario 2100T BUY find.pcworld.com/34823 Compaq Evo N1015v find.pcworld.com/32834 Compaq Presario 3005US find.pcworld.com/33764 Averatec 3120X find.pcworld.com/33761 Toshiba Satellite Pro 6100	78 77 76	Inexpensive \$1024 Very inexpensive \$849 Average \$1478 Very inexpensive \$949 Expensive	Windows XP Very good Home 102 Windows XP Average Home 90 Windows XP Very good Home 104 Windows XP Average Home 91	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (************************************		
1 2 3 7	Compaq Presario 2100T GUY find.pcworld.com/34823 Compaq Evo N1015v find.pcworld.com/32834 Compaq Presario 3005US find.pcworld.com/33764 Averatec 3120X find.pcworld.com/33761 Toshiba Satellite Pro 6100 find.pcworld.com/31829 Sharp Actius MV12W	78 76 76	Inexpensive \$1024 Very inexpensive \$849 Average \$1478 Very inexpensive \$949 Expensive \$1857	Windows XP Very good Home Yery good Home Home Home Home Yery good Home Home Home Home Yery good Home Home Home Home Home Home Home Home	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (************************************		
1 2 3	Compaq Presario 2100T BUY find.pcworld.com/34823 Compaq Evo N1015v find.pcworld.com/32834 Compaq Presario 3005US find.pcworld.com/33764 Averatec 3120X find.pcworld.com/33761 Toshiba Satellite Pro 6100 find.pcworld.com/31829 Sharp Actius MV12W find.pcworld.com/34166 Micro Express NP1124A	78 77 76 76 75	Inexpensive \$1024 Very inexpensive \$849 Average \$1478 Very inexpensive \$949 Expensive \$1857 Expensive \$1899	Windows XP Very good Home 102 Windows XP Average Home 90 Windows XP Very good 104 Windows XP Average Home 91 Windows XP Average 100 Windows XP Average 91 Windows XP Good 100 Windows XP Good 100 Windows XP Good 100	Bargain laptop has tricolor case, colorful status LEDs, and useful application shortcuts, but middling sound. (************************************		

Go to find.pcworld.com/10860 for details on PC World's Star Ratings.

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 129.

THE FIRST LAPTOP WITH Intel's new Pentium M processor to make our chart is wickedly fast: IBM's ThinkPad T40, the new Best Buy on the power list, used a 1.6-GHz Pentium M to lock down a PC WorldBench 4 score of 124—about 25 percent quicker than the average of notebooks equipped with the old 1.6-GHz Pentium 4-M chip.

The 5.4-pound (without peripherals) T40 lasts practically forever on just one charge of its nine-cell battery, running for a remarkable 6.4 hours in our tests.

Three other new laptops earned chart honors this month. The Toshiba Satellite 2455-S305 slipped into the second spot on

² Except where noted, all Intel CPUs are SpeedStep chips, which run at a slower speed on battery power. (We performance-test all notebooks plugged in.)
³ In gigabytes.

Visit find.pcworld.com/34829 for reviews of all products tested this month and ranked in this chart.

	BASE CONFIGURATION		100			Pattery life	Average	Vendor's		
CPU ²	Screen (inches)	RAM (MB)	Hard drive ³	Pointing device	Multi- purpose bays	Extra features *	Overall design	(hours:min) 5	weight (pounds)	Vendor reliabilit service
1.6-GHz Pentium M	14.1	512	80	Touchpad, eraserhead	1	Fair: 24X/10X/24X CD-RW drive, built-in network adapter, Bluetooth	Outstanding	Outstanding/ 6:23	Light/ 6.2	Good/Go
2.4-GHz Pentium 4 ⁷	15	512	60	Touchpad	1	Very good: DVD-R/RW drive, built-in modem and network adapter, Microsoft Works 2002	Very good	Good/ 3:07	Heavy/ 9.1	Good/Fa
2.2-GHz Pentium 4-M	. 15	256	60	Touchpad, eraserhead	1	Good: 8X DYD-ROM and 24X/10X/24X CD-RW combo drive, built-in modem and network adapter	Outstanding	Good/ 3:22	Average/ 7.2	Good/Go
2.2-GHz Pentium 4-M	15.7	512	60	Touchpad	2	Good: 8X DVD-ROM and 24X/IOX/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2003	Outstanding	Good/ 3:02	Very heavy/ 9.9	Good/Fa
2-GHz Pentium 4-M	15	512	60	Touchpad	1	Very good: DVD-R/RW drive, built-in modem and network adapter, Secure Digital slot	Outstanding	Good/ 3:05	Heavy/ 8.9	Good/Fa
2-GHz Pentium 4-M	14.1	256	40	Touchpad	1	Good: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built- in modem and network adapter	Very good	Fair/ 2:04	Light/ 6.6	Fair/Poo
2.4-GHz Pentium 4-M	15.7	512	60	Touchpad	2	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2003	Outstanding	Good/ 3:00	Very heavy/ 9.8	Good/Fa
		5	percent		30.5	10 percent	10 percent	5 percent	10 percent	25 perce
	BASE	001	IFIGUE	RATION		P. C. Street	Overall	Battery life	Average	Vendor
CPU 2	Screen (inches)	RAM (MB)	Hard drive ³	Pointing device	Multi- purpose bays	Extra features '	design	(hours:min) 5	Average weight (pounds) *	Vendor reliabilit service
1.52-GHz Mobile Athlon 4 XP 1800+	15	512	40	Touchpad	0	Very good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in modem and network adapter, Office XP SBE 2002	Fair	Good/ 3:02	Average/ 8.0	Fair/Poo
1.2-GHz Mobile Athlon 4 XP 1400+	13.3	128	20	Touchpad	0	Limited: 16X-24X CD-ROM drive, built-in modem and network adapter	Fair	Very good/ 3:51	Average/ 8.0	Fair/ Po
2A-GHz Pentium 4 ⁷	16	512	40	Touchpad	0	Good: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built-in modern and network adapter, Microsoft Works 2002	Fair	Good/ 3:03	Very heavy/ 9.4	Fair/Po
.2-GHz Mobile Celeron	12.1	256	20	Touchpad	0	Fair: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built- in modem and network adapter, Microsoft Works 2002	Fair	Fair/ 2:29	Very light/ 5.0	7.
2-GHz Pentium 4-M	15	512	60	Eraserhead	1	Fair: 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/Fa
1.13-GHz Pentium III-M	12.1	256	40	Touchpad	1	Fair: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built- in modem and network adapter	Fair	Fair/ 2:50	Very light/ 5.0	7.
2.4-GHz Pentium 4 ⁷	15	512	60	Touchpad	1	Fair: 8X DVD-ROM and 16X/10X/24X CD-RW combo drive, built- in modem and network adapter	Fair	Fair/ 2:04	Heavy/ 9.0	J,
P-GHz Pentium 4-M	14.1	256	30	Touchpad	0	Good: 8X DVD-ROM and 24X/10X/24X CD-RW combo drive, built-in modem and network adapter	Fair	Fair/ 2:20	Average/ 7.3	77.
100		1	percent	1-1-1	100 miles	10 percent	10 percent	S percent	10 percent	25 percei

⁴ Word score reflects both listed and unlisted features.
⁵ Unless otherwise noted, all notebooks come with a lithium ion battery.

the power side. It offers performance with some kick, but it uses the older 2.4-GHz desktop Pentium 4 processor.

We have a new value Best Buy, too: the Compaq Presario 2100T. Only \$1024 nets you a fully equipped notebook with a good keyboard and combination drive. In eighth place, WinBook's new X4 gained a toehold on the value list, but it could have used boosts in speed and battery life.

Finally, the maker of the number four notebook on the value chart has a new name-the company formerly known as Sotec is now Averatec.

Insufficient data to give a rating.

^{*} Includes computer, AC adapter, power cord, floppy drive, and optical drive.
* Single-speed desktop CPU.
* Non-SpeedStep CPU.



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TOP 10 PRINTERS



Visit find.pcworld.com/34805 for reviews of all products tested this month and ranked in this chart.

CONTINUING TO EXPAND its product line beyond the PC box, Dell is now offering a full line of printers, including the stylish, midnight gray-colored Personal Laser Printer P1500. This model debuts in third thanks to its low price and good

performance (it's the fastest printer among small-office models this month). Also noteworthy is our new Best Buy on the corporate side, the Lexmark T630n; this strong all-arounder ranked near the top on many of our ratings criteria.

	SMALL-OFFICE LASER	Street price (3/31/03)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/ graphics	Comments
1	Best Minolta-QMS PagePro 1250W BUY find.pcworld.com/32414	\$199	91	12.0/6.0	Outstanding/ Fair	FEATURES: Rated 17 ppm. Standard 8MB of RAM, 1200-by-1200-dpi maximum resolution, 150 sheets input, 100 sheets output. SUMMARY: Windowsonly printer issued 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. (****** Feb 03)
2	Brother HL-5040 lind.pcworld.com/34802	\$299	90	13.1/6.7	Outstanding/ Fair	FEATURES: Rated 17 ppm. Standard 8MB of RAM, 2400-by-600-dpi maximum resolution, 250 sheets input, 150 output. SUMMARY: This model produced sharp, crisp text pages and showed it could render precise line art, but its gray-scale graphics were dark. Manual duplexing and USB 2.0 connectivity are included; an ethernet print server is optional. (************************************
3	Dell Personal Laser Printer P1500 find.pcworld.com/34799	\$289	80	14,7/7.3	Good/ Fair	FEATURES: Rated 19 ppm. Standard 16MB of RAM, 1200-by-1200-dpi maximum resolution, 150 sheets input, 101 output. SUMMARY: Dell's first laser printer compares favorably with more established models. It was the fastes small-office unit at text, and its image quality was reasonably good across the board. This model has USB 2.0 but no ethernet option. (****
4	Brother HL-1850 find.pcworld.com/30101	\$499	76	10.0/5.6	Very good/ Good	FEATURES: Rated 19 ppm. Standard 16MB of RAM, 2400-by-600-dpi maximum resolution, 350 sheets input, 150 output. SUMMARY: Adequate print speeds and an optional third input tray make this a viable choice for a small workgroup. An ethernet card option supports networking. Output looked clean, and text was legible even at small sizes. (★★★★: Oct 02)
5	Oki Data B4300 find.pcworld.com/34796	\$419	70	8.1/4.7	Very good/ Fair	FEATURES: Rated 19 ppm. Standard 16MB of RAM, 1200-by-600-dpi maximum resolution, 250 sheets input, 150 output. SUMMARY: Text output looked smooth, but the B4300 was sluggish, posting the chart's slowest print speeds for both text and graphics. An ethernet print server (\$289) and additional 250-sheet paper tray are optional. (************************************
	CORPORATE LASER	Street price (3/31/03)	Overall	Speed for plain text/full-page	Print quality for text/	Comments
		(3/31/03)	rating .	graphics (ppm)	graphics	Comments
1	Best Lexmark T630n BUY find.pcworld.com/34790	\$1100	91			
1	Best Lexmark T630n BUY find.pcworld.com/34790 Xerox Phaser 4400/N find.pcworld.com/32405			graphics (ppm)	graphics Outstanding/	FEATURES: Rated 35 ppm. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 250 sheets input and output. SUMMARY: A reasonable price and fast print speeds—especially on graphics—propel this model to the top. Text output looked sharp and focused, as did line art; gray-scale images showed subtle shading. (*********)
1 2 3	find.pcworld.com/34790 Xerox Phaser 4400/N	\$1100	91	graphics (ppm) 22.3/11.0	Outstanding/ Good	FEATURES: Rated 35 ppm. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 250 sheets input and output. SUMMARY: A reasonable price and fast print speeds—especially on graphics—propel this model to the top. Text output looked sharp and focused, as did line art; gray-scale images showed subtle shading. (*******) FEATURES: Rated 26 ppm. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 550 sheets input, 100 output. SUMMARY: The Xerox prints near-perfect text, and a \$451 price drop boosts its value. Gray-scale graphics looked nice, but were grainy and lacked some detail. Options include a 128MB upgrade and a 10GB hard drive. (************************************
1 2 3 4	Xerox Phaser 4400/N find.pcworld.com/32405 Brother HL-2460N	\$1100	91	22.3/11.0 17.8/6.5	Outstanding/ Good Outstanding/ Good Very good/	FEATURES: Rated 35 ppm. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 250 sheets input and output. SUMMARY: A reasonable price and fast print speeds—especially on graphics—propel this model to the top. Text output looked sharp and focused, as did line art; gray-scale images showed subtle shading. (********) FEATURES: Rated 26 ppm. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 550 sheets input, 100 output. SUMMARY: The Xerox prints near-perfect text, and a \$451 price drop boosts its value, Gray-scale graphics looked nice, but were grainy and lacked some detail. Options include a 128MB upgrade and a 10GB hard drive. (************************************

HOW WE TEST: Visit find,pcworld.com/34805 for our test methodology. CHART NOTES: The overall rating for monochrome laser printers is based on print quality (25 percent), price (25 percent), features (15 percent), ease of use (15 percent), speed (10 percent), and service and support (10 percent). See find.pcworld.com/10860 for details on PC World's Star Ratings.

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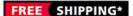


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TOP 10 MONITORS



Visit find.pcworld.com/34904 for reviews of all products tested this month and ranked in this chart.

SEVEN NEW MODELS jockeyed for chart position this month, and four made the grade. None outshone our reigning Best Buys, but good deals abound. If price is a priority and your graphics card lacks a digital video input, consider the View-Sonic VE500. Grabbing fourth place, it delivers superb overall image quality at a very low price. The Cornea LCD MP503 lands in the sixth spot with terrific-looking text and graphics. The number three NEC MultiSync LCD1560NX and number five Samsung SyncMaster 152B debut too, each with snappy good looks and above-average image quality.

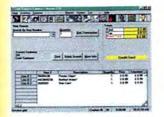
	15-INCH LCD MONITOR	Street price (3/31/03)	Overall rating	Quality of text/ graphics	Comments
1	Best NEC MultiSync LCD1560M BUY find.pcworld.com/33005	\$380	94	Outstanding/ Outstanding	FEATURES: 15-inch viewable area, 13.6 by 6.5 by 13.6 inches, 9.7 pounds, dual video inputs, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: This stately, coal-black unit shines, thanks to a triple treat of desirable features: lovely screen colors, a four-port USB 2.0 hub, and unusually crisp sound from its built-in speakers. It swivels, too. (★★★★ ## Mar 03)
2	Best Compaq TFT 1520 EUY find.pcworld.com/32921	\$399	91	Very good/ Very good	FEATURES: 15-inch viewable area, 13.9 by 8.2 by 15.6 inches, 10.3 pounds, dual video inputs, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: This model's panel is height-adjustable and can pivot 90 degrees into portrait mode, a plus for viewing Web pages or legal documents. In our tests it was better at displaying graphics than text. (**** Mar 03)
3	NEC MultiSync LCD1560NX find.pcworld.com/34676	\$350	91	Very good/ Very good	FEATURES: 15-inch viewable area, 13.6 by 6.5 by 13.6 inches, 8.2 pounds, dual video inputs, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: Affordably priced for a display with dual inputs, the LCD1560NX displayed graphics slightly better than it did text. Icons on the control buttons are hard to see. It lacks the USB hub and built-in speakers of its sibling, the MultiSync LCD1560M. (***
4	ViewSonic VE500 find.pcworld.com/34673	\$289	91	Outstanding/ Very good	FEATURES: 15-inch viewable area, 14 by 7.5 by 12.8 inches, 7.7 pounds, analog video input, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: This model lacks style, but a low price, crisp text on business document screens, and an outstanding warranty make it a terrific value. The on-screen controls are nicely laid out, and easy to follow. (★★★☆)
5	Samsung SyncMaster 152B find.pcworld.com/34664	\$379	90	Outstanding/ Very good	FEATURES: 15-inch viewable area, 14.1 by 7.3 by 13.6 inches, 6.4 pounds, analog video input, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: This thin-bezel model displayed exceptional text and bright graphics on Web page tests. Its unique hinged base allows easy height adjustment. Sound from the built-in speakers is good enough for business uses such as presentations with audio. (************************************
6	Cornea LCD MP503 find.pcworld.com/34694	\$329	89	Very good/ Outstanding	FEATURES: 15-inch viewable area, 15.1 by 2.5 by 14.1 inches, 5.1 pounds, analog video input, three-year warranty, 10.5-hour weekday toll-free tech support. SUMMARY: The model's unique picture-frame style comes with an adjustable back stand for increasing viewing angles. Colors looked deep but a bit dark on some photo test screens. Word and Excel documents had sharp, focused text. (*****)
7	Sony SDM-X52 find.pcworld.com/32933	\$429	89	Outstanding/ Very good	FEATURES: 15-inch viewable area, 15.4 by 7.8 by 14.1 inches, 10.6 pounds, dual video inputs, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: In our tests this stylish flat-panel monitor displayed colors with realistic richness and depth, and it rendered fonts on business documents evenly. The built-in speakers, however, produced thin sound at all volume settings. (************************************
8	Dell UltraSharp 1504FP find.pcworld.com/32930	\$379	89	Very good/ Very good	FEATURES: 15-inch viewable area, 13.7 by 6.8 by 14.1 inches, 8.3 pounds, dual video inputs, 1CO'95-compliant, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: Typically bundled with a color-matched Dell desktop, this gray unit generated bright colors and sharp text. Horizontal viewing angles are narrower than those of other monitors, and you get no height adjustment. (************************************
9	Samsung SyncMaster 152T find.pcworld.com/32927	\$439	88	Good/ Very good	FEATURES: 15-inch viewable area, 14.1 by 7.2 by 14.1 inches, 6.6 pounds, dual video inputs, three-year warranty, 24-hour daily toll-free tech support. SUMMARY: The expensive 152T produced impressive text and graphics. Its silver-tone panel can lift up and extend outward; the buttons for adjusting the on-screen controls are thin slivers, but making adjustments isn't difficult. (***** Mar 03)
10	IBM T560 find.pcworld.com/32939	\$459	88	Very good/ Good	FEATURES: 15-inch viewable area, 14.4 by 9.3 by 17.2 inches, 10.8 pounds, dual video inputs,' three-year warranty, 24-hour daily toll-free tech support. SUMMARY: This pricey, elegant-looking display rendered sharp text on business documents and true-to-life colors in photos. The panel flexes easily. On-screen control buttons are hard to see and require hard pressing. (************************************

FOOTNOTE: \Includes both digital (DYI) and analog inputs. The digital input must be used with a graphics card that has a digital output. HOW WE TEST: Twelve judges rate how well each monitor displays 13 text and graphics images at a native resolution of 1024 by 768. Color and gray-scale screens are from the DisplayMate for Windows video utility (www.displaymate.com). See find.pcworld.com/346i3 for more details on how we test monitors. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. CHART NOTES: Overall ratings are based on text and graphics quality (20 percent each), price (25 percent), features and ease of use (20 percent), and service and support (15 percent). All monitors are TCO'99-compliant unless otherwise stated. Monitor dimensions are given as width by depth by height; measurements include the base. See find.pcworld.com/10860 for details on PC World's Star Ratings.

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TOP 10 CD-RW DRIVES



Visit find.pcworld.com/35159 for more information on all products ranked in this chart.

THE PERFORMANCE GAP in write speeds between CD-RW/DVD-ROM combination drives and cutting-edge CD-Rewritable models has officially closed. Three 48X/24X/48X CD burners that double as DVD readers land on this month's chart: our new top Best Buy, LG's GCC-4480B, and models

from Samsung and CenDyne. In the past, desktop combo drives lagged behind the high-end performers; with this new crop, however, you sacrifice a mere 17 seconds, at most, on a typical full-disc burn. Two other top 52X performers also debut this month: LG's GCE-8520B and Sony's CRX220A1.

	CD-RW DRIVE	Street price (4/7/03)	Overall rating	Performance/ support policies	CD-R write speed for 650MB/ CD-RW write speed for 100MB (min:sec)	Comments
1	GCC-4480B NEW find.pcworld.com/34892	\$75	88	Very good/ Very good	2:45/0:54	FEATURES: 48X/24X/48X/16X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Express 5.5 and InCD 3.39, CyberLink PowerDVD XP 4, one-year warranty, 13-hour weekday and 8-hour Saturday toll-free support. SUMMARY: Provides the best balance of price, performance, and support policies of the three combo drives on the chart. (****)
2	LG Electronics GCE-8520B find.pcworld.cam/34886	\$60	87	Very good/ Very good	2:29/0:55	FEATURES: 52X/24X/52X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Express 5.5 and InCD 3.39, one-year warranty, 13-hour weekday and 8-hour Saturday toll-free support. SUMMARY: Other 52X models are a few seconds faster, but LG offers better support hours. No DVD playback; marginally faster than the GCC-4480B. (************************************
3	Samsung SM-348 find.pcworld.com/34895	\$90	85	Very good/ Good	2:39/0:50	FEATURES: 48X/24X/48X/16X, IDE, internal, 8MB buffer, Mt. Rainier support, Roxio Easy CD Creator 5.3 and DirectCD 5.3, CyberLink PowerDVD XP 4, one-year warranty, 24-hour weekday toll-free support. SUMMARY: Neck-and-neck in performance with the CenDyne combo unit, Samsung's drive comes with above-average tech support policies. (************************************
4	CenDyne 52X CD-RW find.pcworld.com/33140	\$65	84	Very good/ Fair	2:22/0:59	FEATURES: 52X/24X/52X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.39, one-year warranty, 12-hour weekday and 4-hour Saturday toli-call support. SUMMARY: Terrific on-the-fly CD-R write performance and consistently speedy CD-ROM read performance make this a good deal. (***** Mar 03)
5	CenDyne Multi-Purpose CD-RW/DVD-ROM Drive find.pcworld.com/34871	\$95	84	Very good/ Fair	2:36/0:50	FEATURES: 48X/24X/48X/16X, IDE, internal, 8MB buffer, Mt. Rainier support, Roxio Easy CD Creator 5.3 and DirectCD 5.3, CyberLink PowerDVD XP 4, one-year warranty, 12-hour weekday and 4-hour Saturday toll-call support. SUMMARY: This unit uses the same drive mechanism as the Samsung SM-348, hence its nearly identical performance. (************************************
6	Lite-On LTR522465 find.pcworld.com/33149	\$55	83	Very good/ Fair	2:22/0:59	FEATURES: 52X/24X/52X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.39, one-year warranty, 8-hour weekday toll-free support. SUMMARY: Model offers performance matching that of the fourth-ranked CenDyne 52X drive and is \$10 cheaper, but you get fewer tech support hours. (メナナル Mar 03)
7	Sony CRX220A1 find.pcworld.com/34898	\$80	83	Very good/ Very good	2:29/0:58	FEATURES: 52X/24X/52X, IDE, internal, 2MB buffer, Mt. Rainier support, BHA B's Recorder Gold 5.16 and Clip 5.16, one-year warranty, 12-hour weekday and Saturday toll-free support. SUMMARY: Just 7 seconds slower than the fastest drives in our write tests, the Sony also had the fastest digital audio extraction performance. (************************************
8	TDK 48X VeloCD find.pcworld.com/31757	\$100	82	Very good/ Very good	2:32/0:56	FEATURES: 48X/24X/48X,¹ IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Express 5.5 and InCD 3.3, one-year warranty, 10.5-hour daily toll-free support. SUMMARY: Fast CD-R and CD-RW speeds helped this drive stay on the chart; it costs up to \$35 more than comparable models, but you get daily tech support hours. (★★★★☆ Jan 03)
9	Memorex CD-ReWritable 52X Internal Drive find.pcworld.com/33161	\$75	79	Outstanding/ Fair	2:22/0:52	FEATURES: 52X/24X/52X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.39, one-year warranty, 9-hour weekday toll-free support. SUMMARY: Drive tied for top honors in CD-R write performance and did well at writing to CD-RW, but lagged on our application installation tests. (************************************
10	Plextor PlexWriter 48/24/48A find.pcworld.com/31061	\$100	78	Very good/ Fair	2:42/0:59	FEATURES: 48X/24X/48X, IDE, internal, 4MB buffer, Mt. Rainier support, Easy CD Creator 5.3 and DirectCD 5.3, one-year warranty, 11-hour weekday toll-free support. SUMMARY: Still a very good performer, this pricey unit is the only one we've tested that has two mastering applications, Roxio's Easy CD Creator and Oak's SimpliCD. (*** *** Nov 02)

FOOTNOTE: \(^1\) Yendor's speed ratings, listed in order: CD-R write/CD-RW write/CD-ROM read/DVD-ROM read (if applicable). HOW WE TEST: To determine CD-R write performance, we burn data to CD-R discs from an image file and on the fly. We measure CD-RW performance by copying 100MB of files to a CD-RW disc, and then rewriting the same data to the same disc. To gauge CD-ROM read performance, we time how long the drive takes to install Microsoft Office 2000 SBE (disc one); we also evaluate the drive's digital audio extraction speed by extracting 320MB of musical tracks from an audio CD to our hard drive. CHART NOTES: Overall ratings are based on performance (35 percent), price (25 percent), features (20 percent), tech support policies (10 percent), and ease of installation (10 percent). See find.psworld.com/10860 for details on PC World's Star Ratings. Unless otherwise noted, all drives use buffer underrun protection.

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TOP 10 GRAPHICS BOARDS



Visit find.pcworld.com/34769 for more information on products ranked in this chart.

CARDS BASED ON THE ATI Radeon 9700 graphics chip grab the top three places on the power side this month, while two new boards from BFG Technologies and MSI using NVidia's GeForce FX 5800 Ultra chip take the remaining power spots.

The fans on these cards are noisy and block the adjacent PCI slot. Plus, they'll likely be available for a limited time, because NVidia will be releasing several new chips soon (see "NVidia Budget Graphics Chips Disappoint" on page 74 for more).

	POWER GRAPHICS BOARD	Street price (3/31/03)	Overall rating	Overall speed	Features rating	Comments
1	Crucial Technology Radeon 9700 Pro find.pcworld.com/31787	\$340	92	Outstanding	Very good	FEATURES: ATI Radeon 9700 chip, 128MB of DDR SDRAM, 400-MHz RAMDAC; DVI-out, S-Video-out, dual-display support; CyberLink PowerDVD XP player. SUMMARY: This card achieves excellent frame rates—especially at higher resolutions—and handles anti- aliasing well. (**** *** Jan 03)
2	ATI All-In-Wonder 9700 Pro find.pcworld.com/34721	\$399	90	Outstanding	Outstanding	FEATURES: ATI Radeon 9700 chip, 128MB of DDR SDRAM, 400-MHz RAMDAC; DVI-out, TV tuner, 5-Video-in and -out, component video-out; Pinnacle Studio ATI Edition, MatchWare Mediator 7. SUMMARY: Though the latest All-In-Wonder card combines great performance with many extra features, it costs a lot. (******)
3	ATI Radeon 9700 Pro find.pcworld.com/31808	\$340	88	Outstanding	Good	FEATURES: ATI Radeon 9700 chip, 128MB of DDR SDRAM, 400-MHz RAMDAC; DVI-out, S-Video-out, dual-display support; ATI DVD player SUMMARY: This board churns out top-tier frame rates at high res- olutions and maintains impressive rates with antialiasing enabled. The bundle includes few extras. (************ Jan 03)
4	BFG Technologies Asylum GeForce FX 5800 find.pcworld.com/34679	\$399	85	Very good	Good	FEATURES: NVidia GeForce FX 5800 Ultra chip, 128MB of DDR2 SDRAM, 400-MHz RAMDAC; DVI-out, S-Video-out, dual-display sup- port; NvDVD player. SUMMARY: This card boasts strong perfor- mance, but it is expensive and loud, includes no games, and blocks a PCI slot. (大大大学学)
5	MSI FX5800 Ultra-TD find.pcworld.com/34682	\$440	84	Very good	Very good	FEATURES: NVidia GeForce FX 5800 Ultra chip, 128MB of DDR2 SDRAM, 400-MHz RAMDAC; DVI-out, S-Video-out, dual-display support; InterVideo WinDVD player, InterVideo WinDroducer/WinCoder; three games. SUMMARY: Pricey card comes with lots of software, but is noisy and blocks a PCI slot. (************************************
N	VALUE GRAPHICS BOARD	Street price (3/31/03)	Overall rating	Overall speed	Features rating	Comments
1	Best VisionTek Xtasy 9100 64MB AGP NEW find.pcworld.com/34709	\$80	93	Good	Average	FEATURES: ATI Radeon 9100 chip, 64MB of DDR SDRAM, 400-MHz RAMDAC; DVI-out. SUMMARY: One of the lowest prices on the chart and reasonable performance make this an ideal board for the bargain hunter looking for an inexpensive performance boost over integrated graphics. (************************************
2	Gainward GeForce4 PowerPack Pro/600 TV Golden Sample find.pcworld.com/28581	\$75	92	Good	Average	FEATURES: NYIdia GeForce4 MX 440 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-out; InterVideo WinDVD player. SUMMARY: This card is the cheapest on the chart and provides adequate performance for general use, but it doesn't include any games or extra features. (************************************
3	Asus AGP-V8170DDR find.pcworld.com/31790	\$90	90	Good	Good	FEATURES: NVidia Geforce4 MX 440 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-out; Asus DVD 2000 player; Aquanox, Midnight GT/Rage Rally games. SUMMARY: This is a basic board that has good performance, a few games, and better-than-average documentation. (★★★大学 Jan 03)
4	ATI Radeon 9000 Pro find.pcworld.com/30458	\$90	90	Good	Good	FEATURES: ATI Radeon 9000 chip, 64MB of DDR SDRAM, 400-MHz RAMDAC; DVI-out, S-Video-out, dual-display support. SUMMARY: Based on an older version of the Radeon graphics chip, this card is now available for a very affordable price; it offers performance adequate for general use and gaming. (****.000 ct 02)
	ATI All-In-Wonder VE PCI	\$129	83	Average	Very good	FEATURES: ATI Radeon 7500 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; TV tuner, S-Video-in and -out; Pinnacle Studio ATI Edition. SUMMARY: This PCI video card is inexpensive for one that includes

HOW WE TEST: Visit find.pcworld.com/34769 for our test methodology; see find.pcworld.com/10860 for details on PC World's Star Ratings.

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TOP 10 DIGITAL CAMERAS



Visit find.pcworld.com/34889 for reviews of all products tested this month and ranked in this chart.

THE NEW CANON PowerShot S50 earns second place by offering ease of use, plenty of features, and great-looking photos. Two high-end single-lens reflex cameras also win spots on the chart: The new Canon EOS 10D and the retested Olympus E-20N are both over \$1000, but the EOS's price

does not include lenses. That said, both cameras are relatively inexpensive for digital SLRs, and they offer a wider range of features than do their cheaper colleagues on the chart. The EOS 10D can use most of Canon's huge range of EF mount lenses, designed originally for the company's 35mm SLRs.

	CAMERA: \$500 AND OVER	Street price (4/7/03)	Overall rating	Image quality	Ease of use	Battery life/ shots	Comments
1	Best Olympus C-5050 Zoom EUY find.pcworld.com/33212	\$800	86	Outstanding	Very good	Good/ 372	FEATURES: 5-megapixel resolution, 32MB XD-Picture Card media (also accepts SmartMedia and CompactFlash media), 35mm-105mm focal range; USB and video output; 17.3 ounces. SUMMARY: A serious shooter's camera, the C-5050 produces razor-sharp images and comes with powerful, intuitive controls. (★★★★): Mar 03)
2	Canon PowerShot S50 find.pcworld.com/34838	\$600	86	Outstanding	Very good	Good/ 261	FEATURES: 5-megapixel resolution, 32MB CompactFlash media, 35mm-105mm focal range; USB and video output; 11.1 ounces. SUM-MARY: The S50 provides point-and-shoot simplicity combined with well-thought-out controls, but its battery life is the shortest on the chart. (*****)
3	Nikon Coolpix 4300 find.pcworld.com/32000	\$500	85	Outstanding	Fair	Good/ 277	FEATURES: 4-megapixel resolution, 16MB CompactFlash media, 38mm-114mm focal range; USB and video output; 10.1 ounces. SUM-MARY: Lightweight camera takes wonderful shots and is easy to hold with one hand, but its multilayered menus make using its advanced features a tad difficult. (****; Jan 03)
4	Canon PowerShot G3 find.pcworld.com/32516	\$800	84	Very good	Good	Very good/ 447	FEATURES: 4-megapixel resolution, 32MB CompactFlash media, 35mm-140mm focal range; USB and video output; 17.5 ounces. SUM-MARY: The G3 boasts a 4X zoom lens and long battery life, but some competitors' lower-priced 5-megapixel cameras have better image quality. (***** Mar O3)
5	Sony Cyber-shot DSC-F717 find.pcworld.com/31526	\$700	83	Very good	Good	Very good/ 491	FEATURES: 5-megapixel resolution, 32MB Memory Stick media, 38mm-190mm focal range; USB and video output; 23.8 ounces. SUMMARY: Besides taking great shots, this model offers advanced features, including user-selectable zone autofocus and USB 2.0 support for faster downloads. (★★★★ Jan 03)
6	Fujifilm FinePix S602 Zoom find.pcworld.com/30470	\$650	82	Good	Very good	Very good/ 425	FEATURES: 3.1-megapixel resolution, 16MB SmartMedia card, 35mm-210mm focal range; USB and video output; 20.4 ounces. SUMMARY: The S602 Zoom has a hot-shoe flash sync and both SmartMedia and CompactFlash media slots, but it is expensive for a 3-megapixel camera. (************************************
7	Canon EOS 10D find.pcworld.com/34847	\$15001	80	Outstanding	Very good	Outstanding/ 1098	FEATURES: 6.3-megapixel resolution, CompactFlash media slot; USB and video output; 31 ounces (without lens). SUMMARY: Bristling with features, this SLR camera takes beautiful pictures and can use most Canon EF mount lenses. The price, however, does not include a lens or a CompactFlash card. (★★★☆)
8	Nikon Coolpix 5700 find.pcworld.com/3tt18	\$1500	75	Very good	Fair	Good/ 336	FEATURES: 5-megapixel resolution, 16MB CompactFlash media, 35mm-280mm focal range; USB and video output; 19 ounces. SUM-MARY: The complex and powerful Coolpix 5700 takes impressive images. Its long 8X zoom is useful for photographing sports events and wildlife. (★★★☆ Jan 03)
9	Olympus E-20N find.pcworld.com/34835	\$1200	74	Very good	Very good	Outstanding/ 768	FEATURES: 5-megapixel resolution, 32MB SmartMedia card (also accepts CompactFlash media), 35mm-140mm focal range; USB and video output; 41.1 ounces. SUMMARY: This SLR camera provides plenty of features (such as a pop-up LCD screen) and is easy to use, but it is big and heavy. Retested this month. (************************************
10	Leica Digilux 1 find.pcworld.com/30467	\$870	71	Fair	Good	Good/ 360	FEATURES: 3.9-megapixel resolution, 64MB Secure Digital media, 33mm-100mm focal range; USB and video output; 16.1 ounces. SUM-MARY: The big and boxy Digilux 1 has a retro design, a huge 2.5-inch LCD screen, and a fast multiburst mode, but our test photos looked too dark. (************************************

FOOTNOTE: 1 Not including lens; prices for lenses start at \$100. HOW WE TEST: To gauge picture quality, we take a series of shots, with and without flash, at 640 by 480 resolution and at the camera's highest resolution. We photograph a complex still life and a mannequin to see how well each camera captures details and subtle color. We review the on'screen and printed photos and assign image-quality scores. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. CHART NOTES: Each camera's overall rating is based on price (15 percent), picture quality (30 percent), ease of use (15 percent), features (20 percent) Externs Lepters), pictures (20 percent), and support (10 percent). For all ratings, higher is better. Resolutions are expressed in effective pixels, focal range is identified as 35mm equivalent, and camera weights include batteries. See find.pcworld.com/10860 for details on PC World's Star Ratings.

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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/34022 for the *Top 10 Monitors* chart). Note the revised 17-inch CRT monitors chart from the April issue; a calculation error caused incorrect rankings in the original chart.



THE HP SCANJET 5550c's automatic document feeder converts text-laden materials into editable documents.

CLEVERLY COMBINING a below-average price with above-average text display, ViewSonic's G71f+B snared fifth place on the Top 10 17-inch CRT Monitors chart.



	17-INCH CRT MONITORS			SCANNERS		DVD REWRITABLE DRIVES		DIGITAL CAMERAS UNDER \$500
	find.pcworld.com/34022			find.pcworld.com/34424		find.pcworld.com/34853		find.pcworld.com/34421
1	Best CTX VL700 BUY find.pcworld.com/33725		1	Best 1660 Photo find.pcworld.com/31166	1	Best Sony DRU-500A BUY find.pcworld.com/31409	1	Best Olympus C-4000 Zoom
2	NEC MultiSync FE791SB find.pcworld.com/30290		2	Canon CanoScan 5000F USB find.pcworld.com/34409	2	Hewlett-Packard DVD Writer Dvd300i find.pcworld.com/34454	2	Best Sujifilm FinePix 3800 Zoom find.pcworld.com/32450
3	Sony CPD-E240 find.pcworld.com/33647	NER	3	Visioneer OneTouch 9000 USB find.pcworld.com/29882	3	Pioneer DVR-A05 find.pcworld.com/32642	3	Konica Digital Revio KD-4002 find.pcworld.com/32435
4	Samsung SyncMaster 700NF find.pcworld.com/10571	SMALL-OFFICE SCANNER	4	HP Scanjet 5500c find.pcworld.com/31163	4	LaCie D2 DVD-RW find.pcworld.com/34457	4	Fujifilm FinePix 2650 Zoom find.pcworld.com/34388
5	ViewSonic G71f+B find.pcworld.com/33650	SMAL	5	Microtek ScanMaker 4900 find.pcworld.com/29124	5	Toshiba SD-R5002 find.pcworld.com/32645	5	Olympus D-550 Zoom find.pcworld.com/30839
6	liyama Vision Master Pro 413 find.pcworld.com/13260		6	Canon CanoScan Lide 30 USB find.pcworld.com/29883	6	Alera Technologies DVD-R Quad Cruiser find.pcworld.com/33680	6	Fujifilm FinePix A303 find.pcworld.com/32453
7	IBM P77 find.pcworld.com/21761	W.	7	HP Scanjet 5550c find.pcworld.com/34406	7	CenDyne DVR-105 find.pcworld.com/33677	7	Canon PowerShot S230 Digital Elph find.pcworld.com/34394
8	Compaq S7500 find.pcworld.com/30239	VER	1	Best 3200 Photo find.pcworld.com/33827	8	Philips DVDRW 228 find.pcworld.com/31418	8	Pentax Optio 330GS find.pcworld.com/33713
9	NEC MultiSync FE771SB find.pcworld.com/33659	CORPORATE SCANNER	2	Microtek ScanMaker 6800 find.pcworld.com/34400	9	LG GMA-4020B find.pcworld.com/31067	9	HP Photosmart 720 find.pcworld.com/30494
10	Dell M782 find.pcworld.com/21763	CORF	3	Microtek ScanMaker 8700 Pro Design find.pcworld.com/15843	10	Memorex DVD+RW+R Internal ReWritable Drive find.pcworld.com/31421	10	Olympus Stylus 300 Digital find.pcworld.com/34391
	From the April 2003 Issue			From the May 2003 Issue		From the May 2003 Issue		From the May 2003 Issue





EDITED BY MICHAEL S. LASKY, DENNIS O'REILLY, AND ERIC DAHL



HARDWARE TIPS

KIRK STEERS

Simple Tweaks for Peak PC **Graphics Performance**

WHEN IT COMES TO your PC, looks definitely matter. Tiny text, blurry images, and flickering screens aren't just annoying, they can lead to eyestrain, lost productivity, and a bill from the glazier for replacing the window you toss your monitor through out of frustration. But you don't have to give your display the heaveho: A few simple adjustments to your graphics card and other Windows settings can ensure peak visual performance.

Your PC's graphics card is controlled by

its Windows driver, so get the latest driver release for your board. To see what version you have, right-click the desktop and choose Properties to open the Display Properties dialog box, then click Settings. Advanced · Adapter (in Windows XP, also select Properties - Driver).

Visit your graphics-card vendor's Web site to download the most recent version of the driver, but don't install beta drivers. These are works in progress that may cause more trouble than they're worth.

(Point your browser to find.pcworld.com/ 34499 and read the "Get a fresh start" section for more information on updating your driver in Windows XP.)

SIGHT-SAVING SETTINGS

HERE ARE A few settings that should be available for all graphics drivers.

Resolution: This is the number of dotsor pixels (short for "picture elements")displayed on your screen. The higher the resolution, the more dots per inch, and the sharper the displayed image (if your monitor supports the higher resolution). High resolutions increase the processing demands on your graphics board and PC.

The graphics cards in most computers made in the last three or four years support resolutions of at least 1024 by 768meaning the screen image is composed of an orthogonal array 1024 pixels across and 768 pixels tall-and some support screen resolutions as high as 1600 by 1200. However, many older systems, as well as some newer budget systems, have a top resolution of only 800 by 600.

To adjust screen resolution, open Display Properties and click Settings. Slide the 'Screen area' or 'Screen resolution' bar to a higher (More) or lower (Less) resolution (see FIGURE 1). Though higher resolutions improve image quality, they also shrink icons, text, and other on-screen objects. Experiment to find the setting that's right for you. For most people, 1024 by 768 is the highest resolution they can read easily on a 17-inch CRT monitor.

Color depth: This setting is the number of colors that your graphics card supports. The more colors available for use, the more realistic the image, but again, the more colors on your screen, the greater the processing demands on your system.

150 HARDWARE TIPS

Fine-tune your graphics settings for a display that's easy on the eyes; diagnose graphics woes; tweaks for LCDs.

154 WINDOWS TIPS

Get a handle on monster audio and graphics files by using Windows' filemanagement tools; a final "No to All."

158 INTERNET TIPS

Use these tools to clip pop-ups before they sprout; uninstall TurboTax's antipiracy tool; make free PDFs online.

160 STEP-BY-STEP

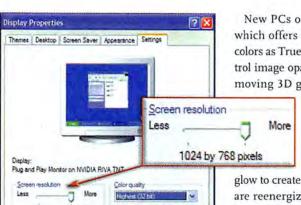
Give a tired PC new pep with a RAM upgrade-but only if you use the right type and speed of memory module.

162 ANSWER LINE

Make sure your sensitive files are truly erased from a hard drive; move your Outlook and OE archive to a removable disc; euros as easy as un-deux-trois.



154



Iroubleshoot Adyanced

FIGURE 1: RESET YOUR SCREEN resolution and other settings via Display Properties.

1024 by 768 pixels

Your graphics card's color-depth settings are listed in Display Properties under the Settings tab on the Colors dropdown menu ('Color quality' in Windows XP). Each is named for the number of bits it assigns to each pixel: True Color (also called 24-bit color) makes 16,777,216 colors available, while High Color (16 bits) supports 65,536 colors. At lower than 16-bit color, your images may suffer. Many drivers no longer offer 8-bit (256 colors) or 15-bit (32,536 colors) settings.

List All Modes

List of valid modes

1024 by 768, High Color (16 bit), 70 Hertz
1024 by 768, High Color (16 bit), 72 Hertz
1024 by 768, High Color (16 bit), 75 Hertz
1024 by 768, High Color (16 bit), 85 Hertz
1024 by 768, True Color (32 bit), 60 Hertz
1024 by 768, True Color (32 bit), 70 Hertz
1024 by 768, True Color (32 bit), 75 Hertz
1024 by 768, True Color (32 bit), 75 Hertz
1024 by 768, True Color (32 bit), 75 Hertz
1024 by 768, True Color (32 bit), 85 Hertz

FIGURE 2: WINDOWS XP LISTS the resolutions, color depths, and refresh rates that your system supports.

New PCs often support 32-bit color, which offers the same 16 million—plus colors as True Color. The extra 8 bits control image opacity. This is useful in fastmoving 3D games but of little help in most business apps.

Refresh rate: Expressed in hertz, or cycles per second, this tells how often the phosphors that

glow to create an image on a CRT screen are reenergized—that is, the times per second that the screen's image is redrawn. A refresh rate that's too low can cause annoying screen flicker. Even if you don't see the flicker, slow refreshes can cause eyestrain and headaches.

Conventional wisdom says your refresh rate should be no less than 72 Hz. Some experts say the minimum rate is 80 Hz. Try different refresh rates until you find the one that works for you. Note that if your refresh rate is too high, you could lose image opacity. Still, few of us can discern rates higher than 85 Hz.

To adjust your screen's refresh rate in Windows XP, open Display Properties and click Settings•Advanced•Adapter•List All Modes. Pick a combination of refresh rate, screen resolution, and color depth

from the list of supported values (see FIGURE 2).

To change your refresh rate in other versions of Windows, open Display Properties and then click Settings Advanced Adapter. Select an option from the 'Refresh rate' drop-down menu. If you see no options there, however, your graphics board and monitor don't support multiple refresh rates.

Even in that case, you might

be able to increase your display's refresh rate by decreasing your screen resolution or your color depth. All three specs compete for graphics-processing capacity, so if your graphics system is running at its maximum, try increasing one setting and lowering another. For example, reducing color depth from 32-bit to 16-bit—no big deal if you never look at photos—may free up enough processing power to let you bump your refresh rate from an annoying 60 Hz to an eye-pleasing 72 Hz. Or you may be able to increase resolution from 800 by 600 to 1024 by 768. There's no

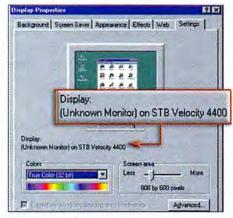


FIGURE 3: FIND OUT if your monitor is listed under the Settings tab in Display Properties.

guarantee, but these tricks might work.

Windows automatically sets your screen refresh rate to a safe but slow 60 Hz when it can't detect your monitor. To confirm that Windows XP correctly recognizes your monitor, open Display Properties and click Settings-Advanced-Monitor. If your monitor isn't listed under 'Monitor type', download and install the device's driver from the manufacturer's Web site.

In other versions of Windows, verify that Plug and Play is enabled. Make

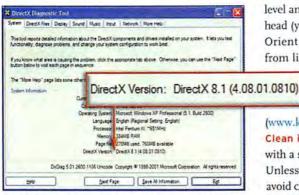


FIGURE 4: FIND YOUR DirectX version and other multimedia data via the DirectX Diagnostic Tool.

sure your monitor is listed under 'Display' on the Settings tab in Display Properties (see FIGURE 3), and then click Advanced. Monitor. Verify that Automatically detect Plug & Play monitors is checked. If it isn't, select it and then reset your refresh rate to a level that is higher than Windows' default 60 Hz.

DirectX: This Windows component controls multimedia functions. To check your current DirectX version, click Start. Run, type dxdiag, and click OK. Choose the System tab and look under System Information on the lower part of the screen (see FIGURE 4). DirectX 9 is the latest version; if you don't have it, go to find pcworld. com/34517 to download it.

TOUCH THOSE DIALS!

YOU CAN IMPROVE the image quality of your monitor via its built-in controls. The options vary by display manufacturer and model, but you should find brightness and other controls on most monitors.

Adjust brightness and contrast: Use a grayscale image such as FIGURE 5 on your screen (go to find.pcworld.com/34532 to download this image). Be sure you can see as many of the image's 17 shades as possible; the two or three darkest may be tough to view in a bright room.

Center and align: Few monitors come straight from the factory with optimal screen geometry. Use your monitor's screen-placement controls to center your displayed image, keep its edges straight, and minimize unfilled screen space.

To avoid eyestrain and other physical problems, put the top of the screen at eye level and at arm's length from your head (your best position may vary). Orient your screen to avoid glare from lights and windows. If that's

> not possible, get a glare filter such as Kensington's \$34 GlareMaster

(www.kensington.com).

Clean it: Gently wipe your screen with a soft, lightly moistened cloth. Unless the monitor is really filthy, avoid cleaning solutions, which can damage delicate screen coatings. Clean the dust from the cooling vents in the monitor's case; over-

heating is your display's lethal enemy.

GRAPHICS TRIAGE

IF YOUR SCREEN goes blank, the problem is likely due to a disconnected monitor cable, an unplugged power cord, or a too-low brightness setting. Monitors do die, however. If you smell something burning or hear popping sounds, your monitor could be failing-turn it off immediately. Monitors have been known to spontaneously combust.

Corrupted graphics drivers cause all kinds of PC problems. To check for a damaged graphics driver, install the plainvanilla VGA driver that comes with Windows. If your troubles disappear, reinstall a clean copy of the monitor's original driver, or an updated version.

Some graphics boards don't work or play well with other hardware devices. Windows allows you to disable graphicsacceleration functions for the sake of compatibility. Open Display Properties and click Settings. Advanced. Troubleshoot-

FIGURE 5: ADJUST YOUR contrast and brightness until 17 shades are discernible.

ing in Windows XP and 2000, or Settings-Advanced · Performance in Windows 98 and Me. Move the slider under 'Hardware acceleration' to the left to disable your graphics acceleration.

A shaking or shimmering image on your screen may be due to nearby magnetic fields. Keep clocks and other appliances that use electric motors, and those HARDWARE TOOLBOX

Living in a Flat World

NOTEBOOK displays are fine-tuned in the factory to work with the system's other hardware; your desktop's flat panel likely isn't. And tuning an LCD isn't the same as tuning a CRT monitor. If both your LCD and graphics board support Digital Visual Interface connections, make sure they're using them. Vendors don't always ship a DVI cable with cards that produce both analog and digital signals, so you'll have to replace the analog cable. If your display supports DVI but your graphics card doesn't, upgrade your card.

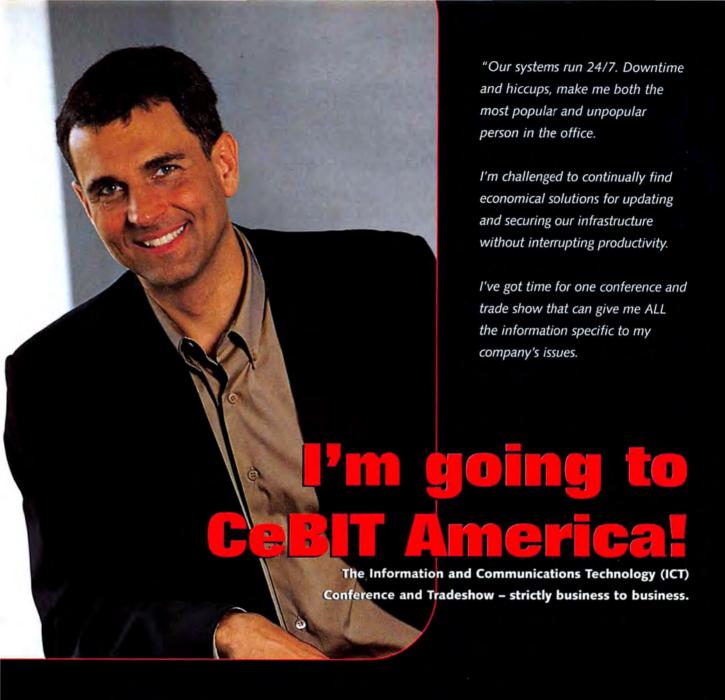
Make sure your LCD is set to its native resolution. Many flat-panel displays don't look good at other resolutions. Unfortunately, some 15-inch LCDs have a native resolution of 1024 by 768 dpi, which makes text minuscule. The solution is to open Display Properties, click Appearance, and change the setting on the 'Font size' drop-down menu to increase the size of your text. (Most browsers include their own font-size settings.)

In Windows XP, open Display Properties, click Appearance • Effects, and check Use the following method to smooth screen fonts. Select ClearType to see a big improvement in the appearance of many of your fonts.

that use a lot of electricity (such as microwave ovens), far from your monitor. Power lines behind walls can cause interference, so try moving the display away from nearby walls.

If your screen image is washed in blue, red, or green, check for a loose cable connecting your graphics board to your monitor. Look for bent pins inside the cable connector; you can often straighten them with needle-nose pliers. If on-screen objects have a rainbow cast, some monitors have convergence controls that you can use to tune the image.

Go to find.pcworld.com/31511 for past Hardware Tips columns. Send your tips and guestions to kirk_steers@pcworld.com. We pay \$50 for published items. Kirk Steers is a PC World contributing editor.





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WINDOWS TIPS SCOTT DUNN

USE ALL YOUR FILE-VIEW OPTIONS SAY 'NO TO ALL' WITH ONE CLICK ADD A FOLDER PANE TO EXPLORER

A Better Way to Manage Sound and Image Files

WHETHER YOU'RE managing a Web site, preparing a business presentation, creating a newsletter, or just assembling a family photo album, today's huge media can soon overwhelm your system-and you. Windows provides tools for identifying, sorting, and managing monster files.



Take your pane to task: The task pane located on the left 98 ME side of Explorer in Windows

XP gives you more control over the files in a folder window. If you don't see this pane in the folder window, the window is too small, an Explorer bar is covering the task pane, or the task pane is turned off. Click Tools-Folder Options and check Show common tasks in folders.

The tasks listed here may not be helpful for a particular folder, however. To modify this task list, right-click an empty area

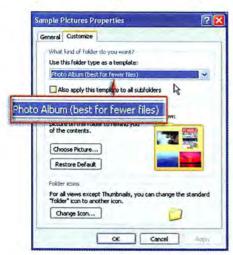


FIGURE 1: MATCH YOUR FOLDER view to its content via a template in the Customize tab.

of the folder window and select Customize This Folder, or from the menu bar choose View Customize This Folder. (This command is unavailable for the root directory of disk drives and for some system folders.) On the Customize tab, under 'What kind of folder do you want?', select the template that most closely matches the contents of your folder, such as Photo Album for a folder containing a few image files (see FIGURE 1). Click Apply, and if the task pane displays the options you need, finish by clicking OK.

The template may change the folder's file view (from Thumbnails to Icons or Details, for example). To override that for the current folder, choose another option from the View menu or the Views toolbar icon. Note that Filmstrip view appears on the menu only if the folder contains one or more viewable images.



Enable thumbnails: All Windows versions since 98 can 98 ME show common graphics file

types-.bmp, .gif, .jpg, and (in later versions of Windows) .tif-as thumbnails. Choose View. Thumbnails from a folder's main menu bar or from its right-click menu. In Windows 98 you won't see this menu option, but just press <Backspace> to move up a folder level, right-click the folder that contains the images you want to see as thumbnails, and choose Properties. In the General tab of the Properties dialog box, check Enable thumbnail view and click OK (see FIGURE 2). The next time you open this folder, you should see a Thumbnails option on your View menu.



Customize thumbnail size:

Microsoft's free Tweak UI utility (part of the PowerToys

collection) lets you change the size and quality of your thumbnails. If you don't already have this tool, go to find poworld. com/34427 to download the version for XP. Double-click the downloaded file to start the installer. You don't have to install all the PowerToys, however; use the Custom setup option to install only Tweak UI. Follow the instructions in the setup wizard until the process is complete; then choose Start-All Programs-Powertoys for Windows XP. Tweak UI for Windows XP. In the left pane, double-click Explorer (or click the + next to it) and click Thumbnails. Use the controls to adjust the size and quality of the thumbnail images to your liking. To save on disk space, use the lowest quality setting you find acceptable.

Windows Squeeze more thumbnails into your folder: There's another

way to fit a few more thumbnails into Windows XP's right Explorer pane. First, make sure the Folders bar is visible: Choose View. Explorer Bar. Folders. Now click any folder in the Folders pane other than the one that holds your thumbnails. Staying in the Folders pane, <Shift>click the folder that holds your thumbnails to reopen it. This removes the file names from under each thumbnail, giving you room to view a few more pictures in the right window (see FIGURE 3). The names return when you open another folder and then <Shift>-click this one again.

Windows Preview files sequentially: Windows Me lets you see image files as a slide show or

hear audio files in a sequence (go to find. pcworld.com/34430 for instructions on how to make a quick slide show). Windows XP adds the ability to play sound, video, and image files directly from their folder windows. First, make sure the folder with your multimedia files is displaying the task pane, not the folder tree, on the left. Click the appropriate link at the top of the list in the task pane-namely, Play all for sound and video files, or View as a slide show for folders with images. Sound and video run in your default media player. Pictures appear in a full-

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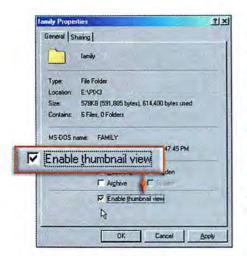


FIGURE 2: ADD THE THUMBNAILS view by checking 'Enable' in the folder's Properties.

screen slide show; move the mouse to display floating controls for going forward or back and for canceling. The controls in the top-right corner of the screen pause, skip, and otherwise control playback. You can also control playback via the keyboard: Press <Tab> to toggle the slide-show toolbar, (Enter) to advance slides, and the left and right arrow keys to see the previous or next slide. Press the spacebar to toggle between letting the slides advance on their own and pausing. (Pausing also displays the toolbar again, but just press <Tab> once more to hide it.)

Note that if you use the 'Play all' feature with video or audio, Windows will play not only the files in the current folder but any video or audio files nested in subfolders, as well (unless the nested folder is compressed). If that's not what you want, select the desired files and click Play selec-

🥯 s's Pictures 3 Back - 5 Search Folders IIIddress ENDOCIMy Pictures v (60 Oth E ssw

FIGURE 3: ZAP THE FILE-NAME captions to squeeze a few more thumbnail images into your folder window.

tion. If you have installed RealOne Player or another media player on your system, your audio files may play in that program rather than within the folder.



Preview mixed sound and image file types sequentially: 98 ME Windows Media Player 9 lets

you review sound and image files in the same folder. Go to find.pcworld.com/ 34463 to download the program. For a simple sequential review of sound or video files, version 7.1 of Windows Media Player will do. Browse to find.pcworld. com/34466 for that version.

Launch Windows Media Player by clicking the Quick Launch toolbar button, by double-clicking a sound or video file, or by choosing Start. Programs (All Programs in Windows XP) · Accessories · Entertainment · Windows Media Player. Click the Now Playing button on the left to see a list of the files you're previewing. Select the files you want to preview and drag them to the Media Player win-

dow. Then wait for Media Player to advance through the list, or simply click Next or Previous to do the job manually.

JUST SAY NO TO ALL



EVERY TIME you move or copy files from one folder to 98 ME another, Windows checks the

target folder for files that have the same names as those you are copying. If it finds a duplicate name, it asks whether you want to overwrite the file in the target folder. When more than one file is selected, your choices are 'Yes' (overwrite just

> this file), 'Yes to All' (overwrite all files with matching names). 'No' (don't overwrite this file), and 'Cancel' (stop the whole process now). If you click 'Yes' or 'No', you will see the same prompt for each duplicate that Windows finds. If you're just resuming an interrupted download from a server, you can click 'Yes to All' to overwrite everything and save yourself some clicks. But this approach slows down the process as Windows overwrites files you downloaded

WINDOWS TOOLBOX

Get More Out of Explorer With FolderBox

IN MANY CASES, moving or copying files from one folder to another involves opening multiple Explorer windows and then futzing with their sizes and positions to make dragging and dropping the files between them easy. Instead of shelling out for a third-party file manager that lets you carve a single window into multiple folder panes, try BaxBex Software's



free FolderBox. This simple Explorer extension adds an extra folder pane to Explorer. Just install the program and choose View Explorer Bar FolderBox. The program works with all versions of Windows and supports most file views (except Thumbnails). FolderBox remembers the folder's window-pane arrangement when you reopen it in a new Explorer session. It even works with Internet Explorer windows. Go to find.pcworld. com/34469 to download your copy.

previously. Why not just say 'No to All'?

Burak Gül of Eskisehir, Turkey, has the solution. To say 'No to All', simply hold down <Shift> as you click No. Windows will move or copy all files except those with duplicate names in the target folder. Note that if you move or copy folders as well as files, you still get at least one prompt for folders and another for files when duplicate names are found.

Send Windows-related questions and tips to scott dunn@pcworld.com. We pay \$50 for published items. Visit find.pcworld.com/ 31607 for more Windows Tips. Scott Dunn is a contributing editor for PC World.

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INTERNET TIPS

SCOTT SPANBAUER

KILL THAT STICKY ANTICOPY UTILITY CREATE AND VIEW PDFs FOR FREE

UPDATE YOUR SPYWARE APPS

The Knock-Down Pop-Ups 2003 Compendium

YOU DON'T NEED me to tell you how hateful pop-ups and their evil twins, popunders, are. But I need to do it anyway. just to get it out of my system. These unwanted advertising browser windows are annoying and often crass. They waste time, interfere with browsing, and generally deserve to be annihilated.

There, I feel better.

Yes, I know, even wonderful sites like PCWorld.com sometimes use pop-ups. Nevertheless, they must die. Pop-up habitué X-10, you're gonna miss me.

If pop-ups afflict you, I'm willing to bet that you use Internet Explorer. That's because the current versions of every major



FIGURE 1: YOU CAN ALLOW certain pop-ups to appear using Mozilla's Popup Manager.

Windows-compatible browser-except Microsoft's-offer settings (often hard to find) that block pop-ups and pop-unders. Mozilla 1.3b and Netscape 7.02: The latest versions of the Mozilla and Netscape browsers include a Popup Manager that permits you to block pop-ups from some (but not all) sites. To block all pop-up and pop-under ads, choose Edit-Preferences, double-click the Privacy & Security category, select Popup Windows, choose Suppress popups, and then click OK. Note that this change disables the program's Popup Manager tool, as well.

Unfortunately, blocking all pop-ups can prevent some desirable Web contentsuch as streaming video playback or login dialogs-from opening. To block popups at some sites but not at others, you have two options. The first is to suppress pop-ups as described above, but choose Exceptions to enter a list of sites you'll allow pop-ups from (see FIGURE 1). The second is to leave the Popup Windows setting on the default 'Allow popups'; then, whenever you encounter an obnoxious pop-up, choose Tools-Popup Manager-Suppress Popups from this Site.

Opera 7.0x: Opera is no slouch at blocking pop-up ads, though it doesn't quite match Mozilla's Popup Manager in flexibility. To block all pop-ups, choose File-Quick preferences. Refuse pop-up windows. Another setting, File · Quick preferences · Open requested pop-up windows only, lets some desirable pop-ups open as expected; but in my experience, the setting also blocks some video-playback windows.

DEDICATED POP-UP KILLERS

IF YOU DON'T LIKE your browser's popup controls, you can try using a thirdparty program. Several commercial Internet utilities, including Symantec's \$70 Norton Internet Security and InterMute's \$30 AdSubtract, do a dandy job of nuking pop-ups along with performing their other duties. And numerous commercial products focus just on stopping pop-ups.

But if all you want is a good pop-up killer, you don't have to spend a dime. AnalogX's tiny POW does the job for free, though it requires some hands-on effort and works only with Internet Explorer. The utility sits in the Windows system tray, tracking open browser windows and closing those it recognizes as pop-ups.

POW knows about a few pop-up types in advance, but you'll have to add new ones to the block list as they arise; this involves launching POW's interface from the system tray icon, and then doubleclicking the title of the pop-up in POW's list of open browser windows. Go to find. pcworld.com/34100 to get your copy.

For industrial-strength ad-blocking and pop-up prevention, try WebWasher.com's WebWasher Classic 3.3 (see FIGURE 2). The 1MB program is free for home and educational use, and \$29 for business use.

Designed to work with Netscape, Mozilla, Opera, and Internet Explorer browsers, WebWasher Classic 3.3 quashes pop-ups automatically without manual configuration. The program also blocks banner ads, cookies, and Web bugs (those minuscule, invisible images that track your Web

NUKE IE'S IMAGE TOOLBAR

THERE YOU ARE browsing the beautiful images at www.lomography.com, using IE 6, only to discover that the browser's



pesky image toolbar keeps popping

up, obscuring the view. What's a low-tech photo connoisseur to do? To make it go away for good, select Tools Internet Options, click the Advanced tab, scroll down to the Multimedia section, uncheck Enable Image Toolbar, and click OK. A little less clutter, a little more action.



FIGURE 2: BLOCK POP-UPS with WebWasher Classic 3.3, a free download for home users.

browsing on the sly). Go to find.pcworld. com/34622 to download the program.

DEACTIVATE TURBOTAX'S PRODUCT ACTIVATION

C-DILLA, NOW CALLED SafeCast, is a copy-protection utility that comes bundled with many applications, including AutoCAD and MathCAD. Notably, it's part of Intuit's product activation for TurboTax 2002. Both Intuit and SafeCast's maker, Macrovision, deny that the antipiracy software monitors your computer usage or communicates with either company's servers. Nevertheless, SafeCast does remain installed and active on your PC even after you uninstall TurboTax.

In response to customer complaints, an Intuit Web page now offers a SafeCast

uninstaller and detailed instructions for using it. Go to find.pcworld.com/ 34088 to download both.

Warning: Some copy-protected programs won't run if SafeCast-or its predecessor, C-Dilla-is not installed on them.

PDFs WANT TO BE FREE

THE INTERNET IS a great way to distribute documents, but some document types are better suited to a particular use than others. Web pages are good for sharing links and photos, but they may look different in different browsers, and they may not print the way you want in various operating systems. Similarly, documents in Microsoft Word may not look the same

when viewed in anything but a Windows version of the programand some of them carry viruses.

> Adobe's PDF (short for Portable Document Format) manages to

overcome most of these difficulties. Forms, résumés, newsletters, and other highly formatted documents usually come out looking just about the same whether the destination is a Mac, a PC, or a Unix computer. Unfortunately, Adobe's Acrobat Distiller program, which converts your page-layout, HTML, or word processing files to .pdf format, is pretty dear at \$250.

But you can use any of several free or low-cost products or services to become a PDF publisher on the cheap. The one to try first is Adobe's own Create Adobe PDF Online site at find.pcworld.com/ 29711 (see FIGURE 3). This is normally a \$10-per-month or \$100-per-year service that allows customers to convert an unlimited number of files from dozens of popular formats to PDF, but a trial offer lets you convert five files gratis (with limits on the number of pages per document,

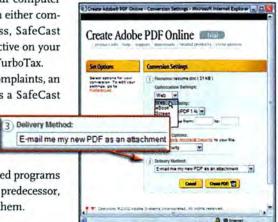


FIGURE 3: CONVERT FILES TO .pdf format, using select free online services like Adobe's.

total download/upload size, and processing time). I ran my résumé through Adobe's service and received the finished PDF file as an e-mail attachment within minutes. Alternatively, you can choose to visit a temporary Web page and download the converted file from there.

REVISION CONTROL

Return of the Spy Catchers

UPDATES exist for two popular spyware utilities, but not without some gotchas. Ad-aware 6: Once the gold standard of spyware removal tools, Lavasoft's Adaware 5.x gradually went stale as the company focused on preparing this new version instead of updating the older app's list of known spyware and adware. The lesson: For best results, you may do well to rely on more than one spy catcher (see below), 871KB; find.pcworld.com/34058 Spybot-Search & Destroy: Patrick Kolla's free adware and spyware remover lacks some of Ad-aware's interface polish, but Kolla's regular updates keep you safe from all the latest sneakware. 2.5MB; find.pcworld.com/32678

BCL Technologies offers a similar but less-limited free service that you can reach at find.pcworld.com/34091; it converts .rtf, .txt, .doc, .xls, and .ppt files under 500KB into .pdf format, and then e-mails them back to you. After signing up, you can mail files to a BCL address and receive the converted files by return mail.

Online conversion services aren't your only route to free PDFs, however. If you are technically savvy, visit The ZipGuy's Free PDF site and download his Free PDF version 0.95 beta (find.pcworld.com/ 34985) and the equally important Free PDF configuration instructions (find. pcworld.com/34094). The ZipGuy's tool acts as a front end to several other free programs that add PDF as a virtual printer in Windows programs.

For a novice-friendly solution, enlist EHelp's RoboPDF Home Edition (find. pcworld.com/34097). Free to home users, RoboPDF Home Edition lets you print documents in the .pdf file format, using the print dialog box of any Windows application. Unfortunately, it also inserts an ad for RoboPDF on each page.

Send your questions and tips to nettips@ spanbauer.com. We pay \$50 for published items. Go to find.pcworld.com/31523 for more Internet Tips. Scott Spanbauer is a contributing editor for PC World.

STEP BY STEP

STAN MIASTKOWSKI

Add RAM for a Faster PC

BULKING UP your computer's memory remains one of the most popular upgrade projects: It's inexpensive, it's relatively easy, and it can dramatically improve performance. And today's memory-hungry software can make upgrading your PC's RAM a virtual necessity. For example, Microsoft recommends at least 128MB of memory for Windows XP; 256MB is better, however, and 512MB is better still.

Most desktop PCs built over the past few years use dual inline memory mod-

ules. PC100 (100-MHz) and PC133 (133-MHz) SDRAM DIMMs are most common for Pentium-based PCs built one to three years ago; systems of that vintage based on AMD processors often use PC1600 (200-MHz) or PC2100 (266-MHz) double data rate modules.

Recently, faster DDR modules have become the standard for both Pentiumand AMD-based systems. The most prevalent type is PC2700 (333 MHz), and PCs that use PC3200 (400-MHz) DDR memo-

THE TOP DOWN

Benefits: Increase system performance, keep more applications open, and improve graphics and video editing.

Cost: 128MB, \$25 to \$35; 256MB, \$40 to \$60; 512MB, \$80 to \$120 (Prices were averages at press time. Check with your dealer for the latest.)

Tools required: Phillips screwdriver, antistatic wrist strap (recommended)

Expertise level: Intermediate Time required: 15 minutes

Vendors:

Corsair (www.corsairmemory.com), Crucial Technology (www.crucial.com), Kingston Technology (www.kingston.com), Mushkin (www.mushkin.com), PNY Technologies (www.pny.com), SimpleTech (www.simpletech.com), Viking Inter-Works (www.vikinginterworks.com)

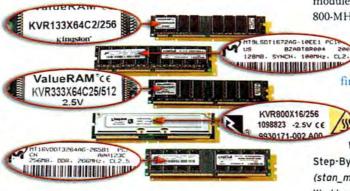
ry are starting to appear. Some high-end computers use dual-channel DDR memory for extra speed. Rambus memory is still available as well. High-performance Pentium 4-based systems often use more-expensive Rambus inline memory modules. Older machines typically have 800-MHz RIMMs, while new systems use 1066-MHz modules.

> We get oodles of mail about memory upgrades. Check out find.pcworld.com/34649 for some helpful answers to your most frequently asked questions.

Visit find.pcworld.com/31676 for past Step-By-Step columns. Stan Miastkowski (stan_miastkowski@pcworld.com) is a PC World contributing editor.

FIND THE CORRECT DIMM

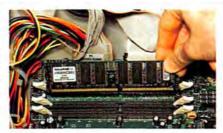
MEMORY modules may look virtually identical, but they're not interchangeable. To ensure you're using the correct RAM, check the Web sites of the makers listed in "The Top Down." Most have instructions for finding RAM that will match your PC's.



See how much RAM your PC has. From within any version of Windows, rightclick My Computer and select Properties. The dialog box displays the amount of RAM at the bottom. Many PCs also show the total amount of RAM as they start up.

Insert the new RAM. Note the notches on your DIMMs-they ensure that the modules can be inserted only one way. Put new DIMMs in the lowest-numbered empty slots first. Carefully press them straight down into the slots, applying gradually increasing pressure. The clips will snap into place when the DIMMs are fully inserted.

Find the RAM. Turn off your PC, unplug it from the wall, and open the case. We suggest wearing an antistatic wrist strap when you work inside your computer. The RAM slots are usually located near the CPU, but closer to the front of the case.



Remove the old RAM (optional). If all your RAM slots are filled, you'll need to remove some of the old modules. Two clips hold each DIMM in its socket. Push down on the clips to open them, rock the modules gently, and lift them straight out of the slots.

Power up and check it out. Plug in your PC, turn it on, and see if it recognizes the new RAM. If not, or if your PC won't start, turn it off, unplug it, and make sure each DIMM is firmly seated. If you had to remove cables to get at the RAM, make sure they're reconnected. If you still have problems, call your memory vendor's tech support line.

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ANSWER LINE

LINCOLN SPECTOR

Wipe Your Drive Clean of All Its Sensitive Data



I'M REPLACING my hard drive. How do I totally obliterate sensitive data on the old drive?

Jim Mercer, via the Internet
TO TRULY ERASE data, you need to write
over it. Simply deleting files or reformatting the drive won't do. Luckily, plenty of
free and inexpensive wipe programs (also
known as shredders) can cover the data
with zeroes or random patterns, making
it unreadable by data-restoration software.

Some machines can recover data that's

ough overwriting probably isn't necessary.

Keep in mind that deleting just the sensitive files may not protect you fully. Unidentified copies of those files could exist in "unused" parts of your hard drive, or in your swap file, among other possible locations. It's a good idea to wipe these areas of your drive as well—or go the surefire route and wipe your entire hard drive. (Visit find.pcworld.com/34832 for more on the dangers of unwiped hard drives.)

To clean up specific files (none holding

state secrets) and the drive's free space, rely on Summit Computer's free Hard Disk Scrubber 2. To be extra cautious, check *Heavy Scrub* to write over the disk three times (see FIGURE 1). Visit find.pcworld.com/34535 to download your copy.

A more powerful option is Jetico's \$40 BCWipe 3, which adds 5220.22-M support and cleans up unused space in the swap file. Visit find.pcworld.com/34538 to download the trial version.

To wipe the entire drive, I recommend LSoft Technologies' free Active@ KillDisk or its \$30 sibling, Active@ KillDisk Professional. The DOS programs load from a bootable floppy and overwrite every partition on the hard drive. The free version does a basic wipe, covering the drive with zeroes in one pass. Professional adds 5220.22-M-compliant wiping, and it will make as many passes as you like.

Wiping takes time, however. On my test system, KillDisk took more than 12 hours to complete one pass of a 13GB drive. The recommended seven passes could take days. Go to find.pcworld.com/34541 to download the freeware, and head to www. killdisk.com for the Professional version.

ARCHIVE OUTLOOK AND OF MAIL



HOW DO I ARCHIVE mail from Outlook Express on a separate disc so that I can retrieve it later?

Abe Kravitz, New York

THIS TECHNIQUE works in both Outlook and Outlook Express: Open Windows Explorer and create a new folder, whether on your hard drive, a network, or a CD-R disc. Now open your mail client and select the messages you want to archive, or choose a folder and press <Ctrl>-A to archive everything in it. Drag the messages out of your e-mail program and into the folder you just created in Explorer. Each message becomes either an .eml (Internet E-Mail Message) file or an .msg (Outlook Item) file, depending on your e-mail client. In your e-mail program, press <Delete> to get rid of the messages, or select the folder and delete that.

To access an archived message, doubleclick the message file or drag it from the archive folder into a mail folder.

Send your questions to answer@pcworld. com. Answer Line pays \$50 for published items. See find.pcworld.com/31577 for more Answer Line columns. You'll find Contributing Editor Lincoln Spector's humorous writing at www.thelinkinspector.com.

EASIER EURO SYMBOLS

IN MY DECEMBER 2002 column, I offered easy ways to type the euro symbol (€) in Windows and Office applications. Reader Rick Richards of Oakville, Ontario, points out that Microsoft Word already has a quick and simple way to do it: Press ⟨Ctrl>-⟨Alt>-E. This is strictly a Word solution−it doesn't even work in Excel (although Excel supports the euro symbol when you format a cell to display numbers as currency). And like the two options I described in December, this method works only if you're using a font that supports the symbol.



FIGURE 1: PURGE YOUR HARD DRIVE of sensitive data with the Heavy Scrub option in the Hard Disk Scrubber freeware.

been written over only one or two times, however. That's where secure delete standards, such as the Department of Defense 5220.22-M, come in. According to this specification, overwriting the drive sectors three times with specific, different characters constitutes one pass. Many experts recommend seven such passes to render the data completely unrecoverable. But reading data that has been overwritten by even the simplest shredders requires expensive hardware, so unless you're worried about professional sleuths, such thor-



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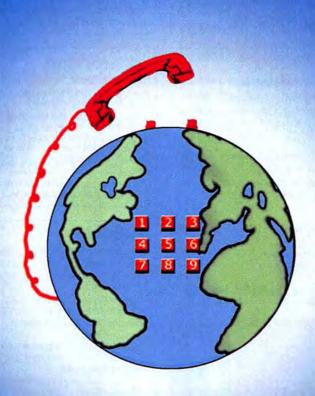
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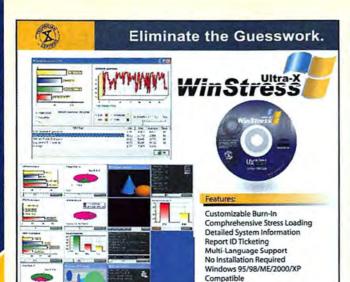
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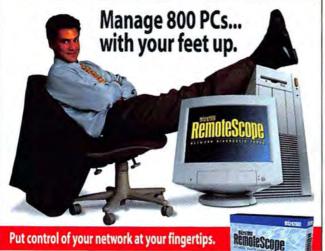
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An Unwired Nation? Maybe Next Year

Dial-up may be dreary, but you don't need to hunt for a Starbucks to use it.

THE TERM "ALWAYS ON" once referred just to broadband connections such as cable or DSL. Now it's increasingly being used to describe wireless Internet access on the go via Wi-Fi and cellular connections-and in response, I'm increasingly muttering, "Baloney."

Always on? As a frequent traveler with infrequently good Internet connections, I'd settle for "on when I need it." Mostly what I get instead is a hotel desk clerk mumbling, "I think your phone has some kind of data-port thingy."

Away from home, you can't take anything about connections for granted, as I discovered recently while attending a conference in a pricey Scottsdale, Arizona, hotel. The place had opened for business just a few months earlier, so an optimist might expect it to have its own Wi-Fi network. It didn't. You'd certainly assume it would have high-speed ethernet, and it did-but in only a small fraction of its rooms. Some architectural genius must have declared, "Let 'em eat dial-up!"

Sluggish as it may be, at least dial-up is available where you expect it. At this writing, T-Mobile boasts 2352 Wi-Fi hot spots across the country. Sounds like a lot, but most of those locations are Starbucks shops, and the map shows more than 20 states where the company has no Wi-Fi coverage at all. When I arrive tired and cranky at some Edge City hotel 2000 miles from home, I want to get my mail from the comfort of my room, not hunt for a café that's open late.

There's another problem: price. T-Mobile and Wayport, for instance, each offer unlimited Wi-Fi data service at their hot spots for a steep \$30 per month if you sign up for a one-year contract, but you can't roam between the two systems. Use T-Mobile's service on a pay-as-you-go basis, and it will cost you 10 cents per minute-with a \$6 minimum. Wayport exacts \$7 for a partial day's worth of service at a single airport. Such charges can eat a big hole in your wallet, particularly if you end up with different wireless providers at airport, hotel, and café.

Doing data over cell-phone networks has its own set of frustrations: Even today's best Internet-savvy cellular connections deliver speed about as exciting as dial-up, and coverage areas are spottier than for voice. Cellular pricing policies are goofily inconsistent, too. Sprint charges \$10 extra for unlimited data with most voice plans, provided you limit yourself to using a data-enabled phone. Put a computer in the picture, and you need a \$180 PC Card-and a data plan that costs a minimum of \$40 per month for 20MB, which you could eat up in a few Windows Update downloads. T-Mobile lets you use your phone as a wireless modem for your notebook, but charges even more.

Higher data rates are possible from cellular networks-when they get upgraded. At a recent conference in New Orleans, I tried out a third-generation data network that Verizon had set up temporarily in portions of the city. Results varied, but more than once the proto-

> type PC Card sucked up a snappy 400 kilobits per second.

The bad news: Verizon Wireless has promised to roll out this service only in San Diego and Washington, D.C. this year, with no word about its cost.

Limited availability, mysterito those data-port thingies.

ous pricing: It's precisely the situation that keeps us plugging old-fashioned modem cords in-

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- . Featuring Intel* Centrino* mobile technology
- Intel® Pentium® M Processor at 1.30GHz
- Intel* PRO Wireless 2100 802 11b 11Mbps* Mini-PCI Wireless Card
- 14.1" XGA TFT Display
- 256MB DDR PC2100 SDRAM
- . 20GB Ultra ATA Hard Drive
- 32MB DDR ATI" MOBILITY" RADEON" 9000 AGP 4X Graphics
- . Modular 8x DVD-ROM Drive
- . Internal Modem and NIC Included
- . Windows* XP Home Edition, WordPerfect* Productivity Pack with Quicken® New User Edition
- . 1-Yr Mail-In Service

as low as \$38/mo., (46 pmts.*) E-VALUE Code: 16967-S80513

NEW Latitude™ D500 Notebook

Small Business Value Notebook

- . Featuring Intel® Centrino® mobile technology
- Intel* Pentium* M Processor at 1.30GHz
- Intel® PRO Wireless 2100 802 11b 11Mbps® Mini-PCI Wireless Card
- . 14.1' XGA TFT Display
- . 128MB Shared DDR PC2100 SDRAM
- . 20GB Ultra ATA Haro Drive
- . Integrated Intel® Extreme Graphics Up to 64MB Shared System Memory
- . Modular 24x CD-ROM Drive
- . Internal Modem and NIC Included
- . Windows' XP Home: 1-Yr Mail-In Service

as low as \$31/mo., (46 pmts.) E-VALUE Code: 16967-S70511

Recommended upgrades:

- . Windows XP Professional, add \$60
- 3-Yr Next Business Day On-Site Service, add \$298



Dell Servers and Workstations

PowerEdge™ 600SC Server

Entry-Level Value Server

- . Intel " Celeron" Processor at 1.80GHz
- . 128MB 266MHz ECC DDR SDRAM (Up to 4GB)
- . 40GB (7200 RPM) IDE Hard Drive (Up to 120GB HD Avail)
- . Upgradeable to 480GB of Internal Hard Drive Storage
- . Embedded Intel® PRO Gigabit® NIC
- Five PCI Expandability Slots (4-64/33MHz, 1-32/33MHz)
- . 1-Yr Z4x7 Dedicated Server Phone Tech Support
- . 1-Yr Next Business Day On-Site Service
- · Small Business Pricing

as low as \$12/mo , (46 pmts.*) E-VALUE Code: 16967-S20504

Recommended upgrades:

- . Custom-Install Site Survey, add \$199
- . PV100T-TR5 Internal Tape Back-Up, add \$199
- System Including Windows® 2000 Server, now \$1249

NEW PowerEdge™ 1600SC Server

Reliable, High-Performance Server

- . Intel® Xeon® Processor at 2GHz
- . Dual Intel® Xeon® Processor Capable (Up to 2.80GHz)
- . 128MB 256MHz ECC DDR SDRAM (Up to 4GB)
- . 36GB (10K RPM) SCSI Ultra320 Hard Drive (Up to 146GB HD Avail.)
- . Upgradeable to 876GB of Internal Hard Drive Storage
- . Embedded Intel® PRO Gigabit® NIC
- Six PCI Slots (2-64/100MHz, 2-64/66MHz, 2-32/33MHz)
- . 1-Yr 24x7 Dedicated Server Phone Tech Support
- 1-Yr Next Business Day On-Site Service

as low as \$22/mo. (46 pmts.) E-VALUE Code: 16967-S20507

Recommended upgrades:

. Small Business Pricing

- . Hot-Swap Hard Drive Capability, add \$100 PowerConnect 2124* 24+1GB Ethernet Switch, add \$299

Dell™ Precision™ 350 Workstation

NEW Affordable, Scalable Performance Workstation

- . Intel* Pentium* 4 Processor at 2 40GHz
- . 128MB Dual-Channel PC1066 RDRAM
- . 20GB (7200 RPM) EIDE Hard Drive
- . 32MB ATI" RADEON" VE VGA AGP 4X Graphics
- · 48x CD-ROM Drive; Integrated Sound
- Integrated Intel® PRO Gigabit® Network Connection
- . Windows XP Professional, Mini-Tower Chassis
- . Lifetime 24x7 Dell Precision Dedicated Tech Support
- . 3-Yr Next Business Day On-Site Service'

as low as \$20/mo , (46 pmts.") E-VALUE Code: 16967-S40507a

· Monitor Not Included

- Recommended upgrades: • 17" Dell UltraSharp" 1702FP Flat Panel Monitor, add \$549
- . 3-Yr Same-Day 4-Hour (5x10) On-Site Service, add \$199



Dell Home Desktops

Dimension™ 2350 Desktop

Affordable Technology Solution

- . Intel® Pentium® 4 Processor at 2GHz with 512K L2 Cache
- 128MB Shared DDR SDRAM at 266MHz
- . 30GB Ultra ATA/100 Hard Drive (7200 RPM)
- . 1/" (16.0" v.r.s., .27dp) E772 Monitor
- . Integrated Intel® 3D Extreme Graphics
- 48x/24x/48x CD-RW Drive with Roxio's Easy CD Creator
- Integrated Audio
- . Harman Kardon HK-206 Speakers
- . 56K DataFax Modem and Integrated 10/100 Ethernet
- . Windows XP Home Edition; WordFerfect Productivity Pack with Quicken* New User Edition
- . 6 Months of America Online* Membership Included
- . 1-Yr Limited Warranty, 1-Yr At-Home Service*

Ask us about no payments for 90 days for well-qualified customers E-VALUE Code: 16967-D50506m

Dimension™ 4550 Desktop

Superior Performance, Smart Value

- Intel* Pentium* 4 Processor at 2.53GHz with 533MHz Front Side Bus and 512K L2 Cache
- . 256MB DDR SDRAM at 333MHz
- . 30GB Ultra ATA/100 Hard Drive (7200 RPM)
- . 17" (16.0" v.i.s., 27dp) E772 Monitor
- . 32MB ATI* RAGE" Ultra Graphics Card
- . 48x/24x/48x CD-RW Drive with Roxio's Easy CD Creator"
- Sound Blaster Live! 5.1 Digital Sound Card
- · Harman Kardon HK-206 Speakers
- . 56K1 Modem and Integrated Intel* 10/100 Ethernet
- . Windows* XP Home Edition, WordPerfect* Productivity Pack with Quicken* New User Edition
- . 6 Months of America Online* Membership Included
- . 1-Yr Limited Warranty: 1-Yr At-Home Service

Ask us about no payments for 90 days for well-qualified customers E-VALUE Code: 16967-D50509m

Dimension™ 8300 Desktop

Cutting Edge Technology

- Intel® Pentium® 4 Processor at 2 66GHz with 533MHz Front Side Bus with 512K L2 Cache
- . 256MB DDR SDRAM at 333MHz
- . 60GB Ultra ATA/100 Hard Drive (7200 RPM)
- . 17" (16.0" v.i.s., 25dp) M782 Monitor
- . 64MB DDR NVIDIA* GeForce4 MX* Graphics Card with TV-Out, 16x DVD-ROM Drive
- 48x/24x/48x CD-RW Drive with Roxio's Easy CD Creator* (2 Bay)
- . Sound Blaster Live! 5.1 Digital Scund Card
- · Harman Kardon HK-395 Speakers with Subwoofer
- . 56K" Modem and Integrated Intel® 10/100 Ethernet
- . Windows* XP Home Edition; Word*Perfect* Productivity Pack with Quicken® New User Edition
- . 6 Months of America Online" Membership Included
- . 1-Yr Limited Warranty: 1-Yr At-Home Service*

Ask us about no payments for 90 days for well-qualified customers E-VALUE Code: 16967-D50513m



Dell Home Notebooks

NEW Inspiron™ 1100 Notebook

Notebook Essentials, Budget-Friendly

- . Intel* Celeron* Processor at 2GHz
- . 14.1" XGA TFT Display
- . 256MB Shared* DDR PC2100 SDRAM
- · 20GB Ultra ATA Hard Drive
- · 8x DVD-ROM Drive
- · Integrated Intel* Extreme Graphics
- Integrated Stereo Sound
- . 94WHr Li-Ion Battery (12-Cell)
- . Internal Modem and NIC Included
- . Microsoft" Windows" XP Home Edition
- · WordPerfect* Productivity Pack with Quicken* New User Edition
- . 6 Months of America Online! Membership Included
- . 1-Yr Limited Warranty, 1-Yr Mail-In Service

Ask us about no navments for 90 days for well-qualified customers E-VALUE Code: 16967-D80509m

NEW Inspiron™ 5100 Notebook

Perfect Balance of Performance and Price

- Intel® Pentium® 4 Processor at 2 40GHz
- . 15" XGA TFT Display
- 512MB DDR PC2100 SDRAM
- . 30GB Ultra ATA Hard Drive
- · 24x CD-RW/DVD Combo Drive with Roxio's Easy CD Creator*
- . 16MB DDR ATI* MOBILITY" RADEON" 7500 AGP 4x Graphics
- · Integrated Stereo Sound
- . 94WHr Li-Ion Battery (12-Cell)
- . Internal Modem and NIC Included
- Microsoft[®] Windows[®] XP Home Edition
- . WordPerfect* Productivity Pack with Quicken* New User Edition
- . 6 Months of America Online Membership Included
- . 1-Yr Limited Warranty. 1-Yr Mail-In Service

Ask us about no payments for 90 days for well-qualified customers E-VALUE Code: 16967-D80514m

NEW Inspiron™ 8500 Notebook

Ultimate Multimedia Performance

- . Mobile Intel® Pentium® 4 Processor-M at 2GHz
- . 15.4" Wide-Aspect UltraSharp" XGA TFT Display
- . 512MB DDR PC2100 SDRAM
- . 40GB Ultra ATA Hard Drive
- 24x CD-RW/DVD Combo Drive with Roxio's Easy CD Creator*
- . 32MB ATI: MOBILITY" RADEON" 9000 AGP 4X Graphics
- · Integrated Stereo Sound
- 72WHr Li-Ion Battery with ExpressCharge" Technology (9-Cell)
- . Internal Modern and NIC Included
- Windows* XP Home Edition
- . WordPerfect* Productivity Pack with Quicken* New User
- . 6 Months of America Online" Membership Included
- . 1-Yr Limited Warranty, 1-Yr Mail-In Service

Ask us about no payments for 90 days for well-qualified customers E-VALUE Code: 16967-D80519m



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Dell recommends Microsoft® Windows® XP Professional for Mobile Computing



The performancedriven desktop for the value-minded shopper.



Dell Home/Small Business

Dimension™ 4550 Desktop

Advanced Business Desktop

- . Intel* Pentium* 4 Processor at 2.53GHz
- 256MB DDR SDRAM
- . NEW 60GB (7200 RPM) Ultra ATA/100 Hard Drive
- . 64MB DDR NVIDIA* GeForce4 MX Graphics Card
- . NEW 4x DVD+RW Drive, Sound Blaster Live! 5.1
- Integrated Intel® PRO 10/100 Ethernet
- . Windows XP Home Edition; Works Suite 2003
- . 1-Yr Limited Warranty, 1-Yr On-Site Service!
- · Monitor Not Included

Ask about our financing plans for qualified customers E-VALUE Code: 16965-S50508y

Recommended upgrades:

- . Windows " XP Professional, add \$60
- · 3-Yr Limited Warranty; 3-Yr On-Site Service; add \$99
- . NEW 15" E151FPb Flat Panel Display, add \$330

The Dimension 4550 is the perfect blend of power and value. More than a great system at a great price, the Dimension 4550 can give you enhanced productivity thanks to the power of its Intel[®] Pentium[®] 4 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 Dell Dimension 4550 - considering everything you're getting, it's a wonder the price doesn't have more zeroes.

Dell Rated #1 in Intel-Based Desktop Satisfaction

21 Consecutive Quarters Technology Business Research Corporate IT Buying Behavior and Customer Satisfaction Study 3rd Quarter - November 2002



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