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PCWORLD

100
mag

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Our No-Hassle
Guide to Fast,
Affordable & Safe
Networking



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In-Your-Face
Web Ads From
Your Computer



Sony's Amazing
Micro-Camcorder:
Big-Time Digital
Video Gets Small

THE TROUBLE-FREE PC

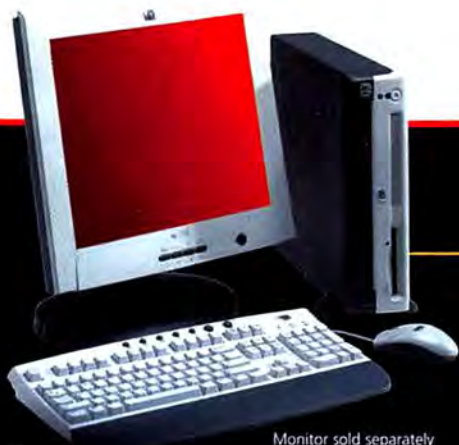
OPTIMIZE
WINDOWS

PROTECT
YOUR DATA

PREVENT
CRASHES

MAXIMIZE
PERFORMANCE

KEEP YOUR
SYSTEM
HUMMING



Monitor sold separately

hp vectra vl420



Small form factor

- ▶ 1.8GHz Intel® Pentium® 4 processor
- ▶ 40GB hard drive
- ▶ 10/100 Ethernet
- ▶ Memory: 256MB std, 1GB max.
- ▶ 24X Max CD-ROM drive
- ▶ Windows XP Pro

\$1158.82 CDW 351081

TOSHIBA

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- ▶ 30GB hard drive
- ▶ 10/100 Ethernet
- ▶ Memory: 256MB std.
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- ▶ Windows XP Professional

\$1949.95 CDW 366691



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Black

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128MB memory module

For hp vectra series computers

- ▶ Memory Type: SDRAM (Synchronous DRAM)
- ▶ Speed: 133MHz
- ▶ Guaranteed 100% compatible
- ▶ Supported by unlimited, toll-free technical support

SimpleTech

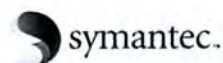
\$69.37 CDW 237083

pcAnywhere V10.5

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- ▶ Select and transfer files fast and easy
- ▶ Encryption and authentication ensures secure access to remote computers
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*Cable and/or DSL can be substituted with ISDN in countries where applicable



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CDW 313291

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SimpleTech

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CDW 207747

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APC
AMERICAN POWER CONVERSION

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CDW 349447

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With Audio PS/2 and USB connections

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- ▶ Flash upgrade firmware support

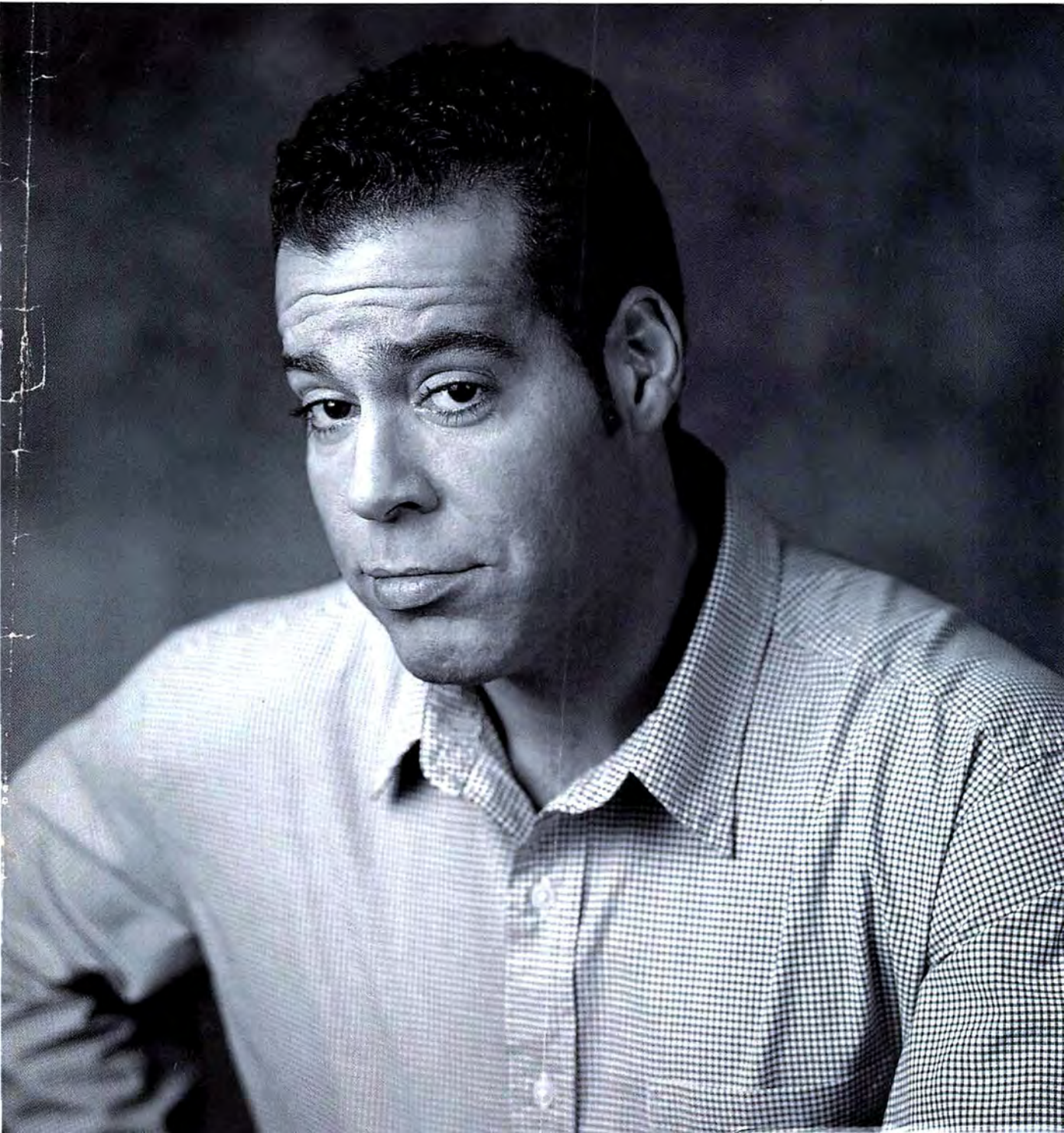
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CDW 317068

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the firewall is secure."**

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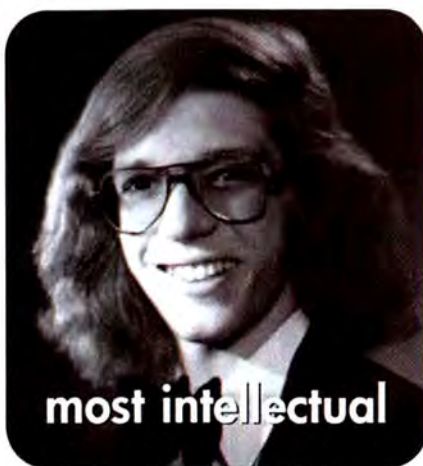
\$36⁸⁹

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most intellectual



cutest smile



best hair



sharpest image

hp digital projector xb31



gets around

hp digital projector sb21

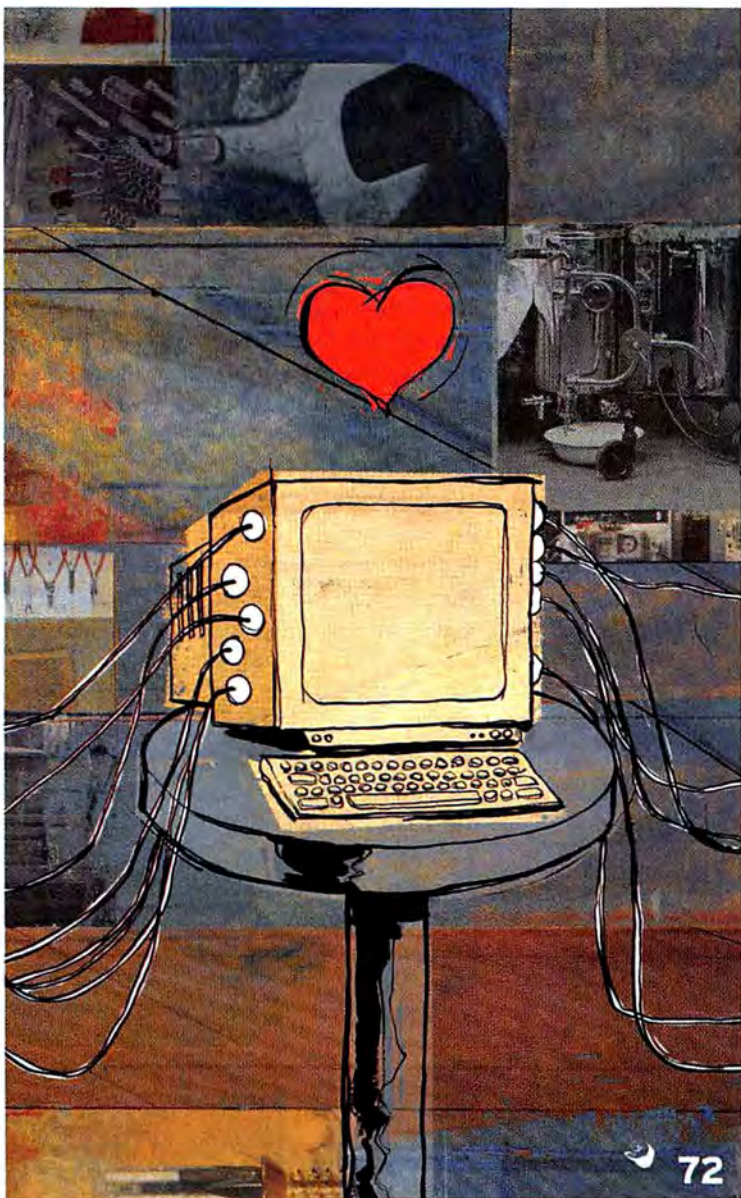
Introducing the digital projectors most likely to succeed.

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Let the popularity contest begin.





COVER STORY

72 Tools for Trouble-Free Computing

A good set of utilities allows you to maintain your computer so it doesn't clog up or break down. We've gathered some of the best programs around for backing up files, repairing the Windows Registry, cleaning up your hard drive, and more, to help you stop trouble in its tracks.

Cover Photography by
Marc Simon

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PC WORLD

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FEATURES

NETWORKING

86 The No-Hassle Networking Guide

New technologies and simplified setup procedures make it easy to network without drilling a single hole. Here's what's available and how to choose the right network for your needs. Plus: Your questions about network setup, security, and safety answered.



NOTEBOOKS

103 Heavy-Hitting Featherweights

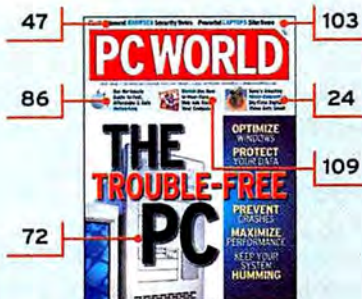
Ultraportable notebooks are sleeker, lighter, more powerful, and more feature-packed than ever. Nevertheless, maximum mobility still demands compromises. We look at five wireless-ready models, and pick a Best Buy.

INTERNET

109 It's an Ad, Ad, Ad, Ad World

If you're bothered by banners and perturbed by pop-ups, ad-blocking software promises to weed out the commercial messages crowding your browser. What does the future hold for disgruntled Internet users, online advertisers, and Web sites that depend on ads?

ON THE COVER



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FEATURES

Future Gear

High-speed wireless networking is key to future handheld devices.
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COMING UP IN JUNE

Troubleshooting Tips: Steve Bass and Kirk Steers tackle annoying and just plain weird PC mysteries.
PC Buying Tips: Get the best-performing gear at the best price.
Thwart Threats: Today's Net dangers are sophisticated and varied. Find out how to defend yourself.

Info Insurance: Discover what data to back up, how to do it, and how to recover from a disaster.
Picture Perfect: Tweak your printer to produce great digital photos.
Help With Help: Solve your PC problems easily and at no cost, using built-in and online sources.

NEWS & TRENDS

- 14 Mighty Mini Media**
Small storage devices' capacities continue to grow rapidly. And they're likely to remain available in an array of (largely incompatible) formats in the future.
- 18 NVidia GeForce4: Power to Spare**
The new chip promises improved game play and image quality. We put two GeForce4-based VisionTek cards through their paces to see for ourselves.
- 20 Connect Fast With 3G Nets**
The latest wireless networks allow Internet access at dial-up speeds from almost anywhere you can use a cell phone—but the price may dissuade you.
- 22 Can the Feds Can Spam?**
The Federal Trade Commission has begun targeting marketers who send deceptive bulk e-mail.
- 24 Hand-Size Handycam**
The incredibly compact DCR-IP7BT digital camcorder uses Sony's new MicroMV-format tapes.

NEW PRODUCTS

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Apple iMac
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NewTek Video Toaster 2
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Sampo America DVE-631CF
See page 53 for a complete list of new products reviewed.

HERE'S HOW

- 140 Windows Tips**
Recapture screen space lost to toolbars, icons, and other on-screen elements; download a free, useful Windows utility.
- 143 Internet Tips**
Make sure you have options if your Internet service provider shuts down; disable IE's Content Advisor.
- 144 Step-By-Step**
Back up, maintain, and tweak Windows' Registry.
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Protect your files on a shared PC; the lowdown on replacement toner cartridges for laser printers.
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Locate your Windows installation files; use a CD-RW disc to move files between a PC and a Mac.



MORE VIDEO TIPS FROM SCOTT & ERIC™

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Scene 2.



Scene 3.



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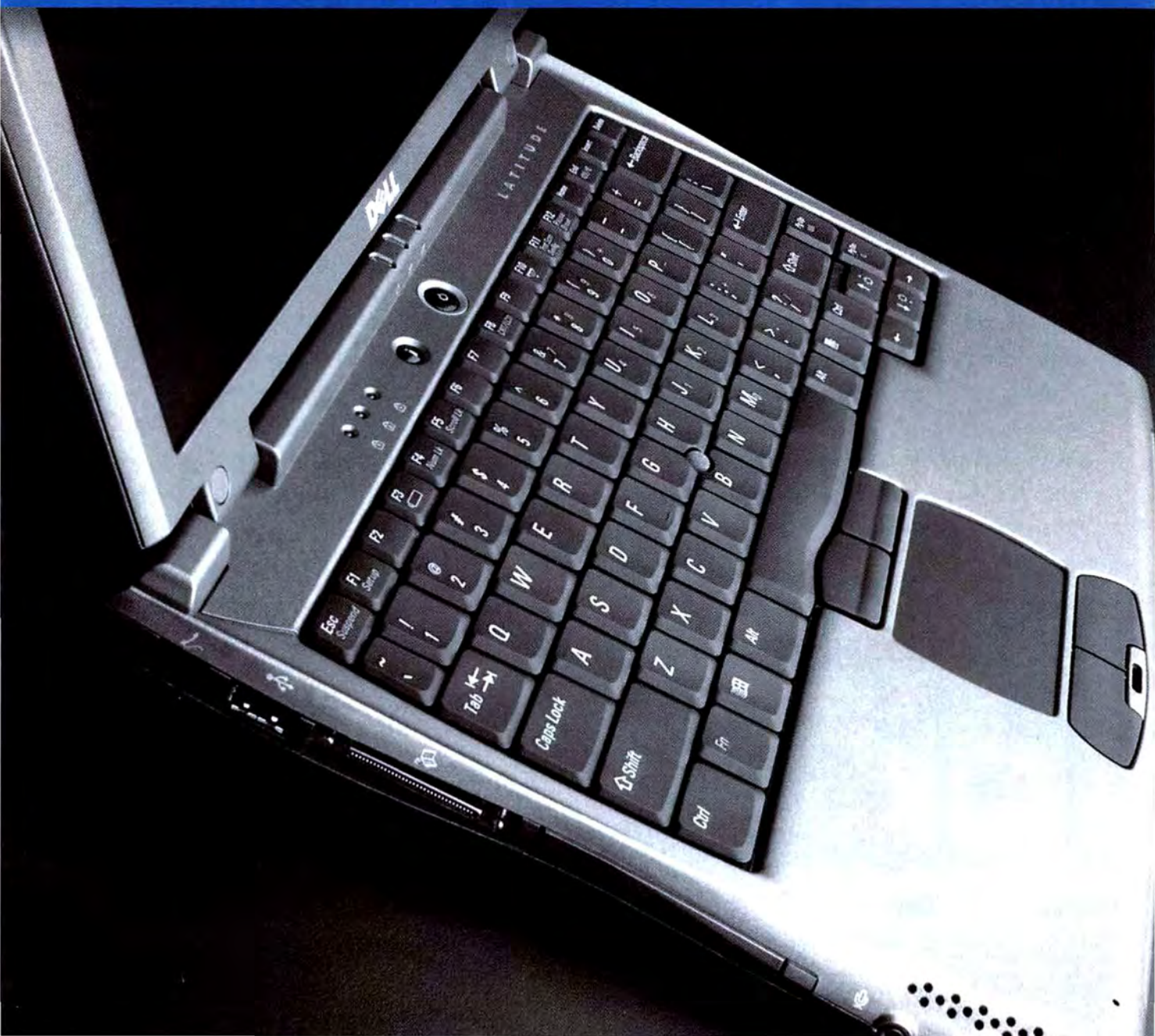
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PC Magazine Editors' Choice

Latitude C400 Notebook

– November 2001

Dell | Small Business

Latitude™ C510 Notebook

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- Intel® Celeron® Processor at 1.06GHz
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- Internal Wireless-Ready Antenna
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Recommended upgrades:

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Latitude™ C610 Notebook

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- 16MB DDR AGP 4x ATI® Radeon™ Video
- Windows® XP Professional
- Modular 24x Max CD-ROM/Floppy Drive
- Internal 56K Capable* Modem and 10/100 NIC
- Internal Wireless-Ready Antenna
- 3-Yr Mail-In Service

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- 3-Yr Mail-In Service

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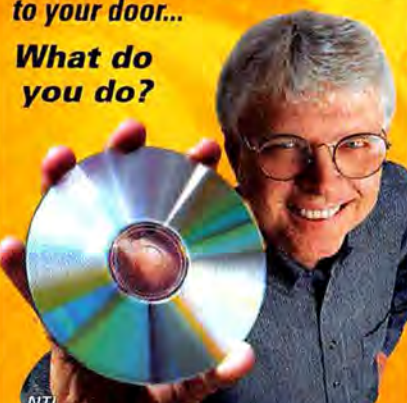
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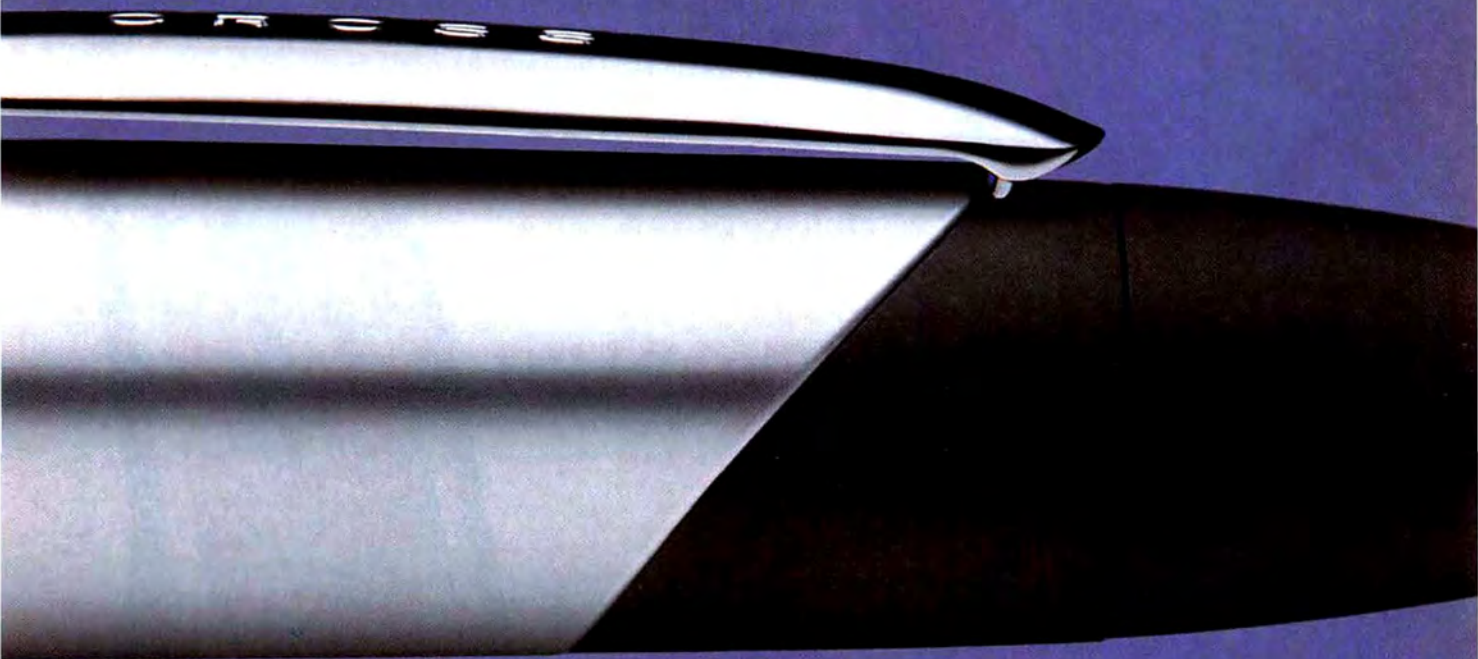
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UP FRONT

HARRY MCCrackEN

Ads, Ad Blockers, Us, and You

WEB ADS THAT POP UP OVER—or under—your browser. Ads that startle you with flashy animations and sound effects. Ads that commandeer the screen for a few seconds, then vanish before your eyes. No doubt about it: Internet advertising is more in-your-face than ever.

You already know that, but Gregg Keizer's "It's an Ad, Ad, Ad, Ad World" on page 109 provides the inside story on how we got here, where we're going, and how PC users are responding. And a disclaimer is in order. If you have dropped by our site lately—and we hope you have—you've seen the trend in action.

Why the explosion of tough-to-ignore commercial messages on the Web? Like countless other online destinations, PCWorld.com aims to provide plenty of useful, free features. And that means selling ads—enough to pay a talented staff, to lease Web server space and bandwidth, to launch valuable new content and tools, and to make a buck or two in the process.

As the steep mortality rate among dot coms shows, executing this strategy is no cakewalk. The Web is still an immature, volatile medium. That's one big reason why online ads continue to morph—and why sites such as ours now run pushier ones. Today's ads are works in progress, whether you find them edifying or irksome, amusing or just plain intrusive.

TO BLOCK OR NOT?

ALL OF WHICH raises some interesting questions. Is PC World shooting itself in the proverbial foot by rating ad-blocker software, as Keizer's article does? Forrester Research reports that a paltry 1 percent of Web users run blockers, but those who do can zap our site's ads. And given



The new Web ads are tough to ignore. Should you try?

that ads pay for so many of the Web's freebies, is it self-defeating for a visitor to block them out? (A Web in which every user erased every ad would be a Web that no rational advertiser would subsidize.)

There are no easy answers here. But one thing's for sure: Nobody can force you to pay attention to an online ad, any more than a TV station can stop you from

rifling the fridge during a commercial break. But it's also true that folks willingly take heed of plenty of commercial messages. In fact, surveys by PC World and other publications show that the information in advertisements is one reason readers find magazines valuable. We

will know the Web has grown up a bit when people feel the same way about online advertising.

Of course, more and more sites hope that user fees will help foot the bills. But this remains an iffy business proposition, and it's clear that fees won't transform the Web into a no-ads zone. Consider the *Wall Street Journal's* site. One of the few successful fee-based online incarnations of a major dead-tree publication, it carries ads and a user charge, just like the newspaper—and come to think of it, just like this magazine.

More intriguing questions: Are there Web features we don't currently offer that you'd pay for? What if PCWorld.com mixed free areas and fee-based sections? Is there a formula for ads that you would find truly useful? Would we be crazy to charge for online content—or nuts not to consider that route?

Drop us a line at eddir@pcworld.com and let us know what you think. The shape of tomorrow's Web is anyone's guess—but you can definitely help mold the online future of PC World. ■

Harry McCracken is an executive editor for PC World.

Tell Us What You Think: Visit www.pcworld.com/pcwinput and rate this issue—you could win \$500. You'll need your subscriber number from the mailing label to take this survey online. The Web site explains the official rules and also how to participate in the drawing if you're not a subscriber. You can enter from April 1 through April 30, 2002.

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MIGHTY MINI MEDIA

THE CAPACITIES OF FLASH MEMORY AND SMALL STORAGE FORMATS ARE SKYROCKETING—AND YOU MAY HAVE TO LIVE WITH MORE THAN ONE TYPE. **BY SCOTT SPANBAUER**

FLASH MEMORY CARDS are tiny, powerful, and even sort of sexy looking. And if you're considering buying one of the newest wave of cool electronic toys—a digital camera, personal digital assistant, or digital audio player—you won't be able to live without them.

There's plenty of good news for buyers: Larger capacities in everything from CompactFlash to Secure Digital media should decrease the number of cards you have to carry by letting you load up far more music, photos, and other files per card. What's more, even the smallest of cards are getting smarter—the postage stamp-size Secure Digital cards have recently added I/O functionality (see "The Tiniest Peripherals: SDIO" on page

15), opening the door to new types of add-in cards for compact audio players and cellular telephones, as well as to multiple slots on larger handheld devices such as Palm and PocketPC PDAs.

In a perfect world, you'd be able to use a single type of flash memory card in all of your devices. But there are five major formats, and you can't take one type of card and stick it into a slot designed for another, with one exception: You can use MultiMediaCards in Secure Digital slots, but not vice versa. (For a rundown on the different formats, see "Sizing Up Flash Memory" on page 17.)



FROM DIMINUTIVE
Secure Digital to CompactFlash
media, capacities are soaring.

So unless you want to juggle a bunch of memory cards in competing formats, it will be worth your while to do a bit of homework. Before buying that new digital camera or handheld to add to your gadget

hoard, find out which memory card it uses, and whether you can use that same type of card in the devices you already own. The price of the memory cards, of course, should factor into your decision as well.

THE TINIEST PERIPHERALS: SDIO

SECURE DIGITAL CARDS are more than the up-and-coming small-format storage media: Like CompactFlash cards, SD cards can serve as the basis for a new generation of thimble-size peripherals—cameras, GPS receivers, and wireless network adapters—that will slide into the SD slot on a PDA or smart phone.

Late last year, the Secure Digital Association ratified its I/O specification—the standard for peripherals based on the postage stamp-size cards. In early March, Palm's European division began shipping the first SDIO device, a \$129 Bluetooth card made by Toshiba; Palm plans to market it in the United States eventually. We tested a pre-production version of the card, successfully using it to transmit a business card from a Palm 1705 to a Bluetooth-equipped notebook.

Since all current Palms and many newer Pocket PCs have SD slots, the market potential for SDIO devices seems huge. Not surprisingly, prototypes of SD cameras, GPS receivers, and other miniature devices have been making waves at trade shows for the past year or so.

But you'll have to wait a bit longer for additional commercial products. For starters, SD Association technical committees are still working on specifications for particular devices.

Association president Ray Creech expects that the draft camera spec will be available by the time you read this, with draft specs for GPS modules and 802.11b wireless adapters to follow later in the year.

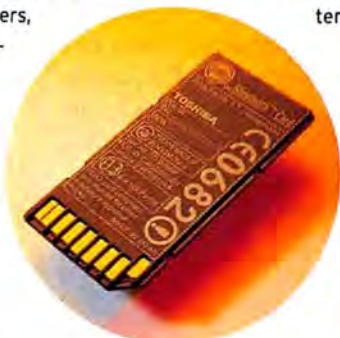
Another issue for devices with SD slots is support.

The SD slot controllers need to be upgradable or already capable of handling the new I/O duties—that will vary by vendor. Moreover, no OS currently has native support for the SDIO standard (Palm owners can use the SDIO Bluetooth card on some models, but that is not

the same as native SDIO support). Therefore, users must rely on peripherals vendors to develop it for each host device—and that's unlikely to occur until the standard is better established.

When will OS support appear? Palm aficionados can expect to see SDIO support in devices based on Palm OS 5 by fall. Pocket PC support could take longer: Since Pocket PC 2002 just debuted late last year, no one expects Microsoft to act swiftly. In the meantime, at least one company, BSquare, is offering a program for Pocket PC vendors who want to support SD and SDIO cards in handhelds planned for release by the 2002 holiday season.

—Yardena Arar



THE FIRST Bluetooth SD card, made specially for some Palm models.

MORE MEMORY

A PART OF FLASH memory's strength is its increasing capacity, coupled with its ever-decreasing size and cost. Just one year ago, CompactFlash cards topped out at 512MB or so. Today, these commonly used cards can hold about a gigabyte of data—that's hundreds or even thousands of digital photos, depending on their resolution and compression, or dozens of CDs' worth of compressed audio.

Though other formats are more limited by their physical

dimensions—at least until higher-capacity flash memory chips appear—they're getting roomier, too. For example, according to a source at flash-memory maker SanDisk, even the petite Secure Digital cards should have reached 256MB by the time you read this. A source at the SD Association says 512MB cards should follow shortly, and SanDisk says versions as large as 4GB may be ready within a year or two.

Of course, you always pay a premium for cutting-edge technology. With flash memo-

ry, that means that either very compact size or high capacity costs extra. Secure Digital and the related MultiMediaCard formats, for instance, command a higher price per megabyte (between 70 and 90 cents) than other flash memory formats do. But according to Andrew Johnson, the Gartner Group's principal analyst for digital imaging, that's all right with buyers, who value the cards' small physical size.

In contrast, the midrange-capacity CompactFlash ▶

IN BRIEF

Product Pipeline

SHARPER PIX: Want to take digital pictures with color, clarity, and detail rivaling photographs from a standard 35mm film camera? Foveon is introducing what it calls an innovative image sensor for digital cameras, in which each pixel can sense all three primary colors (red, blue, and green) at once, instead of being restricted to one color per pixel. Today's typical digital camera has a sensor containing a checkerboard of blue-, red-, and green-sensing pixels. If Foveon's technology works, a digital camera using it will be able to produce images with greater detail, leading to truer colors for your photos—an especially difficult task for today's cameras. The first camera to debut with Foveon's X3 image sensor, Sigma's SD9, should be available for sale in the U.S. in late spring or early summer.



RING OUT: Got Handspring's new Treo Communicator, the phone/PDA combo? Electric Pocket is happy to offer you its free Ringo application for use with the Treo; with it you can compose and share custom ring tones or download phone tones from the Net. You need to register to use it. Visit find.pcworld.com/24341 to check Ringo out.

OUTSIDE THE BOX

FLASH MEMORY is indispensable for shuttling files between your PC and your camera, audio player, or PDA. But even if you eschew gadgets, you may still find a use for an external storage device—especially if you need to work on the same data in multiple locations or need to keep it under lock and key when you're finished.

Overshadowing removable devices are the unprecedented price and performance of rewritable CD drives. For pennies per megabyte, CD-RW gives you virtually unlimited file storage suitable for many kinds of data, including photographs and music. But CD-RW is too slow and too small (at a maximum of 700MB) for other tasks, such as digital video editing.

A portable hard drive offers the highest performance and capacity, because it's built around a standard desktop or laptop drive. The fastest

portable hard drives attach to your computer using IEEE 1394 (FireWire) or USB 2.0 connections. SmartDisk's new 40GB FireLite FireWire drive sold for \$352 (according to PriceGrabber.com) as we went to press, while Maxtor's 120GB Personal Storage 3000LE USB 2.0 drive went for just \$277, about 0.2 cents per megabyte. Now that's cheap removable storage.



PORTABLE PICKS: High-capacity external drives like SmartDisk's 40GB unit (left), and compact (but pricier) USB thumb drives, which store up to 512MB.

If you use a laptop and need a removable drive—but don't need the speed, capacity, and bulk of a USB 2.0 or FireWire model—PC Card drives may be your best bet. Kingston and Toshiba make hard drives that fit into a standard Type II PC Card slot. We found Toshiba's 5GB PC Card drive selling for as little as \$353 as we went to press. At 7 cents per megabyte, the price per megabyte is higher than that of external drives, but it beats flash memory devices hands down. Toshiba is working on higher-density 1.8-inch

drives that could one day possibly boost its PC Card drives' capacity to 20GB.

For even more portable storage, there's always Trekstor's Thumbdrive, which is already available in sizes up to 512MB. At press time the Thumbdrive sold for well over a dollar per megabyte, as did M-Systems' similar DiskOnKey and Sony's stylish Micro Vault. —S.S.

and SmartMedia cards and Memory Sticks are a relative bargain at about 50 cents per megabyte. These prices compare favorably to prices for the highest capacity CF cards as well: At press time, 1GB CF cards still commanded more than \$800 through online vendors, about twice the cost per megabyte of a 64MB CF card.

Gartner's Johnson says that camera users might be better off buying multiple 256MB

cards instead. "You don't want to leave an \$800 card with [a store] just to get your pictures developed," he warns.

Another option for CompactFlash users with demanding storage needs is IBM's 1GB Microdrive CompactFlash card, which sells for less than \$300—but they must be sure their devices support the card's thicker, Type II format. Compaq's iPaq CF adapter accepts Type II cards, for ex-

ample, but none of HP's Jornada Pocket PCs do.

Flash memory products also appear in other formats that continue to fill a useful storage niche, according to Alan Niebel, principal analyst at Web-Foot Research. So-called thumb drives—flash-memory devices that plug into your computer's USB port—serve as higher-capacity replacements for floppy disks. Other higher-capacity external stor-

age devices, which include FireWire-connected and PC Card-based hard disks, meet special-purpose needs in the areas not served by CD-R, CD-RW, and Iomega Zip drives (see "Outside the Box," left).

Another format may also find a place in the market: the quarter-size DataPlay digital media, which offers 250MB of storage per side at a fraction of the cost of most flash media. Though the format promises a good blend of value and compact size—and has been hyped for nearly two years—it has yet to appear in a camera, audio player, or PDA from a major manufacturer. The first DataPlay-based device, a digital audio player co-branded by Evolution Technology and MTV, is supposed to be available for sale in May, however.

PICK A CARD

LIKE THE different kinds of batteries we've learned to live with, five different flash formats may not pose much of a problem for gadget owners. But analysts agree that at least three—CompactFlash, Secure Digital, and Memory Stick—will be around the longest.

Despite its being used predominantly in Sony products, "consumers should be confident that Memory Stick is a good choice," says Johnson. Specifically, he notes its low cost and the many devices that support it—including many of Sony's most popular digital cameras. How well Memory Stick does in the long run may hinge on how well Sony's Clie handhelds sell compared with Palm PDAs, and whether you snap your digital pictures with a Cyber-shot or a Kodak.

CompactFlash has several advantages. It offers the high-

What to look for
in a printer.



Technology that makes sense.

Look closely at a paperclip and you'll see a model of simplicity, efficiency and common sense. Look closely at our new line of printers and you'll see imaging advancements based on the very same principles.

Equipped with innovations such as individual ink tank systems and direct connect, computerless photo printing, the 2002 Canon printers offer something better than mere technology. They offer technology that makes sense.



Individual Ink Tanks

Our new line of printers for 2002 feature the Canon individual ink tank system.

Since inks are separated, they can be changed individually, as opposed to replacing the entire cartridge when only one color runs out. The result is substantially reduced ink waste.



Direct Connect Printing

Introducing the S820D Photo Printer with Canon's exclusive Bubble Jet Direct technology. Bypassing the PC, our direct interface cable plugs right into the Canon PowerShot[®] S30, S40, S330 and S200 digital cameras for instant printing.

There's even a built-in PCMCIA Type II memory card slot for most memory cards, making the S820D Photo Printer a perfect companion to virtually any digital camera. Of course, it also works beautifully when connected to a PC.*





Precision Color Distribution

In search of the best possible color consistency, we realigned the printhead nozzles into a more efficient, symmetrical shape.

Available on our S520 and S750 printers, Precision Color Distribution delivers high-speed printing, accurate color and virtually eliminates the problem of banding.



Large Format Printing

With large format capability, our new S9000 Photo Printer is designed to meet just about any printing need.

It can deliver high-resolution photographic images ranging from standard 4" x 6" prints all the way up to a very impressive 13" x 19" size. All in beautiful color.



MicroFine Droplet Technology™

Our cornerstone technology, this highly-advanced feature creates tiny ink droplets as small as .4 picoliters in size, and positions them on the paper with remarkable precision.

The advantages of this combination are evident. Crisp text, brilliant color and outstanding photo quality.



3,072 Nozzles

The printheads on the Canon S900 and S9000 Photo Printers are fitted with 3,072 tiny ink nozzles.

Providing close attention to detail and astounding quality, our high nozzle count also delivers much faster speeds.



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Canon KNOW HOW™

The 2002 Canon family of Bubble Jet printers.



The Canon S520 Color Bubble Jet Printer. \$149

This printer kicks off our 2002 line with up to 2400 x 1200 dpi in color and print speeds up to 14 ppm black/10 ppm color.



The Canon S750 Color Bubble Jet Printer. \$199*

With up to 2,400 x 1,200 dpi in color and speeds up to 20 ppm black/13 ppm color, the S750 printer is the perfect combination of price, speed and quality.



The Canon S820 Photo Printer. \$299*

Up to 2400 x 1200 dpi, 4 picoliter precision and 8" x 10" color prints in approximately two minutes make this a great choice for affordable photo printing.



The Canon S900 Photo Printer. \$399*

Utilizing 3,072 print nozzles and 4 picoliter precision to create beautiful 8" x 10" photos in approximately one minute, the S900 is simply stunning.



The Canon S820D Photo Printer. \$399***

With all the advantages of our S820 Photo Printer and direct connect, computerless printing as well, the S820D is the perfect digital photography companion.

(camera not included)



The Canon S9000 Photo Printer. \$499*

For those who want it all, the \$9000 Photo Printer offers a 3,072 nozzle printhead, up to 2400 x 1200 dpi, 6-color, large format printing and 8" x 10" photos in about a minute.

Canon KNOW HOW™

TECHNOLOGY THAT MAKES SENSE.

est capacities, it's the most widely compatible card, and at least for now, it appears in the most devices. CF also offers higher read/write speeds than some of its competitors. On the other hand, CF's larger size makes it inappropriate for the smallest products.

The big up-and-comer in small storage is Secure Digital. With the format's emerging I/O spec, SD cards could eventually do almost anything that CompactFlash cards can do now (you can already buy modems, wired and wireless networking cards, and serial ports and other interfaces for CF slots)—and SD cards are significantly smaller.

The Secure Digital card's namesake security readiness is now a moot point, however. Though SD was intended to protect the music industry by incorporating the Secure Digital Music Initiative's digital rights management and copy-protection scheme, the specification was publicly cracked shortly after its publication, and the SDMI consortium has ceased to be active.

MultiMediaCards, though

slightly thinner than Secure Digital cards, will gradually fade away—in fact, the MultiMediaCard format may be the first to go. Most manufacturers are building SD slots into their devices instead of slots for MMCs, because the SD format offers faster read/write performance. Owners of MMCs needn't worry, however: You can plug them into SD slots as well.

Gartner's Johnson believes that SmartMedia will eventually disappear too, because its slim design limits memory capacity; it's also the only flash format with no current or planned I/O capabilities. That shouldn't steer buyers away from SmartMedia-equipped devices, though. Each of the formats "will be around as long as the camera [or other device that utilizes it] is useful," says Johnson.

MEMORY MIX

INTEROPERABILITY and other features are certainly important when you're considering devices that use small flash memory cards, but in today's market you'll probably

have several devices that use competing cards, at least for the near future.

That isn't a disaster. Thanks to broad hardware manufacturer support for all five leading memory card formats, moving your photos, files, and songs between your gadgets and your PC usually is not a big deal. Several card readers priced between \$50 and \$75 support multiple flash formats; among them is LaCie's new USB Hexa Media reader/writer, which handles all five types plus the Microdrive. And a USB or PC Card reader for an individual memory format costs just \$20 or less. Toshiba now builds both SmartMedia and SD slots into its laptops, and HP's Photosmart 100 printer accepts a trio of cards: CompactFlash, SmartMedia, and Memory Stick.

Because the various flash media formats are best suited to different devices, you may end up with multiple card types. Not to worry: Just buy the card that gives you the best cost per megabyte if you can, and use cheap card readers to funnel data to your PC. ▶

IN BRIEF

Did You Know?

ACCORDING TO a recent survey, in 2001 some 16 percent of U.S. adults online report having been victimized by credit card fraud.

16% And 8 percent

of those surveyed experienced identity theft, such as stolen driver's licenses or Social Security numbers.

SOURCE: CRYSTAL BALL

Tidbytes

COOL IT: Does your Toshiba Satellite 5005-series laptop shut off unexpectedly? The company says a BIOS glitch causes a redundant cooling system to turn off some S504 and S507 notebooks' desktop CPUs before the fan kicks in. Toshiba has fixes for each (see find.pcworld.com/24562).



FEATURES COMPARISON

SIZING UP FLASH MEMORY

CARD TYPE	Pros	Cons	Dimensions (width by length by height, inches)	Available capacities (as of 3/1/02)	Price per MB ¹	Available devices other than flash memory
CompactFlash www.compactflash.org	Widely compatible; many device types	Too large for smallest devices	1.7 by 1.4 by .13 (Type I), 1.7 by 1.4 by .19 (Type II)	8MB-1GB	\$0.43	Hard disk; modem; network interface (wired and wireless); Bluetooth; serial
Memory Stick www.memorystick.org	Small size suited to most devices	Supported by few non-Sony products; few I/O devices	.85 by 1.97 by .11	4MB-128MB	\$0.53	Still camera (Clie handheld only)
MultiMediaCard www.mmca.org	Smallest format; works in SD slots	Slow read/write speed; no I/O spec	.9 by 1.3 by .06	4MB-128MB	\$0.73	ROM game and e-book content for Palm PDAs
Secure Digital www.sdcard.org	Small format; I/O devices emerging	Highest cost per MB; I/O devices still emerging	.9 by 1.3 by .08	4MB-256MB ²	\$0.84	Bluetooth ³
SmartMedia find.pcworld.com/24541	Inexpensive	Largest format; no on-board controller; no I/O spec	1.5 by 1.8 by .03	16MB-128MB	\$0.45	None

¹ Average of four least-expensive 64MB cards listed on PriceGrabber.com (an affiliate of PC World) on March 1, 2002.

² Soon 512MB cards will be available.

³ Currently in Europe only.

GRAPHICS

NVIDIA GEFORCE4: POWER TO SPARE

THE NEW CHIP'S IMPROVED TECHNOLOGY YIELDS FASTER GAME PLAY AT HIGH RES.

NVIDIA'S LAUNCH of its GeForce4 Titanium chip again raises the bar for PC graphics, giving demanding gamers far better visuals and faster frame rates than before, even at the highest resolutions. Also debuting is NVidia's more modest GeForce4 MX chip, offering better graphics to casual gamers and business users.

There will be three Titanium models, selling for \$200 to \$400. The new MX cards will come in three variants too, with prices from \$99 to \$230.

FRAME UP

FOR OUR TESTS, we looked at two shipping graphics boards from VisionTek: the high-end \$400 Xtasy GeForce4 Ti 4600, with a 300-MHz clock speed and 128MB of superfast 650-MHz DDR SDRAM, and the \$179 Xtasy GeForce4 MX 440, with a 270-MHz clock speed and 64MB of 400-MHz DDR SDRAM. For a baseline com-

parison, we tested an Xtasy 6964, which has the GeForce3 Ti 500 chip and 64MB of 500-MHz DDR SDRAM.

Our tests of four games at



two resolutions yielded mixed results, though all three cards generally produced very good images. The biggest differences in the new cards' scores appeared at 1600 by 1200 resolution and 32-bit color. There, the Ti 4600 (with NVidia's Quincunx antialiasing technology off) dominated, with the highest marks in all but the Unreal Tournament test, where the MX 440 card beat it.

Bargain hunters will be glad to know that the older Xtasy

6964 did well against the new cards at both 1600 by 1200 and 1024 by 768, topping or tying the others in four of the eight tests. Note that even the lower marks in our high-res tests mostly hovered near 60 frames per second—considered flicker-free, since human eyes can't detect problems at this rate.

NVidia says it has improved Quincunx, making it faster and able to yield smoother images. We were surprised, however, to see some games showing more detail and better contrast with it off. In our tests, it still slowed performance at top resolutions, too.

The Ti chips do boost game play, thanks in part to a revamped graphics engine, the Nfinite FX II, with advanced pixel shaders and dual-vertex shaders. It's faster and helps provide greater scene detail, with more-realistic lighting and surfaces. The Ti also supports the new DirectX 8.1 API (MX models have partial support for DX8). Another plus: New NView technology in Ti

and MX chips lets you hook up two analog or digital displays in any combination.

INSIDE GAMING

NVIDIA EXPECTS games that exploit such GeForce4 features as DX8.1 support to be available shortly (including Star Wars Online and Comanche 4). But past experience tells us most of these games are unlikely to appear before year's end, so some users may be best served by waiting a bit for prices on the top GeForce4 Ti cards to drop. But if you need more speed at the highest resolutions now, a Ti card may be for you. Meanwhile, GeForce4 MX boards offer a good value for casual users.

—Alexandra Krasne ▶

Xtasy GeForce4 Ti 4600

VisionTek

★★★★☆

Street: \$400

find.pcworld.com/24201

Xtasy GeForce4 MX 440

VisionTek

★★★★☆

Street: \$179

find.pcworld.com/24221

TEST REPORT

NVIDIA GEFORCE4 FLEXES HIGH-RES MUSCLES

GRAPHICS BOARD	Unreal Tournament		Quake III		MDK2		Test Drive 6	
	1600 by 1200 resolution (fps)	1024 by 768 resolution (fps)	1600 by 1200 resolution (fps)	1024 by 768 resolution (fps)	1600 by 1200 resolution (fps)	1024 by 768 resolution (fps)	1600 by 1200 resolution (fps)	1024 by 768 resolution (fps)
VisionTek Xtasy GeForce4 Ti 4600 (128MB of RAM)	51	54	69	71	112	112	112	123
VisionTek Xtasy GeForce4 MX 440 (64MB of RAM)	58	64	57	73	63	114	59	112
VisionTek Xtasy 6964 (GeForce3, 64MB of RAM)	61	64	67	71	102	115	88	128



HOW WE TEST: Our performance tests measure the frame rates of the following games: GT Interactive's Unreal Tournament; Id Software's Quake III Arena; Interplay's MDK2 Demo; and Infogrames's Test Drive 6. The test system is a Dell Dimension 4100 Series with a 933-MHz PIII CPU and 128MB of PC133 SDRAM, running Windows Me. New cards were tested with NVidia's DetonatorXP driver version 4.13. All tests shown here were performed at 32-bit color depth. For all scores, higher is better. All rights reserved. fps = Frames per second.

SAMSUNG

ELECTRONICS

Space Saver



Go ahead, size it up.

The new Samsung 171B TFT-LCD is sure to exceed your expectations on every measure. Its Xtrawide™ viewing angle, exceptional brightness, high contrast and slim design make it a space saver and an eye saver.

Best of all, the 171B is just one of over 40 monitors from the world's #1 manufacturer. Whether you are looking for a large screen TFT-LCD, high-resolution Aperture Grill or image-accurate DynaFlat™ monitor, Samsung has a model to fit your needs and desktop perfectly.

Visit our web site: samsungusa.com/monitor
or call 1 800 SAMSUNG.



	171B	151B	171S	151S
SIZE	17"	15"	17"	15"
RESOLUTION	1280x1024	1024x768	1280x1024	1024x768
BRIGHTNESS	250cd/m ²	230cd/m ²	220cd/m ²	230cd/m ²
CONTRAST	400:1	300:1	350:1	300:1
VIEWING ANGLE (H/V)	170°/170°	140°/120°	160°/120°	140°/120°
PITCH	0.264mm	0.297mm	0.264mm	0.297mm
WARRANTY*	3 yr Limited	3 yr Limited	3 yr Limited	3 yr Limited

* includes backlight

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WIRELESS

CONNECT FAST WITH 3G NETS

NEW CELLULAR NETWORKS MAKE MOBILE INTERNET ACCESS AS FAST AS DIAL-UP.

IMAGINE BEING able to get on the Internet with a notebook or PDA anywhere you can use your cell phone—at land-line speeds or faster. That's the siren song of next-generation wireless networks. After many years of hype, these so-called 3G (for third-generation) networks—which succeed the old analog and today's digital cellular networks—are finally rolling out.

We tried two 3G services—from Verizon Wireless and AT&T Wireless—and found that they do indeed deliver significantly higher speeds than their predecessors, which hit top speeds of 14.4 kilobits per second. But there is some bad news: 3G isn't available everywhere, and it isn't cheap.

Verizon Wireless Express Network service is based on the CDMA2000 1X upgrade (also known as 1XRTT) to the CDMA standard used nationwide by Verizon and Sprint.

The peak data speed is 144 kbps, but carriers say average speeds are 40 to 70 kbps, depending on your location, the device, and the amount of network traffic. Express Network launched in the Northeast Corridor (Boston–New York–Washington), the San Francisco Bay Area, and Salt Lake City; by year's end, Verizon expects to offer the service over 75 percent of its network.

Using Express Network with Sierra Wireless's CDMA2000 1X PC Card, the \$300 AirCard 555, we recorded speeds averaging 60 kbps in downtown San Francisco and 70 kbps in Boston using a laptop PC. Average speeds with an HP Jornada 565 Pocket PC slowed to 29 kbps, however, because of the different OS.

Express Network is available for a \$30 surcharge on Verizon Wireless calling plans that cost at least \$35 a month. You can then use the minutes on



THE AIRCARD 555 moves data at 40 to 70 kbps on Verizon's 3G network.

your plan for voice or data—but if you use the AirCard 555, you can't also use a cell phone on the same account. Instead, you must make voice calls using a microphone and an earpiece or the speakers on your laptop or Pocket PC.

PHONE AS MODEM

ALTERNATIVELY, you could get a Kyocera 2235 1XRTT cell phone, which you can use as a modem for data service with Socket Communications' \$99 Digital Phone Card kit.

Sprint expects to roll out its CDMA2000 1X service nationwide sometime around mid-year. But CDMA2000 1X isn't the only 3G protocol. AT&T Wireless's Mobile Internet is based on GPRS, an upgrade of the GSM protocol used in Europe. Its theoretical maximum speed is about 115 kbps.

In our tests in Seattle using a \$299 Novatel Wireless Merlin G100 PC Card in a notebook PC, speeds ran about 38 kbps, which AT&T Wireless expects for that card. Other big GPRS carriers include Cingular and VoiceStream (see chart).

And these services are only the beginning. Both GPRS and CDMA2000 1X have upgrade paths that will increase data speeds to several megabits per second over the next few years. You may have other options too, including a growing number of public 802.11b access points.

Even so, digital cellular networks promise the greatest coverage, not to mention both voice and data services. For business travelers in areas with service, 3G will be worth the price premium.

—Yardena Arar ►

AT A GLANCE

NEXT-GEN WIRELESS INTERNET SERVICES ARRIVE

WIRELESS VENDOR	Network type	Max/average speeds	Pricing	Areas served
AT&T Wireless Mobile Internet find.pcworld.com/24501	GSM/GPRS	115 kbps/40 kbps	Starts at \$50 per month for 400 voice minutes, 1MB of data.	More than 30 cities, including Chicago, Dallas, Seattle, Phoenix, and Detroit
Cingular Wireless Internet Express find.pcworld.com/24502	GSM/GPRS	115 kbps/40 kbps	Surcharges for any voice plan start at \$7 per month for 1MB of data downloads; additional charges for interactive messages (SMS) apply.	Washington state, Las Vegas, North and South Carolina, eastern Tennessee, coastal Georgia
Verizon Wireless Express Network find.pcworld.com/24503	CDMA2000 1X	144 kbps/40–60 kbps	You pay a \$30 surcharge on cell phone plans costing \$35 or more; plan minutes can be used for voice or data.	Major northeastern cities; San Francisco Bay Area; Salt Lake City
VoiceStream iStream find.pcworld.com/24504	GSM/GPRS	56 kbps/40 kbps	Ranges from a \$3 surcharge on voice plans for 1MB of data via phone to a \$40 surcharge for 10MB of data on a phone, PDA, or laptop.	6500 U.S. cities, plus Canada via roaming agreements

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E-MAIL

CAN THE FEDS CAN SPAM?

THE FTC CRACKS DOWN ON DECEPTIVE MARKETING PRACTICES.

LONG-SUFFERING spam recipients have acquired a new ally in their ongoing struggle to stem the ever-rising tide of unsolicited e-mail: the Federal Trade Commission.

While the FTC is not tackling the admittedly enormous problem in its entirety—at least not yet—it has begun to crack down on marketers who use bulk commercial e-mail to engage in deceptive or unlawful practices. In February, the agency filed six civil lawsuits against individual participants in a massive spamming campaign aimed at luring investors into a classic pyramid investment scheme.

The marketers' e-mail messages promised recipients that if they invested \$500, they would realize a payoff of \$46,000 within three months.

According to FTC investigators, these marketers were engaging in a "Ponzi" scheme that was doomed to collapse because, to keep it going, operators would have had to recruit an impossibly large pool of investors. The agency's lawsuits—which it filed in U.S. district courts in Florida, North Dakota, Rhode Island, and California—charged the operators with engaging in deceptive marketing.

Howard Beales, director of the FTC's Bureau of Consumer Protection, says that

the suits were the first step in an enforcement campaign that will eventually take on bulk commercial e-mailers who engage in other deceptive practices—among them, failure to include a valid return e-mail address in their posts.

Most Internet users will welcome any FTC effort to halt the daily barrage of e-mail pitches for everything from herbal Viagra and sexual enhancement products to pornographic Web sites and dubi-

Last year, federal lawmakers introduced five measures designed to stem the flood of unsolicited marketing e-mail. But these attempts have made little headway, especially in a Republican-dominated House of Representatives that tends to view the bills as unnecessarily antibusiness. Only one bill—H.R. 718 by U.S. Representative Heather Wilson (D-New Mexico)—had made its way out of committee at press time. Critics say that amend-

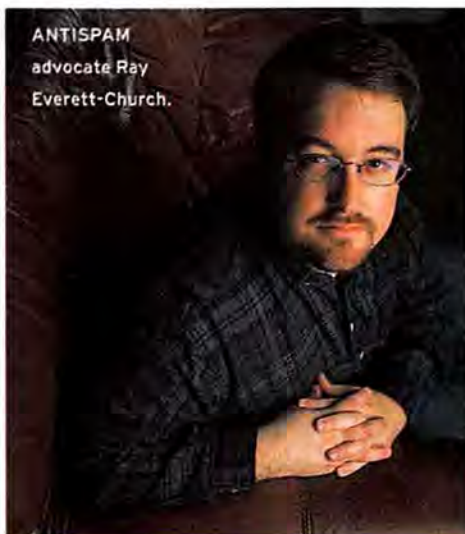
ments have weakened that measure to the point where it provides little consumer protection.

Everett-Church says the key amendment was a switch away from an opt-in requirement that would have restricted spammers to e-mailing only people who give them permission to do so. Instead, the bill merely requires marketers to remove individuals

from mailing lists if they request it after receiving spam.

"That is unacceptable to the antispam people because it puts the burden on the consumer," Everett-Church says.

E-mail marketing experts say that spam opponents have been more successful in getting states to pass antispam laws because of the lack of organized resistance at the state level: According to law professor David E. Sorkin's



ANTISPAM
advocate Ray
Everett-Church.

ous get-rich-quick schemes.

Ray Everett-Church, a director of the Coalition Against Unsolicited Commercial E-mail (CAUCE), however, says that he'd like to see the FTC do more to fight spam.

"Generally, I think the antispam world would have liked to see the FTC lead off with something stronger than just going after pyramid schemes," Everett-Church says. "But any enforcement at all is good."

IN BRIEF

Downloads

Head to find.pcworld.com/24321 to find these files.

TOP 5

- 1 **Matrix Screen Saver** 1733KB
Have your monitor emulate the trickling green glyphs from the sci-fi adventure film.
- 2 **WebWasher 3.0** 1197KB
Use this freeware to eliminate banner ads and protect your personal information.
- 3 **PowerDesk Utilities 4** 115KB
You can make Windows Explorer more useful by running this free system utility.
- 4 **CoffeeCup Free HTML** 6830KB
Create professional-looking Web pages with relative ease.
- 5 **Sam Spade 1.14** 1845KB
Level the playing field against spammers with this network-query suite of tools.

spam law Internet site, www.spamlaws.com, 20 states already have enacted some form of restriction on spam. Another dozen states are considering legislative action.

The laws seem to be surviving judicial challenge. Earlier this year, the California Court of Appeals upheld a 1998 state law requiring that e-mail marketers include a toll-free telephone number or valid e-mail address on each message to enable consumers to contact senders and ask to be dropped from future mailings.

But state laws have limited impact because federal law bars states from imposing restrictions on interstate trade. And both federal and state antispam laws would be difficult to enforce against spammers who operate outside the United States.

What has made adopting national restrictions so ▶



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problematic is the difficulty of banning obnoxious commercial advertising without interfering with individuals' freedom of speech.

"Things that some people consider spam, like anonymously sent political e-mails, we feel are constitutionally

protected," says Rob Courtney, a policy analyst at the Center for Democracy and Technology located in Washington, D.C.

With the outlook cloudy for heavy government intervention, Everett-Church says that identifying and complaining

to a spammer's Internet service provider is still the most effective antispam strategy. Since many ISP contracts prohibit users from sending bulk e-mail, your complaint could shut spammers down—if only until they find a new ISP.

—Bill Wallace

DIGITAL CAMCORDER

HAND-SIZE HANDYCAM

A NEW TAPE FORMAT ALLOWS SONY TO REDUCE THE SIZE OF ITS LATEST CAMCORDER.

SONY'S NEWEST digital camcorder elicits plenty of oohs and ahhs when people see it: The DCR-IP7BT Handycam is so tiny it can fit in a shirt pocket. That's because its 2-by-4-by-3-inch case—a smidgen larger than two packs of playing cards back to back—holds Sony's new MicroMV-format tapes. By far, it's the smallest camcorder we've ever used.

MicroMV tapes are smaller than the more widely used MiniDV tapes, but they still hold an hour of video because they compress it more. The compression doesn't seem to have much effect on the video quality: In my informal tests, images were sharp and had strong, accurate colors. The \$1699 DCR-IP7BT can also take still images or short video clips and store them on the included 8MB Memory Stick media. You can then transfer images and video from the media to your PC through the USB port. The camcorder has



INNOVATIVE: The DCR-IP7BT also has a Bluetooth adapter.

an i.Link port (Sony's version of the standard IEEE 1394 port, aka FireWire), as well as a composite port and S-Video in and out ports.

I found the DCR-IP7BT relatively easy to use, but a few of the buttons are rather small, and not all are located where your fingers naturally fall. The unit lacks buttons for controlling video playback: You must use either the included remote control or the on-screen menu. Battery life was acceptable—about 1 hour in my tests.

The downside of the MicroMV format is that you can't

use it directly with any video editing programs other than Sony's MovieShaker (which comes with the camcorder). Unfortunately, because only Sony employs MicroMV, most video editing programs can't read the video. If you want to use another program to edit video from the DCR-IP7BT, you'll have to import it into MovieShaker first, and then save it in another format. Fortunately, MovieShaker is a reasonably good program.

The other big feature of this camcorder is its built-in Bluetooth adapter. You can use it to send still images or short videos to a Web album on Sony's ImageStation Web site via the included battery-powered Bluetooth modem. Sony also offers a similar model (the DCR-IP5) without the Bluetooth capability for \$1300.

The DCR-IP7BT is an excellent camcorder, but you are limited in your choice of editing software. The ability to upload pictures is interesting, but of limited practical use. And the camcorder is expensive. If older technology and larger size don't bother you, consider opting for our March Best Buy, the \$650 Panasonic PV-DV701 camcorder, instead.

—Richard Baguley ■

IN BRIEF

Site to See

BE SURE not to miss www.thesmokinggun.com if you occasionally indulge a craving for the cult of celebrity. Where else can you quickly view documents such as the



Enron code of ethics or the judgment awarding Anna Nicole Smith \$89 million? Be forewarned: Some content, mostly from public sources, is raunchy and macabre.

Did You Know?

PCs ARE becoming more important as entertainment centers, according to The Yankee Group research firm. Its survey of 1400 consumers showed that 76 percent of broadband households have used a PC to play audio CDs within the past three months. In addition, 60 percent say they have used a PC to play online games, and 49 percent have used a computer to download music from the Internet.

Tidbyte

TROUBLE: U.S. customers of Tiny Computers, which pulled out of the American market last year, can't get their on-site service agreements honored. Time Group, which bought the U.K. portion of Tiny, says it plans to honor those warranties only.

DCR-IP7BT Handycam

Sony

★★★★☆

List: \$1699

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Editor's Choice, December 2001



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Files: Scanned: 7372
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RECOVERY CDs A PC MUST

HIDDEN COST OF XP UPGRADES

COPY-PROTECTING CD MUSIC



ONLINE MARKETING AND OTHER ANNOYANCES

STEPHEN MANES got it exactly right ["Tech Companies to You: 'Hello, Sucker!'" *Full Disclosure*, March]. Recently I wanted to download RealPlayer but became so annoyed with Real's Web page and the cheap contrivances it uses to sell the premium player that I abandoned the idea. As for RealPlayer taking control of one's media files...that too is true! After I downloaded it on an earlier computer, I lost all file associations to media files using other players.

Donald McKeown, Cherry Hill, New Jersey

MANES MAKES SOME valid points. However, I understand the "customer is a sucker" mentality of Web vendors.

I work in tech/billing support for a telco company. In my two years on the job, I have found people can be stupid (suckers) when it comes to PCs and the Net.

Manes is obviously frustrated (as am I) when companies treat customers as if they had one brain cell each. However, he should ask himself, "Would a company do it if it didn't apply to most people?"

*Jarrett R. Hickey
Chicopee, Massachusetts*

I WAS SURPRISED Manes did not mention the opt-out boxes that you have to select or deselect every time you sign up for a service or buy something on the Web. I find these boxes particularly annoying because they are always worded differently and you must read all the fine print to figure out whether or not to check them. Furthermore, some sites hide these boxes at the bottom of the page beneath a lot of unnecessary blank space.

Matt Walsh, Orland Park, Illinois

KUDOS TO Stephen Manes. Pop-up and pop-under windows, many without close boxes, are nothing but pure harassment. The Internet is fast becoming unusable because of this scourge. Since these ads represent the antithesis of advertising, we should all avoid any business with the companies involved; it is our only choice!

Mel Marlon, Richmond, Massachusetts

HOT BUTTON

Debate Over Music Copying

I READ WITH INTEREST Kevin McKean's editorial "Why Your CD-RW May Be Obsolete" [*Up Front*, March]. I believe the music industry is making a mountain out of a molehill about copying. Most people will still buy its material because it is a pain to download and make your own discs.

Even so, I think McKean's idea of charging a premium for the recording media is viable—though it does mean we would also be paying extra for discs that would be receiving data (instead of music).

Stan Howey, Mt. Pleasant, Michigan

IF YOU COPY CD music, it is piracy, it is wrong, and it is illegal. You are depriving the artist of rightful royalties. To justify copying by saying it is for your personal

Editor's note: For more on Web ads, see both "It's an Ad, Ad, Ad, Ad World" and *Up Front* elsewhere in this issue.

XP: HIDDEN COSTS

A CONCLUSION to be drawn from "The XP Verdict" [*News & Trends*, March] and your other Windows XP coverage:

Three forces threaten the pocketbooks of consumers.

1. PCs have a useful life span of two to three years.
2. Microsoft serves up new operating systems every 18 months.
3. Many hardware and software makers now refuse to post updates to work with new operating systems.

Most software packages have reached their zenith in terms of features, meaning that most of us don't need newer versions. With Microsoft running the show, however, buying a new PC or a new ▶

use only does not hold water. If I take a person's hat without permission for my personal use, does that justify the taking? Certainly not.

William Berry, Cincinnati

DON'T BUY MUSIC CDs with onerous copy protection schemes. Better yet, boycott record labels employing them. When the labels start losing money, they'll be more responsive to consumers.

Bob McFadden, Alexandria, Virginia

VIDEOS, the movie industry once insisted, would destroy movies. Instead, home video saved it. I suspect MP3s could similarly revitalize the music industry.

Eric Welch, Forreston, Illinois

operating system becomes a major investment that carries many hidden costs.

Marc Heatherington, Salem, Oregon

I AM VERY disappointed by your XP coverage. You are doing little to educate readers and much to further misperceptions.

The computer industry is evolving fast. A printer purchased three years ago is old, and a five-year-old system is an antique.

Old hardware should usually stay with an old operating system. Any user who does not understand the fundamental differences between a 9x- and an NT-based OS, who does not know enough to check the HCL [Microsoft Hardware Compatibility List], and who has not verified WDM [Windows Driver Model] driver availability with hardware manufacturers is a user who does not have the knowledge needed

to upgrade an OS and should be advised against making such an upgrade.

Pat Croteau, Ottawa, Ontario

NO RECOVERY CD? NO SALE

I FIND IT RIDICULOUS that Hewlett-Packard has decided to not include a recovery CD with its computers [On Your Side, March]. No consumer should have to go through the hassle of ordering one and waiting for it to be shipped. As owner of a small computer consulting/repair business, I will not recommend HP PCs as long as the company has this policy.

Ray Johanson

Port Jefferson Station, New York

SHOP LOCALLY...

YET AGAIN *PC World* amazes me with high-quality articles I can relate to. "The Store Next Door" [February] is a prime example, as I myself strongly support local PC vendors over the "big guys." I much prefer the selection, tech support, and buying advice that local vendors seem to be fairly good at providing.

Dennis Deveau, Calgary, Alberta

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

CORRECTIONS

IN MARCH'S "The Skinny on Big, Flat Screens," we should have said that NEC-Mitsubishi's NEC MultiSync LCD1830 has analog, but not digital, video inputs.

March's *Hardware Tips* should have said that a USB 1.1 controller transfers data about four times faster than a typical parallel port.

February's *Answer Line* recommended that you move your Quicken data file `qdata.qdf` to where you keep other data files (to My Documents, say). However, you should also move all other `qdata` files, regardless of their extensions.

In February's *Windows Tips*, the directions on page 145 for removing Start menu items from Windows 2000 should have said to type `gpedit.msc`.

PC World regrets the errors.

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NET HOOKUP**

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COOKIE CONTROL**

**ON YOUR SIDE:
NETZERO TRIMS SERVICE**

Still Stuck in the Slow Lane?

Lots of areas still can't get broadband. Here's why—and what you can do.



MARGARET MADIGAN is good at solving problems. Living in Massachusetts and working as a marketing manager for a California-based company, she spends much of her day putting out fires, mostly via telephone and e-mail. "My workgroup is on the West Coast, so I need to be flexible," she says. "Sometimes it means staying connected even when I'm at home."

But one problem has stymied Madigan for nearly a year: She is unable to get broadband Internet access at her home. You might guess that Madigan lives in a remote rural enclave. But that's hardly the

case—her residence is located in urban Charlestown, Massachusetts, a diverse community of older residents and young professionals that lies in the shadows of Boston's downtown high-rises.

"I check with my phone and cable providers regularly to see if broadband service has become available, and I get nothing but noncommittal answers," says Madigan. "Not only do they not offer it, they won't give me any indication that it's even on the radar screen."

It's not just the fact that she can't get broadband that galls Madigan, it's also

her telephone and cable companies' poor explanations and seeming lack of concern. "In a service industry, you need to understand your customers' needs and provide a solution, or at least indicate how you're going to go about servicing their needs. It boggles my mind that neither of these things is being done."

AN IMPATIENT MINORITY

STATISTICS SHOW that Madigan and others in a similar dilemma are in the minority. According to The Yankee Group, a research and consulting company, either cable or DSL broadband service is available to about 75 percent of U.S. households, and more than 85 percent of households can get the more expensive, slower satellite-based broadband. Of the 10 million households that use some form of broadband, twice as many have cable as DSL. Speeds vary, but downloads often fly along at 500 kilobits per second, close to 10 times the speed of dial-up.

Those figures are comforting, unless you're in one of the many neighborhoods still plodding along at 56 kbps. Lots of the places without broadband are rural locations that might represent a limited market for profit-hungry service providers, but many, like Charlestown, are dynamic urban or suburban neighborhoods that would seem to be perfect markets for broadband. (My own Boston suburb consists of over 150 relatively new homes. More than half my neighbors work for technology companies, yet the entire region remains a broadband wasteland.)

Why the service gaps? In most cases, they exist because a local telephone or cable company either doesn't have the ▶

equipment to provide broadband or has outdated equipment. Purchasing, upgrading, or installing equipment requires significant investment. Given the recent economic downturn, most corporations are unwilling to invest in a technology that is still struggling to define standards, much less make a profit. Two major telephone companies, BellSouth and SBC, recently said they would invest less money in expanding DSL this year than last year.

There's also strong disagreement between local telephone and cable companies about whether the playing field is level. The Telecommunications Act of 1996 requires local phone companies, such as Verizon, to share their networks with independent DSL service providers, whereas the cable broadband industry is under no such obligation. That disparity has led some to allege that local phone companies, the Baby Bells, are dragging

their feet in establishing DSL networks.

According to Link Hoewing, assistant vice president of Internet and technology policy at Verizon, "[Deregulation] policies were designed for the telephone market, not broadband. We believe these policies undermine deployment and restrict the investment necessary for the broadband industry to reach its full capability."

THE BROADBAND LOBBY

BROADBAND HAS a new, powerful ally on Capitol Hill. Technology lobbying group TechNet—which, not surprisingly, is headed by honchos from such companies as 3Com, Cisco, and Microsoft—is pressuring government leaders to loosen telecommunications industry regulations and establish tax breaks to spur deployment and consumer demand. The key, according to TechNet, is to attract consumers by providing a combination of

affordable access and compelling content.

Michael Goodman, a senior analyst at The Yankee Group, is blunt about TechNet's initiative. "It's completely self-serving. It's a proposal created by people who want to sell more switchers and routers." But he agrees that producing content that depends on high-speed connections—high-quality streaming video or audio, or glitzy animations—is essential. "Let's face it, nobody is going to pay \$50 a month so they can download Yahoo faster."

What does this mean for consumers who just want a faster connection? In the short term, companies may not rush to help. "It doesn't make sense to force broadband deployment where it's not going to be profitable," Goodman says.

The bottom line: If you can't get cable or DSL service now, it will almost certainly become available in the future (but just try and get a service provider to give ▶

PRIVACY WATCH

New Tools Take the Bite Out of Cookies

IF YOU CARE ABOUT Internet privacy, you might have been tempted recently to relocate to Vienna, Florence, or Marseilles: The European Parliament voted last fall to forbid Web sites from placing cookies on a visitor's computer without the user's permission.

Though the European legislation still has some hurdles to clear, there's been no significant movement toward the same goal by lawmakers on this side of the Atlantic. So if you want to avoid being tracked while you surf, says Lauren Weinstein, a moderator for the Privacy Forum mailing list, "continued vigilance regarding cookies is more important now than ever. Firms are engaged in all manner of data collection and tracking."

Fortunately, users now have far more power to specify which sites can set and read cookies, those small data files that identify computers. I recommend that you allow originating Web sites to set cookies. If you've paid for a subscription to Salon.com, for instance, the site will know you're a subscriber when you return. But you should block third-party cookies, which frequently come from ad-serving companies like DoubleClick and may be used to track you. (Note: PCWorld.com places its own cookies on visitors' computers. The site's advertisers also place cookies.)

Netscape has always allowed users to block third-party cookies in the Preferences dialog box; just click *Edit•Preferences*. If you have Netscape 6.x, expand the

Privacy and Security topic, and select *Cookies*. If you have an earlier version, select *Advanced* in the left pane. In either version, click the radio button that allows only cookies from originating sites.

IE CUTS OUT THE SWEETS

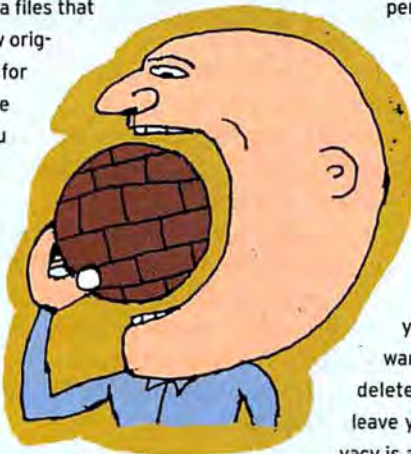
NEW PRIVACY FEATURES introduced in Internet Explorer 6 give you control over third-party cookies. Under *Tools*, go to *Internet Options* and choose the *Privacy* tab. You don't need to puzzle over IE's slider control. Simply click the *Advanced* button, put a check next to *Override automatic cookie handling*, and then direct IE to accept first-party cookies and block third-party cookies.

For detailed cookie control, you can choose from a host of independent cookie blockers and cookie managers with even more advanced features.

AnalogX's CookieWall (find.pcworld.com/21781) works with all versions of Internet Explorer. If you have a version of IE from 4.01 through 5.01, you can try IDcide's Privacy Companion (see find.pcworld.com/21741 for more info).

Initially, you will get a lot of queries from cookie manager programs, but once you set the preferences for all the sites you want to use cookies on, the programs quietly delete all the cookies you don't want, and then leave you alone. And being left alone is what privacy is all about.

—Andrew Brandt



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you a specific time frame). But if you can't bear to listen to the screech of your dial-up modem any longer, look into satellite or the more promising fixed-wireless technology. Fixed wireless, which requires installation of a rooftop antenna, costs about the same as satellite and works similarly except that it communicates with a local transmitter tower instead of a satellite. Under perfect conditions, it can achieve speeds far better than DSL, cable, or satellite, but it can be slowed by weather and an overload of users. Its availability is limited and will probably remain so until the technology matures. (See find.pcworld.com/24281 for more information on fixed wireless.)

In the meantime, contact your cable and telephone companies to find out what's holding up deployment. Tell them in writing that you'll switch ISPs to get broadband. Ask your neighbors to join in. Some providers send e-mail to keep customers informed about service changes;

ON YOUR SIDE

NetZero Cuts Off Some Users

NETZERO'S ADS promised unlimited Internet access at half the price of America Online. I took that to heart and switched my ISP. Boy, was I fooled. Slow connections. Annoying toolbar that stays up 24/7. Then I got a letter saying my account will be terminated because of overuse! What does unlimited mean to NetZero? Sounds like false advertising.

Michael Choe, Brockton, Massachusetts
On Your Side responds: According to a company spokesperson, NetZero (now

part of United Online) trimmed or shut down its Internet service in areas where telecommunications costs and customers' usage made the service too costly. (The company declined to say how many subscribers were affected.) Those who prepaid for unused service got refunds. The spokesperson, who declined to be identified, said NetZero cannot guarantee that it will not make further service and pricing changes down the road.

—Grace Aquino

consider signing up at the providers' Web sites. Visit sites such as www.technet.org, thelist.internet.com, www.dslreports.com, and www.isp-planet.com to keep up with the latest industry developments.

If your town is a dial-up ghetto, you'll likely have to wait a while for broadband.

But look at the bright side: If using dial-up teaches us anything, it's patience. ■

Anne Kandra is a contributing editor, Grace Aquino an associate editor, and Andrew Brandt a senior associate editor for PC World. E-mail us at consumerwatch@pcworld.com.

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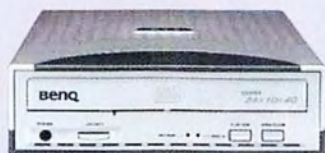
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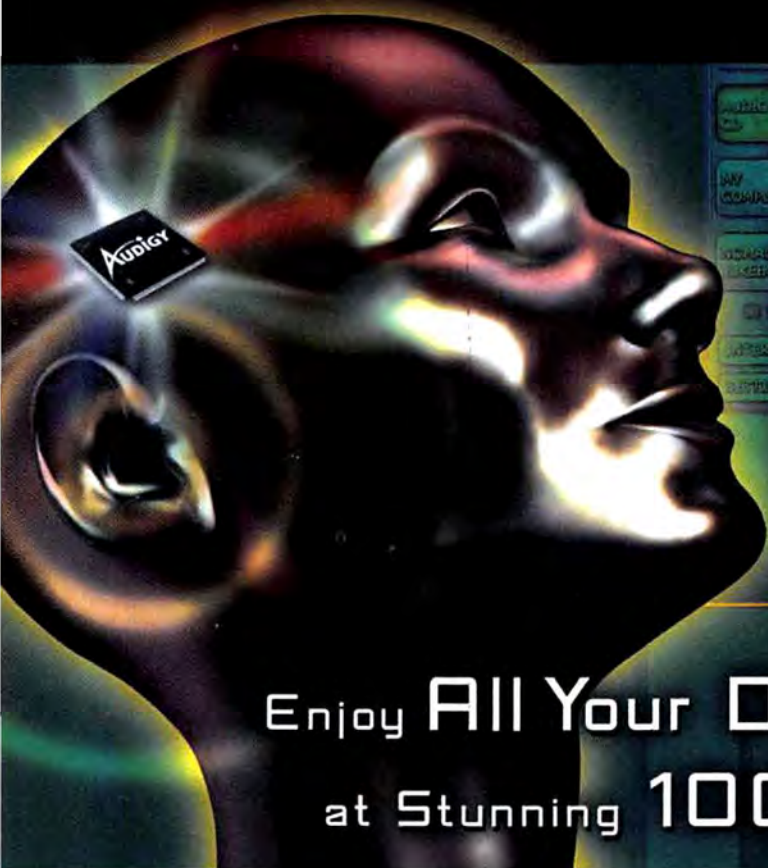
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Save Time: Let the Web Surf for You

Why wander the Web aimlessly? 'Spy' services alert you when sites change.



WHEN I'M ONLINE, I constantly monitor several sites for fresh information, including news, auction listings, and stock updates. More often than not, I wait for a site to download and find nothing new. Seems like a waste of time, especially since I'm stuck at dial-up speeds until Comcast installs cable in my new home.

To deal with the switch back to a regular modem, I've changed my Web surfing habits by visiting sites that load faster. But now I'm also trying a radical approach: I'm letting someone else surf for me.

Several little-known sites aim to deliver your favorite Web destinations on a need-to-update basis. Recently I signed up for Spyonit (www.spyonit.com), which lets you create a list of "spies" that visit Web sites for you and send you e-mail when they find something of interest. You can choose prefabricated spies or make your own by searching for a keyword or requesting updates when a Web page has changed. Right now I have spies watching for Lyle Lovett tour dates, Brooks Robinson memorabilia, and the latest version of The Onion, among other things.

Spyonit isn't perfect: Custom Web page updates are just once a day, so it's a poor

choice for constantly changing news sites.

But I do like having a list of auctions closing on EBay, Yahoo, and Amazon sent to me each morning.

Another site, Web2Mail.com, claims to do something pretty neat. If I send an e-mail message to www@web2mail.com that provides a URL in the subject line,

Web2Mail will send me the Web page in HTML format.

Or I can search the Web just by sending a message to the same address and typing a query like "search Tyrannosaurus" in the subject line. Sending e-mail queries is nice, but getting a response from Web2Mail can take hours—never just 5 minutes as the site claims—and sometimes it doesn't work at all.

KEEP ON THE ALERT

THE BEAUTY OF services like these is that they help minimize the time I spend navigating the Web. And they're not alone. Many sites, PCWorld.com among them, offer their own alert services that tell you when something you're interested in happens online. CNN.com and others send

breaking-news alerts, while sites like Bidalert.net update you on EBay auctions.

If possible, however, I'd like to launch my proxy Web surfing from as few locations as I can. That's why I like Yahoo Alerts (alerts.yahoo.com), an index of e-mail alerts for everything from news and auctions to real estate and job listings. You can set up alerts to hit your in-box periodically or whenever new information is available. Yahoo does place ads in your e-mail, but the alerts cover a lot of ground and get their information from quality sources, like the Associated Press, the *Sporting News*, and CareerBuilder.

For now, Spyonit and Yahoo Alerts are my bases of operation for monitoring the Web without constantly surfing the Web. Spyonit gives me auction listings and site updates, while Yahoo Alerts sends me bulletins from its vast pool of information. I check my e-mail periodically, and if there's an alert that interests me, I go to the relevant site. Otherwise I simply log off and go about my day. ■

Contact PC World Contributing Editor Brad Grimes at websavvy@pcworld.com.

GIMME FIVE

Terrific Sites for Travel Deals

1. Southwest Airlines: If you're willing to fly in and out of smaller airports, this site offers great deals and pleasing flights. www.iflyswa.com

2. Expedia: Don't count on it for great airfares, but hotel discounts can be significant if you plop down your credit card in advance. www.expedia.com

3. Amtrak: Not every trip is a bargain. If you noodle around, however, you can find

good promotional rates—often for shorter rail journeys. www.amtrak.com

4. Flights.com: This European site offers truly cheap tickets worldwide, including U.S. cities. Overseas wanderers can get Eurail passes, too. www.flights.com

5. AAA: If you're a member of AAA, don't make travel plans until you visit one of its regional sites. If not—hey, you have to get car insurance somewhere. www.aaa.com

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Web hosting has rapidly evolved into a "must have" for businesses. Today, customers and vendors expect a business to have a Web presence, and a business lacking a Web site cannot be competitive and efficient.

At the same time, the level of sophistication of business Web sites varies dramatically. A Web presence can range from a simple online brochure to a highly complex site with e-commerce, streaming media and data management capabilities. Factors that influence the requisite functionality of a business Web site include the business size, product and service offering, maturity level, available technical and capital resources, and the industry.

But the common thread among all business Web sites is that they must be reliable and meet the demands of a growing business.

And let's face it – the Web hosting industry has reached a point where the product offerings among the leading providers are somewhat similar. Sure, some providers are tailored to niche markets or have some competitive "bells and whistles" on their hosting offerings. However the true mark of distinction for Web hosting providers has evolved to this: Who can ensure my online business is always open for business, guide me through growing my Web presence, and provide the best-of-class customer service at the most affordable price?

Now when a business decides which provider to trust with managing its online businesses, the determining factors are no longer the hardware and product offerings. Rather, the decision boils down to which Web host can be trusted "with the keys to the shop" and will be there for you when you need it.

Interland, Inc. (www.interland.com), the leading provider of business-class Web hosting for small and medium businesses, recognizes what customers demand and deserve. To meet this expectation, Interland is setting the new standard for service and reliability. And because of the company's strong financial position, it is able to provide quality products and services at a competitive price point.

For example, Interland is rolling out an innovative service program for its dedicated and high-value Web hosting customers. Today, dedicated customers can service their accounts online or by calling a toll-free number. Now under Interland's new service program, customers are assigned a dedicated service manager supported behind the scenes by a full-time team of expert professionals to quickly and accurately address the range of issues that a customer may face – technical support, billing or sales, for example.

Interland service offerings are built around industry-leading operating systems, including Microsoft Windows 2000® and Red Hat Linux 7.1®, to provide the reliability, performance and scalability required to maintain our customers' mission-critical Internet operations. Its world-class technology infrastructure is achieved by working with innovative partners such as Hewlett Packard, Cisco Systems, Compaq, Foundry Networks and Veritas, and backbone providers including UUNET, Sprint, AT&T and others.

Interland's products include shared, virtual and dedicated hosting plans; business applications hosting; value-added services, and more. The product portfolio includes two unique product "tracks." One track is designed for more traditional small and medium businesses that want to focus on their core business, not running their Web site and administering their servers. The second track focuses on the technology-savvy businesses that were the early adopters of Web hosting and e-commerce. These users want hosting products with maximum control and flexibility.

The Interland dedicated support program – combined with the company's state-of-the-art infrastructure and hosting product portfolio – is an industry first. Interland is taking Web hosting to the next level and meeting the growing demands of business. And business customers should expect nothing less.

For more information, please visit Interland online at www.interland.com.

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Last Call for Windows XP Upgrades

Still sitting on the fence? Jump, and avoid these installation hassles.

DON'T BOTHER WRITING. I know only five months ago I told you why I didn't like Windows XP—Product Activation and price gouging. Okay, I'll say it: I was wrong. XP is terrific. So despite scattered reports of upgrade nightmares and compatibility problems, I'm recommending XP. Still waffling? Hey, by waiting this long, you've sidestepped some glitches that Microsoft and other companies have already fixed. Now I'm going to help you avoid the upgrade hassles that remain.

One big exception: XP isn't for everyone. Sure, it makes perfect sense for Windows 9x users with enough hardware muscle. But I've been surprised by the number of people who ask me if they should abandon Windows 2000 for Windows XP Professional, the version for businesses. I say if Win 2000 is working fine, stick with it. XP inherited most of its skills from Windows 2000—it just slapped on a candy-coated interface. (By the way, I switched XP back to the Classic style by right-clicking the desktop, choosing *Properties*, clicking the *Appearance* tab, going to the 'Windows and buttons' drop-down list, and selecting *Windows Classic style*.)

Bootable insurance: You need your CD-ROM drive to install XP, so in case of problems, set your PC's BIOS to boot in this order: floppy, CD-ROM drive, hard drive. Enter your BIOS settings by pressing <Delete>, <F1>, or the key specified on screen as you boot. Check your boot order under *BIOS FEATURES SETUP*. Don't want to mess with the BIOS? No sweat—we have a tool at find.pcworld.com/23601 to create a boot disk for your current operating system with generic drivers for your CD-ROM drive. And for one more ounce of prevention, do a full system backup just before you begin the XP installation.

Driven to distraction: Go to the Web sites of your peripherals vendors and download any XP updates and patches for the devices. Don't forget products you use rarely—in my case the forgotten ones were my X10 camera and label printer. Two great sources for driver updates are WinDrivers (www.windrivers.com) and DriverGuide (www.driverguide.com).

UPDATE? JUST SAY 'YES'

DURING SETUP you'll be asked if you want XP to perform a Dynamic Update. It's imperative that you say yes, because this update gives XP a chance to add new

six months old—a step Microsoft obliquely recommends. During my XP installation, the setup program suggested that I connect my HP printer only after XP was installed. If XP's setup doesn't find drivers for printers and other devices connected to your system, your installation could hang. The devices should be detected automatically when reconnected to the PC after the XP installation is complete.

Clear the background: You probably have lots of programs on your PC that load automatically when your machine boots up—like firewalls, ad blockers, and anti-virus tools. Don't install XP until you've

reset these programs so that they don't load at boot-up. Once XP is running, you can set them back to autoload.

This is a good time to visit the program vendors' Web sites to check for upgrades. For instance, I took out ZoneAlarm Pro before installing XP, and subsequently put in an upgraded version of the

firewall software. I also removed and then reinstalled my antivirus program and my ad-blocking utility, AdSubtract. (Remember to write down any license numbers or registration codes for your shareware.)

When did I know for sure that XP is a great piece of software? Right after I managed to convince my mom to put aside her prized copy of Linux and let me upgrade her computer to XP. ■

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached at steve_bass@pcworld.com.



drivers. And be sure to take advantage of XP's efficient auto-update feature to download and install all the latest patches soon after they become available.

If you can't find an XP driver for a particular device, try using a Windows 2000 driver—it's far more likely to work than a 9x driver because XP is built on top of Windows 2000. XP may warn you that the driver isn't XP-compatible and will try to dissuade you from installing it. Ignore that advice and load it anyway.

Make the disconnect: Before you upgrade, temporarily disconnect devices more than

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BUGS & FIXES

STUART J. JOHNSTON

D'oh! More Holes in Internet Explorer

Fix the latest problems with IE, Quicken, and BlackICE Defender.

I KNOW THAT I'M repeating myself: It's time to plug holes in Internet Explorer. Microsoft recently put out a new, cumulative patch that fixes a bunch of known security holes, along with six—count 'em, six—new ones. The company released another cumulative patch only two months ago, but since then, bug sleuths have exposed new weak spots. This latest release includes the previous cumulative patch, and also takes care of new holes in IE 5.01, 5.5, and 6.0. (The earlier patch did not fix holes in IE 5.01; hop to find.pcworld.com/23481 for details about that first release.)

Two of IE's latest flaws are particularly worrisome. The most dangerous hole allows an attacker to take advantage of a so-called buffer overrun error—a common avenue of attack. The buffer is the place



where your browser briefly stores information until it's needed. Think of the buffer as a quart saucepan on the stove: If someone pours in more than a quart of cream, the overflow will make a big mess.

So how does a bad guy overflow the buffer and bring disaster to your PC? The miscreant tricks you into clicking a link on a specially designed Web page or opening an HTML e-mail. Planted in the link or message are sneaky instruc-

tions for displaying an HTML document that allow an overload of information to be delivered to IE, causing it to crash. A crafty operator could also include code to take over your PC, theoretically enabling the hacker to do anything you could do, like delete all your files.

The second flaw in IE could let an attacker read any file on your PC that can be displayed inside a browser window, including Web pages, HTML e-mail messages, and any Microsoft Office documents that are saved in HTML format. Again, the attack would occur after you click a link on a tainted Web site or open an HTML e-mail. In the latter case, you need only to open the message; you don't need to click anything within it.

At that point, the bad guy would be able to read—but not change, delete, or execute—any file displayed in your browser. Go to find.pcworld.com/23501 to read Microsoft's lengthy bulletin and get a link to the download.

As with many previous IE weaknesses, no actual attacks have been reported. But you should keep on top of security updates all the same.

Note: If you're running Internet Explorer 5.01 with Service Pack 2 installed, you're

safe from the first flaw. The second vulnerability, however, affects all versions of IE. ■

Stuart J. Johnston is a contributing editor for PC World.

IN BRIEF

Quicken Patch

QUICKEN 2002 users who tried to install the Release 2 update may have encountered an error condition preventing the program from running. Intuit has issued separate patches for Quicken 2002 Deluxe and Quicken 2002 Home & Business. Go to find.pcworld.com/23201 for the fixes. If they don't work, visit find.pcworld.com/23541 to get the revised R2.

BlackICE Flaw

INTERNET Security Systems closed a hole in the latest version of its BlackICE Defender firewall program. If your PC runs Windows XP or 2000, the hole could let a cracker crash your system by using the Internet to send it an avalanche of "pings." Go to find.pcworld.com/23202 to grab the latest version, BlackICE Defender 2.9.

BUGGED?

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

READER'S TRIUMPH: MONEY BUG FIXED

ROBERTA DOMOS of Redmond, Washington, was having a big problem with Microsoft Money 2002 Deluxe & Business. Doms has an accounts receivable account tied to an online banking account. The snag: When she marked an invoice as paid, Money refused to display any downloaded transaction data. Doms complained to Microsoft at least half a dozen times, and the technicians acknowledged that the bug was a "known issue." Doms's persistence eventually paid off. Microsoft fixed the bug.

If you have Money's automatic "Background Banking" online feature enabled, you will have received the patch already. However, if you turned off the automatic update feature, you can get the fix by selecting *Internet Updates•Update Now* within Money. Visit find.pcworld.com/23181 for more information.



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NEW PRODUCTS

EDITED BY ANNE B. McDONALD

Color PDAs for All Pocketbooks



BRIGHT:
Palm M515 (left),
Sony Clie PEG-
T615C.

P D A s

IF THE NEW crop of handhelds using the Palm operating system is any bellwether, monochrome is out and color is in—for roughly the same prices monochrome-screen units commanded in the past. And the current PDAs' screens lure you with more than just snazzy color: Their sharpness and brightness really make them worth a look.

I reviewed two shipping color Palms: the **M130** and the **M515**, which look exactly like their predecessors, the round-ed-plastic M125 (with a monochrome screen) and the metal-bodied M505 (with a color display). Like the older mod-

els, these new Palms offer 8MB and 16MB of RAM, respectively, as well as Secure Digital card expansion slots. I also looked at a shipping Sony **Clie PEG-T615C** armed with a high-resolution active-matrix display, an ultraslim aluminum case, 16MB of RAM, and a slot to accommodate Sony's Memory Stick media.

WELL PRICED

AT \$279, THE PALM M130 is the least expensive color PDA with an expansion slot on the market. Its backlit, 2-by-2-inch display is bright—in fact, it seemed brighter when viewed

indoors than the 2.25-by-2.25-inch screen of the M515, which costs \$120 more. When viewed in direct sunlight, however, the passive-matrix screen of the lower-priced Palm M130 appeared washed out and virtually unreadable. While its backlight is adjustable, it stays on until you power down the unit. Although that means shorter battery life, in ordinary use that shouldn't be an issue, since the M130's included rechargeable lithium ion battery is topped off each time you put the device in its included USB syncing cradle.

UPGRADE IN A FLASH

MODELED on the wildly popular Palm V, the M515's vastly improved, user-controllable backlighting and sharp screen make it appealing both aesthetically and functionally. The active-matrix color screen can show up to 65,000 colors. Alas, though the unit's screen is brighter, its colors don't appear to be. But text on the \$399 M515 is exceptionally legible both indoors and in direct sunlight. Both of the new Palm models offer vibrat-

ing, sound, and LED alarms, but only the M515 has Flash memory, which makes OS software upgrades easy. If the built-in 16MB of RAM is not enough for your extra programs and data, the Secure Digital card slot can handle memory cards and third-party applications, as well as peripherals such as modems.

In addition, both Palm units come bundled with MGI PhotoSuite Mobile Edition for storing, viewing, and sharing video clips and still images, as well as DataViz's Documents

Clie PEG-T615C

Sony

A winner with its crisp text resolution and extra features.

★★★★☆

List: \$399

find.pcworld.com/23941

M130

Palm

★★★☆☆

Lowest-price color Palm.

List: \$279

find.pcworld.com/23921

M515

Palm

★★★★☆

Buy this for its top-flight color and bright, easy-to-read screen.

List: \$399

find.pcworld.com/23922

52 COLOR PALM-BASED PDAS

Palm M130, Palm M515, and Sony Clie PEG-T615C

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63 ORG CHARTS

HumanConcepts OrgPlus 4 Professional

64 WEB BROWSER

Browse3D

66 MONITOR

Wacom Cintiq 15x graphics tablet

to Go for viewing, creating, and editing Word- and Excel-compatible files and for viewing PowerPoint files.

LOOK MA, ONE HAND

SONY'S beautifully designed Clie PEG-T615C matches the higher-end Palm's 2.25-by-2.25-inch screen and \$399 price tag, and one-ups it with its exclusive Jog Dial and Back Button. These two features make one-handed scrolling through menus and selecting items incredibly easy.

This Sony's screen is the sharpest and crispest display I've seen on a Palm-powered PDA. Text legibility in any lighting condition is superb. Colors seemed more pastel than primary; otherwise, the display is the best in the field.

The PEG-T615C's generous software bundle comes with DataViz's Documents to Go and Rand McNally's StreetFinder Express, among other titles. An embedded speaker supports PC-converted .wav and MIDI audio files.

The lower-priced M130 is fine if you're on a budget. The Palm M515 and Sony Clie PEG-T615C are comparable on price and quality, but the Sony's extras make it the ultimate winner—unless you prefer a device that handles the more widely available SD cards. If so, choose the M515.

—Michael S. Lasky

Toshiba's P4-M-Powered Portable

NOTEBOOK
TEST CENTER TOSHIBA'S NEW Satellite Pro 6100

Series offers you a complete desktop-replacement package. We looked at a model that was powered by a 1.7-GHz Intel Pentium 4-M SpeedStep processor.

The \$2699 preproduction unit we saw didn't break records on the first of our two PC WorldBench 4 tests; it earned a score of 98, which put it on a par with two previously tested 1.13- and 1.2-GHz Pentium III-M notebooks. You might expect a performance boost from the extra 500 MHz, but historically, Pentium 4-based desktops and now laptops (see find.pcworld.com/24141) haven't shown their muscle on standard business apps, such as those in PC WorldBench 4. However, this laptop offers the promise of better performance in certain types of applications, such as graphics and video editing, as well as music encoding.

The Satellite Pro 6100 Series exhibited a noticeable performance drop when we tested it under battery power:

The SpeedStep technology, which lowers the processor speed to 1.2 GHz to conserve the battery, led the unit to a second PC WorldBench 4 score of 89. (AMD mobile chips with PowerNow also slow under battery power.) The battery lasted a fair 2 hours, 3 minutes in our test; if you're on the road a lot, remember to pack a spare.

The 7.8-pound Satellite Pro is really geared for desktop replacement duties, however, as its list of components might indicate. Its brilliant 15-inch screen is powered by an NVIDIA GeForce4 420 Go graphics chip and 16MB of RAM and can handle resolutions up to 1200 by 1600 pixels at 32-bit color. Additionally, you get 256MB of DDR SDRAM; a 40GB drive; an 8X DVD-ROM and 8X/8X/24X CD-RW combination drive in the modular bay; a built-in modem, ethernet, and wireless 802.11b capability; one video-out and two USB ports; a MiniPCI slot,

two PC Card slots, and a Secure Digital slot; and Windows XP Professional.

All in all, the Toshiba Satellite Pro 6100 Series offers you plenty of features for your money and gives you enough processing power to get the job done.

—Anush Yeghazarian ▶

Satellite Pro 6100 Series

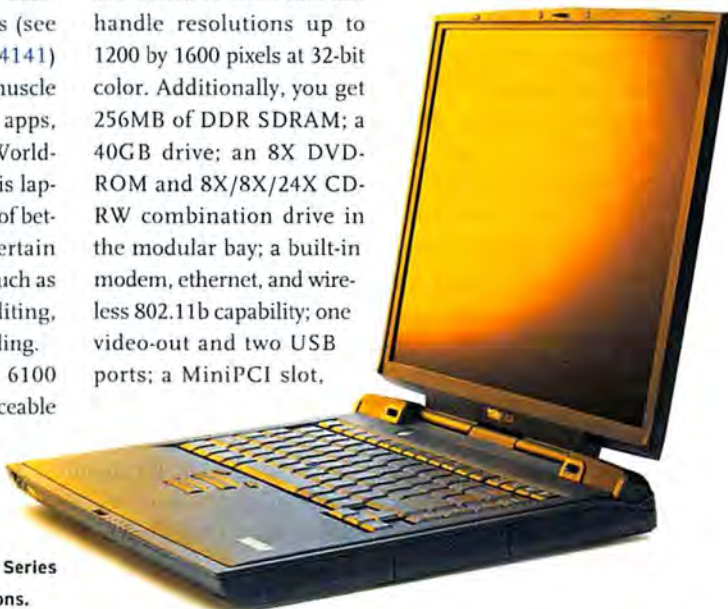
Toshiba

(Preproduction unit, not rated)

A good desktop replacement system, especially for graphics apps, but you'll need a spare battery to travel.

Street: \$2699

find.pcworld.com/23942



CHOOSE ONE: The 6100 Series has multiple configurations.

Adobe Photoshop 7: Get Ready to Paint

GRAPHICS SOFTWARE

PHOTOSHOP, Adobe's big-gorilla image editing application, traditionally has provided tons of tools for preparing photos. In **Photoshop 7**, Adobe adds a painting engine that offers effects previously available only from rival Procreate (formerly Corel) and its Painter software.

The Procreate application is designed more for artists than for occasional users. It stocks a bazillion "natural-media" tools that mimic real brushes, inks, crayons, and paints, approximating how they'd appear when applied to canvas, paper, or even cloth; you can "paint" with copied patterns, as well (think plaid or grass). Though Photoshop still doesn't provide anywhere near the number of painting tools that Painter does, version 7 greatly expands Photoshop's ability to customize brushes and patterns, and the results look very Painter-ish. However, Adobe insists that it isn't trying to horn in on Painter's turf.

I tried out a Photoshop 7 beta version, using a Wacom Intuos 2 graphics tablet. The

tablet lets you enhance and manipulate images via a pressure-sensitive pen; the harder you press, the more "effect" is applied to an image or photo. The patterns (which you create within a new Pattern Maker dialog box) proved useful for enhancing photos

program's existing Auto Contrast and Auto Levels commands—in other words, you can try it before resorting to manual controls. It worked well on some images (the ones for which I'd screwed up the color values), but it didn't work so well on images with



GET ACQUAINTED WITH PAINT: Photoshop 7 expands the ability to customize its brushes, which let you swab images with patterns, such as Scattered Leaves.

and for creating new pieces (especially backgrounds).

Those familiar with cloning tools will rave about Photoshop's new "healing brush," which is similar to a cloner but adds a few tricks. While a cloner lets you copy a piece of an image and paint it elsewhere, the healing brush analyzes the lighting, shading, and tonal range in the destination area and adjusts the pasted material to match. The brush works especially well when it's cleaning up dusty scanned images or prettifying faces that have blemishes or razor bumps, and it's significantly faster than using the clone tool for those tasks.

The new Auto Color command works much like the

hue or saturation problems.

Photoshop's new file browser creates thumbnails of the images on your hard drive slowly (understandable), but after the thumbnails are done, you can view, sort, and even rank them quickly. You can dock this file browser in the options toolbar, but you can't drag it outside the main application window, so it competes for space with Photoshop's many other palettes.

Photoshop 7 is now compatible with Windows XP and with Mac OS X, and that may make the program a must-have upgrade for some. Others might be forgiven for waiting to see what Adobe has on tap next for Photoshop.

—Alan Stafford ►

QUICK TAKES

Go Remote

TIRED OF USING multiple remotes to get your home theater system fired up? Check out Intrigue Technologies' new universal controller, the **Harmony Internet Powered Universal Remote**. It's programmable from a PC using the Internet and a USB connection. The compact but pricey (\$199) remote is fairly easy to set up if your equipment's data is already stored in Harmony's database. If not, the setup process is time-consuming—especially if you don't have a broadband connection, as the site isn't terribly well designed. But when you've finished, and you've loaded the information into the remote, you get one-button access to your entertainment options.

When you choose "Watch TV" or "Game Console," for instance, and then press the power button, the remote will instantly turn on all the devices needed. The Harmony also downloads local TV listings and has a nifty feature called Zap that takes information from your TV via the remote—say, a show's URL—and puts it on your home page on the company's site. Intrigue Technologies, find.pcworld.com/23962

—Anne B. McDonald



Photoshop 7

Adobe Systems

★★★★★

The supreme leader of imaging applications gets valuable new tools, but it's not a critical upgrade unless your OS is very new.

Street: \$609

find.pcworld.com/23961

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CREATIVE®

Swap TV Shows Digitally

DIGITAL VIDEO RECORDER

EVER WANTED to share an episode of *The Sopranos* with your friends without having to swap videotapes? Sonicblue's new 4000-series personal video recorders allow you to send TV shows to others over the Internet, and they let you view digital pictures on your TV too.

I looked at a shipping unit of the **ReplayTV 4040**—essentially a souped-up, \$699 digital video recorder with a 40GB hard disk and a Wind River VxWorks operating system that utilizes your broadband network connection.

A clearly illustrated setup poster makes the installation straightforward; all of the necessary wires are included. I connected the sleek, silver ReplayTV box to my TV using audio/visual cables and then strung a network cable between my router and the device's 10/100 mbps ethernet port. After I powered on the unit, it automatically found my IP address, took advantage of my broadband connection, and walked me through the channel-lineup configuration in a breezy 5 minutes. Owners who can afford two or more 4000s may stream episodes from one to another in real time, if the devices are on the same home network.

The colorful user interface is easier to read and navigate than that of earlier ReplayTVs, but I found the image quality of recordings varied greatly among settings. At the highest setting, the picture was great; the medium setting was only acceptable, however, and the standard setting showed

imperfections in the image.

In addition to the ethernet support (no dial-up modem compatibility), the 4040 lets you share recordings, but only



NO DIAL-UP: ReplayTV 4040 works only with broadband.

with other ReplayTV 4000-series owners. I found the two-step sharing process convenient but time-consuming:

A 30-minute sitcom recorded at high quality (about 1.3GB of data) took more than 36 hours to send over a DSL network connection. However, I did like the handy slide-show feature, which enabled me to transfer my digital camera's

images from my PC using Windows Explorer and view them on a big-screen TV.

While I found it generally easy to configure the unit to search for and record my favorite shows, I did have some

gripes with the interface. For example, there's no configuration wizard for setting up Internet sharing, and you can't view how drive space is allocated. I was also disappointed by the functional but chunky remote control.

Despite these caveats, the ReplayTV 4040 still is a worthy, though pricey, upgrade over its predecessors.

—Melissa J. Perenson

ReplayTV 4040

Sonicblue

★★★★☆

Though expensive considering the comparatively small hard drive, this recorder is great for use with a broadband network.

List: \$699

find.pcworld.com/23963

iMac's Monitor Bends to User's Will

DESKTOP

IS IT A sunflower? A lamp? An alien life form? By now, you probably have an opinion about the looks of the latest **iMac**. I tried one and found that inside that matte-white lamp base is a very usable, powerful home computer with a reasonable price tag.

Whatever you think of the design, it succeeds at conserving space and at being adjustable. It's small enough to tuck into a corner, and the monitor can be pushed up and completely out of the way.

iMac

Apple

★★★★★

This Mac may be small, but with an 800-MHz G4 CPU, it packs serious computing power.

List: \$1799

find.pcworld.com/23621

But when you grab the edge of the screen and position it, it stays put. The stainless steel arm moves fluidly and feels substantial—Apple suggests you use it to carry the iMac.

The 15-inch LCD shows photos with vivid, natural colors, but the text smoothing that OS X applies to all text at 12 points and larger makes the type look blurry.

With an 800-MHz G4 processor and 256MB of RAM, this system, the top of the new iMac line, allowed me to run multiple office applications and switch among them without delay. It also has a DVD-R-burning SuperDrive and a 60GB hard drive.

Like its predecessors, this model isn't designed for internal expansion. You can add an

AirPort 802.11b card and upgrade to a maximum of 1GB of RAM. Any other additions must be external, but the three USB ports and two FireWire ports should provide enough basic connections.

—Rebecca Freed ▶



STURDY:

You can use the arm of the iMac to lift it.

Keeping black & white on the run!



Minolta Co., Ltd., Osaka, Japan



magicolor 3100 shown with
optional 1,000 sheet input feeder

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VIDEO EDITOR

WANT TO MAKE professional-looking videos for a fraction of what you'd pay a production company? Take a look at NewTek's **Video Toaster 2**, billed as a TV studio in a box. In my tests of a shipping unit, the system managed to make good on that ambitious claim, although it does demand significant PC processing power.

The Video Toaster 2, which consists of a PCI card and software, requires a PC with at least a 1.5-GHz Pentium 4 processor, 512MB of RAM, and Windows 2000. NewTek recommends that you use 10,000-rpm SCSI drives in a striped RAID array. With the Toaster 2 itself costing \$2995, you'd need to spend about \$3000 more on PC hardware (if you don't have it already) to get a complete package up and running. However, this is one robust and capable product.

Among its many features are a program for editing prerecorded video; over 300 digital video effects; a video painting program for special effects; a character generator (for making captions, credits, and the like); a digital disk recorder; and a 3D rendering program for creating your own animated logos. Teamed with NewTek's optional SX-8 Switcher (\$1995), the Video

Toaster 2 can switch between live video from up to 24 different cameras, and audio from any of nine different sources, with the click of a mouse.

Cheaper video editing programs such as Pinnacle Systems' \$99 System Studio 7

recorded video of a new-product demo or a speech from someone who can't be there (as is done at the Oscars).

The software does take a bit of getting used to. Its interface is designed to look more like a TV studio than a computer



VIRTUAL STUDIO: The Video Toaster 2 lets you mix video from live or prerecorded sources, apply effects to live video, and add captions.

can do some of the things that the Video Toaster can do—for example, create transitions (such as fades) between clips. But adding a transition using only software can be time-consuming—from a few seconds to many minutes—and if you don't like the result, you have to start over. The Toaster 2 performs transitions in real time, which is helpful if you're working on a long video.

The system also can create transitions and effects on live video (or a combination of live and recorded video), which none of the software-only products can do. This capability makes it a good choice for an event where, for example, you'd like to show live video with captions on a big screen and then transition to a pre-

program, which can be confusing for users without TV video-editing experience. Fortunately, it comes with an excellent set of manuals and tutorials. And the program is modular: You can set it up so that you have only the components you need on screen, and you can save different layouts for different tasks. My tests weren't entirely problem-free, however. The character generator, for instance, crashed on me on several occasions.

It's definitely not a program for novices. But for individuals or businesses who want to produce professional-quality videos of conferences and events, the sophistication of the NewTek Video Toaster 2 makes it well worth the price.

—Richard Baguley ▶

QUICK TAKES

Sounds of Silence

THE CRANKY GUY in the next cubicle is always asking me to turn down my PC speakers. What satisfies him, however, leaves me listening to Bruce Springsteen singing at a bare whisper—which is completely unacceptable. Headphones offer a private listening solution, but the cord always seems to be either tangled or not long enough. To the rescue comes Amphony's \$129 **Model 1000**, a 2.4-GHz wireless, portable digital headset. The unit can receive signals up to 200 feet in its line of sight from its base station or 50 feet through walls or ceilings—without any compromise in sound quality. Digital transmission eliminates the noise and audio distortion of analog wireless systems. The base transmitter can be used in audio systems or computers, and it can service an unlimited number of headsets. Furthermore, the snug-fitting ear cushions block out all exterior sounds while you listen. Now I don't hear anything from the guy in the next cubicle—and he's happy not to hear me. Amphony, find.pcworld.com/23561

—Michael S. Lasky



Video Toaster 2

NewTek

★★★★★

Powerful, complex, and expensive video editing system; worth the price for those who need this level of sophistication.

List: \$2995

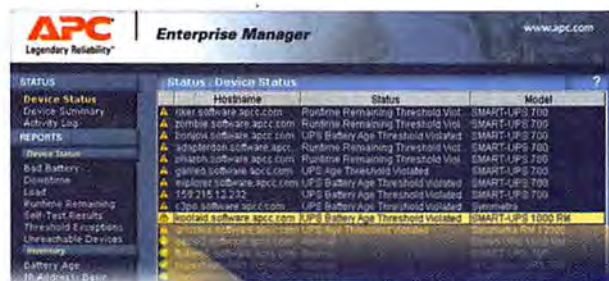
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Double-Duty DVD Player

DVD PLAYER

MORE AND MORE, features formerly found only on PCs are being added to home electronics. Take the new \$179 DVD player from Sampo, the **DVE-631CF**, which incorporates a CompactFlash card reader. Not only can you watch DVD videos on it, you can also view JPEG photos and images, listen to MP3 music files, and watch MPEG-1 video files stored on a CompactFlash memory card of any capacity.

The shipping player I tested proved versatile and easy to use—just as Sampo promised. Before turning the player on, I inserted a 32MB CF card. Once on, the player rec-

ognized the card, and a scrollable menu of the card's folders and files appeared on my TV screen. Using the directional keys on the player's remote control, I easily located the folder containing my JPEG pictures (some I took with my digital camera; others I copied from the Web).

The player let me view each photo either individually or as

a group of thumbnail images. Selecting a number on the remote instantly brought up the full image of the corresponding thumbnail.

Viewing digital images on a TV has one moderate drawback. Because of the relatively low resolution of most TV screens, my photos didn't seem as sharp as they appear on my desktop monitor; some JPEGs taken from the Web looked downright blurry.

Nevertheless, the conve-



POP YOUR COMPACTFLASH memory card from a digital camera directly into this Sampo DVD player to view images or video files.

DVE-631CF

Sampo America

★★★★☆

Adds the versatility of a CompactFlash card reader for viewing digital images to a well-priced, high-quality DVD player.

List: \$179

find.pcworld.com/23741

nience of quick viewing (no more booting up the PC just to look at a few shots) can outweigh this limitation. I liked the player's ability to handle all the MP3 files and MPEG-1 videos that can be stored on a CF card. That, combined with its full roster of DVD video and CD audio features, makes the Sampo DVE-631CF a useful, versatile addition to a home entertainment system.

—Michael S. Lasky

Save lots of cash. Or, gigs of cash. However you say it.



Laptops

DVD/CD Burners

Chart Your Organization

ORG CHARTS

HUMANCONCEPTS' market-leading OrgPlus has long been one of the most intuitive and powerful tools for producing organizational charts. And the newest version, **OrgPlus 4 Professional**, is more Web-friendly than ever: Not only can you easily publish a chart to the Internet or a corporate

intranet, but your colleagues can manipulate it. Using a Web browser (Netscape 4 or IE 4 or later), they can zoom in and out, print selected branches, or even export the chart back to an OrgPlus file.

Longtime users of Microsoft Office may know OrgPlus; Microsoft licensed earlier versions to add organizational chart-making capabilities to its flagship productivity suite. While the basic tools still exist in Office, OrgPlus 4 Professional offers many extras.

In addition to the Web publishing features, the program lets you turn a chart into a PowerPoint slide or a Word booklet with a table of con-

tents. You can automatically generate charts from data in Excel, text, or even XML format. The software offers more than 20 templates with different backgrounds, colors, and layout styles to make your chart look more professional. You can even split off a portion of your chart and link it to the original chart, making it easy to move between the two.

In my tests with a shipping version of OrgPlus 4 Professional, I was able to create a small org chart and publish it to the Web in less than half an hour—all without having to spend much time with the



EVEN THE START page for OrgPlus 4 Professional is clearly organized.

OrgPlus 4 Professional

HumanConcepts

★★★★☆

Powerful, easy-to-use tool is worth the premium price for companies that rely heavily on organizational charts.

List: \$495

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very complete manual. But at \$495, this product is only for companies that are serious about charting. If you don't need the new publishing and data import tools, OrgPlus 4 Standard offers much of the basic capability for \$190.

—Yardena Arar ►



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NEW PRODUCTS

A (Web) Room With a View

WEB BROWSER

MOST WEB browsers display one Web page at a time. Users often resort to opening clumsy, multiple windows to conduct research, test a Web project, and so forth. **Browse3D** takes a different approach.

This Internet Explorer add-

store the set of pages you're working with? After filling the wall, you can save it. Later, load your saved wall, and the pages pop back into place.

There are a few minor annoyances. The left wall fails to ignore error pages. Site icons are not shown in the Favorites



A DOUBLE-CLICK on any Web page shown on Browse3D's right or left "walls" will quickly display that page in the center.

on displays a virtual room. On the "wall" in front of you is a Web page of your choice. On your left hang snapshots of other pages you've visited—a visual representation of your browser's History feature. Clicking Browse3D's Pan Left button turns the view toward these snapshots; you can pop any of the pages back to the center wall (where you actually browse) with a double-click.

With its Auto Crawl function on, Browse3D grabs links from the current page and loads them into snapshots on the right wall. To explore an unfamiliar Web site, set Auto Crawl loose, and then pan right to see what it has found.

Without Auto Crawl, you manually select pages to populate the right wall. Need to

menu as in other browsers. Browse3D can bog down when Auto Crawl is on, and its pop-up window suppression sometimes generates JavaScript errors.

I found the visual metaphor comfortable, but I couldn't get used to it for everyday use. Still, if you work with multiple windows or feel lost on the Web, Browse3D could help you keep your bearings.

—Matthew Newton ►

Browse3D

Browse3D

★★★★☆

A new approach to Web browsing that literally can change the way you see the Web.

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NEW PRODUCTS

An Office DaVinci's LCD

MONITOR

WACOM, a leading name in pen input devices, has taken an extra step: Its 15-inch **Cintiq 15x** LCD monitor also works as a graphics tablet that lets you draw directly on its screen using a cordless pen. It's such a natural, obvious concept that I thought, "Someday all monitors will work this way." The

fine detail, which is critical for artists and designers. The unit is simple to set up and adjust, thanks to its reasonably intuitive buttons and on-screen controls, as well as its thorough, clear documentation. The Cintiq 15x supports both VGA and digital video interfaces, and provides connection cables for both.



ELECTRONIC

EASEL: Wacom's Cintiq 15x LCD is easily adjustable.

only hitch: At \$1899, the Cintiq 15x is too expensive for a casual purchase. And it's not targeted at those who wrangle text or numbers—the package doesn't include any writing or editing utilities.

However, the image quality of this 1024-by-768-pixel flat panel is quite nice: Text in Microsoft Word and Excel looks sharp and easy to read, and icons are very distinguishable. Photographs and illustrations have vivid, accurate color and

The fun begins when you start drawing on the screen. The pen and panel worked flawlessly together, creating fine or thick lines without a single hiccup. The panel's support arm lets you position the screen like an easel, from almost flat to almost perpendicular; you can even place it in your lap. When I allowed my palm to touch the screen, it didn't affect my image or move the Cintiq's cursor. The cordless pen has 512 levels of pressure sensitivity, and it needs no batteries.

If you have to reach around a keyboard, the Cintiq 15x is not comfortable to work with. But as a tool for serious graphic artists, its form flawlessly follows its function.

—Rebecca Freed ■

Cintiq 15x

Wacom

★★★★☆

For those who edit images full-time, this product is mighty enticing, despite its hefty price.
Street: \$1899

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At Your Service:



From vendors to hotels to consultants, there's plenty of help available to make your presentations shine.

Business trips today, sadly, are more about preparation than poolside piña coladas. And presenters, who once found time to relax before their meetings, now toil until showtime to keep pace with changes affecting their messages.

"To be seen as an expert in anything, you have to be up on relevant business and world events," says Ken Braly, a professional speaker based in San Jose, Calif. "But events can happen so quickly, your audience is hearing about them while you are traveling to the meeting."

But even as the news moves at warp speeds, high-tech services are helping mobile presenters, especially those with time-sensitive material, to keep their presentations fresh.

Many presenters, for example, can now plug into high-speed data ports in their hotel rooms, or at nearby digital service centers.

Braly says speakers can use these Net connections to adjust their presentations, even after their first contact with an audience.

"Questions that arise on the first day of a two-day seminar," Braly says, "can get

answered more completely on the second day. You can use the Net to add slides to your PowerPoint presentation, or insert references from the latest news."

Braly and others advise presenters to check into hotels with 24/7 business support services, including access to printers and other digital equipment. They should also select meeting rooms at hotels or service centers that include built-in support for videoconferencing and audiovisual presentations.

With these services, and with reliable data ports and output devices on site, presenters need only worry about having the best projectors and portable equipment for their meetings.

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LIGHT AND BRIGHT

Experts typically recommend projectors that are lightweight but don't sacrifice such essential qualities as high brightness and sharp resolution. And manufacturers like ViewSonic and Mitsubishi Digital Electronics America have come forward with state-of-the-art projectors that are built specifically to match these guidelines.

Mitsubishi's XD200 ColorView XGA (1024 X 768) projector, for example, boasts 2000 ANSI lumens of brightness as well as micro-mirror digital light processing (DLP) technology in a 6-pound package.

Mitsubishi has also built a lower-cost SVGA (800 X 600) version of the XD200—dubbed the SD200—geared to budget-conscious buyers.

ViewSonic's PJ350 XGA projector, meanwhile, packs 1100 lumens of brightness, picture-in-picture and zoom functions, and digital keystone correction for squaring images from a variety of angles into a wee 3.3-pound package.

Many mobile presenters already know how to handle their portable PCs and projectors. But technology consultants, either

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They're the PJ500 and PJ550, ViewSonic's go-anywhere 5.3 lb. ultra-portable projectors. With 1,200 lumens, these projectors deliver the goods, crisp and clear, whether you want SVGA (PJ500) or XGA (PJ550). Their short focal length provides versatility for any setting from the small conference room to the large training room. And they outshine the competition with advanced features like component video to show HDTV signals and eco-mode for extended lamp life and whisper-quiet operation.

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PJ350

Hard to believe such high brightness (1100 lumens), clarity (1280x1024), and contrast (500:1) come from an easy-to-carry 3.3lb. – perfect for on-the-go presenters. Monitor loop and DVI make the PJ350 an even better value.



PJ750

When you're willing to trade a pound or two for extra high brightness, get 1700 lumens and XGA 1024x768 resolution in this versatile portable, great for on the road or in the office.



PJ1065

When you want the best in a conference room or larger venue (project from 4 to nearly 40 feet), this 2700 lumen powerhouse supports HDTV and DVI signals and has multiple RGB inputs/outputs.



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on hand or on the phone, and telephone numbers for local ISPs, can be life-savers.

The Internet itself is another valuable resource for mobile presenters. Braly, along with speaker/consultant Rebecca Morgan, publishes SpeakerNet News (speakernetnews.com), an online newsletter that includes helpful Web links for speakers and "Techno-Tips" that demystify home- and mobile-office technologies for business travelers.

Hardware manufacturers, too, are helping to take the guesswork and uncertainty out of multimedia presentations. ViewSonic has imbued its PJ350 with support for DVI-I, HDTV, and other video and data signals. And its super-high brightness and contrast makes it ideal for a spectrum of corporate environments—even for big-screen entertainment at home.

Mitsubishi's XD200 ColorView projector, meanwhile, brings image management a step further with Directional Correlational Deinterlacing (DCDi), an Emmy-award-winning video-processing technology from Faroudja, a division of Sage Inc. DCDi eliminates the jagged edges that appear when standard interlaced video is viewed on progressive-scan displays.

Mitsubishi also uses its own patented ColorView Natural Color Matrix algorithm to provide flexible color manipulation and control in the XD200. ColorView provides



Mitsubishi's XD200 ColorView projector brings image management a step further.

color control on six axes (red, blue, green, cyan, magenta, and yellow). Users manipulate each color independently by moving a toggle bar.

Presenters using the XD200 can also match their portable PC displays to their projectors without a complicated calibration process, by using the sRGB color standard. The combination of sRGB, the ColorView algorithm, and DCDi helps users to accurately predict their output in the meeting room; it also makes the XD200 a top-notch performer for watching movies and sports at home.

Presenters will find intuitive controls and robust imaging features in ViewSonic's PJ350. The PJ350 includes a one-touch setup button for fast, easy synchronization and sharp focusing. Its wireless remote control affords total control, flexibility, and convenience. And the PJ350's PersonalTheater projection feature makes setting up home entertainment applications just as easy.



ViewSonic's PJ350 includes a one-touch setup button for fast, easy synchronization and sharp focusing.

HELP WHEN YOU NEED IT

Both Mitsubishi and ViewSonic back their projectors with warranties for parts, including lamps. Users of the XD200 can count on "Emergency Roadside Assistance" for projectors under warranty: Mitsubishi will replace malfunctioning projectors the next business day whenever possible.

ViewSonic PJ350 users can turn to 24/7 toll-free technical support for their projectors, and opt for 48-hour "Express Exchange Service" for problem units.

While hardware manufacturers can provide expert advice for their own projectors, and technology consultants can get the kinks out of ad-hoc presentations, only a design consultant who knows presentation software can help a speaker to make the greatest visual impact possible.

"If I were using PowerPoint," says speaker Ken Braly, "a design consultant could show me more effective ways to use the program."

He or she could also show Braly how to make better use of a remote mouse, laser pointer, or wireless Internet access.

But Braly also warns speakers not to go overboard when seeking advice from high-tech gurus and designers.

"The presentation itself is foremost, and the technology should aid the presentation and not get in the way," Braly says. "If the audience walks out marveling at your gee-whiz technology, but doesn't remember what you said, you've failed."



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Whether your PC is brand new or showing its age, the best utilities will keep it in tip-top shape.

BY LINCOLN SPECTOR
ILLUSTRATIONS BY PJ LOUGHRAN

MAINTAINING A COMPUTER is much like maintaining a marriage—healthy ones require both regular attention and occasional extra effort. Neglect either your spouse's or your PC's needs, and you risk having to get along by yourself.

Utilities—applications that maintain and repair your system—help your PC run better and more dependably. Patience, love, and an open mind, among other things, make your marriage run smoothly, but few people want marital advice from a computer magazine, so we'll stick with what we know.

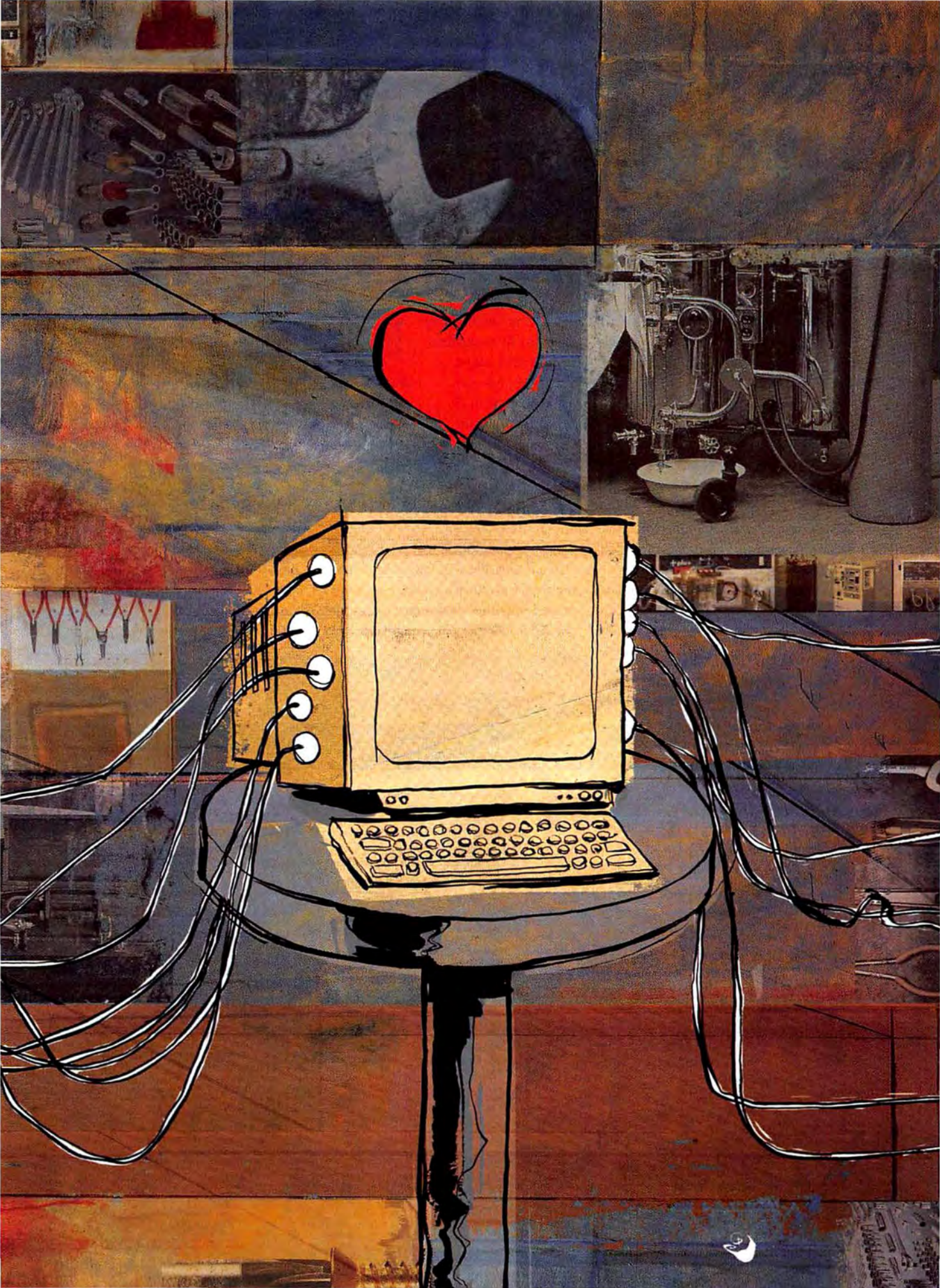
We tested 22 utilities and grouped them according to task: programs designed for setting up a new or updated system; apps for diagnostics, repair, and cleanup; and several more that you might—or should—run regularly, such as defragmenters.

At the end of this article, we also look at how the two major utility suites—Symantec's Norton SystemWorks 2002 and Ontrack's SystemSuite 4 Fix-It Utilities—measure up as overall packages and how their components compare to stand-alone applications (McAfee, whose suite we reviewed last year, is phasing out its McAfee Utilities product). But this article isn't about suites exclusively; you can easily maintain a healthy computer without either of these. (We'll discuss security utilities, such as antivirus software and firewalls, in our July issue.)

Another package chock-full of helpful utilities debuted last year—it's called Windows XP. (Throughout this roundup, we treat Microsoft's latest operating system as a new utility suite, though some of its tools appear in earlier versions of Windows, too.) In some cases, the tools built into Windows XP performed better than the retail software we reviewed for this article. ►

Tools

for Trouble-Free Computing



Setting Up Your System

YOU DON'T MIGRATE your files to a new computer every week, and you may never have to repartition your hard drive. But sooner or later you'll undoubtedly have to migrate files, and repartitioning may come in handy if you want to use multiple operating systems, back up your entire system easily, or store your programs and data under separate drive letters.

Migration

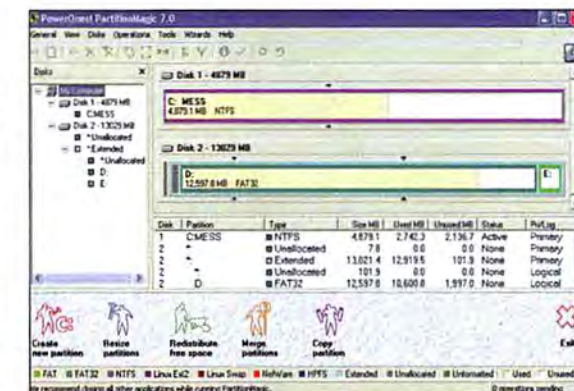
Best Buy: V Communications PC Upgrade Commander

UPGRADING TO a new computer should be easy, but in fact it can be incredibly difficult. Not only do you have to reinstall and fine-tune applications, but you have to figure out how to move all of your data and settings. Migration programs can help. Simply install the same program on

both your old and new machines, then run a wizard. The application transfers files and Registry settings from your old PC to your new one.

We moved data from a computer running Windows 98 to one running Windows XP, using three commercial migration programs—LapLink's PC Sync 3, Miramar Systems' Desktop DNA, and V Communications' PC Upgrade Commander—plus Windows XP's own Files and Settings Transfer Wizard. Most of them were helpful; none was a panacea.

In our tests, the Windows wizard didn't move the desktop's wallpaper, and it moved only the Start menu items that pointed to files, skipping ones that pointed



PARTITIONMAGIC 7 makes it easy for you to organize your drive into multiple partitions.

to programs—not a serious omission, but a hassle if you've spent time organizing your Start menu. Its Outlook Express results were odd: The wizard was the only program to move the mail rules—by far the hardest part—yet it didn't move the accounts or messages.

PC Upgrade Commander, our Best Buy, moved both the accounts and the messages, but not the rules. It was also the only program that moved actual applications (with a warning that you might

FEATURES COMPARISON

Migrate Files and Create Partitions

MIGRATION PROGRAM	Street price (3/1/02)	Supported operating systems	Features	Comments
LapLink PC Sync 3 find.pcworld.com/24134	\$79	Windows 95/98/NT 4.0/Me/2000/XP	Synchronizes and migrates between two PCs via network, serial cable (included), or Internet.	Failed to move My Documents and files that weren't "supported." By far the most difficult-to-use program of the four we tested. ★★☆☆☆
Miramar Systems Desktop DNA find.pcworld.com/24135	\$40	Windows 95/98/NT 4.0/Me/2000/XP; Linux; DOS	Migrates files and performs scheduling, disk spanning (for copying large amounts of information), and multi-user migration.	Missed Outlook's address book and rules, but moved the mailboxes and accounts. It transferred some, but not all, of the Start menu's shortcuts. ★★☆☆☆
Best Buy V Communications PC Upgrade Commander find.pcworld.com/24133	\$50	Windows 95/98/NT 4.0/Me/2000/XP	Transfers settings using network, parallel cable (included), or removable media devices such as Zip and Jaz.	Only PC Upgrade Commander moved the entire Start menu and installed applications (with a warning that you might have to reinstall some of them). ★★☆☆☆
Windows XP Files and Settings Transfer Wizard find.pcworld.com/24131	Bundled with Microsoft Windows XP	Windows XP	Moves applications, files, and settings. Includes tools for IT professionals and home users.	Try this before you buy anything. The program had limited success with Outlook Express: It moved mail rules, but not accounts or messages. ★★☆☆☆

PARTITIONING SOFTWARE

Best Buy PowerQuest PartitionMagic 7 find.pcworld.com/24120	\$70	Windows 95/98/NT 4.0/Me/2000/XP; Linux; DOS	Supports FAT16, FAT32, NTFS, and Linux EXT2/Swap file systems.	Can divide, merge, and copy partitions within Windows on hard drives as big as 80GB. Offers boot management for multiple OSs. ★★★★★
V Communications Partition Commander 6 find.pcworld.com/24129	\$40	Windows 95/98/NT 4.0/Me/2000/XP; Linux; DOS	Supports FAT16, FAT32, NTFS, VFAT, and Linux EXT2 file systems.	Has automated partitioning, and a backstep wizard to undo partitioning and to resize, create, move, and copy partitions. Works in DOS, not Windows. ★★☆☆☆



HOW WE TEST: We tested partitioning software on a 1.5-GHz Pentium 4 system with 256MB of RAM and Windows XP Professional. We started with a 26.9GB partition on a 60GB drive; then we created a new partition using the drive's free space, resized the original partition, and moved the original partition.

have to reinstall some of them anyway—we didn't, because the apps worked fine). As a safety net, it prevents programs transferred from the old computer from starting automatically on the new machine, so you can test them. It was the only migration program we used that managed the thorny task of transferring the entire Start menu. The retail software package includes a parallel cable.

Desktop DNA asks so many questions, you're sure it will do a great job. Unfortunately, it does not. The program transferred Start menu shortcuts pointing to files, but not those pointing to programs. Outlook Express mailboxes and accounts made the move, but the address book and rules did not.

PCMover, the migration component of LapLink's PC Sync 3, was the only program we looked at that failed to perform the fundamental chore of moving My Documents—an unforgivable flaw. It also skipped data files in Quicken. A LapLink representative told us that PCMover does not support Quicken and e-mailed us instructions for manually selecting Quicken files to transfer them.

Though PC Sync can perform migration, its main function is to keep the files on two PCs synchronized. It costs more than the other programs we tested, and it's by far the most difficult to use of the four. Just getting two computers to recognize each other was a challenge. PC Sync includes a serial cable to connect two PCs.

Partitioning

Best Buy: PowerQuest PartitionMagic 7

WHY SPLIT YOUR HARD DRIVE into partitions rather than leaving the drive as one big storage bin? For starters, doing so lets you back up the data in one partition onto a second. Partitioning software also lets you put more than one operating system on your PC and switch among them.

The two programs we reviewed—PowerQuest's PartitionMagic 7 and V Commu-

nications' Partition Commander 6—can resize, create, and delete partitions.

Partition Commander 6 runs entirely in DOS. Once the program is up and running, the interface looks like a Windows app, and it's easy to use. But if you use a wizard, it works on tasks one step at a time. In other words, you can't tell it to resize one partition and create another, and then go take your coffee break.

PartitionMagic 7, our Best Buy, is basically a Windows program, although it has to exit and reenter Windows to finish its chores (a DOS version of the program comes in the package, too). PartitionMagic's Windows program is every bit as easy to use as Partition Commander's Windows-like environment. The program also helps you split an existing partition in two and pick which folders go onto which new "drive." After you've told PartitionMagic what to do, click a button to confirm the changes; then take a break while PartitionMagic reboots into either the single-tasking Recovery Console environment (in Windows 2000 and XP) or DOS (in Windows 9x and Me), makes changes, and then reloads Windows.

Adding a new operating system proved complex and difficult with both programs. Partition Commander has an Add an OS Wizard, but XP isn't one of its options. When you're installing an oper-

ating system on a clean partition, it's not obvious with Partition Commander 6 which partition is the clean one. Partition-Magic 7, on the other hand, won't prompt you to install the boot manager—a little program that lets you choose your operating system each time you start up.

Regular Maintenance

ONCE YOUR SYSTEM is configured the way you want it, file backup programs will keep your data safe, and defrags will keep your hard drive running reliably.

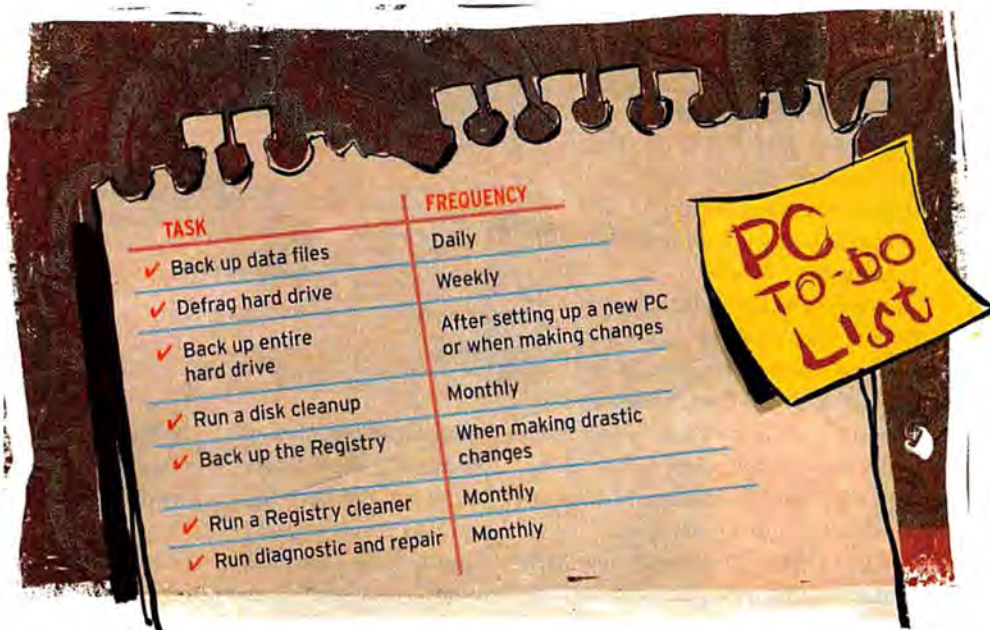
File Backup

Best Buy: Stomp Backup MyPC

FAILING TO BACK UP your data is playing with fire. Imagine losing your address book or that big project due tomorrow.

If timely access to your data is essential, you need a more sophisticated solution, one that includes regular, automated, incremental backups to a network. Average users won't need such precautions: Backing up files and settings you've created or changed should be enough.

If your hard drive goes down, however, you'll have to reinstall everything. The best way to deal with day-to-day back-



ups is to use a CD-RW drive. Consequently, we tested four programs—Stomp's BackUp MyPC, NewTech Infosystems' Backup Now 2.5.1, Dantz's Retrospect Express 5.6, and Iomega's QuikSync 3—that can back up using CD-RW drives.

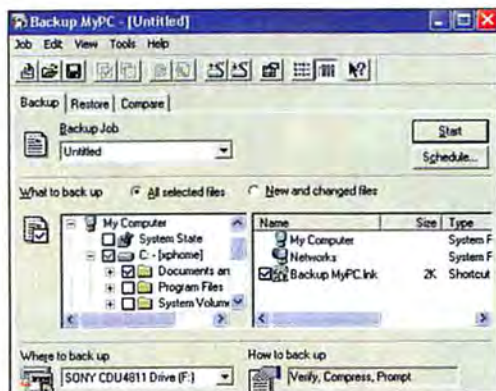
Stomp's BackUp MyPC, formerly Backup Exec Desktop by Veritas, wins top honors for its ease of use and lack of serious flaws. Setting up a backup routine is simple, using either the wizard or dialog boxes. You can easily define full and incremental backups, schedule them, and restore files.

At first glance, NTI Backup Now 2.5.1 seems every bit as easy to use as BackUp MyPC. But the longer you work with Backup Now, the more shortcomings you discover. For instance, when Backup Now fails to back up a single file (which is quite

common among backup programs), it doesn't mark the files it did back up, and as a result it backs them up again—modified or not—next time. Backup Now offers only limited support for storage devices, but a new version, 3.0, will include support for additional media and devices.

If Best Buys were awarded on ability

WITH BACKUP MYPC,
select just the folders
you need to back up.



alone, Dantz's Retrospect Express 5.6 would win. One very nice touch: Retrospect can restore a drive to the state it was in after its last backup (even recognizing and not restoring files that were purposely deleted).

But Retrospect Express is difficult to use. For example, instructing it to back up specific folders involves defining the folders as "sub-volumes"—a procedure that's neither obvious nor clearly explained. (Dantz says it will address this problem in the next version.) This is software for

people who have time to read the manual.

Iomega's QuikSync takes a different approach: It backs up automatically in the background while you work. However, QuikSync can't support CD-RW drives

FEATURES COMPARISON

Back Up Files and Defragment Your Hard Drive

FILE BACKUP PROGRAM	Street price (3/1/02)	Supported operating systems	Features	Comments
Dantz Retrospect Express 5.6 find.pcworld.com/24123	\$49	Windows 95/98/NT 4.0/Me/2000/XP	Full or partial backups to a variety of media, including tape, disk, recordable CD, and recordable DVD.	Does modified file backups, allowing you to recover the state your drive was in at the time of the last backup. Don't plan on using this software without reading the manual. ★★☆☆☆
Iomega QuikSync 3 find.pcworld.com/24122	\$40	Windows 95/98/NT 4.0/Me/2000/XP; Mac OS 8.5.1 and higher	Backs up files to your hard drive in the background while you continue to work. Includes a scheduler.	QuickSync backs up to disk (including all Iomega removable products) but depends on your drive's packet-writing software to enable it to back up to CD-R/RW. ★★★★★
NewTech Infosystems Backup Now 2.5.1 find.pcworld.com/24139	\$70	Windows 95/98/NT 4.0/Me/2000/XP	Backs up image/partition or individual files and folders to recordable CD media. Includes a scheduler.	As easy to use as BackUp MyPC, but we saw several shortcomings. If it fails to back up a single file, it doesn't mark the files that it did back up. ★★☆☆☆
Best Buy Stomp BackUp MyPC find.pcworld.com/24121	\$79	Windows 98SE/NT 4.0 (SP4 or higher)/Me/2000/XP	Full or incremental backups to a variety of media, including tape, disk, recordable CD, and recordable DVD.	Veritas Backup Exec's heir wins top honors because it makes backup routines simple to set up, via wizards or versatile dialog boxes. Allows one-button backup and restore. ★★★★★
DEFRAGGER				
Ontrack SystemSuite 4 JetDefrag find.pcworld.com/24124	\$60	Windows 95/98/NT 4.0/Me/2000/XP	Has defragmenting utility and scheduler.	Not as fancy or as pretty as Speed Disk, but it's simple to use. ★★☆☆☆
Symantec Norton SystemWorks 2002 Speed Disk find.pcworld.com/24125	\$70	Windows 98/NT 4.0/Me/2000/XP	Has defragmenting utility and scheduler.	Includes an easy-to-use scheduler. Pretty to look at, with lots of bells and whistles. ★★★★★
Best Buy Windows XP Disk Defragmenter find.pcworld.com/24126	Bundled with Microsoft Windows XP	Windows XP	Has defragmenting utility.	Fast, easy to use, and included with Windows. Scheduling is possible, but difficult. ★★★★★



HOW WE TEST: We ran PC WorldBench 4 benchmarking software on a 1.5-GHz Pentium 4 system with 256MB of RAM, Windows XP Professional, and a fragmented 54.26GB drive. Then we installed and ran a defragmentation program, and ran PC WorldBench 4 again.

without the help of software that isn't included. But a program such as Roxio's DirectCD, which likely came bundled with your CD-RW drive, will do the job.

Defraggers

Best Bet: Windows XP Disk Defragmenter

AS YOU CREATE, delete, and edit files, they become increasingly fragmented—scattered in pieces all over the hard drive. A defragger reunites these pieces. We used to say that defragging would speed up a system, but with today's larger, faster hard drives, that no longer seems true.

The PC World Test Center's tests reveal that defraggers don't actually improve performance. And Steve Gibson, president of PC consulting firm Gibson Research Corporation, confirmed our findings.

Nevertheless, regular defragging is still a good idea to aid disaster recovery. The more fragmented the files on your drive are, the more likely a disk error is to destroy them.

But while there is reason to use a defragger, there's no reason for you to buy one. Symantec's Norton SystemWorks has a defragger called Speed Disk, and Ontrack SystemSuite 4 includes JetDefrag (apparently both companies still want you to think of their defraggers as speedup tools).

Windows XP's Disk Defragmenter, on the other hand, not only comes with the operating system, but is simple and fast.

The only reason we can see to use a defragger other than Windows' own is to make scheduling easier. (Windows' Disk Defragmenter has no built-in scheduler.)

Pretty to look at, Speed Disk has lots of accoutrements, but they're of questionable value. For example, you can specify where on the disk files will go, though we haven't found evidence that such optimization enhances performance.

Ontrack's JetDefrag may not be as fancy as Speed Disk, but it gets the job done. It doesn't let you choose where on the disk particular files go, though Ontrack claims to place files intelligently for quick access.

Occasional Maintenance

SOME JOBS you don't have to do regularly, but only when necessity dictates. For instance, if your hard drive fills up, a disk cleanup program can make room. When things aren't working properly, diagnostic tools may find and fix the problem. And to prepare for the worst, drive imaging software can provide an exact copy of your hard drive's state in happier days.

Disk Cleanup

Best Buy: Ontrack SystemSuite 4

HARD DRIVES accumulate junk. If you're running out of room, you have to get rid of something. But what? Cleanup pro-

grams help you locate seldom-used files, leftover temporary files, and other space wasters.

Windows' Disk Cleanup isn't an overly ambitious tool. It cleans out obvious file types (temporary Internet files, Recycle Bin, and so on), and not-too-obvious ones like downloaded program installer files.

Ontrack's SystemSuite 4 Fix-It Utilities wins our Best Buy because of its wide assortment of cleanup utilities and its integrated file viewers, which let you examine files before you delete them.

One of Ontrack's utilities, QuickFileClean, easily takes care of safely deletable files. For a more thorough cleanup, AdvancedFileClean helps you choose files to delete. The program clearly explains file types and their history (for example, "Graphics, sound, and movie files that have not been accessed since 1999"), and its expandable outline file list and file

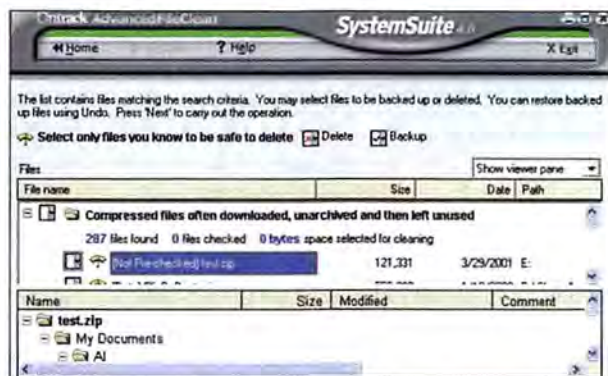
viewers help you decide what goes. Well, mostly: The file list's layout makes it difficult to see what folder a file is in.

McAfee QuickClean 2 falls short of a Best Buy, primarily because it lacks file viewers. This omission is all the more annoying when you notice a grayed-out "Viewer" option on the menu—grayed out because the application works with QuickView, a discontinued Windows accessory.

If QuickClean does not clean enough for you, the program includes additional tools

to help you examine files by category (fonts, data files) and decide which files stay and which go. QuickClean one-ups the other contenders in one respect: It's the only program we reviewed for this article that can search for and remove duplicate files—and that can reclaim a lot of space. This is a dangerous maneuver, however, because two applications may look for the same file in different places (QuickClean properly warns you).

Symantec's CleanSweep, available both in SystemWorks and as a \$30 stand-alone program, contains a simple utility, ▶



grams help you locate seldom-used files, leftover temporary files, and other space wasters.

These programs know that some files, such as those in your Temp folder or in the Recycle Bin, are safe to delete. Others, such as old Word documents and duplicate files, are questionable—you, not the program, must decide file-by-file which can go. All of the programs we reviewed offer a quick and easy way to remove the safely deletable files; the question is, how do they help you choose among other files that you may or may not want to delete?

We took a look at Windows XP's Disk Cleanup tool, and at the file-cleaning capabilities of Symantec's and Ontrack's suites, plus Network Associates' McAfee QuickClean, a stand-alone program.

SHOULD YOU DELETE that file? Ontrack's AdvancedFileClean lets you view as you decide.

Fast & Safe Cleanup, as well as Internet cleanup tools and an uninstaller, but its tools for creating more room on your hard drive are decidedly limited. You cannot, for instance, go through a list of deletion candidates and say yea or nay.

In theory, cleanup programs are also uninstallers that remove applications, but we found that these programs do even less than the uninstall routines accompanying the software that you're trying to remove. (Windows' own Add/Remove Programs control panel is merely a shell for launching these routines.)

Diagnostics and Repair

Best Buy: Ontrack

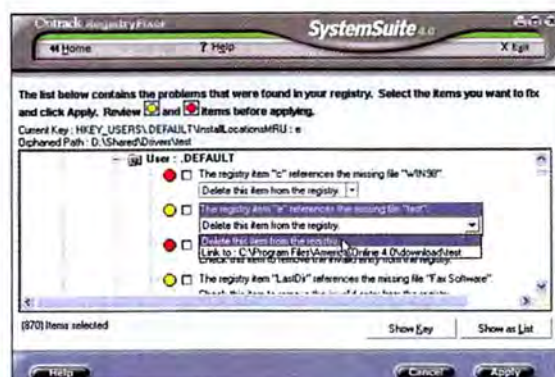
SystemSuite 4

COMPUTER HARDWARE fails occasionally, and headaches with Windows are entirely too common.

Most of Windows' problems exist in one place: the Registry—a database that contains Windows' settings, application and hardware configurations, hardware specifications, and user identifications and preferences. It also contains potentially conflicting junk inserted by every program you've installed—including those you've unin-

stalled. We took a good look at programs intended to clean and repair the Registry, as well as those that back it up.

XP doesn't offer a Registry cleanup tool, but it has a great way to back up and restore the Registry: System Restore, which backs up the Registry automatically every



SYSTEMSUITE'S
Registry Fixer rates
problems by the danger
involved in fixing them.

24 hours by default and lets you restore it manually whenever you want. Regular and frequent backups of the Registry are critical because restoring an incompatible version can prevent the operating system from functioning. Restoring the Registry manually in Windows XP entails walking through a short and simple wizard, and a reboot.

Of the third-party programs we looked at, Ontrack's SystemSuite offers the most

extensive set of hardware diagnostic and Registry cleanup tools. One of them, PC Diagnostics, runs many hardware tests. Reasonably clear descriptions usually succeed in explaining what a test will do.

Symantec's Norton SystemWorks, by contrast, no longer contains the hardware diagnostics program included in earlier versions. Instead, Symantec focused its efforts on other areas of the suite.

Both suites offer similar Registry cleaners. Symantec's WinDoctor and Ontrack's Registry Fixer examine the Registry, provide a list of problems, and then let you fix them en masse or one at a time. They nearly always find a huge number of problems, so expect to give up on the one-at-a-time stuff and go the all-at-once route.

Ontrack's Registry Fixer won't let you "fix" a potentially dangerous problem—such as a Registry listing that could render Windows unbootable if changed or deleted—without examining it first. WinDoctor, on the other hand, simply doesn't list the dangerous ones. In theory, this gives Registry Fixer a major advantage, but in reality, it's a minor one—you probably won't have the patience to trudge through all of the hundreds of potentially dangerous problems anyway.

FEATURES COMPARISON

Clean Up Your Hard Drive

DISK CLEANUP PROGRAM	Street price (3/1/02)	Supported operating systems	Features	Comments
McAfee QuickClean 2 find.pcworld.com/24128	\$79	Windows 95/98/NT 4.0/Me/2000/XP	Removes ActiveX controls, histories, cookies, caches, and old e-mail messages and attachments; also offers file shredding and an Application Remnant Cleaner.	Basically solid product misses a Best Buy because of its lack of file viewers (despite a grayed-out Viewer option on its menu). ★★★★★
Microsoft Windows XP Disk Cleanup find.pcworld.com/24127	Included with Microsoft Windows XP	Windows XP	Cleans temporary Internet files, Recycle Bin, and downloaded program installer files.	Sufficient for light duty, but go for a more powerful tool if your hard drive is completely full. ★★★★★
Best Buy Ontrack SystemSuite 4 Fix-It Utilities find.pcworld.com/24124	\$60	Windows 98/NT 4.0/Me/2000/XP	Offers a wide assortment of cleanup utilities; has integrated file viewers.	Has the most thorough file-cleaning tools of the four utilities we tested. Advanced cleaners allow you to review the files before you delete them. ★★★★★
Symantec Norton CleanSweep 2002 find.pcworld.com/24125	\$30 (stand-alone)/\$70 (suite)	Windows 98/NT 4.0/Me/2000/XP	Gets rid of unwanted Web cookies, ActiveX controls, browser plug-ins, and other Internet files.	Includes Internet cleanup tools (to remove unneeded files) and an uninstaller, but its tools for making room could be more versatile. ★★★★★

Ontrack's SystemSuite has a useful Registry backup program, System Saver, that you can schedule. Symantec included a similar tool in SystemWorks 2001, but no longer offers it. Windows XP's System Restore makes that tool unnecessary.

Disk Imaging

Best Buy: PowerQuest

Drive Image 5

TODAY, MANY computers ship with an image file of the system included on their hard drives. Should you encounter a problem that you can't fix, this disk image file allows you to return the system to its original state.

But wouldn't it be better to return it to a point when it last worked properly—with all of your personal tweaks intact? Drive imaging software can do that for you. Unlike with file backup software, you probably won't need to use it frequently. Instead, use it after setting up your new PC, and again after making a major change, such as installing an application. The main difference between drive imaging and file backups is that drive imaging is meant to return you to a complete working installation, whereas file backups protect the day-by-day changes to your data.

A drive imaging program creates an exact copy of your hard drive setup and stores it in one large compressed file, which you can save on a dedicated partition on your hard drive or on a series of CD-R or CD-RW discs.

Writing an image to a partition is faster and easier but requires a lot of free drive space (as well as partitioning software). And if your drive dies, you're out of luck.

Like partitioning programs, the three drive imaging programs we reviewed—PowerQuest's Drive Image 5, Symantec's Norton Ghost 2002, and V Communications' DriveWorks—need to boot into DOS to do their thing. PowerQuest says Drive Image 2002, which wasn't ready in time for this review, will support backup and partitioning from within Windows.

The current version of Drive Image wins our Best Buy because it's easy to use

DRIVE IMAGE 5's simple interface makes it easy to create and restore an image of your hard drive.



and reliable. As with the company's Partition-Magic, Drive Image has modules that work inside and outside of Windows. You can load the Windows program QuickImage, tell it that you want to back up the C: drive to a file, set options such as the compression level, and then click the Create Image icon. QuickImage will then close Windows, reboot to DOS, perform the imaging, and boot back into Windows.

We found nothing easy about Norton Ghost 2002, but in its defense, it is designed with highly technical corporate IT users in mind. You load Ghost by booting from a floppy—a floppy that you create from a wizard inside Windows. Be careful what options you pick in that wizard, however. If you don't read the on-screen fine print, you could easily create a floppy that can write to a CD-RW but not read from it. In other words, you'll be able to create a hard drive image, but should disaster strike, you won't be able to restore it.

Once you've booted into the DOS-based Ghost, you have to contend with confusing terminology ("Proceed with partition dump?") and an annoying copy-protection scheme. One thing in Ghost's favor: It's the only imaging program of the three that will work across a network, giving you an option other than backing up to a partition or a CD-RW disc.

DriveWorks combines drive imaging with a version of Partition Commander. It's a good thing it can create partitions,

because DriveWorks does not support recordable CD media at all—V Communications says that'll arrive in a future release. As with Partition Commander, Windows XP users have to boot DriveWorks from the included CD-ROM or floppy. And if you boot from one of these disks, you can create, resize, or back up an NTFS partition (the preferred kind for Windows 2000 and XP) or a FAT32 partition (preferred for Windows 98 and Me).

The Suites

Best Buy: Symantec SystemWorks 2002

SYMANTEC'S SystemWorks 2002 and Ontrack's SystemSuite 4 are both chock-full of useful tools, but most users will be able to get along without either suite. We've awarded Ontrack's SystemSuite two Best Buys for its diagnostic and disk cleaning tools. It's an extremely feature-



FULL-FEATURED but confusing, Norton Ghost suits IT departments better than home users.

rich package, with far more tools in a single box than Symantec offers. But bugs in other areas keep it from winning a Best Buy as a suite. For instance, the All-In-One Wiz-

ard can, on some computers, disable Microsoft's Word XP, although it is relatively easy to enable it again. Symantec wins this year because we didn't stumble upon any such bugs in SystemWorks.

Although neither suite is absolutely necessary, both offer one feature that's essential on any PC: antivirus software. You don't need to buy a whole suite to get a good antivirus program, however.

Both suites have plenty of other tools. For example, each includes a disk ▶

scanner that inspects your hard drive for file system errors such as lost clusters, and optionally scans the drive for physical problems as well. (Symantec's scanner is called Disk Doctor; Ontrack's is DiskFixer.)

Each suite also has an easy way to run multiple maintenance checks. Norton's is called One Button Checkup. SystemSuite has four different maintenance wizards.

Both packages contain an early warning program that operates in the background, looking for problems with your hard drive, Windows, and other trouble spots. Symantec's is called System Doctor; Ontrack's is SystemMonitors. Both suites have a tool that can defragment the Registry (Symantec's Optimization Wizard and Ontrack's Registry Defrag). Both suites offer unerase tools, as well as shredders if you want to make sure that no one will ever recover a particular file. And each program lets you create an emergency boot floppy to help you

SYSTEMSUITE offers many helpful utilities, but SystemWorks proved more reliable.

recover from a disaster. The suites also include tools for monitoring installations and tracking system changes, plus a wizard for removing applications. Both are able to move a program to a different location (folder, drive, or computer), as well as archive and restore a seldom-used application.

Both programs boast Web-based services for updating, but on closer examination, these are merely links to Web sites that offer these services to anyone.

Ontrack's SystemSuite comes with plenty of tools you won't find in SystemWorks, such as NetDefense Firewall, and



a program called CrashProof that tries to stop Windows crashes. SystemSuite also has many file management utilities that SystemWorks lacks, such as PowerDesk Pro. Among the software's other unique tools are ClockSync, which resets your system clock by syncing with an atomic clock, and DiskVerifier, which scans CD media for errors.

Symantec has removed features that were in previous versions of SystemSuite, stating that they weren't popular or were no longer necessary. About the only thing you'll find in SystemWorks that you won't find in SystemSuite is a limited version of Roxio's GoBack, a backup program that operates in the background, tracking every change made to your system files.

To read about more utilities, visit find.pcworld.com/24481, and head over to find.pcworld.com/24101 to download software mentioned in this article. ■

You'll find a collection of Contributing Editor Lincoln Spector's humorous writing at www.thelinkinspector.com.

FEATURES COMPARISON

Keep Your Data Safe

DISK IMAGING PROGRAM	Street price (3/1/02)	Supported operating systems	Features	Comments
Best Buy PowerQuest Drive Image 5 find.pcworld.com/24136	\$70	Windows 95/98/NT 4.0/Me/2000/XP; DOS	Supports FAT16, FAT32, NTFS, HPFS, and Linux EXT2/Swap file systems.	Included QuickImage utility lets you create partitions from within Windows. Offers automatic resize on the fly; restores individual files and folders; supports CD-R and CD-RW. ★★★★★
Symantec Norton Ghost 2002 find.pcworld.com/24137	\$40	Windows 95/98/NT 4.0/Me/2000/XP; Linux	Supports FAT16, FAT32, NTFS, and Linux EXT2 file systems.	Advanced features are better suited for an IT department than a home or small-office user. We didn't like the program's confusing terminology and annoying copy protection. ★★☆☆☆
V Communications DriveWorks find.pcworld.com/24138	\$70	Windows 95/98/Me/NT 4.0/2000/XP; DOS; Linux	Supports FAT16, FAT32, NTFS, and Linux EXT2 file systems.	No support for recordable CD, but the program can create and resize partitions. You can set up a backup routine using the wizard or dialog boxes. ★★☆☆☆
REGISTRY UTILITY				
Best Buy Ontrack SystemSuite 4 Registry Fixer find.pcworld.com/24124	\$60	Windows 95/98/NT 4.0/Me/2000/XP	Performs Registry cleaning, backup, and restore.	Shows a list of problems and then lets you fix those problems en masse or one at a time. ★★☆☆☆
Symantec Norton SystemWorks WinDoctor find.pcworld.com/24125	\$70	Windows 98/NT 4.0/Me/2000/XP	Performs Registry cleaning; diagnoses various Windows problems, including software errors and hardware configuration conflicts.	In our tests, WinDoctor scanned the Registry and found potential problems, but didn't list dangerous ones. ★★☆☆☆



HOW WE TEST: We tested Registry cleaning software on a 1.5-GHz Pentium 4 system with 256MB of RAM and Windows XP Professional.

Performance far beyond "built-in" limits

TEST RESULTS

	Windows 2000/XP Built-in Defragmenter	Diskeeper 7.0
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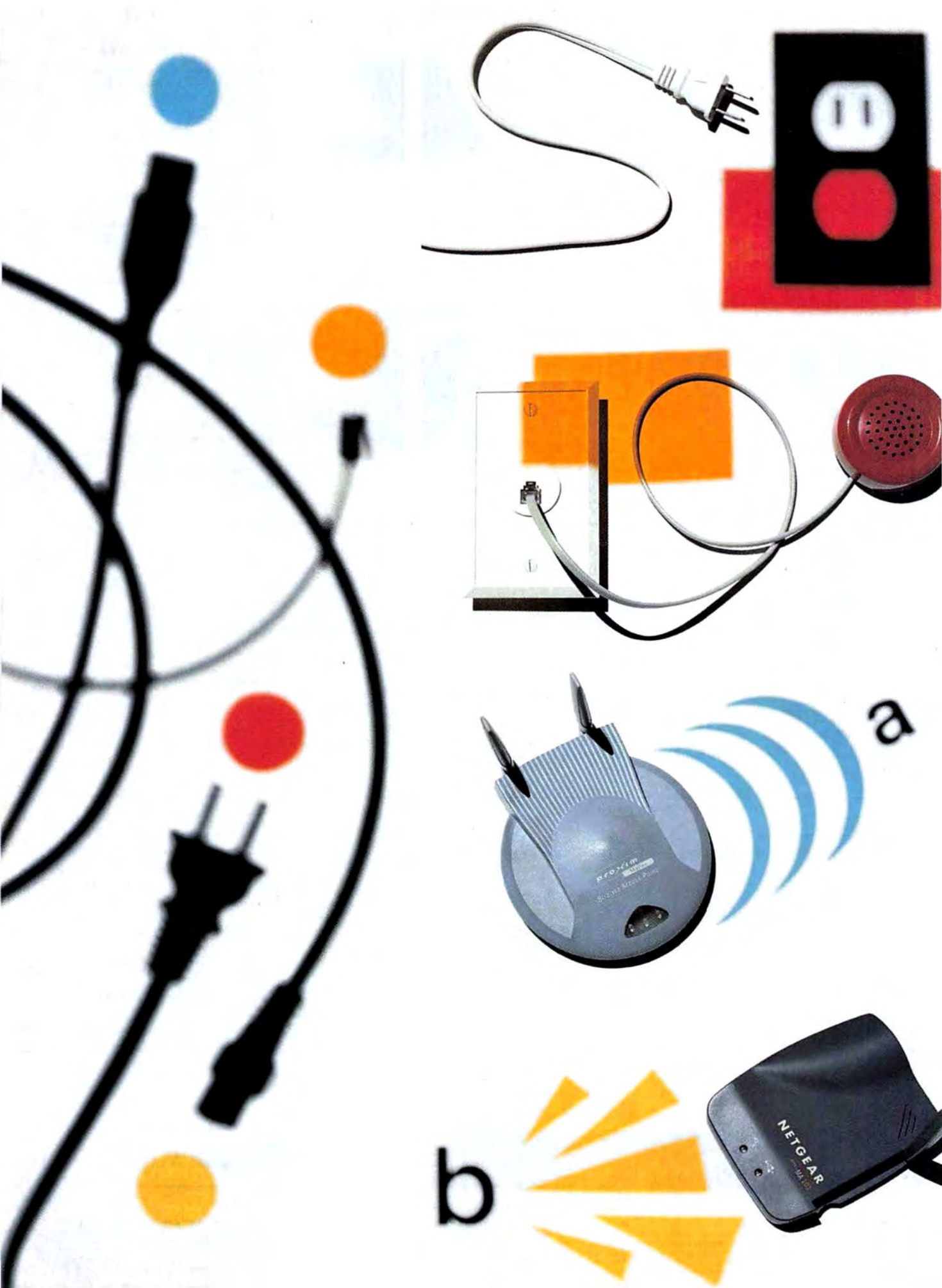
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The No-Hassle Networking Guide

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NETWORKING COMPUTERS used to be a job for IT pros or obsessed hobbyists who didn't mind wriggling into a crawl space to run cable. These days, you can connect PCs in your office or home with an afternoon of work—no new wires needed.

Wireless networking technology is maturing and speeding up. And newer, faster phone-line and power-line network technologies provide inexpensive alternatives for sharing Internet access, files, printers, and multimedia. We tested the latest network technologies, surmounted the most common setup hurdles, addressed network security concerns, and assembled several networking setups to create this guide to no-hassle networking. ►

NETWORKING ANSWERS: New Technologies

BY PAUL HELTZEL

THE FIRST STEP in connecting your PCs is to choose a network technology. And these days you have plenty of options, even if you don't want to run new wires. Each comes with its own advantages and disadvantages, from networks that use existing phone or power wires to different types of wireless networks. To get a feel for which ones work best, we plugged in and tested power-line (HomePlug) and phone-line (HomePNA) networking hardware in a typical home office. We also set up two kinds of wireless networks: 802.11b (also known as Wi-Fi) and the fast, new 802.11a (or Wi-Fi5), checking out their performance at opposite ends of a 20-foot room, 40 feet apart in adjacent rooms, and (when the weather allowed) while working outside on the patio. (See the features chart below for more details on performance and pricing.)

Wi-Fi networks may be the best choice for most small networks. Though the Wi-Fi networking hardware we tested did not ace our speed tests, it offered the best combination of reasonable prices and quick setup. The more expensive Wi-Fi5 equipment performed about twice as fast (averaging 13 mbps). Power-line products turned in impressive results too, cruising to the second-best times in our tests.

Phone-line products, the budget choice in the networking lineup, were among the easiest to set up—Windows XP recognized the adapters and installed the drivers without our having to insert a CD. Simple but sluggish: Phone-line products also provided the slowest file transfers.

Any of these no-new-wires networking

start slower than most wired networks and drop with distance, as well as questions about whether you'll have a strong enough signal to support a connection. But while Wi-Fi5 equipment—the latest generation of wireless networking hardware—is too expensive for most home users, it's the fastest technology we tested, and it offered easier installation than did comparable Wi-Fi products.

Surprisingly, the Intel Pro/Wireless 5000 CardBus Adapter came with only a

WI-FI5'S BIGGEST HANG-UP IS THAT IT'S INCOMPATIBLE WITH LESS-EXPENSIVE WI-FI NETWORKS.

technologies has more than enough bandwidth for basic file, printer, and Internet sharing. In some cases, though, you might want to consider mixing the products to create a hybrid network (see **Scenario 4**, page 101) that gives you the roaming ability of wireless products with the reliability of wired network hardware.

Q: What's the fastest wireless networking technology now available?

A: Wi-Fi5

WIRELESS HARDWARE OFFERS some obvious benefits (such as surfing on the porch) and some not-so-obvious drawbacks, including real-world speeds that

small paper instruction sheet. Installation was a breeze, however. Using default settings, we networked two notebooks with Pro/Wireless 5000 adapters in about 15 minutes. Since Wi-Fi5 equipment is so new, and since vendors are targeting businesspeople on the move (at least around the office), PCI cards weren't available in time for our testing. As a result, we tested Wi-Fi5 using PC Card network adapters on two laptops running Windows XP.

Wi-Fi and Wi-Fi5 hardware installations are similar except in one detail: For Wi-Fi5, you won't find any USB adapters, a mainstay of Wi-Fi networking. USB connections would create bottlenecks in

FEATURES COMPARISON

No-New-Wires Network Standards

NETWORK STANDARD	Street price			Rated speed (mbps)	Tested speed (mbps) ¹	Comments
	PC Card	PCI card	USB 1.1			
Wi-Fi5/802.11a	\$130-\$170	\$180-\$200	n/a	54	13.1	Speedy, flexible, and capable of handling multimedia. So what's not to like? It's expensive and incompatible with 802.11b. And no 802.11a routers are yet available.
Wi-Fi/802.11b	\$80-\$120	\$120-\$140 ²	\$140-\$150	11	4.1	Reasonably priced entry into wireless networking. Lots of options for routers, access points, and adapters.
HomePNA	\$60-\$70	\$30-\$60	\$50-\$70	10	4	Easy installation, low cost. Fine for Web use but sluggish for file transfers.
HomePlug	n/a	\$150	\$150	14	5.2	Plugs into any outlet in your home. Strong bet for large homes where wireless signals will be weak. Its adapters are twice as bulky as wireless adapters.

n/a = Not applicable.

¹ Medium-range test; see Test Report, page 90. ² If you already have a wireless PC Card, you can buy a PCI card with a slot to accommodate it for \$40 to \$60.

802.11a networks, which can transfer data more than twice as fast as the USB 1.1 connections most PCs have.

The 802.11a standard theoretically tops out at a blistering 54 mbps, though we never achieved even half that speed in our tests. Still, the Wi-Fi5 cards we evaluated delivered impressive real-world performance. Our throughput rates peaked at around 22 mbps and averaged around 13 mbps—that's more than twice the speed of the Wi-Fi, HomePlug, and HomePNA equipment we tested.

The drivers for most wireless adapters assume that you'll be using an access point to relay signals between your PCs. In network-speak, this is called "infrastructure" mode. But wireless cards can also work in "ad-hoc" mode, where the cards communicate directly with each other—no access point needed. Unfortunately, Wi-Fi5 access points aren't yet available with built-in routers, so to share your broadband Internet connection, you must use an ethernet cable to connect the access point to a stand-alone router. You can pick up a router with a built-in firewall for \$100 or less. Or you can set up a single always-on PC, and use Windows Internet Connection Sharing to share its dial-up or broadband connection.

Though Wi-Fi5 offers a higher level of encryption than Wi-Fi, it still uses Wired Equivalent Privacy, which critics say is too insecure. For home use, however, WEP combined with common sense security setups should be adequate (for more on security, see page 100).

Wi-Fi5's biggest hang-up is that it's incompatible with less-expensive Wi-Fi networks. Whereas Wi-Fi5 operates in the 5-GHz band, Wi-Fi operates in the 2.4-GHz band (as do some other electronics devices, such as cordless phones and microwaves, which can cause interference). Dual-mode access points to bridge communication between the two wireless technologies are expected later this year, though availability and pricing have yet to be announced. Later this year, 802.11g networks promise to combine the speed of 802.11a with 802.11b compatibility.

A wireless Wi-Fi5 PC Card adapter will set you back \$130 to \$170, and an access point currently costs between \$300 and \$400. However, equipment costs will drop as these products spread through the market. Businesses looking to extend their existing networks with the fastest wireless networking equipment available should look into Wi-Fi5.

Q: What's the lowest-cost technology for starting a wireless network?

A: Wi-Fi

ATTRACTED BY THE idea of roaming around with your constantly connected laptop, but not ready to commit to Wi-Fi5 at \$170 per network adapter? Consider the widely used Wi-Fi standard instead. Wi-Fi hardware is fast enough for shared Internet access and most file-sharing duties in homes or small offices.

We installed Wi-Fi adapters from two vendors, Proxim and Netgear, and each installation took about half an hour. Since lots of Wi-Fi products are available, and you can mix and match hardware from different manufacturers, we wanted to test compatibility right out of the box.

If you use adapters or access points from different manufacturers, you'll need to tweak a couple of settings to get everything running smoothly. The SSID (or Service Set Identifier, a name you enter to identify the wireless network) and the radio channel settings (there are 11 channels to choose from) need to match for each wireless adapter. These quick parameter changes are easy to make—and to forget. If they differ at all, the network won't work, and you'll be left to angrily curse the red light in your system tray that signifies no connection.

We plugged in one PC Card and one USB network adapter (in many cases you can connect the adapter to your PC without powering the PC down, but check your manual to make sure), and then installed the drivers and the configuration utility. That's when we hit a minor roadblock: The devices were set, by default, to infrastructure mode. Since we hadn't (yet) set up an access point, we need-

GLOSSARY

UNLESS YOU WORK in an IT department, you'll rarely come across most networking terminology. Enrich your networking lexicon with these terms, and you'll have most of the information you need to lay out a network.

ACCESS POINT A wireless hardware device that attaches to a wired network and sends data to and receives data from your wireless network adapters.

AD-HOC MODE A networking arrangement in which you set your wireless network adapters to communicate directly with each other, rather than through an access point.

FIREWALL A way to prevent unauthorized Internet users from accessing your network, by rejecting incoming requests to access an IP address. A hardware firewall is often built into a router. A software firewall does much the same thing on your PC. Some hardware and software firewalls prevent unauthorized outgoing data as well.

GATEWAY A source of access to the Internet for multiple computers. In most home networks, a router serves as the gateway, though one computer running the appropriate software can also act as a gateway.

HUB A piece of hardware, usually a small box, that contains a series of ports (usually 4, 8, or 16), allowing you to connect your computers to form or extend a network.

INFRASTRUCTURE MODE A network arrangement in which adapters in a wireless network communicate with a central transmitter/receiver called an access point, which functions as a sort of wireless hub.

IP ADDRESS A number that every computer needs to get on the Internet. IP stands for Internet Protocol.

LATENCY The time data takes to arrive at its destination. Excessive latency can cause slow-loading Web pages and noticeable delays in network games.

NODE A computer or other hardware device connected to your network. A PC, a printer server, and a network printer are all nodes on your network.

ROUTER A piece of hardware used to connect one LAN to another. Home networking routers have now added features such as firewalls, and they function just like gateways. The distinction is simply marketing.

SWITCH A more intelligent (and expensive) hub that routes data to the computer meant to receive it. A regular (passive) hub sends data to all of its ports (only the requesting PC accepts the data), which slows things down.

ed to change the mode setting to ad-hoc.

As with Wi-Fi5, the biggest installation hurdle we faced was lackluster documentation. One manual failed to cover XP installation, for example, notwithstanding the XP-ready decal on the box. Another product came only with a small poster to serve as an installation guide—the full manual resides in a PDF file on the accompanying CD-ROM.

Most networks require at least one Wi-Fi access point. Adding an access point (you can find them for \$150 and up) effectively doubles your wireless network's range. To share a cable or DSL connection, look for an access point that has a built-in router; this will allow you to share Internet access with each PC in your network (see **Scenario 2**, page 91).

Though Wi-Fi networks are slower than Wi-Fi5 ones (Wi-Fi hardware consistently achieved speeds of about 4.1 mbps in our tests), they're also far less expensive. If you search online vendors, you can find a Wi-Fi network adapter for as little as \$80. And since Wi-Fi has been around longer than Wi-Fi5, a greater range of compatible products exists, including routers, print servers, and various types of

NEW POWER-LINE NETWORK ADAPTERS TURNED IN THE **SECOND-FASTEST** TIMES IN OUR TESTS.

access points, as well as PCI and USB adapters for connecting a desktop.

Typically, Wi-Fi products offer you a relatively painless way to get started with wireless networking. For the most part, we found that roaming around with a connected laptop worked well. If any adapter is more than 100 feet from an access point, however, you're in for headaches. Too many obstructions, such as walls, brick, and steel, will also greatly reduce your range. In these situations, a wired or hybrid network is a better choice.

Q: What technology can I use to network a group of computers through my existing phone jacks?

A: HomePNA

PHONE-LINE NETWORKING hardware (HomePNA) is the oldest of the no-new-wires network standards we looked at, and it's the least expensive. For \$30 to \$70 per computer, you can quickly create a

network connection anywhere that you have a working telephone jack.

Two D-Link phone-line adapters—which came as part of D-Link's DHN-920 kit—readily connected to PCs in adjacent rooms of the test site, about 40 feet apart. Windows XP automatically recognized the USB phone-line adapter. Then we connected each phone-line network adapter to a regular telephone jack with the included phone cable.

HomePNA hardware won't disrupt your telephone use. When we made phone calls while sending files across the two-PC phone-line network, our throughput remained constant. Each network adapter includes a phone-line splitter, so you can run a cable from the network adapter to a telephone or answering machine or use a separate splitter to split the phone line at your wall jack.

The phone-line-to-USB network adapters were the slowest of the products we tested, consistently transferring data at about 4 mbps. Speeds drop off as line noise increases, so your results will depend on the quality of your line.

Their low cost makes phone-line networks the budget choice for simple file and network sharing in a home or small office that has plenty of phone jacks. Unlike with ethernet hardware, you don't need a hub to connect multiple computers to a phone-line network. Keep in mind, though, that phone-line networks only cover one line at a time. So a network that is set up over the main phone line won't work with a separate fax line or with the line you installed to keep the kids from tying up your main number.

Phone-line networks aren't quite as flexible as either power-line networks (since most homes don't have phone jacks in every room) or wireless equipment (because you can't really roam while you're tethered to a phone jack). But if

TEST REPORT

How Fast Are They Really?

NETWORKING COMPANIES often make impressive-sounding speed claims about their products, based on the theoretical limit of the network technology they employ. The latest generation of network products is no exception, boasting top speeds of up to 54 mbps. Unfortunately, factors such as line noise and interference make it unlikely that you'll experience speeds that fast in the real world. To get an idea of what you can expect, we ran speed tests on representative products using each network technology.

NETWORK STANDARD	Rated speed (mbps)	Real-world throughput (mbps)			35MB file transfer (seconds)	50MB directory transfer (seconds)
		SHORT DISTANCE	MEDIUM DISTANCE	ROAMING		
Wi-Fi5 (802.11a) ¹	54	22.3	13.1	5.2	18.1	26.4
Wi-Fi (802.11b)	11	4.5	4.1	3.7	74	108
HomePNA (phone line)	10	4	4	n/a	71	116
HomePlug (power line)	14	5.5	5.2	n/a	54.3	101

HOW WE TEST: We set up a network of a Gateway desktop PC with a 1.8-GHz Pentium 4 CPU and a Compaq notebook with a 1000/733-MHz Pentium III-M CPU in a typical home office. For our file and directory transfer tests, as well as for the short-distance real-world throughput tests, we set up the PCs at opposite ends of a 20-foot room. For the medium-distance throughput tests, we set up the PCs in adjacent rooms, about 40 feet apart. In our roaming test, we moved the notebook PC outside. n/a = Not applicable. ¹Wi-Fi5 desktop adapters were unavailable for testing, so we ran our speed tests using two notebooks.

you're simply connecting a few household desktops so that they can share a modem or broadband connection (see **Scenario 1**, at right), phone-line products are an excellent way to save money.

Q: What technology will let me use electrical outlets to start a network?

A: HomePlug

MAYBE YOU'D LIKE to start a wireless network, but you're concerned that wireless adapters start to lose their signal and drop in speed as you place them farther apart. Still, you'd like to connect from any room in the house—even rooms without phone jacks. What should you do? Consider a power-line network. HomePlug power-line network adapters will cost you about \$150 for each connected PC and \$179 for a power-line cable/DSL router for sharing a broadband connection.

After all, since most rooms in your house have multiple outlets, plugging into power-line networking could give you an instant network connection just about everywhere in your home. That level of flexibility has made power-line products one of the most anticipated networking technologies to hit store shelves in some time, despite some rather unimpressive early implementations.

As with phone-line products, you don't need a hub to connect more than two computers using HomePlug. And notwithstanding its name, HomePlug can be a great way to connect a small office. Your building's wiring is your hub, and the power line hardware transmits data using those wires, while drawing its power from them. You can plug into power strips, though you should avoid ones with surge protection or line conditioning, either of which can negatively affect power-line data signals. Power-line network adapters contain their own surge protection circuitry, which protects both the adapter and your PC.

The previous iteration of power-line networking products drew ire from folks disappointed by its less-than-blazing 350-kbps speed—much too slow for sharing large files. We looked at a preproduction

SCENARIO 1

How Can I Share a Net Connection Cheaply?

TWO COMPUTERS SHARE a modem connection through Windows Internet Connection Sharing (ICS) on a phone-line network.



Advantages: Inexpensive and simple to set up. No need to purchase a separate router to enable your networked computers to share a single Internet connection.

Disadvantages: The PC connected to the Internet has to stay on continuously.

Cost: Less than \$50 for each for phone-line network adapter (one for each PC you want to network). Starter kits with two adapters go for between \$70 and \$120.

version of a second-generation HomePlug network adapter from Linksys (the PLUSB10), which offers a theoretical top speed of 14 mbps. In tests at an apartment and at a detached home, real-world

throughput topped out at slightly over 5 mbps. Your results might be quite different, depending on line noise.

We connected the adapters to electrical jacks 20 to 40 feet away, with no speed ►

SCENARIO 2

How Can I Connect Without Any Wires?

TWO PCs SHARE a broadband Internet connection, wirelessly, at opposite ends of a house or apartment, or on separate floors.



Advantages: No wires to string. You can place your equipment anywhere within range (about 150 feet between pieces of wireless hardware), check e-mail and surf the Web by the fireplace, and even stay connected in the backyard. Adding an access point positioned as close to the center of your network as possible will essentially double the range of your network adapters.

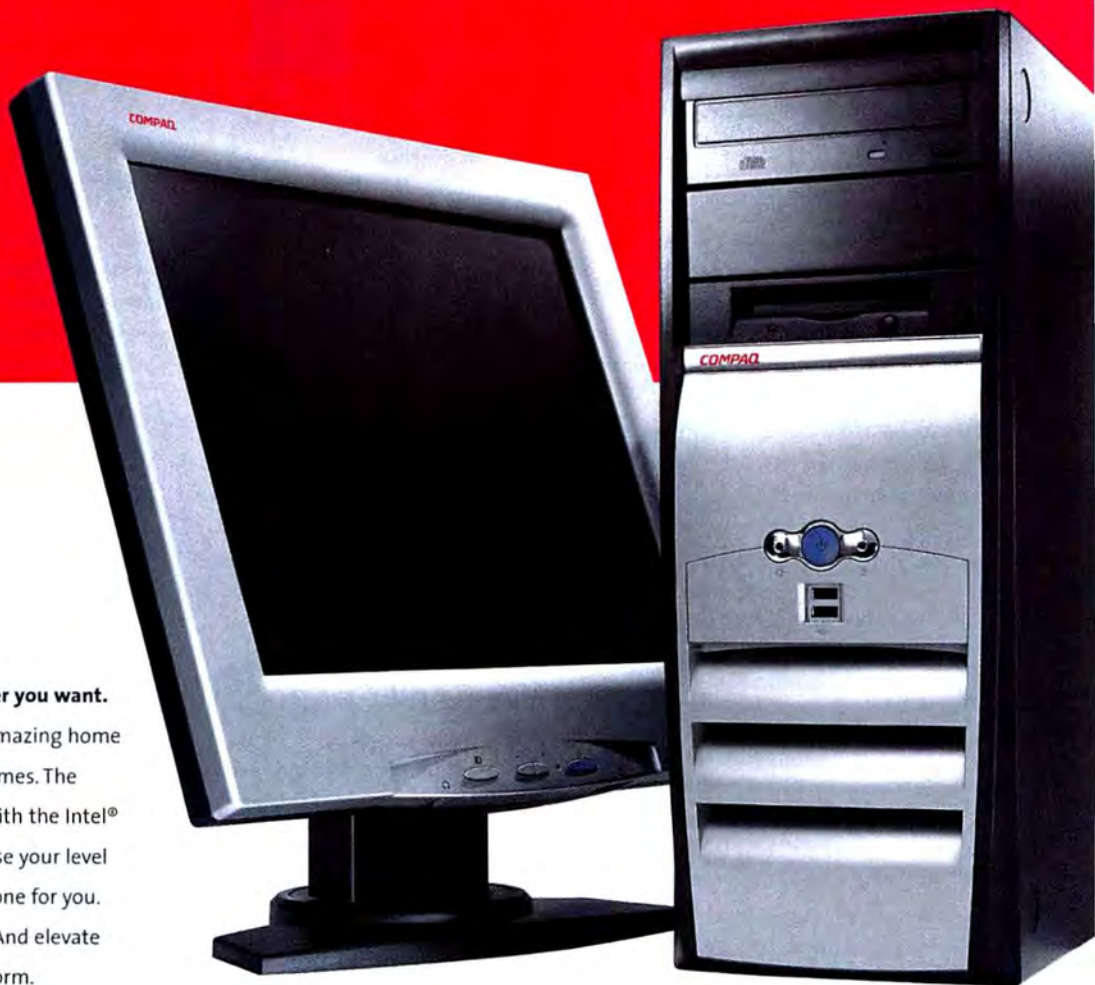
Disadvantages: Limited range. If necessary, you can set up additional access points.

Cost: Wireless network adapters can cost as little as \$80 each. Access points with a built-in router and switch are available for approximately \$150 and up.

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difference over those distances, and the power-line network fared better than both Wi-Fi and phone line in terms of raw speed (see "How Fast Are They Really?" page 90). Setting up USB power line network adapters proved as simple as installing a phone line network product. And once the drivers are installed, you're ready to go. The ethernet-to-power-line bridge that we tested (Linksys's PLEBR10) didn't require new drivers because it connected through the preinstalled ethernet adapter in the test PC.

If you often find yourself crouching under your computer desk to install new equipment, the additional wire that both power-line and phone-line products add to the tangle could be annoying. In addition to being cable-free, wireless network adapters come in less-cumbersome PC Cards and USB adapters that make the equipment less obvious; from an aesthetic standpoint this might be more important at home than at the office.

Still, HomePlug products are a good bet for most homes and should become more attractive as their prices drop over the next 12 months. Power-line networks avoid the security weaknesses of wireless networks while still permitting you to work from any room in your home.

A power-line network can also serve as an intriguing extension to an existing network, creating a hybrid network. One of the power-line network adapters we connected to a desktop was, in fact, a power-line-to-ethernet bridge, which can link a power-line network to a wireless network, for example. For the test, we connected one end of the bridge to the desktop's ethernet network card via RJ-45 cable.

Power-line products instantly extend your network to any outlet in the house and, perhaps just as important, to places where wireless products might have trouble maintaining a strong signal. The back yard is still better served by wireless, but a power-line network may be your best bet for the attic or the basement.

Paul Heltzel is the author of Home Networking Solutions (Muska & Lipman Publishing).

NETWORKING ANSWERS: Setup Tips

BY YARDENA ARAR

Q: What equipment do I need?

A: Regardless of the type of network you have, you'll need an adapter for each device on the network. In some cases your PC may have a built-in adapter—for example, an ethernet port or 802.11b adapter (found in a growing number of laptops). If not, you must add an adapter by inserting a PC Card into your notebook, installing a PCI card in your desktop, or plugging in a USB device.

In addition to needing adapters (also called clients), you may need hardware to connect your devices to each other and to the Internet. For example, if you use a wired ethernet network, you'll need cables to connect your network devices. And unless you're simply connecting two PCs in a room (in which case you could plug an ethernet cable into the adapter on each), you'll probably want a hub—a central connecting point with ports for cables from each networked device. Hubs are frequently priced as low as \$40.

If you want the PCs on your network to share a single Internet account, you may want to invest in a more complex device known as a router (or residential gateway). Routers, available for \$100 or less, make sure traffic gets to the device to which it is addressed. Most residential gateways are basically routers that connect a single incoming Internet hook-up to a home or local-area network.

To set up a wireless network, you need to use a specialized kind of bridge called a wireless access point (about \$150). It's essentially a radio that allows devices with wireless adapters to communicate with a wired network (like the Internet). Since most people who set up a wireless home network also want their PCs to share Internet access, many vendors combine a router with an access point in a device known as a wireless residential gateway.

Q: Do I need to have a router in order to share Internet access?

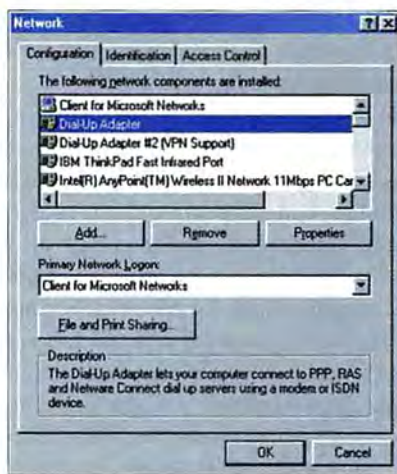
A: No. If you'd rather, you can set up one

of the PCs on your network to serve as a host (which will function as a router) by using software. Your options include using the Internet Connection Sharing software in Windows 98 SE or later and turning to such third-party products as WinProxy from Osis Software, which offers antivirus protection and more robust firewall features than Windows.

Bear in mind that the computer functioning as a router must carry a modem for dialup access or—if you have cable or DSL access instead—two ethernet adapters (one of them



CONFIGURING A NETWORK with Windows' Internet Connection Sharing Wizard is a matter of following a fairly clear set of steps.



FROM THE NETWORK PROPERTIES screen in Windows 98, you can install and configure your network hardware and software.

to attach to a broadband modem and the other to link to your network).

Further, in order for any PC on the network to have Internet access, the host PC must be up and running.

Q: Why would I need a router?

A: It allows you to network numerous PCs (and ethernet-enabled printers) and gives you a de facto firewall without re-

quiring a host computer to remain on. Also, most routers permit you to run a Web server for a personal or corporate Web site, if your ISP allows it.

Heads up: At the time of this writing, no gateway/router products supported a USB connection to a modem; so make sure you avoid getting a USB broadband modem that lacks an ethernet port.

Q: Can I network some computers with wires and some without?

A: Some wireless gateways include ether-

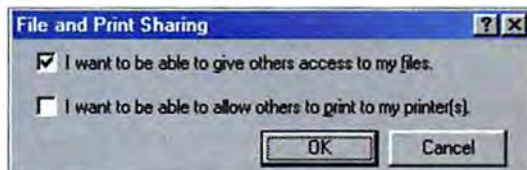
net ports for connecting wired computers and support communication between the two types of networks. You can connect a PC with an ethernet adapter—or you can run a cable from a hub—directly to one of these ports to cre-

ate a hybrid ethernet-and-wireless network. And if you like, you can add HomePlug or HomePNA devices by plugging an appropriate network bridge (HomePlug to ethernet or HomePNA to ethernet) into one of the ethernet ports.

Q: Will my equipment's placement

change the network's performance?

A: In some cases, yes. Wireless networks are the most sensitive to placement, since the radio signals they use to communicate have a limited range. Obstacles such as walls and doors can block the signals. In general, try to put your wireless access point/gateway in the most central location possible relative to the PCs on the network. And try to place each wireless adapter in such a way that its antenna points toward the wireless access point.



MOST NETWORKS REQUIRE you to enable file and print sharing, so protect yourself by setting up a firewall.

Q: Can I network PCs that are running different versions of Windows?

A: Sure. In fact, if you have a hub and/or a router, you can put a Mac or a Linux-based machine on your network to share Internet access. Just remember to enable TCP/IP—the networking protocol of ▶

SCENARIO 3

How Can I Link Non-PC Devices to My Network?

A WIRELESS PRINT SERVER (to the left of the divider) enables several computers to share a printer. A networked consumer electronics product (to the right)—in this case, an MP3 stereo component—connects to a phone-line network.



Advantages: Not every element of your network has to connect to a PC. Adding a print server spools printing jobs so that individual machines can get back to work faster. An MP3-enabled stereo component lets your home audio system play Internet

radio stations and MP3 files stored on networked PCs.

Disadvantages: Adds expense and complexity to the network.

Cost: Wireless print servers cost about \$200. Stand-alone digital audio components are available for between \$300 and \$800.

IF YOU WANT A MAC AND A PC TO SHARE FILES, YOU'LL NEED ADDITIONAL SOFTWARE.

the Internet—on the OS you're using, for the adapter you have. If you want a Mac and a PC to share files or otherwise communicate with each other, you'll need additional software such as Thursby Software Systems' \$149 Dave (www.thursby.com) or the \$199 PC MACLAN from Miramar Systems (www.miramar.com).

If one computer runs Windows XP, disable Internet Connection Sharing on the non-XP system. Use XP's networking wizard to create a copy of the network software for the older Windows PC.

Q: I've installed my network hardware. How can I share files and a printer?

A: Windows 2000's and XP's network setup guides walk you through the Windows settings changes needed to enable your networked PCs to share files and printers.

To enable File and Printer Sharing in your network settings in Windows 98 and 98 SE, right-click *Network Neighborhood* and select *Properties* on the pop-up menu, or open *Control Panel* and double-click *Network*. Windows 95 has File and Printer Sharing enabled by default. To enable File and Printer Sharing in Windows XP, you must use the Network Setup wizard.

You must also specify which drives or folders you wish to share. To do so, right-click the drive (in *My Computer*) or folder, and click *Sharing*. If you use NT File System in Windows 2000 or XP, you can password-protect specific files. Right-click the file, select *Properties*, and click the *Security* tab to set permissions. Enabling file sharing may make your PC vulnerable to hacks, so be sure to use a firewall.

To share a printer, you'll have to install the driver for your printer on each computer on your network, regardless of which version of Windows you're using.

Q: Can I print using any printer attached to another networked PC?

A: No. Most printers will work fine using Windows' built-in printer sharing, but a



WINDOWS XP PROVIDES an array of options for sharing files and printers over a network.

few won't accept jobs over a network. Multifunction devices are the most prone to refusing; consult the manufacturer.

Q: Can I put a printer that lacks built-in ethernet support on my network without attaching it to a PC?

A: Yes, by using a print server, which typically starts at about \$120. A print server is hardware—stand-alone or built into a router—and software that handles network communications for a printer that lacks networking capability (see **Scenario 3**, page 99). Attach the printer cable to the print server's parallel port and run the software. Then run the printer installation wizard on each PC, stating that you're installing a printer on a network. The printer will appear in your Network Neighborhood. Caveat: The printer must have a cable connecting to the server. You can't use USB printers with most, unless the printer has a parallel port. Typically, you also lose bidirectional communication—for example, you don't get a message if the printer has run out of paper or out of ink, or even if the job went through.

Yardena Arar is a senior editor for PC World.

NETWORKING ANSWERS: Security Tips

BY YARDENA ARAR, ALAN STAFFORD, AND ANDREW BRANDT

Q: What kind of security precautions should I take during setup?

A: In general, you should start by changing any default passwords or network IDs and you should change these every 30 days. For a wireless or power-line network, use the built-in encryption scheme; but set it up only after your network is up and running. Using encryption during setup adds an unnecessary level of complexity to an already hassle-prone task.

Q: I've heard that an 802.11b (Wi-Fi) wireless network is inherently insecure. What can I do about this?

A: A wired network, at the very least, poses a physical barrier to intruders: You have to be physically connected to a wired network. The Wi-Fi specification's built-in encryption scheme, WEP (Wired Equivalent Privacy), was intended to provide the same basic level of security. But encryp-

tion experts have shown that WEP can easily be hacked. Anyone within antenna range of a wireless network and armed with a simple piece of software would need just an hour or so to gain access. Fol-



WIRELESS NETWORKS include encryption options to make them harder to hack. But the security they provide is far from airtight.

low the manufacturer's setup guidelines when setting your encryption keys—the alphanumeric codes used to create and unlock the encryption—on the base stations and wireless networking cards.

Q: How can I ward off hackers?

A: Install a personal firewall (such as Zone Labs' ZoneAlarm, find.pcworld.com/24441). This will isolate your PC from the rest of the Internet by checking each packet of data and determining whether it should be allowed to get in (or in some cases, leave) your machine.

Q: If I already have a gateway/router, do I need a separate software firewall?

A: Not necessarily—but you're better off with both. Most gateways/routers use a technology called Network Address Translation to generate internal IP addresses for each device on the network. These internal addresses differ completely from the single IP address your ISP assigns you when you make a connection—the one identifying your network to the Internet at large. Hackers trying to access that address will see only a router, at most. NAT ensures that incoming traffic gets to the right computer while rendering computers inside the network invisible to probes.

NAT is not 100 percent secure against skilled hackers, however, so it's best to supplement it by installing software firewalls on each of your computers.

If you have a computer plugged into a broadband modem without a gateway/router, you definitely need a software firewall to make your PC invisible to the network and to block attacks.

Q: Can I run one antivirus program and protect the whole network?

A: No. It's best to run an antivirus application on every computer, workstation, mail server, and file server in your whole network. Run daily updates on the antivirus program. And keep your Windows OS up-to-date by going to *Start•Windows Update* and following the pop-up screens.

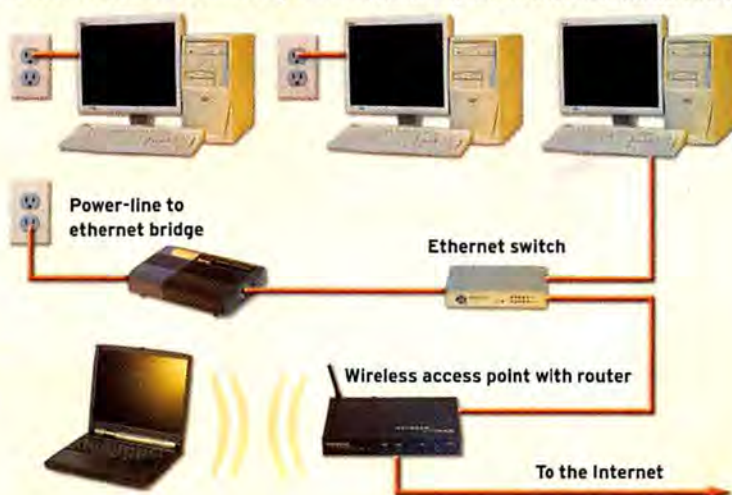
Q: How can I tell if I've been hacked?

A: Strange things happen: Applications stop working or behave erratically; you incur higher-than-normal bandwidth usage; you can't access services such as

SCENARIO 4

How Can I Mix Different Network Types?

A HYBRID NETWORK connects power-line, ethernet, and wireless network hardware.



Advantages: A hybrid network allows you to connect existing networks to the latest network technology. Ethernet offers great speed. Power-line offers no new wires and great range. Wireless offers roaming capability. A switch acts like a hub, but instead of sending data to every port, it routes data more quickly to its intended destination.

Disadvantages: Each technology requires its own bridge. A hybrid network is trickier to configure than a network that uses all the same type of hardware.

Cost: Power-line network adapters and bridges cost \$150. A switch usually costs just a bit more than a hub, starting at around \$40 for a 5-port switch, and topping out at just less than \$250 for a 24-port switch. Wireless access points are available with routers and sometimes switches included for around \$170; wireless adapters for around \$100.

Web or FTP servers; Web pages on your network get overwritten with shout-outs. Unfortunately, hacks frequently go undetected for a while because hackers are get-

cations from clean installation discs or from clean backups. Some hackers can take over a newly installed OS even faster than one that's been running for a while

IT'S BEST TO RUN AN ANTIVIRUS PROGRAM ON EVERY COMPUTER IN YOUR WHOLE NETWORK.

ting better at covering their tracks. So in addition to using a firewall, keep your virus definitions up-to-date; they will filter out the Trojan horse tools that hackers attempt to plant on your computer.

Q: What can I do if I'm hacked?

A: Reformat your hard drive and then reinstall the operating system and appli-

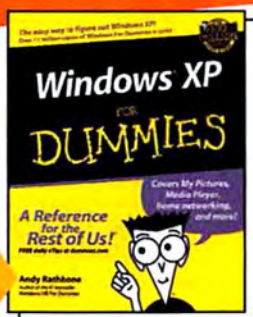
cations from clean installation discs or from clean backups. Some hackers can take over a newly installed OS even faster than one that's been running for a while

Alan Stafford is a senior editor for PC World, and Andrew Brandt is a senior associate editor for PC World.

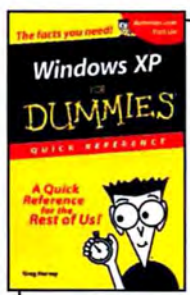
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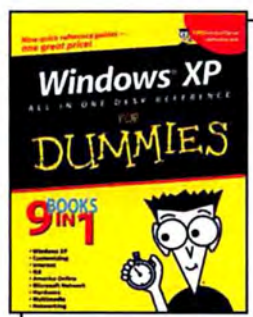
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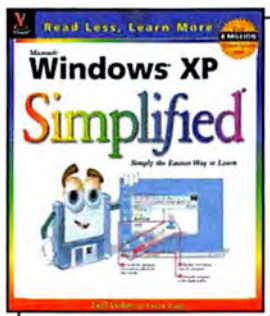
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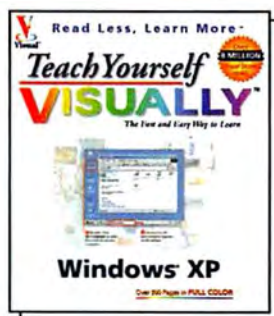
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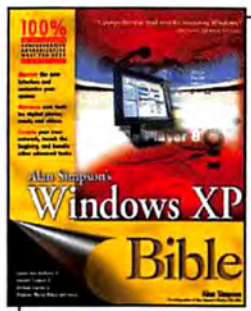
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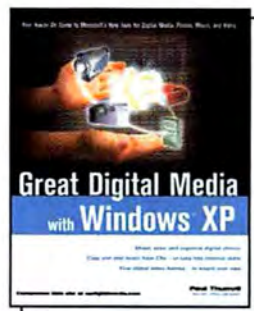
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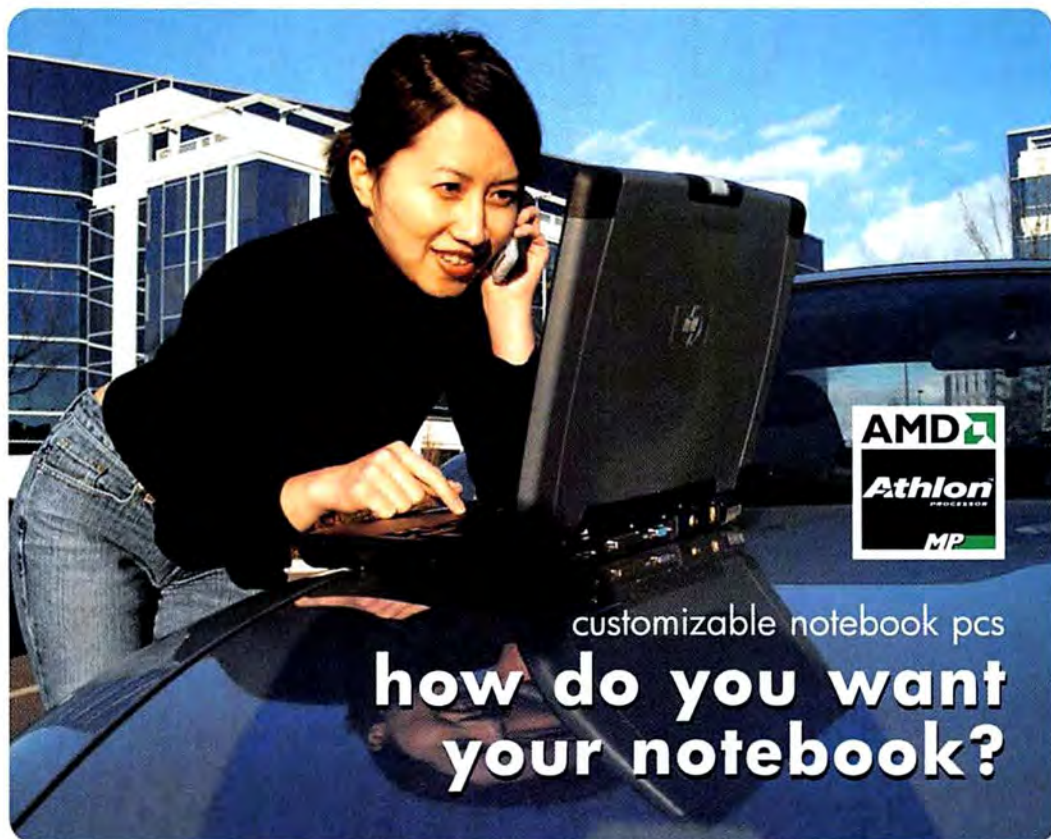
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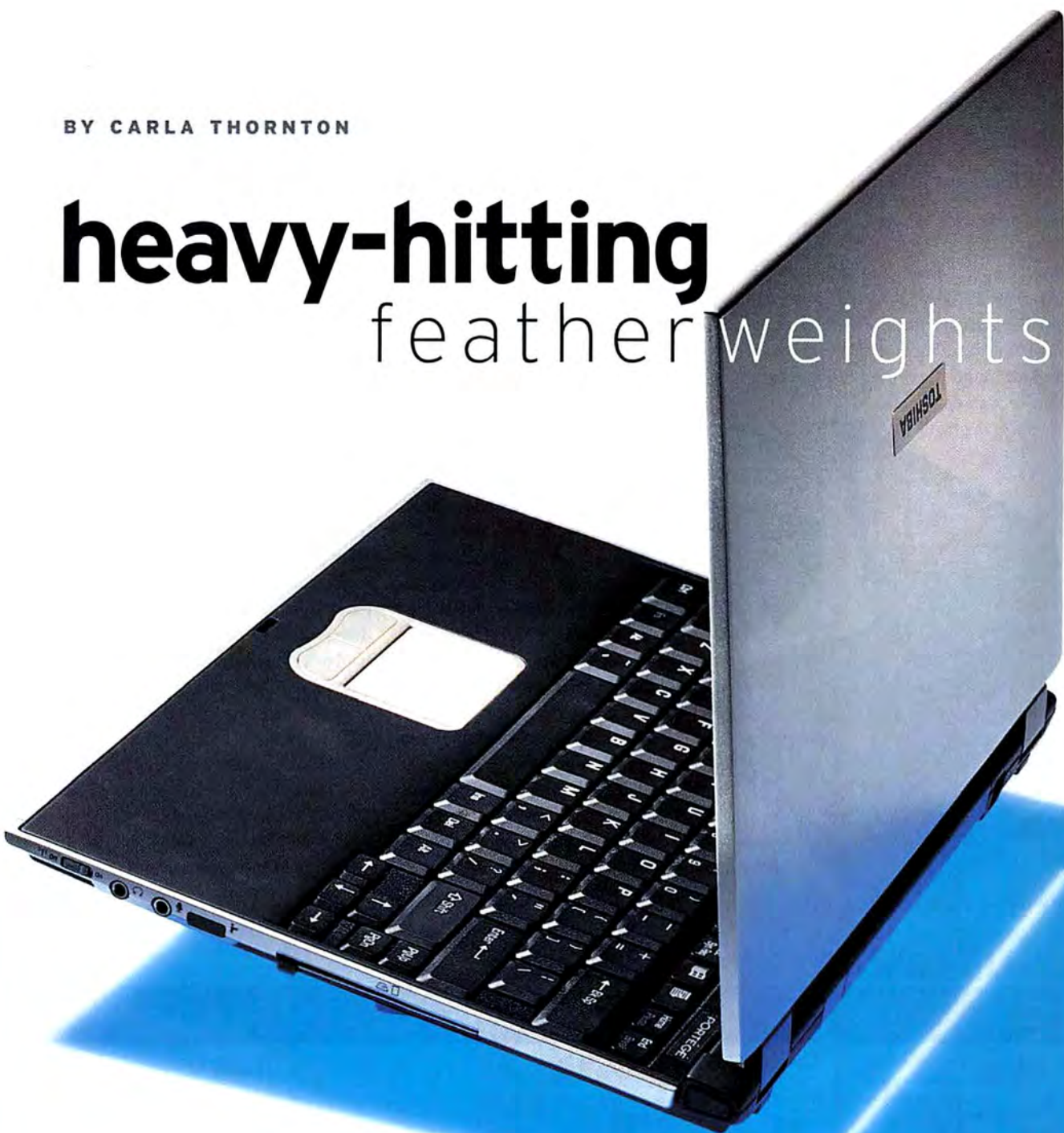
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BY CARLA THORNTON

heavy-hitting featherweights



Today's ultrathin notebooks don't sacrifice power and won't break your back. We review five wireless-ready contenders. ►

TOSHIBA'S PORTÉGÉ 2000: one of the thinnest we've seen.

Ultrathin notebooks, aka thin-and-lights, are to standard laptops what bantamweights are to sumo wrestlers. At about an inch thick when closed and weighing as little as 2.6 pounds without peripherals, ultras ride the cutting edge of portability. Of course, you have to make some compromises when using a thin-and-light notebook—most don't have

built-in optical drives, and some leave off legacy ports. Today's models, however, are smaller and pack more powerful components into their slim cases than ever before, and although they're not budget fare, they've come down considerably in price.

We took a close look at five thin-and-light models from Compaq, Fujitsu, IBM, Sharp, and Toshiba. After evaluating each notebook's price, weight, battery life, and other features, we picked IBM's ThinkPad X23 as our Best Buy. For

\$2979, the X23 offers a 12.1-inch screen, a 30GB hard drive, and a keyboard almost as easy to type on as a full-size laptop's.

Many currently available thin-and-light notebooks come equipped with integrated 802.11b wireless (or Wi-Fi) hardware, which lets them access networks and the

Net without jacking in—as long as you are near a public Internet access point. The ThinkPad, Toshiba Portégé 2000, and Fujitsu LifeBook B Series offer integrated 802.11b, with antennas and radio cards built into the case. The other models that we looked at, Compaq's Evo N200 and Sharp's PC-UM10M, require PC Card adapters that incorporate both the antenna and the receiver.

If your office is installing a wireless LAN or you happen to frequent any of the handful of airports or hotels that are equipped with wireless, then opting for 802.11b could be a smart choice. See the sidebar "Going Wireless" on page 106.

THE HIGH PRICE OF THINNESS

ULTRAPORTABLES DEMAND more than a few trade-offs. All the notebooks we evaluated for this article lack internal bays, which can accommodate an optical drive or other devices such as a second hard drive. Optical and floppy drives, usually standard with larger notebooks, are extra-cost items on most thin-and-lights. (Of the notebooks here, only the LifeBook B Series bundles a USB floppy drive.) And none in this group have parallel, serial, or PS/2 ports, or the more cutting-edge IEEE 1394 or S-Video-out ports.

Fortunately, travelers can have their



**Best
BUY**

GENEROUS FEATURES and a well-laid-out keyboard help

the IBM ThinkPad X23 earn our Best Buy. It also has an Ultraport, a proprietary USB port atop its screen (inset), for hooking up inexpensive IBM gadgets, such as a digital camera.

FEATURES COMPARISON

ultrathin notebooks

SYSTEM	Street price (2/15/02) ¹	PC WorldBench 4 performance score ²	CPU ³	Screen size (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Minimum weight/maximum weight (pounds) ⁴	Dimensions (inches) ⁵
1 Best BUY IBM ThinkPad X23 find.pcworld.com/24021	Expensive \$2979	Windows XP Professional Good 88	866-MHz LV Pentium III-M	12.1	256	30	Eraserhead	3.5/6.5	11.9/1.3
2 Toshiba Portégé 2000 find.pcworld.com/24022	Average \$2647	Windows XP Professional Average 60	750-MHz ULV Pentium III-M	12.1	256	20	Touchpad	2.6/5	11.5/9/0.8
3 Compaq Evo N200 find.pcworld.com/18123	Inexpensive \$2178	Windows 2000 Good 82	700-MHz ULV Pentium III-M	10.4	192	20	Touchpad	2.8/6.8	9.9/8/1.1
4 Fujitsu LifeBook B Series find.pcworld.com/24023	Average \$2576	Windows XP Professional Average 76	700-MHz ULV Pentium III-M	10.4	128	20	Eraserhead	3.3/4.4	9.9/8.5/1.3
5 Sharp PC-UM10M find.pcworld.com/24024	Average \$2348	Windows 2000 Average 78	600-MHz ULV Pentium III-M	12.1	256	20	Touchpad	2.9/4.2	11.1/9.1/0.8

¹ Price includes cost of docking station or port replicator, and optical and floppy drives, if included.

² Performance word scores reflect comparisons of PCs running the same operating system.

³ All CPUs are SpeedStep chips, which run at a slower speed when on battery power.

⁴ Minimum weight reflects the weight of the notebook by itself. Maximum weight includes the weight of the computer, AC adapter, power cord, docking station or port replicator, optical drive, and floppy drive or supplementary battery, if included.

ultraportable and keep their legacy features too, via extra-cost add-ons. All five notebooks here gain most missing features when you attach either a snap-on docking station equipped with an optical drive, or multiple separate peripherals and a port replicator. Choosing the all-in-one docking station can avoid the octopus effect of having several external peripherals plugged in at once. The Compaq Evo N200 and IBM ThinkPad X23 both use docking stations. The downside: Docking stations add at least a couple of pounds and another \$250 to \$500 in cost.

The Fujitsu LifeBook B Series, the Sharp PC-UM10M, and the Toshiba Portégé 2000 use simple port replicators, which provide the missing legacy ports, and external USB or PC Card drives. This piecemeal approach lets you pick what to buy and what to take on the road.

WHO'S GOT THE GOODS?

OF OUR REVIEW GROUP, the Portégé 2000 and the ThinkPad X23 came the best equipped out of the box. Besides integrated Wi-Fi hardware—in the sides of the ThinkPad's screen panel and under the Portégé's keyboard—both notebooks include a traditional ethernet connection, a modem jack, a VGA port, one PC Card slot, an infrared port, two USB 1.1 ports,

and headphone and microphone jacks. The Portégé's port replicator provides two additional USB 1.1 ports for an impressive total of four. A potential downside: Neither the Portégé nor its port replicator comes with a parallel port.

The ThinkPad and the Portégé also provide some unusual extras. The ThinkPad features a CompactFlash card slot, great for quick transfers of data or images from devices such as digital cameras, and the Portégé throws in a Secure Digital card slot. SD cards are less popular than CompactFlash ones, but they let you add storage and some games.

Compaq's \$379 docking station, or Mobile Expansion Unit, adds a DVD-ROM drive, two extra USB 1.1 ports, and missing parallel, serial, and PS/2 ports.

Fujitsu is the only vendor in the group that makes you choose between built-in Wi-Fi and a built-in standard wired ethernet jack. You can order the LifeBook B Series with one or the other along with a 56-kbps modem, but not all three. However, it does have two PC Card slots.

The Sharp PC-UM10M comes with the



**FUJITSU'S
LIFEBOOK B SERIES**

has a stylus for its touch screen.

fewest built-in features. To hook up an external monitor, you must plug an included adapter cable into a proprietary connection on the left side of the notebook. To add Wi-Fi, you need to get a PC Card adapter, which typically runs about \$100—a little less if you shop for bargains (802.11b cards are interchangeable—you don't have to use a card sold by the notebook's vendor). The Sharp's port replicator adds missing legacy connections.

MIDLING PERFORMANCE

BECAUSE IT TAKES a year or longer for low-voltage versions of mobile processors to become available for thin-and- ▶

Battery life	Docking station or port replicator and type of optical drive	802.11b connectivity	Overall design	Comments
3:50	Docking station with 6X DVD-ROM and 4X/4X/24X CD-RW combination drive	Built-in antenna and receiver	Very good	Decked-out notebook has CompactFlash card slot and comfortable keyboard. Though only 3.5 pounds, it's the heaviest model in our review. ★★★★★
6:50	Port replicator, external 12X-24X CD-ROM drive	Built-in antenna and receiver	Good	Silver ultraportable is the thinnest and lightest around. Bundled second battery helps it achieve the longest battery life we've seen. ★★★★★
2:05	Docking station with 8X DVD-ROM drive	Via PC Card adapter *	Average	Docking station provides fairly strong stereo speakers. Cramped keyboard has difficult-to-read white lettering. ★★★★★
3:20	Port replicator, external 12X-16X CD-ROM drive	Built-in antenna and receiver	Average	Bluish-silver model has few legacy ports, but is the only laptop here with a USB floppy drive. Includes stylus to use with touch screen. ★★★★★
2:14	Port replicator, external 6X-10X CD-ROM drive	Via PC Card adapter *	Limited	Slim, silver-colored case rivals the Portégé as the thinnest available, but unit skimps on legacy connections and optical drive options. ★★☆☆☆

* In order: width, depth, height.

* Wireless PC Card costs \$100 extra.

lights, CPUs in ultraportables are always a few clock cycles behind those in the latest full-size laptops. In this roundup, IBM's ThinkPad X23—equipped with an 866-MHz LV Pentium III-M, 256MB of RAM, and Windows XP Professional—came the closest to matching a full-size notebook's performance. It earned a PC WorldBench 4 score of 88, only about 12 percent behind some portables outfitted

with 1.2-GHz Pentium III-M processors—currently the fastest mobile CPU.

While none of the notebooks we looked at are speedy marvels, they all handle basic tasks fairly smoothly. However, a slowdown might be perceptible with processor-intensive operations such as complex spreadsheet calculations.

Thin-and-light used to be synonymous with short-and-not-so-sweet battery life,

but not anymore. The Portégé 2000 turned in an amazing 6 hours and 50 minutes of battery life—the longest we've ever recorded from any notebook, including desktop replacements. The Portégé 2000 uses two batteries—a built-in lithium polymer battery and a bundled supplementary lithium ion unit that adds a scant 0.7 pounds of weight. But there's one small hitch: It attaches to the note-

MOBILE 802.11B

going wireless

WHETHER YOU'RE CONSIDERING laying out two grand for a new 802.11b-enabled ultraportable or you've retrofitted your old notebook with a \$100 wireless PC Card adapter, you probably expect to be able to answer e-mail and surf the Internet practically anywhere you happen to be. Unfortunately, it's not that simple.

Although the 802.11b (aka Wi-Fi) standard has grown in popularity for home networks, public places that use 802.11b devices are still rare. In the United States, fewer than a thousand locations offer Internet access points, the wired gateways with which Wi-Fi devices communicate via radio waves. Most commercial wireless locations are Starbucks coffee shops, which use VoiceStream's wireless services. The rest include a smattering of hotels and airports. And most airports offer wireless access only in first-class passenger lounges. (Direct your browser to www.wlana.org/public/index.htm to search for access point locations.)

FEW PLACES TO ROAM

RESEARCH FIRM IDC reports that a relatively paltry 1.24 million access points were sold worldwide last year. About 60 percent of these were installed in the U.S., and most of those units were bought for offices, not public access, says Jason Smolek, an IDC analyst who follows enterprise networks.

Broader adoption of 802.11b will require seamless access availability across far-flung locations, regardless of provider. Although services can be reasonably priced—for instance, VoiceStream's Global Wireless by T-Mobile (formerly MobileStar) service costs \$2.95 for the first 15 minutes and 20 cents for each additional minute, or \$20 for 120 minutes on a prepaid card—service plans vary among providers, and they serve limited locations, so you

can't be assured that your account will work wherever you travel.

At least one consortium, the Wireless Ethernet Compatibility Alliance—consisting of Cisco, IBM, Intel, Microsoft, and 3Com—is working to establish a standard to help confused wireless customers. Called "WiFi Internet Service Provider roaming," or WISPr, it would regulate how companies share subscriber usage information, allowing wireless users to "roam," as cell phone users do, and to receive one bill from their primary providers.



LINKSYS WAP11
access point and
Symbol's \$99
wireless PC Card.

GOING THE DISTANCE

TO SEE HOW wireless-ready ultraportables would fare in a typical office, we took a couple for a spin in some informal tests. We used the IBM ThinkPad X23, which has built-in wireless, and Sharp's PC-UM10M, which requires a wireless LAN PC Card adapter and a Linksys WAP11 access point. We sent files between offices and downloaded music from the Internet.

Although 802.11b allows for data transfers at speeds of up to 11 mbps, our past testing has shown that walls, floors, and other objects slow transfer rates considerably. It took us 2 minutes to copy a 4MB file over about 150 feet inside an office building. That's a transfer rate of about 0.25 mbps (still far faster than using a dial-up connection). But we lost our connection completely when we went down one floor. (There was no notable performance difference between built-in and PC Card adapters.) Although its performance and consistency can't match a wired network's, 802.11b can be useful in companies where wired ethernet is too difficult or expensive to add.

IDC's Smolek predicts that it will be several more years before all notebooks have Wi-Fi built in as ethernet is today, and perhaps longer for public wireless access to be widely available. Even then, he wonders how many people will use it.

"Do people really want to check e-mail at a coffeehouse? Or even at the airport? Some people want total access all the time, but I think this has been overblown," he says.

book via the same port on the bottom that connects the port replicator, so you can't have both attached at once.

ROOM TO WORK

THE LATEST ultraportables offer at least 20GB of storage, more than enough for most business travelers. The Portégé 2000's hard drive is unique: The 8mm-thick drive is about 20 percent thinner than those of other ultraportables. A few, including the ThinkPad X23, are available with 30GB hard drives.

Most ultraportables now also have 12.1-inch active-matrix screens. That's small enough to fit comfortably on an airplane seat tray, yet plenty big for working with most files, though it may not be ideal for viewing large spreadsheets or graphics.

The Compaq Evo N200 and the Fujitsu LifeBook B Series have smaller, 10.4-inch screens. The Fujitsu's active-matrix LCD is also a responsive touch screen. In addition, the LifeBook B Series has an anti-reflective coating that Fujitsu claims makes the screen readable in any lighting situation—but we found it too dark to use in bright light outdoors.

Try typing on an ultraportable before you buy it, if at all possible. A keyboard that's too small or poorly laid out can literally cramp your style, especially if you're accustomed to touch typing.

The best ultraportable keyboard by a long shot belongs to the ThinkPad X23. This eraserhead-equipped keyboard is so com-

fortable, some touchpad diehards may reconsider their preference. The X23 owes its comfort to near-standard key travel and an 18.5mm pitch (the distance from the center of one key to the next), so it feels similar to a full-size ThinkPad.

It's back to the drawing board for Compaq. The most difficult unit to type on, the Evo N200 has small keys with white lettering that looks blurred at an angle.

ENTERTAINMENT BLUES

UNLESS YOU ADD headphones or external speakers, the ultraportable multimedia experience is pretty dismal. Most thin-and-lights, including all but one model in this review, sport one speaker, located on the bottom of the case. The Fujitsu B Series has built-in stereo speakers, but they give new meaning to the word *tinny*. Listening to music CDs without headphones can be pleasant with the ThinkPad X23 and Evo N200, but only if you add their extra-cost docking stations.

And again thanks to its docking station, the ThinkPad is the only ultraportable here that is capable of using the hot new DVD-ROM/CD-RW combination optical drive. This combo lets you watch DVD movies and burn your own discs. Also, both the ThinkPad's and the Evo N200's docking stations offer modular bays for swapping in other extra-cost devices, such as a 250MB Zip drive.

Bringing up the rear in multimedia is the Sharp PC-UM10M, whose only optical-drive option is a \$279 USB 1.1 CD-ROM drive that reads at a nominal 6X–10X. (And in our experience USB 1.1 drives rarely achieve even those comparatively slow



COMPAQ'S EVO N200

can hook up to a docking station to attach an optical drive and extra ports.

speeds.) Fujitsu also offers just a CD-ROM drive for the LifeBook B Series—a PC Card 12X–16X model for \$128.

WHAT A TRAVELER WANTS

FOR BUSINESSPEOPLE who spend more time in airports and hotel rooms than at the office, a light, well-designed laptop can make all the difference. And for early adopters, built-in wireless is an added bonus. If you can afford it, the IBM ThinkPad X23 is the perfect wireless-enabled ultraportable. Next up: Toshiba's Portégé 2000. It's the thinnest, lightest ultraportable we've seen, yet it still pulls off astoundingly long battery life.

The Compaq Evo N200 is more affordable than the other models here, but try it out first: Its small keys could prove frustrating. Fujitsu's LifeBook B Series would be a good choice for business travelers whose work includes roaming wireless-networked office sites. The Sharp PC-UM10M would suit jet-setters who don't need many legacy connections.

Ultimately, ultraportable laptops aren't the right tool for everyone—especially those users who are willing to carry a little extra weight in return for a larger screen and a built-in modular bay. But for executives who need to stay in touch without slowing down, they're the perfect fit. ■

Carla Thornton regularly covers notebooks for PC World.

SHARP'S PC-UM10M attaches to a port replicator and external CD-ROM drive.





How
to

enlarge a small fish:

1) Using your pen for ease and control, draw a path around your small fish. Then copy your selection.

2) Paste your fish back into your photo, creating a new layer.



3) Adjust the scale of your new layer to your liking, and place it. 4) With the blur tool, blur the edges of the fish for realism.

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Visit our web site for more detailed tips and a free "Wacom Photo Fun CD".



Digital photo taken with the Express PhotoPC 880z Digital Camera

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3-BUTTON

MOUSE:



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It's an

Ad, Ad, Ad, Ad, Ad, Ad, Ad World

BY GREGG KEIZER

Welcome to pop-up purgatory: Why ads are taking over the Web—and how to take back your browser.

MAYBE YOUR browser should have a McDonald's-like sign that reads "Over 24 Billion Served." That's the number of ad impressions—ads loaded into Web browsers—generated in just one week. If you feel that a disproportionate percentage of those ads are hitting you square in the face, you're not alone.

This is not a black-and-white issue. Even people who detest Web ads concede that the explosion in Web advertising has financed a no-cost Internet rich in content. ►

And even the most intrusive ads help pay for the Web's free content (including the news and information at PCWorld.com; see this month's *Up Front* on page 13 for more about this subject). If every surfer blocked all advertisements all the time, companies might have to charge user fees for their Web services or, worse, they could go out of business.

But the latest generation of online ads don't just sit meekly on a host page, carrying an identifying label that says "Advertising" and hoping to get clicked. Instead, the ads pose stealthily as non-commercial content or bombard our eyeballs with pyrotechnic excess. And Darwinian competition among advertisers has spawned increasingly aggressive forms, formats, and features of ads.

If you want to put an end to the madness on your desktop, you can use ad-blocking software to eliminate most ads that appear in your browser. We tested four applications (see the features comparison chart below) against the most aggressive ad environments, and found that Intermute's \$30 AdSubtract Pro was the most effective.

WHEN IT RAINS ADS, IT POURS

TV HAS ITS 15- and 30-second spots, as well as interminable infomercials. Magazines have multi-page spreads on heavy stock, and perfumed blow-in cards. The Web, however, beats them both, with a bewildering blizzard of advertisement styles, sizes, and traps—some ancient (in Web years),



THE VAGUELY creepy pitch for X10's cams mixes security with cheesecake photos.

28 million: Unique visitors to X10.com who came from clicking X10's ubiquitous pop-under ad in May 2001.

SOURCE: JUPITER MEDIA METRIX

some brand new. Before you can fight ads—or decide whether to try—you need to know what you're up against.

Standard banner ads, including new formats such as the vertically oriented sky-scraper, stay inside the primary browser window. Not so with the now-infamous pop-up and pop-under ads: They appear in new browser windows, typically stripped of toolbars and menus, and either cover your original browser window or hide beneath it. Similar to pop-ups and pop-underers are interstitials (ads that appear after you click a link but before you see the next page) and pop-up transitionals (a type of ad that plays in a separate window between two pages of content). Superstitials, the most highly evolved ad species, move across the face of a Web page, as if they were animations projected on a piece of glass over the page.

Those ad formats can be annoying, but others are downright pernicious. Most legitimate sites try to avoid using deceptive ads to get clicks, but some don't mind the trick banner, an ad that mimics a dialog box: You click its OK button to dismiss a system message, only to be drawn into a spiral of other Web ads. Then there's adware like TopText, which skulks onto your system when you install certain shareware or freeware programs and then spawns its own pop-ups to compete with those launched by the sites you visit. (Utilities such as AdAware [find.pcworld.com/23681] can detect and exterminate TopText and others of its ilk.)

FEATURES COMPARISON

AdSubtract Beats Ads Best

OF THE FOUR AD-BLOCKING packages we tested, AdSubtract Pro blocked the most ads overall and the most forms of ads. We subjected each product to sites that use large numbers and various types of ads, and we timed how long the page took to load with and without ads.

PRODUCT	Price	Works on	Pro	Con	Ad types blocked	Ad-free pages display
Best Buy AdSubtract Pro ★★★★★ www.adsubtract.com	\$30	Windows 95/98/Me/NT/2000/XP	Easy to set up, does the best job of beating back ads.	Regular installation of filter updates required to maintain effectiveness.	Banners, pop-ups, Flash ads, cookies	1.7 times faster
Guidescope ★★★★★ www.guidescope.com	Free	Windows 95/98/Me/NT/2000	You're not required to download new filtering instructions.	Remote proxy transmits your surfing habits to Guidescope—a scary thought for users concerned with privacy.	Banners, Flash ads, cookies	1.9 times faster
Norton Internet Security ★★★★★ www.symantec.com	\$70	Windows 98/Me/NT/2000/XP	Ad-blocking element is just one component of this antivirus and personal firewall suite.	Failed to block many types of ads; ad-free page still includes blank clickable areas that take you to ads.	Pop-ups, Flash ads	1.3 times faster
WebWasher ★★★★★ www.webwasher.com	Free	Windows 95/98/Me/NT/2000	Sophisticated settings let you fine-tune the blockade; only product that prevented mouse-trapping.	Its cookie blocking and management features couldn't do the job.	Banners, pop-ups, Flash ads, mouse-trapping	1.5 times faster

Worst of all are the mouse-trappers and high-speed spawners, so called because they break your browser's Back button and/or disable the close box, and often have the scary ability to replicate windows faster than you can get rid of them. The sleazy underbelly of the Web is rife with questionable spawning techniques like these, and you'll likely hit them if you click the links in spam e-mail.

BLOCK, BLOCK, BLOCK THAT AD

YOU COULD APPLY some ad-blocking techniques without using ad-blocking software. All you'd have to do is turn off all graphics, Java, JavaScript, and Flash in your browser—and sacrifice nearly all the interactivity and usefulness of your Web experience in the process. That's why software that selectively removes the ad tumors, rather than killing the patient, is the smarter solution.

The emotionally charged nuisance factor often sparks people's interest in blocking online advertisements, but there are other good reasons to fight back: Blocking ads frees up precious bandwidth and can protect your privacy. Ads take time to load, and they get in the way. "They're forcing us to do something" that most people don't want to do, says Intermute CEO Ed English, whose company makes the AdSubtract ad-blocker program.

Because many ad servers place cookies on your computer, ad companies are able to track your surfing. The companies claim that the function of most cookies they set is to regulate the type and amount of advertisements you receive. But because the larger ad services span a wide array of Web sites, ad-related cookies can also provide the ad companies a lot of insight into your Web surfing preferences. "We never consented to be followed on the Web," argues English.

With a bit of effort, you can lessen the load, speed up your surfing, and reduce the clutter on the pages you visit. We snared four different ad blockers—AdSubtract, Guidescope, Norton Internet Security (which includes a Web ad-blocking component), and WebWasher—and ran them through the wringer, testing them against some tough ad-generating sites. We also examined two other anti-ad programs, Internet Junkbuster Proxy and Proxomitron, but rejected both. Junkbuster is extremely difficult to set up, and Proxomitron failed to banish some of the most common ads.

Some ad blockers are better than others, of course—AdSubtract walked away with our Best Bet

85% of
mouse-trapping
sites also spawn
new ad windows,
preventing you
from closing
those ads, too.

SOURCE: CYVEILLANCE



NO, IT ISN'T a Windows
dialog box—it's just an
incredibly annoying
simulation of one.

prize by blockading every ad we encountered. But even the slackest of the four here successfully purged pages of in-frame, banner-style ads.

Most ad-blocking programs work as specialized proxy servers. Running on your PC, they examine the addresses that your browser requests, check each one against the entries in a frequently updated database of ad server addresses, and then drop requests for ad content. Some also rely on pattern matching to look for windows and images that match known sizes and shapes of ads.

No anti-ad utility works flawlessly; but without ads, pages definitely load faster. In our informal tests, pages with their ads blocked appeared in just 60 percent of the time they took to load with ads.

Finally, some advertising tactics defeat most ad-blocking software; rarely do the anti-ad programs prevent mouse-trappers and the high-speed window spawning that often accompanies them. In our tests, only WebWasher managed to circumvent these ultra-aggressive annoyances.

AN AD-FREE FUTURE? UNLIKELY

THE WEB IS the new frontier of publishing, so it's no surprise that online advertising is in Wild West mode. "Anyone can have the publishing tools to put something on the Web, and not all those people play by the same rules," says Greg Stuart, president and CEO of the Interactive Advertising Bureau, an online ad industry group.

To Stuart and the IAB, there are no bad advertisements, only bad practices. "We're not out to stifle innovation," Stuart says. That means virtually everything goes. The IAB's guidelines are voluntary, apply only to its members, and include no mechanism for calling an advertiser to account. "If a member company was disguising an ad to look like a system message, we would probably have a discussion with them," Stuart says—but he adds, "the people who are doing that are not my members."

"You can't rely on the [advertising] industry to police itself," says AdSubtract's Ed English. "Too often, advertisers think they've won if we click, no matter how they got us there."

Beating back the tsunami of ads is a daunting task—and until recently, few people even bothered to attempt it. But as ads have become more intrusive, that situation may be changing.

As recently as last October, analysts found that three-quarters of surveyed Web surfers didn't even know that Web ad-blocking software existed. ►



Is It Wrong to Block Ads on Free Sites?

ALL OF US use ad-supported Web sites. Does that mean that we're duty-bound to support ads? Absolutely, say advertisers. "Users must accept the quid pro quo of advertising," says Greg Stuart, head of the Internet Advertising Bureau, an online advertising trade association. "They're getting something for free or at a reduced cost. And yes, blocking ads violates that implied contract."

That basic deal seems to be acceptable to most users and sites. After all, successful ad-free sites that charge subscription fees are as rare as hen's teeth. Porn sites aside, you could count them on a couple of hands.

Without advertisements, the Web as we know it would vanish faster than a pop-up slain by AdSubtract.

Of course, some sites don't want to depend on users' choosing not to block ads. If more sites adopt software like MediaBeam's AdKey, which denies site access to visitors who block the site's ads, users may feel more pressure to accede to this unspoken contract. But will users give in? "Most people would equate ad filters with a TV remote used to switch the channel when an ad comes on," says Junkbuster's Jason Catlett. Ed English of AdSubtract puts it even more bluntly. "Are you obligated to read every single ad that's in a print magazine or a newspaper?" he asks. "Of course not."

Blocking the most intrusive ads is an easier call. After all, you may put up with a perfumed card inserted into a magazine, but would you feel as generous if it popped out and spritzed you in the eye?

For some ad-blocking proponents, the fundamental issue is not ethical but practical. "It's like it's never enough," says AdSubtract's English. Banners led to animated GIFs, which led to Flash animations, which begat pop-ups and pop-underers. Ads litter our drives with temporary files, hog CPU resources, and consume bandwidth. In the end, English says, "People have a right to control what appears on their computer."

My computer, my bandwidth, my life. Now them's fightin' words.

No wonder ad people like Jeffrey Silverman, vice president and general manager of North American media for DoubleClick, are so sanguine about the future of Web advertising. "No, I don't lose any sleep thinking about ad-blocking software," he says. "The [ad-blocking software] adoption rate is just so extremely low."

But as advertisers' tactics change, disgruntled users will likely take matters into their own hands. Marissa Gluck, a senior analyst with Web rankings firm Jupiter Media Metrix, says that Internet users are less tolerant of intrusive ads, particularly pop-ups and pop-underers. "In 1999, 23 percent of the people we surveyed found pop-up ads very annoying, to the point where they would consider not returning to the [offending] site," Gluck says. "But in 2001, that number was 41 percent."

Site visitors are mad because they're being subjected to a glut of ads and to sometimes-questionable advertising tactics, adds Brian Murray of Cyveillance, a company that tracks public perceptions for some major Web advertising clients. His company's research found that intrusive techniques such as spawning and mouse-trapping have moved from porn and gambling sites to the mainstream. Many sites that depend on ads as a primary source of revenue (including PCWorld.com) use pop-ups, pop-underers, and superstitials—sometimes all at once.

Why do advertisers use intrusive techniques when most surfers hate them? Frankly, it's because

Just 1%
of surveyed Web
surfers say they
use ad-blocking
software.

SOURCE: FORRESTER RESEARCH



ADS FOR Bonzi.com's ape applet in some cases changed a person's home page without permission.

they're effective. "Some of the most intrusive ads have the unfortunate effect of getting a customer's attention," Murray says. "[Sites are] actually rewarded for engaging in these tactics."

Some sites that depend on advertising to make ends meet even take the aggressive step of blocking users of ad-blocking software. One German company, MediaBeam, has developed software it calls AdKey that can tell whether a Web visitor's browser has loaded ad graphics. If AdKey determines that the visitor is using blocking software, it prevents the user from visiting the site as long as the blocking software remains on. A German hacker managed to find a way around the software fairly quickly (see find.pcworld.com/23821), but MediaBeam promises that AdKey 2.0, a work in progress, won't suffer from the same weakness, raising the stakes in an increasingly aggressive programming arms race between ad and anti-ad forces.

The future looks grim for anyone who wants to see fewer or less-intrusive ads. Research firm GartnerG2 projects that online advertising will more than double by 2005.

That means a lot more ads, and probably new evolutionary steps in advertising technology. One way or another, the battle to capture our attention on the Web is only heating up. ■

Gregg Keizer, an Oregon-based writer, detests pop-ups but enjoys (well, tolerates) banner ads.

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See your local software retailer, visit www.powerquest.com/partitionmagic, or call 1-888-497-9998 and discover what a good fence can do for your data.



WORRIES BEGONE

Micro Exchange puts quality and confidence in buying pre-owned hardware



Pre-owned computers make sense!

Many savvy users seek sellers of factory-refurbished PCs and peripherals for their deep discounts on name-brand hardware. They also worry that renewed products might be less reliable than unused hardware.

One vendor, Micro Exchange Inc. (www.microexchange.com), is bringing integrity to the pre-owned hardware market by backing brand-name PCs with 90-day warranties and outstanding technical support.

Visitors to www.microexchange.com are finding low prices on high-performance notebooks, PCs, monitors, and printers—even the latest PDAs. Many are also shopping among 300,000 parts and accessories at Micro Exchange's sister site, Service Electronics, (www.separts.com).

Micro Exchange's enterprise customers depend on the site for servers, PCs, and peripherals matching their current networked environments. Service Electronics supplies them with hard-to-find replacement parts for their irreplaceable systems.

"We make full use of every system that we receive from the nation's leading retailers and OEMs," says CEO Philip Calvanico. "Not only that, but our stringent quality-control measures and our full warranties guarantee the performance of every system and part we sell."

Call In a Specialist

Micro Exchange employs over 300 technology specialists (with over 700 employees at five facilities nationwide) to ensure that the products meet the manufacturers' original specifications and configurations. Each specialist has his or her own area of expertise, and many are certified to refurbish and repair the world's largest PC manufacturers' systems—right down to the chip-and-component level.

Micro Exchange also covers products with a 90-day warranty. Customers during that period may call the company's technology specialists for toll-free technical support.

Micro Exchange's live tech support and three-month warranties have helped the company build a loyal following among IT leaders, students, professionals, university administrators, and consumers alike.

"We strive to provide our customers with the same level of satisfaction they would receive when purchasing a new computer," notes Calvanico. **"Our rate of return is lower than or the same as that enjoyed by many direct sellers of new hardware."**

The Savings Speak for Themselves

At Micro Exchange, savvy users are finding the same lightning-fast multimedia PCs being sold directly by manufacturers. The company gets its systems directly from OEMs and retailers and passes along its savings to buyers on the Web.

Micro Exchange's enterprise customers have for years been returning to www.microexchange.com to find the hardware that will keep their networks up and running. They can even trade in their current computer inventories for newer hardware.

"We're actually helping enterprises fund their technology rotations," says Calvanico, **"by letting them turn in their owned and off-lease assets, and putting that money toward the modern equipment they need to meet their current business goals and technology requirements."**

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ronments. Service Electronics supplies them with hard-to-find replacement parts for their irreplaceable systems.

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TOP 100

EDITED BY THE REVIEWS STAFF

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Top 10 Digital Cameras

Sony's funky Cyber-shot DSC-F707 (left) captures beautiful images. The hefty Olympus E-20N's through-the-lens viewing lets you shoot with speed and accuracy.

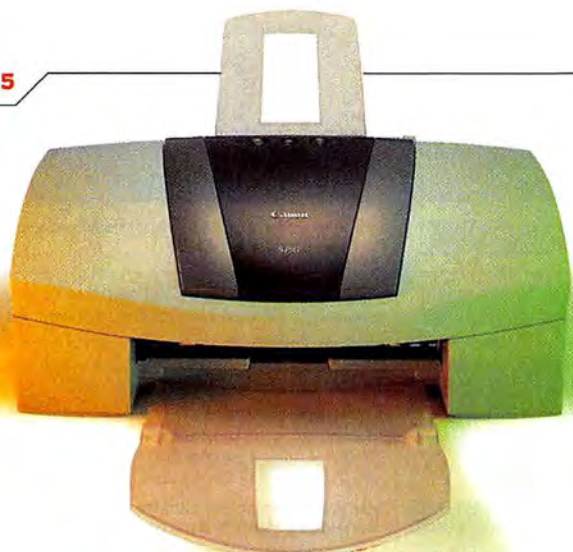


5-Megapixel Cameras Come Into Focus

This month's **Top 10 Digital Cameras** features three new models with 5-megapixel resolution—the highest available so far in a consumer camera. The prices are also high—from \$999 for the Sony Cyber-shot DSC-F707 to \$1999 for the semi-pro Olympus E-20N. Though all three offer extensive imaging controls, they come in wildly different shapes and sizes—and any serious digital photographer should find that one of the three fills the bill. For printing photos, try the Canon S750 Color Bubble Jet. Our new Best Buy ink jet printer produced beautiful color images and churned out text pages faster than any other printer on the chart.

Freelance writers Dan Littman, Joel Strauch, and Carla Thornton, and PC World editors Richard Baguley, Tracey Capen, Seán Captain, Lisa Cekan, Rebecca Freed, Heather Morra, Kalpana Narayana-murthi, Melissa J. Perenson, and Alan Stafford contributed to this month's Top 100 section. Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, Tony K. Leung, and Thomas Luong of the PC World Test Center performed testing on the products reviewed here, with support from Julio Giannobile and Julian Weatherby.

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Top 10 Printers

Canon's S750 Color Bubble Jet Printer is the most expensive model on our chart, but clean, speedy text printing and beautiful glossy photos earn it a Best Buy.

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Top 10 Monitors

Bright, lifelike colors and sharp text help the NEC MultiSync FE950+ land in the upper half of our 19-inch CRT monitors chart.



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Top 15 Office PCs

With an LCD monitor and impressive speed from a 1.3-GHz Celeron processor, the Gateway 300X wins the Best Buy title for value office PCs.



YOUR GUIDE TO THE TOP 100

EACH MONTH WE TEST a large number of PCs, printers, monitors, and other products. Only the best products land on the charts, which are refreshed monthly.

System configurations are shown as tested. The overall rating for each product is calculated on a 100-point scale and reflects results from our hands-on evaluations

and performance tests. A 90-point score is exceptional, while one in the 70s is above average.

The PC WorldBench 4 score is a measure of how fast a PC can run a mix of common business applications as compared with our baseline machine, a Gateway Select 1200 with a 1.2-GHz Athlon processor, 128MB of PC133

SDRAM, and a 20GB hard drive. For example, a PC that scores 120 is 20 percent faster than the baseline system. The policies score is based on vendor support policies (not shown on charts). Please see find.pcworld.com/15720 for additional details on how we compile charts for the Top 100.

TOP 15 OFFICE PCs

	POWER SYSTEM		Overall rating	Street price (2/20/02)	PC WorldBench 4 performance score ¹		Comments
1	Best BUY Dell Dimension 8200 find.pcworld.com/13160		83	Expensive \$2236	Windows 2000 Good 119		Solid all-around performer with a vibrant monitor and tool-less access for upgrades. (★★★★☆ Nov 01)
2	Gateway 700XL find.pcworld.com/21041		82	Very expensive \$3098	Windows XP Professional Good 118		Pricey system packs a powerful punch. The DVD-RAM/R drive is good for data backup/archiving and video recording. (★★★★☆ Apr 02)
3	MicronPC Millennia TS Professional find.pcworld.com/21021		79	Expensive \$2575	Windows XP Professional Good 111		Offering plenty of expansion room, this system lets you easily access the case interior and drive bays. (★★★★☆ Apr 02)
4	Micro Express MicroFlex 1900A find.pcworld.com/21022		79	Inexpensive \$1499	Windows XP Home Very good 125		This reasonably priced model is a top-notch performer and includes a DVD+RW recordable drive. (★★★★☆ Apr 02)
5	Sys Performance 2000+ find.pcworld.com/22222	NEW	78	Expensive \$2452	Windows 2000 Very good 124		Includes a giant, high-quality LCD monitor. SmartMedia and CompactFlash readers are handy for digital photographers. ★★★★★
6	Systemax Ascent SA-16 [†] find.pcworld.com/18701		76	Inexpensive \$1299	Windows XP Professional Good 116		Beige-box system offers solid performance and plenty of expansion room, but the monitor displayed blurry text. (★★★★☆ Mar 02)
7	Polywell Poly 880NF-2000 find.pcworld.com/21541	NEW	76	Expensive \$2385	Windows XP Professional Very good 123		Small-office system clad in a sleek aluminum case offers top-level performance and a great monitor. ★★★★★
VALUE SYSTEM		Percent of overall rating ▶	15 percent	20 percent			
1	Best BUY Gateway 300X find.pcworld.com/22421	NEW	79	Average \$1198	Windows 2000 Average 101		Offers an LCD monitor and impressive performance from a Celeron CPU, all for a reasonable price. ★★★★★
2	Micro Express MicroFlex 1200C find.pcworld.com/15221		78	Inexpensive \$999	Windows 2000 Very good 117		Excellent performance, ample expandability, and an affordable price keep this system near the top. (★★★★☆ Jan 02)
3	ABS Conquest VP find.pcworld.com/16700		78	Average \$1149	Windows XP Professional Very good 115		An included IEEE 1394 interface bolsters this fast system; the monitor could be better, however. (★★★★☆ Jan 02)
4	IBM NetVista A22p find.pcworld.com/19341		78	Average \$1108	Windows XP Home Average 91		Features a pop-off front cover for easy drive-bay access; remote management software can be downloaded. (★★★★☆ Mar 02)
5	Gateway E-1800 find.pcworld.com/22201	NEW	77	Average \$1269	Windows XP Professional Poor 89		Budget system includes management software for corporate networks and provides easy, tool-less upgrade access. ★★★★★
6	Sys TaskMaster 1000T find.pcworld.com/19361		77	Average \$1253	Windows 2000 Good 109		A good performer; in addition, the configuration we tested included a sharp 15-inch LCD monitor. (★★★★☆ Mar 02)
7	Dell Optiplex GX240 find.pcworld.com/18761		76	Expensive \$1471	Windows XP Professional Average 91		This business-friendly model offers high security and network manageability but little room for expansion. (★★★★☆ Mar 02)
8	Compaq Evo D500 find.pcworld.com/15840		75	Average \$1254	Windows 2000 Average 100		Attractive case offers tool-less access to components, but limited expandability. Price goes up \$109 this month. (★★★★☆ Jan 02)
		Percent of overall rating ▶	25 percent	15 percent			

All systems tested or retested under our new PC WorldBench 4 test suite. See find.pcworld.com/10860 for details on PC World's Star Ratings.

¹ Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. See "Your Guide to the Top 100" on page 117 for more details.

² In gigabytes.

³ We define vertical cases as towers (taller than 20 inches), midsize towers (15.5 to 20 inches), or minitowers (shorter than 15.5 inches); and horizontal cases as desktops (5 inches or taller) or compacts (shorter than 5 inches).

POLYWELL AND SYS TECHNOLOGY win new power chart positions with AMD's latest processor, the 1.67-GHz Athlon XP 2000+. Both systems make a good showing on PC WorldBench 4, with scores only a point or two behind that of the current speed leader on our chart, the Micro Express MicroFlex 1900A (which uses AMD's next-fastest CPU). The Sys comes with handy extras, including a speedy CD-RW drive, USB 2.0 ports for fast connections to the newest external drives, and a unique

floppy drive with built-in slots for reading CompactFlash and SmartMedia cards. A Caliber Alps DT 1310i with Intel's latest processor, the 2.2-GHz Pentium 4, just missed the chart, as did a Premio Apollo 850R with a 2-GHz Pentium 4 chip.

Things move around a bit more on our value chart, with two newcomers from Gateway joining the ranks. Our Best Buy, the Gateway 300X, impressed us with a

Visit find.pcworld.com/23381 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION								Extra features	Design/ documentation	Vendor's reliability/ service
CPU	RAM (MB/type)	Hard drive ²	Monitor size (diagonal inches)	Graphics board	Case type ¹	Open bays/slots				
2-GHz Pentium 4	256/ RDRAM	80	19	64MB GeForce3 Ti 200	Midsize tower	2/3	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, network adapter, Wake-on-LAN, Microsoft Office XP SBE	Good/ Good	Outstanding/ Fair	
2.2-GHz Pentium 4	512/ RDRAM	120	15 (LCD)	64MB ATI Radeon 8500	Tower	3/2	Outstanding: DVD-RAM/R drive,* 24X/10X/40X CD-RW drive, V.90 modem, network adapter, Wake-on-LAN, Office XP SBE	Good/ Good	Good/ Fair	
2.2-GHz Pentium 4	256/ DDR SDRAM	80	19	64MB VisionTek GeForce3 Ti-200	Midsize tower	4/3	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, network adapter, Office XP Small Business Edition	Good/ Good	Good/ Fair	
1.6-GHz Athlon XP 1900+	512/ DDR SDRAM	60	17	64MB GeForce 3	Midsize tower	4/2	Very good: DVD+RW drive,* V.90 modem, network adapter	Good/ Adequate	*/s	
1.67-GHz Athlon XP 2000+	256/ DDR SDRAM	80	18 (LCD)	64MB Leadtek WinFast Titanium 200T ⁴	Midsize tower	4/1	Very good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, network adapter, digital media readers, WordPerfect Office 2002	Good/ Adequate	*/s	
1.6-GHz Athlon XP 1900+	256/ DDR SDRAM	60	19	32MB Matrox MGA G-550	Midsize tower	3/4	Good: 16X/10X/32X CD-RW drive, network adapter, Office XP Small Business Edition	Good/ Adequate	*/s	
1.67-GHz Athlon XP 2000+	512/ DDR SDRAM	80	19	64MB Hercules 3D Prophet 3 Ti 500	Midsize tower	7/1	Adequate: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, network adapter	Good/ Good	*/s	
	10 percent						15 percent	15 percent	25 percent	
1.3-GHz Celeron	256/ SDRAM	40	15 (LCD)	Integrated Intel 815E	Midsize tower	1/2	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.92 modem, network adapter, Wake-on-LAN, tool-less drive bays	Adequate/ Good	Good/ Fair	
1.2-GHz Athlon	256/ DDR SDRAM	40	17	64MB Asus AGP- V7700	Midsize tower	3/3	Good: 12X DVD-ROM drive, 12X/8X/32X CD-RW drive, V.90 modem, network adapter	Good/ Good	*/s	
1.4-GHz Athlon	256/ DDR SDRAM	40	17	32MB Leadtek GeForce2 Pro	Midsize tower	3/2	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, network adapter	Good/ Adequate	*/s	
1.6-GHz Pentium 4	256/ SDRAM	41	15	32MB VisionTek GeForce2 MX	Midsize tower	2/3	Very good: 16X/10X/40X CD-RW drive, network adapter, chassis- intrusion detection, client management software, Wake-on-LAN	Good/ Adequate	Good/ Fair	
1.2-GHz Celeron	256/ SDRAM	40	17	Integrated Intel 815E	Desktop	1/2	Outstanding: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.92 modem, network adapter, Office XP Small Business Edition	Good/ Adequate	Good/ Fair	
1-GHz Athlon	256/ SDRAM	41	15 (LCD)	32MB Gigabyte GV-AG32S	Minitower	2/2	Outstanding: 24X/10X/40X CD-RW drive, network adapter, Corel WordPerfect Office 2002	Good/ Adequate	*/s	
1.8-GHz Pentium 4	256/ SDRAM	20	17	32MB ATI Rage Ultra 32	Desktop	0/2	Good: 8X/4X/32X CD-RW drive, network adapter, chassis-intrusion detection, client management software, Wake-on-LAN	Good/ Adequate	Outstanding/ Fair	
1.7-GHz Pentium 4	256/ SDRAM	20	15	16MB Vanta	Desktop	0/2	Average: 22X-48X CD-ROM drive, network adapter, intrusion detection, client management software, Wake-on-LAN	Good/ Adequate	Good/ Poor	
	10 percent						15 percent	10 percent	25 percent	

* DVD-RW and DVD+RW drives can handle CD-RW functions; DVD-RAM/R drives cannot. DVD-RW drives can also write DVD-R, but DVD+RW drives cannot.

³ Insufficient data to give a rating.

⁴ Tests were conducted with this board, but PC now comes with a 64MB Leadtek WinFast A170 DDR2 graphics board.

⁵ Formerly known as the Systemax Ascent SA-15.

15-inch LCD monitor and respectable performance wrung from Intel's latest Celeron processor. In addition to its 1.3-GHz clock speed, the chip benefits from a .13-micron design that allows Intel to double the L2 cache size to 256KB.

At number five, Gateway's E-1800 packs management and security features for corporate offices. A Polywell Poly 880NF nearly made the chart, and a Com-

paq Evo D300v missed by a wider margin, partly due to sluggish performance.

Finally, some chart rankings have changed because of modified weightings that focus a bit more on extra features and price. We made these adjustments because minor differences in speed are difficult for most users to discern, but a richer feature set or a lower price is easy for anyone to appreciate.



THE ZIPPY Sys Performance 2000+
impressed us with its 18-inch LCD monitor.

TOP 15 NOTEBOOK PCs

POWER NOTEBOOK		Overall rating	Street price (2/15/02)	PC WorldBench 4 performance score ¹	Faster	Comments
1	Best BUY IBM ThinkPad A30p find.pcworld.com/18122	89	Expensive \$3099	Windows 2000	Outstanding 113	Features dual modular bays, ergonomic sloping case, and huge hard drive. PDA syncing bay device optional. Price falls \$300. (★★★★☆ Feb 02)
2	Dell Inspiron 8100 find.pcworld.com/14880	89	Inexpensive \$1658	Windows 2000	Good 100	Desktop replacement is built for multimedia, with GeForce2 Go graphics plus IEEE 1394 and S-Video ports. (★★★★☆ Dec 01)
3	IBM ThinkPad T23 find.pcworld.com/14881	87	Average \$2649	Windows 2000	Good 105	Equipped with a whopping 48GB hard drive and a big screen with a light at the top. A \$600 price drop boosts this model up the chart. (★★★★☆ Dec 01)
4	Dell Latitude C810 find.pcworld.com/21182	86	Average \$2625	Windows XP Professional	Very good 101	All-in-one has dual optical drive design. Unit is unavailable with both standard and wireless networking connections built in. (★★★★☆ Apr 02)
5	HP Omnibook 6100 find.pcworld.com/16402	86	Expensive \$2825	Windows 2000	Very good 106	Corporate speedster has wireless-ready design and handsome, thin case with modular bay. (★★★★☆ Jan 02)
6	Toshiba Tecra 9000 find.pcworld.com/19841	83	Expensive \$2999	Windows 2000	Good 101	Slim, all-silver unit with sloping front includes both Wi-Fi (802.11b) and Bluetooth wireless antennas. Drops \$155 this month. (★★★★☆ March 02)
7	WinBook N3 1.2 find.pcworld.com/23461	NEW 73	Inexpensive \$1976	Windows XP Professional	Poor 76	Dual-purpose buttons on front play audio CDs or launch applications and Web sites; no serial or infrared port. ★★★☆☆
VALUE NOTEBOOK		Percent of overall rating ▶	15 percent	20 percent		
1	Best BUY Dell Latitude C610 find.pcworld.com/21183	81	Expensive \$2386	Windows XP Professional	Very good 99	Revamp of older model allows wireless and standard networking options to be built in, eliminating need for PC Cards. (★★★★☆ Apr 02)
2	IBM ThinkPad R30 find.pcworld.com/16403	81	Average \$1699	Windows 2000	Good 88	Two-spindle unit has most standard connections, a light at the top of the screen, and built-in WiFi wireless support. Price falls \$250 this month. (★★★★☆ Jan 02)
3	Compaq Presario 1720 find.pcworld.com/19482	80	Average \$1599	Windows XP Home	Very good 95	Lightweight, well-equipped consumer laptop comes with DVD-ROM/CD-RW combination drive and IEEE 1394 port. (★★★★☆ Mar 02)
4	Toshiba Satellite 5005-S504 find.pcworld.com/19484	80	Average \$1799	Windows XP Home	Very good 95	Fantastic sound and dedicated audio controls will delight music lovers; also includes SD and SmartMedia slots. (★★★★☆ Mar 02)
5	HP Pavilion N5445 find.pcworld.com/21184	80	Average \$1649	Windows XP Home	Very good 94	Dedicated audio controls and IEEE 1394 port highlight this handsome consumer-oriented all-in-one with fixed drives. (★★★★☆ Apr 02)
6	Fujitsu LifeBook C Series find.pcworld.com/16404	80	Inexpensive \$1399	Windows 2000	Good 88	Offers four USB ports; DVD-ROM/CD-RW combination drive is a pleasant find in a low-cost notebook. (★★★★☆ Jan 02)
7	Compaq Presario 2701 find.pcworld.com/19483	79	Average \$1999	Windows XP Home	Very good 97	Dual optical drive design lets you use DVD-ROM and bundled CD-RW drives simultaneously. Price includes \$99 optional second battery. (★★★★☆ Mar 02)
8	Sony VAIO PCG-FX390P find.pcworld.com/19485	79	Average \$1899	Windows XP Professional	Average 83	Removable floppy drive, tiltable keyboard, and clearly marked connections highlight this all-in-one. Price falls \$300 this month. (★★★★☆ Mar 02)
		Percent of overall rating ▶	20 percent	15 percent		

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

¹ Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. See "Your Guide to the Top 100" on page 117 for more details.

² Except where noted, all CPUs are SpeedStep chips, which run at a slower speed when on battery power.

³ In gigabytes.

TWO NEWLY ANOINTED Best Buys lead our power and value lists. On the power side, a \$300 price drop gave IBM's \$3099 ThinkPad A30p the boost it needed to muscle aside Dell's Inspiron 8100. The ThinkPad's strong performance and huge hard drive bolstered its claim to the title. Gateway has discontinued the Solo 5350 that we tested in February (with a 1-GHz/733-MHz Pentium III-M CPU), clearing the way for Dell's Latitude C610 to move into the Best Buy spot among value notebooks.

Look for bigger chart shake-ups in the months to come, as notebooks equipped with the mobile P4 processor debut. For a preview, see "Take Pentium 4 Power on Your Next Trip" (find.pcworld.com/23542).

WinBook finally throws its hat into the crowded ring of multimedia laptops with the new N3 1.2, which lands in seventh place on our power chart. The N3 is the snazziest model in WinBook's mostly

Visit find.pcworld.com/23462 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION							Extra features *	Overall design	Battery life (hours:min) *	Average weight (pounds) *	Vendor's reliability/ service
CPU †	Screen (inches)	RAM (MB)	Hard drive ‡	Pointing device	Multi-purpose bays						
1.2-GHz Pentium III-M	15	256	48	Eraserhead	2	Very good: 6X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in modem and network adapter, Lotus SmartSuite	Outstanding	Average/ 2:19	Heavy/ 8.5	Good/ Fair	
1-GHz Pentium III-M	15	256	20	Touchpad, eraserhead	1	Very good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office XP Small Business Edition 2002	Outstanding	Good/ 3:01	Heavy/ 9.0	Good/ Fair	
1.13-GHz Pentium III-M	14.1	256	48	Eraserhead	1	Good: 8X DVD-ROM drive, built-in modem and network adapter, Lotus SmartSuite	Outstanding	Average/ 2:41	Light/ 6.5	Good/ Fair	
1.13-GHz Pentium III-M	15	256	30	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Good/ 3:00	Heavy/ 9.1	Good/ Fair	
1.13-GHz Pentium III-M	15	256	30	Touchpad, eraserhead	1	Good: 8X DVD-ROM drive, built-in modem and network adapter	Outstanding	Very good/ 3:58	Average/ 7.8	Good/ Fair	
1.13-GHz Pentium III-M	14.1	256	30	Eraserhead	1	Very good: 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Good/ 3:04	Average/ 7.1	Good/ Fair	
1.2-GHz Pentium III †	15.1	256	20	Touchpad	0	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Average	Poor/ 1:52	Average/ 7.8	*/ †	
5 percent							10 percent	10 percent	5 percent	10 percent	25 percent
1-GHz Pentium III-M	14.1	256	20	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Very good/ 3:56	Average/ 7.8	Good/ Fair	
1-GHz Pentium III	14.1	256	30	Eraserhead	1	Good: 8X/4X/24X CD-RW drive, built-in modem and network adapter, Lotus SmartSuite	Outstanding	Average/ 2:22	Light/ 6.7	Good/ Fair	
1-GHz Pentium III-M	14.1	256	20	Touchpad	1	Good: 6X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in modem and network adapter	Average	Good/ 3:13	Average/ 6.8	Fair/ Poor	
1.1-GHz Pentium III †	15	512	30	Touchpad	0	Good: 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter, Lotus SmartSuite	Very good	Poor/ 1:47	Heavy/ 8.7	Good/ Fair	
1.06-GHz Pentium III-M	15	256	20	Touchpad	0	Good: 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Works 2002	Average	Good/ 3:35	Heavy/ 8.6	Good/ Fair	
1-GHz Pentium III	14.1	128	30	Touchpad	0	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Average	Good/ 3:18	Average/ 7.7	Good/ *	
1-GHz Pentium III-M	15	512	30	Touchpad	1	Very good: 8X DVD-ROM drive, 8X/4X/24X CD-RW drive, built-in modem and network adapter	Very good	Good/ 3:19	Very heavy/ 10.1	Fair/ Poor	
1-GHz Pentium III	15	256	30	Touchpad	1	Good: 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Word 2002	Very good	Average/ 2:46	Heavy/ 8.2	Good/ *	
5 percent							10 percent	10 percent	5 percent	10 percent	25 percent

* Word score reflects both listed and unlisted features.

† Unless otherwise noted, all notebooks come with a lithium ion battery.

‡ Includes computer, AC adapter, power cord, floppy drive, and optical drive.

† Single-speed desktop CPU.

* Insufficient data to give a rating.

conservative lineup to date. As for the N3's drawbacks, its battery lasted for only 1 hour, 52 minutes on one charge, and it managed a sluggish PC WorldBench 4 score of just 76. Both of these disappointments are due, in part, to its 1.2-GHz Pentium III desktop processor.

Although Gateway's new Solo 1400b LS Pro fell short of our value list, bargain hunters might want to check it out. This

\$1448 all-in-one with fixed floppy and DVD-ROM drives is light for a notebook that comes with a 15.1-inch screen—only 6.1 pounds, without the power adapter. Unfortunately, the Solo stumbled in our performance tests, finishing about 15 percent behind Sony's VAIO PCG-FX390P, the only other 1-GHz Pentium III-based notebook running Windows XP Professional that we've tested.



MULTIMEDIA MARVEL: WinBook's N3 1.2 has S-Video-out and IEEE 1394 ports.

TOP 15 HOME PCs

	POWER SYSTEM	Overall rating	Street price (2/8/02)	PC WorldBench 4 performance score ¹ Faster	Comments
1	Best BUY Gateway 700XL find.pcworld.com/20681	93	Expensive \$2999	Windows XP Home Very good 118	Model comes well stocked for video or image editing. The sound system is powerful, and the LCD monitor is sharp. (★★★★☆ Apr 02)
2	Dell Dimension 8200 find.pcworld.com/19883	93	Average \$2857	Windows XP Home Good 113	Top-notch entertainment PC has powerful sound. Its monitor is stunning on movies and games, but text is fuzzy. (★★★★☆ Apr 02)
3	Compaq Presario 8000Z find.pcworld.com/19221	87	Average \$2351	Windows XP Home Good 116	Well-equipped system comes with everything you need to edit and burn home movies on DVD. Price drops \$100. (★★★★☆ Mar 02)
4	HP Pavilion 950 Athlon NEW find.pcworld.com/23062	84	Average \$2773	Windows XP Home Good 116	Impressive model sports four front ports, including IEEE 1394, and an interior packed full of high-end components. ★★★★★
5	ABS Performance Ti 500 find.pcworld.com/17321	83	Very inexpensive \$1599	Windows XP Home Very good 117	Loaded system in a towering black case delivers speed, smooth game play, and powerful sound at a bargain price. (★★★★☆ Feb 02)
6	Alienware Aurora DDR AMD XP 2000 NEW find.pcworld.com/23061	83	Expensive \$3137	Windows XP Home Outstanding 124	This PC has blazing speed, a large display, and rich sound. It includes loads of storage space, but it's pricey. ★★★★★
7	Falcon Northwest Mach V Athlon 2000 find.pcworld.com/19222	81	Very expensive \$3989	Windows XP Home Outstanding 126	If you have the cash, you'll be hard-pressed to find a better entertainment system than this Mach V. Price drops \$667. (★★★★☆ Mar 02)
VALUE SYSTEM Percent of overall rating ▶			10 percent	25 percent	
1	Best BUY Dell Dimension 4400 find.pcworld.com/19882	94	Average \$1488	Windows XP Home Good 97	Dell's latest midrange PC is fairly fast and includes two optical drives. Images on its 17-inch monitor looked faded. (★★★★☆ Apr 02)
2	Gateway 500XL find.pcworld.com/19884	92	Average \$1399	Windows XP Home Very good 100	Dropping \$250 this month, this Gateway comes nicely packaged with an easy-access case and an LCD monitor. (★★★★☆ Apr 02)
3	Polywell Poly 880NF find.pcworld.com/19901	87	Average \$1399	Windows XP Home Outstanding 115	Fastest value system even rivals some power contenders. Comes with an LCD monitor, as well. (★★★★☆ Apr 02)
4	NuTrend Intrepid SE find.pcworld.com/17301	84	Inexpensive \$1099	Windows XP Home Very good 103	A low-cost but high-performance value PC with nice extra features. Monitor quality is unimpressive, however. (★★★★☆ Feb 02)
5	EMachines T4160 NEW find.pcworld.com/23041	79	Inexpensive \$923	Windows XP Home Good 90	Relatively slow system provides basic multimedia features, ports in the front, and a CD-RW drive for under a grand. ★★★★★
6	Gateway 300C NEW find.pcworld.com/23043	74	Very inexpensive \$754	Windows XP Home Average 87	Two front USB 1.1 ports and adequate Celeron performance for a bargain price, but the 15-inch CRT monitor is poor. ★★★★★
7	Polywell Poly 1000DU find.pcworld.com/15114	71	Average \$1299	Windows XP Home Good 93	System squeezes impressive performance from a low-cost processor and includes a variety of extras. (★★★★☆ Dec 01)
8	Gateway Profile 3CX find.pcworld.com/19223	67	Expensive \$1699	Windows XP Home Good 94	Space-saving all-in-one design includes a good LCD monitor, but the unit is pricey and offers little expandability. (★★★★☆ Mar 02)
Percent of overall rating ▶			20 percent	20 percent	

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

¹ 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 117.

² In gigabytes.

³ 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). All-in-one PCs integrate a system and a monitor.

FOR ITS LATEST HIGH-END Pavilions, HP has picked representatives from both sides of the processor war. This month we tested two nearly identical versions of the Pavilion 950, one with a 1.66-GHz Athlon CPU and the other running a 2.2-GHz Pentium 4. Of the two, the Pavilion 950 Athlon earned a spot on our power chart, at number four. Though both PCs are attractive systems for power users, the Pavilion 950 Athlon was faster in our tests and nearly \$200 cheaper than its Pentium twin.

At number six, Alienware's Aurora DDR is all about power, with a blazing PC WorldBench 4 score of 124 and a 100GB hard drive. Made for gamers, the Aurora DDR includes a 19-inch monitor and full-sounding speakers. Its sound and graphics scored well on all of our test games. But like other decked-out gaming systems, such as Falcon Northwest's Mach V, the Aurora DDR is expensive, at \$3137.

Visit find.pcworld.com/23142 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION						Extra features	Graphics/ sound quality	Setup and ease of use	Vendor's reliability/ service
CPU	RAM (MB/type)	Hard drive ⁴	Monitor (inches)	Graphics	Case type ³				
2.2-GHz Pentium 4	512/ RDRAM	120	15 (LCD)	64MB ATI Radeon 8500	Midsized tower	Outstanding: DVD-RAM/R drive,* 24X/10X/40X CD-RW drive, V.92 modem, network adapter, two USB 2.0 ports, Microsoft Office XP Small Business Ed.	Very good/ Good	Very good	Fair/ Fair
2.2-GHz Pentium 4	256/ RDRAM	80	19	64MB GeForce3 Ti 500	Midsized tower	Good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, Microsoft Works Suite 2002	Very good/ Outstanding	Very good	Outstanding/ Good
1.53-GHz Athlon XP 1800+	512/ DDR SDRAM	120	19	64MB GeForce3 Ti 500	Midsized tower	Good: DVD-RW drive,* 24X-48X CD-ROM drive, V.90 modem, network adapter, Microsoft Works 6.0 and Money 2000 Standard	Very good/ Outstanding	Very good	Fair/ Poor
1.66-GHz Athlon XP 2000+	1024/ DDR SDRAM	80	15 (LCD)	64MB GeForce3 Ti 500	Midsized tower	Very good: DVD-RW drive,* 16X DVD-ROM drive, V.92 modem, network adapter; Microsoft Works, Encarta, and Money; Pinnacle Studio 7	Good/ Very good	Good	Fair/ Poor
1.53-GHz Athlon XP 1800+	256/ DDR SDRAM	60	19	64MB Leadtek WinFast Ti 500 TD	Tower	Very good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, net- work adapter, Corel WordPerfect Office 2002, Roxio Easy CD Creator 5	Very good/ Outstanding	Good	*/s
1.66-GHz Athlon XP 2000+	512/ DDR SDRAM	100	19	64MB GeForce3 Ti 500	Tower	Good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, Plantronics LS-1 headphones, gamepad, joystick, Works Suite 2002	Very good/ Outstanding	Good	*/s
1.66-GHz Athlon XP 2000+	1024/ DDR SDRAM	80*	22	64MB VisionTek Xtasy 6964	Midsized tower	Average: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, network adapter; Deus Ex, Giants (games)	Very good/ Outstanding	Very good	*/s
10 percent						10 percent	15 percent	5 percent	25 percent
1.7-GHz Pentium 4	256/ DDR SDRAM	40	17	64MB GeForce3 Ti 200	Midsized tower	Very good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, net- work adapter, Microsoft Works Suite 2002	Good/ Average	Very good	Outstanding/ Good
1.8-GHz Pentium 4	256/ DDR SDRAM	40	15 (LCD)	64MB GeForce2 MX400	Minitower	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.92 modem, net- work adapter, Microsoft Works Suite 2002	Very good/ Average	Very good	Fair/ Fair
1.4-GHz Athlon XP 1600+	256/ DDR SDRAM	80	15 (LCD)	32MB integrated GeForce2 MX	Midsized tower	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, net- work adapter, Lotus SmartSuite Millennium Edition	Good/ Poor	Good	*/s
1.7-GHz Pentium 4	256/ DDR SDRAM	40	17	32MB VisionTek Xtasy 5332	Midsized tower	Very good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, net- work adapter, Corel WordPerfect Office 2002, Nero Burning ROM 5.0	Good/ Very good	Good	*/s
1.6-GHz Pentium 4	256/ SDRAM	40	17	32MB TNT	Minitower	Average: 16X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Works 6	Average/ Average	Good	Good/ Poor
1.3-GHz Celeron	128/ SDRAM	20	15	815EP using main memory	Minitower	Good: 16X/10X/40X CD-RW drive, V.92 modem, network adapter, Microsoft Works Suite 2002	Poor/ Average	Very good	Fair/ Fair
1-GHz Duron	128/ DDR SDRAM	40	19	32MB Matrox Millennium G450	Midsized tower	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, net- work adapter, Lexmark Z53 Color Jetprinter, Logitech Webcam	Good/ Very good	Average	*/s
1.2-GHz Pentium III	128/ SDRAM	40	15 (LCD)	810e using main memory	All-in-one	Good: 16X/10X/40X CD-RW drive, V.90 modem, network adapter, Microsoft Works Suite 2002	Poor/ Poor	Very good	Fair/ Fair
10 percent						10 percent	10 percent	5 percent	25 percent

* DVD-RW and DVD+RW drives can handle CD-RW functions; DVD-RAM/R drives cannot. DVD+RW drives cannot record DVD-R discs.

³ Insufficient data to give a rating.
⁴ Two 40GB hard drives with RAID.

EMachines recently introduced a new line of value PCs, and we tested two of them this month. The T4160 hits number five on our chart. It had a reasonable PC WorldBench 4 score of 90 and includes a CD-RW drive and a 40GB hard drive for a mere \$923. Its sibling, the T1400 (which costs \$30 less), had a nearly identical PC WorldBench 4 score of 89 but missed the chart. We weren't impressed with its

sound quality, and its integrated graphics slowed game play to a crawl.

The Gateway 300C grabs number six on the value chart; at just \$754, it's the least-expensive unit in the Top 15. With a 1.3-GHz Celeron CPU, its PC WorldBench 4 score of 87 was slightly below average for our value contenders, and its gaming scores were in the dumps. Still, it's fine for office tasks and Web browsing. ►



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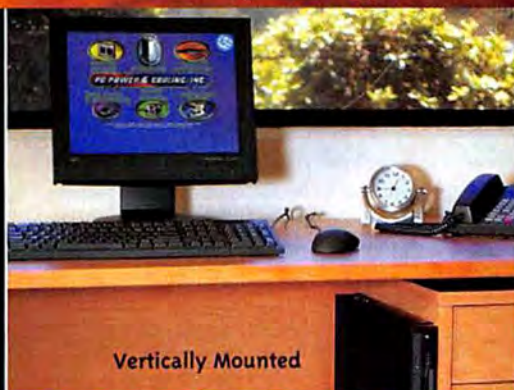
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TOP 10 PRINTERS

TOP 100

TEST
Center

Visit find.pcworld.com/23981 for reviews of all products tested this month and ranked in this chart.

CANON'S NEW S750 Color Bubble Jet Printer makes a spectacular debut, capturing the winning position its first month on the chart. Replacing Canon's discontinued S630 model, the S750 has the fastest text speed and the lowest cost per page for color graphics of all the ink jets on our chart. We also

tested another new model from Canon, the S9000 Color Bubble Jet Photo Printer, which excels at printing photos. But its \$499 price is steep, even among ink jets that can print tabloid-size pages—a shortcoming that kept it off the chart. Next month we'll look at monochrome laser printers. ▶

	INK JET PRINTER	Street price (2/25/02)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/graphics	Cost per page for monochrome/color (cents)	Comments
1	Best BUY Canon S750 Color Bubble Jet Printer NEW find.pcworld.com/22841	\$199	90	7.2/1.2	Very good/Good	2/8.8	FEATURES: Rated 20 ppm monochrome/13 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: The quick S750 prints beautiful glossy photos, and handles text with accuracy and speed. Its gray-scale images and lines were only adequate. ★★★★★
2	Best BUY Epson Stylus C80 find.pcworld.com/16660	\$179	88	6.9/1.5	Adequate/Good	3.8/12.5	FEATURES: Rated 12 ppm monochrome/5 ppm color. 2880-by-720-dpi maximum resolution, 150 sheets input, 30 output. SUMMARY: Fast unit good for high-volume home-office printing. Excels at photos and uses pigment-based inks, so photos should last longer. (★★★★★ Jan 02)
3	Lexmark Z43 Color Jetprinter find.pcworld.com/10561	\$100	86	4.6/0.6	Good/Good	5.1/18.9	FEATURES: Rated 12 ppm monochrome/6 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Delivers clean text; crisp, narrow parallel lines; and detailed, realistic color graphics. Photos were washed out and somewhat fuzzy, though. (★★★★★ Jan 02)
4	HP Deskjet 940c Color Inkjet Printer find.pcworld.com/16681	\$149	83	4.7/0.7	Good/Good	6/13.8	FEATURES: Rated 12 ppm monochrome/10 ppm color. 2400-by-1200-dpi maximum resolution, 150 sheets input, 50 output. SUMMARY: Gray-scale images looked wonderful in our tests; glossy photos displayed great detail and texture but were too dark. (★★★★★ Jan 02)
5	Lexmark Z53 Color Jetprinter find.pcworld.com/10560	\$130	83	5.9/0.6	Good/Very good	5.1/18.9	FEATURES: Rated 16 ppm monochrome/8 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Printed text significantly faster than the Z43, but is otherwise very similar. Colors appeared too bright in photo tests. (★★★★★ Jan 02)
6	HP Deskjet 920c Color Inkjet Printer find.pcworld.com/19264	\$99	80	4.2/0.7	Good/Very good	6/13.8	FEATURES: Rated 5.2 ppm monochrome/2.2 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Affordable printer with respectable print quality. Both gray-scale and color graphics were attractive. Limited 90-day warranty is unimpressive. (★★★★★ March 02)
7	HP Deskjet 845c Color Inkjet Printer find.pcworld.com/16680	\$99	80	3.8/0.5	Adequate/Good	6/13.7	FEATURES: Rated 8 ppm monochrome/5 ppm color. 1200-by-600-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Delivers smooth, detailed gray-scale images and superb highlights and shadows on photos. An excellent option for inexpensive photo printing. (★★★★★ Jan 02)
8	Canon S300 Color Bubble Jet Printer find.pcworld.com/16641	\$99	79	5.1/0.8	Very good/Good	2.3/12.1	FEATURES: Rated 11 ppm monochrome/7.5 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Text output quality was clean with fine details. Photo output looked good, though slightly washed out. Print cost per page is low. (★★★★★ Jan 02)
9	Epson Stylus C60 find.pcworld.com/16647	\$99	74	5.6/1.4	Adequate/Adequate	5/15	FEATURES: Rated 12 ppm monochrome/8 ppm color. 2880-by-720-dpi maximum resolution, 100 sheets input, 30 output. SUMMARY: A capable photo printer that produced subtle details with impressive speed, though some shots showed a slightly red cast. (★★★★★ Jan 02)
10	Compaq 1400P Color InkJet Printer find.pcworld.com/19262	\$150	63	5.2/0.5	Good/Adequate	5/19.9	FEATURES: Rated 15 ppm monochrome/7 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Excellent option for digital camera users thanks to its CompactFlash card reader, but output quality is inconsistent. (★★★★★ March 02)

HOW WE TEST: The overall rating for color ink jet printers is based on price (25 percent), print quality (20 percent), features (15 percent), ease of use (15 percent), speed (10 percent), service and support (10 percent), and cost of consumables (5 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings.

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TOP 10 MONITORS

TOP 100

TEST
Center

Visit find.pcworld.com/23521 for reviews of all products tested this month and ranked in this chart.

FOUR NEW MONITORS make the chart this month, though none made strong enough showings to dislodge the top three models from February's list of 19-inchers. The NEC MultiSync FE950+ comes in fourth, while the Samsung SyncMaster 950b takes sixth, and the Sony CPD-G410R debuts in

eight place. Dell's P992 just squeaks onto the chart at number ten. Several new monitors fell short, such as the Iiyama Vision Master Pro 454 (which has two VGA inputs and built-in speakers), the Compaq P920, and the KDS XtremeFlat XF-9p. Next month we'll review 15-inch LCD monitors. ▶

	19-INCH MONITOR	Street price (2/15/02)	Overall rating	Quality of text/graphics	Comments
1	Best BUY ViewSonic GS790 find.pcworld.com/10573	\$289	93	Very good/ Very good	FEATURES: 18-inch viewable area, .26mm ¹ shadow mask tube, up to 95-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Vibrant and realistic colors make this model a good choice for graphics pros, and sharp text makes it well suited for word processing, too. (★★★★☆ Sept 01)
2	Best BUY Optiquest Q95 find.pcworld.com/10800	\$229	92	Very good/ Very good	FEATURES: 18-inch viewable area, .27mm ¹ shadow mask tube, up to 80-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, three-year warranty, 24-hour daily toll-free support. SUMMARY: One of the cheapest monitors on the chart, this is a fine choice for price-conscious buyers who don't need extras such as USB ports or built-in speakers. Text looked sharp and colors appeared bright. (★★★★☆ Sept 01)
3	Compaq S920 find.pcworld.com/18802	\$319	91	Very good/ Very good	FEATURES: 18.1-inch viewable area, .26mm ¹ shadow mask tube, up to 89-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Renders sharp, dark text in word-processing documents and spreadsheets, and vibrant colors in photos. Easy-to-use on-screen controls include horizontal and vertical moiré adjustment. (★★★★☆ Feb 02)
4	NEC MultiSync FE950+ find.pcworld.com/23302	NEW \$349	87	Very good/ Very good	FEATURES: 17.9-inch viewable area, .25mm ¹ Diamondtron NF aperture grille tube, ³ up to 89-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Provides above-average image quality for both text and graphics, but the seven-button control interface could confuse some users. (★★★★☆)
5	Sony CPD-G420S find.pcworld.com/10577	\$430	86	Very good/ Very good	FEATURES: 17.9-inch viewable area, .24-.25mm ¹ FD Trinitron aperture grille tube, ³ up to 85-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Well suited for heavy word processing or professional graphics. Price drops \$50 this month, but other monitors on our chart provide comparable image quality for less. (★★★★☆ Sept 01)
6	Samsung SyncMaster 950b find.pcworld.com/23301	NEW \$219	86	Satisfactory/ Good	FEATURES: 17.9-inch viewable area, .26mm ¹ shadow mask tube, up to 75-Hz refresh rate, ² up to 1280 by 1024 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: This monitor is very attractively priced and has strong graphics image quality, but text—especially small fonts—was a little fuzzy and difficult to read. (★★★★☆)
7	Hewlett-Packard P920 find.pcworld.com/10578	\$429	86	Very good/ Very good	FEATURES: 17.9-inch viewable area, .24mm ¹ Diamondtron NF aperture grille tube, ³ up to 99-Hz refresh rate, ² up to 1920 by 1440 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 11-hour weekday toll-call support. SUMMARY: Delivers pleasing color and fine, clear text. Matches the number ten Dell with the highest maximum resolution of all monitors here. (★★★★☆ Sept 01)
8	Sony CPD-G410R find.pcworld.com/23303	NEW \$399	86	Very good/ Very good	FEATURES: 17.9-inch viewable area, .24mm ¹ FD Trinitron aperture grille tube, ³ up to 85-Hz refresh rate, ² up to 1800 by 1440 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Clean-looking monitor has just two control buttons; navigating the on-screen menu can be confusing, however. A little expensive, but it boasts impressive text and graphics. (★★★★☆)
9	IBM P97 find.pcworld.com/18803	\$499	85	Very good/ Very good	FEATURES: 18-inch viewable area, .24-.25mm ¹ FD Trinitron aperture grille tube, ³ up to 85-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Pricy display renders sharp lettering and delicately detailed photos—it's a solid choice for heavy text work or video editing. Discards basic beige in favor of black. (★★★★☆ Feb 02)
10	Dell P992 find.pcworld.com/23341	NEW \$429	85	Very good/ Very good	FEATURES: 17.9-inch viewable area, .24mm ¹ FD Trinitron aperture grille tube, ³ up to 90-Hz refresh rate, ² up to 1920 by 1440 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Provides solid text and nice graphics, and has plenty of easy-to-use controls (including both vertical and horizontal moiré controls) in the on-screen menu. (★★★★☆)

HOW WE TEST: Twelve judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, spreadsheets, Web pages, and scanned photos. The overall rating is based on text and graphics quality (25 percent each), price (25 percent), features and ease of use (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings.

¹ Specification represents diagonal dot pitch for shadow mask monitors and stripe pitch or varying stripe pitch for aperture grille monitors. ² Maximum refresh rate at 1080 by 1024 resolution (the tested resolution for this size monitor). ³ Uses an aperture grille tube in which parallel wires near the sides of the screen are strung farther apart than those at the middle.

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TOP 10 GRAPHICS BOARDS

TEST
Center

Visit find.pcworld.com/23361 for reviews of all products tested this month and ranked in this chart.

THIS MONTH WE'VE CHANGED the structure of the *Top 10 Graphics Boards* chart. It now consists of two parts: The first half covers power graphics cards, where performance is the most important criterion. The second half comprises value

cards, where price is paramount. That means you can choose from the most advanced graphics cards, or select the best card for a limited budget. For details of how the rankings are calculated, see "How We Test" at the bottom of the chart. ►

POWER GRAPHICS BOARDS		Street price (2/15/02)	Overall rating	Image quality	Overall speed	Features rating	Comments
1	Best BUY Gainward GeForce3 PowerPack Ti/450 find.pcworld.com/22822	NEW \$169	95	Good	Outstanding	Good	FEATURES: NVIDIA GeForce3 Ti 200 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-out, composite-out; software DVD player. SUMMARY: Earned very high frame-rate scores, but had some glitches in one of our test games (Test Drive 6) and only middling image-quality scores. ★★★★★
2	ATI Radeon 8500 find.pcworld.com/17122	\$250	93	Very good	Very good	Outstanding	FEATURES: ATI Radeon 8500 chip, 64MB of DDR SDRAM, 400-MHz RAMDAC; dual-display capability, DVI-out, S-Video-out, composite-out; software DVD player, two games. SUMMARY: The driver installer automatically updates your PC to DirectX 8. Includes many hardware extras. (★★★★★ Feb 02)
3	VisionTek Xtasy 6964 find.pcworld.com/21261	\$320	92	Good	Outstanding	Good	FEATURES: NVIDIA GeForce3 Ti 500 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; DVI-out, S-Video-out; color-calibration utility. SUMMARY: Produced fast frame rates for all test games (especially at high resolutions), but is expensive and lacks the features of cheaper cards. (★★★★★ Feb 02)
4	ATI All-In-Wonder Radeon 8500DV find.pcworld.com/22801	NEW \$330	90	Good	Very good	Outstanding	FEATURES: ATI Radeon 8500 chip, 64MB of DDR SDRAM, 400-MHz RAMDAC; dual-display capability, DVI-out, in and out for audio, S-Video, composite, and IEEE 1394; video editing and DVD software, color-calibration utility. SUMMARY: This card has strong overall performance and is well suited for video editing. ★★★★★
5	Asus AGP-V8200T2 Deluxe find.pcworld.com/22901	NEW \$230	89	Good	Very good	Good	FEATURES: NVIDIA GeForce3 Ti 200 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-in and -out, composite-in and -out; video editing software, software DVD player. SUMMARY: Board provides high frame-rates, as well as strong image quality, at a very reasonable price. ★★★★★
VALUE GRAPHICS BOARDS							
1	Best BUY Gainward GeForce2 Ti/500 XP Vivo Golden Sample find.pcworld.com/17721	\$130	92	Average	Outstanding	Good	FEATURES: NVIDIA GeForce2 Ti chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-in and -out, composite-in and -out; video editing software, software DVD player. SUMMARY: Not the cheapest card on the value chart, but high performance and video editing features push it to the top. (★★★★★ Feb 02)
2	MSI G2Ti Pro-VT find.pcworld.com/23003	NEW \$100	92	Average	Very good	Good	FEATURES: NVIDIA GeForce2 Ti chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-in and -out, composite-in and -out; video editing software, software DVD player. SUMMARY: Though this board carries an attractive price, our test games looked rather dark and colors had a yellowish cast. ★★★★★
3	Asus AGP-V7100 Pro Pure 32MB find.pcworld.com/13101	\$89	88	Very good	Good	Average	FEATURES: NVIDIA GeForce2 MX-400 chip, 32MB of SDRAM, 350-MHz RAMDAC; color-calibration utility, software DVD player, three games. SUMMARY: A generous game bundle, attractive images, and a low price make this model a great choice for casual gamers on a budget. (★★★★★ Nov 01)
4	VisionTek Xtasy 5864 find.pcworld.com/17701	\$135	88	Good	Very good	Average	FEATURES: NVIDIA GeForce2 Ti chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-out; color-calibration utility. SUMMARY: Speed scores were near those of the fastest cards at lower resolutions, but lagged behind the scores of power graphics cards at higher resolutions. (★★★★★ Feb 02)
5	ATI Radeon 7500 find.pcworld.com/22981	NEW \$149	82	Good	Very good	Good	FEATURES: ATI Radeon 7500 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-out, composite-out; color-calibration utility, software DVD player. SUMMARY: Above-average performance, but more expensive than other cards and comes with no extra features. Includes a short setup guide; no printed manual. ★★★★★

HOW WE TEST: We test graphics boards under Windows Millennium Edition. Our performance scores are based on tests that we evaluate on frame rate (70 percent) and image quality (30 percent). We use GT Interactive's Unreal Tournament, Id Software's Quake III Arena, Interplay's MDK2 Demo, Infogrames' Test Drive 6, and the Caligari TrueSpace 4.2 Benchmark for both performance and image-quality testing. We test graphics boards in a Dell Dimension 4100 Series with a 933-MHz Pentium III CPU and 128MB of PC133 SDRAM. To test each board, we use drivers supplied by the vendor. Overall rating is based on performance (65 percent for power boards, 42.5 percent for value boards), features (15 percent for power, 27.5 percent for value), price (10 percent for power, 20 percent for value), and support policies (10 percent). All boards are 4X AGP compatible. 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/24361 for reviews of all products tested this month and ranked in this chart.

FOR MORE THAN A YEAR, CD-RW write speeds have held steady at 10X, while CD-R speeds have nearly quadrupled. Our new number one, the TDK VeloCD 32/10/40 carries a 10X vendor rating. The Lite-On CD-ReWriter 32x12x40x—in second place for the second month running—and the new

CenDyne Lightning II CD-RW 32x12x40 have upped the rewritable speed to 12X. Not all manufacturers are jumping on the 12X bandwagon just yet, however, since media is scarce.

Also new this month is LG Electronics' GCE-8240B, which posted the fastest CD-R times by a 24X drive we've seen. ▶

	CD-RW DRIVE	Street price (2/21/02)	Overall rating	Performance/support policies	CD-R write speed for 650MB/ CD-RW write speed for 100MB (min:sec)	Comments
1	Best Buy TDK VeloCD 32/10/40 find.pcworld.com/24041 NEW	\$165	87	Very good/ Outstanding	3:36/1:18	FEATURES: 32X/10X/40X, IDE, internal, 4MB buffer, buffer underrun protection, Ahead Nero Burning ROM 5.5 and InCD 3.14, one-year warranty, 10.5-hour daily toll-free support. SUMMARY: By the slimmest of margins, this model outperformed the competition on our CD-R write tests; it also had the fastest application installation time. ★★★★★
2	Best Buy Lite-On CD-ReWriter 32x12x40x find.pcworld.com/21802	\$100	87	Outstanding/ Average	3:43/1:06	FEATURES: 32X/12X/40X, IDE, internal, 2MB buffer, buffer underrun protection, Ahead Nero Burning ROM 5.5 and InCD 3.12, one-year warranty, 9-hour weekday support (calls are not toll-free). SUMMARY: Ties with the CenDyne drive for fastest CD-RW write speed; however, documentation is lacking. Price drops \$50 this month. (★★★★★ Apr 02)
3	TDK VeloCD 24/10/40 find.pcworld.com/21801	\$145	85	Good/ Outstanding	4:09/1:18	FEATURES: 24X/10X/40X, IDE, internal, 2MB buffer, buffer underrun protection, Ahead Nero Burning ROM 5.5 and InCD 2.31, one-year warranty, 10.5-hour daily toll-free support. SUMMARY: Last month's Best Buy, this model includes a good software bundle and comes with daily technical support. (★★★★★ Oct 01)
4	LG Electronics GCE-8240B find.pcworld.com/24061 NEW	\$115	84	Very good/ Very good	3:58/1:28	FEATURES: 24X/10X/40X, IDE, internal, 8MB buffer, buffer underrun protection, Roxio Easy CD Creator 5.1 and DirectCD 5.1, one-year warranty, 13-hour weekday and 8-hour Saturday toll-free support. SUMMARY: LG may be late to the 24X market, but this is the only 24X model to crack the 4-minute barrier on our CD-R write tests. ★★★★★
5	CenDyne Lightning II CD-RW 32x12x40 find.pcworld.com/24062 NEW	\$165	81	Outstanding/ Average	3:41/1:06	FEATURES: 32X/12X/40X, IDE, internal, 2MB buffer, buffer underrun protection, Ahead Nero Burning ROM 5.5 and InCD 3.12, one-year warranty, 9-hour weekday and 4-hour Saturday support (calls are not toll-free). SUMMARY: As fast as our second-ranked Lite-On drive, but you'll pay for marginally better tech support and documentation. ★★★★★
6	QPS Que Internal 32x10x40x CD-RW find.pcworld.com/24063 NEW	\$150	80	Very good/ Average	3:37/1:19	FEATURES: 32X/10X/40X, IDE, internal, 2MB buffer, buffer underrun protection, Ahead Nero Burning ROM 5.5 and InCD 3.21, one-year warranty, 9-hour weekday support (calls are not toll-free). SUMMARY: This model's performance is comparable to that of the number one TDK; support has decreased to 9 hours on weekdays. ★★★★★
7	Yamaha CRW3200 LightSpeed3 find.pcworld.com/19461	\$175	79	Very good/ Good	4:09/1:16	FEATURES: 24X/10X/40X, IDE, internal, 8MB buffer, buffer underrun protection, Ahead Nero Burning ROM 5.5 and InCD 2.31, one-year warranty, 8.5-hour weekday toll-free support. SUMMARY: Solid performance and excellent software (including Adobe Photo Deluxe 4) help keep this drive competitive, despite its high price. (★★★★★ Mar 02)
8	Sony CRX175M/C1 find.pcworld.com/21803	\$175	78	Very good/ Very good	4:06/1:18	FEATURES: 24X/10X/40X, IDE, internal, 2MB buffer, buffer underrun protection, BHA B's Recorder Gold 3.01 and B's Clip 2.29, one-year warranty, 12-hour weekday and Saturday toll-free support. SUMMARY: The first CD-RW drive we've tested that has a Memory Stick slot, which facilitates copying digital images and other files to CD. (★★★★★ Apr 02)
9	Teac CD-W524E find.pcworld.com/18182	\$125	76	Good/ Average	4:30/1:33	FEATURES: 24X/10X/40X, IDE, internal, 2MB buffer, buffer underrun protection, Roxio Easy CD Creator 5.1 and DirectCD 5.1, one-year warranty, 9-hour weekday support (calls are not toll-free). SUMMARY: Though this drive is a little sluggish compared with other 24X offerings, Teac includes an above-average software bundle. (★★★★★ Feb 02)
10	Plextor PlexWriter 24/10/40A find.pcworld.com/14023	\$145	73	Good/ Good	4:39/1:39	FEATURES: 24X/10X/40X, IDE, internal, 4MB buffer, buffer underrun protection, Roxio Easy CD Creator 5.01 and DirectCD 5.01, one-year warranty, 10-hour weekday toll-free support. SUMMARY: Not as fast as other drives in the same speed class; however, the device's drivers make it easy to create music CDs. (★★★★★ Dec 01)

HOW WE TEST: To gauge CD-ROM read performance, we time how long the drive takes to install Microsoft Office 2000 SBE (disc one). To determine CD-R write performance, we burn data to CD-R discs from an image file and on the fly. We evaluate digital audio extraction speed by extracting 320MB of musical tracks from an audio CD to our hard drive. 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. 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.pcworld.com/10860 for details on PC World's Star Ratings. ¹ Vendor's speed ratings, listed in order: CD-R write/CD-RW write/CD-ROM read.

TOP 10 DIGITAL CAMERAS

Visit find.pcworld.com/24001 for reviews of all products tested this month and ranked in this chart.

THE THREE NEW ARRIVALS this month have several things in common: 5-megapixel resolution, extensive exposure controls, and the highest prices on the chart. But when it comes to design, they're as different as Frank Lloyd Wright, Ludwig Mies van der Rohe, and Frank Gehry: Nikon's Coolpix 5000 is

quietly stylish and functional; Olympus's E-20N is massive and efficient; and Sony's Cyber-shot DSC-F707 is ultramodern and high-tech—in line with Sony's luxury consumer bent. Of the three, the E-20N feels the most like a pro's camera: It's the only one with true, through-the-lens viewing. ▶

	CAMERA: \$500 AND OVER	Street price (2/22/02)	Overall rating	Image quality	Ease of use	Battery life/shots	Comments
1	Best Buy Casio QV-4000 find.pcworld.com/16261	\$599	85	Very good	Good	Very good/389	FEATURES: 4.13-megapixel CCD resolution, 16MB CompactFlash media, 34mm-102mm focal range; USB and video output; 16.6 ounces. SUMMARY: Solid all-purpose camera. Better look and design than earlier Casio models, with great image quality, many control options, and innovative Best Shot feature. (★★★★☆ Jan 02)
2	Best Buy Nikon Coolpix 995 find.pcworld.com/14801	\$599	84	Very good	Good	Very good/309	FEATURES: 3.34-megapixel CCD resolution, 16MB CompactFlash media, 38mm-152mm focal range; USB and video output; 16.2 ounces. SUMMARY: Huge, sometimes intimidating list of features, including a swivel lens and custom buttons. Photos look good, with fine detail. Price drops \$200 this month. (★★★★☆ Dec 01)
3	Canon PowerShot G2 find.pcworld.com/14800	\$899	84	Outstanding	Adequate	Very good/348	FEATURES: 4.1-megapixel CCD resolution, 32MB CompactFlash media, 34mm-102mm focal range; USB and video output; 18.9 ounces. SUMMARY: Full-featured camera takes the best photos of the bunch and has a long battery life. Includes a roomy storage card and swing-out viewfinder. (★★★★☆ Dec 01)
4	Sony Cyber-shot DSC-F707 find.pcworld.com/23902	NEW \$999	83	Very good	Good	Excellent/404	FEATURES: 5.2-megapixel CCD resolution, 16MB Memory Stick media, 38mm-190mm focal range; USB and video output; 24.5 ounces. SUMMARY: Besides futuristic styling, this camera has a 5X optical zoom; it can shoot in dark rooms with or without flash. The electronic viewfinder is not as sharp or fast as we'd like. (★★★★☆)
5	Epson PhotoPC 3100Z find.pcworld.com/14804	\$599	83	Good	Very good	Good/271	FEATURES: 3.34-megapixel CCD resolution, 16MB CompactFlash media, 34mm-102mm focal range; USB and video output; 16.9 ounces. SUMMARY: Great price for this easy-to-use model. Takes movies with sound. Practical choice for a family with both novice and experienced photographers. (★★★★☆ Dec 01)
6	Nikon Coolpix 5000 find.pcworld.com/23881	NEW \$1099	83	Very good	Good	Very good/332	FEATURES: 5.24-megapixel CCD resolution, 32MB CompactFlash media, 28mm-85mm focal range; USB and video output; 15 ounces. SUMMARY: Relatively small and light for a 5-megapixel camera, the 5000 offers a huge selection of controls, but it's not the quickest or easiest camera to use. (★★★★☆)
7	Olympus E-20N find.pcworld.com/23901	NEW \$1999	82	Good	Excellent	Excellent/618	FEATURES: 5.1-megapixel CCD resolution, 32MB SmartMedia, CompactFlash (optional) media, 35mm-140 mm focal range; USB and video output; 41.7 ounces. SUMMARY: A digital camera on steroids, the massive E-20N offers through-the-lens viewing and nicely organized controls for fast action and pleasurable shooting. (★★★★☆)
8	Olympus D-40 Zoom find.pcworld.com/19143	\$699	82	Good	Good	Very good/369	FEATURES: 4.1-megapixel CCD resolution, 16MB SmartMedia card, 35mm-98mm focal range; USB and video output; 8.8 ounces. SUMMARY: One of the smallest 4-megapixel cameras available, the D-40 is stylish and relatively easy to use; a good choice for sophisticated traveling snapshooters. (★★★★☆ Mar 02)
9	Sony Cyber-shot DSC-S85 find.pcworld.com/14803	\$799	81	Good	Good	Excellent/427	FEATURES: 4.1-megapixel CCD resolution, 16MB Memory Stick media, 34mm-102mm focal range; USB and video output; 16.4 ounces. SUMMARY: Well designed and easy to use, with extremely long battery life. Photos looked a bit oversaturated, however, and the shutter button is touchy. (★★★★☆ Dec 01)
10	Canon PowerShot S40 find.pcworld.com/19141	\$799	81	Outstanding	Adequate	Adequate/173	FEATURES: 4.1-megapixel CCD resolution, 16MB CompactFlash media, 35mm-105mm focal range; USB and video output; 11.1 ounces. SUMMARY: The PowerShot S40 has a stylish aluminum body and takes beautifully sharp and vivid photos. A couple controls can be confusing, however, and battery life is short. (★★★★☆ Mar 02)

HOW WE TEST: Each camera's overall rating is based on price (15 percent), picture quality (30 percent), ease of use (15 percent), features (20 percent), battery life (10 percent), and support (10 percent). For all ratings, higher is better. To gauge picture quality, we take a series of shots, with and without flash, at 640 by 480 resolution and at the camera's highest resolution. We take pictures of a complex still life and of a mannequin to see how well each camera captures image details and subtle colorings such as skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores; we then average those scores. Camera weights include batteries. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings. * 35mm film equivalent.

MORE REVIEWS

TOP 100

TEST
Center

MISSED AN ISSUE OF *PC World* or passed your copy along to a friend? Here's a recap of other *Top 100* topics from previous issues. To read reviews of the products ranked on these charts, go online and type in the *PC World* Find-It URL at the

top of each chart (for example, find.pcworld.com/22361 for products listed on the *Top 10 Scanners* chart). Next month's *Top 100* will include 15-inch LCD monitors, monochrome laser printers, and digital cameras priced under \$500. ■



MICROTEK'S SPEEDY ScanMaker 4800 captures color and details well. It includes a generous software bundle and an adapter for 35mm film.

IBM'S P77, the highest-scoring 17-inch monitor we've tested, rendered even the smallest fonts clearly and displayed vivid, lifelike colors.



SCANNERS

find.pcworld.com/22361

SCANNERS
From the April 2002 issue

1 **Best Buy** Microtek ScanMaker 4800
find.pcworld.com/18981

2 Canon CanoScan N1240U
find.pcworld.com/13141

3 Compaq S200
find.pcworld.com/20601

4 Visioneer OneTouch 8920
find.pcworld.com/16180

5 Epson Perfection 1650 Photo
find.pcworld.com/15842

6 Microtek ScanMaker 5700
find.pcworld.com/15844

7 Canon CanoScan N670U
find.pcworld.com/15841

1 **Best Buy** HP Scanjet 7450c
find.pcworld.com/10423

2 Epson Perfection 2450 Photo
find.pcworld.com/16181

3 Microtek ScanMaker 8700 Pro Design
find.pcworld.com/15843

PRINTERS

find.pcworld.com/22381

COLOR LASER PRINTERS
From the April 2002 issue

1 **Best Buy** Oki Data Oki C7200n
find.pcworld.com/14942

2 **Best Buy** Lexmark C720n
find.pcworld.com/14941

3 Minolta-QMS Magicolor 2200 DeskLaser
find.pcworld.com/21661

4 Tektronix Phaser 750N by Xerox
find.pcworld.com/14946

5 Minolta-QMS Magicolor 2210 GN
find.pcworld.com/20541

6 Brother HL-2600CN
find.pcworld.com/20542

7 Oki Data Oki C9200n
find.pcworld.com/14947

8 Lexmark C910n
find.pcworld.com/20822

9 Xerox Phaser 860N
find.pcworld.com/14948

10 Minolta-QMS Magicolor 6110 GN
find.pcworld.com/14980

MONITORS

find.pcworld.com/21764

17-INCH CRT MONITORS
From the April 2002 issue

1 **Best Buy** IBM P77
find.pcworld.com/21761

2 **Best Buy** Samsung SyncMaster 700NF
find.pcworld.com/10571

3 NEC-Mitsubishi MultiSync FE700+
find.pcworld.com/21762

4 ViewSonic G75f
find.pcworld.com/13380

5 Dell M782
find.pcworld.com/21763

6 Iiyama Vision Master Pro 413
find.pcworld.com/13260

7 Compaq P720
find.pcworld.com/16267

8 Sony CPD-G220S
find.pcworld.com/10572

9 KDS XF7P
find.pcworld.com/16266

10 Eizo Nanao FlexScan T565
find.pcworld.com/10576

DIGITAL CAMERAS

find.pcworld.com/21621

DIGITAL CAMERAS UNDER \$500
From the April 2002 issue

1 **Best Buy** Toshiba PDR-M71
find.pcworld.com/17961

2 **Best Buy** Casio QV-2900UX
find.pcworld.com/14807

3 HP Photosmart 318
find.pcworld.com/14806

4 Toshiba PDR-M25
find.pcworld.com/20862

5 Olympus Camedia C-2040 Zoom
find.pcworld.com/10584

6 Fujifilm FinePix 2600 Zoom
find.pcworld.com/17965

7 Nikon Coolpix 775
find.pcworld.com/17968

8 Casio QV-3500EX
find.pcworld.com/17967

9 Kodak DX3900 Zoom
find.pcworld.com/17962

10 Olympus Camedia D-510 Zoom
find.pcworld.com/17969

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KINGSTON TECHNOLOGY: TAKING THE STRESS OUT OF MEMORY UPGRADES

www.shop.kingston.com

You already know that memory upgrades are the fastest, most reliable way to boost your PC's performance—so what's holding you back?

Many users are afraid that by installing new memory, they might damage their PCs. But the procedure is actually quite painless, and the results—from improved multitasking to eye-popping multimedia—are often substantial.

Now the largest independent memory manufacturer, Kingston Technology Company Inc., is helping users to successfully upgrade their own systems, through demonstrations and system-specific memory guides.

Visitors to www.Shop.Kingston.com can access detailed hardware advice as well as an easy-to-follow animated tutorial. "We wanted to show users how easy it is to install memory," says Jason Jacobi, a Kingston spokesman. "And once they see it for themselves, they can feel comfortable buying the upgrade they need to run today's leading software and operating systems, including Microsoft Windows XP."



KINGSTON MAKES IT EASY FOR YOU

Customers at Shop.Kingston.com already use the site's Memory Configurator to choose memory by system model, memory specification, or Kingston part number. PDA users, and those with digital cameras and MP3 players, can search for their upgrades by device type.

Now Kingston's animated online tutorial, "Memory Installation in 3 Steps," shows users how just how easy it is to install memory. The animated demo reviews a typical system's layout and components and illustrates the correct way to place modules in a PC's memory bays.

Kingston also provides free, detailed Adobe Acrobat PDF-formatted installation guides for PCs from leading manufacturers, as well as guides for installing Flash memory modules and software drivers.



First-time memory buyers will especially benefit by clicking on Kingston's animated installation guide, from the Shop.Kingston.com homepage. "It takes the anxiety out of the installation process for users at any level," says Jacobi. "After watching it, you won't be afraid anymore to take the cover off of your PC."

QUALITY YOU CAN COUNT ON

By installing their own modules, users can experience firsthand the high quality of Kingston's modules. IT professionals rely on Kingston memory to update their systems. And many leading PC manufacturers in the United States build Kingston memory right into their new machines.

Kingston each year builds and tests more than two million customized modules for hardware manufacturers and systems developers. Now consumers, through Shop.Kingston.com, can receive the same memory, and the same warranties, as Kingston's business customers.

"Kingston has a good handle on quality," says Kingston consumer Tim Scovell. "I'm always adding modules to my systems, and the Kingston memory works every time."

Kingston's memory is system-specific, and the company guarantees the compatibility of modules selected through the Kingston Memory Configurator. "It leads you to the exact memory your system requires," Jacobi adds.

In the unlikely event that a customer has trouble with his upgrade, he or she can call Kingston at 800-435-0640 and consult with a memory expert, 24/7.

With its latest support for novice upgraders, and with its 24/7 customer service, Kingston is making its memory products and professional-level support available to every consumer. "At Shop.Kingston.com," Jacobi says, "Web surfing, gaming, and exciting multimedia are going to be possible on more systems than ever before."



www.shop.kingston.com

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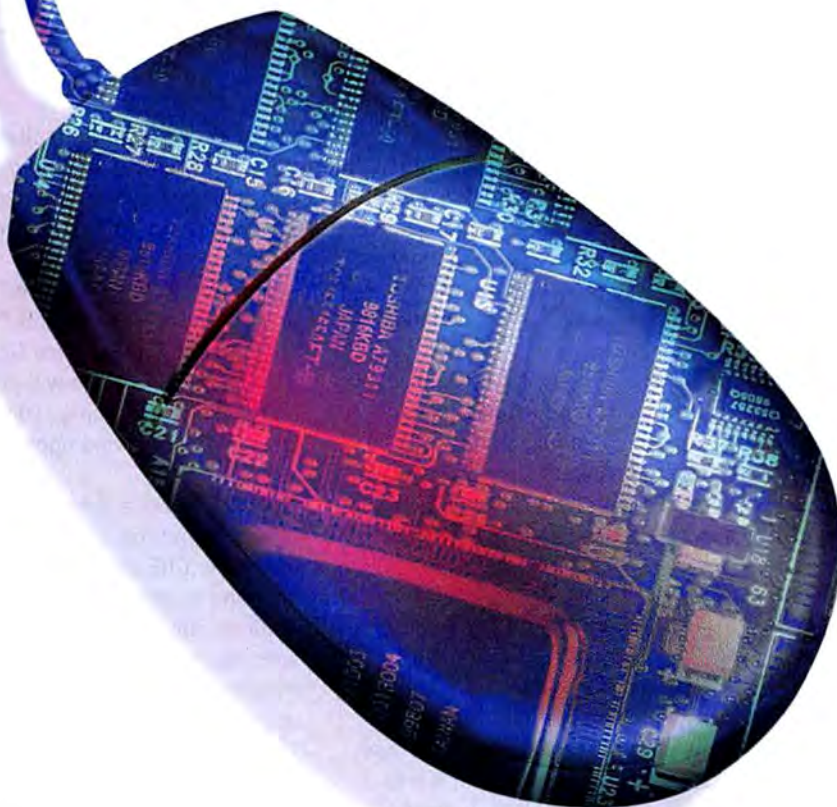
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PC AMERICA: INVENTORY MANAGEMENT AT POINT OF SALE

www.pcamerica.com

While many motorists in Dimondale, Mich. say the family-owned Windmill Truck Stop is a home away from home, its controller, Kevin Edelmann, says it's been more like a house of accounting horrors. Besides monitoring retail fuel sales in the truck stop's "truckers only" area, he also has to keep an eye on commuters' and travelers' purchases in the king-sized complex's convenience store, family restaurant, motel, and auto service center. "Keeping track of all of that inventory has been a nightmare," Edelmann says.

The Point of Sale (POS) system that the Windmill had been using since 1982 did a fine job of ringing up sales, but it couldn't tell store managers anything about what was on the shelf. "The system only broke sales down by department," Edelmann says. "So it couldn't tell the difference between a tube of toothpaste and a bottle of shampoo."

Edelmann found only a few POS solutions that were easy to use, Microsoft Windows-based, and able to support multiple input devices. And none of them could manage the 20,000-plus items in the Windmill's convenience store and restaurant. "We desperately needed a solution that could bring all of these components of our business together," he says.



PC AMERICA

Things finally turned around at the Windmill once Edelmann deployed PC America's Cash Register Express (CRE 2000), a Windows-based POS program that works with ordinary PCs and peripherals, as well as barcode scanners, receipt printers, and pole displays (which show charges at the checkout counter). Now all of the Windmill's cashiers can use touch screens and barcode scanners to enter orders and update inventory. And setting up CRE 2000 could not be easier, says Edelmann. "PC America did



The home page for PC America speeds you to the point-of-sale products you need.

an excellent job pulling all of the hardware together initially. But the great thing about their software is that I can grab any component I want off the shelf and throw it together in no time. This is one slick program."

The Windmill has processed more than half a million transactions with CRE 2000 and PC America's Restaurant Pro Express (RPE 2000) since October 1999. And Edelmann predicts that PC America will continue to develop the software he needs to keep things running smoothly. "PC America is constantly improving upon their products," he says.

Now PC America is helping retailers like the Windmill to move beyond the sale itself to increase revenues. A new feature in CRE 2000 gives businesses the ability to print coupons on the bottom of sales receipts on an Epson TM-T88II receipt printer. They can use the coupons to advertise specials on slow business days (e.g., "10 Percent Off All Purchases Every Tuesday"), or to give their customers discounts on overstock items (e.g., "Get a Free Six-Pack of Pepsi on Your Next Visit").

CRE 2000's couponing feature promises retailers an excellent route to a crucial dimension in retail sales. "Repeat business is the most important aspect of any business," says PC America's president, Howard Gosman. "With this addition to our POS package, we are giving our customers a quick and easy-to-use method for creating it."



Cash Register Express Software for Windows...\$495

Computerize any type of retail store using Cash Register Express for Windows. Computerization pays for itself, saving you thousands of dollars, giving you peace of mind, and making the best use of your time. Cash Register Express



has more than 250 of the most desired point of sale features to help you leapfrog past your competition by controlling costs, reducing errors and increasing efficiency.

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- ◆ Credit Card Software
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All PC America Software requires Microsoft Windows. The software was written in Visual Basic using Microsoft Access Files. The source code is available.

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CRUCIAL MEMORY:

ADD MORE IN A FLASH

www.crucial.com

Which is more important, the photo of your baby's first smile or the photo of your son's first day of school? Last month's sales totals or next month's sales projections? For handheld PC users and digital photographers, deciding what to keep and what to delete when their storage cards get full can be agonizing. Fortunately, it's easy to escape this desperate ritual by buying "flash" memory cards.

"You can use these cards as 'digital film' in your camera, or to back up phone numbers, addresses, and larger files from your PDA," says Scott Heimgartner, product marketing manager at Crucial Technology, a division of Micron, a leading maker of DRAM.



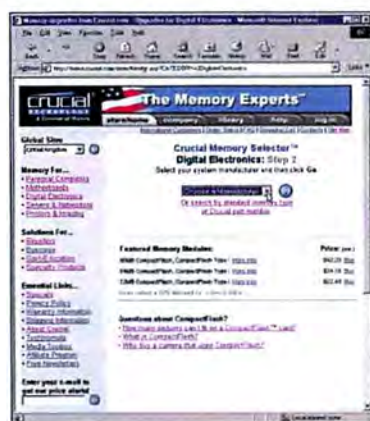
However, Heimgartner points out, digital devices don't all accept the same card format. Handheld PC users and others can avoid any confusion by using Crucial's Web site, Crucial.com, to find the right type of card for their devices. The site's Memory Selector tool searches Crucial's database of more than 15,000 computers and electronic devices for fully compatible memory upgrades.

"Crucial.com makes choosing the right flash memory card easy," says Heimgartner. "You simply use the Memory Selector to find the right card for your camera, MP3 player, or handheld. Then you can complete your order in a matter of seconds."

Online checkout at Crucial.com is quick and easy. All online buyers receive a 10-percent discount, and two-day shipping is free in the US.

ALWAYS COMPATIBLE

Crucial offers a money-back guarantee that the memory upgrades purchased through the Memory Selector will be 100-percent compatible with its customers' digital devices. The site also backs all of its flash memory cards with a five-year warranty.



As a subsidiary of DRAM maker Micron, Crucial can offer memory upgrades directly to consumers, at factory-direct prices. Micron, the largest memory manufacturer in the United States, tests all of its memory modules under extreme temperatures, voltages, and operating conditions. And it offers extensive warranties and free service and support.

Micron's expertise in flash memory is abundantly evident at the Crucial.com Web site. Crucial.com includes a comprehensive discussion of flash memory, a list of the technology's benefits, and a glossary of memory terms. "We want to make sure that when you're buying a flash memory card, you're getting the right capacity for your storage needs," Heimgartner says.

Users of MP3 players, for example, typically require between 64MB and 128MB of memory in their devices. 32MB is often enough to store a low-res family photo collection on a camera or PDA. But business professionals using their handhelds to store spreadsheets will want to upgrade to 128MB of CompactFlash memory.

GREAT PRICES, GREAT SERVICE

Even though memory prices continue to fluctuate, it's still an excellent time to buy from Crucial.com. The site keeps its prices down by cutting out the middleman. Crucial's customers save money by investing in upgrades that boost their systems' performance and reliability, and add data storage space.

"Crucial," says Heimgartner, "has built a reputation for dealing honestly and directly with its customers. When you order from Crucial, you can expect high-quality products that are backed by our incredible service and support."



Your only
source for
factory-direct
DDR!

128MB PC2100 DDR

\$39⁵⁹

**Upgrading
your memory
doesn't
have to be
complicated.**



A-5 March 15, 2001

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Crucial RAM.**

Select your system make and model at Crucial.com, and you'll find memory guaranteed to be compatible with your system or your money back. It's that easy! Best of all, you'll get the same top-quality memory the world's leading computer makers install in their systems. Visit Crucial.com and get great memory upgrades at low, factory-direct prices.

\$36⁸⁹

128MB PC133 SDRAM

for today's most popular systems

Prices reflect an automatic 10% discount for ordering online. Prices were taken on 2/18/02 from Crucial's Web site; however, prices can (and do) change daily. Prices may vary according to specific system requirements.

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HERE'S HOW

EDITED BY MICHAEL S. LASKY AND DENNIS O'REILLY



WINDOWS TIPS

SCOTT DUNN

Screen Smarts Give You an Unobstructed View

**ALL
Versions**

IN THE LONG-LOST days of DOS, your PC ran just one application at a time. The application used the whole screen, and you had to close it before you could launch another program. In these modern times, multitasking allows a horde of programs, toolbars, and icons to compete for every on-screen pixel. You could expand your Windows desktop to a second monitor, but if you don't have the space or resources to do that, use these tricks to

maximize your existing screen real estate. **Make a new resolution.** To compact everything on your screen, switch to the highest resolution your video card, monitor, and eyesight can tolerate. (Remember: The higher the resolution and number of colors, the slower the refresh rate, which can make your eyes tire faster.) Right-click the desktop and choose *Properties*. Click the *Settings* tab and use the control under 'Screen area' or 'Screen resolution' (the name will vary with your video driver)

to increase the screen size (see **FIGURE 1**).

As you increase the screen size, your color-level indicator may automatically decrease—from 'Highest (32-bit)' to 'Medium (16-bit),' for example. Be sure to choose the highest resolution that maintains the color level you want.

Click *Apply* to test your new resolution. Most video systems will ask if you want to keep this resolution. If everything seems too tiny, click *No* and try a lower resolution. If your screen is unreadable because the resolution you chose is incompatible with your monitor, 'No' will often be selected automatically within 15 seconds. If you wait but still can't read your screen, reboot your computer and press **<F8>** as Windows loads, then press the number that corresponds to the Safe Mode option and press **<Enter>**. Repeat the steps above to reduce your screen resolution to one your system can tolerate. Restart your PC to return it to normal mode.

Expand your workspace. The title bars, scroll bars, and other on-screen elements in an application window usually just take up space. To compact these elements, right-click the desktop, choose *Properties*, and click the *Appearance* tab. (In Windows XP, click the *Advanced* button as well.)

To increase the screen space available for applications, choose *Active Title Bar* or *Inactive Title Bar* (or select the corresponding picture at the top of the dialog box) and click the down arrow next to the Size control to make these elements smaller. Title bars don't get any smaller than the space occupied by their text, so to reduce them further, use the Font control and its corresponding Size control. The Tahoma font that ships with most versions of Windows is surprisingly readable even when shrunk down to 7 points.

140 WINDOWS TIPS

Recapture screen space lost to toolbars, icons, and other on-screen elements; Wonderful Windows freeware.

143 INTERNET TIPS

Save your e-mail address, and the rest of your online identity, from a sinking ISP; disable IE's Content Advisor.

144 STEP-BY-STEP

Windows' Registry isn't so mysterious after all. The right Registry tweaks can keep your PC running like clockwork.

146 HARDWARE TIPS

Share a PC without worrying about lost data or changed settings; remanufactured laser printer cartridges.

148 ANSWER LINE

Know where your Windows installation files are located on your hard drive; diagnose why a Web page won't open; use an old monitor with a new computer; swap CD-RW discs between a PC and a Mac.

Now choose *Scrollbar* from the Item drop-down list, or click the scrollbar in the picture above it. Once again, use the Size control to shrink the scrollbar to a petite, but legible, size (see **FIGURE 2**).

Open applications maximized. You may sometimes want to maximize your application windows to give them as large a workspace as possible. You can do this by

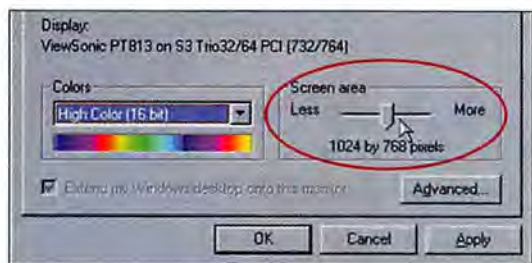


FIGURE 1: INCREASE YOUR SCREEN area by switching to the highest resolution your PC (and eyes) can handle.

clicking the middle button on the right end of any title bar, but you can also switch between the maximized and normal state by double-clicking anywhere in the title bar. In addition, you can maximize an application each time you launch it by editing its shortcut properties. Find the application on the Start menu, right-click its icon, and select *Properties*. Choose *Maximized* from the Run drop-down list, and click OK (see **FIGURE 3**).

Scrunch desktop icons. If your icons are taking up too much of your desktop space, right-click the desktop and choose *Properties*. Click the *Appearance* tab (in Windows XP, you'll also need to click *Advanced*) and choose *Icon* from the Item drop-down list. Select a smaller size for your icons (such as 16) and click *Apply* (in Windows XP, you have to click OK, and then *Apply*). Experiment with the setting until you find a size that suits you.

If you auto-arrange your icons by right-clicking the desktop and selecting *Arrange Icons by Auto Arrange*, you may be able to get more icons per square inch by adjusting the Icon Spacing (Horizontal) and Icon Spacing (Vertical) settings in the Appearance controls. You can also save a little bit of screen space by giving desktop icons shorter names so that each label takes up only a single line.

Match the screen to your app. To get the best view possible of your application windows while retaining access to your taskbar and desktop icons, adjust the screen to the type of document you're working on. For example, when you work on tall documents such as word-processing files, drag the taskbar to the left or right edge of your screen.

(In Windows XP, you may need to right-click the taskbar and uncheck *Lock the Taskbar*.) Arrange your desktop icons vertically along the opposite edge and keep the middle of the screen open for your word processor or other application.

On the other hand, when you work on spreadsheets and other wide documents, keep the taskbar at the top or bottom of the screen and arrange desktop icons horizontally along the opposite edge.

Bonus tip: If you'd like to use a single key sequence to enlarge application windows horizontally or vertically and leave room to view your desktop icons and taskbar, check out the Wonderful Icon freeware in this month's *Windows Toolbox*, page 142.

Tweak the taskbar. You get more control over your taskbar's thickness when it's on the left or right side of your screen. Just drag the edge until the taskbar is skinny enough to suit you. (In Windows XP, you

may need to right-click the taskbar and uncheck *Lock the Taskbar*.) You may not be able to see the full name of each open file on its taskbar button, but you can distinguish the files by their icons—or pause the pointer over each one until an identifying tool tip appears.

To change the size of the icons on the taskbar, right-click the desktop, choose *Properties*, and click the *Appearance* tab. (In Windows XP, click the *Advanced* button as well.) Choose *Caption Buttons* from the Item list, or click a minimize, maximize, or close button in the picture at the top of the dialog box.

Lower or raise the number in the Size box—but keep in mind that some icons, such as those used by firewalls and other network software, provide useful information, so make sure you can see them. And if you're thinking of going gigantic, you should know that not all icons scale well, resolution-wise. Making them big also makes them fuzzy. Note that in ►

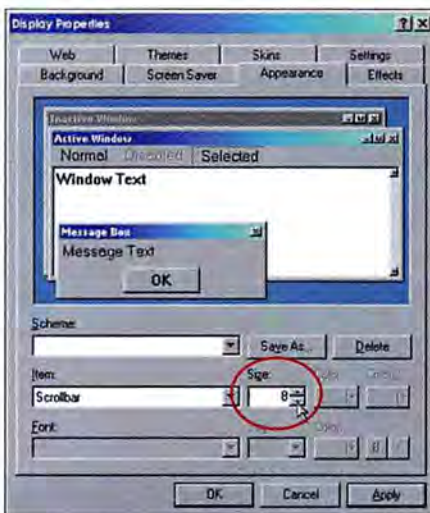


FIGURE 2: COMPACT TITLE BARS and other screen elements in Display Properties.



FIGURE 3: APPLICATIONS will open maximized via this Run setting under Properties.

Windows XP, the Size setting also affects icons on the toolbars you create when you right-click the taskbar and choose an option from the Toolbars menu.

You save a few pixels from Windows XP's taskbar when you lock it. Right-click the taskbar and make sure *Lock the Taskbar* is checked. This saves a bit of space by removing some draggable borders.

Put away palettes. The floating palettes in such programs as Adobe Photoshop, QuarkXPress, and Macromedia Free-Hand take a considerable amount of your workspace. The \$17 Interface Improvers available at www.interfaceimprovement.com hide the palettes of several Macromedia and Adobe applications, magically popping them back into view when your mouse touches the edge of the screen.



FIGURE 4: HIDE AND REVEAL palettes automatically in such apps as Photoshop.

The palettes disappear again when your mouse moves away from them. You can set an Interface Improver to make palettes pop in and out one by one or all together (see FIGURE 4).

If you don't want to bother with additional software, here's a tip that works in such Adobe applications as Photoshop, Illustrator, and InDesign: Make sure there is no active text insertion point and press <Tab> to hide all palettes. Press <Tab> again to bring them back.

DON'T LET YOUR TOOLBARS WASTE SO MUCH SPACE

DO THE TOOLBARS in your folder windows hog too much space? If your screen resolution is high enough and your folder window large enough, you can make your window panes a little larger by putting two or more toolbars on a single line. (In Windows XP, you may have to unlock the toolbars first by right-clicking the toolbar area at the top of the window and unchecking *Lock the Toolbars*, if it isn't unchecked already.)

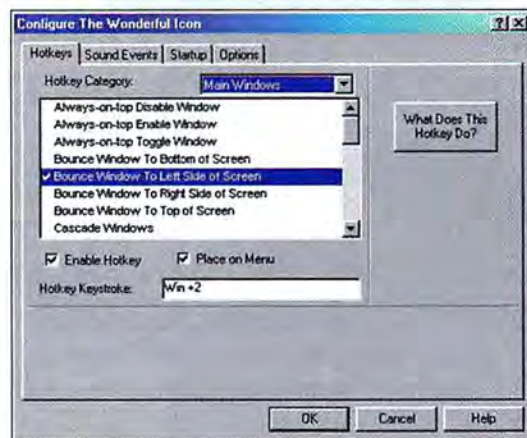
To combine toolbars, simply drag the left edge of one and drop it onto any other. A toolbar can share space with the menu bar, or two or more toolbars can be placed side by side. (In Windows XP, you may want to recheck *Lock the Toolbars* when you're done to freeze your selected alignment.) Any buttons that get pushed off the right edge of the toolbar for lack of space can still be accessed—just click the double-greater-than symbol (>>).

In Windows 2000, Me, or XP, you have other ways to abbreviate toolbars. Right-click the Standard buttons toolbar and choose *Customize*. To put your toolbar on a diet, select the buttons you don't need from the list that appears in the right pane and click *Remove*. You can also drag and drop buttons between the lists of current buttons and available buttons; or use the *Move Up* and *Move Down* buttons to place the icons that you use less frequently to the right, where they will disappear into the >> menu but remain accessible. To save even more space, choose *No text*

WINDOWS TOOLBOX

What a Wonderful Windows Freebie!

THE WONDERFUL ICON freeware for Windows is as useful as its name is meaningless. The utility lets you force a window to stay on top, put minimized applications in the system tray (the area near the clock), change system sound effects at regular intervals, and maximize application windows in a single direction (vertically or horizontally). And you can assign these and other chores—such as muting or changing the volume, and minimizing or restoring applications—to a keyboard shortcut. You can also put these functions on the utility's pop-up



tray menu. If you've been wishing you could perform routine tasks with a quick keystroke, and without having to learn a macro program, Wonderful Icon may be for you. And you can't beat the price. Now *that's* wonderful. Go to find.pcworld.com/20781 to download your copy.

labels from the 'Text options' drop-down list. When you've achieved your preferred button lineup, click *Close*.

If you press <Enter> rather than clicking the Go button after you choose or type a file or folder name in the Address bar, you can save space by right-clicking the button and unchecking *Go Button*. ■

Send Windows-related questions and tips to scott_dunn@pcworld.com. Windows Tips pays \$50 for published items. Scott Dunn is a PC World contributing editor.

INTERNET TIPS

SCOTT SPANBAUER

If Your ISP Sinks, Don't Go Down With the Ship

THE BUDDHA TAUGHT that all is impermanent, and broadband Internet service providers exemplify his teaching perfectly. Many of us traded in our dependable dial-up service for a broadband connection, only to be left scrambling during the DSL shakeout. More recently, the collapse and consolidation of cable ISPs marooned thousands of others—and don't get me started on the folding of free ISPs (see February's *Consumer Watch* at find.pcworld.com/21641 for information on how to deal with their demise).

When your broadband ISP pulls the plug, you may lose more than just your Internet access; your e-mail addresses and Web sites could wink out as well. And the shakeout isn't over.

So how do you keep a failing ISP from taking your online identity down the drain with it? Don't put all your eggs in one basket: Get your Internet connection, your e-mail address and server, and your Web site hosting from separate providers.

That way, if one of the companies goes belly up, the other services will carry on without interruption. If DSL suddenly becomes a better deal than cable for high-speed Internet access in your area, you can dump one service in favor of the other without having to print new business cards or losing Web site visitors.

E-MAIL WITH LEGS

START BY SIGNING up for e-mail from an ISP with a long, unbroken track record, such as EarthLink, Sprint, or AT&T WorldNet. America Online and MSN are also likely to stick around for a while, but limit your choice of e-mail readers to Netscape Mail if you choose AOL and to Outlook Express if you opt for MSN.

All your service providers should rely on standards-based protocols, such as POP3 and SMTP for e-mail, and FTP for uploading Web pages. The trick is to use the Big Name ISP's POP3 server for receiving e-mail (which will usually work even if you're connecting through a different ISP in Timbuktu), and use your local access provider's own SMTP server for sending e-mail. Changing your access provider won't affect your receipt of e-mail; you simply enter the new provider's SMTP server address in your e-mail program to continue sending e-mail.

Companies that specialize in Web hosting often charge as little as \$5 per month, and sometimes less. You may find that a local hosting company has what it takes to weather the ups and downs of the Internet economy, though it

may not offer browser-based e-mail or toll-free access numbers for uploading files. Internet.com's The List (thelist.internet.com) is a good place to start looking for a hosting service or any other kind of ISP you may need.

Of course, as the Buddha would tell you, no ISP—not even AOL—is guaranteed to last forever. If you want to be completely sure that an ISP meltdown won't also vaporize your mail or Web site, consider creating your own domain. In addition to making your e-mail and Web site addresses more personalized and memorable ("Just send that message to spanbauer.com"), domain names are easily transferable from one ISP to another.

Splitting up your services among different providers and employing a domain name will probably cost more per month than going with a single \$20 all-in-one service. But if flexibility and a consistent online presence are important to you or your business, the few extra dollars per month may be money well spent. ■

Send your questions and tips to nettips@spanbauer.com. We pay \$50 for published items. Scott Spanbauer is a contributing editor for PC World.

KILL THE CONTENT ADVISOR

HERE'S A FREQUENTLY asked question (and answer) you may want to tuck away for future reference, especially if you have kids: How do you disable Internet Explorer's Content Advisor censorware when you've forgotten the password?

It's easy. First, launch the Registry Editor (select *Start•Run*, enter *regedit*, and click *OK*), press *<F3>*, enter *ratings* in the 'Find what' field, and select *Find Next*. Regedit's search should land on the *\HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\policies\Ratings* branch, which contains a binary value called *Key* (see **FIGURE 1**). Right-click the *Key* value and choose *Delete*, then exit Regedit and restart Windows. Finally, in Internet Explorer, choose *Tools•Internet Options•Content*, click the *Disable* button, enter a new password when prompted, then click *OK*.



FIGURE 1: GET RID OF Internet Explorer's Content Advisor password by deleting it from the Registry.

STEP BY STEP

STAN MIASTKOWSKI

Care and Feeding of the Windows Registry

THE REGISTRY IS *the* essential part of Windows—a big, complex database that stores all the configuration settings for your software and hardware in a hierarchical form like file folders. You don't often need to deal with the Registry, because Windows' built-in tools work in

the background to make sure it stays in tip-top shape. But because the Registry is so huge and complicated, it can develop troubles that cause strange problems or even bring your PC to a grinding halt.

To most of us, the Windows Registry is a dark and mysterious place. This month,

THE TOP DOWN

Benefits: Customize and optimize Windows features

Cost: Free

Expertise level: Intermediate-expert

Time required: Varies

we cover some basic housekeeping chores you can do to keep the Registry happy, and we review some Windows tips and tweaks that involve directly editing the Registry. If you're the adventurous sort (and are conscientious about doing backups), editing the Registry is the ultimate way to customize many Windows settings to your personal preferences. ■

Stan Miestkowski is a contributing editor for PC World.

A BACK UP THE REGISTRY

ALL VERSIONS of Windows automatically create a backup copy of the Registry each time you start your PC, but keeping an additional backup provides extra insurance. Of course, you can't restore changes you haven't backed up, which means you should make backups frequently. Fortunately, there are several ways to back up the Registry.

1 Use System Restore. Windows Me and XP users can create System Restore points, which back up all data (including the Registry) so you can restore your system to that precise state. You should run System Restore manually before you make major hardware or software changes or try to work with the Registry. Click *Start•Programs (All Programs, in XP)•Accessories•System Tools•System Restore*, choose *Create a restore point*, click *Next*, and follow the directions.

To begin, select the task that you want to perform:

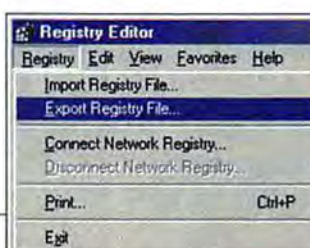
☐ Restore my computer to an earlier time

☒ **Create a restore point**

Restore point description:

Before Editing Registry

2 Use the Registry Editor. The export capability in Windows' Registry Editor can back up parts of the Registry, or create a full backup. In Windows 2000, this is your best option. Click *Start•Run*, type *regedit*, and press <Enter>. Select *My Computer* in the folder tree, select *File•Export*, and fill in a file name and destination. For added peace of mind, save the file on a CD-RW disc or other removable media.



3 Copy the Registry files manually. In Windows 95 and 98, the Registry resides in *System.dat* and *User.dat* in the Windows directory. In Windows Me, copy *Classes.dat* too. To see hidden and system files, you'll need to set Windows Explorer to show them. In Explorer, choose *View (95 and 98) or Tools (Me and XP)*; then select *Folder Options*, open the *View* tab, and pick *Show All Files (95 and 98) or Show hidden files and folders (Me and XP)*. Once you can see them, copy the files.

4 Use backup software. Check your backup utility for an option to back up the Registry along with the other files on your hard drive. Some backup utilities do this automatically; others require you to specify Registry backup.

5 Run Windows' Registry Checker. For Win 98 and Me only—see section B, below.

B USE WINDOWS' BUILT-IN REGISTRY TOOL



WINDOWS 98 AND ME include a background utility called Registry Checker. When you boot your PC, Registry Checker scans for problems; if it can't fix them, it restores the most recent Registry backup.

If you keep your PC running all the time, it's a good practice to reboot the computer daily so Registry Checker can do its work. You can also run Registry Checker manually (especially before and after making system changes that don't require a restart). To do this, click *Start•Programs•Accessories•System Tool•System Information*, open the *Tools* menu, and click *Registry Checker*.

C CLEAN THE REGISTRY



THE LONGER YOU USE Windows, the more cluttered the Registry can grow, especially if you regularly install and uninstall software. That's because some applications don't remove all traces of themselves when you uninstall them. Orphan Registry entries can cause problems such as sluggish performance or even system lockups, but the more common result is a bloated Registry that takes longer to load. Registry Checker (discussed in section B) doesn't clean out invalid entries.

If you still use Windows 95 as your operating system, you have a built-in Registry cleaning tool. To access it, click **Start+Run**, type **regclean**, and press **<Enter>**.

In versions after Windows 95, Microsoft didn't include RegClean, so you'll have to use third-party utilities. Two free ones are available from Downloads: EasyCleaner (find.pcworld.com/21381) and RegClean (find.pcworld.com/21382). Neither works with Windows XP, but XP's Registry structure doesn't develop as many problems.

For the most comprehensive Registry checking, cleaning, and optimizing, however, you'll need to purchase a utility suite such as Norton SystemWorks (\$70, www.symantec.com) or Ontrack SystemSuite (\$60, www.ontrack.com). For more information, see "Tools for Trouble-Free Computing," on page 72. Both utility suites have comprehensive features that fully check, optimize, and maintain the Registry, going far beyond Windows' built-in Registry tools or the free add-ons. Both work with all versions of Windows from 98 through XP.

D TWEAK THE REGISTRY

WITH A BIT OF SURFING on the Web, you can discover numerous Registry tips and tweaks for customizing various Windows features by editing the Registry. One of the largest selections is located at the Windows Registry Guide (www.winguides.com/registry).

If you have a broadband (cable or DSL) Internet connection, you'll find that tweaking the Windows Registry is almost always necessary for getting maximum data speed. Two helpful sites to check for Windows Registry information are DSL Reports (www.dslreports.com/tweaks; select **RWIN** in the 'Jump to topic' drop-down list box) and Speed Guide (www.speedguide.net/Cable_modems/cable_registry.shtml).

The easiest way to make changes to the Registry is with a .reg file; such files are downloadable from some of the sites mentioned above. Double-clicking a .reg file immediately incorporates the changes into your existing Registry. (Make sure you have a backup first.)

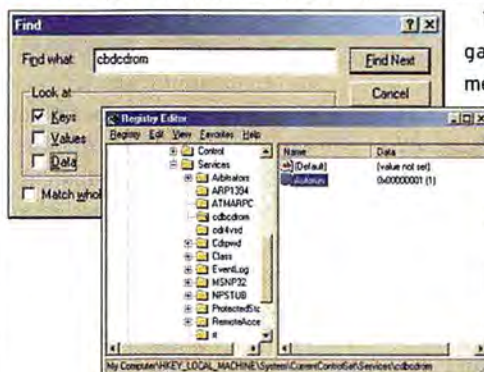
To input other changes, you'll need to use RegEdit, a feature that's available on all versions of Windows. The example that we illustrate here turns off the AutoRun feature of your CD-ROM drive. So if you'd prefer not to have a music CD automatically start to play or have a program CD automatically start up, this Registry tweak will solve your problem. Some versions of Windows permit you to make the same change from the CD-ROM Properties box. In Windows XP, you can perform many (but not all) system tweaks from menus, without having to edit the Registry.

WARNING: Editing the Registry can cause problems—an incorrect entry can "break" your PC. Follow the directions carefully, and make absolutely sure that you have a current Registry backup before you begin.



1 Start RegEdit. Choose **Start+Run**, type **regedit**, and press **<Enter>** to run the program.

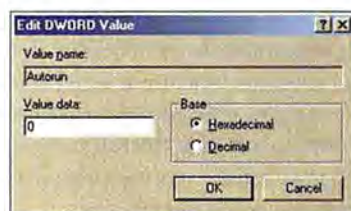
2 Find the key. The key for changing the Windows CD-ROM AutoRun feature is at **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\cdrom**.



To find the key, you can navigate through the hierarchical menus or you can press **<Ctrl>+F**, type **cdrom**, and press **<Enter>**. RegEdit will stop at the desired key. The name of this key may vary—if your Registry doesn't contain **cdrom**, try searching for **cdrom** with the Services folder highlighted in the tree listed above.

3 Change the key value. Double-click the **AutoRun** entry in the right-hand window. In the **Edit DWORD Value** box that pops up, change the '1' in the 'Value data' box to 0 and click **OK**.

You will need to exit RegEdit and reboot your PC to bring the change into effect.



HARDWARE TIPS

KIRK STEERS

Protect Your Data and Settings on a Shared PC

A HOT STOCK TIP. Your toothbrush. A twin-size bed. A personal computer.

What do they have in common? They're all things you're better off *not* sharing. Having a coworker or family member mess up your PC's settings or lose important files can start you contemplating a new lifestyle as a hermit. The best way to protect your files is to get the interlopers a PC of their own. If this isn't practical, you could upgrade to Windows 2000 or XP, which restrict users to their own folders and settings. You get limited protection in Windows 9x and Me by creating customized settings for each user, or by installing separate copies of Windows and applications for each user via multibooting. Last month's column at find.pcworld.com/21861 has more on multibooting.

Another alternative to a computer buying splurge is to install a hard disk for each user so that everybody can use their

own copy of Windows and their own application software. Romtec's \$50 Trios RX-910T6 multi-IDE hard drive selector makes it easy to switch between up to three hard drives when your PC boots, loading the operating system and software on the chosen drive. While the PC runs on that drive, you can't access any OS, software, or data located on the other drives.

Trios mounts in a drive bay and connects to the primary IDE connector on your PC's motherboard, as well as to your system's internal hard drives (see **FIGURE 1**). Most computers will boot up only from an IDE hard disk that's attached to the primary IDE connector.

To share data with the PC's other users, you must store it on a CD-RW disc or on another removable medium, or put it on a hard drive that's not attached to the Trios. Also, your PC's BIOS must automatically detect hard drives for Trios to work properly. Fortunately, most PCs made in the last few years have a BIOS up to the task.

TONER TALK



I'VE SEEN ADS FOR recycled and remanufactured toner cartridges that are much cheaper than those sold by my laser printer's manufacturer. Are they as good as my printer vendor's cartridges? Will they damage my printer?

Diane Johnson, Chicago

REMANUFACTURED laser printer cartridges can definitely save you money, but you're wise to be suspicious. The quality of toner cartridges from third-party manufacturers varies widely from company to company. Before you buy, ask where the vendor is located, how and where it makes its cartridges, and how long it has been in business. Don't buy any cartridge that doesn't come with a guarantee that covers damage to your printer.

Printer manufacturers are quick to suggest that third-party cartridges don't meet the rigid quality standards of their own products. Sometimes they're right, but these firms make big profits selling toner cartridges and other printer consumables, so they have an incentive to discourage



FIGURE 1: THE TRIOS RX-910T6 hard drive selector isolates your files on a shared PC.

you from buying a competitor's product. You may also have heard that using a third-party cartridge will invalidate your printer's warranty. It won't. The Sherman Anti-Trust Act says so. ■

Send your hardware-related questions and tips to kirk_steers@pcworld.com. We pay \$50 for published items. Kirk Steers is a PC World contributing editor.

Trios RX-910T6

\$50 online

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A FINE LINE

M.H. STANLEY of Fairview, Texas, asks about the two faint lines running horizontally across his Trinitron screen: one about a quarter of the way from the top, and the other the same distance from the bottom. Trinitrons have vertical phosphor stripes about a hundredth of an inch wide painted on the inside of the monitor glass. An aperture grille, or tension mask, of taut, parallel vertical wires is aligned between each phosphor stripe to keep electrons from accidentally exciting the phosphors of the intended stripe's neighbors. The two horizontal lines are actually very fine wires used to hold the vertical wires in place.

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Where Are the Windows Installation Files I Need?



WHILE MAINTAINING my computer, I'm often prompted to insert the Windows CD-ROM. If I happen to be stuck with a vendor's System Restore disc, how do I extract the files I need?

Ernest Wiatrek, Abilene, Texas

IF YOU'RE USING the version of Windows that came with your computer, you shouldn't need a Windows CD-ROM for basic maintenance. Microsoft requires that vendors put the installation files in a folder on the hard drive. (Vendors include restore discs, or restore partitions, primarily for disaster recovery.)

When you install a Windows component from Control Panel's Add/Remove Programs applet, for example, Windows looks to this "installation path" for the needed files. You're asked to insert your Windows CD-ROM only if the path points to your CD-ROM drive and the right disc isn't there. If the installation path points to a folder on your hard drive, you won't be asked to insert a disc.

The easiest way to find the installation path is with Microsoft's free Tweak UI add-on. Download a version for Windows 9x, Me, 2000, and NT from find.pcworld.com/20881, or get Microsoft's PowerToys for Windows XP (which includes Tweak UI) at find.pcworld.com/21863.

Once Tweak UI is installed, launch it by selecting *Start•Settings•Control Panel* and double-clicking the *Tweak UI* icon. Click the *My Computer* tab, and in the Folder drop-down list, select *Installation Path*; it will appear in the Location field below.

For Tweak UI for Windows XP, the in-

structions are slightly different: Once it's installed, select *Start•All Programs•PowerToys for Windows XP•Tweak UI for Windows XP*. Navigate in the left pane to *My Computer•Special Folders*. In the Folder drop-down list, select *Installation Path*.

To find the installation path without Tweak UI, select *Start•Run*, type *regedit*, and press **<Enter>**. Select *MyComputer\HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Setup* in the left pane, and in the right pane, find the value named 'SourcePath'. The installation path is listed in the Data field.

Now when you're prompted to insert the Windows CD, click *Browse* and enter in the 'Browse to' field the installation path you just found. In XP, click *OK* and then enter the installation path in the 'Copy files from' text box.

WHY WON'T THAT PAGE OPEN?



THERE ARE SOME Web sites I just can't access. I've checked with friends, and they can access these sites. Any idea why I can't?

Dan Tran, Philadelphia

FIRST, BE PATIENT. Many browser problems are temporary. Wait a few minutes and try accessing the site again. If you're the patient type, wait an hour and try again. If you're really patient, wait a day.

And you were right to ask your friends. If they couldn't open the site either, you know that the problem is with the site (unless you and your friends have the same ISP). Try accessing the site through your ISP on another computer. This is

often easier to do with a dial-up account than with a cable, DSL, or other broadband connection. With dial-up, you just manually enter your ISP's local access number in the log-on box. With an always-on connection, you may have to reconfigure the PC's network settings. Of course, if your broadband ISP also offers a dial-up number, you can use that.

If you can't access the site through your ISP on the second PC, the fault lies with your service provider. If you can access the site, the problem is with your computer—or more likely, your browser.

Your security settings may be too high. In Internet Explorer, select *Tools•Internet Options*. Click the *Security* tab and make sure 'Internet' is selected under the Web content zones. Click the *Default Level* button, set the slider under 'Security level for this zone' down one level, and try accessing the site again. If your browser is set to the High security level (see **FIGURE 1**), try setting it to *Medium*, *Medium-low*, or even *Low*, despite your browser's warnings of impending doom. Click *Custom Level* to bring up the Security Settings dialog box. Scroll down to the Scripting section and make sure Java is enabled.

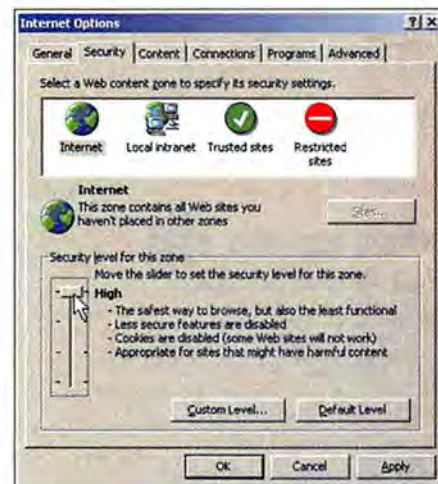


FIGURE 1: IF YOU CAN'T ACCESS a Web site, lower your browser's security settings.

Some sites require 128-bit encryption, and not all browsers have it. Luckily, it's a free upgrade. To check the encryption level of your copy of Internet Explorer, select *Help•About Internet Explorer* and look under 'Cipher Strength'. If it's not

REVERSE WORD SEARCHES

TRAVIS ROTH of Lincoln, Nebraska, sent me a couple of useful and little-known keyboard shortcuts for continuing a search in Microsoft Word after the Find dialog box has been closed. The shortcuts even change the search's direction. Press **<Ctrl>-<Page Down>** to have Word search for the next occurrence of your last search string, and press **<Ctrl>-<Page Up>** to make Word search for the previous occurrence. If you haven't searched for anything since you loaded Word, these keystrokes move the cursor to the next or previous page.

128-bit, click *Update Information* to go to Microsoft's update page.

Some sites conflict with firewalls. Disable your firewall and then see if you can access the site. Don't forget to enable it again after you leave the site. (If the firewall is the problem, adjust its settings and then try to reach the site again.)

Something in your cache could be causing the conflict. To clear the cache in Internet Explorer, select *Tools>Internet Options*. Under 'Temporary Internet files' on the *General* tab, click the *Delete Files* button, then click *OK*. For a thorough browser cleaning, give Wizard Systems' \$15 TweakIE shareware a try. Visit find.pcworld.com/23263 to download a copy.

Parental controls may be the culprit. In Internet Explorer, select *Tools>Internet Options* and click the *Content* tab. Choose the *Disable* button under Content Advisor (if no such button exists, the source of your problem lies elsewhere). You'll need

the password you originally used to enable these controls. For more on disabling parental controls, see this month's *Internet Tips* on page 143.

Of course, you may have good reasons for high security settings or banning objectionable material from your browser. In that case, consider whether accessing a particular Web site is worth the risk.

SKIP THE NEW MONITOR

? IS IT NECESSARY to buy a new monitor when you buy a new PC?

Gary Pauline, Naperville, Illinois

I REPLACE MY computer more often than I replace my monitor, and I've never experienced a problem because of it.

The version of Windows that came with your computer probably has a driver for your old monitor. If it doesn't, Windows will pick a generic monitor driver that will likely work just fine.

If you prefer the driver written for your monitor, find it at www.driverzone.com/monitor.html. And read the January *Hardware Tips* at find.pcworld.com/21881 for more on monitors and drivers.

CD-RW BETWEEN A PC AND MAC

? MY PC AND my friend's Mac both have CD-Rewritable drives. Can I use these drives to move files between the two systems?

Frank Noble, Burlington, Massachusetts

YES. THE ONE important rule is to write to the disc—on either computer—in the ISO 9660 format standard. After exploring a bit in your CD authoring software's help system, you should be able to figure out how to do this. In Easy CD Creator,

select *File>CD Layout Properties* (or *File>CD Project Properties*). Under *General*, select *ISO 9660* as the File System and click *OK*.

Don't use DirectCD (which comes with Easy CD Creator) for this job. It supports ISO 9660 for CD-Recordables, but not CD-Rewritables. CD-RWs are preferable for this sort of sneakernet because you don't waste a disc when you use one.

ISO 9660 has one interesting limitation: You must use old-

fashioned, DOS-style file names (eight characters with a three-character extension, or 8.3). Your CD authoring software should truncate file names automatically.

The only other important issue is association: how the operating system knows what program to launch when you double-click a file. Windows uses file-name extensions—.doc, .jpg, and so on. The Mac OS checks an internal piece of the file called the resource fork.

PC applications generally add the extension automatically when you save a file; Mac apps don't. When you name a file on a Mac that's going to a PC, add the appropriate extension to the file name.

On either system, if double-clicking a file doesn't load it in the right program, open the program manually and drag the file into the application's window.

KEEP MULTIPLE DESKTOPS

? IS THERE ANY program that will let you configure your desktop into "pages" with different icons, programs, and other elements?

Don Boudreaux, Lafayette, Louisiana

THERE ARE SEVERAL programs that let you create, alter, and switch between multiple desktops. My favorite is a shareware program called *Desks At Will* from Idyle Software (see **FIGURE 2**); you can download it at find.pcworld.com/21864. If you want to keep the program, it costs about \$23 to register for up to four users.

Desks At Will gives you three ways to switch between desktops. You can name and password-protect desktops, decide whether each desktop keeps its own unique wallpaper and icon layout, and even set apps to load on a particular desktop or to be visible in all of them.

The program doesn't currently support Windows XP, though that may change by the time you read this. Microsoft gives away its own Virtual Desktop Manager in PowerToys for Windows XP. Go to find.pcworld.com/21863 to download it. ■

Send your questions to answer@pcworld.com. Answer Line pays \$50 for published items. You'll find a collection of Contributing Editor Lincoln Spector's humorous writing at www.thelinkinspector.com.



FIGURE 2: NEED MULTIPLE DESKTOPS? *Desks At Will* offers three ways to switch between them.

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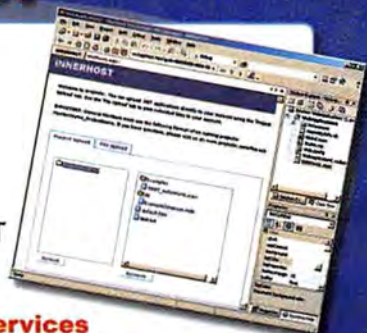
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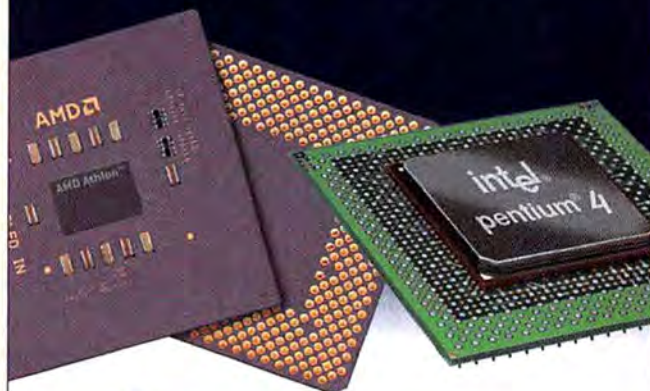
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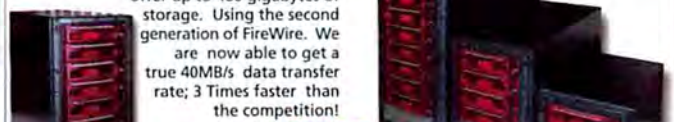
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How to Fix Keyboards: Don't Touch 'Em!

WHAT VARMIN'T GNAWED OFF a hunk of my keyboard? When I recently opened a brand-new Sony VAIO—a desktop machine, not a space-hampered notebook—I immediately discovered that some mad genius had hacked off a couple of inches of width and “improved” what’s left.

It's another grim event in the long, sad decline of the PC keyboard, a device that remains as important as ever despite all attempts to eliminate it with voice or stylus or to improve it by turning it big and wavy. On this particular model, the handy island of cursor-movers between letters and numbers has vanished. Instead, Sony stuck the arrow keys below and beside the right <Shift> key. <Page Up>, <Page Down>, <Home>, and <End> have migrated to those very same keys—provided you hold down a smallish <Function> key nestled between the <Ctrl> and <Windows> keys. <Alt> and all the keys to the right of the spacebar get downsized too. And poor <Insert> and <Delete> end up to the right of the function keys, about where you'd expect to find <Scroll Lock> and <Pause>.

When it comes to keyboards, consistency makes sense. Sitting down at a PC and getting to work without having to curse what's under your fingers is a genuine productivity booster. But increasingly we see all sorts of improvements that aren't.

Blame Microsoft for some of them. The primary function of <Windows> keys is to put the operating system's logo onto your keyboard—twice! Better idea: the key on the company's Office Keyboard that sup-



plants the awkward <Alt>-<Esc> combination for toggling among programs. But Microsoft shoves this key onto a slab where it's out of easy reach.

Other sinister forces keep “improving” things in stupid ways. Some keys—including those on the bottom row and, on the new VAIOs, the arrow keys—have mysteriously turned convex. Never mind that concave keys are easier to hit, and your fingers don't slide off them.

Keyboard feel is pretty much a lost art. Everything I've tried lately has a dead, sticky touch, in part because just about everybody uses the cheapest possible technology. So I still peck away at the

highly responsive keyboard that came with my now-long-dead Zenith computer 13 years ago. It's my only PC item of that vintage that's still usable every single day.

SMALL GETS BETTER

THERE'S BRIGHTER news in small packages, now that even Handspring (home of Graffiti's inventors) has realized that pen input is too clunky for busy users. The folding Stowaway keyboard has a slim profile that may be the most ergonomic of all, and thumb-typing on RIM's BlackBerry devices and Handspring's Treo phones is surprisingly easy. Digit Wireless's Fastap keyboard, which may show up in new handhelds, cleverly crams a key for each alphanumeric character into the same space as a phone keypad.

Don't get me started on laptop keyboards. Their touchpads have lately developed a new glitch: the incredible jumping cursor. I first ran into this phenomenon on Apple iBooks, but it's migrated to PC notebooks. The issue is simple: When one finger rests on a touchpad, the cursor shouldn't hop around if another finger brushes near or onto the pad's surface. This is a software problem. The logic should stipulate that if one finger is already on the pad, ignore any others. That's how it used to work. I guess nobody bothers to complain.

But why just fix it? How about shrinking the touchpad and swapping it with the <Escape> key? Then you can tout a keyboard that's “new and improved.” ■

Contributing Editor Stephen Manes, a cohort of the public television series Digital Duo, has written about PCs for nearly two decades.



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