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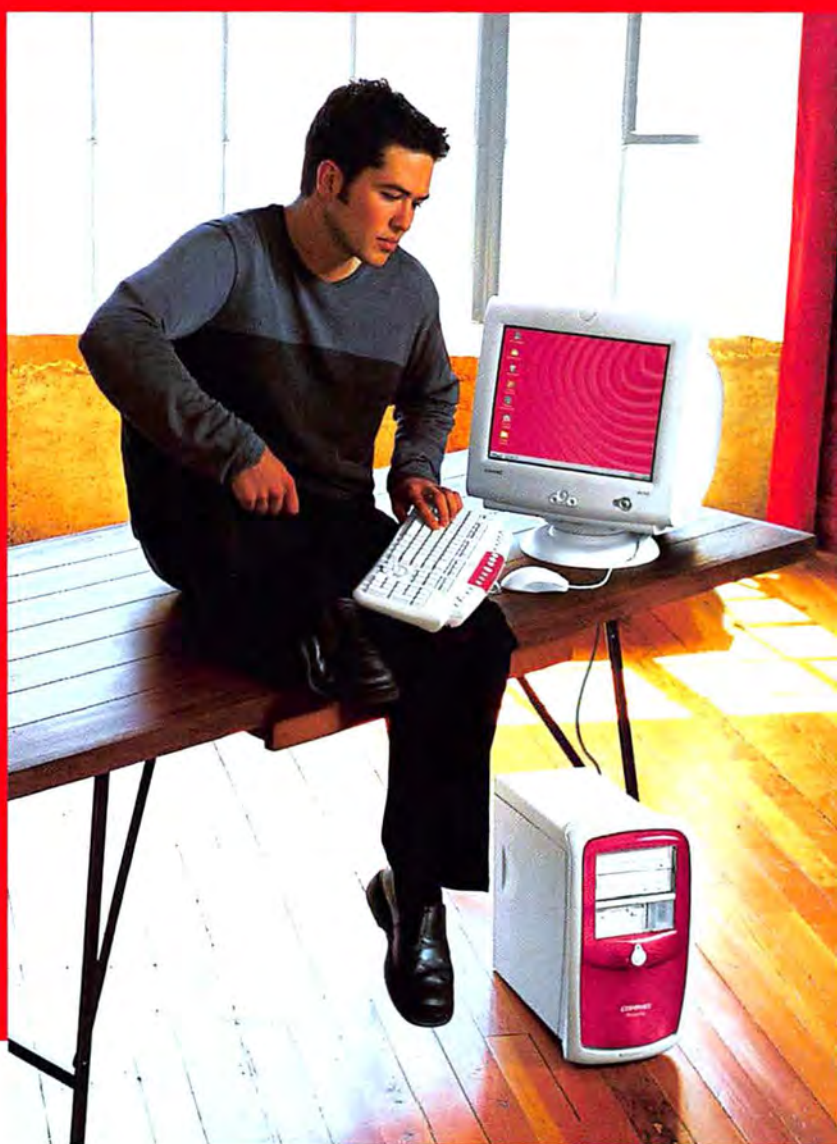
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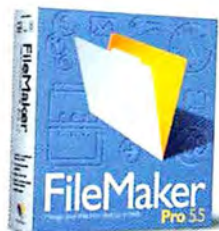
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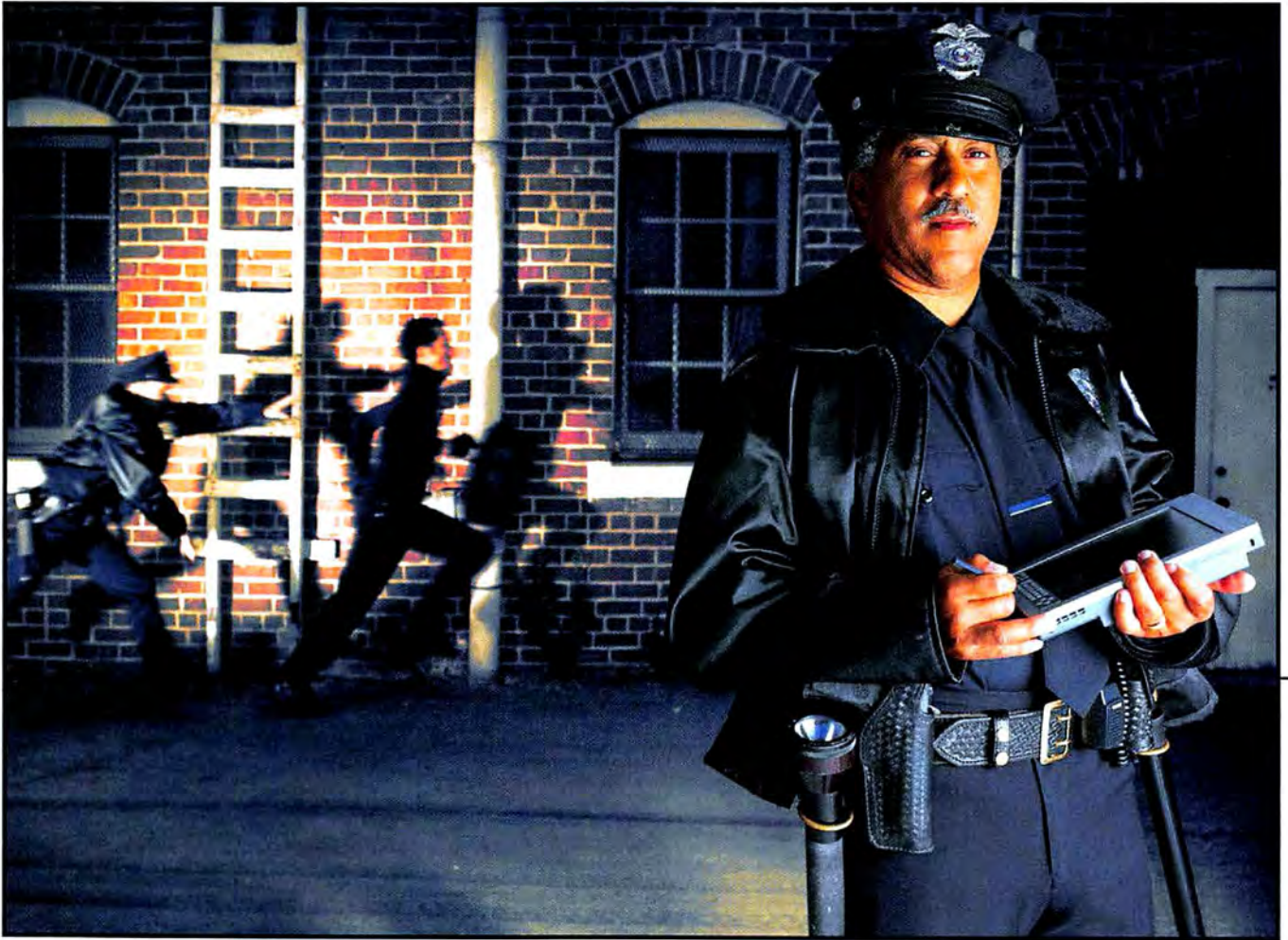
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FEATURES

DIGITAL AUDIO

110 Easy as MP3

Sure, digital audio is terrific—but it's not just MP3 files, and it's a far more complicated realm than the familiar world of cassettes and CDs. Here's everything you need to know to turn your home into a digital music center—creating the files, managing them, and listening to them. We also look at different types of portable players and how to use audio files on your living-room hi-fi.

RELIABILITY AND SERVICE

125 Service Takes a Dive

Faced with declining profit margins and slumping sales, PC makers are cutting costs wherever they can. One casualty, according to our latest survey of *PC*

World readers, is customer support: While reader ratings for PC reliability held steady, scores on service measures were down—precipitously. We examine what happened and offer tips for dealing with lousy support.



PC SECURITY

135 Holey Software!

These days, programs all too often ship with at least one security flaw that can leave your system open to attack. Who is responsible for this sorry state of affairs? Are things getting worse? Can't vendors ensure that their software is hole-free before they ship it? Here's the scoop on how people find and exploit holes, why apps have them, and what vendors are (and aren't) doing about it. Plus, steps you can take to protect yourself.

Cover Illustration by Nick Fain



COVER STORY

92 Windows XP Inside and Out

Microsoft's latest operating system is here, promising greater stability and an array of features, both new and familiar. Should you take the upgrade plunge? We dove in to see just how fast and reliable the OS is, as well as to discover what changes and tweaks it holds in store. Learn what to expect from the installation process. Find out more about XP's user interface, digital-media utilities, security features, maintenance resources, and Internet tools. Read our hands-on advice, and decide whether XP is right for you.



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This Top 10 chart featured a tight race for number one this month.
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COMING UP IN DECEMBER

Holiday Buying Guide: Get your system something nice this year.
PCs Versus Gizmos: Can your PC beat the new consumer electronics devices at their own game?

Sublime Software: Here are two dozen of the best freeware and shareware applications around.
Roundups: We test home PCs and digital cameras to find the best.

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Creative Labs' new Audigy chip quadruples the processing power of its Sound Blaster Live predecessor and produces more-realistic 3D sound.
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Whether it covers a site's banner ads with its own clients' pitches or creates multiple links to their sites, adware takes a lot of liberties with your PC.
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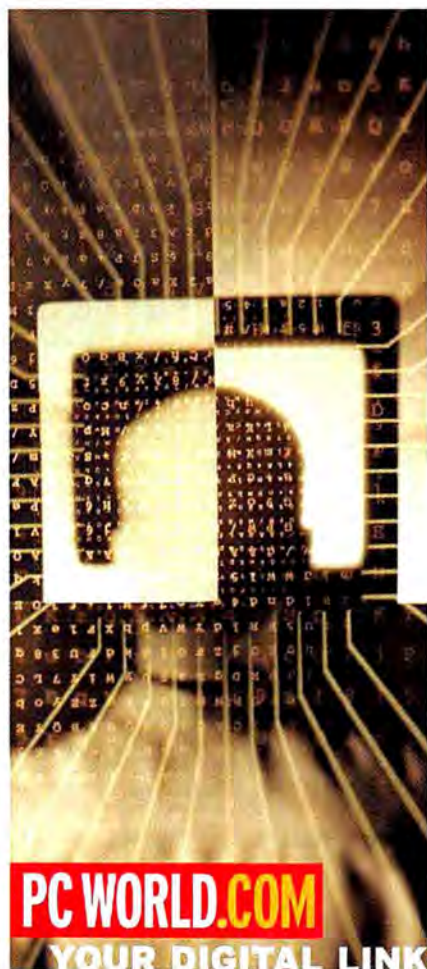
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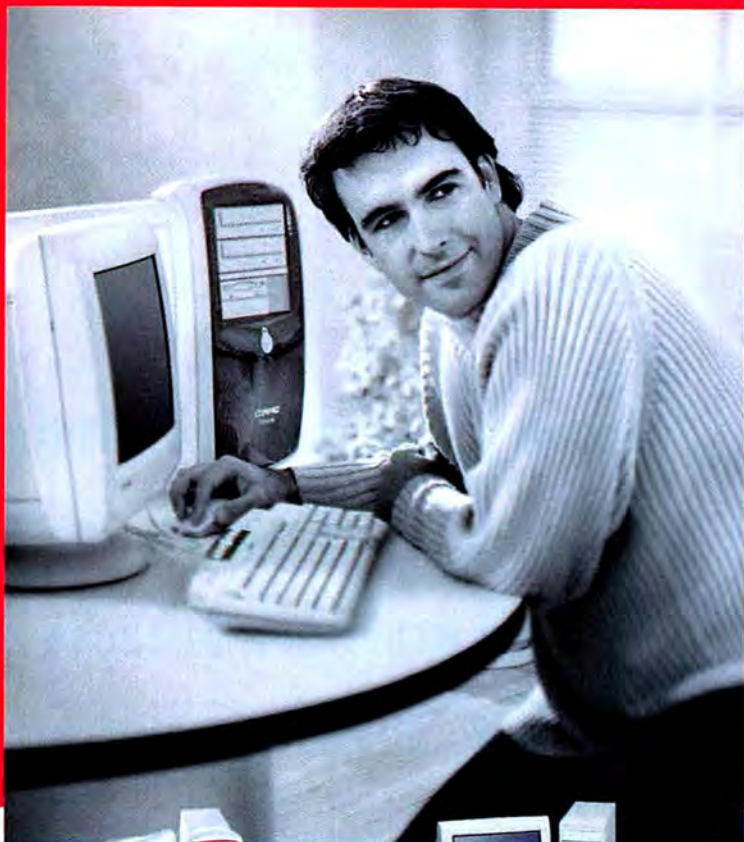
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NEWS & TRENDS

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THE DVD DILEMMA

THREE REWRITABLE DVD FORMATS ARE DUKING IT OUT FOR YOUR DOLLARS. IS IT TIME TO BUY? BY JON L. JACOBI

IT'S BEEN a while coming, but the day that you'll trade both your trusty CD-RW drive and your familiar VCR for a new rewritable-DVD device is fast approaching.

Why swap? How about to get more speed, greater reliability, and discs with seven times the capacity of a CD-ROM? Or to create your own digital DVD movies that are easily searchable, won't degrade over time, and can be stored more compactly than videotapes?

Trust us: You will eventually own a rewritable-DVD device. What's confusing matters is that there are now three contenders battling for your upgrade money: DVD-R/RW, DVD+R/RW, and DVD-RAM.

Both DVD-R/RW and DVD-RAM drives have already appeared (Pioneer's DVD-R/RW \$799 DVR-A03 and Panasonic's DVD-RAM/DVD-R \$549

LF-D311N DVDBurner; for more, see find.pcworld.com/14380). But today the battle is truly joined, as the much-anticipated DVD+RW format debuts in Hewlett-Packard's \$599 DVD100i drive. All three camps will have new VCR-like DVD recorders this fall, too, priced from \$1500 to \$2500.

The format offering the best compatibility with existing DVD-ROM drives and movie players should win. Unfortunately, it's still too early to tell which format that will be. The early favorites seem to be the DVD Forum's DVD-R/RW and DVD+RW from the DVD+RW Alliance.

ENTER DVD+RW

ALTHOUGH IT'S the last of the trio to reach store shelves, DVD+RW brings 4.7GB capacity, superior speed, and lower cost to the table.

The offspring of an alliance between originally six, now eight, major companies, DVD+RW took a while to get to market. The companies pulled the

plug on a near-shipping 3GB product after hearing DVD-RAM and DVD-R were upping capacity to 4.7GB. Two more years and much hype later, a prototype of HP's DVD+RW drive has come our way. Our tests confirm that it writes at a



scintillating 2.4X—that is, 3.32 megabytes per second—easily the fastest of the three formats, and far faster than any CD-RW drive. In addition, it writes CD-Rs at 12X, writes CD-RWs at 10X, reads CD-ROMs at 32X, and reads DVD at 8X—making it a great all-purpose drive. (In CD technology, 1X equals 150 KBps. For DVD, 1X equals 1.38 MBps.)

It also doesn't hurt that the HP drive costs roughly \$200 less than Pioneer's DVR-A03 DVD-R/RW model. Media prices are competitive, too: DVD+RW discs now sell for about \$15 each. (DVD-R discs cost about \$8 each and DVD-RWs are around \$18 apiece.)

The DVD100i's glass jaw is compatibility. The interoperability with legacy DVD-ROM drives and DVD movie players (those made before 2000) that DVD+RW's developers wanted has proved impossible to achieve. Just as they do with DVD-RW discs, many legacy DVD-ROM drives and movie players misidentify a DVD+

RW disc as a dual-layer DVD-ROM and simply sit there, scratching their laser-laden heads. DVD+RW media fares much better with newer players: Seven of the ten current movie players we tested it with could read it (see "The DVD Playbook," page 29). If you bought a DVD player within the last 10 months, odds are it will work with DVD+RW.

To improve compatibility, the DVD+RW Alliance has announced DVD+R—a write-once media that its sponsors say most legacy players can deal with. We couldn't verify this claim because DVD+R is not yet available. Moreover, initial DVD+RW drives won't be able to write DVD+R discs without a firmware upgrade; drives that can write DVD+R may be available by early 2002.

ON TO DVD-RW

WHILE DVD-R and DVD-RW are the official DVD Forum formats, they've been developed and marketed almost exclusively by Pioneer Electron-

ics. Drives have been available for several years but were prohibitively expensive until last winter, when Pioneer released its DVR-A03 DVD-R/RW drive (or SuperDrive, as Apple calls it). The unit can write DVD-R at 2.7 MBps, DVD-RW at 1.38 MBps, CD-R at 8X, and CD-RW at 4X; and it can read all of the above formats, as well as DVD-ROM and CD-ROM, at reasonable speeds. Alas, at \$799 on the street, the DVR-A03 is still beyond the reach of the average consumer.

DVD-R's biggest strength is its compatibility: A large portion of the DVD-ROM drives and movie players already in homes can read it. No other DVD media currently shipping can make that claim.

DVD-RW is another story. As with its rival, DVD+RW, older drives and players often misidentify a DVD-RW disc as a dual-layer DVD and won't play it. A firmware upgrade would probably fix this problem, but such firmware is unlikely to become available for most products. Like DVD+RW discs, DVD-RW media does better with current players: Seven of the ten models we tested could read DVD-RWs.

AND DVD-RAM?

THE DVD Forum's DVD-RAM has been around for several years. It was the first format to be used both in PC drives and in a DVD recorder for the living room. Though it has some advantages as a backup medium, DVD-RAM stands little chance of dominating the burgeoning DVD market because it has more-limited speed and compatibility than the other two rewritable standards.

One major strength of DVD-RAM is its durability—up

IN BRIEF

Pipeline

SHARING: Sonicblue's new ReplayTV 4000 digital video recorders, due in November, have ethernet ports and hard drives that store up to 320 hours of video and TV clips. Use them to stream video from one unit to another on a home network, or to share programs over the Net.

find.pcworld.com/14085

\$99 STUDIO: The Intel Play Digital Movie Creator provides everything a budding filmmaker needs: a camera that can record up to a full

minute of 320-by-

240-resolution

video with audio (or 4

minutes of 160-by-120-

resolution video with

audio, or up to 1200 still

photos), plus software

that renders downloading and assembling clips (with dissolves and effects) a snap.

find.pcworld.com/14084

SMALL: Olympus says that its cigarette-pack-size D-40 Zoom digital camera is the world's smallest 4-megapixel digicam. A built-in speaker allows immediate video and audio playback, a rare feature. It also has presets

to handle common lighting situations. Estimated street price is \$799.

find.pcworld.com/10483

Did You Know?

IN AUGUST 2000, 51 percent of U.S. households surveyed reported they had one or more PCs in their home, up 10 percentage points from December 1998.

SOURCE: U.S. CENSUS BUREAU

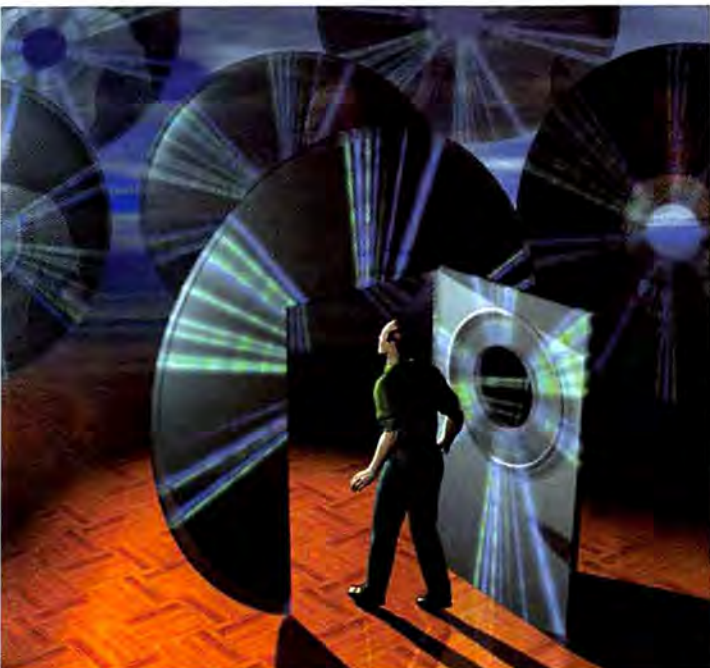


ILLUSTRATION: JIM LUDTKE

FEATURES COMPARISON

GUIDE TO REWRITABLE DVD FORMATS

FORMAT	Drive example	Capacity	Current maximum write speed	Write cycles	Pro	Con
DVD-RAM	\$549 Panasonic LF-D311N (also has DVD-R capability) find.pcworld.com/11041	4.7GB per side	1.4 MBps (typically 700 KBps for data)	100,000	Rewritable; more write cycles than others; proven technology. Compatibility is improving.	Slow for data; incompatible with most drives and players.
DVD-R	See DVD-RAM, DVD-RW	4.7GB	2.77 MBps	1	Cheaper discs than rewritable media; high compatibility with legacy DVD-ROM drives and players.	No rewrite.
DVD-RW	\$799 Pioneer DVR-A03 (also has DVD-R capability) find.pcworld.com/11040	4.7GB	1.385 MBps	1000	Rewritable; compatible with many current drives and players.	Largely incompatible with older drives and players.
DVD+R	Not available	4.7GB	Not available	1	Promises greater compatibility with legacy drives and players than +RW. Cheaper than rewritable discs.	No rewrite; compatibility promised but unproven. Not sold yet. DVD100i won't write it without unpromised firmware upgrade.
DVD+RW	\$599 HP DVD100i find.pcworld.com/14460	4.7GB	3.324 MBps	1000	Rewritable; fast; compatible with most current drives and players.	Largely incompatible with older drives and players.

to 100,000 rewrites and a predicted 100-year life. (DVD-RW and DVD+RW are rated for only 1000 rewrites.) Another is capacity: DVD-RAM discs can be single- or double-sided and can accommodate up to 4.7GB per side—twice what other formats offer. Both of

these features make DVD-RAM a superior format for archiving and backup. However, although the current crop of second-generation players can transfer data at 1.4 MBps (fast enough for DVD video and movie applications), for data apps, a verification cycle cuts

that speed by almost one-half.

DVD-RAM's most significant drawback is its almost total incompatibility with DVD movie players. Panasonic's recent DVD-RAM LF-D311N DVDBurner is able to write to DVD-R, which improves matters, and a number of DVD

drives can read DVD-RAM data discs. Unfortunately, however, Panasonic's recorder has been the only player that can read DVD-RAM video. Panasonic is releasing three other compatible players, but little else exists. Moreover, to play single-sided discs in compati-

THE LAW & YOU

YOUR COPY RIGHTS WITH DVD

SO YOU'RE considering a new rewritable-DVD drive or a new DVD recorder—just what are you allowed to do with them?

You already know that copying commercial DVD movies is illegal. All DVD recorders, DVD rewritable drives, and their media can recognize encrypted content and won't let you copy it. Forget making a backup of *Gone With the Wind* in case the kids use the original to play Frisbee. That fair-use rule might apply to software, audio CDs, and cassettes, but not to DVDs because the Digital Millennium Copyright Act makes removal of copy protection illegal.

Programs that illegally remove copy protection exist, however, and even average users who know where to look can find them. Fortunately for the movie industry, using such programs is time-consuming, and still too pricey given media costs.

What the movie and TV industry fear is an MP3-Internet type of debacle. In a year

or two, affordable rewritable-DVD drives and cheap media will be everywhere, and so will the temptation to record and trade protected content without paying for it. But video files are hundreds of times larger than their audio counterparts, so until broadband is the rule, nothing approaching the Napster situation is likely to occur.

Backing up data, recording your own home movies, transferring old VHS tapes—all those activities are allowed. In addition, you can record broadcast and cable TV shows for your personal use, just as you already can with your VCR. But that may change. Many plans are in the works to protect broadcast content, and some capability currently exists. For example, most digital

set-top boxes are capable of encrypting their content with Macrovision's scheme, which lets the broadcast appear normal but will not allow a flawless copy. All VCRs sold after March 2000 are Macrovision-aware, and DVD recorders are as well.

Consumer advocates and some legislators are now wondering if, in the effort to preserve content owners' rights, too modest an effort has been made to preserve

consumers' rights.

New legislation and court cases are in progress that may change the interpretation of the DMCA. Stay tuned.



ble DVD drives and movie players, you may first have to remove them from their cartridges. Many analysts believe the awkwardness of this procedure will inhibit most users from adopting the media. And at present, DVD-RAM media goes for about \$17 per 4.7GB side, somewhat pricier than competitors' media.

IN YOUR LIVING ROOM

THE BATTLE isn't being fought only on the desktop—replacing VCRs is on the agenda, too. Panasonic began shipping its DMR-E10 DVD-RAM-based recorder more than a year ago and is replacing it this fall with the DMR-E20; Pioneer's DVD-RW-based PVR-9000 and Philips' DVD+RW-based DVDR1000 should be out before Christmas. No new recorders were available in time for testing.

COMPATIBILITY

THE DVD PLAYBOOK

WE SURVEYED SEVERAL currently marketed DVD movie players to see which recordable-DVD format gives you the most choices.

PLAYER	Reads DVD+RW	Reads DVD-RW	Reads DVD-R	Reads DVD-RAM
Apex AD-1500	○	○	●	○
Apex AD-3201	●	●	●	○
JVC XV-S65GD	○	○	●	○
Panasonic DVD-RP56	●	●	●	○
Panasonic DVD-RV31	●	●	●	○
Samsung DVD-M101	●	●	●	○
Samsung DVD-M301	●	○	●	○
Sony DVP-NS300S	●	●	●	○
Sony DVP-NS400D	●	●	●	○
Toshiba SD1700	○	●	●	○

● = Yes ○ = No

Based on the product demos we've seen and our experience with the DMR-E10, all of these devices have VCR-like functionality and can record 1 to 6 hours of high-quality MPEG-2 compressed video; longer recording times decrease video quality, yielding slightly more-



HP's DVD100i, a new \$599 internal DVD+RW drive.

jagged edges or other visual artifacts. To maximize recording capacity, all units offer variable-bit-rate recording, a function that lets the recorders analyze the content they're recording frame by frame and

increase or decrease the detail they take in, as needed.

All three recorders should be excellent for archiving your favorite content, whether that's home movies, broadcast TV, or old video now residing on VHS tapes. And all three include copy-protection mecha-

nisms to prevent you from copying DVD movies (see "Your Copy Rights With DVD").

The Panasonic recorder stands out with what the company calls a time-slip feature, which lets you record a program and simultaneously go back over the DVD-RAM disc to watch what you've already recorded.

Pioneer's recorder will be the first to offer digital inputs (IEEE 1394 ports) along with familiar analog-video ports, but its DVD-RW discs require a slightly longer finalization period than the others before DVD players can read them. Both recorders will write to DVD-R discs.

A big caveat: DVD-RAM recorders should cost between \$1500 and \$2500. That's far cheaper than the original cost of the Panasonic DMR-E10 (\$4000), but it's still far out of reach of most consumers.

NOT VHS VS. BETA

SOME observers have likened the impending struggle between DVD+RW and DVD-RW to the old VHS-versus-Betamax war, but that analogy isn't entirely accurate. VHS and Betamax were incompatible all the way down the line. Devices using each DVD for-

IN BRIEF

Did You Know?

U.S. INTERNET users who actively use online banking

13.6 MILLION

services now number 13.6 million, an increase of 7.5 million since the end of 1999.

SOURCE: COMPTON ADVISORS

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PAYING POSTAL: The U.S. Postal Service now offers electronic services such as Pay@Delivery, an e-version of Collect-On-Delivery (COD). It lets a buyer—say, an auction winner—deposit a payment that's electronically released to the seller upon delivery of the package. Also available are Send Money (like a Postal Money Order) and Electronic Postmarks. find.pcworld.com/10482

mat can create discs that can be played in at least some DVD players, and some drives can read each other's formats. The market might dictate players and drives that can read all three, but it's more likely that at least one format will eventually fall by the wayside.

The drives—and definitely the DVD recorders—are still too costly to find immediate, widespread acceptance, but prices should come down over the next two years. For now, although the HP DVD100i drive is faster and cheaper, the Pioneer DVR-A03 remains our choice because it writes DVD-R, which is supported by most drives and players. But check back with us again after DVD+R shows up—we may have a change of heart. ▶

COMPONENTS

P4 MEMORY: NEW OPTIONS

INTEL'S PENTIUM 4 CAN FINALLY BE MATCHED WITH SDRAM AND DDR SDRAM, NOT JUST COSTLY RDRAM MODULES. WHAT'S YOUR BEST BUY?

PREVIOUSLY, if you wanted Intel's Pentium 4, you had to buy a PC with pricey RDRAM. But now Intel has released its PC-133 SDRAM-based chip set, the 845, and Via Technologies has launched its unlicensed chip set, the P4X266, which pairs the P4 with DDR memory. So which offers you the best combination of value and performance?

Each memory type has its proponents. Cost-conscious upgraders and IT groups want an SDRAM chip set for the P4 because SDRAM is an inexpensive and trusted memory type. DDR—formally, DDR SDRAM—is also fairly cheap and promises better performance, which excites some PC enthusiasts. Intel, RDRAM's strongest advocate, contends that RDRAM-based PCs offer the very highest performance.

THE TESTS

IN EXCLUSIVE *PC World* tests comparing three similar 1.7-GHz P4 PCs—each carrying 256MB of SDRAM, DDR, or RDRAM and running Win-



YOU CAN now choose between RDRAM, SDRAM, and DDR for P4 PCs.

dows 2000 Professional—the RDRAM-based system outran the PC-133 SDRAM-based PC as expected, though by fairly small margins. But the comparable DDR-based PC outpaced both systems on most of our tests, including a multimedia task—an area where we had expected the RDRAM system to shine. And despite the recent plunge in memory prices (see “More Memory, Please,” page 34), RDRAM re-

mains roughly three and four times costlier than DDR and SDRAM, respectively.

We asked Dell Computer to supply us with two matching P4 systems: one based on Intel's RDRAM chip set, and the other on Intel's SDRAM chip set. Shipping systems configured with a P4 CPU and DDR memory weren't available at test time, so we requested a reference system from Via.

Dell sent us a shipping Di-

mension 8100 with 800-MHz RDRAM and a preproduction Dimension 4300 with 133-MHz SDRAM. Both units carried identical 60GB, 7200-rpm IBM hard drives; Nvidia GeForce3 graphics cards with 64MB of DDR SDRAM; 16X DVD-ROM drives; 16X/10X/40X CD-RW drives; and 17-inch monitors.

Via's system came with 266-MHz DDR memory; a 40GB, 7200-rpm IBM hard drive; an Nvidia GeForce2 Pro graphics card with 64MB of DDR SDRAM; a 12X DVD-ROM drive; and a 17-inch monitor. (Note that our tests emphasized 2D over 3D graphics, and the graphics cards in each system were deemed sufficiently comparable to permit accurate testing.)

The DDR-based system led the pack with a PC World-Bench 2000 score of 230; the RDRAM PC landed a 219; and the SDRAM unit a 208. That gives the DDR PC about a 5 percent lead over the RDRAM system, and a 10 percent advantage over the SDRAM unit. The RDRAM unit bested the SDRAM system by slightly more than 5 percent.

In our timed MusicMatch test, the three systems finished within 2 seconds of one another, with the DDR-based unit managing a tiny lead. ▶

TEST REPORT

MEMORY MATCHUP: DDR-BASED PC COMES OUT ON TOP

SYSTEM	Processor	Memory	OS	PC WorldBench 2000 <small>Faster</small>	ADDITIONAL TESTS (Lower score is better.)		
					MusicMatch ¹	Photoshop 5.5 ¹	AutoCAD 2000 ¹
Dell Dimension 4300	P4-1700	256MB PC-133 SDRAM	Windows 2000	208	64	107	614
Dell Dimension 8100	P4-1700	256MB PC800 RDRAM	Windows 2000	219	63	102	541
Via reference PC	P4-1700	256MB PC2100 DDR SDRAM	Windows 2000	230	62	102	438



HOW WE TEST: All systems are tested with PC WorldBench 2000, *PC World's* application-based benchmark. In the MusicMatch encoding test, we time the conversion of a raw 14.3MB .wav file to .mp3 format using MusicMatch Jukebox. In the Photoshop 5.5 test, we time the running of a macro that applies a series of filters to a 1.6MB image file. In the AutoCAD 2000 test, we time Autodesk Group International's AUGI Gauge benchmark, which runs computer-aided drafting tasks. All rights reserved. ¹Time is in seconds.

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COLOR.



Introducing the printer that will change the picture of modern photography forever. The new EPSON Stylus® Photo 785EPX, the first printer with features designed specifically for digital cameras. At last, you can create digital photographs that come to life with the world's richest color and most stunning detail.



With image quality so true you'll swear it was from a state-of-the-art photo lab. It's all about color accuracy, brightness and contrast that until now could only be the work of a master technician. Brought to you brilliantly and easily courtesy of a master printer. No complicated instructions. No tricky editing. In fact, the only thing you'll find difficult is believing how simple it all really is. Here's why: 6-color printing for supersmooth gradations and truest flesh tones • 2880 x 720 dpi for incredible detail • The world's first printer with PRINT Image Matching™ technology that ensures digital cameras and printers work together to produce automatically optimized



Optional 1.6" preview monitor attaches above printer control panel (\$99)

prints* • Variable ink droplet technology for sharp detail and maximum clarity • Convenient photo printing and enhancement with or without using



Supports multiple memory cards

a computer – just insert your digital camera's memory card into the adapter and print • Preview pictures with an optional color preview monitor • Compatible with CompactFlash® Type I and II, SmartMedia™, IBM® Microdrive™, Memory Stick® and Secure Digital™ memory types • True BorderFree™ printing in frame-ready sizes • View print settings with an easy-to-use control panel • Choose from different paper types, multiple sizes and layouts • Built-in USB



port with Windows/Mac compatibility for quick, easy setup. For more info, call 1-800-GO-EPSON or visit epson.com.

Easy-to-use control panel

*Digital cameras with PRINT Image Matching are now being introduced by leading manufacturers like Asahi (Pentax), Casio, Epson, Konica, Kyocera, Minolta, Nikon, Olympus, Ricoh, Sanyo, Sony and Toshiba. Remember, this technology is for optimization but this printer is compatible with any digital camera.

Epson Stylus Photo 785EPX just \$249

Scores were also close in our Photoshop 5.5 test: The DDR- and RDRAM-based systems finished in a tie, each of them completing the test nearly 5 percent ahead of the SDRAM unit; that's a difference you might notice over a workday.

The DDR-based system really showed its stuff in the timed AutoCAD 2000 test, which it completed in 7 minutes, 18 seconds. In contrast, the RDRAM-based PC took 9 minutes, 1 second and the SDRAM-based unit took 10 minutes, 14 seconds. The DDR unit thus ran 23 percent faster than the RDRAM PC, and a whopping 40 percent faster than the SDRAM unit. You're unlikely to miss that.

UPGRADES

MORE MEMORY, PLEASE

WHETHER YOU use SDRAM, DDR, or RDRAM in your system, more is better. And with memory at ridiculously low prices—thanks in part to low demand from slumping PC sales—there's no reason to skimp on this vital part of your system.

Too little memory can throttle the performance of even a new PC with a fast CPU. And additional RAM is one of the most cost-effective ways to boost an older system's performance.

If you don't have enough RAM, your PC must constantly retrieve information directly from your hard drive, explains Stephen Rodriguez, director of strategic initiatives at memory vendor Kingston Technology. A hard drive is fast, but nowhere near as fast as memory, he says.

Why do you need additional RAM?

- ◆ To run more applications at once.
- ◆ To access graphics more quickly. Even today's 32MB and 64MB graphics cards still rely extensively on main memory—and the more RAM you have, the smoother games, DVDs, and other multimedia programs will run.
- ◆ To run Windows XP. Microsoft lists 64MB as the minimum memory for XP, but it recommends 128MB (some experts even suggest 256MB). To improve its performance in a system with only

In addition, you'd probably notice the 13 percent speed difference between the RDRAM and SDRAM machines.

BEHIND THE NUMBERS

INDUSTRY analysts have long stated that the combination of P4 and RDRAM would offer the best performance because

Intel and Rambus, RDRAM's creator, designed the technologies to complement each other. The P4's frontside bus supports transfers of up to 3.2GB per second, as does two-channel RDRAM. At best,

DDR can support 2.1-GBps transfers; SDRAM offers a maximum rate of 1 GBps. So how did the DDR-based PC outrun the RDRAM unit?

Senior analyst Kevin Krewell of research firm Micro-Design Resources suggests RDRAM's large bandwidth may not offer much benefit

data, but it's not fully utilized in business apps, which use short bursts of data, he says. In tackling those short data bursts, RDRAM suffers from its biggest drawback, longer latency, which is the amount of time between when a CPU requests data from memory and when it actually arrives.

RDRAM's fast bus may be more than is necessary for most of today's applications.

with standard business applications—the ones most people use. RDRAM's bandwidth may come in handy for processing multimedia (such as video or music streaming), which uses large chunks of

RDRAM's fast bus may simply be more than is necessary for most of today's applications, Krewell adds.

TOP VALUE

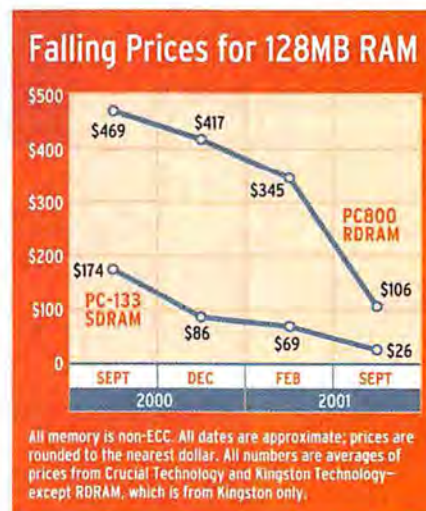
UNTIL MORE programs that need RDRAM arrive, DDR's shorter latency and lower cost make it a good option for performance-minded users. And Via's \$1300 estimated price for our test PC makes the platform a bargain. Users unwilling to embrace Via to get a P4 DDR PC should have an Intel option in early 2002. (Intel has filed suit against Via to get the unlicensed chip set pulled off the market, which may give buyers pause. For its part, Via has filed patent suits against Intel relating to the P4 CPU.)

SDRAM P4 PCs should offer a decent balance of value and performance. Dell has aggressively priced its RDRAM-based 8100 at \$2099, while the SDRAM-based 4300 should cost a somewhat high \$2079. We expect most SDRAM PCs to offer larger savings over their RDRAM counterparts than the Dell units do. If you work often with bandwidth-intensive apps, your best bet may be an RDRAM-based system, despite its premium.

—Tom Mainelli ►

64MB of RAM, the XP OS actually disables some of its features, including Fast User Switching.

The average price of an additional 128MB of PC-133 SDRAM is \$26 (see chart), and equivalent DDR costs \$34. Even RDRAM costs \$106, so there's no reason to skimp—just don't wait too long to buy. Though users love these prices, makers understandably do not, and they're eager to get supply and demand back in sync.



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AUDIO

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CREATIVE LABS' NEW AUDIGY TECHNOLOGY TAKES PC AUDIO TO STUNNING NEW LEVELS.

CREATIVE LABS raises the standard in PC audio to pleasing new heights with a line of sound cards based on its new Audigy chip. The impressive result: audiophile-quality digital sound processing for mainstream PC products.

Audigy-based boards deliver that high-quality sound by using about four times the processing power of Creative's Sound Blaster Live series, which lets the chip calculate more 3D sound effects for more-realistic 3D sound.

The Audigy's 24-bit/96-kHz digital-to-analog converters significantly outperform the 16-bit/48-kHz DACs that today's better cards contain. The new DACs put Audigy-based cards on a par with good-quality home stereo components and allow them to decode 24-bit DVD-Audio discs as well as

standard 16-bit CDs. Home recording enthusiasts will appreciate both the board's 32-bit digital mixing capability and its excellent 100-decibel signal-to-noise ratio.



CREATIVE LABS' AUDIGY line of PC audio products produces stunningly realistic 3D effects.

We tested the top model in Creative's new line, the \$250 Sound Blaster Audigy Platinum EX, a unit well suited for the pickiest PC audiophile. Mainstream audio buffs may be satisfied with one of the company's less expensive Audigy boards that target specific activities, such as the Sound Blaster Audigy Gamer and MP3+ cards, each \$100.

INSIDE THE SOUND

THE AUDIGY line is built around a basic board with a microphone input, as well as digital and analog outputs

supporting six audio channels for full Dolby Digital 5.1 3D sound. The card also ships with an IEEE 1394 port, called SB1394, for connecting external devices such as DV camcorders or setting up peer-to-peer networking.

Our test board came with a breakout box called the Audigy Drive, which houses optical and coaxial digital I/O connectors, an infrared remote, and MIDI-in and -out connectors—important if you enjoy creating home recordings.

Setting up all of these pieces was complicated: You can expect to spend at least half an hour installing the hardware and bundled software. But once complete, the setup yielded impressive sonic results.

CDs, DVDs, and MP3s were crisp and clear, with better depth, presence, and range.

But perhaps the greatest potential of the card was revealed by its ability

to produce truly jaw-dropping effects during 3D game play. Imagine the sound of your steps as you walk from the floor of a canyon into the closed confines of a mine shaft. In the real world the sound in the two environments would be quite different. Now imagine walking out of the mine shaft while a voice deep within it calls out. The Audigy card is particularly impressive at reproducing such complex sonic environments. Music creation and audio editing are served by extensive bundled software. The Plat-

IN BRIEF

Site to See

TIRED OF airline entertainment that's as bland as the food? Try InMotion Pictures (www.inmotionpictures.com), a service that allows you to rent DVD players and movies to watch during your flight—



or flight delay. You can get one-way (if both airports have the service) in-airport rentals of a DVD player, a headset, and a movie for \$10—additional movies go for \$4 each. Round-trip rentals are \$10 a day and include a movie. DVD rental is \$5 for each movie as long as it is returned to an InMotion airport drop box or mailed back within five days. A player's batteries last about 4 hours. Additional headsets and batteries are available. Service is currently offered in over a dozen major North American airports; more are planned.

inum EX includes full versions of Image Line's Fruity Loops, Sonic Foundry's Acid DJ 2, Steinberg's Audio Suite, and Ulead's VideoStudio 4 SE Basic, along with standard WAV editors and MP3 applications. But unless you're setting up a home recording studio, the Platinum bundle may be more than you need. Most PC audio fans would be better served by the less expensive Sound Blaster Audigy cards. Either way, you should find the results appetizing.

—Eric Dahl ▶

Sound Blaster Audigy Platinum EX

Creative Labs
★★★★★

It's the best commercial sound card available, but the wealth of software and connections may overwhelm some audio enthusiasts. List: \$250
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CONSUMER ALERT

STEALTH AD INVASION

DON'T LOOK NOW, BUT YOUR COMPUTER MAY BE HARBORING SOFTWARE THAT LETS UNWANTED ADVERTISING IN.

FEEL LIKE online ads are getting more annoying? You're not alone. Consumer advocates are up in arms over adware—a new class of advertising products that typically install on your PC as part of a software download. Once it's there, adware does tricks like putting commercial links and ads on Web pages you visit—without the site's consent.

Recent adware controversies have centered on Gator and Ezula, two firms that bundle their adware with dozens of popular programs, including the game Snood, utilities like WeatherBug, and file-sharing software such as Kazaa and AudioGalaxy Satellite.

Gator covers banner ads on a site with ads from its clients. The program also sends periodic reports to Gator's server about the Web sites you've visited and the ad banners you've clicked, so Gator can favor you with ever-more-relevant ads. According to the company's lengthy privacy policy, the data



EZULA'S TOPTXT overlays links onto the Web pages you visit. When you click a TopText link, it transports you to a client advertiser's site.

Gator collects is anonymous and will not be sold.

Ezula's TopText, in contrast, works by overlaying hyperlinks onto whatever Web page you're viewing. While visiting ESPN.com, for example, you might see a yellow TopText link on the word *football* that, if clicked, would take you to a competing sports site.

The trend shows few signs of abating. Ezula and Gator

say that their advertisers are very pleased with results, and they claim that millions of PCs have loaded the software.

SNEAKY OR SMART?

CRITICS SAY these new ad techniques violate consumers' rights and infringe on copyright laws by changing a Web site's content and design. One trade group, the Internet Advertising Bureau, claims that

Gator's practice of covering a site's ads with Gator's clients' ads illegally interferes with the contractual relationship between the site and its advertisers. Gator has countered with a declarative relief civil suit against IAB, seeking to have its practice ruled to be lawful.

Consumer groups also criticize the way adware often is slipped into downloads without adequate notification.

Gator CEO Jeff McFadden maintains users aren't tricked

into installing his software (adware programs are listed in the terms-of-service contracts users

must accept before they can download), and he says there's nothing wrong with helping people get free software in exchange for seeing ads. Michele McGarry, spokesperson for Ezula, says users are notified about TopText and it's up to them to opt in or out of it.

Many users overlook the particulars of the often-dense TOS agreements, however. So some people realize they have adware only when extra links appear on Web pages or when ads multiply.

Web surfers' ire over these programs is having an impact. Spedia, which distributed a program like TopText, stopped in response to complaints. Spedia had bundled adware with its SurfPlus software, which blocks pop-up ads.

In the meantime, privacy experts caution users to download prudently. You need to be aware of what you're downloading and who produced it. And no one surfing today's Net should confuse "free" with "annoyance-free."

—Tom Spring ►

HOW TO GET RID OF ADWARE

IDEALLY, YOU'LL KEEP adware off your PC by being careful about what you download. But if you've already been bitten, try these tips:

TO DETECT ADWARE

- ◆ Open the Windows Task Manager by pressing <Ctrl>-<Alt>-<Delete>. It lists the programs running in the background.
- ◆ Visit Scumware.com. One of its applets detects Ezula TopText or Spedia SurfPlus.
- ◆ Use a firewall like ZoneAlarm. It alerts you

TO REMOVE THE PROGRAMS

- ◆ Open Windows' Control Panel and uninstall the software with the Add/Remove Programs applet.
- ◆ Check LavaSoft's free Ad-Aware program (www.lavasoftusa.com). It helps you remove programs installed surreptitiously on your PC.

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PDAs

POCKET PC 2002

UPSCALE PALM RIVALS STRENGTHEN MOBILE, USABILITY FEATURES—BUT PRICES RISE, TOO.

WITH THE LAUNCH of the Pocket PC 18 months ago, Microsoft finally produced a credible—and increasingly successful—challenger to the Palm operating system, which still dominates the personal digital assistant universe. So in its first revision of the Pocket PC OS, Pocket PC 2002 (originally code-named Merlin), Microsoft was not about to overhaul something that was working just fine. Judging from our tests with a shipping HP Jornada 565—one of the first PDAs to use the upgrade—Microsoft is correct in touting its new Pocket PC 2002 as more evolutionary than revolutionary.

Also shipping this fall on models from Casio, Compaq, Symbol, and Toshiba, Pocket PC 2002 introduces a slew of tweaks intended to address user complaints, increase the devices' usefulness for mobile communications, and make them more attractive to corporate buyers.

On the user front, for example, Pocket PC 2002 adds two text-input options to the old software keyboard and letter recognizer: Block Recognizer accepts one-stroke characters akin to Palm's Graffiti; Transcriber—previously a downloadable add-on—recognizes cursive script (but doesn't get everything right and is difficult to correct). The opening

Today screen—an at-a-glance view of your datebook, to-dos, and in-box—can be personalized with skins or photos.

Business users with lots of contacts will appreciate having the ability to view them by company as well as by last name, something a Palm does not offer. New on-screen date-



SMALL BUT LOADED: HP's featherweight Jornada 565 has a built-in CompactFlash slot.

book buttons make switching views—from daily to weekly, monthly, annually, or by text entry—quick and easy.

Some of Pocket PC 2002's most impressive features relate to e-mail. It's easier to set up a POP3 or IMAP4 account; and the PDA, when cradled, can automatically retrieve messages from several accounts via a desktop PC's Net connection. Similarly, Pocket PC 2002 supports desktop pass-through Web browsing and

instant messaging via MSN Messenger. Pocket Internet Explorer now recognizes HTML, CHTML, and WAP content.

If you use Outlook 2002 (a free copy comes with the Pocket PC 2002 desktop software), you can mirror your subfolders on your PDA—a useful trick for people who receive and sort lots of e-mail. In addition, Pocket Outlook contains a spelling checker, as does Pocket Word.

ENTERPRISE FRIENDLY

CORPORATE IT types will appreciate innovations such as support for strong passwords and virtual private networks, and a built-in Windows Terminal Services client for remote access to a Windows 2000 server. These features aren't accessible via the cradle, however; in order to use them, you'll need to establish direct network access via an add-on module.

All Pocket PC 2002 devices must store the OS in Flash ROM so that it can be upgraded as required. Unfortunately, among Pocket PCs sold up until now, only the Compaq iPaq keeps the OS in Flash ROM (and hence can be upgraded to Pocket PC 2002).

The Jornada 565 packages the new OS in the sleekest,

IN BRIEF

Downloads

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TOP 5

- George Orwell's 1984 Theme** 1332KB
Throw yourself into the morbidity of a bleak totalitarian future with this theme.
- TypingMaster** 3467KB
This text-to-speech application can teach your PC how to talk.
- WinSpeech** 702KB
More text-to-speech software to teach your PC how to talk.
- Internet Explorer 6** 496KB
Download the full version of Microsoft's latest Web browser.
- Kazaa Media Desktop** 1730KB
Download MP3 and video files with this tool, but beware of its adware component.

lightest (6.1 ounces) Pocket PC to date, with 32MB of RAM and 32MB of ROM (in which the OS and several HP apps are stored). The brilliant, 16-bit color TFT screen is on a par with the best we've seen. But you pay for these goodies: \$599 for the 565, and \$649 for the Jornada 568 (which carries 64MB of RAM).

Analyst Stacey Wu of Mobile Insights says a Pocket PC 2002 will be particularly useful—and better than the Palm competition—for the truly mobile professional who can afford to pay \$600 or more (especially if wireless local- or wide-area network access is involved) to stay well connected on a device that possesses a magnificent display.

But if you have already invested in a Pocket PC in the past year or so, don't worry: Pocket PC 2002 shouldn't prompt major upgrade envy.

—Yardena Arar ■

Jornada 565

Hewlett-Packard

★★★★★

Street: \$599

find.pcworld.com/14661

Pocket PC 2002

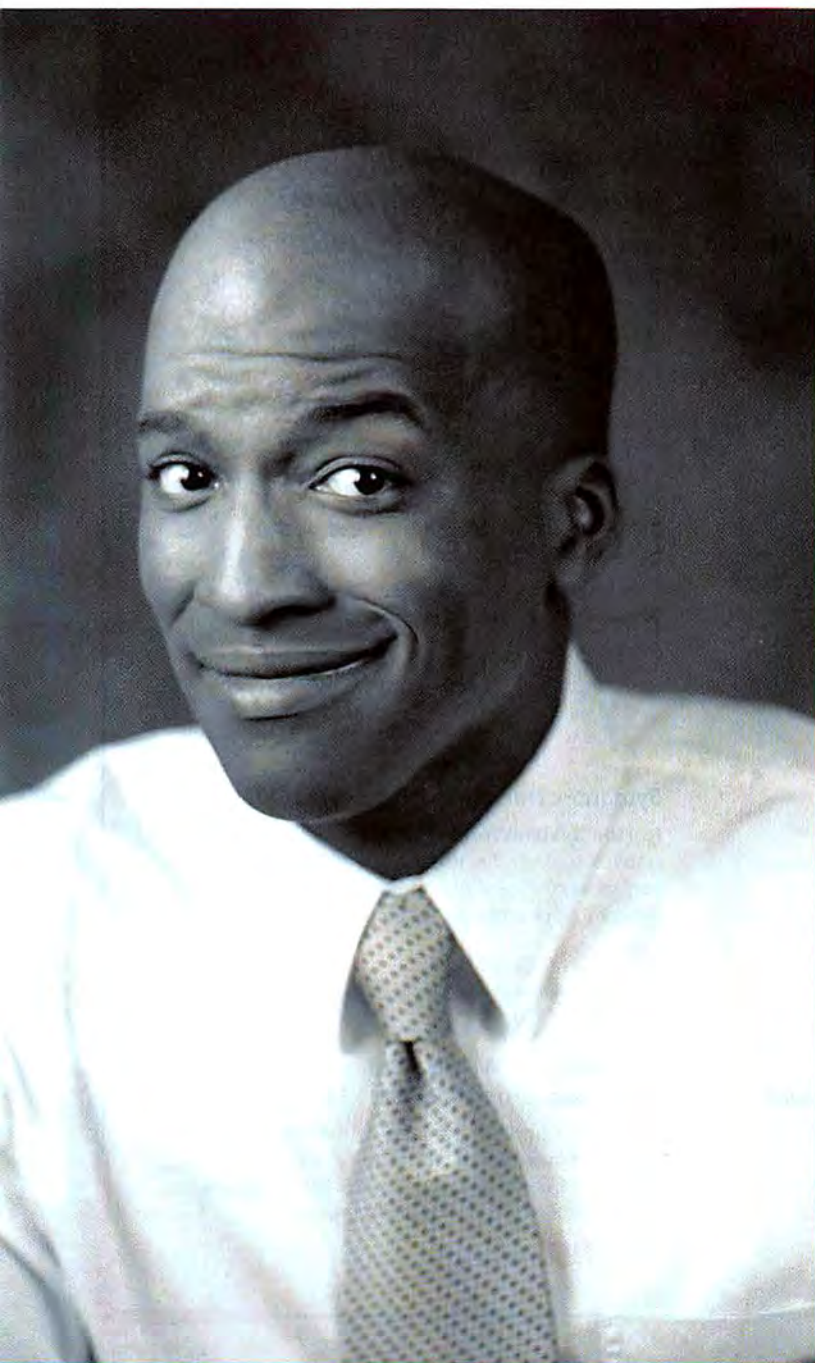
Microsoft

★★★★★

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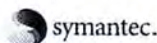
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THE NEW LOOK:
REVIEWS ARE IN

THOSE MONITOR
BUTTONS

CELL PHONE PRIVACY

I READ Cameron Crouch's article "Will Big Brother Track You by Cell Phone?" [*News and Trends*, September] with alarm. Using constantly active GPS has many dangers. For example:

- ◆ The article describes consumers being bombarded with ads and offers as they pass establishments. But third parties could record and sell cell-phone data without the handset users' consent.

- ◆ Here in Canada, Spy Vs Spy (www.spyvsspy.com) has devices for sale or rent that can listen to cellular phone frequencies and trace them. Stalkers could use this signal to trace their targets to their heart's content—as could parents in a bitter child custody dispute.

Jim Wilson

Vancouver, British Columbia

HOT BUTTON

CPU Wars: Who's the Winner?

HOW COULD YOUR magazine print such a lopsided and unfair article ["CPU Wars 2001," *News and Trends*, September]? It depicts an Athlon 4 system running Windows Me as in the same class as the Pentium III-M processor running Windows 2000. Among notebooks in your *Top 100*, Win 2000 systems typically outperform Win Me systems by about 20 percent.

Some explanation of the disparity in performance should have been made.

Brandon Guthrie, Boise, Idaho

THE ARTICLE showing Intel ahead of AMD was intriguing—especially since the PIII-M system shown racing ahead of the Athlon 4 PC had 256MB of RAM, while the latter had just 128MB of RAM.

Kamran Khan, Centralia, Illinois

AS SOMEONE WORKING with wireless carriers and telephone companies to tie location technology into responding 911 agencies, I can tell you that existing 911 centers here in Texas, New Mexico, and Oklahoma have no technology in place to track a 911 caller through GPS (though on a 911 call, the cellular provider *must* transmit location information—by tower triangulation if necessary). Judging from the difficulties cellular companies and telcos have had complying with the current FCC mandates, continuous tracking of cell-phone locations is unlikely in the next ten years.

Robin Krisher, San Angelo, Texas

THERE IS ANOTHER side to the coin regarding the tracking of cell phone locations. Someone impersonated my son in



the commission of a violent crime. The crime was committed in Southern California, while my son was in the San Francisco Bay Area. Fortunately, he used his cell phone a number of times. The cell phone company was able to verify that his cell phone was used only in the San Francisco Bay Area, and the people he called verified that they talked to him.

Kathleen Schramm, via the Internet

FINDING PHONE SUPPORT

AS I READ THE September *Web Savvy* column on the lack of telephone support at some vendor Web sites ["Don't Call Us—Ever"], this site came to mind: Whois.Net (www.whois.net). It provides all sorts of contact information for almost any Web site you can think of, from an address and phone number to names of support technicians to fax numbers. I have used Whois.Net when I couldn't find contact info on a company's Web page.

Derek Reichert, Milwaukee

PC UPGRADING

IN THE SEPTEMBER ISSUE, Kirk Steers wrote about upgrading PCs ["Do-It-Yourself Dream Machines"]. I heeded his advice and not only ordered a 128MB RAM upgrade module for my 64MB home PC, but installed it myself this afternoon. ▶

Everything went smoothly, and I now have 192MB of RAM. I'm no computer whiz, but I certainly feel like one, thanks to Kirk and your magazine!

Tom Kent, Walnut Creek, California

THE BUTTON CONUNDRUM

YOUR ROUNDUP of large monitors, "Screen Gems" [September], has a picture of the Hitachi CM810 with a caption

exclaiming, "Huh?"—referring to the many buttons on the monitor's front panel. The caption for an adjacent picture of a Sony monitor with only three buttons and a joystick says, "That's more like it."

The three-button/joystick combo, however, requires a user to jump from one on-screen menu to another just to change some simple setting. In contrast, having all the controls on the front panel elimi-

nates wading around in submenus, and it lets you make changes faster.

David D'Biagio
Ellwood City, Pennsylvania

MIXED REVIEWS FOR NEW LOOK

THE FOLKS AT *PC World* have done a great job making an outstanding publication even better. Your Find-It system with the five-digit URL is a wonderful innovation, and with URLs printed in blue, I can even throw my highlighter away.

Jerry Woitas, Kingsville, Texas

WHAT'S UP WITH the colors? The blue-gray and rust-orange shades that dominate are dull, boring, and ugly. Instead of my first thought being "Hey, this article will be interesting," it was more like "Man, this is ugly."

Jim Counihan, via the Internet

I LIKE YOUR new format; however, the blue color you have chosen for URLs is hard to read, and I just ignore it.

Holly S. Hoxeng, Denver ■

PC World welcomes your letters to the editor. Send e-mail to letters@pcworld.com.

CORRECTIONS

IN OCTOBER'S *Top 10 Printers*, the Samsung ML-1210 should have had 4 stars.

September's "100GB and Larger" (*News and Trends*) should have said that an hour of uncompressed video takes about 70GB of space (an hour of compressed DV video takes about 13GB).

In "Who Knew Windows Could Do That?" (August), the keyboard commands for creating a new folder (page 124) work only in Windows 2000 and Me. For other versions of Windows, use one of the following:

- ◆ If you're working in an Explorer or folder window with nothing selected, press <Alt>F<Enter><Enter>.
- ◆ If you have a file or folder selected, press <Alt>FNF.
- ◆ If you have a file or folder selected in the file pane (not in the Folders Explorer bar tree), press <Shift><F10>NF.

PC World regrets the errors.

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AnthroBench Catalog, pg 6



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CONSUMER WATCH

ANNE KANDRA

**BEHIND ON-SITE
SERVICE PROMISES**

**ON YOUR SIDE:
WEB PRICE GAFFE**

**PRIVACY WATCH:
SNOOPY VIRUSES**

On-Site? Next Day? No Way!

Getting your PC manufacturer to make a house call can be a real chore.



WHEN THE DISK drive in Michael Segal's Dell Dimension bit the dust, he was not too worried. Back when he purchased the PC, he had shelled out a hundred dollars to pay for an extra year of on-site, next-business-day service. So he figured the fix was a phone call and a few hours away.

But that's not how things worked out. Segal, chief technical officer of a medical software company located in Chestnut Hill, Massachusetts, called Dell tech support and soon found himself involved in a lengthy diagnostic process on the telephone. "I didn't mind that," says Segal,

"It makes sense for the company to determine what's wrong with the system before they send someone to repair it." After the tech support representative confirmed Segal's suspicion that the disk drive needed to be replaced, however, Segal discovered that "next business day" service applies only when the necessary parts are in stock. And you guessed it—the disk drive he needed wasn't in stock.

The technician and the new drive eventually showed up—six business days later. But Segal was left feeling that Dell had misrepresented its 'next business day'

service. "[The company's failure] to stock basic parts converts the service to a 'next business week' plan, which should carry a very different price tag," he says.

MORE THAN A PHONE CALL

COMPANIES ARE QUICK to tout the ease and convenience of on-site service plans, which can certainly be tempting, especially to novices and users who reach for antacid at the very thought of going under their PC's hood. Ironically, though, the process of persuading your PC vendor to send a technician can be more frustrating—and time-consuming—than the problem itself. Many customers incorrectly assume that with on-site coverage, all they have to do is pick up the phone and a trained technician will be on the way. The reality? That phone call is more likely to launch you into a round of telephone diagnostics. If you're lucky, the technician on the horn solves your problem. If not, you may be plunged into the nether regions of techno-hell, spending tedious hours on the line with tech support, repeated diagnostic procedures, software reinstallations, and reboots.

That's because almost all on-site service contracts specify that on-site technicians are dispatched strictly at the company's discretion, and only after extensive phone-based troubleshooting. If you've ever done time in a tech support phone queue, you know what that can mean: Clear your schedule and fire up the coffeemaker. In some cases, even if you qualify for on-site service, companies may expect you to install new cards or other parts that *they* think don't involve much technical know-how. And even when ►

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CONSUMER WATCH

the company concludes that an on-site visit is justified, it's not unusual, judging from the letters I've received from frustrated consumers, for the service to be delayed—as it was in Segal's case—by the lack of a part. Of respondents to a recent *PC World* survey who received on-site service, nearly 30 percent waited three days or more for a technician to arrive.

Dan Allen, Dell's director of consumer and small-business marketing services, cites a number of reasons why Dell may not have a part available. The out-of-stock item may be an older part that seldom

fails, or it may be a common part that the company has to install frequently and so may run out of. Or the industry may be suffering through a shortage, as with the scarcity last year of LCD monitors. "It's possible that the drive in [Segal's] case was unavailable because of demand," Allen says. Dell's description of its next-day service (which appears on its Web site) includes a warning that service may be delayed if a part is out of stock.

Dell recently downgraded the basic warranty plan for most of its desktop PCs from three years to one. The company

PRIVACY WATCH

Viruses That Steal Your Data

THE SECRET TURKEY GLAZE recipe is no longer a secret.

The recipe—which sounds quite tasty, by the way—is just one of the documents delivered to *PC World* by last summer's Sircam virus. One Excel spreadsheet we received had a home inventory listing 13 guns and other possessions as well as the owner's name and address. A letter from a social services agency in South Africa discussed a child custody battle and identified both parents. And one start-up's secret business plan is now in the open.

From a privacy standpoint, Sircam is a very scary virus. It grabs documents at random from a victim's hard drive and then sends the captured documents out to a set of e-mail addresses harvested from the user's address book and from the cached archive of visited Web pages.

By now, you're probably protected from Sircam. (If you suspect you may still be infected, head to find.pcworld.com/12040 for a tool that can get rid of the virus.) But the virus's outbreak demonstrates that keeping a file on your personal hard drive

provides no guarantee that it will remain private. Net-savvy viruses can exploit persistent Internet connections and steal files right off your PC. "This is a growing trend we've seen over the past few years," says Vincent Weafer, the director of Symantec's

virus lab, referring to viruses that "steal documents and then send them to other computers."

And Sircam, which stole random files from infected drives, was not even particularly smart about how it took stuff. The worst, experts say, is yet to come: The next Sircam clone may look for Quicken files or other sensitive data on your PC.

And it won't necessarily send them to other victims. A virus could easily send the files back to its maker, who might put them to some nefarious use.

Sircam offers an important lesson: To protect your privacy, you must have up-to-date antivirus software. Not opening unexpected file attachments also helps. If you can't follow those two rules, don't be surprised if next Thanksgiving all your friends are serving your Secret Turkey Glaze.

—Andrew Brandt



currently offers a year of free coverage for parts, labor (including next-business-day, on-site service), and phone support, with options for extended coverage ranging from \$69 to \$119. Most other major computer vendors, including MicronPC and Gateway, offer similar service plans, with on-site service either free for a limited time or available for an extra fee.

"You wouldn't go to the doctor and not have tests—it's the same with the phone technician."

—Dell's Dan Allen

When you pay for on-site service, however, it's important to know what you are—and what you *aren't*—buying. The best way to do that is to read the vendor's description of its service carefully. In virtually all cases, you'll find that one thing you don't get is freedom from having to try to solve the problem yourself with a phone technician's help.

Telephone diagnostics are essential to high-quality tech support, Dell's Allen insists. "The key to success is knowing what's wrong," he says, "and we can't dispatch a technician until we know what the problem is. And the fact is, we're able to resolve 80 to 90 percent of calls without ever dispatching a technician. You wouldn't go to the doctor and not answer questions or have tests—it's the same with the phone technician."

Well, maybe. But you wouldn't expect your doctor to keep you on the phone for hours while he talks you through removing your own appendix. And that's how the on-site service system feels to some consumers. Lorna Rush, a real estate agent in Acton, Massachusetts, says she spent hours on tech support hold when her MicronPC notebook suddenly quit working. "I had to call back at least eight times," she says, "and each time I'd end up with a different technician and would have to repeat the entire history. I also got

disconnected at least once and had to go back to the beginning of the queue after spending 30 minutes on hold. It took weeks to resolve the problems, and I felt like the technicians were simply reading to me from a textbook."

MicronPC representatives declined to comment on Rush's case. However, her complaint is a common one made about many PC makers.

Gateway representative Lisa Emard says, "There's no hard-and-fast rule about whether a technician will be dispatched to fix a problem, but the customer's attitude and comfort level definitely is a factor."

Okay, so getting on-site service isn't quite as simple as it sounds when you buy your PC.

But that doesn't mean it has to

be an ordeal. Here are some tips for making the process as smooth as possible:

♦ **Do your homework.** Go online and learn everything you can about the problem by visiting your PC maker's and software developers' tech support sites, as well as resources such as AskMe.com, Expertcity.com and PCWorld.com's Expert Help.

♦ **When you call tech support,** expect to spend some time troubleshooting and be prepared with detailed notes on your problem. If you don't feel confident in the support technician's expertise, make sure you ask for a supervisor.

♦ **Keep a log** including dates, times, names of technicians, and incident numbers. Take notes or consider recording the conversation (make sure you inform the rep that you're doing so, to conform to applicable state laws), so you can refer to the record later if necessary.

♦ **If you're uncomfortable** with the level of technical expertise required for the diagnostics or repairs you're being asked to do, insist on a visit from a technician, even if the phone rep hesitates. Explain your concerns calmly and logically. If the representative still refuses, ask to speak to a manager. Well-managed support departments will honor reasonable concerns and requests from customers.

♦ **If a needed component or part** is out of stock, ask for an alternative. You ►

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might not get it—Dell's Allen says such requests are honored only if the alternative is technically viable and "engineering approved"—but it's still worth a try. You might just end up with an upgrade.

♦ **If you schedule a visit** from a technician, back up your hard drive (if possible) well before the visit.

♦ **Clear your schedule** and plan to be there during the visit. The technician will have plenty of questions for you, and you need to know what he or she is doing in case problems crop up later.

PC users shouldn't have to spend entire days of their lives coaxing a technician to make a house call. But until getting help for a problem PC is as easy as picking up the phone, you'll need a lot of time—and even more patience. ■

Anne Kandra is a contributing editor, Grace Aquino an associate editor, and Andrew Brandt a senior associate editor for PC World.

ON YOUR SIDE

Pricing Blunder at Online Merchant

I SEARCHED various online shopping bots, looking for a good deal on Corel's WordPerfect Office 2002 Professional. The lowest price I found for the software package was \$114 at PC Mall.com. I ordered it and then called the vendor to check on delivery. A sales representative said that the \$114 price applied only to per-seat licenses purchased in volume by large companies. For the full consumer version of the software, I would have to pay \$399.

The site didn't indicate this, and I argued that the company should honor the \$114 price. But the rep refused and canceled my order. Days later, PC Mall still had the wrong labels and prices on its site. The experience made me suspicious: Is this a bait-and-switch trick?

Jeffrey D. Padden, Lansing, Michigan

PC World responds: I contacted PC Mall on Padden's behalf. Alex Prieto, director of customer service for PC Mall and MacMall, agreed to honor the \$114 price in Padden's case as a one-time courtesy. PC Mall has since updated its Web site with detailed product names, versions, and prices for Corel WordPerfect. But the site's policies state, "pricing, product availability and offers are subject to change without prior notice. [The company] reserves the right to make changes without notice due to... typographical, photographic or technical errors in online or print advertising." Many online merchants employ similar rules, so if you have any doubts, call to confirm details before completing an order online. Make sure that you get what you want.

—Grace Aquino

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Contra Costa Times CA, 1 August 2001

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Can't Find That File? Try a Little Sharing

When download sites and search engines come up empty, Gnutella can help.

I CAN USUALLY FIND just about anything I look for on the Web: sports scores, news, Dwight Yoakam CDs. But sometimes I have trouble locating drivers, shareware, product documentation, and other files I need. Even my favorite download sites and search engines fail occasionally. That's why I've started snooping around other people's hard drives.

I access their drives with their permission, naturally—courtesy of Gnutella, a Napsteresque peer-to-peer network that lets users trade files across the Internet. Like Napster, it's mostly an MP3-music swap meet, one that's bedeviled by copyright lawyers and bandwidth constraints. But you can also find video clips, shareware, drivers, manuals...you name it.

In my dreams, peer-to-peer networks like Gnutella let millions of smart, helpful people serve up anything from music to utilities to Ph.D. theses on microeconomics. Suddenly I'm not forced to rummage through ad-infested Web sites to find the files I need.

We're not there yet, but Gnutella is still worth checking out. To get started, you need a Gnutella "servent" application, which turns your PC into both a server and a client. There are several free ones to



choose from, including BearShare, Gnutella (my favorite), and LimeWire. Visit find.pcworld.com/12224 to find all three, and see gnutella.wego.com for a boatload of Gnutella downloads and tips.

Unlike Napster, Gnutella lacks a central server: Your servent talks directly to other PCs. Letting strangers poke around your drive sounds like an open invitation to hackers, but it's not—other users can download files from your PC, but they can't *upload* anything. And you decide which folders (if any) you make public.

Searches can be slow—run them in the background—and you may even come up empty. But my ever-improving results tell me that more folks are joining the network and that they're sharing a richer array of files. Keep these Gnutella tips in mind:

Participate: Make useful items available on your own drive—media clips, pictures you've taken, drivers that work well, and the like. This isn't only fair, it's necessary: New technology may cut you off Gnutella if it determines you're a freeloader.

Beware of copyrighted material: Gnutella lacks Napster's new schemes for stopping users from trafficking in unauthorized copies of media clips. But entertainment companies have already descended on ISPs to get their help in ridding Gnutella of bootlegs. So be careful out there.

Get broadband: Despite recent speedups, Gnutella eats up bandwidth—a cable modem or DSL is almost essential.

Be safe: Any network that gives users access to each others' drives has its risks. You don't want to catch a virus, so don't download anything with a .vbs extension, and be wary of .exe files. Bear in mind that firewalls may prevent Gnutella from working. See www.gnutellanews.com/information/firewalls.shtml for details.

Try again: If a download doesn't start quickly, it probably never will. Just restart it. If it fails again, move on. With Gnutella, there are always new places to look—and it can only get better from here. ■

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

GIMME FIVE

Great News Sites Off the Beaten Path

1. The Wire: The Associated Press's latest news, straight from the source. wire.ap.org

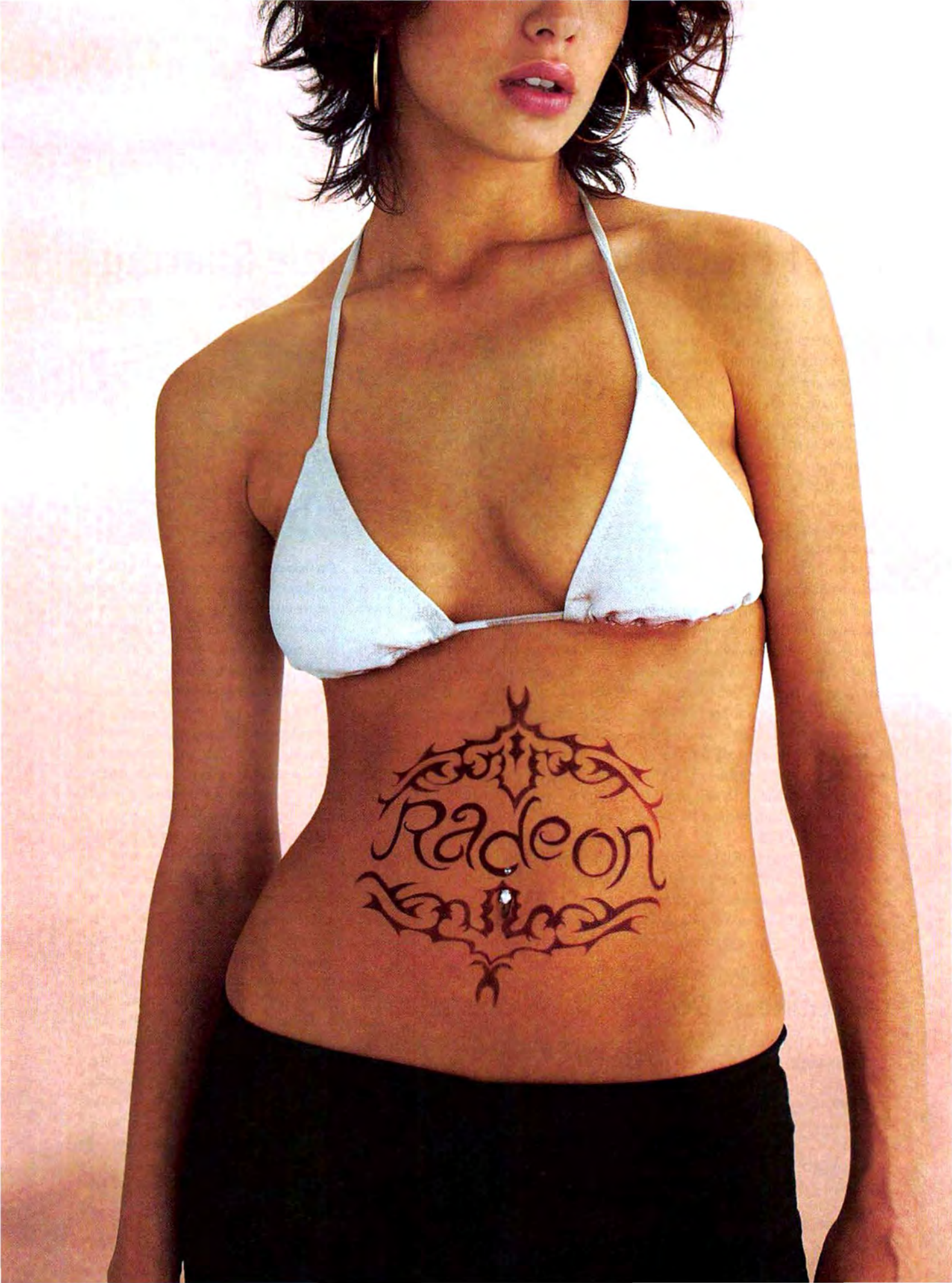
2. The Morrock News Digest: No graphics—just a quick but thorough look at news stories and issues. www.morrock.com

3. Guardian Unlimited: Every newspaper should have a site as good as that of Britain's *Guardian*. Visit its global-news

page. www.guardian.co.uk/worldlatest

4. The Christian Science Monitor: Complete and well written; *Editor & Publisher* named it one of the Web's best news sites. www.csmonitor.com

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STEVE BASS

Your Second Line of PC Defense

Standard security precautions may not guard against new threats.

THERE'S A NEW BREED of Internet-borne troublemaker on its way to your PC. The tried-and-true security precautions you've been following (religiously, right?) will protect you to an extent, but to be really safe you need to take them to the next level. I'm telling you, security is a habit you'll be glad you formed.

I assume you've protected your PC with antivirus software and a firewall. Well, that's not enough anymore, and I have one word for anyone who doesn't believe me: *SirCam*. Call me paranoid, but ever since that Internet worm wreaked havoc this summer, I've suspected *everything*—e-mail attachments, downloads, and even some of the Web sites I visit. (Watching for black helicopters is another story.)

To get the upper hand, I use Finjan's SurfinGuard 5.5, a cool utility that intercepts all the active content I download: e-mail attachments, Java applets, scripts, ActiveX files, and executable files. SurfinGuard flags the items and drops them into a virtual holding tank. It then pops up an alert box so I can block the file's activity, allow it to run, or—get this—watch to see what it's trying to do.

If the downloaded content attempts any hanky-panky, such as opening a network connection, deleting a file, formatting my drive, or changing the Registry, SurfinGuard stops the action cold. And the program doesn't depend on virus signatures the way an antivirus package does. Instead, SurfinGuard works by watching for abnormal behavior. The utility can monitor your Palm-to-PC sync connections and ICQ exchanges, and it can pre-

vent your PC's microphone or camera from being turned on by a Trojan horse that makes its way onto your PC.

For a genuine eye-opener, visit www.finjan.com/mcsrc/test.cfm and run the company's harmless Visual Basic Script, JavaScript, and executable attacks to see whether your PC's antivirus program protects you. SurfinGuard is a freebie for personal use. Go to find.pcworld.com/12224 to obtain it and the other utilities mentioned here.

HEY, YOU'RE INFECTED

READER ALEX CENSOR has devised a neat trip wire of sorts that protects your e-mail contacts from infection and stops a virus in its tracks: Create an invalid entry in your Outlook or Outlook Express address book. Enter a bogus first and last name starting with a non-alphanumeric character (***virus-trap**, for example). Enter **<illegaladdress** as the e-mail address, being sure to include the less-than symbol. Outlook and Outlook Express will alert you that this entry is not a valid e-mail address (it's not supposed to be) and will ask if you still want to add it. Click Yes and then OK.

When a virus tries to mail itself to the addresses in your address book, this will be the first entry it encoun-



ters. The mail server will reject the fake address—and probably all other addresses in the message's "To:" and "cc:" fields. Some servers may send the message to the valid addresses, but you'll be alerted when the bogus address bounces.

Viruses may masquerade as a harmless file type, so you need to be able to see your file-name ex-

tensions (.exe, .gif, and so on). My user-group buddy David Jung wrote a free utility—called Extension Manager—that hides and unhides extensions, including ones that are usually viewable only by tweaking the Registry (available at find.pcworld.com/14640). Or use Ontrack's PowerDesk 4, a free Windows Explorer clone that shows extensions—and outdoes Explorer for managing files.

One of the SirCam attachments I received was loaded with some guy's Hot-mail passwords. This unnerved me so much that I now use PowerDesk's DES key-coding encryption to encode all my sensitive files and folders.

Follow these steps, and the next time a virus attempts to send something nasty to your PC, just smile and say, "Return to sender. No forwarding address."

PC World Contributing Editor Steve Bass runs the Pasadena IBM Users Group. Sign up for his Home Office newsletter at www.pcworld.com/bass_letter. You can write to him at steve_bass@pcworld.com.

PowerDesk 4

★★★★★

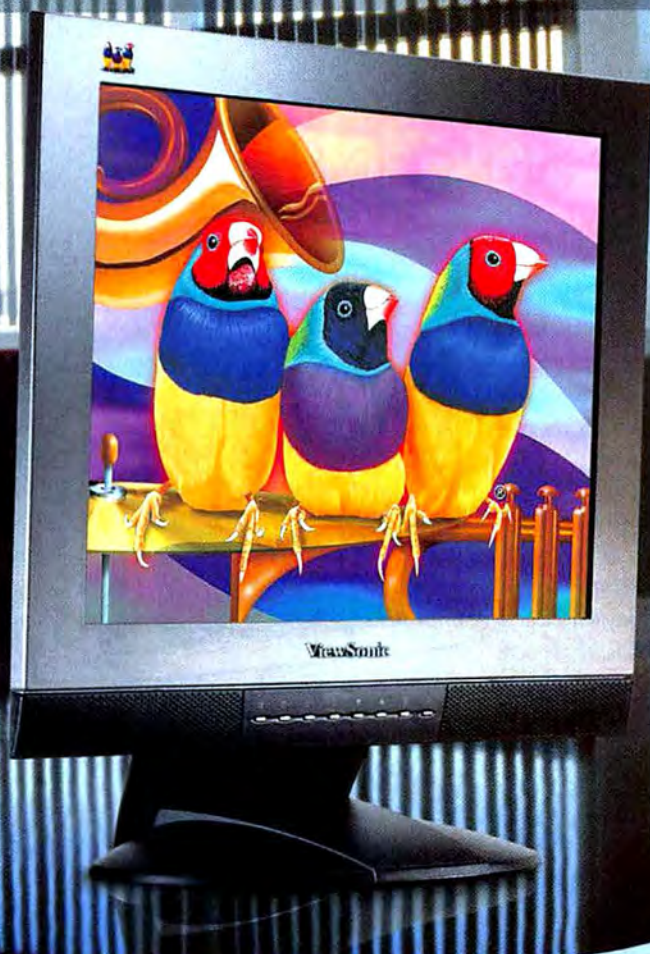
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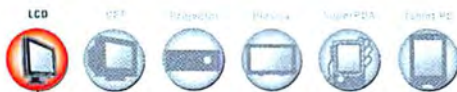
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BUGS & FIXES

STUART J. JOHNSTON

Worms Find New Ways to Snare Your PC

The latest virus strains strike MSN Messenger and Adobe Acrobat.

THINK YOU'RE safe from worms? Guess again. These devious programs, which replicate by weaving around networks, are starting to show up in places I never expected.

Two of the most recent worms were found lurking in Microsoft MSN Messenger and Adobe Acrobat files. Both are fairly harmless, but they demonstrate how vulnerable our PCs are to smart bad guys.

First, the MSN Messenger worm: This pest, called W32/Annoying.Worm, appears in your instant messaging session masquerading as a picture file. If you click the file (named pic1234.exe), a fake error message will pop up, telling you that the file has been corrupted. Then the worm infects your system.

Afterward, every time you start your PC, the sneaky program loads too. The worm watches for you to begin a chat session and then pretends to be you. You'll see the

worm shoot a message to your chat-mate that asks, "Hey, want me to send my new pic?" If the other person answers with "yes," "sure," or other similar affirmatives, it whisks off a copy of itself to the unsuspecting victim, and the cycle starts all over again.

Head over to find.pcworld.com/13706 to get Symantec's



worm-removal instructions, or visit find.pcworld.com/13705 for McAfee's. If you run Symantec's Norton AntiVirus software, any virus definition file dated August 8 or later will protect your PC. Any McAfee

DAT (virus definition) file numbered 4154 or later will block the worm's chokehold.

The second worm affects files that I always felt were safe, but no longer. Now, even Adobe Acrobat files can carry malicious intruders and target

your in-box. Watch for an e-mail message that contains words or phrases on the Subject line such as "Find the peach" or "Joke." The tainted file may be named "joke.pdf" or "search.pdf."

Opening the file in Acrobat and clicking a prominent icon unleashes the worm; it mails a copy of itself to 100 names in your Outlook address book. Called VBS/PeachyPDF@MM, the worm needs the full Adobe Acrobat program (version 5 or later) to run amok; if you have only Acrobat Reader installed, you're okay.

For additional info, go to find.pcworld.com/13709 for Symantec's page, or visit find.pcworld.com/13708 for McAfee's posting. McAfee users who have DAT file numbered 4154 or later are safe. And Norton users are protected with virus definition files dated August 7 or later. ■

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

IN BRIEF

New QuickTime for Internet Explorer

SERVICE PACK 2 for Internet Explorer 5.5, shipped by Microsoft earlier this year, doesn't allow existing Netscape plug-ins to run within IE. Apple's QuickTime plug-in, for example, lets Windows and Macintosh users play audio and video files on their computers—but it won't work with IE 5.5 SP2 or the new IE 6. Apple recently released an ActiveX plug-in that allows QuickTime to run happily with IE 5.5 SP2 and IE 6. Visit find.pcworld.com/13740 to grab the free download.

HandEra Fixes Microdrive Snag

UNTIL RECENTLY, IBM's 340MB CompactFlash (CF) Microdrive cards—tiny high-capacity hard drives—would not work with HandEra 330 handheld Palm devices. HandEra has released a patch to fix the problem. Hop to find.pcworld.com/13744 for a link to the download.

BUGGED?

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

PALM HOTSYNC BLUES

DO PALM HANDHELDS zap PCs? Some Palm V owners think so and have sued the company. They claim that an electrical defect in Palm's HotSync serial port cradle has damaged their PCs' serial ports, and in some cases, their PCs' motherboards. At press time, Palm declined to comment, citing the pending lawsuit.

The trouble seems to arise in the combination of charging and syncing the PDA. To be safe, disconnect the power to the cradle while using the HotSync feature, and disconnect the serial cable when charging your Palm. Hop to PalmInfoCenter.com at find.pcworld.com/13741 for links to discussions and lawsuit details.



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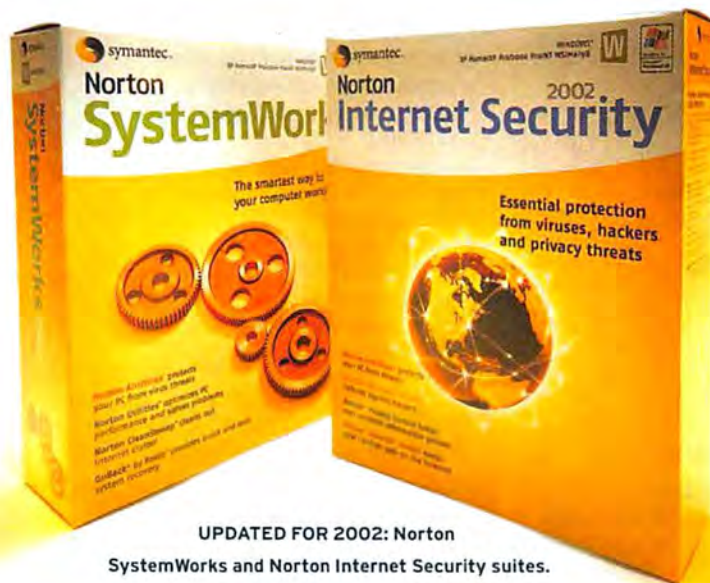
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NEW PRODUCTS

EDITED BY THE NEWS DEPARTMENT

Symantec Utilities: Worth the Upgrade



UPDATED FOR 2002: Norton SystemWorks and Norton Internet Security suites.

UTILITIES

IF YOU DON'T have a utility suite on your PC, it's time to consider getting one, since Norton SystemWorks, the best package available, just got better. Why have a utility suite? Because it can keep your PC out of trouble by detecting problems early and providing the tools to fix those problems. I looked at a prerelease version of Symantec's **Norton SystemWorks 2002** and found it stronger, smoother, and more versatile than its predecessor—in short, a worthwhile upgrade. I also looked at its companion program, **Norton**

Internet Security 2002. New features in both utilities focus on keeping a PC safe and secure, while existing ones have been fine-tuned for better performance and ease of use.

SystemWorks 2002 (\$70 for the Standard version and \$100 for the Professional, before a \$30 rebate on each) boasts a beefed-up AntiVirus 2002 that automatically checks for virus updates every 4 hours (you can turn the feature off). For easier access and faster file checking, AntiVirus 2002 now has an icon in Windows Explorer. Also new: AntiVirus 2002 checks outgoing e-mail

attachments, as well as incoming e-mail, for viruses. Under the hood, AntiVirus uses a new script-blocking technology that, the vendor claims, will protect against fast-spreading viruses. And scanning speed has been improved by at least 30 percent, judging from my tests.

SystemWorks 2002 also includes two new utilities that you can choose to install or not. Roxio GoBack Personal Edition sets aside part of your hard drive to periodically save crucial system settings. It can then restore them when you experience problems—handy if a newly installed program gums up your PC's guts.

The most obvious changes in SystemWorks 2002 are a cleaner overall interface that makes using individual components easier and a streamlined installation process that sets commonly used defaults (I found it simple to change them later). As in previous versions, SystemWorks' master menu offers a fast One-Button Checkup for assessing overall system health. Norton Utilities and CleanSweep—which are also accessible on the master menu—remain essentially unchanged. The

\$100 Professional edition that I tested adds the personal version of Norton Ghost (for making backup images of your hard drive) and WinFax 10.

Norton Internet Security 2002 (\$70 before a \$30 rebate), which can run alone or integrate with the SystemWorks interface if you're running SystemWorks, includes new multiuser parental controls. You can set various levels of

Norton Internet Security 2002

Symantec

(Beta software, not rated)

Goes beyond a simple firewall by offering ad blocking; parental controls; and easy, virtually automatic setup.

List: \$70, rebate \$30; \$20 upgrade from competing product.

find.pcworld.com/13681

Norton SystemWorks 2002

Symantec

(Beta software, not rated)

With a streamlined interface, greater speed, several new features, and more stability, SystemWorks continues to be a must-have utility.

List: Standard \$70; Professional \$100; rebate \$30; \$20 upgrade from competing product.

find.pcworld.com/13681

68 UTILITY SUITES

Symantec Norton Internet Security 2002, Norton SystemWorks 2002

69 PDA MODULE

Sprint PCS Wireless Web Digital Link

70 24X CD-RW DRIVES

CenDyne Lightning 24x10x40, Plextor PlexWriter 24/10/40A, QPS Que 24x10x40x

72 DIGITAL CAMERA

Polaroid PhotoMax PDC 640 Modem

PHOTO SCANNER

Hewlett-Packard Photo Scanner 1000

77 LCD MONITORS

Samsung SyncMaster 760vTFT, ViewSonic ViewPanel VE170m

GRAPHICS SOFTWARE

Jasc Software Paint Shop Pro 7 Anniversary Edition

78 NOTEBOOK

Fujitsu LifeBook C Series C-6591

80 UTILITIES

PKWare PKZip Suite 4.5, WinZip Computing WinZip 8.1

Internet access for different users; for instance, you can prevent certain data—phone numbers, addresses, names—from being entered into Microsoft MSN Messenger or AOL Instant Messenger. Returning utilities include an updated version of Norton AntiVirus, an ad-blocking tool, Web filtering features, and a firewall.

Symantec has made the fire-

wall setup process much easier. A wizard provides extensive explanations as it guides you through crucial steps. Much of the configuration of Internet-accessing applications is now automatic. And the new Home Networking Wizard automatically detects computers on a local network and configures them for access through the firewall, a

process that I found far simpler than in prior versions.

Overall, Symantec has done an excellent job of improving two already solid products. Both suites run on Windows 98, Millennium Edition, NT Workstation, and 2000, and the company says that both also are compatible with Windows XP Home and XP Professional out of the box.

On my two test PCs running Windows 98 and Me, neither suite bogged down the system performance or showed any unusual behavior. Well-priced upgrades make moving up a no-brainer if you already use the Norton suites. If you don't have a utility suite yet, the 2002 Norton editions are a practical choice.

—Stan Miastkowski

Excuse Me, Your Handheld Is Ringing

PDA MODULE

RIDE PUBLIC transportation, and you often encounter troubled souls who claim to hear voices. With the advent of Sprint PCS's **Wireless Web Digital Link**, however, mass transit may soon be filled with oddballs who are speaking into their PDAs. And when they aren't answering the voices within the devices, they could be e-mailing them.

The Digital Link is a \$200 Springboard expansion module from AirPrime that fits any Handspring Visor PDA; with it you can place cellular voice calls and get wireless Internet access. You pay for the data access as part of a Sprint PCS service plan that includes data capability.

The Digital Link is really a

kludge—it adds 3.4 ounces (about two-thirds the weight of a Handspring Visor Platinum) and considerable bulk, so you'll want to remove it when you're not using it. You can recharge it with the included recharger or while it's attached to your PDA (if you own a rechargeable Handspring model).

Currently, Web access over Sprint's CDMA network is limited to 14.4 kbps, but the

module is supposed to work with Sprint's third-generation, 144-kbps wireless service, due next summer. Sprint, though, says the device won't work with faster service iterations, scheduled to hit 288 kbps only six months after the 144-kbps service starts.

I tried a preproduction Digital Link and found it useful for sending and receiving e-mail, doing instant messaging via ICQ, and pulling up specially formatted Web sites. At its current speed, however, it is still slow, and I received the equivalent of a busy signal during some peak usage periods.

The module has all of the regular features of a mobile phone, including three-way calling. You can store phone



THIS SPRINT PCS module turns a Visor into a wireless phone.

numbers in your PDA and dial them on the screen, and the speak and listen functions work as well as those on a typical wireless phone.

—Alan Stafford ▶

Wireless Web Digital Link

Sprint PCS

(Preproduction unit, not rated) Worthwhile if you want to take the Web with you—and don't mind getting stares when you use your PDA as a cell phone. List: \$200

find.pcworld.com/13860

24X CD-RWs: Software Matters

CD-RW DRIVES

TEST CENTER THERE IS more to consider than just speed when you purchase a CD-Rewritable drive package. We tested new 24X/10X/40X drives—from CenDyne, Plextor, and QPS—and found that not all 24X-speed CD-RW drive packages are equal.

Whether you want to back up your data, store digital images, or make audio CDs, any of these three drives should suit your needs, and all perform markedly better than a typical 8X (or even 12X) drive. Although all three produced generally good performance results when presented with the writing and reading tasks in *PC World's* standard tests, there were a few surprises.

On most of the tests, the fastest drive of the three was CenDyne's **Lightning 24x10x40**. Paradoxically, however, this drive proved to be the slowest at extracting 320MB of audio tracks from a CD. The \$180 Lightning breezed through the task of writing to a CD-R from a 650MB image—taking only 1 second longer than TDK's 24/10/40 VeloCD Re-Writer, which was a Best Buy in our October roundup, "CD-RW ASAP" (find.pcworld.com/13840).

TEST REPORT

24X CD-RW DRIVES

MODEL	Write 650MB to CD-R from an image ¹	Write 650MB to CD-R on the fly ¹	Write 100MB to CD-RW ²	Extract 320MB of audio tracks from CD ³
CenDyne Lightning	4:01	4:11	1:19	2:08
Plextor PlexWriter	4:37	4:39	1:39	1:40
QPS Que 24x10x40x	4:01	4:12	1:20	1:37

HOW WE TEST: Go to find.pcworld.com/14360 for information on our CD-RW drive tests. Best times in bold. ¹ In min:sec. ² Using packet writing.

com/14782). And in our writing-on-the-fly test, the Lightning shaved 1 second off the time that the TDK drive took to write a folder containing 650MB of files to CD-R.

The reasonably priced QPS **Que 24x10x40x CD-RW** drive from QPS performed identically to the TDK drive on two tests (burning to CD-R on the fly and using packet writing to put 100MB of files on a CD-RW). The \$190 Que took a scant 1 second longer than the TDK drive in writing an image to CD-R. Its CD-ROM read performance was mixed, however: It had one of the fastest digital audio extraction times we've seen, yet it was 21 seconds slower at installing the first disc of Microsoft Office 2000 Small Business Edition than the CenDyne.

Plextor's **PlexWriter 24/10/40A** is the Cadillac of this group, yet it was oddly sluggish compared with the other two. That result was a bit of a surprise to us in light of Plextor's claim that its proprietary technology will help to boost the \$230 drive's performance. Compared with the CenDyne Lightning, the PlexWriter was slower by 36 seconds at burning our image file, by 28 sec-

SPEEDY 24X CD-RW drives: from top, Plextor, QPS, and CenDyne.



onds at writing to CD-R on the fly, and by 20 seconds at writing to CD-RW. Still, the Plextor drive excelled at digital audio extraction, taking 1 minute, 40 seconds to extract our 320MB of audio tracks.

Both CenDyne and QPS bundle Ahead's Nero Burning ROM 5.5 CD-mastering software and InCD packet-writing software. CenDyne also includes handy DOS drivers, Adobe Acrobat Reader, and a user-friendly manual.

Plextor's software bundle includes the basic version of Roxio's Easy CD Creator 5.01 and DirectCD 5.01; if you want features such as music editing, you'll have to upgrade to the Platinum version of Roxio's software for about \$80 more. The drive also comes with Plextor Manager 2000, which features the company's AudioFS drivers for easily transferring individual tracks from an audio CD to your PC.

Plextor's drive has an edge with regard to both its audio applications and the company's reputation for reliability, and QPS's model scores well on performance (but it lacks

extras). CenDyne's Lightning 24x10x40, however, gets my vote for its lower price and good tech support (the only vendor of the three to offer Saturday support hours).

—Melissa J. Perenson

Lightning 24x10x40

CenDyne

★★★★☆

Excellent performance and a low price distinguish this inexpensive 24X CD-RW drive.

Street: \$180

find.pcworld.com/13840

PlexWriter 24/10/40A

Plextor

★★★★☆

Pricy and offers so-so performance, but comes with great software for audio enthusiasts.

Street: \$230

find.pcworld.com/13821

Que 24x10x40x

QPS

★★★★☆

Great performance, but lacks the software extras you get with the CenDyne package.

Street: \$190

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SONY

DREAM ON™ >>>>

The white water in the river.

The white lettering on the paddle.

The white splash of sunlight on the helmet.

The white knuckles on the fingers.



Life, they say, is in the details. And no detail escapes the Sony Digital8™ Handycam® camcorder. Not only does Digital8 let you record high resolution digital video on affordable 8mm tape, but it captures stunningly crisp digital still images on Memory Stick™ media. The i.LINK® (IEEE 1394)* DV Interface lets you easily transfer and edit video like never before. With SteadyShot® Picture Stabilization System, shaky shots are all but extinct. Plus, record in total darkness with NightShot™ 0 Lux Recording System. Sony Digital8 camcorders. Because when there's more in your camera, there's more in your movies. www.sony.com/di



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Polaroid's Internet-Ready Camera

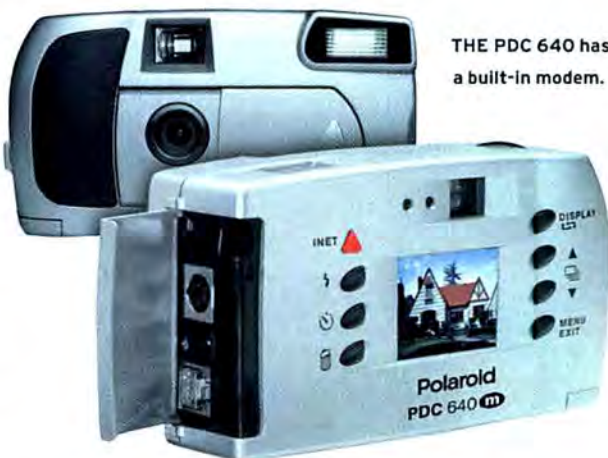
DIGITAL CAMERA

A DIGITAL CAMERA with a modem? You bet. Polaroid's **PhotoMax PDC 640 Modem** camera is equipped with a 56-kbps modem that lets you upload photos from the camera to PolaroidDigital.com for editing and sharing. The modem is convenient, but if you get the PDC 640 you'll have to settle for the camera's mediocre photo quality.

First you hook up the \$249 camera to a PC (with an Internet connection), using the included USB cable; then you install the bundled PhotoMax Image Maker software and go through an easy registration

process. Next, you set up an account at Polaroid's site and pay a pricey \$60 for a one-year subscription, which entitles

you to 50MB of online storage. Friends can view your photos, and you can order prints. One limitation: You



THE PDC 640 has a built-in modem.

can get similar services without charge at some other Web sites, but this camera's modem won't take you anywhere but to the Polaroid Web site.

Over a standard phone line, you can upload pictures from the camera to Polaroid's site, from any location in the United States. You use the included RJ-11 phone cable to plug the PDC 640 into the phone line. After you select the images to upload, you press the "Inet" button on the camera for the modem to dial a local server. A caveat: The company recommends using an analog phone line. The beta model I tested didn't function on my office's PBX phone system.

The dial-up process can take several minutes, and a single photo can take up to a minute to upload, depending on the size of the image. The camera has a number of basic features, including 2MB of internal memory, a slot where you can add an optional CompactFlash card, and a low 640 by 480 maximum resolution that translates into less-than-stellar shots. On screen, most of my pictures appeared murky and lacked detail.

In spite of its drawbacks, the PDC 640 Modem camera may still be the way to go for those who need to instantly upload photos without using a laptop or a desktop PC.

—Grace Aquino ►

A Petite Photo Scanner

SCANNER

WANT TO KEEP your e-mail correspondents up-to-date with digital images of a newborn baby's progress or your latest world tour? In a hurry to digitize a photograph so you can get an image to a business

by-9.5-inch device is a major plus. After spending 5 minutes installing software and connecting the single included USB 2.0 cable to my PC, I started scanning my favorite pictures. It took only about 15 seconds to scan a photo, convert that photo into a .jpg file, and store it as a thumbnail in a dated folder.

The quality of my photos remained fairly accurate at 300-dpi resolution and 30-bit color, although some pictures lost detail in darker areas. Playing with the photo enhancer tool that comes with the included ACDSee software allowed me to adjust images' color and sharpness for more precision. (It also let me get creative and make a photograph of myself

Photo Scanner 1000

Hewlett-Packard

★★★★☆

Price, ease of use, and portable size are perfect for beginners, but more-advanced digital imaging options are limited.

List: \$100

find.pcworld.com/13800

sepia-toned with purple hair.) With the HP Photo Printing software that is also bundled, I was able to create a digital photo-album documenting my travels, and then print it out with a photo printer.

The \$100 HP Photo Scanner 1000 is not for users who need the higher resolution of typical flatbed scanners or the ability to scan areas larger than 4 by 6 inches. But it's extremely easy to use, and it's great for sharing and archiving digital images and for sending pictures to keep in touch.

—Heather Morra



DESK FRIENDLY: HP's photo scanner is about the size of a hardback book.

client? HP's inexpensive and space-efficient **Photo Scanner 1000** is perfect for users who value scanning convenience.

The easy setup for this 6.5-

PhotoMax PDC 640 Modem

Polaroid

★★★☆☆

Good for folks looking to upload digital photos quickly without a PC, but this camera's features are skimpy, and the quality of its photographs is middling.

List: \$249

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- Internal Mini-PCI 56K Capable⁴ Modem
- MS® Windows® Me; MS® Works Suite 2001
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1-Yr Phone Tech Support

\$899 Business Loan: \$24/mo., 48 mos.¹¹
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1-Yr Phone Tech Support

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Recommended upgrade:

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E-VALUE Code:
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Recommended upgrade:

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Support

\$649 Business Loan: \$17/mo., 48 mos.¹¹
E-VALUE Code:
10236-291006

Recommended upgrades:

- Intel® Pentium® III Processor at 1.0GHz, add \$199
- 3-Yr Same Day Service (4-Hour) 5x10 On-Site
Service,⁸ add \$349

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- Embedded Ultra3 (Ultra 160) SCSI Controller
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\$999 Business Loan: \$27/mo., 48 mos.¹¹
E-VALUE Code:
10236-291009

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Big, Flat, and Almost Affordable: New 17-Inch LCDs

MONITORS

MONITOR MAKERS are bringing 17-inch LCDs into the mainstream by pushing their prices below \$1000. Two 17-inch models now shipping

tinny and thin: If you want to cut the price more, opt for the speakerless version and save yourself \$60 to \$100. The Samsung model doesn't come with speakers.

The Samsung SyncMaster does the best job I've seen of

what with even a small change in viewing angle, but that's a minor flaw. When I dragged the pointer across the screen, I observed some ghosting on the ViewSonic display, and, to a lesser degree, on the Samsung monitor as well.

The recommended (native) resolution for both monitors is 1280 by 1024 pixels; both models identify this resolution prominently.

The ViewSonic's quick-start booklet lists safety precautions in 14 languages and provides three-step, illustration-only setup instructions. If I had had to rely on these diagrams to install the monitor, however, I would have been lost. Complete documentation is included on a CD-ROM.

My one quibble with the Samsung SyncMaster: The on-screen controls display is small, and figuring out how to cycle through the menu choices isn't easy. The bezel's con-

trol buttons aren't completely intuitive either, although the printed manual explains how to use them.

The SyncMaster and the ViewPanel are both high-quality products, and neither would be a bad choice. But when it comes to details, Samsung's flat-panel has the edge.

—Rebecca Freed



ROOM FOR A VIEW: LCDs from ViewSonic, left, and Samsung.

from Samsung and ViewSonic make persuasive arguments for moving up to a big LCD.

The overall quality of both displays is very high, but Samsung's **SyncMaster 760vTFT** won me over with superior-looking text plus great color fidelity. Its swiveling base is a thoughtful design touch, and the \$799 price is sweet.

ViewSonic's \$899 **ViewPanel VE170m** renders similarly clear, detailed photos and true, saturated color. It handled subtle differences in shades a little better than the SyncMaster, but on-screen icons sometimes appeared murky. Although lettering in Microsoft Word lacked density, small letters in Excel documents and on Web pages looked sharp, and most of the text was clear and legible.

The ViewPanel's built-in, 1.5-watt speakers sounded

displaying consistent brightness across the entire screen. The brightness of the ViewSonic monitor varied some-

Paint Shop Pro With Extras

GRAPHICS SOFTWARE

TO CELEBRATE its tenth anniversary, Jasc Software has released a new edition of its popular **Paint Shop Pro 7** image editing software. Though this \$109 shipping package is unchanged from the version we reviewed in the November 2000 issue, it does come bundled with some great extras—notably the Animation Shop program, as well as Media Center Plus, a program for organizing and categorizing media files such as digital photos into albums.

The package also throws in a selection of filters for processing images and adding special effects; one lets you transform photos into collages, and another into pastel paintings. Many of these filters (such as Eye Candy Fire, which can easily add smoke or flames to any picture) are useful; others are older versions of filters available from their third-party makers or are demo versions that put a big stamp across the image.

Paint Shop Pro remains an extremely powerful and rea-

sonably priced Photoshop alternative, with plenty of image processing tools inside. Still, some aspects of the program (such as the masking and the photo enhancement tools) remain difficult to use. The new filters and additional programs are nice extras.

—Richard Baguley ►

Paint Shop Pro 7 Anniversary Edition

Jasc Software

★★★★☆

Not a must-have upgrade to this Adobe Photoshop alternative, but comes with many extras.

List: \$109

find.pcworld.com/13707

SyncMaster 760vTFT

Samsung

★★★★☆

Provides a knockout image at a great price, with no compromises in design or construction.

Street: \$799

find.pcworld.com/13703

ViewPanel VE170m

ViewSonic

★★★★☆

A good, affordable flat-panel with great image quality, though text could be better.

Street: \$899

find.pcworld.com/13704

Fujitsu's Very Well Connected Laptop

NOTEBOOK

TEST Center WHAT WOULD you say about a laptop that performs well, has satisfactory battery life, is loaded to the gills with extras, and costs—depending on configuration—from \$1500 to just under \$2000? You might say, "It's too good to be true."

I found Fujitsu's new **LifeBook C Series C-6591** to be quite real, however, and an incredible value. My \$1900 850-MHz/700-MHz Pentium III notebook packed in lots of standard equipment: built-in DVD/CD-RW and floppy drives; four USB ports; IEEE 1394 (FireWire), S-Video-out, and ethernet ports; 128MB

LOADED:
A feature-rich Fujitsu LifeBook.



of RAM; a 30GB hard drive; a 14.1-inch XGA display; an ATI Rage Mobility-P graphics card with 8MB of memory; a 56-kbps V.90 modem; and Windows 98 SE.

At 7.1 pounds without the

power cord, it's relatively heavy, which makes the C-6591 more of a desktop replacement than a travel companion. However, the Fujitsu is also a viable on-the-go multimedia machine. It's

the first notebook we've seen with four USB ports—especially useful for people who want to connect several devices (say, a printer, a digital camera, a scanner, and a PDA) simultaneously. The trade-off: The C-6591 does not include legacy PS/2

or serial ports, though it does have a parallel port.

This shipping notebook's PC WorldBench 2000 score of 143 made it comparable in performance with other similarly configured Windows 98 SE notebooks, and its battery lasted a respectable 2 hours, 47 minutes.

The only other thing to say of this well-equipped, high-value laptop: The price is right.

—Michael S. Lasky ►

LifeBook C Series C-6591

Fujitsu

★★★★☆

A good desktop replacement or multimedia machine on the go with many standard components that cost extra on other laptops.

List: \$1900

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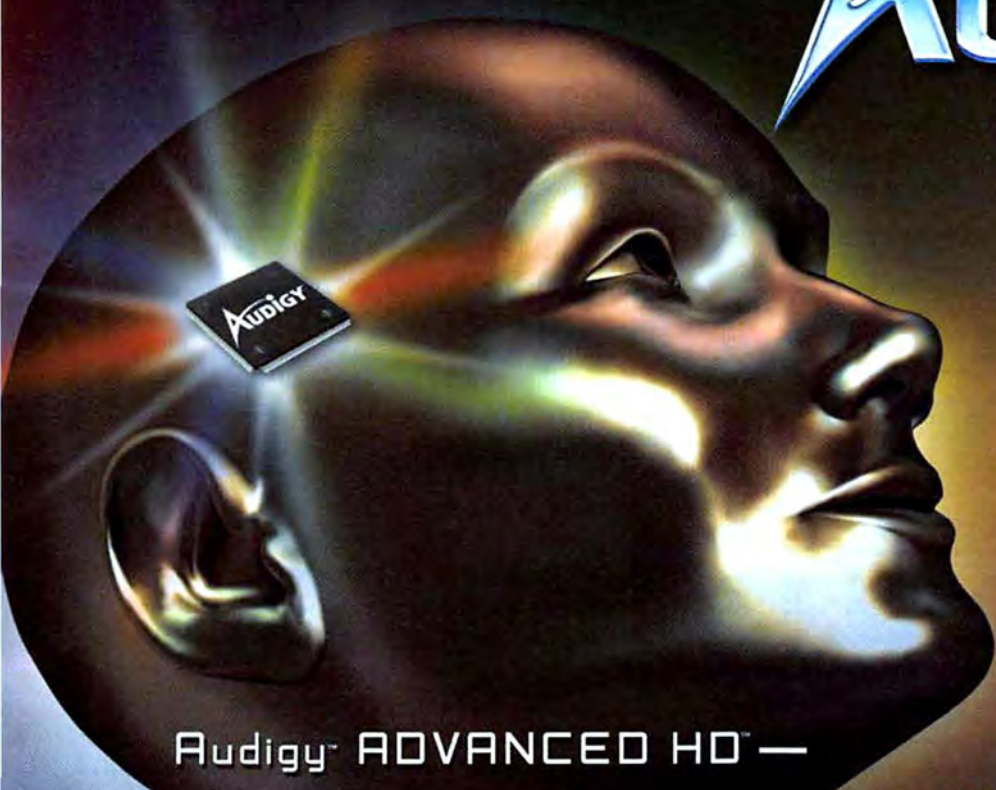
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More Zip for Your Files

UTILITIES

COMPRESSING FILES is even easier now, thanks to new versions of WinZip and PKZip. Both compress one or more files into .zip archives, and both restore archives.

The new shipping **WinZip 8.1** (\$29; free upgrade for registered users) offers several nice enhancements, many of them integrated with Windows Explorer. For instance, after you right-click a .zip file, you can select from a cascading menu of recently used folders, or retrieve files from multiple archives at once.

The \$29 **PKZip Suite 4.5**, on the other hand, is almost identical to version 4. The best

new feature in my beta copy was virtually unlimited file capacity. However, since file size isn't a big problem for most users, upgrading (\$19)



RIGHT-CLICK on a .zip file, and WinZip 8.1 offers multiple extraction options.

may not be worthwhile. And PKZip's best features—such as support for Public Key Infrastructure digital signatures, which tells you who added files to an archive—already appear in version 4.

The best place to work with your .zip files is in Windows Explorer. PKZip for Windows doesn't do much there, but another program in the suite, PKZip Explorer, does—and handles the job even better than WinZip 8.1. Also, with PKZip Explorer you can view an archive as a Windows folder. And you can use Win-

dows Search to find text inside compressed files; WinZip doesn't let you search archives.

Want the basics? WinZip wins. Need more powerful features like archive searching? PKZip's the one.

—Lincoln Spector ■

PKZip Suite 4.5

PKWare

★★★★★

Its extra features enhance the package for power users.

List: \$29; \$19 upgrade

find.pcworld.com/13702

WinZip 8.1

WinZip Computing

★★★★☆

Better basics in this program.

List: \$29; free upgrade for registered users

find.pcworld.com/13682

WARNING: REPEATED USE OF THIS PRODUCT CAN LEAD TO A GIDDY SENSE OF FULFILLMENT FOR DIGITAL PHOTOGRAPHERS, WEB DESIGNERS AND ANYONE ELSE WITH A LUST FOR POWER.

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Award-winning Paint Shop Pro



Some awards are from previous versions.

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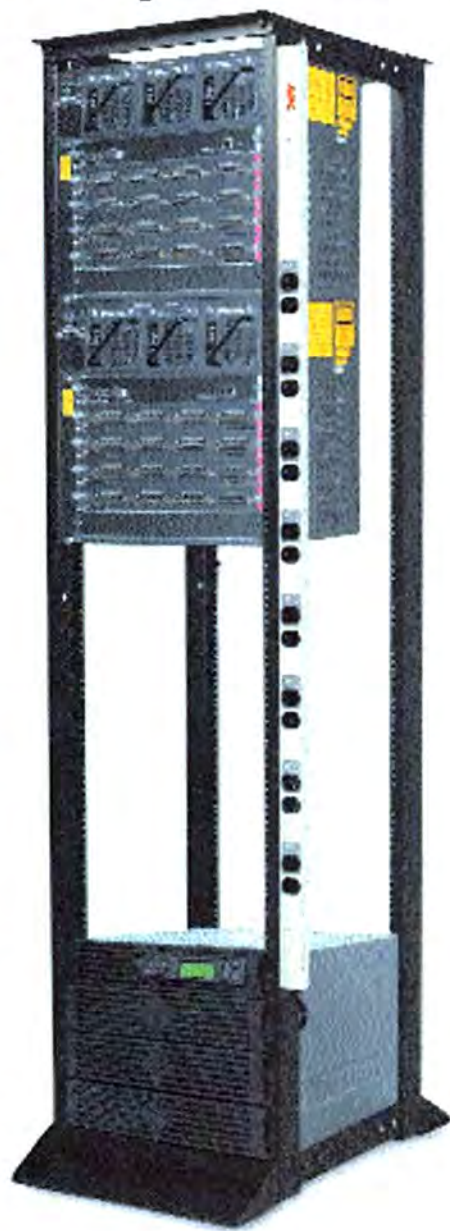
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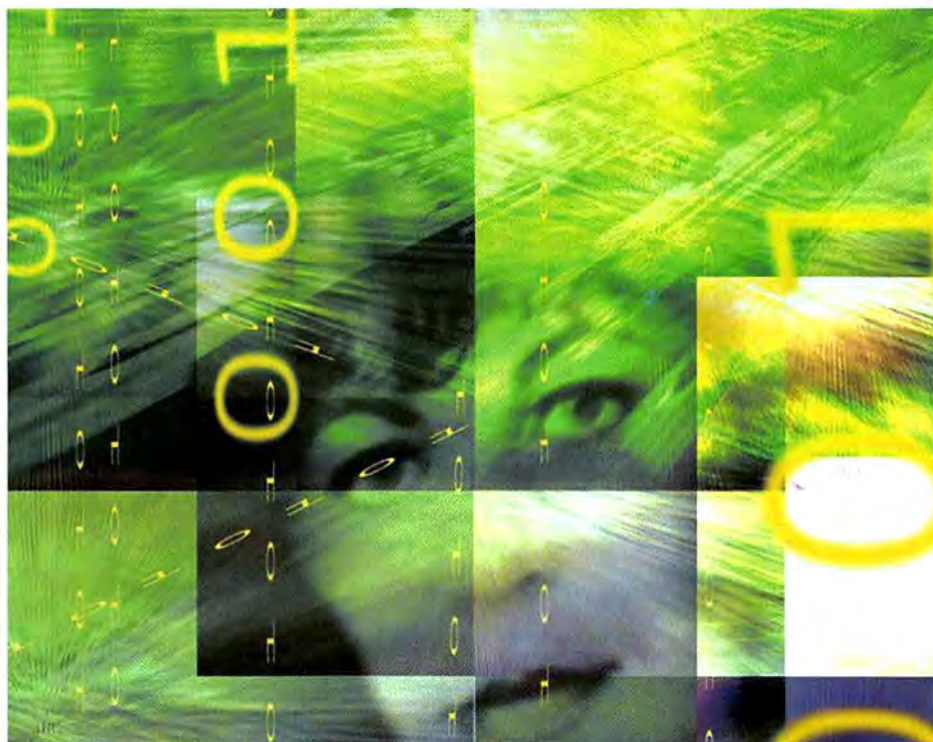
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HOT SHOTS

CLICKS & PICS

SECRETS FROM THE WORLD'S BEST DIGITAL PHOTOGRAPHERS



Make no mistake: digital cameras are taking their place beside traditional tools every day. In the studio and in the field, professional photographers are bypassing the darkroom's delicate processing and nasty chemicals for instant, high-fidelity images, ready for layout. And digital cameras, like those offered by Canon, Olympus, and Pentax, offer additional perks, like automatic color correction and multimedia recording.

"The quality has been there for a long time, since Leaf camera backs came to market nearly a decade ago," says Brian Harris, a professional photographer based in Waltham, Mass. Maybe that's because Harris himself actually designed some of the earliest digital camera technologies, as a technologist at Leaf (now a part of Creo Products Inc.) and the Agfa-Gevaert Group.

The super-high-resolution, 14-bit cameras

Continued on page 3

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Continued from page 1

Harris uses today capture more color than the human eye can see. Trouble is, Harris' digital cameras cost more than \$20,000 apiece, and their inner workings can be terribly complicated. But Harris and other professionals have some advice for photographers whose pockets are a little shallower, camerawise.

Going Digital: Some Shopping Tips

First, road-test your camera before buying it. Take a few pictures. "Pick the real-world applications," Harris says. "Shoot groups of people, your friends and family. Also, zoom in and try to capture as much detail as possible in an image."

And check how the camera handles color fidelity. For instance, examine its mastery of flesh tones and fluorescent colors. "Many vendors will show you pictures of people with dark skin and dark hair," Harris says. "But the real challenge is light skin and long blonde hair. You'll find that [with a low-quality digital camera,] blonde hair can end up looking like chicken soup."

Canon, Olympus, and Pentax all know the difference between blonde locks and long noodles, and they're producing the digital cameras to prove it. All three are combining reliable hardware and sophisticated software to deliver high-resolution pictures and improved color reproduction, even for low-light situations.

Canon's 2.1-megapixel PowerShot S110 Digital Elph camera uses an adaptive primary color filter and automatic exposure sensitivity adjustment to create pixel-perfect, high-resolution pictures. It can create black-and-white images up to 1600x1200 pixels. And the PowerShot S110 also offers additional resolution settings of 1024x768 and 640x480, which makes it ideal for on-screen applications like Web sites and CD-ROMs.

Olympus' 4-megapixel D-40 ZOOM camera combines a 2.8x optical zoom lens with the company's Enhanced Color Management (ECM) system, a technology that customizes color settings for each of the camera's shooting modes. ECM captures better skin tones and truer skies and landscapes. Users need only select their favorite color mode; the D-40 does the rest.

Lovers of simplicity will take to Pentax's point-and-shoot, 3.34-megapixel Optio 330. The camera relies on



KATIE TERRIO, a Boston-based musician, photographed by **Brian Harris** using a digital camera and natural low light.

newly designed hardware and advanced image processing technology to produce sharp, rich images with very little tweaking. With the turn of a dial, photographers can choose among Standard, Nighttime, Multi-Exposure, and Manual Modes. The Optio 330 even has an "easy view" function for instantly reviewing the camera's most recent snapshots.

Paper Chase

Of course, finding the right camera is only the first step to producing great images: output can be just as important.

Continued on page 5

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4.1 megapixels. Noise reduction. Auto-Connect USB ease. Creative control. It will help you see things in new ways. Transform the ordinary into art. And capture the most realistic digital images yet. Nothing's impossible.

Continued from page 3

Digital photographers often turn to professional-quality photo-finishing paper to print their images. International Paper's Jet Print Photo papers, for example, yield brilliant photorealistic prints with all types of ink-jet printers.

Jet Print Photo paper replicates the look and feel of photographic prints, with a professional finish and a special coating that supports heavy ink load and coverage. The paper dries instantly, making for smear-proof and water-resistant results. Even better, it comes in nine varieties, each designed for a specific purpose. For instance, the company's Portrait Studio Satin Professional Photo Paper produces studio-quality, framable prints, and Multi-Project Photo Paper serves well as a tool for trial and exploration. Photo Canvas paper creates the unique look of an art canvas, and the bright white sheets in Premium Photo stock bring out stunning, crisp colors and contrasts.



INTERNATIONAL PAPER'S Jet Print Photo paper comes in nine varieties. Each offers a professional finish and a coating that supports heavy ink load and coverage.

With finishes ranging from matte and gloss to textured, satin, and canvas, International Paper's Jet Print Photo line actually improves a digital camera's ability to memorialize special events and capture breathtaking landscapes. And its support for all printer types makes it ideal for showing off a digital photographer's most treasured images.

But paper isn't the only potential destination for digital photographs: software developers and hard-



SMARTDISK MVP allows photographers to create personalized CD presentations for PC and TV viewing.

ware manufacturers are offering shutterbugs other unique places to store and manage images.

Multimedia Management

SmartDisk MVP helps photographers create personalized CD presentations for PC and television viewing. Creative folks can use the software to organize, manage, and combine their digital files—including music, video, photos, and data—through its innovative entertainment center interface.

SmartDisk MVP users can keep a visual inventory and create multimedia CD-ROMs with the click of a button. And SmartDisk MVP includes a comprehensive tutorial and a "wizard" for easy step-by-step use.

But for all its simplicity, SmartDisk MVP is also very powerful. Users can assign images and multimedia files to specific, clearly identifiable albums for quick and easy access. And they can choose any still image or video frame from their albums to create album covers.

SmartDisk MVP takes the stress out of managing multimedia files, whether they're coming from a digital camera or heading for a CD-ROM or printer. It lets users print digital images either singly or as entire albums, and in a multitude of sizes and layouts.

After all, with the number of small, lightweight output devices on the market today, users need all the help they can get. IDC says sales of such devices will grow to 78 million in 2002, up 72 percent from the 9 million sold in 2000. SmartDisk MVP adds value to these devices, and helps users store their data more efficiently.

Great Things in Small Packages

Many traditional photographers are finding that their lightweight digital cameras are a blessing in themselves, as they return from the field—be it a Himalayan expedition or the corporate boardroom—

Continued on page 7



The subject matter may give him trouble. But the camera won't.

As The Crocodile Hunter will tell you, it's an unpredictable world out there. So travel with a dependable companion. The ultra-compact Pentax Optio 330 digital camera. With 3.34 megapixel resolution and 3X optical zoom, you can get in close and get the shot you're after. Unless the shot gets you first.



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Continued from page 5

with pictures much more dramatic than they could have imagined.

Calgary, Alberta-based adventure photographer Bruce Kirby was able to transmit images instantly to thousands of schoolkids via the Internet in 1997, when he joined an expedition to Mount Everest. Many more kids followed Kirby's trek across the Saudi Arabian desert's forbidding Empty Quarter a year ago.

Kirby captured pictures of the people and terrain in these challenging places, and schoolteachers in Canada incorporated them into their curricula. But Kirby likes his digital camera for many more-mundane reasons.

"I like the ease of post-shoot image management, and I like being able to FTP images to my clients," he says. "There's no need to make dupes before sending out an original—no need to store anything in a fire-proof safe."

Larry Lawfer, a professional photographer based in Milton, Mass., loves being able to turn around the results of a corporate shoot on the same day. "Often, the only problem in seeing that through," he says, "is when we encounter a bottleneck. Some clients still lack the bandwidth they need to receive high-resolution images."

Power in an Hour

Battery life often presents itself as another, unexpected drawback for digital photographers trying to capture important footage in remote locations.

To tackle this problem, battery-making experts at Rayovac have produced a breakthrough technology: a one-hour Nickel Metal Hydride (NiMH) battery charger for high-capacity NiMH rechargeable batteries. Rayovac's own NiMH batteries can last up to three times longer than alkaline batteries in digital cameras. And users can save hundreds of dollars, because they can charge the batteries up to 1,000 times before replacing them.

The Rayovac 1-Hour Charger really does take just one hour to fully charge NiMH batteries. (Most battery chargers take up to 7-8 hours. Even "fast-charge" models typically take two to four hours.) Only the Rayovac 1-Hour Charger can bring four AA or AAA NiMH batteries to full capacity in such a short time.

The Rayovac 1-Hour Charger's "smart-charger" technology allows it to detect the amount of charge in each battery, and charge each one individually to max-



CANON'S
PowerShot S110:
Elegant styling and
the fastest shutter
speed in its class.

imum capacity; it never overcharges a battery. It can also charge a 9V NiMH battery—this takes two to three hours—and it can charge Nickel Cadmium (NiCd) batteries as well.

And the Rayovac 1-Hour Charger is easy on the eyes, too. It has a sleek, high-tech look and is not much larger than many cellular phones. The charger's accessory kit includes a carrying case and a DC adapter that plugs right into a car cigarette lighter.

Design Matters

For those who won't countenance an ugly camera, never mind a dead battery, the leading digital camera makers are again coming to the rescue.

Olympus' D40 ZOOM is one of the world's smallest 4-megapixel digital cameras, packing high image quality and a robust feature set into a case measuring just 3.4 inches x 2.7 inches x 1.7 inches. The whole device, with batteries, weighs less than 7 ounces.

Yet it's one of the most technologically advanced cameras on the market.

Pentax's Optio 330, meanwhile, is among the smallest and lightest 3-plus megapixel cameras with a 3X optical zoom lens. It measures a mere 3.6 inches x 2.3 inches x 1.2 inches. Its flat, pleasing design makes it easy to carry; its stainless steel exterior and friendly curves make it a pleasure to hold.

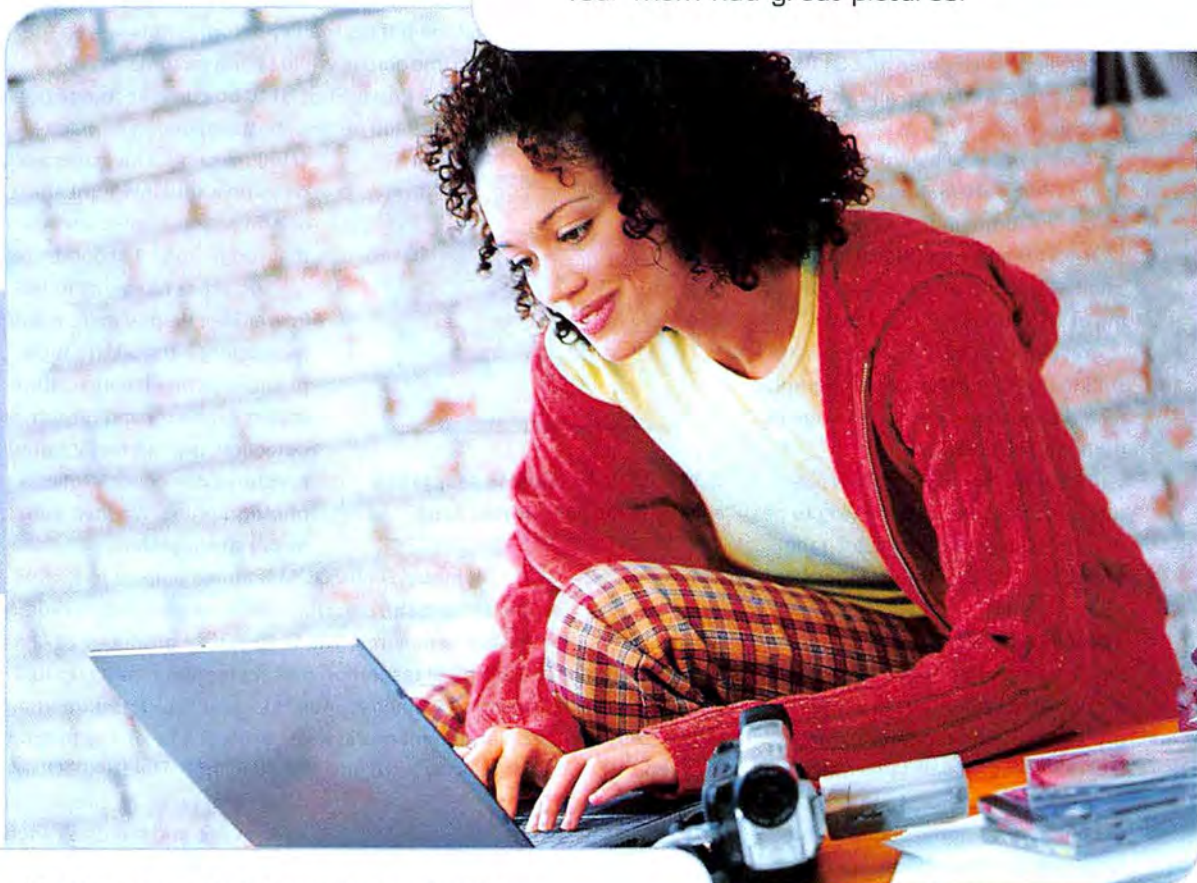
For "retro" styling, Canon's PowerShot S110 takes

Continued on page 9



RAYOVAC'S NiMH batteries
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Continued from page 7

the cake. The camera's stainless-steel body is downright luxurious, with a bright ballast finish and a circular hairline. The PowerShot S110 measures 3.5 inches x 2.3 inches x 1.0 inch, and weighs less than seven ounces.

Along with its elegant styling, the PowerShot S110 features a 2X (equivalent to 35-70mm in the 35mm format) f/2.8-4.0 all-glass aspherical lens, 3-point autofocus, and continuous shooting at 2.5 frames per second.

Yet even the best digital tools are no substitute for traditional photographic techniques; the old saw, "garbage in, garbage out," still applies.

"Your goal—to get a great picture—is the same, and the way to get there is going to be very much the same, too," says photographer Larry Lawfer.

The Zone System

Lawfer, as well as Brian Harris, credits master photographer Ansel Adams with simplifying photography for professional and amateur photographers alike. During the 1930s and '40s, Adams and visual artist Fred Archer invented the "Zone System" to help photographers control the tonal range in their photographic negatives.

In the Zone System, the photographer first previsualizes a subject scene in shades of black and white, using the system's ten-step Zone-Scale Card. He then takes a light-meter reading of target zones and makes any necessary exposure adjustments to accurately record the amount of light reaching the film.

Once in the darkroom, the Zone System photographer decides whether an image's contrast needs adjustment. If it does, he can shorten the film's normal development time to decrease the picture's contrast. With a longer than normal development time, the photographer can boost the contrast in his image.

A Little About Lighting

Photographers should, of course, try to prevent taking over- and underexposed pictures in the first place. And one way to do that is to make sure the digital cameras they're using are smart enough to compen-

sate for poor unfavorable lighting conditions.

Canon, Olympus, and Pentax all offer protection against the pitfalls many photographers—even the pros—come across while taking pictures.

Canon's PowerShot S110 boasts nine image quality settings and the fastest shutter speed in its class—

1/1500 second. The camera also takes beautiful low-light shots, offering slow shutter speeds that range up to 1 second.

And other functions in the PowerShot help to ensure a perfect picture—the S110's high-precision white balance, automated exposure and brightness detection, and perfectly round apertures can cover a lot of a photographers' (or their subjects') shortcomings.

Olympus' D-40 ZOOM features a noise reduction mode for clear, colorful nighttime photos that require longer exposures. The D-40 ZOOM produces 2272-x-1704-pixel resolution files for creating prints up to 11 inches x 14 inches. And the camera's Optimum Image Enlargement mode gives users the flexibility to print images up to 16 inches x 20 inches. The D-40 ZOOM

offers great picture quality; it's easy to use and builds a range of advanced features into a hassle-free camera that fits in the palm of your hand.

The Pentax Optio 330 also offers smooth, trouble-free operation. With modes like Standard, Night Scene, Metered Manual, Movie, Multi-Exposure, and Playback, image taking and viewing on the Optio 330 is an almost instant process.

The Optio 330 features an array of white-balance modes: Auto, Daylight, Shade, Tungsten Light, Fluorescent Light, and Manual. In the Manual position, photographers can balance and maintain color, free from the influence of artificial light that is out of their control.

While Lawfer, Kirby, and Harris welcome the added safeguards digital cameras offer their users, they continue to encourage aspiring photographers to learn the Zone System and the fundamentals of lighting a shoot.

"At least learn a bit about lighting," Lawfer says, "because no matter what you're using, there's no escaping the fundamentals." ■



OLYMPUS' D-40 ZOOM is easy to use and fits in the palm of your hand.



PENTAX'S Optio 330 produces sharp, rich images with very little tweaking.

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HOW DIGITAL PHOTOS ARE FINISHED.

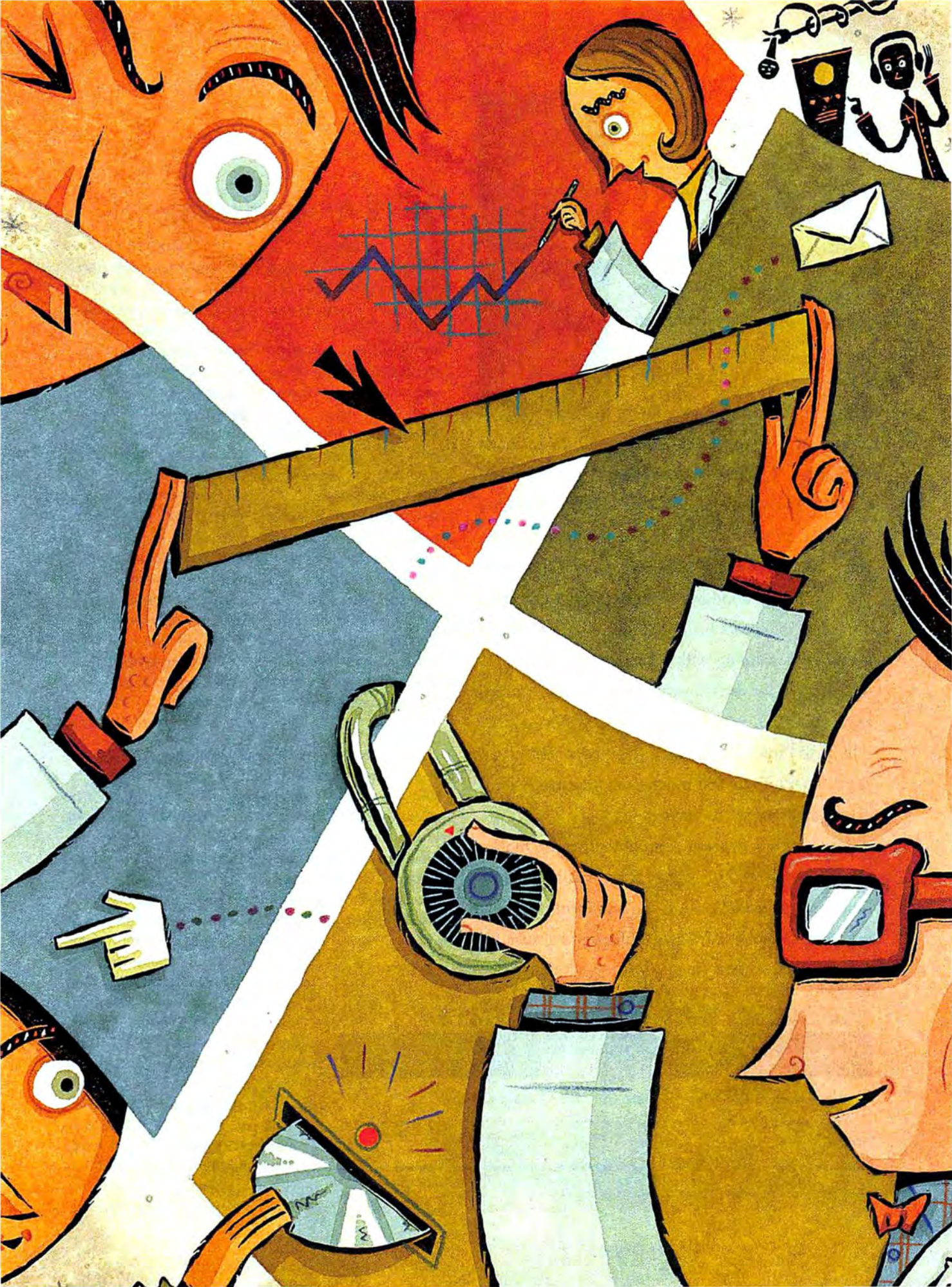
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Easier than Windows 2000 and less crash-prone than Win Me, XP is Microsoft's biggest OS upgrade in years—and its most controversial. We tested it in the field and in the lab to see what works, what doesn't, and if you should make the leap. ►

BY SCOTT SPANBAUER

Windows XP

Inside & Out



"Should I get it?"

That's what everyone wants to know about Windows XP. We won't keep you in suspense: For most Windows 98 and Windows Me users whose systems can handle it, the answer is yes.

Due to ship October 25 (barring unlikely last-minute court orders stemming from the still-pending antitrust wrangling), Windows XP could be the most stable version of Windows yet: It's at least as stable as Windows 2000, Microsoft claims. It's also the most feature-laden. Thank its dual bloodlines for that happy combination: From Windows NT and 2000, it inherits a secure, stable core. From Windows 9x and Me, it inherits compatibility with hardware and software, as well as tools for working with digital images, video, and audio. And in either of its two flavors—Home Edition or Professional—it's a great match for the latest PCs with their fast processors, capacious hard drives, and speedy CD burners.

For users who upgrade, initial reports are mostly positive. Microsoft has improved the installation experience greatly from Windows 2000's incompatibility nightmare. Of the *PC World* editors and associates



REPORT CARD

XP's Hits and Misses

HITS

- **Stability:** Yes, a Windows PC (other than a Win 2000 box) can really run crash-free for days, even weeks.
- **Remote Desktop (requires Windows XP Professional):** Take control of your desktop computer from the road.
- **Remote Assistance:** Connect to an XP-equipped computer, troubleshoot it, and even reboot it if necessary.
- **User Accounts:** Keep your apps running and your data secure while others log on.
- **Windows Messenger:** This open-standards-based utility could become the instant messaging, voice, videoconferencing, and application-sharing tool of choice for real-time online connections.

MISSSES

- **Windows Product Activation:** Not too bad, but this anti-piracy scheme may still inconvenience law-abiding users.
- **An uninvited dog:** If you hated Office's talking paper clip, you'll be apoplectic over the cutesy canine "helper" in Windows XP's search utility.
- **System tray balloon text:** Though it eventually goes away, the intermittent prodding to create a .Net Passport account is very irritating.
- **No Java Virtual Machine:** The first time you encounter a Java-based Web site, Microsoft's Java interpreter is a lengthy download away.
- **Windows Movie Maker:** Still missing commonly used video output options.

who installed both prerelease and final shipping versions of Windows XP, most reported only minor incompatibilities.

Most, but not all. As with any upgrade, you might run into a problem with a key application or peripheral that renders the upgrade undesirable. We won't know the complete story on compatibility until millions have tried XP, and until software and hardware vendors have had a few months to roll out updates.

Once beyond the upgrade process, people liked the way Windows XP booted up swiftly. Only a few who upgraded old machines at or below Microsoft's minimum requirements

noticed even a small slowdown in performance (see "XP Performance: Satisfactory, Not Stellar," page 100).

And everyone was favorably impressed by the new OS's reliability. If you're coming from the crash-prone 9x/Me camp, this is the single best reason to upgrade. Based on the same core operating system as Windows 2000 and NT, both versions of this new OS pay much closer attention to how applications, drivers, and Windows itself use your system's memory, normally preventing one bit of code ▶

PRODUCT BASICS

VITAL UPGRADE STATISTICS

OPERATING SYSTEM	Star rating	Estimated retail price		Upgrade eligibility
		Full version	Upgrade	
Windows XP Home Edition	★★★★☆	\$199	\$99	Windows 98, 98 SE, Me
Windows XP Professional	★★★★☆	\$299	\$199	Windows 98, 98 SE, Me, NT 4.0, 2000, XP Home Edition

Minimum system requirements: 233-MHz CPU, 64MB of RAM (not shared with integrated graphics), 1.5GB of free disk space. Recommended system requirements: 300-MHz CPU, 128MB of RAM, 2GB of free disk space.

What to Expect: The Upgrade XPerience

THINKING ABOUT upgrading to Windows XP? Here's what you'll need, and what to expect.

Windows XP requires more memory, processor might, and hard disk space than any previous Windows version (see "Vital Upgrade Statistics," page 94). But even if your PC meets Microsoft's recommendations, the company doesn't recommend the XP upgrade for computers more than about two years old, because it has given up trying to make Windows compatible with older hardware and BIOSs. Several *PC World* editors upgraded older systems, but the odds are against a trouble-free installation, according to Microsoft.

CHECK YOUR APPS

EVEN IF YOUR system's hardware passes muster, your applications and peripherals may not. *PC World* editors who tested XP found problems with various applications and devices, including Apple's QuickTime, Norton AntiVirus 2001, WinDVD, Roxio's Easy CD Creator 4.0, an Epson Perfection 636U scanner, and a Rio 500 MP3 player. (Fixes and updated drivers may be available by the time XP launches.)

One of the quickest ways to tell whether your computer's setup will work with XP is to take PCWorld.com's Web-based Windows XP Readiness test at www.pcworld.com/xpready (the test was coproduced with PC

Pitstop). In addition, you can visit www.microsoft.com/hcl to search Microsoft's own hardware compatibility listings.

For a more thorough analysis, use Microsoft's Windows XP Upgrade Advisor, which will be available on the installation CD-ROM, as a free 35MB down-



load from Microsoft's Windows XP Web site (see find.pcworld.com/14081), or on a CD-ROM that will be free in stores.

Don't take the Upgrade Advisor's warnings as gospel, however. *PC World* staffers report that a few applications and peripherals flagged as incompatible—including a SanDisk CompactFlash reader and a version of Zone Labs' ZoneAlarm firewall—worked just fine after the upgrade.

We also found that some settings—in particular, the video refresh rates and network connections—needed a little tweaking after we upgraded our systems to Windows XP.

NOT JUST IF, BUT HOW

BEFORE YOU upgrade, you must also decide which version of Windows XP you need. At \$99, the Windows XP Home Edition upgrade is the least expensive option, but don't let the name fool you: Home Edition has 98 percent of the business-oriented features

found in Professional. If your business uses Windows NT or 2000 server domains to manage network resources and user accounts, however, you'll need Professional. Similarly, you'll need Professional if you have a multiprocessor PC, if you want Windows to encrypt the files on your hard disk, or if you want to use the OS's new Remote Desktop feature.

But while Windows 98, Me, NT 4.0, and 2000 users can all use the \$199 XP Professional upgrade, only Windows 98 and Windows Me users can use the

cheaper Home Edition upgrade. If you still use Windows 95, you'll have to wipe your hard drive clean and install the full version of either Home Edition (\$199) or Professional (\$299)—assuming your computer can run Windows XP at all. Expect to spend at least an hour upgrading, and be prepared to answer the occasional configuration question.

If your current OS qualifies for an upgrade, you can use the upgrade versions to perform what XP calls a new installation (a clean install), which lets you put XP on a bare hard drive, or you can place it on a separate partition so you can boot up either XP or your current Windows version. A new installation is likely to generate fewer compatibility problems, but it also requires reinstalling all your applications and configuration settings. Installing Office XP on a dual-boot machine will also trigger the suite's product activation feature: You'll have to get an additional confirmation number from Microsoft.

You may find dual-booting worthwhile, though, not just to reduce compatibility hassles, but to gauge performance, and to run applications or games that don't play well with XP.

If it turns out that Windows XP isn't for you, you can uninstall it by using Control Panel's Add or Remove Programs applet (unless you upgraded from Windows NT or 2000, or chose to convert the hard disk partition from FAT32 to NTFS). And if XP suits you just fine, you can regain disk space by deleting the uninstall data.

from affecting another. Even if an application is incredibly buggy, XP usually can prevent it from crashing Windows or other applications.

One potential upgrade concern may turn out to be no big deal. Some PC users accustomed to installing Windows wherever and whenever they feel like it feared that Windows XP's Windows Product Activation antipiracy mechanism would be a burdensome inconvenience. But the copy-control scheme likely won't affect most license-abiding Windows users (see "Product Activation: Not So Bad After All," page 102).

Because Windows XP unites so many features—new and old—into a single product family, we've grouped them into five major areas: user interface, digital media tools, user security features, maintenance and help, and Internet tools.

XP's New Look

WINDOWS XP'S INTERFACE is nothing revolutionary. You get more control over how the OS looks and works, including whether icons appear on the desktop, how system folders such as the Control Panel appear, and what texture and color the windows and icons display. On the whole, the changes are good; the ones you don't like, you can disable in most cases. One annoying feature you can't shut off at will is the balloon text that pops up



WINDOWS XP MAINTAINS TIGHT CONTROL OVER WHO IS WHO AND WHO DOES WHAT.

periodically from several icons in the notification area (the system tray). We were particularly antagonized by one rather intrusive pitch to sign on to Microsoft's Passport authentication system, which you need only to log in to the Windows Messenger or MSN services. Be patient: It eventually fades away.

Windows XP includes new themes—collections of color settings and background images for windows—that have rounded corners, shading, and textured window frames and buttons. If you don't like Windows XP's blue, blobby windows (you can opt for olive green or silver, too), other themes should be available through a forthcoming Plus add-on pack, or from Microsoft's Web site. You can also revert

to a classic look similar to that of Windows 98 or 2000.

The most significant interface changes are in the Start menu and the taskbar. The revised Start menu displays links to frequently used applications, essential system folders, and common tasks. It acts as a good personal portal to Windows XP, but if you dislike it, you can revert to the classic Start menu. The taskbar sports two new space-saving features. Links to documents or windows for the same application (multiple Web browser windows or Word documents, for instance) now pop up vertically from a single taskbar button. And system tray icons that you seldom use disappear after a while (but you can locate them by clicking a button that expands the area).

DECISION GUIDE

SHOULD YOU GET XPERIENCED?

THE VERSION of Windows XP you should upgrade to—if any—depends on your needs and what you have already.

IF YOU HAVE...	and you use your PC for...	then you should...	because...
Windows 9x/Me on a PC that doesn't meet Windows XP's requirements	mission-critical business tasks (e-mail, Microsoft Office) or multitasking—or if stability is a problem	buy a new system with Windows XP Professional or Home Edition	you'll get a fast, inexpensive, up-to-date PC running the most stable, secure, feature-rich version of Windows yet.
	Web browsing, e-mail, entertainment, and other personal tasks—and stability is not a problem	stick with what you have	XP's better stability and security don't offset the cost of upgrading, plus you'll avoid installation hassles.
Windows 9x/Me on a PC that meets Windows XP's requirements	mission-critical business tasks (e-mail, Microsoft Office) or multitasking—or if stability is a problem	upgrade to Windows XP Professional with a clean install	your PC is far less likely to crash, and you can protect files and e-mail from others who share the PC.
	Web browsing, e-mail, entertainment, and other personal tasks—and stability is not a problem	upgrade to Windows XP Home Edition, but dual-boot for now	your PC is far less likely to crash while running XP; if an application or device doesn't work with XP, you can boot to 9x/Me.
Windows 2000 on a PC that meets Windows XP's requirements	mission-critical business tasks (e-mail, Microsoft Office, other productivity software)	stick with what you have for another six months	you already have XP's key productivity features—stability and security. Let other business users be the guinea pigs.
	Web browsing, e-mail, entertainment, and other personal tasks	upgrade to Windows XP Professional	you'll have better compatibility with games, apps, and hardware, plus new media tools, remote access, and Fast User Switching.

Other changes in appearance—including drop shadows, richly colored see-through icons, and animated cursors and window movements—may tax your graphics board and CPU, but you can turn them off. We found them helpful in more easily differentiating one window from another, simplifying work with on-screen objects.

One screen innovation you'll want to try out if you have a portable computer or a desktop LCD monitor: ClearType. This font-smoothing technology is turned off by default; you can find it by clicking Control Panel's *Display* icon, selecting the *Appearance* tab, and then choosing *Effects*. ClearType refines your LCD's jagged pixels and makes the display easier on the eyes (see the illustration on page 98). Amen to that.

Sound & Vision

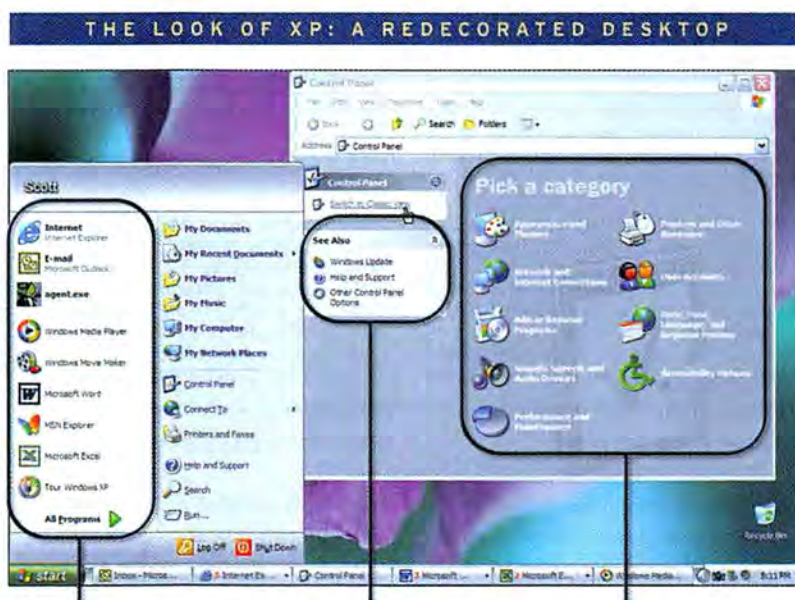
WINDOWS XP INHERITS many of Windows Me's digital media features. If you download digital audio files, copy CD tracks to a portable digital audio player, or use a Webcam, a digital camcorder, or a digital still camera, Windows XP can help. Sometimes, though, it forces you to do things Microsoft's way.

Microsoft tirelessly promotes its latest media player, called Windows Media Player for Windows XP—undoubtedly to emphasize this version's exclusive availability in the new OS. The differences between it and Media Player 7.1 (a free download for users of previous versions of Windows), however, are few. If you have a CD-R/RW drive, the XP player lets you burn CDs at your recorder's highest rate; Media Player 7.1 limits you to 2X speeds. (See "XP's Extras" from the October 2001 issue, at find.pcworld.com/14662, for more about XP's native CD-R/RW support.)

The CD-burning speed boost is a real improvement, but two other major differences are noncritical. If your system has a Windows Media Player-compatible DVD decoder application installed, you can watch DVDs in Media Player as well as in the decoder's own interface. (Windows XP's setup program will detect your existing noncompatible decoder app and attempt to download a free update automatically.)

As before, you can convert audio CD tracks to Microsoft's WMA format. But if you want to turn them into MP3s, you'll have to use a third-party plug-in. And unlike the DVD decoder, this update isn't free: Microsoft says several offerings will be available online for about \$10 each by the time Windows XP ships. It's no bargain, considering you can do the job for free with software from MusicMatch and others.

Windows Movie Maker is basically the same lite, throwaway video transfer and editing utility included in Windows Me. Its

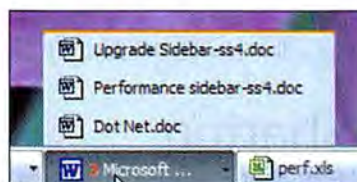


APPS ABOVE the line in the new Start panel are static; frequently used apps appear below.

FOLDERS include links to common tasks and locations that relate to their contents.

A SIMPLIFIED Control Panel groups icons under categories, but you can opt for the old-style view.

TASKBAR CLUTTER-BUSTERS



LEFT: Links to documents or windows from the same application—Microsoft Word in this example—pop up when you click a single taskbar button.

BELOW RIGHT: Rarely used system tray icons are hidden by default. **BOTTOM:** You can find them by clicking the button with the small arrow at the far left.



biggest weakness: Since there's no option for output to standard video devices such as VCRs, you can watch videos only on a PC.

Microsoft did add some higher-resolution video-capture modes (previous versions of Movie Maker were limited to 320 by 240 resolution). But Movie Maker remains best suited for grabbing brief, low-resolution clips to e-mail to grandma (assuming she's okay with downloading 1MB or more per minute of video).

Finally, XP gives digital photography aficionados a camera-friendly download, viewing, and printing interface. Windows XP's My Pictures folder presents links to specific tasks related to the folder's content: viewing a photo slide show, printing photos, ordering prints online, and uploading photos to a Web ▶

CLEARTYPE: CURE FOR THE LCD JAGGIES

browser window (repeat as necessary) impertinent site again. But many useful pop-ups. The windows may open when shortly thereafter, or as you leave the hassle.

Since most pop-ups are created in Java, the popping by turning off your browser Netscape Navigator 4.7 x, choose *Edit, Advanced* in the Category tree, remove *Enable JavaScript* in the displayed options. Internet Explorer 5. x, choose *Tools, Internet Security* tab, select the *Internet zone, Level* button. Scroll through the Settings.

BEFORE: Fonts on an LCD monitor or notebook display look jagged.

browser window (repeat as necessary) impertinent site again. But many useful pop-ups. The windows may open when shortly thereafter, or as you leave the hassle.

Since most pop-ups are created in Java, the popping by turning off your browser Netscape Navigator 4.7 x, choose *Edit, Advanced* in the Category tree, remove *Enable JavaScript* in the displayed options. Internet Explorer 5. x, choose *Tools, Internet Security* tab, select the *Internet zone, Level* button. Scroll through the Settings.

AFTER: ClearType smooths the type, making text easier on the eyes.

site. As we went to press, the Online Print Ordering Wizard listed two services, from Fujicolor and Kodak, both offering 4-by-6 prints for the going rate of 49 cents each. Web publishing options were still limited to MSN and Xdrive. Microsoft says other services will appear later this year.

The Scanner and Camera Wizard lets you download, view, and delete images stored on an attached digital camera, as well as take photos from the computer screen—if your camera complies with Microsoft's Windows Image Acquisition specification. It's all good, although these features may be a subset of the capabilities your camera's own software already offers—if it is compatible with Windows XP. Microsoft says most Windows 2000 versions of digital camera software will work with Windows XP.

Security & Sharing

IF YOU'RE UNFAMILIAR with Windows 2000 and its predecessor, Windows NT, get ready for changes in the way you access your PC and its contents. In Windows 9x, security was an easy-to-bypass afterthought. Anyone could read, edit, or delete any file on the hard disk, since neither the MS-DOS operating system underlying Windows 9x/Me nor the FAT and FAT32 file systems have any mechanism for controlling file access, other than the simple read-only flag. That's a problem for anybody whose computer is accessible to coworkers, kids, roommates, or others.

In contrast, Windows XP maintains tight control over who is who and who does what. You can require users to log in, so that only authorized users can access files. This is good, not only for protecting your data, but for preserving settings and preferences.

Windows XP recognizes three kinds of users. Administrators have full control over all aspects of system configuration; the other two categories, Limited and Guest, have curtailed capabilities. You'll want to pay attention during installation, when both the Home Edition and Professional versions prompt you to create user accounts: By default they make everyone on board an Administrator—a recipe for disaster if any of the users are inquisitive children or unhappy employees. Administrators are

able to create and delete accounts, override passwords on accounts, and tinker with other users' files and settings. To ensure that your data and identity are secure, make yourself the only Administrator on the system.

If multiple people do use the computer, and the PC isn't at the low end of Windows XP's system requirements, you should try a new feature called Fast User Switching, which allows one user to remain logged in—programs running and all—while another user takes over and launches other programs. Switching between two logged-in user accounts takes only seconds, as long as the machine has sufficient RAM; in our testing,

128MB was plenty for moderate multiuser loads. And since Windows XP resists crashing much better than Windows 9x/Me, the new feature could change the way families and offices share a computer. For example, you could leave your QuickBooks file ▶

FEATURES

WHAT'S NEW TO XP?

SOME OF the Windows XP features Microsoft is touting actually were introduced in previous Windows versions or in other products.

FEATURE	First appeared in
INTERFACE	
Themes	Windows 95
Simplified folder views	Windows Me
Window/cursor animation	Windows 98
Fast User Switching	Windows XP
DIGITAL MEDIA	
Windows Media Player for Windows XP	Windows XP
Windows Movie Maker	Windows Me
CD ripping	Windows Me
SECURITY	
User log-in and file security	Windows NT 3.1
Remote Desktop	Windows XP
File/folder encryption	Windows NT 4.0
PC HEALTH	
System Restore	Windows Me
Remote Assistance	Windows XP
INTERNET	
Internet Explorer 6	Free download as of August 2001
Windows Messenger	Windows XP
Personal firewall	Windows XP
Internet Connection Sharing	Windows 98 SE
OTHER	
Windows Product Activation	Office 2000



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open for weeks, while the kids play games, download files, and surf the Internet. (Remember to save your data before leaving, however, to avoid losing it if the PC is shut down.)

Remote Desktop, a related feature, uses some of the same underlying multiuser technology as Fast User Switching to allow you to connect to and control your PC over a phone line or the Internet. Competing with third-party remote-control applications like Symantec's PC Anywhere, Remote Desktop is exclusive to

Windows XP Professional, so the PC you wish to control must run that version of the OS. The system dialing in from afar, however, needs only a Windows Terminal Services client (some are included on the Windows XP CD-ROM or are available for download—there's even one for Pocket PCs). If you forget to load up your documents and e-mail before a trip, this feature puts them just a dial-up connection away. Performance for word processing and similar tasks is good, even over a 56-kbps modem. ►

LAB TESTS

XP Performance: Satisfactory, Not Stellar

MICROSOFT touts XP as the fastest incarnation of Windows ever. But in our tests, we found its performance generally on a par with that of other recent Windows versions. It may not be a reason to upgrade, but neither is it a reason not to.

The PC World Test Center compared XP Home Edition and Professional with Windows Me and 2000 by putting all of the OSs through a battery of hand-timed application performance tests (see "How We Test" in the chart below). The XP-compatible version of PC WorldBench wasn't ready in time for use in this story.

We used two PCs representing the low and medium-high ends of the current market: an 800-MHz Celeron PC and a 1.4-GHz Athlon model. We tested

them both with Microsoft's recommended minimum of 128MB of RAM and with 256MB. Since the difference in the two systems' results reflected only the Athlon's faster speed, we omitted the Celeron figures here. We also found no performance difference between the two versions of Windows XP.

Memory, generally considered a low-cost performance pick-me-up, had little impact except in the memory-intensive Photoshop 6 tests. If you spend a lot of time using Photoshop or other RAM-hungry applications—or if you typically run many active applications at once—upgrading to 256MB of RAM should help regardless of which Windows you use.

One place where our testing revealed a perceptible perfor-

mance difference was in start-up and shutdown times. Windows 2000 took more than 20 seconds longer to boot, because it's much larger than Windows Me, and because XP uses new optimizations for reading and loading OS code into memory. Windows 98 users may see a marked im-

provement in boot-up times, too, since that OS doesn't support Fast Boot BIOSs as the three later Windows do. At shutdown, Windows Me outperforms the others by unceremoniously dropping network connections. To test how Windows XP's

Fast User Switching—its ability to let one user's apps run in the background when one or more other users log in—affects performance, we ran the same Word 2000, Access 2000, Notes 5, and Photoshop 6 tests shown in the chart, but with a second user logged in and with Netscape Navigator, Lotus

TEST REPORT

FAST BOOTS WITH XP AND ME

OS	Boot-up (seconds)	Shutdown (seconds)
Windows XP Professional	34	9
Windows 2000	57	9
Windows Me	35	3

provement in boot-up times, too, since that OS doesn't support Fast Boot BIOSs as the three later Windows do.

At shutdown, Windows Me outperforms the others by unceremoniously dropping network connections.

To test how Windows XP's

Notes, and Windows Movie Maker still running. Though we anticipated that this might degrade performance, and that additional RAM might restore the lost performance, we were wrong: We got virtually the same results with both 128MB and 256MB, whether a second user was logged in or not.

Still, your use of Fast User Switching may tax your system more severely. If you plan to keep more users logged in or to run more apps, extra RAM may keep your foreground user accounts running faster. And if you plan to use Fast User Switching on less-powerful systems with less RAM, be prepared for slowdowns.

TEST REPORT

WINDOWS VS. WINDOWS VS. WINDOWS: A WASH

OS	Word 2000	Access 2000	Notes 5	Photoshop 6	Multitasking
Windows XP Professional	47	31	2	60	356
Windows 2000	45	33	4	66	345
Windows Me	44	36	4	54	355



HOW WE TEST: We tested each OS by hand-timing boot-up, shutdown, and common tasks in Microsoft Office 2000, Lotus Notes R5, Adobe Photoshop 6.0, and Netscape Navigator 4.08. We ran all tests on a 1.4-GHz Athlon-based PC and a Celeron-800-based PC, first with 128MB of RAM, then with 256MB. All times are in seconds. See find.pcworld.com/19720 for details.



VIRUSSCAN
ONLINE

FROM VIRTUAL EVIL

6/14/01 3:07:01 PM
Scan Completed: 3 virus detected
Scanned: c:\
Include Subfolders: Scan All Files
Excluded Files: 7372
Infected: 3
Infected with W32/AZ worm

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Help Is Here

WINDOWS XP'S REVAMPED Help system simplifies troubleshooting and configuring your PC—and asking another human being for assistance. From a new Web-page-like Help and Support Center on the Start menu, you can browse standard static help content, jump over to Microsoft product newsgroups, check for fixes on Windows Update, and launch any of the troubleshooting tools pioneered in earlier Windows versions.

A couple of new tools could make Windows XP a must-have upgrade for some.

If you've ever donated an aging PC to a friend or relative, you know what happens next: They need help, usually by long-distance. Remote Assistance, also based on Windows Terminal Services, allows one Windows XP user to request help from another, either via e-mail or through the Windows Messenger instant messaging client. Depending on which level of control the per-



XP INHERITS MANY OF WINDOWS ME'S DIGITAL MEDIA FEATURES.

son requesting help allows, the respondent can view the remote computer while chatting over Windows Messenger—the equivalent of looking over someone's shoulder while they explain what's wrong with the computer—or take complete command of the computer remotely. The only drawback: Both systems must be running Windows XP.

System Restore, which debuted in Windows Me, is another terrific help tool. Like Roxio's GoBack, System Restore lets you take your system's configuration back to a specific point in time—uninstalling applications and drivers, and reversing

settings. System Restore monitors your activity and creates restore points automatically at sensible moments, such as just before you install new drivers. You can set your own restore points, too. And XP introduces a related feature: driver rollback. When you install a new driver, the OS retains a copy of the old one as a backup in case the new one causes problems. ▶

COPY CONTROLS

Product Activation: Not So Bad After All

WINDOWS Product Activation, which is designed to enforce Microsoft's license terms by preventing users from running one copy of Windows XP on several PCs, has alarmed people who fear it will hamper legitimate hardware upgrades. But Microsoft appears to have listened to the complaints (see "Readers to Microsoft: Copy Controls? No Way!" from August 2001, at find.pcworld.com/14700).

Within 30 days of installing the OS, you must activate it with Microsoft, a process every participating *PC World* editor found painless. Windows XP sends a numeric identifier generated from ten of your system's components to Microsoft's server, which in turn

sends you a certificate activating your copy of Windows XP on that particular machine.

CALLING MICROSOFT

IF YOU TRY to install Windows XP on a different computer, producing a new hardware identifier, a dialog box will pop up asking you to call a Microsoft operator (Microsoft says operators will be available around the clock) and explain the discrepancy. If satisfied with your response (and Microsoft says it will always give users the benefit of the doubt), the operator will issue you a new certificate, which you'll type into a dialog box to complete the boot process.

If you have a network card and leave it alone, you should



ACTIVATION, NOT REGISTRATION: You don't have to give your name or other personal information to activate Windows XP.

be able to remove or replace up to six other signature elements (including the display and IDE adapters, the CPU, the amount of installed RAM, the hard drive, and the CD-ROM/RW or DVD drive) without triggering activation, Microsoft says. Otherwise, you can still change up to four other elements before having to contact Microsoft. Adding components never triggers a challenge.

More importantly, WPA resets after 120 days, considering whatever you have to be the activated configuration. That means that after four months you can install XP on a second PC, activate it, and keep the first one operating without running afoul of WPA.

Doing so would violate the software license, but Microsoft is probably wise to cut us all some slack here.

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A Nod to the Net

LIKE WINDOWS 98 AND ME, XP introduces a new version of Internet Explorer. But Internet Explorer 6 delivers almost as few new features as, well, Internet Explorer 5.5. Most bolster support for Web standards, including a new privacy spec called P3P (see *Internet Tips*, page 182). P3P, and hence IE 6, will play a major role in Microsoft's .Net effort, through the Passport authentication system (see "The Road Ahead: .Net on the Horizon?" below).

What else does IE 6 offer? A snazzy look for navigation icons, and a new Explorer bar (called Media) that puts Microsoft's WindowsMedia.com site a little closer to your face than it would otherwise be. One slight inconvenience: Windows XP doesn't include Java support. If your system doesn't have the necessary Java software and you visit a game site or another Web site that demands it, you'll be prompted to download the 5MB Java Virtual Machine from Microsoft's site.

More interesting than IE 6 is the Windows Messenger application. Not just a rewrite of earlier Microsoft efforts (MSN Messenger and Netmeeting), Messenger lets Webcam-equipped Windows XP users videoconference with each other. Messenger users can also text-chat with MSN Messenger users. Microsoft says the program could interact with other clients—including AOL's—in the future, since Messenger is based on the nonproprietary Session Initiation Protocol standard.

In a nod to the growth of broadband access, XP contains a firewall—software that protects your PC against attempts by hackers to access it through your Net connection.

WHAT'S NEXT

The Road Ahead: .Net on the Horizon?

WITH WINDOWS XP out the door, Microsoft can focus on its ambitious plan to change computing as we know it.

The latest versions of Windows, Pocket PC, and Office are part of the company's vision of a universal computing network that reaches across all kinds of devices: PCs, handhelds, servers, and even household appliances. In Microsoft's scheme, these devices are all connected in a digital weave known as .Net.

Though details are sketchy,

.Net shapes up as a collection of products, services, and technologies all designed to further the goal of universal connectivity via the Net. Though third-party firms are also developing .Net products, Microsoft is leading the way with development tools, server products, and client software. Everything will be based on the industry-standard Extensible Markup Language (XML), which, unlike the Web-pioneering HTML lan-

It's no-frills, but it does its job well. Enabling Internet Connection Sharing automatically enables the firewall.

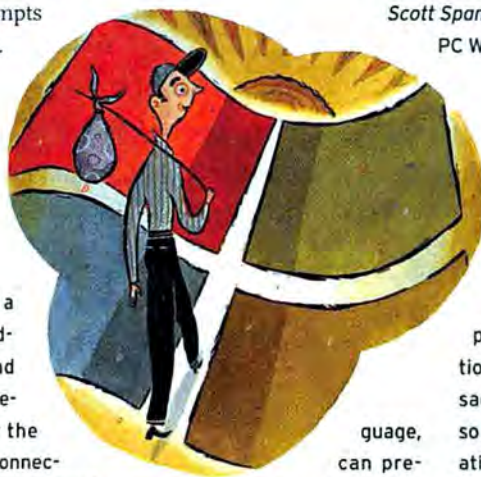
The firewall's default settings suffice to deter incoming probes. XP's firewall is a one-way affair, however: If a virus slides through in an e-mail attachment (as Trojan horses do), it's free to upload your data or perform other harmful outgoing tasks.

Finally, Windows XP includes support for the increasingly popular 802.11b wireless ethernet standard as well, automatically integrating it into your other network connections.

EXPERIENCE XP

WE MAY BE UNIMPRESSED with some XP features, but don't let that obscure the big picture. With security and stability that far surpass Windows 9x's, decent performance, and reasonable pricing, Windows XP gets *PC World's* thumbs-up. It may not be the best Windows possible, but it's the best Windows to date. ■

Scott Spanbauer, a contributing editor for *PC World*, lives in Boulder, Colorado.



guage, can present structured data (such as databases and spreadsheets) and is more similar to traditional software development languages.

The first major .Net component most of us will encounter is a suite of services, called .Net My Services, that Microsoft hopes to launch by next year.

The suite will link the company's Passport authentication system with instant messaging and mail applications, so users of .Net-enabled operating systems (including Windows XP and Pocket PC) can retrieve calendars, contacts, e-mail, voice mail, and other personal information wherever they are, whenever they want.

The company is making Passport available to other services that authenticate users. But will you be comfortable with Microsoft holding all the keys?



FACE TIME: Windows Messenger now includes videoconferencing capability.

An IBM ThinkPad T23 laptop is shown from a low angle, tilted upwards. The screen is open and displays a blue background with the text "Free to succeed." The keyboard and trackpoint are visible. The text "IBM ThinkPad T23" is printed on the bottom left of the laptop's base.

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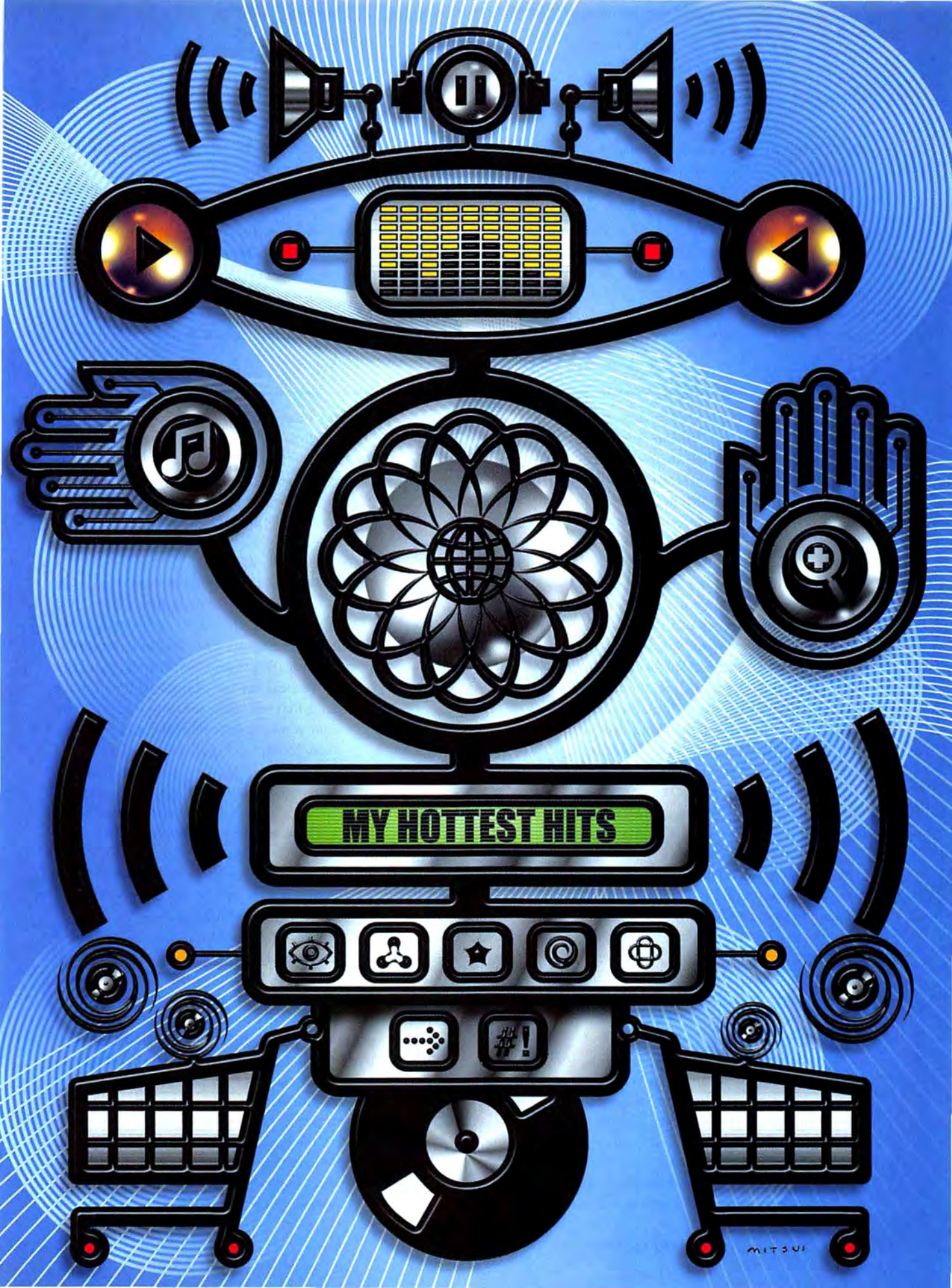
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Napster may have faded, but the revolution lives on. Here's everything you need to know to turn your PC into a digital music center.

BY MICHAEL GOWAN ILLUSTRATIONS BY GLENN MITSUI

FOR MANY PEOPLE, the ultimate music format used to be the cassette tape: Cassettes were portable and easy to use, and tape players were cheap. Then along came compact discs, which were just as simple and portable as tapes, but sounded better. Now CDs are being challenged by the new wave of digital audio, which is even more portable. For about \$250 you can buy an MP3 player that holds more than 150 CDs' worth of music, has a battery that lasts about 8 hours, and is only slightly bigger than a pack of playing cards. But switching from the familiar world of cassettes and CDs to the far more complicated world of digital audio means not only selecting the right hardware but also figuring out where to find the audio files you want, how to process them, and how to manage all of your music. With a little bit of planning and getting up to ►

Easy as MP3



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speed, however, creating such an audio library should be easy.

The digital audio revolution began in 1987, when the Fraunhofer Institute in Germany began working on a technology that may one day make the CD as passé as eight-track tape: a file compression scheme that came to be called MPEG Audio Layer 3, aka MP3, capable of creating digital audio files as small as one-tenth the size of an uncompressed file. Sure, the compression results in some loss of quality, but it gave something in return: portability and versatility. As the MP3 format grew in popularity, users found that they could store thousands of easily accessible

tracks on their PCs. And—despite Napster's ongoing legal troubles—MP3 music is here to stay.

These days, tiny portable devices allow you to take compressed music with you. Newer compression formats like Windows Media Audio and RealAudio shrink files to ever-smaller sizes. Sophisticated applications can convert audio to those and other formats, and then play it. Countless Web sites offer music in a wide assortment of genres. To help you pick which components you need to bring the music home (and take it on the go), we've assembled a guide to each, beginning with where to find tunes.

Find It



THE MP3 format makes huge, uncompressed audio files small enough to be downloadable over the Internet. Because songs and other audio clips

are digitized, you can make as many copies of them as you like without any loss of quality. Take that idea, throw in millions of people with Internet access (many of them with broadband), and you get a service called Napster (www.napster.com). Napster let you share MP3 files on your hard drive with other users running the Napster application, and you could access their music files. Napster's servers acted as a catalog, matching searches with the files on users' hard drives. At its peak, Napster had more than 70 million users (according to Napster's own figures). The Recording Industry Association of America, however, soon obtained an injunction against Napster, forcing the service to filter out copyrighted works. At present, Napster is still offline as it strives to comply with the court order and to launch its subscription service (see "Pay for It" on page 122).

In the wake of Napster, other peer-to-peer file-sharing technologies, such as Gnutella (gnutella.wego.com), have arisen. Aimster (www.aimster.com), Audiogalaxy (www.audiogalaxy.com), Kazaa (www.kazaa.com), and Morpheus (www.musiccity.com) all allow music file sharing as well. (Check out "Napster Alternatives" at find.pcworld.com/12202 for more information on these services.) But all of these music-sharing applications potentially violate copyright law too, because downloading music through them without paying for it means that the musicians don't get paid; it is possible, therefore, that the

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Fortunately,
you can down-
load legal
digital audio
files for free,
and doing so
is just as
easy as using
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RIAA may take these services to court as well.

Fortunately, you can download legal digital audio files for free, and doing so is just as easy as using Napster, though the selection is far less extensive. Sites like Amazon.com (www.amazon.com), Listen.com (www.listen.com), and Yahoo Music (music.yahoo.com) offer free tracks from popular artists. MP3.com (mp3.com) also has a huge selection of free tracks, but you've probably never heard of many of the artists represented there. MSN Music (music.windowsmedia.msn.com) has an interesting service that recommends new music: You type in the name of a band you like, and the service compiles a list of other bands that you might also enjoy. It even provides access to a preprogrammed streaming-audio broadcast of similar songs.

Music news sites such as RollingStone.com (www.rollingstone.com) and Billboard (www.billboard.com) maintain large archives of top artists' downloads. Artists and record companies have also discovered that giving away a free track is a great promotional tool, so check the sites of your favorite artists to see if they've gotten with the digital audio revolution.

Downloading music from such sites does have some drawbacks. Songs can come in several different formats, including MP3, Windows Media Audio, RealAudio, LiquidAudio, and Bluematter. To play files saved in various formats, you may need to download new plug-ins or player programs. Even the tracks that you get from Napster and similar peer-to-peer services occasionally have problems: You can end up with an unplayable or shoddy-quality file because someone encoded it badly.

With the end of the free Napster service, you might have thought that there was no more free music, but plenty of free tracks are out there if you know where to find them. ▶

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Create It



SO HOW DO YOU get down with digital audio? You probably already have a ton of music, but converting your existing CD collection into a digital audio library is thankfully simple. You need a PC, a CD-ROM drive, and some software.

In the jargon, a software application that copies and compresses audio tracks is called a *ripper*. It extracts the music from a CD as a .wav file—an uncompressed copy of the song. Each minute of uncompressed audio takes approximately 10MB of space on your hard drive. To shrink the file size, your PC uses a *codec* (short for *compressor/decompressor*) to compress the sound. The codec determines what information can be omitted to make the file smaller. The human ear can't hear every frequency; through a science called *psychoacoustics*, the codec removes bits that you would never hear to create a more manageable file size.

Some people claim that they can distinguish compressed audio from uncompressed. See the "Compressed Audio" sidebar below for details of our tests on the four major audio codecs.

A compressed file's size depends on how much compression you apply; this compression is generally described as a playback bit rate. If you choose a high bit rate—say 320 kilobits per second—the file will be bigger, and less audio data will be taken out. If you pick a low bit rate—96 kbps, for example—you'll get a much smaller file, but the compression may cause noticeable aural defects (for more on the inner workings of MP3 compression, check out "How It Works: MP3" at find.pcworld.com/12980). Coding Technologies of Sweden has come out with a new format, called MP3pro, that is supposed to sound twice as good as standard MP3 (see "MP3pro Offers Better Sound in Less Space," find.pcworld.com/12547); unfortunately, however, portable players that support this format are not yet available. ►

TEST REPORT

Compressed Audio: Can You Tell the Difference?

MANY PEOPLE complain that compressed audio doesn't sound as good as CD audio. While that may be true if you listen to CDs on an expensive high-fidelity system, our tests with 30 listeners—mostly members of *PC World's* staff—show that for most people, music compressed in MP3, WMA, RealAudio, or Dolby's AAC format is nearly as good as from a CD if the music files are encoded at high enough sampling rates.

We compressed—in all formats and at all bit rates—four different pieces of music. In our double-blind tests, we asked users to

listen to two versions (compressed and uncompressed) of each audio segment, and then pick which segment they thought was the compressed version. We then asked them to rate the difference in quality of their pick, assigning a score of five (imperceptible), four (perceptible but not annoying), three (slightly annoying), two (annoying), or one (very annoying). The music was played on a PC using a Sound Blaster Live Platinum sound card with its optional Live Drive expansion component, and a pair of high-end Sony MDR-7506 headphones.

Our testers found that all of the formats scored above four at a bit rate of 128 kbps or higher. However, RealAudio also scored an average of 4.1 when encoded at 64 kbps—significantly higher than the other formats at such a low bit rate. Interestingly, our testers did not rate 128-kbps WMA files any higher than 96-kbps WMA files.

Although MP3 is the most widespread format, it performed the worst at lower bit rates. In particular, it was rated very low at 64 kbps, achieving an average score of only 2.2. MP3 earned much better scores at higher bit rates, effectively matching RealAudio's marks at 128 kbps and above.

For general use, 128 kbps is fine (or 192 kbps if you have really good ears). If you want to pack a lot of audio into a small amount of memory space, you can take the bit rate down to 64 kbps for RealAudio and 96 kbps for AAC. With MP3, however, the lowest usable rate is 128 kbps; any lower, and the quality drops substantially. Go to find.pcworld.com/11900 for an expanded version of this sidebar, including more details on how the tests were conducted and more information about the results.

—Ramon G. McLeod

How the Formats Compare

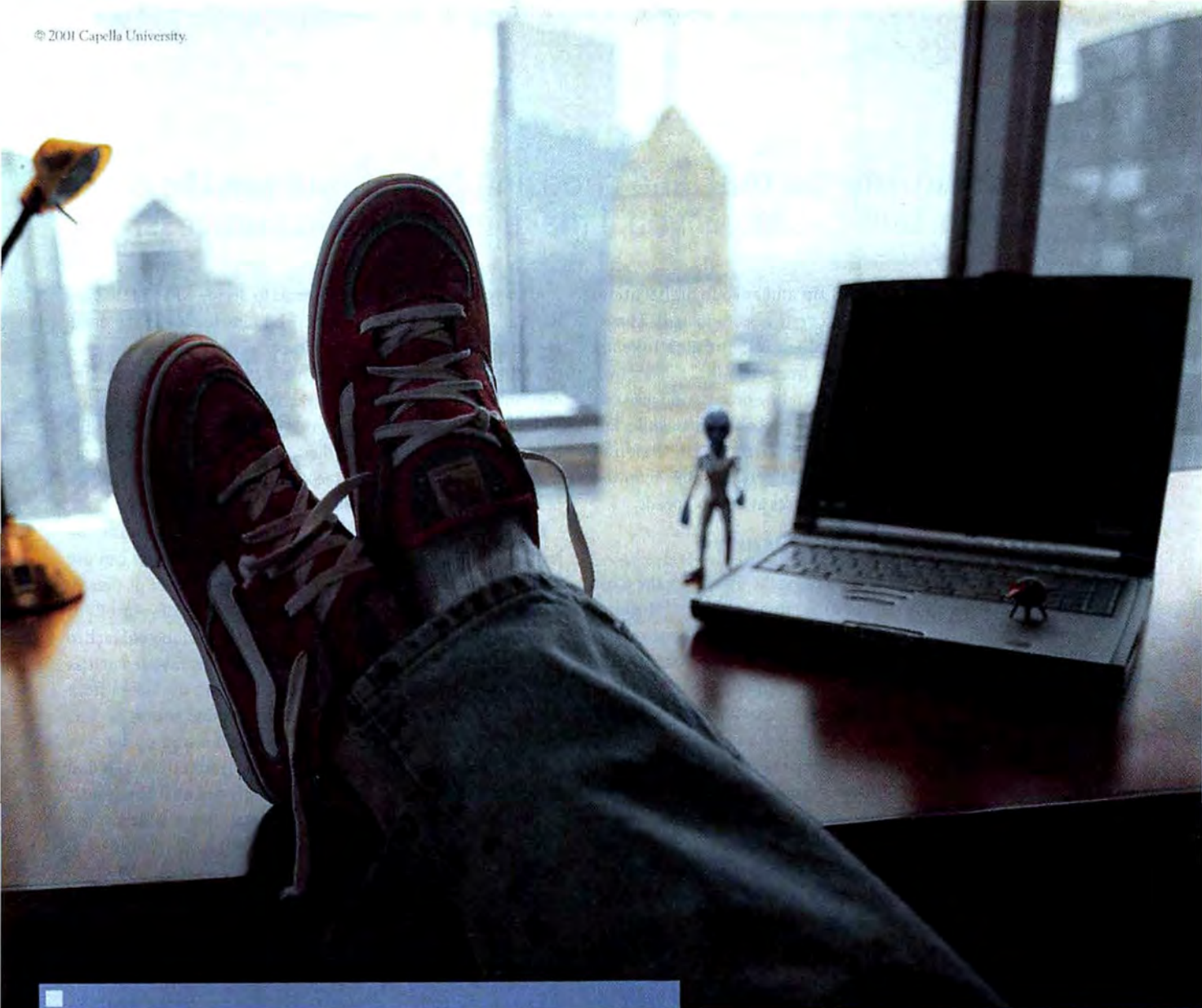
THIRTY PEOPLE scored the four major codecs on sound quality (on a scale of 1 to 5) at various bit rates. MP3 came out worst at lower bit rates.

CODEC	Tested bit rate (kilobits per second)				
	64	96	128	192	256
AAC	3.4	4.6	4.8	1	1
MP3	2.2	1	4.7	4.8	4.9
RealAudio ²	4.1	1	4.8	4.9	4.8
WMA	3.6	4.1	4.1	1	1

¹ Not tested.

² The RealAudio codec supports slightly different bit rates: 64, 96, 132, 176, and 264 kbps.

HOW WE TESTED: We compressed four samples of music and then asked 30 people to rate the compressed version against the uncompressed. The clips were rated on a scale of 1 to 5, in which 1 meant the compression artifacts were very annoying and 5 meant the compressed and uncompressed versions were indistinguishable. The scores are averages of the judges' ratings. See find.pcworld.com/11900 for more details.



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Selecting the format and choosing the bit rate are the most important decisions you'll make in the ripping process.

Popular applications that can rip and encode digital audio include Audiograbber (www.audiograbber.com-us.net), MusicMatch Jukebox (www.musicmatch.com), and RealJukebox (www.real.com). You can download free versions of the last two, but the pay versions speed up the encoding process and give you more control, so upgrading to them is probably worthwhile. For example, MusicMatch claims that the commercial version of MusicMatch Jukebox can rip music 25 percent faster than the free versions and can burn to CD-R discs at higher speeds.

QUALITY VERSUS QUANTITY

SELECTING THE FORMAT and choosing the bit rate are the most important decisions you'll make in the ripping process. Most rippers support the MP3 format, as do most players—one reason MP3 is so popular. With other software, like MusicMatch Jukebox and Windows Media Player, you can encode in WMA or MP3 (however, the Windows XP version of Windows Media Player supports only WMA); RealJukebox uses its own format.

Here's the question to ask before you select a format: What will you do with the file after it's been encoded? If you want to listen to it only on your computer, you can pick any format as long as you have a software player that can read the file. If you have a portable player or a listening device other than your PC that you want to use, check which formats the player supports. Almost all players can play MP3 files, but some can play songs in other formats. Depending on the bit rate, there are sound-quality differences among the formats: We found that WMA, RealAudio, and Dolby's AAC all produced better sound than MP3 at lower bit rates; see the sidebar "Compressed Audio" on page 114.

After you pick a format, you'll need to decide what bit rate you want to use with it. The higher the bit rate, the better the quality—and the larger the file. Unfortunately, you must trade one for the other. Most MP3 encoders use 128 kbps as the default; a 3-minute song at 128 kbps will take about 3MB of storage space.

Once you've set your file format and bit rate, you select the tracks you want and instruct the software to rip and encode the tracks. (See "Rockin' in the Free World: All About MP3s" at find.pcworld.com/12545 for more on how to encode files.)

But why stop at CDs when you're converting your music collection into digital files? If you have a sound card, you can use an RCA connector cord to hook your stereo receiver or preamplifier to your PC and then make digital versions of your LPs or cassettes. First connect the receiver or preamp's line-out jack to the line-in jack on your sound card; then use software such as MusicMatch Jukebox or RealJukebox to record the tracks from the albums and use a program that has a sound editor, such as Roxio's Easy CD Creator (www.roxio.com), to clean up some of the pops and clicks. (See "Transfer Music from LPs to CDs and MP3s" at find.pcworld.com/12546 for more tips on this process.)

Once you've made a few hundred digital files of your favorite songs, you'll want to organize them. Fortunately, this is easy: Using your ripping application, you can create an ID3 tag—essentially an ID card—for the file. Many of the programs that rip music from CDs can embed within this tag the artist or group name, the song title, the album title, and the music genre simply by accessing an online database service such as Gracenote (www.gracenote.com) or [Freedb.org](http://freedb.org). Your player can display the information, making it a breeze to identify and organize your music.

Play It



DIGITAL AUDIO permits you to mix and match music tracks however you like and to listen to those tracks in the office, in the gym, or just about anywhere else you happen to be. Picking the right playback hardware will only enhance your enjoyment.

The easiest (and cheapest) way to listen to digital audio tracks is on your PC. Free players such as Winamp (www.winamp.com) and full-featured programs like MusicMatch Jukebox or RealJukebox can play any MP3 file. You may need to download plug-ins to listen to other formats; Winamp offers plug-ins for LiquidAudio and Ogg Vorbis, a recently released MP3 alterna-



Archos Jukebox 6000

tive. Windows Media Player can play MP3 and RealAudio files, as well as files in WMA format.

The most important feature of a software player is its ability to help you organize your song library. Most players let you view and sort your accumulated files by artist, song title, album, or genre (as long as you put in ID3 tags). That comes in handy when you're scrolling through a thousand or more songs trying to find a particular track. Programs can also keep track of songs held in different directories, allowing you to store albums neatly in separate folders.

Playlists are another powerful software feature, freeing you from the tyranny of the set track order on a CD, cassette, or LP. You can easily mix the order of songs and put different artists ▶



HUGHES

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Portable devices that let you play digital audio tracks away from your PC come in all shapes and sizes.

together to fit whatever mood you're in—an instant mix tape, if you will. You create a playlist by dragging files from the library into the playlist window of your playback application. Here's a tip: Take your entire library and copy it into a single playlist. Click the random (or shuffle) button, save the playlist with a unique name, and let it play. Now you have your own radio station, guaranteed to play only the songs you like.

The sound you hear from your computer is a function of more than just the player you use: Your sound card and speakers play important roles as well. When buying a new system, look for a sound card with plenty of inputs such as line-in, microphone-in, and even SPDIF digital-in sockets for connecting CD players or other devices with digital outputs. Also look for software bundled with the card that allows you to adjust the sound to your preferences. Creative Labs' Sound Blaster Platinum and Turtle Beach's Santa Cruz cards meet these requirements. You may want to get speakers that include at least two satellites and a subwoofer, such as the TDK Tremor series. Alternatively, you may decide to splurge on a six-speaker set such as the Klipsch ProMedia



TDK Mojo



Creative Nomad Jukebox



RioVolt SP250

5.1, a THX-certified sound system that will sound great whether it is playing back digital audio, CDs, or the latest blockbuster DVD. And don't forget that you can connect your stereo system to your sound card too: Just run a cable from the line-out socket of your sound card to the line-in socket of your stereo, set your amp to the right input, and turn up the volume.

TAKING IT TO THE STREETS

THOUGH IT MAY SEEM otherwise, you don't spend all your time at your computer. Neither should your digital audio. Portable devices that let you play digital audio tracks away from your PC come in all shapes and sizes, but they can be categorized into three types, based on the storage medium they use: flash-memory models, hard-drive models, and—believe it or not—CD players. (See the chart below for more on these devices.) A format coming soon is DataPlay (www.dataplay.com); it uses a disc the size of a quarter to hold nearly as much data as a CD.

Flash-memory players were introduced first. Available from Rio (www.riohome.com), Intel (www.intel.com), and other companies, they have the advantage of being very small. Because such players have no moving parts, the batteries

last a long time and the tracks won't skip, no matter how rocky the terrain. But as with other products that use flash memory (such as digital cameras), storage is at a premium. Most flash memory players come with 64MB or 128MB of memory, although you can get much more if you're willing to pay for it. For instance, the Rio 800 comes with 64MB of internal memory for a street price of about \$180, but versions carrying 128MB or 384MB of internal memory are available for the higher street prices of \$245 and \$500, respectively.

If you buy a model that has a lower amount of memory in it, make sure it has a remov-

FEATURES

Portable MP3 Player Types

PLAYER	Storage type	Removable storage	Storage capacity	Formats supported	Maximum battery life (hours) ¹	Weight (ounces)	Street price
Archos Jukebox 6000 find.pcworld.com/12541	Hard drive	○	6GB ²	MP3 ³	8	12.3	\$249
Creative Nomad Jukebox find.pcworld.com/12543	Hard drive	○	6GB ²	MP3 ³	4	14.0	\$260
Frontier Labs Nex II find.pcworld.com/13721	Memory card	●	128MB	MP3, WMA	15	3.0	\$199
Rio 800 find.pcworld.com/12540	Flash memory	○ ⁴	64MB	MP3, WMA	12	2.4	\$180
RioVolt SP250 find.pcworld.com/13722	CD-R	●	650MB	MP3, WMA	15	8.3	\$180
TDK Mojo find.pcworld.com/12542	CD-R	●	650MB	MP3, WAV, AIFF	10	9.9	\$150

● = Yes
○ = No

¹ As claimed by manufacturer.
² A 20GB model is also available.

³ Firmware is upgradable, so new formats may be added.
⁴ 32MB, 64MB, and 128MB backpack expansion packs available.



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able memory card, because you will probably want to buy a bigger one, or multiple cards, very quickly. You can store only about eight or nine MP3 files encoded at 128 kbps on a 32MB card, so you'll likely want two or three cards handy for quick swaps. The cost of such extra cards can add up, though: A 64MB expansion pack for a Rio goes for \$80, and the 128MB CompactFlash cards compatible with many players can cost \$100 each.

Players that use a hard drive don't suffer from a storage shortage. Creative's \$260 Nomad Jukebox and Archos's \$249 Jukebox 6000 each have 6GB of space—which can hold about 100 hours of music encoded at 128 kbps, enough for many people's entire

music collection. Creative is also launching a 20GB version of its Nomad Jukebox for \$399. Hard drives require more power, so they use more or larger batteries than flash-memory players do, and they use buffer memory so that the hard drive doesn't have to be on constantly. As with flash-memory players, you use the included software and USB cable to download tracks to a hard-drive device. With multiple tracks to organize, the quality of the player's on-board file manager becomes extremely important, as does the legibility of the player's LCD screen. Most hard-drive models also feature a line-out jack for hooking them up to your stereo. Even though you get much more storage from a hard- ▶

CONVERGENCE

MP3 on the Hi-Fi: Digital Audio Comes to the Living Room

UNTIL RECENTLY, you could play digital audio on your PC or your portable player, but not on your stereo system. But that is beginning to change, with several vendors launching products that allow you to add MP3 and Internet radio capability to your high-fidelity stereo.

SonicBlue's Rio Receiver (find.pcworld.com/12300) and Turtle Beach's Audiotron (find.pcworld.com/12301) rely on a home networking connection to your PC to stream MP3, WMA, and WAV files from your PC to your stereo equipment; they do not contain a hard drive to store files. If you can get past the home networking obstacle—whether you use HomePNA phone-line networking or ethernet—either of these units can serve as a useful, reasonably priced (about \$300 street) way to enjoy digital music in your home environment.

Some other products don't require a networking connection, but they're far pricier. The Compaq IPaq Music Center (find.pcworld.com/12302) is available for about \$600, while HP's Digital Entertainment Center is scheduled for release this fall at a list price of around \$1000. Both have a built-in modem and HomePNA support; the Compaq supports ethernet as well. Each unit features a hard



Philips FW-i1000

on a par sonically with my audio CDs—I'm thoroughly convinced of the value such a unit provides. But the high price will put off many prospective users.

BUILT-IN MP3

PHILIPS HAS another appealing product if you're in the market for a new stereo system. Its \$500

FW-i1000 compact mini-system includes an AM/FM tuner, dual cassette decks, a three-CD changer, and speakers. But the real hook—and the reason this model costs about \$200 to \$300 more than other Philips mini-systems—is the integrated Internet radio. The unit has an ethernet

jack and can connect to Internet radio stations over a DSL or other broadband connection. The IM Networks Radio service provides about 700 Internet radio channels, but adding other stations is simple, especially via the Web, and you can create new stations without much trouble. Navigating the interface's buttons and dials is easier than



Compaq IPaq Music Center

you might expect (though it would become tedious if you tried browsing the full spectrum of channels). Still, the prospect of listening to Celtic radio from Ireland or to an old hometown favorite through your hi-fi—without using a PC—is very enticing.

And after just a few hours of playing a diverse selection of MP3s—which were ripped at the default 128 kbps, yet seemed

Center looked right at home with my Nakamichi receiver and other stereo components. (The HP unit was unavailable for testing for this article.)

—Melissa J. Perenson

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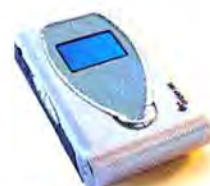


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You can create playlists for your MP3 CD player, so you can plan a sound track to match your journey.

drive player, these portables don't cost much more than flash-memory players. They do tend to be a little larger, and they make more noise when the hard drive is being accessed.

CD players that can handle MP3s are the latest development in portable digital audio. Besides being able to play regular audio CDs, they can play CD-Recordable discs with MP3 files on them. With 650MB of space on a CD-R, you can store about 10 hours of music in the MP3 format—plenty for a round-trip coast-to-coast plane ride. Such players have the advantage of being relatively inexpensive (for example, the RioVolt SP250 costs \$180, while the TDK Mojo has a street price of approxi-



Frontier Labs Nex II



Rio 800

mately \$150), and CD-R discs are quite cheap.

Getting your files onto a CD-R just takes a few clicks with the encoding software of your choice (such as MusicMatch Jukebox or RealJukebox). Alternatively, you can use the software that comes with most CD-R or CD-RW drives. With either kind of software, you can create playlists for your MP3 CD player, so you can plan a sound track to match your journey.

One pointer before you start burning: You should use CD-R discs if you intend to create audio CDs, because most consumer CD players can't read CD-RW discs. For more details, jump to find.pcworld.com/12544 to read our roundup of CD-RW mastering programs.

Pay for It



WHERE WILL digital audio go from here? Napster seemed to promise access to the entire catalog of recorded music from the beginning of time, available on demand over the Internet, but you can forget about that. What you can expect to become available soon are subscription services that give limited access to music for a monthly fee.

Many record companies are launching such subscription services. Record labels Sony and Universal Music Group, in conjunction with Microsoft, have put together a service called Pressplay, while AOL Time Warner, BMG Entertainment, EMI, and RealNetworks have teamed up to form a competing service, MusicNet. These services will be licensed to other companies that will in turn offer them to the public. Ironically, Napster's subscription service will be one of these MusicNet licensees.

TO FEEL THE MUSIC, PLEASE INSERT \$\$\$

WHEN IT'S LAUNCHED, Pressplay MSN (Microsoft's cobranded version of Pressplay) will provide "access to tens of thousands of songs from a wide variety of artists, representing more than 50 percent of major-label content available today," according to an MSN spokesperson. Whether its monthly subscription fee will permit unlimited downloads or will restrict users to a certain number of songs per month was still undetermined at the time we went to press. The fee for the service had not been set either, although MSN claims it will be "competitive." The music offered through the service will be copy-protected using Windows Media Player's Digital Rights Management feature, but whether that will let you copy music to a portable player is also up in the air. Other parties, including FullAudio (www.fullaudio.com) and

EMusic (www.emusic.com), are set to offer competing services. FullAudio expects its service to cost between \$5 and \$15 a month. At launch, users won't be able to copy music to a portable player, but FullAudio spokesperson Sandy Rapp claimed that the ability to copy music to players that support Microsoft's Digital Rights Management system is "in the works."

These music subscription services will require you to use their software to play the music. Pressplay MSN will insist on a player that supports WMA, and the Napster subscription service will demand a new version of the Napster client that includes a secure music player from PlayMedia systems. Record companies will set rules that determine whether you can copy the music you get from these services to other devices or even to portable players.

In addition, Macrovision, a copy-protection and digital rights management technology company, has begun working with record labels to copy-protect music CDs, using a system called SafeAudio. If you try to rip a protected CD to an MP3 file, the resulting music file will sound garbled.

WHICH FORMAT WINS?

ALTHOUGH THE NEW subscription services will try to promote their own file formats, millions of MP3 files have already been created and are still being swapped over the Internet. That should give the MP3 format an advantage for years to come. But whatever file format you choose, and however you play it, there is no doubt that the future of music lies with the Internet.

Michael Gowan regularly writes about digital audio for PC World. Audio file format tests were carried out by Robert James of the PC World Test Center.



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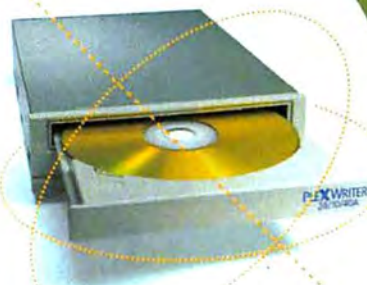
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»» OUR SURVEY OF
27,000 READERS SHOWS
CUSTOMER SUPPORT AT
AN ALL-TIME LOW. ««

Service Takes a Dive

BY LAURIANNE McLAUGHLIN

You or your company paid good money for your computer or laptop. As part of the deal, you're entitled to the manufacturer's help in your computer's hour of need. But far too often, you don't get that help, according to the results of our latest survey on PC reliability and service. In one of the steepest declines we've seen in the eight years we've been surveying readers, service has deteriorated on every measure we track.

Our 27,000 survey respondents tell us that when their machine breaks, they wait on hold longer to talk to a technician, the techies seem to have less know-how, and the companies take longer to fix the problem. Worse yet, many readers never have their problems resolved.

In the ten months since we published our last report (in the January 2001 issue), service has turned lean, if not mean. The only good news is that PCs aren't breaking down any more often now than in the past. Readers say they've run into fewer problems each year, and most users are generally satisfied with their desktops' and notebooks' reliability.

WHERE HAS GOOD SERVICE GONE?

WHILE RELIABILITY has remained about the same, the numbers we gathered on the service front tell a very different story. Support has declined significantly for work and home desktop computers and for notebooks. And less than half of the people who participated in our survey reported that they were very satisfied with the service they received. ▶

Find out which PC makers fared best and worst, AND how to get the help you thought you paid for.

Take Charles Tator, a technician with Unisys in Long Island, New York. Tator knows what it's like to be stuck with an unresolved problem. About a month before the one-year warranty on his Compaq Presario expired, the system's modem started acting flaky: It would disconnect him from the Internet, and at various times, his machine would freeze. He switched ISPs, but that didn't help. Tator e-mailed Compaq to explain his problem and the fixes he had tried, but Compaq's reply—which arrived within 24 hours—did him no good, he says. "I received an automatic response saying it could be the [phone] line, it could be the ISP," recalls Tator. "But I had already tried a second ISP."

Tator called Compaq and waited 45 minutes on hold, only to be told that his warranty had expired. Since he had e-mailed Compaq before his warranty was up, Tator argues, the company should have taken care of the problem and sent him the inexpensive part. It refused, so he replaced the modem himself with a new \$59 unit, which corrected the problem. "This cost them," Tator says. "Since then, our family has bought two more PCs—an HP and an IBM. We're not getting Compaqs ever again."

Compaq feels that Tator's experience was atypical. "With online support, our goal is to have a technician respond by e-mail within 30 minutes," says Steve Young, Compaq's vice president of worldwide customer care in the access business group. "We are reaching that goal." When Tator ran into

REPORT CARD

Winners and Losers



IT'S A SORRY STATE OF AFFAIRS: Not one company in the mix is worthy of an Outstanding rating. In our previous survey (find.pcworld.com/12320), Dell ranked well above other brands. The Texas giant is still by itself at the top in the home PCs category, but it has slipped from Outstanding to Good. At the other end of the spectrum, Compaq took a nosedive, earning a Poor rating for its home PCs.

Readers who own work and home PCs built by local stores (mom-and-pops) sent in enough reports to let us include these stores in the rankings.

WORK PCs	HOME PCs	NOTEBOOKS
OUTSTANDING	OUTSTANDING	OUTSTANDING
None	None	None
GOOD	GOOD	GOOD
Dell, Hewlett-Packard, IBM, local retailers ¹	Dell	Dell, IBM
FAIR	FAIR	FAIR
Compaq, Gateway	Gateway, Hewlett-Packard, IBM, local retailers, ¹ MicronPC	Compaq, Gateway, Hewlett-Packard, Toshiba
POOR	POOR	POOR
None	Compaq, Emachines	None

¹ We received enough responses from owners of locally built machines to include them in our rankings. Local retailers are grouped here as a single category.

SOURCE: PC World Reliability and Service survey, based on 27,081 online participants' responses recorded from April through June 2001. Companies are listed alphabetically within each rating tier.

SURVEY RESULTS

Readers Rate Work PCs

Top vendors Dell and Hewlett-Packard have trouble spots in service, but Compaq's

	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	High satisfaction with reliability	Overall reliability score	Short hold time
★★★★★ GOOD								
Dell First-class reliability; techs take ages to pick up calls.	Outstanding	Outstanding	Outstanding	Outstanding	Outstanding	Outstanding	Outstanding	Poor
Hewlett-Packard Reps resolve problems, but you'll wait on hold.	Fair	Outstanding	Good	Outstanding	Good	Fair	Good	Poor
IBM Though PC parts aren't likely to fail, service is just middle-of-the-road.	Good	Outstanding	Good	Good	Outstanding	Fair	Good	Good
Local retailers ¹ Middling reliability; calls get picked up quickly, staffers know their stuff.	Fair	Good	Fair	Good	Fair	Fair	Fair	Outstanding
★★★☆☆ FAIR								
Compaq Solid PCs, but some troubling service scores.	Good	Outstanding	Good	Outstanding	Outstanding	Poor	Good	Poor
Gateway Dependable PCs and sincere techs; otherwise, so-so service across the board.	Good	Outstanding	Outstanding	Good	Good	Fair	Good	Fair
RELIABILITY ONLY ²								
MicronPC Systems are solid, but customers aren't ecstatic about their reliability.	Good	Outstanding	Good	Fair	Good	Fair	Good	n/a

n/a = not applicable. ¹ Local retailers are grouped together in a single category. ² We didn't receive enough responses to rank MicronPC on service. However, we were able to tabulate the company's reliability scores.

problems during the phone call, says Young, it was probably because the technician didn't have access to the e-mail transactions to find out what had happened prior to then. "We're almost finished rolling out a new system that will capture all communication channels," says Young. This will let techs view the entire history of a customer problem, he adds.

Compaq has registered some of the worst declines in service, according to our survey, but it's hardly alone. All the big computer brands we rated have seen their service scores drop. That said, the majority of respondents still had positive experiences. (We received too few responses from users of various smaller manufacturers' PCs to include ratings for these companies in our report.)

Based on our readers' reports, no vendor scored high enough to earn a rating of Outstanding. Even Dell, the perennial star of our survey, shines less brightly than before. Though the company still sits at the top of the overall rankings for home and work PCs and for notebooks, its vaunted customer service is clearly slipping. Specifically, Dell customers' calls to tech support were not picked up as quickly on average, plus a bigger proportion of home PC owners were left with unresolved problems. In past surveys, Dell regularly finished well ahead of the pack, but now it has lost much of its advantage over Hewlett-Packard, IBM, and local retailers. (For our previous survey's results, go to find.pcworld.com/12320 and check out the Janu-

Less than 1/2

of survey respondents say they are 'very satisfied' with their service experience.

(SOURCE: PC World Survey)

scores are even worse. Local shops shine in service.

	Quick resolution	No resolution	Knowledgeable tech support	Sincere effort by tech support	High satisfaction with service	Overall service score
	Good	Good	Fair	Fair	Good	Fair
	Good	Outstanding	Fair	Good	Poor	Fair
	Fair	Fair	Good	Fair	Fair	Fair
	Good	Fair	Good	Good	Good	Good
	Fair	Poor	Poor	Poor	Unacceptable	Poor
	Fair	Fair	Fair	Good	Fair	Fair
	n/a	n/a	n/a	n/a	n/a	n/a

Company ratings within each tier (Good and Fair) are alphabetical. Outstanding is the highest possible word score; Unacceptable, the lowest.

ary 2001 story "In Search of Trouble-Free PCs.")

The worst offenders? Compaq and Emachines—both rated Poor for their home PCs—languish at the bottom of the heap. For a detailed breakdown of each PC maker's scores on six reliability and six service measures, see the chart on the facing page for work PCs, the chart on page 128 for home PCs, and the one on page 130 for notebooks. For the ▶

A WORD ABOUT THE SCORES

WORD SCORES AWARDED CORRESPOND to the companies' relative rankings. Each measure listed here and in the charts relates to a particular question (or set of questions) we asked *PC World* subscribers in our survey. Visit find.pcworld.com/14621 for percentages underlying each word score.

RELIABILITY MEASURES

- ◆ **Percent of PCs with problems:** Percentage of PCs that have had at least one problem needing repair.
- ◆ **Problems per year:** Average number of problems per PC per year of age.
- ◆ **Problems on arrival:** Percentage of PCs that did not work properly when they were first turned on.
- ◆ **Dead on arrival:** Percentage of PCs that were nonfunctional when they were first turned on.
- ◆ **Component failure:** Percentage of PCs that have had at least one faulty component replaced.
- ◆ **High satisfaction with reliability:** Percentage of respondents who indicated that they were very satisfied with their PC's reliability.

SERVICE MEASURES

- ◆ **Short hold time:** Percentage of phone service recipients who waited on hold for 5 minutes or less.
- ◆ **Quick resolution:** Percentage of service recipients whose most recent problem was resolved in five days or less.
- ◆ **No resolution:** Percentage of service recipients whose most recent problem was never resolved.
- ◆ **Knowledgeable tech support:** Percentage of service recipients who rated the knowledge of the technician who helped them as Excellent or Good.
- ◆ **Sincere effort by tech support:** Percentage of service recipients who rated the sincere effort of the technician who helped them as Excellent or Good.
- ◆ **High satisfaction with service:** Percentage of service recipients who indicated that they were very satisfied with the service they received.

first time, we tracked responses from readers who own PCs built by local stores. Local retailers are ranked together in one group. In the home PC and work PC categories, local retailers did fairly well on service measures. See the charts for more details.

THE SLIMFAST PLAN

WHY HAS SERVICE declined so drastically? The PC industry is suffering through an ugly year. Sales are slumping, companies are fighting a price war, and profits are shrinking. Clearly, the environment doesn't encourage companies to go the extra mile to improve customer service. "Hardware vendors are under the gun to cut costs wherever they can," says Ana Volpi, program manager of research firm IDC's technical support services group.

Because layoffs reduce costs, almost every major PC maker has laid off employees this year. For example, Dell cut about 5000 jobs earlier this year; and following the proposed HP-Compaq merger, the new HP says that it plans to lay off roughly 15,000 people. We asked a number of PC makers whether tech support staffers would be laid off.

Dell told us that its cutbacks would not affect its

30%

of PC owners in our survey who contacted tech support had their problems resolved in less than one day.

(SOURCE: PC World Survey)

support operations. "We purposely did not make cuts among the front-line service representatives, the people who handle our customers directly," says Rick Chase, Dell's vice president of customer service in the home and small-business group.

As part of Gateway's plan to cut 2100 jobs in the United States, the company will consolidate several call centers around the country. "It's possible that there will be job losses among technical support operators in certain regions," says Gateway spokesperson Tyson Heyn. "But we are hiring technicians in other areas, such as Kansas City, Missouri, and Sioux Falls, South Dakota." Heyn adds that Gateway plans to ramp up service options on the ground through its local Country Stores, beefing up phone support and keeping more spare parts on hand.

HP spokesperson Ann Finnie says that at this writing the company has not ironed out any details about its post-merger support operations. HP couldn't say whether the HP and Compaq brands would remain separate, nor could it specify how the job cuts would affect its service departments.

Even confronted with the grim reality of layoffs, such companies as Compaq and IBM deny that

SURVEY RESULTS

Readers Rate Home PCs

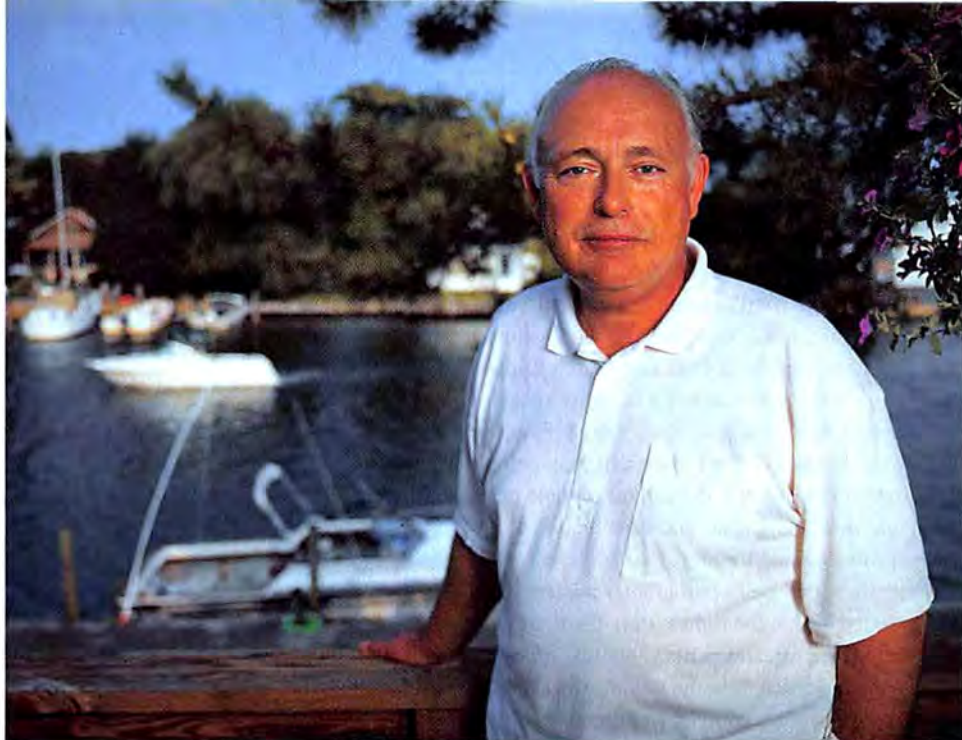
Dell is at the top of the heap but gets some service knocks. Compaq takes a tumble

	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	High satisfaction with reliability	Overall reliability score	Short hold time
★★★★ GOOD								
Dell Solid machines but long hold times.	Outstanding	Good	Good	Outstanding	Outstanding	Outstanding	Outstanding	Poor
★★★ FAIR								
Gateway Some serious reliability problems, and service is only middling.	Poor	Poor	Poor	Good	Fair	Fair	Fair	Poor
Hewlett-Packard Supersturdy components, spotty service.	Good	Poor	Fair	Good	Outstanding	Poor	Fair	Good
IBM Impressive reliability, but lots of customers are left in the lurch.	Good	Good	Good	Outstanding	Good	Fair	Good	Fair
Local retailers' Some reliability problems, but techs are there when you need them.	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Outstanding
MicronPC Need a tech staffer over the phone? You'll probably have to be patient.	Outstanding	Outstanding	Poor	Poor	Good	Good	Good	Unacceptable
★★ POOR								
Compaq Hordes of unhappy campers, very worrisome service scores.	Poor	Poor	Fair	Good	Good	Unacceptable	Fair	Poor
Emachines Dependable computers, but how low can service go?	Good	Fair	Outstanding	Outstanding	Good	Unacceptable	Good	Unacceptable
RELIABILITY ONLY ²								
Acer Lots of problems from the get-go, and some owners aren't thrilled.	Fair	Good	Poor	Fair	Fair	Poor	Fair	n/a
Sony Some high points in reliability; customers fairly content.	Outstanding	Good	Good	Fair	Good	Fair	Good	n/a

n/a = not applicable. ¹ Local retailers are grouped together in a single category. ² We didn't receive enough responses to rank Acer or Sony on service. However, we were able to tabulate their reliability scores.

service is suffering. "Despite the economic climate, we continue to invest in customer service," says Compaq's Young. Compaq regularly surveys its customers about support every week, and Young says those surveys indicate that significant improvements in service have occurred this year compared with last year. Young adds that Compaq has shortened its customers' hold times to roughly a minute on average, and increased the likelihood that problems will be fixed during the first technical support call.

Our survey results show a different picture, though. Only 42 percent of respondents who own Compaq home PCs had their calls picked up in 5 minutes or less—a sharp drop from the previous survey's figure, 64 percent. When we asked readers whether problems were resolved in five days or



UNHAPPY with Compaq: Charles Tator fixed his PC's modem on his own after the company wouldn't help.

less, 56 percent of Compaq customers said yes, down from almost 64 percent previously. Nearly 14 percent of Compaq home PC owners said they were left with an unresolved problem, compared with slightly over 9 percent in last January's survey.

ONLINE SUPPORT STRUGGLES

TO CURB THE COSTS associated with call centers, PC companies have promoted their online support tools. Online help is a great idea—in theory. When your system has a problem, you go to your PC maker's Web site and track down fixes that work. You get a snappy response by e-mail or engage in live chat with a technician. Furthermore, the most sophisticated tools allow a tech to diagnose your PC's ailments remotely. All of this should mean that you need never pick up the phone. (Of course, online support does no good for people whose PCs won't boot or who otherwise can't get online.)

But in practice, online support hasn't fared so well. Of our survey respondents who posted tech support questions (via e-mail or a Web-based template) to their PC's maker and got replies, only a quarter said that the response solved the problem; another 38 percent felt it didn't help at all.

Dell discontinued Resolution Assistant, its online support tool, at the end of July. Resolution Assistant let customers engage in live chats with technicians and allowed the techs to carry out diagnostic tests remotely. "It wasn't giving customers the satisfaction we needed it to," reports Dell spokesperson Bryant Hilton. Dell ended up receiving many phone calls following online sessions, Hilton adds. And that's not the way online help is supposed to operate. For now, Dell will offer ▶

and joins Emachines at the bottom.

	Quick resolution	No resolution	Knowledgeable tech support	Sincere effort by tech support	High satisfaction with service	Overall service score
	Good	Fair	Good	Good	Good	Good
	Fair	Poor	Fair	Fair	Fair	Fair
	Poor	Poor	Poor	Fair	Poor	Poor
	Fair	Poor	Fair	Poor	Poor	Fair
	Fair	Fair	Good	Fair	Fair	Good
	Fair	Fair	Fair	Fair	Fair	Fair
	Poor	Poor	Poor	Fair	Poor	Poor
	Unacceptable	Unacceptable	Poor	Poor	Unacceptable	Unacceptable
	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a

Company ratings within each tier (Good, Fair, and Poor) are alphabetical. Outstanding is the highest possible word score; Unacceptable, the lowest.

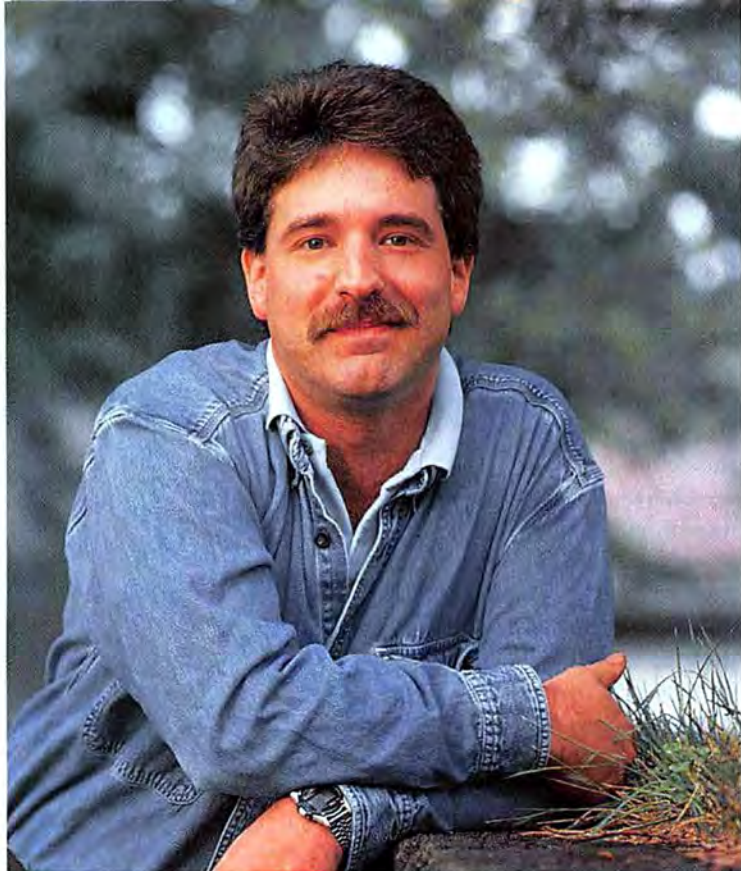
e-mail support but not online chat. The company says it is continuing to evaluate future online tools.

Paul Didier, a small-business owner in Long Beach, California, was unimpressed with Resolution Assistant—and with Dell. Last March, Didier started to get error messages on his three-month-old Inspiron 8000 notebook. Didier tried phoning Dell twice, but he couldn't reach a human being. The first time, he waited 45 minutes on hold only to be disconnected; the second time he called, he gave up after waiting for more than an hour.

Didier then tried Dell's Resolution Assistant. The tech pointed him to the right system file to adjust, but then logged off. Didier never got the information he really wanted: how the modification would affect the speed of his computer. "I was in the middle of writing a question and that was the last I heard of him," adds Didier, noting that there was no way to get the technician back online.

As part of our research for this story, we evaluated the technical support offered by six PC companies. Unfortunately, our only experience with online tech support—HP's Assisted Support—made phone tech support seem blindingly fast.

When we phoned HP with two relatively simple problems (discussed in one phone call), it took just 25 minutes—including hold time—to fix them.



EMACHINES owner Mike Schnee saved time and money by buying and installing a fan himself.

When we used the online support option, however, solving just one of the problems took three times as long (the other problem never got resolved). The most painful part of the process was the excruciating time lag while we waited for AI, the HP online support technician working with us, to answer our

PHOTOGRAPH: BRUCE ZANE

SURVEY RESULTS

Readers Rate Notebooks

Dell and Big Blue build dependable machines, but service is spotty across all

	Percent of PCs with problems	Problems per year	Problems on arrival	Dead on arrival	Component failure	High satisfaction with reliability	Overall reliability score	Short hold time
★★★★★ GOOD								
Dell Service slips, especially on hold times.	Fair	Good	Good	Outstanding	Fair	Good	Good	Poor
IBM Mostly solid laptops, but problems take a while to be fixed.	Outstanding	Outstanding	Good	Fair	Good	Fair	Good	Good
★★★☆☆ FAIR								
Compaq Reliable computers, very few DOAs, but many service problems.	Poor	Good	Good	Outstanding	Fair	Poor	Fair	Fair
Gateway Time on your hands? You may need it to get your PC fixed.	Fair	Good	Fair	Fair	Fair	Fair	Fair	Poor
Hewlett-Packard Reliable notebooks for most owners, but support techs are slow to pick up calls.	Outstanding	Fair	Good	Outstanding	Outstanding	Fair	Good	Poor
Toshiba Pretty sturdy machines, but customers could be happier with service.	Good	Outstanding	Outstanding	Outstanding	Good	Fair	Good	Fair
RELIABILITY ONLY ¹								
Fujitsu Dependable machines, few dead on arrival.	Good	Outstanding	Outstanding	Outstanding	Good	Fair	Good	n/a
MicronPC Small number of problems each year; otherwise, mediocre reliability.	Fair	Outstanding	Fair	Good	Fair	Fair	Fair	n/a
Sony Not many DOA systems; components tend to last.	Outstanding	Good	Good	Outstanding	Outstanding	Fair	Good	n/a

n/a = not applicable. ¹ We didn't receive enough responses from owners of Fujitsu, MicronPC, or Sony machines about their service experiences to be able to rank these companies in our overall charts. However, we were able to tabulate their reliability scores.

questions. AI took 18 minutes to type this simple response to one question: "Yes." We contacted HP to find out what had happened. Susan Hollis, HP's worldwide e-support program manager, concluded that our experience was an isolated incident. Hollis reports that HP has improved its online support features over the past few months. Customer satisfaction levels are also improving, she says.

Some companies say they're happy with their online support. Gateway, for example, says it has been able to solve problems much more efficiently. Its online program, launched in fall 2000, includes live chat with techs. Gateway also reports that it has been able to solve more customers' problems without sending replacement parts. Gateway's corporate customers are now more likely to request support online than over the phone, according to Dan Ludwick, Gateway's director of service development and marketing. In October 2000, 15 percent of service requests arrived electronically, Ludwick says, but today that figure has risen to 52 percent.

FINDING A FIX

WHILE WINDOWS ME caused its fair share of upgrade headaches, respondents running Me express slightly higher levels of satisfaction than users who have Windows 95 or 98 PCs. One possi-

38%

of readers surveyed who received online support said the response didn't help.

(SOURCE: PC World Survey)

ble explanation for these results might be Me's System Restore utility. If your PC runs into trouble, System Restore lets you roll your computer back to the way it was on a certain date, as long as you asked System Restore to take a snapshot of your PC at that earlier time. This can return your system to a stable state, but System Restore can introduce other hassles. For example, if the underlying problem is a corrupted driver, using System Restore would amount to overkill—and would entail far more work for you than reinstalling the driver, which would solve the problem in one step.

When we called various tech support lines to test companies' service, we were surprised at how heavily techs relied on System Restore as a catch-all fix and instructed us to run it. On some occasions, the techs advised us to run System Restore immediately, without performing any preliminary diagnostic tests. For the PC problems we were contacting vendors about, running System Restore wasn't necessary—and it didn't always fix the problem.

SELF-SERVE ISLAND

AS THE ODDS of poor service from PC companies increase, it's wise to become as self-reliant as possible. You can save time, money, and aggravation with online research or, in some cases, a quick part swap. Mike Schnee of Akron, Ohio, an assistant manager at a retail store, called Emachines when his home PC started making a strange noise. Schnee and the technician narrowed down the problem to the fan. But the tech insisted that Schnee, at his own expense, send the whole ▶

companies.

	Quick resolution	No resolution	Knowledgeable tech support	Sincere effort by tech support	High satisfaction with service	Overall service score
	Fair	Fair	Good	Good	Good	Fair
	Poor	Fair	Good	Fair	Fair	Fair
	Poor	Poor	Fair	Poor	Fair	Poor
	Poor	Fair	Fair	Poor	Fair	Fair
	Fair	Fair	Poor	Poor	Fair	Fair
	Poor	Fair	Fair	Fair	Poor	Fair
	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a

Company ratings within each tier (Good and Fair) are alphabetical. Outstanding is the highest possible word score; Unacceptable, the lowest.

SURVEY METHODOLOGY

PC WORLD'S Reliability and Service survey was conducted in conjunction with Survey.com of Campbell, California. We invited subscribers to take the Web-based survey from April through June 2001. We received 27,081 reports from verified PC World subscribers describing their PCs' reliability and their experiences, if any, in getting service. We only included reports about PCs that were three years old or newer. Using this data, a team of PC World editors and research experts analyzed the reliability and service performance of each manufacturer's work, home, and notebook PCs. We rated each PC maker's performance on 12 weighted measures and then used those results to determine the company's overall ranking.

system back for repair. Schnee wasn't excited about that prospect, so he looked for an alternative.

"I found out it would cost me \$7 to \$14 for a fan with heat sink from a local place," Schnee says. "That's easily less than the shipping." So he bought and installed the new fan himself. But remember, installing third-party components can void parts of some warranties, so always check your policy. For more tips on how to cure your PC's ills, see "How to Deal With Lousy Support" on this page.

Still, no matter how self-reliant computer owners have become, readers who responded to *PC World's* survey echo the attitude of frequent fliers who've grown displeased with the major airlines: Service just isn't what it used to be.

No doubt, this is a tough economic time. And no doubt, providing customer service at a reasonable cost is a complex undertaking that employs legions of smart people. But any business that depends at least partly on word-of-mouth recommendations should be concerned when less than half of its customers are very satisfied with the service they get.

Repeatedly, readers tell us that bad service will make them less likely to buy from the same PC maker next time. As Paul Didier, once a loyal Dell customer, puts it: "It doesn't matter if companies have good techs, [when] you aren't able to get through to them," he says. "I will not consider buying a Dell again until they remedy this situation."

When your PC manufacturer won't help you with your broken system, taking matters into your own hands is an option; but don't let the company off the hook. Be vocal. Document your complaint. Write to your PC maker's CEO and to the company's local Better Business Bureau branch. Spread the word among friends and coworkers. And whatever you do, don't forget to write to us. ■

Laurianne McLaughlin is a freelance writer based in Massachusetts. If you have a gripe with your PC maker, or you want to applaud your service experience, contact us at onyourside@pcworld.com.

TESTING TECH SUPPORT

WHILE RESEARCHING this story, a team of *PC World* editors evaluated technical support. In our hands-on tests, we contacted six manufacturers by phone with two hardware questions. Go to find.pcworld.com/13820 for more details.

TIPS TO GET HELP

How to Deal With Lousy Support

WHEN YOUR PC GETS SICK, you can choose from two possible strategies. You can try the *Sleepless in Seattle* approach: *I'm smart and charming, and I'm going to find good service.* Or you can opt for the *Cast Away* approach: *I'm going to fix this myself.* Here are some tips for both methods.

ATTENTION, PLEASE: GET YOUR PC MAKER TO LISTEN

- ◆ **Have all key information** at hand when you first call. This includes system information (such as serial numbers and service tag numbers), order or invoice numbers, date of purchase, and any fixes you've tried.
- ◆ **Back up your data**, and keep your backups current. Maintain a list of all your apps. Take notes on any weird PC behavior following installation of a new program or downloading a driver.
- ◆ **If a technician doesn't offer helpful answers**, ask for someone else, preferably a supervisor. The company would rather solve your problem the first day, since that costs less money.
- ◆ **Keep detailed notes** on your support calls, and maintain a log of dates and times, plus each fix the techs suggest. Get their phone extensions, if possible, and any case numbers assigned to your PC problem.
- ◆ **If the end of your computer's warranty** is near, don't waste any time. If necessary, press your PC maker to send the appropriate replacement part.
- ◆ **As a last resort**, send a letter (not an e-mail) to the CEO's office and the Better Business Bureau (if there is one) in the city where the manufacturer is located; at www.bbb.org you can find addresses for all local BBB offices. The BBB can often cut through bureaucracy.

TAKE CHARGE: SOLVE YOUR OWN PC PROBLEMS

- ◆ **Use a free site** such as *PC World* partner PC Pitstop (www.pcpitstop.com) to run diagnostics and scout out typical PC ills.
- ◆ **Consult one or more volunteer sites** such as Wayne's Computer World (www.waynescomputerworld.com) and question-and-answer forums such as *VirtualDr.com* (for instance, see Windows Me tips at find.pcworld.com/13842). Or visit Experts Exchange's hardware forum (find.pcworld.com/13843).
- ◆ **Read newsgroup postings.** Two good places to start are the Usenet Info Center's directory at find.pcworld.com/13844 and the comp (Computers) discussions at find.pcworld.com/13040. Laptop users should check out the comp.sys.laptops group (find.pcworld.com/12760).
- ◆ **Local PC shops** may offer tech support, for which they charge by the hour. Get friends, neighbors, and colleagues to recommend a shop if possible; simply choosing a store from the yellow pages can be risky.
- ◆ **Consider fee-based support** sites such as *Expertcity.com* or *Askdrtech.com*. Through Expertcity.com's ExpertLive, independent experts will quote you their prices on handling your PC question. In return for an annual fee of \$49 or more, Askdrtech.com offers phone and e-mail help.

FOR MORE DETAILS on finding the best help, turn to June's "Get the Help You Need" (find.pcworld.com/12381).

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HUGHES



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Holey Software!

New security bugs that let hackers attack your data appear weekly. Here's why apps are so full of holes and how you can protect yourself.

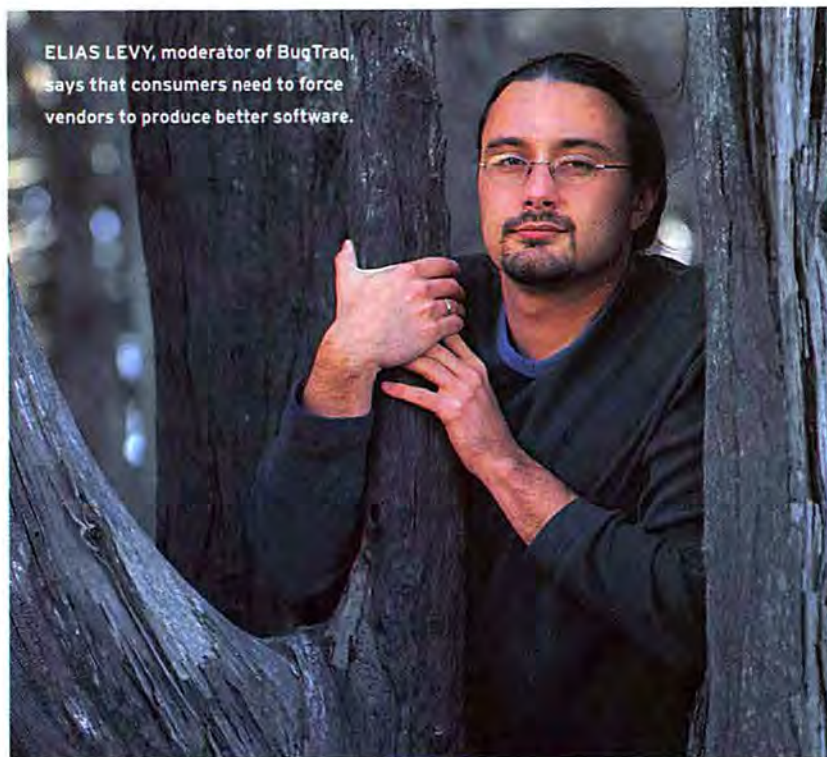
BY KIM ZETTER

PHOTO-ILLUSTRATIONS BY
PIERRE-YVES GOAVEC

Imagine you own a small company that has a few high-profile clients. One day you discover that confidential data you store about these clients—credit card numbers, personal contact information, and promotional plans—is being broadcast over the Web for all to see. You have no clue how it's happening or how to stop it.

That was the real nightmare for one company that sought the help of James Sinclair, chief technology officer of Global Network Security Services in Los Angeles. In July 2000, after three weeks of searching for the data leak, the company (which understandably ►

ELIAS LEVY, moderator of BugTraq, says that consumers need to force vendors to produce better software.



"If customers asked [Microsoft] for security, or if they voted with their wallets, I believe the company would pay attention."

wants to remain anonymous) called Sinclair's firm to investigate. A few hours later, GNSS discovered the problem: a security hole in FileMaker Pro Web Companion desktop database software that allowed an intruder to access the data from outside. "We don't know how our client was targeted," says Sinclair. "There are so few people who use FileMaker—comparatively speaking—that it was really the luck of the draw that they got hit."

FileMaker had posted an announcement and a fix for the hole two months earlier, but Sinclair's client never heard about it. The company had no tech staff, and they would have discovered the flaw only by visiting FileMaker's Web site—the software vendor never notified customers about the problem by e-mail.

Buggy software has long been the bane of computer users. But bugs can cause double the trouble when they involve a security hole. It's frustrating enough when your system locks upon opening an application, but when a security flaw

leaves your PC open to attack, you want to know who to blame.

There are no easy answers. Tracking down your attacker is usually a fruitless task, and vendors are loathe to accept responsibility for a program's failings. Even more frustrating: Security holes may simply be a fact of life, given the complexity of today's software.

Fortunately, there are plenty of things you can do to protect your PC (see "Batten Your PC's Hatches" on the next page and "Essential Patches" on page 138). Even so, you might feel that software vendors should do more to prevent problems in the first place. Some observers say litigation may be the only way to force vendors to take more responsibility.

HOLE LOTTA TROUBLE

FROM OPERATING systems to browsers to antivirus packages, nearly every major software product has had a security flaw or two. BugTraq, a mailing list at Security-Focus (www.securityfocus.com) that

tracks holes and patches, has counted 35 vulnerabilities in Windows 98 alone. Internet Explorer has had a whopping 69.

While some holes clearly spell bad news, other bugs can be exploited only in rare cases or they affect few users. The FileMaker glitch, for example, "[could have] affected only a small percentage of customers," according to FileMaker spokesperson Steve Ruddock. "As far as I know, the security hole was only theoretical. We never heard of anyone who suffered problems from it." Of course, that's no comfort to James Sinclair's client.

Security holes in popular desktop programs like Outlook or Norton AntiVirus are more likely to touch you directly, but holes in server-based software can affect you, too. A flaw in an e-commerce site's online shopping cart program, for instance, could give thieves access to the credit card number you submit to the site.

Even more unnerving is the fact that the U.S. Navy controls its submarines with Windows NT, a program that has been plagued with bugs, including security holes, since its release. In 1997 a missile cruiser was rendered dead in the water because of a data-calculation bug in NT. BugTraq lists 164 holes in Windows NT 4.0, predecessor to Windows 2000 and Windows XP Professional. "The program was marketed as being secure," says Richard Power, editorial director of the Computer Security Institute in San Francisco. "But it had so many holes that hackers [said] the NT stood for 'nice try.'"

TRACING THE SOURCE

SCOTT CULP, program manager of Microsoft's Security Response Center (which investigates reports of holes and monitors the company's patching process), says that bug-free software is impossible to achieve. "Every piece of software that has ever been developed has had bugs. And every piece of software that ever will be developed is going to have bugs."

But is the problem getting worse, or are we just getting better at finding holes?

Bruce Schneier, CTO for Net security firm Counterpane and author of two books

on cryptography, says there is more focus on finding flaws—both among researchers looking to make programs secure and among hackers who want to crack them. But, he says, there are more holes as well. “As systems get more complex, they get less secure,” he says. “Computers, software, and the Internet are getting so interconnected that insecurities are mounting faster than our ability to find them.”

Vendors, spurred by competition and the consumer cry for more features, bloat their wares with extras, says Schneier. As lines of code increase, so do bugs. There is no industry standard for an acceptable number of bugs, but a sometimes-quoted figure is one bug per 10,000 lines of code—a lot of bugs when you consider that Windows 2000 reportedly contains some 40 million lines of code.

Elias Levy, CTO of SecurityFocus and moderator of BugTraq, adds that poor programmer training leads to security flaws. “Many programmers drop out of college after their first or second year.... And if they do [finish] school, most universities don’t teach how to write secure code. It’s simply never been part of the curriculum.”

Schneier says other security flaws appear when programs designed for different purposes are combined—for example, Microsoft Word macros and e-mail. Macros, pieces of code that automate specific tasks, are a great idea on their own, but can become dangerous when combined with e-mail. Click on an e-mail attachment containing a malicious macro, and it can reformat your hard drive.

But macros, as well as Java and ActiveX applets, aren’t unsafe until someone uses them with evil intent. The CSI’s Power says that users would benefit from software vendors erring on the cautious side and disabling potentially dangerous functions by default. Programs would then have to ask for your permission when suspicious code attempts to run on your PC. “The very process of going in and opening something that’s closed by default,” he says, “forces users to make a conscious decision about security.”

Of course, Microsoft products aren’t ►

Batten Your PC's Hatches

FEEL AS IF YOUR PC is under siege? In addition to installing antivirus and firewall software, there's a lot you can do to guard against intruders. Follow this list to help secure your PC.

DISABLE FILE SHARING: File sharing lets networked computers pass documents back and forth, but it also lets strangers steal files from your PC over the Net. Consider enabling file sharing only when you need to give someone access to files, and then disabling it afterward. And use password protection for shared files so that only the person you designate can read them. **FIX:** To disable file sharing, go to *Start•Settings•Control Panel•Network•Configuration•File and Print Sharing*. Make sure the option boxes are not checked and then click *OK*.

BOLSTER YOUR BROWSER: The Web harbors bad code that can exploit your browser's ability to run scripts. **FIX:** Adjust the security in Internet Explorer or Netscape Navigator. You can change IE's security via its sliding bar (depending on your version of IE), or you can choose specific functions to control. To use the sliding bar, go to *Tools•Internet Options•Security*. Select *Internet Zone*, click *Default Level*, and move the bar from Low to Medium or High. Low provides almost no protection from Web hazards; Medium disables many scripts but allows cookies; and High disables virtually all scripts and cookies. To set specific functions, select *Custom Level* and set controls one by one. Be warned: This is more complex. In Netscape, choose *Edit•Preferences*, and then *Advanced* in the Category window.

CONFIGURE OUTLOOK AND OUTLOOK EXPRESS: Outlook allows you to disable macros in e-mail attachments or to let some macros through—such as those that are digitally “signed” by trusted sources. You can also have Outlook adopt the security options you define in IE. In Outlook Express, you can set e-mail security levels based only on the settings you've chosen for IE's Internet and Trusted Sites Zones. **FIX:** To allow Outlook to let only trusted macros through, go to *Tools•Macro•Security* and click *High*. Then, to ensure that Outlook is using your IE security settings, click *Tools•Options•Security*. You should see the Internet Zone icon in the Secure Content list box. While you're at it, click on *Attachment Security* and make sure it's also set to High.

DISPLAY FILE EXTENSIONS: Many viruses have an extension to the file name, such as .vbs (Visual Basic Script), or a double file extension, as in AnnaKournikova.jpg.vbs, that tips you off. But the default setting in Windows hides them, so you're tricked into opening a malicious attachment. **FIX:** Display full file extensions in Windows Explorer by clicking *Tools•Folder Options*. Select *View* and check *Show all files* (in Windows 9x) or *Show hidden files and folders* (in Windows 2000 and Me). Some extensions are visible only with a Registry tweak. You can see even those extensions by installing a free copy of Extension Manager (find.pcworld.com/12240). Then, before opening any attachment, right-click the message in your in-box and click *View Attachments* (but don't click the attachment). If the file has two extensions, it's probably up to no good. If the extension is .bat, .com, .exe, .lnk, or .pif, it is an executable file and may attack your system.

PATCH HOLES: New security holes are constantly being uncovered in operating systems, browser programs, antivirus scanners, and applications. Don't be caught with your system open. **FIX:** Install the latest patches from software vendors. See “Essential Patches for the Worst Security Holes” on page 138.

—Stuart J. Johnston



the only programs with flaws. Adobe Acrobat Reader, America Online's Instant Messenger, Netscape Navigator, and Symantec's Norton AntiVirus have all had holes. But Microsoft, Levy points out, is the "800-pound gorilla" that critics focus on because the company's software is so pervasive. A security hole that affects millions of its users is naturally an attractive target for malicious hackers.

TARGET: MICROSOFT

CRITICS ALSO FOCUS ON Microsoft because it has the resources to do extensive testing but still misses holes. Counterpane's Schneier says Microsoft is too

quick to send products to market, and consumers have accused the company of shipping programs with known security flaws.

Microsoft's Culp says the company reviews written code, then tests software by emulating how users might operate it. But, he adds, "there are [always going to be] people who will use the product in ways that we just didn't conceive." And a program as big as Windows can be unwieldy to test. It's broken into parts and produced by separate design teams. Mark Croft, product manager for Windows XP, says that "fewer than a dozen" people have a complete picture of that program.

Culp also says the company addressed

the quick-to-market issue with its much-publicized delay of Windows 2000, which was held back a year for debugging.

"In the past...we said it [was] acceptable to ship with a certain number of low-severity, very-difficult-to-exploit security vulnerabilities," says Culp. "At some point you say that the probability of this thing ever being exploited and of it actually ever affecting customers in any type of meaningful way is sufficiently low that we would be comfortable shipping with that bug. In Windows 2000, we said we will no longer make that judgment. If it is a security bug, we will not ship."

Schneier, however, rejects the idea ►

DOWNLOADS

Essential Patches for the Worst Security Holes



MALICIOUS HACKERS tend to be opportunists. Rather than expend the effort to find new security flaws, they usually attack well-known holes in software. The good news is that patches are available to plug these holes. But if you're weary of installing all of them (patches, after all, can be buggy and sometimes introduce new problems to your PC), knowing which ones you really need can be confusing. Here's a list of the most crucial cures for your vulnerable system.

OPERATING SYSTEMS

WINDOWS 95 If you have an early version of Windows 95, install Service Pack 1 (available at find.pcworld.com/13020). To see the version of Windows you have, go to *Start•Settings•Control Panel•System*. If you have version 4.00.950 A or later, you don't need the pack.

WINDOWS 98 Users of the first edition of Windows 98 should download the service pack (at find.pcworld.com/13021). Windows 98 Second Edition users don't need the pack. But all Windows 98 users should get the latest "critical updates package" (at find.pcworld.com/13022).

WINDOWS MILLENNIUM EDITION There is no service pack for Windows Me, but Microsoft does offer patches, labeled for Me, that fix flaws in versions of Internet Explorer, Outlook, and Outlook Express that operate with Me (see below).

WINDOWS 2000 PROFESSIONAL Install Service Pack 2 for Windows 2000. The 20MB pack may require up to 710MB of free

hard-disk space to install the files, but you'll get most of that space back after installation (available at find.pcworld.com/13023).

WINDOWS 95 THROUGH 2000 Microsoft's Java Virtual Machine, which lets IE and other apps run "trusted" Java applets and ActiveX controls, has a flaw that allows crackers to run evil applets on your PC. Visit find.pcworld.com/13024 to get the patch.

E-MAIL CLIENTS

OUTLOOK EXPRESS A hole in Outlook Express's VCard technology also affects Outlook. A VCard is a virtual business card that can load automatically into your Outlook and Outlook Express Contacts database when someone sends it to you. The hole allows someone to insert malicious code into a VCard. Go to find.pcworld.com/13025 to download the patch.

OUTLOOK 97 THROUGH 2000 AND OUTLOOK EXPRESS 4.0 THROUGH 5.01 Crackers can exploit a hole to send e-mail that can reformat your hard disk (go to find.pcworld.com/13026).

BROWSERS AND OFFICE

INTERNET EXPLORER 5.5 A new feature of IE called Print Templates has a hole that can turn your PC into a cracker's playground (the patch is available at find.pcworld.com/13027).

NETSCAPE 7 Netscape's SmartDownload 1.3 has a hole that could let an attacker take over your PC (go to find.pcworld.com/13028).

MICROSOFT OFFICE A bug in PowerPoint 2000 could let a cracker reformat your hard disk (get the patch at find.pcworld.com/13029). A patch (available at find.pcworld.com/13030) stops an attack made through ActiveX controls in Office 2000. Another patch (available at find.pcworld.com/13031) fixes a hole related to macros in Word 97, 2000, and 2002 for Windows.

—S.J.J.

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that Windows 2000 raised the security bar. "[Microsoft] said...[Windows 2000] would be more secure than any other version to date. But there are more security holes in it than any other version of Windows."

RESPONSE CENTER

BUGTRAQ'S LEVY acknowledges that Microsoft has become more responsive to fixing holes. Last year, Culp says, the response center received 10,000 e-mail reports, resulting in 600 investigations and 100 security bulletins. The other e-mail reports were duplicates of the same bug, false, or bugs the company fixed in the next version of a product.

"Much as we'd like it to be different, we're both fallible and non-omnipotent," says Culp. "That's where the security response process comes in.... Most vendors stop the development and engineering process when they release the product to market.... We've got a sustained engineering process that follows the product even after it's been released."

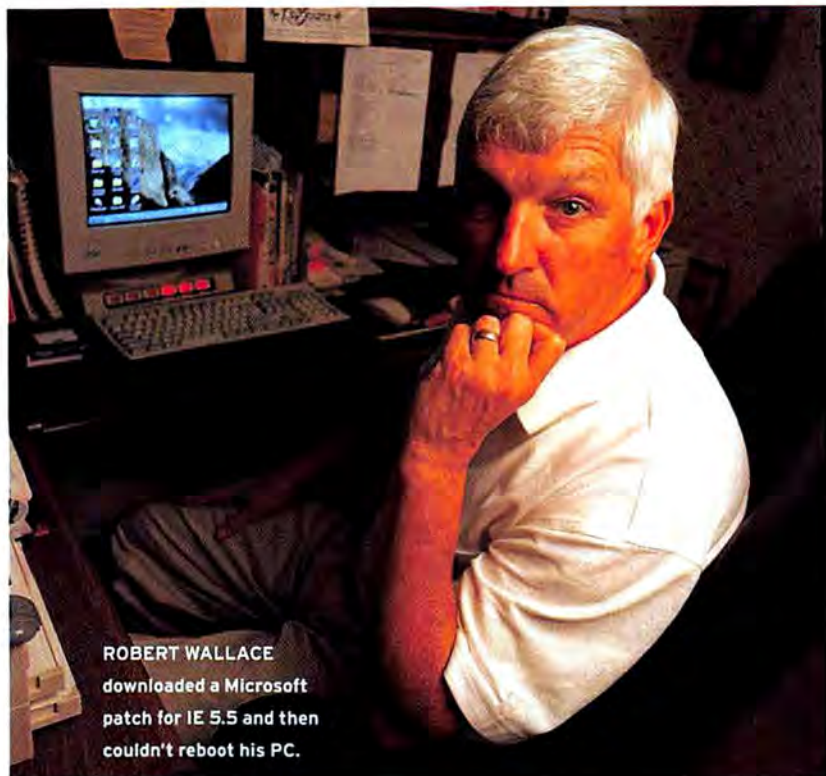
But can you really trust any software vendor to properly patch bugs that it created in the first place?

Robert Wallace of Lake Zurich, Illinois, thinks not. He installed a patch for IE 5.5, and then couldn't reboot his PC. After \$35, 17 hours, and four Microsoft support reps, his PC was still down. Microsoft said they'd call him back. A few days later, his 15-year-old son helped restore his backup. "Microsoft [reps were] polite when they called, and they did refund the money, but they took five business days to get back to me. That's five days that I was down."

BUG HUNTERS

DESPITE THE PRODUCT evaluation that Microsoft and other vendors perform, security holes clearly pass through unnoticed. That is, until products hit the market and bug hunters take over with their own brand of rigorous testing.

Bug hunters find and publicize holes that vendors miss. They include a range of people: security researchers; system administrators; crackers (criminal hackers), who reverse-engineer a program



ROBERT WALLACE
downloaded a Microsoft
patch for IE 5.5 and then
couldn't reboot his PC.

"Microsoft [reps were] polite...but they took five business days to get back to me. That's five days that I was down."

specifically to exploit its flaws; and "white-hat" hackers, who find and publicize holes with no intent to wreak havoc on systems. Their aim is to force vendors to fix holes.

After finding a flaw, a bug hunter may or may not contact the vendor before posting the information to a list like BugTraq, where system administrators, security consultants, and journalists can read it. Vendors, of course, would prefer that vulnerabilities were never made public. But hackers and security pros say that publication forces vendors to quickly fix problems they would otherwise ignore. It also lets users and system administrators take measures to protect themselves, thus decreasing the amount of time during which crackers who already know about a hole can silently exploit it. Even if a patch isn't available, users can disable a vulnerable feature until the patch is posted.

Rain Forest Puppy, a hacker who has written a disclosure policy that serves as an unofficial guideline for many bug

hunters (available online at find.pcworld.com/13000), says that even under threat of publication, vendors can be unresponsive to bug reports. Nonetheless, he advises bug hunters to give vendors five working days to respond to a report—whether that means promptly issuing a patch or stating the time needed to investigate a problem—before publicizing it. "If they don't acknowledge it in a week—if they're on vacation or whatever—then that's already a poor response," he says.

FULL DISCLOSURE

BUT NOT EVERYONE thinks publicizing holes is a good idea, since crackers (some of whom are consultants and administrators, too) also read bug lists, looking for new holes to exploit. A month after a flaw in Microsoft's Information Internet Server (IIS) software was published, a cracker wrote the Code Red worm to exploit it.

Marcus Ranum, CTO of software vendor NFR Security, says that many PC

HUGHES



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users and administrators—for whatever reason—don't fix their systems even when a patch is available. Thus, publicity about holes makes their systems more vulnerable. The problem is exacerbated if a bug report includes exploit code—programming code that demonstrates in practice what the report describes in theory. Bug finders sometimes post exploits to allow administrators to test their systems for holes or test a vendor's patch. And some programmers need the exploit to convince their bosses of the need to create a patch for customers. But once an exploit is published, it can also be used by crackers to break into systems.

Levy admits that disclosing holes is a double-edged sword. "Once you inform the good guys, you also inform the bad guys," he says. But he and Schneier say that disclosure has done more to help security than harm it—as evidenced by Microsoft's improved response to holes. And, Levy says, "Incredibly enough, until this year Apple didn't even have an e-mail address to report security problems. Now they do."

Disclosure, in the end, puts the onus on users and administrators to patch their systems. Hundreds of thousands of systems could have escaped the Code Red scourge in July had administrators fixed their systems a month earlier when Microsoft released a patch for the buffer overflow problem that the worm exploited. (Visit find.pcworld.com/14600 for more about full disclosure and software holes.)

FIGHTING BACK

THOUGH SECURITY problems might be endemic to software, Schneier says software vendors get away with more defects than other industries do. "Chrysler won't [knowingly] sell you a car with an [unsafe] feature—they know if you get into an

accident, they'll be held liable. But there is no such product liability in software."

Schneier adds that software makers are slow to learn from mistakes. "Buffer overflows are the poster child of why problems aren't getting better," he says. "They were discovered in the 1960s and were first used to attack computers in the 1970s.... Here we are 40 years later, and buffer overflows are the most common security problem. And that's an easy problem to fix. If you are a software vendor, there is zero excuse for buffer overflows."

But vendors have little legal incentive to address problems—no current laws re-

writing Managers now charges higher premiums for clients using Microsoft's IIS and Windows NT, but no security-related consumer suits seem to be pending against software makers. Vendors anticipating the sting of litigation are taking pains to protect themselves. Terms-of-service agreements that users must click through before installing software carry "limitation of liability" clauses. Accepting such agreements means you may be relinquishing your right to sue. Enforcement of these clauses has not been tested in court, however.

"Liability would be a great incentive,"


says Levy, "but...even under the best efforts, software will still have some errors. So are we placing [software vendors] in a position in which they simply can't deliver?"

In the final analysis, Levy says, consumers may have more clout than they think. "Microsoft is very customer-focused," he says. "If customers asked them for security, or if they voted with their wallets, I believe the company would pay attention. But even with all of the press about security problems in Microsoft products, customers simply don't view security as a high priority.

Or at least they don't make that known for Microsoft to make it a priority."

Perhaps it's time consumers let software vendors know how they feel about security—and take their business elsewhere when it appears that no one is listening. Of course, going elsewhere won't always be a viable option, especially in a Microsoft-centric world. But until software security improves, it's mostly up to users to defend themselves. ■

Kim Zetter is a senior associate editor and Stuart J. Johnston is a contributing editor for PC World.



Top Holey Apps

Rank	Package	Known Security Holes
1	Microsoft Internet Explorer	69
2	Microsoft Windows 98	35
3	Microsoft Windows 95	30
4	Microsoft Outlook	28
5	Netscape Navigator	22
6	Microsoft Outlook Express	16
7	Microsoft Windows Me	10
8	Microsoft Excel	10
9	Microsoft Word	9
10	Qualcomm Eudora	8
11	Symantec Norton AntiVirus	7
12	AOL Instant Messenger	6
13	Mirabilis ICQ	6
14	Sun Java	5
15	Microsoft PowerPoint	5

Source: BugTraq

quire vendors to fix holes. Of course, if a hole in a personal finance package results in users' data being open to perusal, for instance, the vendor will have to issue a patch, or suffer consumers' ire. But many holes are less obvious—such as ones that let a cracker use your PC to attack a Web site. In that case, you may never know your system has been compromised.

Schneier says the only things that will force vendors to produce better software are consumer lawsuits and higher insurance premiums for software makers and the businesses that use their products.

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Have you taken a look at your home PC lately? Your kids are abandoning it because it can't support their favorite games. And if you're using a broadband Internet connection, you may have noticed by now that your old 56K modem wasn't the only thing slowing you down. Indeed, yesterday's screamer is today's dinosaur: new PCs blaze at Gigahertz speeds, and even notebooks are reaching the 1-GHz performance mark.



Dinosaurs can still become multimedia and gaming dynamos, when you buy the same memory upgrades used by professional designers, video editors, and other high-performance users. "Adding memory is the fastest, smartest, and least expensive way to boost your system's performance," says Jason Jacobi, a spokesman at Kingston Technology Company Inc., the world's largest independent memory manufacturer. "Press reports have already shown the risks of overclocking [pushing CPUs past their approved limits] and the high costs of swapping in a new processor. Memory upgrades for PCs, notebooks, and other devices have proven to be reliable and the most effective route."

Professional PC users have counted for years on Kingston's memory products to keep their systems up to date. (Top-tier system manufacturers build Kingston memory into their new systems.) Each month, Kingston builds and tests more than two million customized modules for desktops, notebooks, printers, handheld devices, graphic cards, and digital cameras.

Business or Pleasure

Now consumers can get that same memory, factory-direct, through Kingston's new Web site, www.Shop.Kingston.com. The site helps all users find memory that is perfectly compatible with their systems. "You don't have to know the difference between EDO and PC100 modules to find the



right memory on our site," Jacobi says. Shop.Kingston's product search tool, The Kingston Memory Configurator, eliminates any worries about compatibility by allowing shoppers to sort memory by system model, memory specification, or Kingston part number. And users of PDAs, digital cameras, and MP3 players can search for memory according to the types of devices they're using.

Shop.Kingston also makes upgrades easier by providing shortcuts for most PCs and handheld devices. And if users still have questions about their memory requirements, they can always call Shop.Kingston, toll-free and 24/7, at 800-435-0057.

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Shop.Kingston can also offer competitive pricing to its customers. The site regularly features value pricing on high-performance modules, and rebates for new products. By selling Kingston memory directly to consumers, the site can deliver memory of unparalleled quality at a low price. Individual users receive the same lifetime warranties as Kingston's business customers, and each module undergoes the same rigorous testing at the manufacturer's facilities.

Spokesman Jacobi says Shop.Kingston will help make Web surfing, gaming, and multimedia exciting on more kinds of systems than ever before. "With Shop.Kingston.com," he says, "consumers now have the same opportunity as our business customers to get the best memory on the market, at a great price, for their high-performance needs."



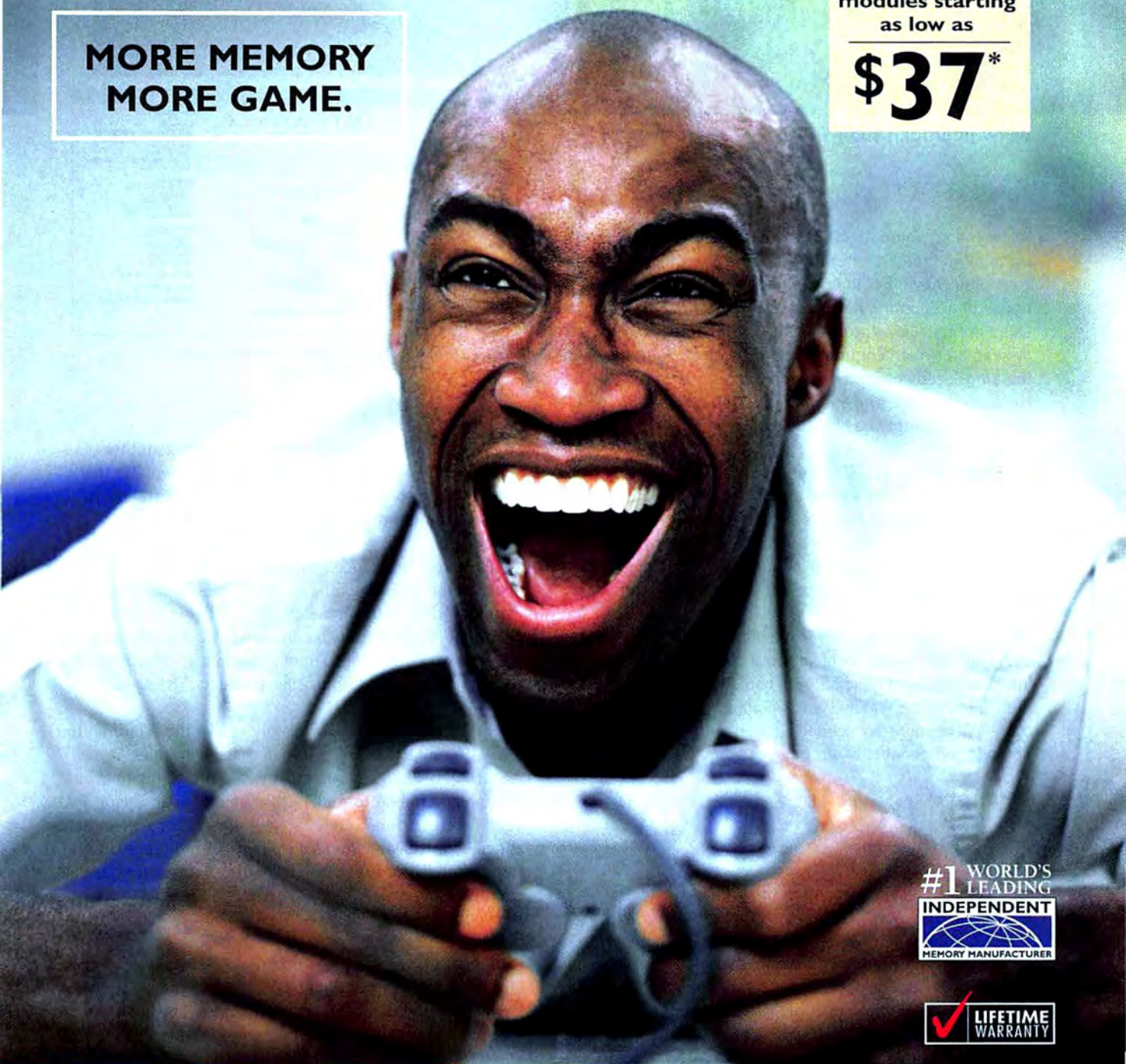
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While many motorists in Dimondale, Mich. say the family-owned Windmill Truck Stop is a home away from home, its controller, Kevin Edelmann, says it's been more like a house of accounting horrors. Besides monitoring retail fuel sales in the truck stop's "truckers only" area, he also has to keep an eye on commuters' and travelers' purchases in the king-sized complex's convenience store, family restaurant, motel, and auto service center. "Keeping track of all of that inventory has been a nightmare," Edelmann says.

The Point of Sale (POS) system that the Windmill had been using since 1982 did a fine job of ringing up sales, but it couldn't tell store managers anything about what was on the shelf. "The system only broke sales down by department," Edelmann says. "So it couldn't tell the difference between a tube of toothpaste and a bottle of shampoo."

Edelmann found only a few POS solutions that were easy to use, Microsoft Windows-based, and able to support multiple input devices. And none of them could manage the 20,000-plus items in the Windmill's convenience store and restaurant. "We desperately needed a solution that could bring all of these components of our business together," he says.



PC AMERICA

Things finally turned around at the Windmill once Edelmann deployed PC America's Cash Register Express (CRE 2000), a Windows-based POS program that works with ordinary PCs and peripherals, as well as barcode scanners, receipt printers, and pole displays (which show charges at the checkout counter). Now all of the Windmill's cashiers can use touch screens and barcode scanners to enter orders and update inventory. And setting up CRE 2000 could not be easier, says Edelmann. "PC America did



The home page for PC America speeds you to the point-of-sale products you need.

an excellent job pulling all of the hardware together initially. But the great thing about their software is that I can grab any component I want off the shelf and throw it together in no time. This is one slick program."

The Windmill has processed more than half a million transactions with CRE 2000 and PC America's Restaurant Pro Express (RPE 2000) since October 1999. And Edelmann predicts that PC America will continue to develop the software he needs to keep things running smoothly. "PC America is constantly improving upon their products," he says.

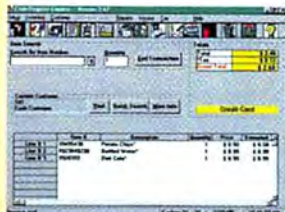
Now PC America is helping retailers like the Windmill to move beyond the sale itself to increase revenues. A new feature in CRE 2000 gives businesses the ability to print coupons on the bottom of sales receipts on an Epson TM-T88II receipt printer. They can use the coupons to advertise specials on slow business days (e.g., "10 Percent Off All Purchases Every Tuesday"), or to give their customers discounts on overstock items (e.g., "Get a Free Six-Pack of Pepsi on Your Next Visit").

CRE 2000's couponing feature promises retailers an excellent route to a crucial dimension in retail sales. "Repeat business is the most important aspect of any business," says PC America's president, Howard Gosman. "With this addition to our POS package, we are giving our customers a quick and easy-to-use method for creating it."



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All PC America Software requires Microsoft Windows. The software was written in Visual Basic using Microsoft Access Files. The source code is available.

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Have your favorite business applications been bringing your desktop PC to its knees? Is your notebook buckling beneath the burden of DVD movies and other multimedia tools? PC enthusiasts often go to great lengths to bring their systems up to speed, from overclocking their CPUs to building new systems to their own specifications. But did you know that adding RAM is often the quickest, cheapest and most reliable way to boost your system's performance?



RAM upgrades can dramatically improve system performance, according to studies by nonprofit groups such as the Council on Computing Power. One study found that additional RAM could accelerate PCs running Windows 98 by as much as 42%. And many experts say systems running Microsoft Windows 2000 and Windows XP can take even better advantage of memory upgrades.

That's one of the reasons Crucial.com, a Web-based DRAM seller, is making upgrades easier for users that want to get the most out of their new (and existing) systems. "Buying the right memory for your system's motherboard should be a non-event," says Mike Sanor, technical support manager at Crucial. "That's why we're giving shoppers the tools they need to make clear decisions and to avoid compatibility problems."

Crucial has designed an online Memory Calculator to simplify memory upgrades, by helping users find just the right amount of RAM to maximize their systems' performance. "The Memory Calculator helps users find that sweet spot," says Sanor, "with performance benchmarks for motherboards with a variety of processors, operating systems and different amounts of memory."



Crucial assesses motherboard performance with Business Winstone and Content Creation Winstone from Ziff Davis. The tests measure the time a system takes to run applications through a series of scripted activities. Both Winstone tests focus on "hot spots," periods of processor- or disk-intensive activity, when user wait time is often the longest. Information from motherboard manufacturers and Crucial's own internal compatibility testing assures the accuracy of the Memory Calculator's data. The vendor continually adds new test results, and users can ask Crucial to add their favorite motherboards to the list.

"Buying the right memory for your system's motherboard should be a non-event."

—Mike Sanor, technical support manager, Crucial

As a division 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. It also guarantees its modules to be compatible with systems matched through its Memory Selector tool.

Sanor says the Memory Calculator serves as a source of unbiased information about motherboards and memory, and demonstrates the difference additional RAM can make in most systems. "We've always made the assertion that adding RAM is the quickest, cheapest, easiest and often the most effective way to boost performance," he says, "Now we have the data to back it up."



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TOP 100

EDITED BY KALPANA NARAYANAMURTHI

167



Top 10 17-Inch Monitors

ViewSonic's G75f produces sharp text and rich graphics.



Top 10 Power PCs

When placed on its side, the Dell Dimension 8200 can be opened for easy access to internal components.

154

New Processors Make a Splash

Make it with more megahertz: Intel's speediest processor to date, a Pentium 4 running at 2 GHz, debuts on the *Top 10 Power PCs* chart inside a Dell Dimension 8200, which captures the top spot. Intel's Processor-M, the company's latest offering geared toward the mobile market, first appears in our charts in two desktops that land on this month's *Top 10 Power PCs* and *Top 15 Home PCs* rankings. Meanwhile, our *Top 15 Notebook PCs* chart hosts the first laptop we've seen to sport AMD's Mobile Athlon 4 processor. See "Your Guide to the Top 100" (find.pcworld.com/11080) for details on how we compile all our charts.

Freelance writers Richard Jantz, Dan Littman, Joel Strauch, and Carla Thornton, and PC World editors Seán Captain, Lisa Cekan, Rebecca Freed, Alexandra Krasne, Heather Morra, Kalai Murugesan, Melissa J. Perenson, and Alan Stafford contributed to this month's Top 100 section. Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, Danny W. Lam, Tony K. Leung, and Thomas Luong of the PC World Test Center performed testing, with support from Julio Giannobile and Julian Weatherby.



Top 10 Digital Cameras

A low \$199 price and long battery life propel the new Olympus Camedia D-370 into the number one Best Buy spot.

173

Top 10 Ink Jet Printers

Canon's S630 Color Bubble Jet ink jet printer offers dark text and fine detail on low-resolution snapshots.

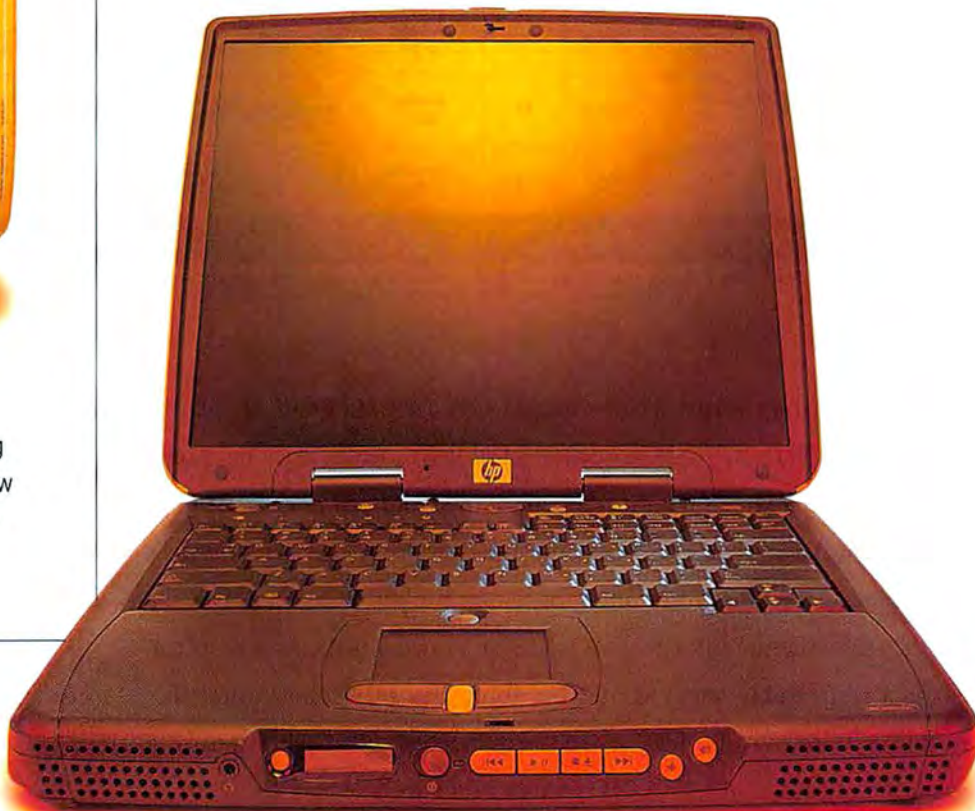
165



Top 15 Notebook PCs

Powered by an Athlon 4-1000 processor, HP's \$2199 Pavilion N5470 lands in the number four spot on our power laptops chart.

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GUIDE TO STAR RATINGS

What are the Star Ratings in the Top 100 charts?

With the September 2001 issue, *PC World* launched a new five-point Star Rating system, which assesses a product's overall quality and performance.

Every time we review a new product, it will be assigned a star rating. These star ratings reflect our opinion of a product at the time we reviewed it. The rating

won't change or be updated unless bug fixes or major updates compel us to take another look at the product, or unless we do a more extensive follow-up review. In subsequent issues, a date will accompany these ratings indicating how long ago a product received its rating. Products that we tested before the September 2001 issue will not have star ratings.

In addition, the overall number rating and the Best Buy distinction will continue to appear in our charts. Both the overall rating and the chart rankings take price into account and will continue to work in the same way as they have in the past.

See "A Guide to *PC World's* Star Ratings" (find.pcworld.com/10860) for more information.

TOP 10 POWER PCs

	POWER SYSTEM	Issue tested	Overall rating	Street price (8/17/01)	PC WorldBench 2000 performance score ¹	Faster	Comments
1	Best BUY Dell Dimension 8200 find.pcworld.com/13160	NEW	84	Expensive: \$2919	Windows 2000	Very good 236	Pricey, but in return you get solid performance, top-of-the-line components, and a distinctive case design. ★★★
2	Best BUY Sys Performance 1400TD find.pcworld.com/11341	Oct 01	83	Inexpensive: \$1915	Windows 2000	Outstanding 245	Swift performer is paired with a rich, attractive display, but it's light on software. Drops \$178 this month. (★★★ Oct 01)
3	Xi Computer 1400 MTower SP find.pcworld.com/10126	Sept 01	83	Expensive: \$2799	Windows 2000	Outstanding 242	Fast system has a sharp display, two 41GB hard drives linked with an IDE RAID card, and a high price to match. (★★★ Sept 01)
4	Polywell Poly 815TS-1260 find.pcworld.com/13161	NEW	83	Average: \$2199	Windows 2000	Very good 236	Using Intel's Processor-M, this unit earned the same PC WorldBench 2000 score as Dell's P4-2000-based Dimension 8200. ★★★
5	NuTrend Athlon Ultra 2 find.pcworld.com/11342	Oct 01	82	Very inexpensive: \$1699	Windows 2000	Very good 233	Performance matches that of other speedy Athlon-based systems; includes an IEEE 1394 card with three ports. (★★★ Oct 01)
6	Dell OptiPlex GX400 find.pcworld.com/10360	July 01	80	Average: \$2146	Windows 2000	Average 203	Efficiently designed corporate system has excellent display. Dell's lower service scores this month cause it to fall from the top spot.
7	Gateway Professional S1800 find.pcworld.com/13162	NEW	78	Average: \$2508	Windows 2000	Good 229	Speedy, well-designed system offers tool-less access to components. Comes with a sharp flat-panel display. ★★★
8	Xi Computer 1333 DDR MTower SP find.pcworld.com/13164	July 01	77	Average: \$2259	Windows 2000	Average 216	Performance lags slightly behind that of similarly configured systems. Comes loaded with extras. Floppy drive difficult to access.
9	Tangent Medallion Pro Plus find.pcworld.com/10124	Sept 01	77	Average: \$2195	Windows 2000	Good 220	Comes with a graphics card that supports two displays at once. Two hard drives provide plentiful storage. (★★★ Sept 01)
10	HP Vectra VL800 find.pcworld.com/13180	Apr 01	76	Expensive: \$2960	Windows 2000	Average 208	Priciest system on the chart delivers reliable performance and ships with a roomy 21-inch display.
Percent of overall rating ▶				10 percent	25 percent		

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

¹ A system's performance word score is relative to the scores earned by other PCs running the same operating system. See "Your Guide to the Top 100" (find.pcworld.com/10860) for more details.

DELL'S NEW DIMENSION 8200—loaded with a 2-GHz Pentium 4 CPU, 256MB of PC800 RDRAM, a 100GB hard drive, and a price tag pushing three grand—snags the number one spot on our power chart. A Polywell Poly 815TS-1260, the first desktop system we've reviewed with Intel's Processor-M (originally intended for use in mobile PCs), matched the Dell's performance in our PC WorldBench 2000 tests; as a result, it earns a respectable berth at number four. Our other newcomer this month is Gateway's Professional S1800, a speedy 1.8-GHz Pentium 4 system that comes with an LCD monitor and a well-designed chassis.

NEW ON THE CHART

1 Dell Dimension 8200

Best BUY **The fine points:** Running Windows 2000 and using Intel's latest processor, a Pentium 4 operating at 2 GHz, the Dimension 8200 earned a score of 236 on our PC WorldBench 2000 tests, tying Polywell's Poly 815TS-1260 as

the fastest Intel system we've tested. And speed isn't the Dimension 8200's only plus: This system is loaded. In addition to its fast processor, it comes with 256MB of PC800 RDRAM, the first 100GB hard drive we've seen, a 16X DVD-ROM drive, and a 16X/10X/40X CD-RW drive. The components are housed in a contoured, gray-and-black midsize tower that has a

case lock and a front flap that pops up to reveal two USB ports and a headphone jack. When placed on its side, the case opens like a clamshell after you press buttons on the top and the bottom. (Close the case carefully, however, or cables that dangle down can get caught.)

You can reach the three open PCI slots and two open bays (one internal, one external) without resorting to tools: A green plastic bar pops off of the top of the PCI slots, and green tabs on each bay let you slide drives in and out smoothly.

The 19-inch Dell M991 monitor, which matches the gray-and-black color scheme of the case, delivered rich, vibrant colors and crisp, easy-to-read text—even at the maximum resolution of 1600 by 1200. All the other peripherals match the case as well, from the keyboard and the mouse to the elegant, wineglass-shaped Harman/Kardon HK-95 three-speaker set.

Dell's documentation includes a color

Visit find.pcworld.com/13780 for reviews of all products ranked in this chart or tested this month.

BASE CONFIGURATION								Extra features	Design/ documentation	Vendor's reliability/ service
CPU	RAM (MB/type)	Hard drive (GB)	Monitor size (diagonal inches)	Graphics board	Case type ²	Open bays/slots				
Pentium 4-2000	256/ RDRAM	100	19	Dell GeForce3	Midsize tower	2/3	Very good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, net- work adapter, Microsoft Office XP Small Business Edition	Good/ Average	Outstanding/ Fair	
Athlon-1400	256/ SDRAM	61.5	19	ATI Radeon	Midsize tower	4/4	Good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, network adapter	Good/ Poor	³ /Fair ³	
Athlon-1400	256/ SDRAM	82 ⁴	19	Leadtek WinFast GeForce3	Tower	6/3	Very good: 12X/8X/32X CD-RW drive, network adapter, Microsoft Office XP Small Business Edition	Good/ Good	³ /Fair ³	
Pentium III- M-1260	256/ SDRAM	80 ⁴	19	Leadtek WinFast GeForce3	Midsize tower	5/3	Outstanding: 16X DVD-ROM drive, 8X/12X/32X CD-RW drive, V.90 modem, network adapter, Lotus SmartSuite Millennium Edition	Good/ Average	³ /Fair ³	
Athlon-1400	256/ SDRAM	80	19	Leadtek WinFast GeForce3	Midsize tower	3/1	Outstanding: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, network adapter, Corel WordPerfect Office 2002	Good/ Good	³ /Fair ³	
Pentium 4-1400	256/ RDRAM	40	19	Dell GeForce2 GTS	Midsize tower	4/5	Very good: 8X DVD-ROM and 8X/4X/32X CD-RW combination drive, network adapter, Wake-on-LAN, Dell LegacySelect	Good/ Average	Outstanding/ Fair	
Pentium 4-1800	256/ RDRAM	40	15 (LCD)	VisionTek GeForce3	Midsize tower	3/3	Good: 12X/10X/32X CD-RW drive, network adapter, Microsoft Office XP Small Business Edition	Average/ Average	Good/ Fair	
Athlon-1333	256/ SDRAM	61.4 ⁴	19	Leadtek WinFast GeForce2 Ultra	Midsize tower	3/2	Good: 16X/10X/40X CD-RW drive, V.90 modem, Microsoft Office 2000 Professional	Good/ Good	³ /Fair ³	
Pentium 4-1700	256/ RDRAM	80 ⁴	19	Matrox Millennium G450	Midsize tower	3/3	Good: 8X DVD-ROM drive and 4X/4X/24X CD-RW combination drive, network adapter	Average/ Poor	³ /Fair ³	
Pentium 4-1500	256/ RDRAM	40	21	HP GeForce2 GTS	Desktop	2/4	Good: 16X DVD-ROM drive, network adapter, HP's E-DiagTools, ProtectTools 2000, TopTools management software	Average/ Good	Good/ Fair	
	10 percent						10 percent	15 percent	30 percent	

* We define vertical cases as towers (taller than 20 inches), midsized 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).

3 Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs.

* Total space on two hard drives.

setup poster that, combined with the color-coded rear ports, makes assembly a breeze. In addition, Dell's Solutions Guide offers thorough and illustrated upgrading and troubleshooting sections. Microsoft's Office XP Small Business Edition comes bundled.

Upshot: If you have money to burn and you must have the most cutting-edge system available, the Dimension 8200 is for you. It's certainly one of the most highly engineered systems we've seen, but innovation has its cost—in this case, \$2919.

4 Polywell Poly 815TS-1260

NEW The fine points: Intel says its Pentium III Processor-M is designed primarily for laptops, mainly because of the .13-micron manufacturing process that the company uses to make the chip. The process packs the transistors tighter together to decrease power consumption, thus prolonging a portable's battery life

and reducing the chip's heat output. The PIII-M's smaller core also allows an increase of the chip's L2 cache from 256KB to 512KB, which in turn can enhance performance as more instructions become accessible in the cache. Considering the chip's added advantages, it's no surprise that desktop manufacturers are also jumping on board to reap the benefits. Using a PIII-1260 Processor-M, Polywell's Poly 815TS-1260 sped to a score of 236 on our PC WorldBench 2000 tests, tying the Dell Dimension 8200 and earning top honors for Intel systems running Windows 2000. Its score is particularly impressive considering that it uses PC133 memory instead of the faster RDRAM that Pentium 4 PCs use. The system's two hard drives provide a combined 80GB of storage, thanks to the system's Ultra DMA/100 RAID controller. The RAID setup likely added some extra oomph to our test system's performance.



THE POLYWELL POLY 815TS-1260, powered by Intel's Processor-M, performed speedily.

Unfortunately, the Poly 815TS-1260 ships with a poor monitor. The 19-inch Top Victory Electronics 1995S produced fairly bright colors in our test images, but text looked fuzzy even at 1024 by 768 resolution and was difficult to read at the maximum resolution of 1600 by 1200.

The large, aluminum-hued midsize tower houses three open PCI slots ▶

and five open drive bays (four external and one internal) for expansion. You can smoothly remove and replace the metal side of the case after you loosen two thumbscrews; a thumbscrew in each of the PCI slots allows for easy, tool-less card installation. Some of the loosely hanging interior cables could be annoying when you're adding or removing expansion cards and drives, however. The 8X/12X/32X CD-RW drive should be sufficiently quick for most uses, though it's far from the fastest drive available today. The system's funky-looking, gray-and-black keyboard (with translucent edging) allows quiet typing, but the keys on our test model felt slightly loose.

Upshot: For users in small to medium-size businesses looking for high-powered performance without heavy power consumption, the Poly 815TS-1260 should fit the bill. However, we recommend an upgrade to another monitor, such as the ViewSonic GS790 or the ViewSonic PF790 (Polywell carries both).

7 Gateway Professional S1800

NEW The fine points: Armed with a 1.8-GHz Pentium 4 processor and 256MB of PC800 RDRAM, Gateway's Professional S1800 soared to a score of 229 on our PC WorldBench 2000 tests—13 points above the average for 1.7-GHz P4 machines

running Windows 2000 (the Professional S1800 is the first Pentium 4-1800 system that we've tested). You can open the well-designed, gray-and-beige midsize tower case without tools simply by pressing on two tabs. The sturdy side panel then swings out smoothly and reattaches easily. Green tabs allow you to release each of the three open drive bays with minimal effort. The thumbscrews on each of the three open PCI slots can be difficult to grip, but they still let you perform upgrades without having to pull out a screwdriver.

Our test system's 15-inch Gateway FPD1510 flat-panel LCD monitor delivered bright colors and sharp text. Adaptec's Easy CD Creator and DirectCD come bundled for use with the 12X/10X/32X CD-RW drive. However, some smaller desktop vendors offer 16X/10X/40X drives, and even faster models are available. Gateway shipped Microsoft's Office XP Small Business Edition with our test system as well. The basic, sturdy Gateway keyboard allows for smooth, quiet typing.

Upshot: Small to medium-size businesses needing a powerful, well-rounded system that can be upgraded easily should be pleased with the Professional S1800.



GATEWAY'S PROFESSIONAL S1800 can be upgraded easily, thanks to tool-less access to the interior.

ALSO OF NOTE

ANOTHER SYSTEM with Intel's 2-GHz P4 processor, Tangent's Medallion Micro, failed to make the chart. The Medallion Micro carries a price tag nearly as high as that of the Dell Dimension 8200. It features an 8X DVD-ROM and 8X/8X/32X CD-RW combination drive, an NVidia GeForce3-based graphics card, and a 60GB hard drive. However, it doesn't include an office suite, some of its components aren't topflight, and its crowded interior offers only limited room for upgrades. The new Tangent also lags a bit in performance: The Medallion Micro's score of 224 on our PC WorldBench 2000 tests places it 12 points below the similarly configured Dell Dimension 8200. ▶

TECH TREND

With Prices Falling, Get Your RAM While It's Hot

MEMORY PRICES have been in free fall recently: You can find 128MB of PC133 SDRAM for around \$30, and 256MB for about \$60. Even pricier DDR SDRAM and RDRAM have become more affordable. Available for approximately \$500 a year ago, 128MB of each type can now be found in the \$50-\$100 range.

As a result of cheaper memory, many system vendors are stocking more of their PCs with lots of RAM. According to Richard Gordon, an analyst at Gartner/Dataquest, "It's a no-brainer for vendors to put 256MB in a system." However, don't worry about PC makers soaking up all the RAM supply and causing prices to rebound. "PC growth is lower this year than last," Gordon says.

But even if demand picks up, you probably won't see much of a



price increase. Memory vendors have made some production cutbacks in response to slowing demand, but not in any great magnitude, according to Gordon. "Pricing won't go up to where it was a year ago," he predicts. "It might go up 20 percent, but that increase is still 20 percent of a low number."

While RAM prices aren't likely to increase much, if at all, the demand for more system RAM should continue its upward march. The biggest RAM hog? Your operating system. Microsoft recommends a minimum of 128MB of RAM to run Windows XP efficient-

ly, and more would probably be better. See "P4 Memory: New Options" in *News and Trends*, page 30, for the latest on RAM, and *Step-By-Step* on page 186 for details on installing memory.

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TOP 10 VALUE PCs

	VALUE SYSTEM	Issue tested	Overall rating	Street price (8/17/01)	PC WorldBench 2000 performance score ¹	Faster	Comments
1	Best Buy NuTrend Athlon Mega 2 find.pcworld.com/10366	Aug 01	85	Inexpensive: \$1069	Windows Me Outstanding 178		Speedy Windows Me system shifts from power chart to value chart this month. Ships with an IEEE 1394 card.
2	Best Buy Tangent Valera PC find.pcworld.com/13182	NEW	82	Average: \$1445	Windows 2000 Outstanding 236		Swift system comes with dual monitor capability; motherboard has an integrated IDE RAID controller for hooking up two hard drives. ★★★☆☆
3	Micro Express MicroFlex 1333A find.pcworld.com/10363	July 01	82	Average: \$1399	Windows 2000 Outstanding 231		Excellent cost/performance ratio. Moves from power chart to value chart this month; price drops \$200.
4	ABS Conquest GL find.pcworld.com/10368	Apr 01	81	Inexpensive: \$1099	Windows Me Very good 160		Impressive monitor and simple assembly aided by color-coded ports and a setup poster.
5	Polywell Poly 830K7-1000 find.pcworld.com/10370	Aug 01	81	Inexpensive: \$1150	Windows Me Very good 161		Includes a hard drive that's easy to remove (through the front of the tower) plus partition backup software.
6	Dell OptiPlex GX150 find.pcworld.com/10367	June 01	80	Average: \$1386	Windows 2000 Good 190		Ships with corporate management and security features. Dell's lower score for service this month causes system to drop from the top spot.
7	Premio Apollo 815EP find.pcworld.com/11343	Oct 01	80	Very inexpensive: \$899	Windows Me Very good 161		Inexpensive—and \$100 less this month—with basic components but high performance and lots of internal space. (★★★☆☆ Oct 01)
8	Dell Dimension 2100 find.pcworld.com/13183	NEW	76	Inexpensive: \$1118	Windows 2000 Average 158		Stylish-looking system offers tool-less access to drives and bays, but limited expansion possibilities. ★★★☆☆
9	Sys TaskMaster 950D find.pcworld.com/11461	Oct 01	76	Average: \$1268	Windows 2000 Good 191		Duron-950 PC outruns Duron-850 machines and includes a good monitor. Sheds \$84 this month. (★★★☆☆ Oct 01)
10	HP E-pc C10 find.pcworld.com/10122	Sept 01	75	Average: \$1498	Windows 2000 Good 189		Hefty corporate tools—including manageability software, a case lock, and a rear port-control system—but little room to grow. (★★★★☆ Sept 01)
Percent of overall rating ▶				20 percent	20 percent		

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

¹A system's performance word score is relative to the scores earned by other PCs running the same operating system. See "Your Guide to the Top 100" (find.pcworld.com/10800) for more details.

LAST MONTH'S NUMBER ONE, Dell's OptiPlex GX150, slips to number six due in part to our new Reliability and Service scores this month, which reflect Dell's flagging customer service. (For the full results of the survey, please see "Service Takes a Dive" on page 125.) Meanwhile, NuTrend's Athlon Mega 2 steps over from the power chart to snag top honors. The new Tangent Valera PC takes the second Best Buy, and Dell's inexpensive Dimension 2100 debuts at number eight.

NEW ON THE CHART

2 Tangent Valera PC

Best Buy **NEW** The fine points: Equipped with a 1.33-GHz Athlon processor and 256MB of 266-MHz DDR memory, our test Valera sped to a PC WorldBench 2000 score of 236—12 points (or about 5 percent) above the average for similarly configured systems running Windows 2000. This PC offers several options for hooking up peripherals. The

Matrox Millennium G450 Dual Head graphics board has two VGA-out ports; Matrox's software lets you drive two monitors simultaneously, with independent resolutions and refresh settings. The motherboard's integrated IDE RAID controller lets you hook up two hard drives, thereby speeding access—and because it's integrated, you don't lose a PCI slot to an add-in RAID card. Our test unit came with a single 40GB hard drive, however.

A large metal panel and a support bar

block access to the open PCI slots and drive bays, and the interior is further cluttered by unkempt cabling.

The Valera we looked at came with a 19-inch Optiquest Q95 display, which delivered rich colors in our test images and clear, legible text at normal resolutions; text became difficult to read at the maximum resolution of 1600 by 1200, however. The standard beige midsize tower offers one uncommon feature: a pass-through cable that allows access to two USB ports, a microphone jack, and a headphone connection on the front of the case. A sliding latch locks the case's sturdy side panel (and a screw holds the latch shut), but getting the panel off and on takes some elbow grease.

Though the Valera's manual is large, it focuses on basic setup and troubleshooting, and includes little information specific to this particular system.

Upshot: Despite its messy interior, the

Visit find.pcworld.com/13660 for reviews of all products ranked in this chart or tested this month.

BASE CONFIGURATION								Extra features	Design/ documentation	Vendor's reliability/ service
CPU	RAM (MB/type)	Hard drive (GB)	Monitor size (diagonal inches)	Graphics	Case type ²	Open bays/slots				
Athlon-1333	128/ SDRAM	40	19	Leadtek WinFast GeForce2 MX	Midsize tower	4/1	Very good: 16X DVD-ROM drive, V.90 modem, network adapter, Corel WordPerfect Office 2000	Good/ Outstanding	³ /Fair ³	
Athlon-1333	256/ SDRAM	40	19	Matrox Millennium G450	Midsize tower	5/3	Good: 12X DVD-ROM drive, network adapter	Good/ Average	³ /Fair ³	
Athlon-1333	256/ SDRAM	40	15 (LCD)	CardExpert GeForce2 Ultra	Midsize tower	3/3	Outstanding: 12X DVD-ROM drive, 8X/4X/32X CD-RW drive, V.90 modem, network adapter	Good/ Good	³ /Fair ³	
Athlon-1100	128/ SDRAM	30	19	Gigabyte TNT2 M64	Midsize tower	4/2	Very good: 16X DVD-ROM drive, V.90 modem, network adapter, Corel WordPerfect Office 2000	Very good/ Outstanding	³ /Fair ³	
Athlon-1000	256/ SDRAM	40	17	MicroStar MS-8818	Midsize tower	3/4	Outstanding: 16X DVD-ROM drive, 12X/10X/32X CD-RW drive, V.90 modem, network adapter	Good/ Average	³ /Fair ³	
Pentium III-933	128/ SDRAM	20	17	Dell TNT2 Pro	Desktop	0/2	Good: 8X/4X/32X CD-RW drive, network adapter, Wake-on-LAN, Dell LegacySelect, OpenManage software	Average/ Average	Outstanding/ Fair	
Pentium III-1000	128/ SDRAM	30	17	ATI Rage Fury Pro	Midsize tower	5/5	Good: 22X-52X CD-ROM drive, network adapter, Intel LANDesk client manager, Microsoft Office XP Small Business Edition	Good/ Good	³ /Fair ³	
Celeron-900	128/ SDRAM	20	17	Integrated Intel 810	Minitower	1/2	Average: 24X-48X CD-ROM drive, network adapter, Microsoft Office XP Small Business Edition	Good/ Good	Outstanding/ Fair	
Duron-950	128/ SDRAM	41	19	Matrox Millennium G450	Minitower	2/2	Good: 12X/10X/32X CD-RW drive, network adapter	Average/ Poor	³ /Fair ³	
Pentium III-1000	256/ SDRAM	40	17	Integrated Intel 815	Compact	0/0	Average: 24X-40X CD-ROM drive, network adapter, Wake-on-LAN, HP E-DiagTools, TopTools management software	Average/ Average	Good/ Fair	
	10 percent						10 percent	10 percent	30 percent	

² We define vertical cases as towers (taller than 20 inches), midsized 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).

³ Insufficient data to give a rating, or the rating is derived from the vendor's Reliability and Service survey scores for its home PCs.

speedy Valera has ample room for expansion. It would make a capable small-office system for users who need its dual-display or RAID hard drive capabilities, but you'd have to pay extra for a second hard drive to take advantage of the latter.

8 Dell Dimension 2100

NEW The fine points: Dell's matte black Dimension 2100—with matching monitor, keyboard, and mouse—is a striking contrast to the standard beige-box PC. Design pluses extend beyond the color scheme: You can open the 2100's minitower case by flipping a latch on the case's top and lifting off the lid, which snaps back in place easily. The interior appears somewhat cramped, but the swing-out power supply frees up room to work. There isn't much expansion capability, however, with only two open PCI slots and one open drive bay. On the other hand, the drive bays do allow you to click

drives into place without using tools.

Despite its futuristic looks, the 2100 we tested lacked high-powered internal components, making do with a Celeron-900 processor, a 20GB hard drive, and a 24X-48X CD-ROM drive.

The Dimension 2100 posted a PC WorldBench 2000 score of 158—a reasonable mark for a high-megahertz Celeron machine, but lower than scores turned in by Windows 2000 systems that use Intel Pentium or AMD Athlon or Duron processors. The 17-inch Dell E771p monitor displayed vibrant colors, but text looked slightly fuzzy at 1024 by 768 resolution and blurred even more at the maximum resolution of 1280 by 1024.

Our test unit came with Microsoft's Office XP Small Business Edition—a welcome find in a system that costs a little over a grand. The unit ships with a thick reference and troubleshooting guide packed with detailed information and



BACK IN BLACK: Dell's Dimension 2100 has a matching keyboard, monitor, and speakers.

helpful illustrations. The integrated network interface allows the Dimension 2100 to be easily linked to a small-office network or to a broadband modem.

Upshot: Many small to medium-size businesses should appreciate this stylish, affordable system. Companies looking for higher-level processors and components might want to reexamine the options list, however—especially the CPU line. ▶

TOP 15 NOTEBOOK PCs

	POWER NOTEBOOK	Issue tested	Overall rating	Street price (8/10/01)	PC WorldBench 2000 performance score ¹	Faster	Comments
1	Best BUY IBM ThinkPad A22P find.pcworld.com/12845	NEW	90	Average: \$2942	Windows 2000	Outstanding 192	Decked-out desktop replacement has a video-in port, 1600 by 1200 screen resolution, a huge hard drive, and lots of extras. ★★★★★
2	Toshiba Satellite 2805-S603 find.pcworld.com/12846	NEW	88	Inexpensive: \$2399	Windows Me	Outstanding 157	This thick notebook lacks a docking station. It does have great sound, CD-player buttons, an IEEE 1394 port, and a SmartMedia slot. ★★★★★
3	WinBook Z1 find.pcworld.com/10442	Aug 01	86	Average: \$2849	Windows 2000	Outstanding 195	Drops \$390 this month. The fastest notebook on the chart has a large screen and lots of storage. Design is clunky; support hours are limited.
4	HP Pavilion N5470 find.pcworld.com/12847	NEW	85	Inexpensive: \$2199	Windows Me	Very good 149	The Athlon processor helps keep the price down. This laptop has great audio controls, with buttons that can light up in the dark. ★★★☆☆
5	MicronPC TransPort GX+ find.pcworld.com/10448	Sept 01	85	Average: \$2709	Windows 2000	Good 173	Classy, well-appointed notebook has a high-resolution (1400-by-1050) screen and is easy to upgrade. (★★★★ - Sept 01)
VALUE NOTEBOOK		Percent of overall rating ▶		15 percent	20 percent		
1	Best BUY Dell Latitude C600 find.pcworld.com/10450	June 01	81	Expensive: \$2585	Windows 2000	Very good 164	Lightweight corporate notebook comes ready for wireless networking and performs above average for its processor class.
2	Best BUY Compaq Presario 1700f-850 find.pcworld.com/10451	Feb 01	80	Average: \$1622	Windows Me	Very good 145	Striking metallic-accented black notebook includes a row of programmable Internet shortcut buttons. Service score drops to Poor.
3	Compaq Presario 1800 find.pcworld.com/10446	Sept 01	79	Average: \$2099	Windows Me	Outstanding 151	Sleek notebook offers long battery life. Doubles as a jukebox with an array of CD-player controls. Sheds \$300 this month. (★★★★ - Sept 01)
4	Enpower ENP-325W2 find.pcworld.com/10454	Feb 01	78	Average: \$1799	Windows Me	Very good 145	Utilitarian system simplifies access to components. Overhanging screen panel makes the unit awkward to carry. Price falls \$200.
5	Chem USA ChemBook 3830 find.pcworld.com/12840	NEW	77	Average: \$1499	Windows Me	Very good 143	All-in-one notebook also makes a nice stand-alone CD player. Battery, hard drive, and memory could be easier to access. ★★★★★
6	WinBook J1 find.pcworld.com/10457	July 01	77	Average: \$1597	Windows Me	Very good 147	Lightweight laptop pumps impressive speed and battery life from a desktop Pentium III processor. Drops in price by \$100.
7	MicronPC TransPort GX+ find.pcworld.com/10453	Apr 01	77	Average: \$2250	Windows 2000	Average 154	Handsome notebook accepts affordable expansion components. Performance and battery life are unimpressive, however.
8	Sony VAIO PCG-SR33 find.pcworld.com/13760	NEW	77	Inexpensive: \$1099	Windows Me	Poor 107	This inexpensive thin-and-light model weighs just under 5 pounds but provides slow performance and a cramped keyboard. ★★★☆☆
9	Toshiba Satellite 2805-S402 find.pcworld.com/11425	Oct 01	77	Expensive: \$2399	Windows Me	Very good 144	Slightly thick laptop omits docking connection but has CD-player buttons and good sound. Vendor's reliability score improves. (★★★★ - Oct 01)
10	Fujitsu LifeBook S Series find.pcworld.com/12841	NEW	76	Expensive: \$2599	Windows 98 SE	Good 138	Lightest notebook equipped with an internal modular bay we've seen. Includes a snap-on docking foot with legacy ports. ★★★★★
		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" at find.pcworld.com/11080 for more details.

YOU CAN NEVER BE TOO THIN, too rich, or—these days—overequipped with USB ports. Like their desktop counterparts, many laptops now offer two, three, or even four of these convenient little connectors. The latest trend: an extra USB port modified for proprietary peripherals.

This month's new power Best Buy, the \$2942 ThinkPad A22P, has just such a modified port. IBM's UltraPort, located above the top of the notebook's screen, accepts a small digital camera, a CompactFlash reader, or

any of several other inexpensive add-ons.

The new Compaq Evo N400c offers a stylish-looking silver docking panel on the lid, called the MultiPort. So far, Compaq sells one plug-in for it: the \$189 802.11b MultiPort Module for wireless networking. The Evo didn't make our chart, however. This Pentium III-700/500 unit, with a DVD-ROM drive and a required docking station, costs a high \$2738.

Visit find.pcworld.com/13761 for reviews of all products ranked in this chart or tested this month.

	BASE CONFIGURATION						Extra features	Overall design	Battery life (hours:min) ²	Average weight (pounds) ³	Vendor's reliability/service
	CPU	Screen (inches)	RAM (MB)	Hard drive (GB)	Pointing device	Multi-purpose bays					
	Pentium III-1000/700	15	256	32	Eraserhead	1	Good: 8X/4X/24X CD-RW drive, built-in modem and network adapter, Lotus SmartSuite	Outstanding	Very good/4:22	Heavy/8.4	Good/Fair
	Pentium III-1000/700	15	256	30	Eraserhead	0	Very good: 6X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in modem and network adapter, Lotus SmartSuite	Very good	Average/2:06	Heavy/8.8	Good/Fair
	Pentium III-1000/700	15	256	30	Touchpad	2	Very good: 8X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in modem	Very good	Good/3:06	Heavy/8.5	*/Good ⁵
	Athlon 4-1000	15	256	20	Touchpad	0	Good: 8X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Works 2001	Average	Good/3:11	Heavy/8.5	Good/Fair
	Pentium III-900/700	15	256	30	Touchpad	1	Good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office 2000 Small Business Edition	Outstanding	Good/3:08	Heavy/8.1	Fair/Good ⁵
5 percent							10 percent	10 percent	5 percent	10 percent	25 percent
	Pentium III-750/600	14.1	128	10	Touchpad, eraserhead	1	Good: 10X-24X CD-ROM drive, PC Card network adapter, built-in 802.11b wireless card	Outstanding	Good/3:45	Average/7.8	Good/Fair
	Pentium III-850/700	14.1	128	32	Touchpad	1	Good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Word 2000	Very good	Average/2:25	Average/7.4	Fair/Poor
	Pentium III-1000/700	15	128	20	Touchpad	0	Good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Works 2000	Average	Good/3:36	Heavy/8.4	Fair/Poor
	Pentium III-850/700	15	128	10	Touchpad, eraserhead	1	Average: 8X DVD-ROM drive, built-in modem	Very good	Good/3:24	Heavy/8.1	*/Good ⁵
	Pentium III-1000	14.1	256	20	Touchpad	0	Good: 8X/6X/32X CD-RW drive, built-in modem and network adapter	Average	Average/2:54	Average/7.7	*/Fair ⁵
	Pentium III-1000	13.3	192	10	Touchpad	0	Average: 8X DVD-ROM drive, built-in modem and network adapter	Average	Average/2:23	Average/7.1	*/Good ⁵
	Pentium III-800/650	15	128	20	Touchpad	1	Good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office 2000 SBE	Outstanding	Average/2:45	Heavy/8.2	Fair/Good ⁵
	Celeron-600	10.4	128	10	Touchpad	0	Average: 8X-16X CD-ROM drive, built-in modem, Microsoft Word 2002	Average	Good/3:03	Very light/4.7	Good/Good ⁵
	Pentium III-850/700	15.1	128	20	Eraserhead	0	Good: 6X DVD-ROM and 4X/4X/24X CD-RW combo drive, built-in modem and network adapter, Lotus SmartSuite Millennium	Average	Average/2:24	Heavy/8.8	Good/Fair
	Pentium III-750/600	12.1	256	30	Touchpad	1	Very good: 8X DVD-ROM and 8X/4X/24X CD-RW combo drive, built-in modem and network adapter, Microsoft Works 2000	Average	Average/2:26	Light/6.5	Good/Fair ⁵
5 percent							10 percent	10 percent	5 percent	10 percent	25 percent

² Unless otherwise noted, all notebooks come with a lithium ion battery.

³ Includes computer, AC adapter, power cord, floppy drive, and optical drive.

⁴ Insufficient data to give a rating.

⁵ Due to insufficient data from PC World's survey of notebook service, score is based on responses to anonymous calls for tech support and on our survey of desktop service.

Five other new laptops did make the cut. Toshiba's \$2399 Satellite 2805-S603, second on the power chart, is a multimedia pro's portable paradise. Number four on the power chart, Hewlett-Packard's \$2199 Pavilion N5470, bears the new Mobile Athlon 4-1000 CPU and features HP's useful touchpad lock. On the value list, the \$1499 ChemBook 3830 (number five) has a desktop Pentium III-1000

CPU. Hitting the eighth spot, Sony's inexpensive VAIO PCG-SR33 is a small and light notebook with an IEEE 1394 connection and lots of software for digital editors, but it lacks many other features. Fujitsu's latest LifeBook S Series model squeaks aboard at number ten; it's the lightest laptop we've tested that has a modular bay built into the case.

—Carla Thornton ►

IBM'S LOADED ThinkPad A22P is a new Best Buy on the power chart.



TOP 15 HOME PCs

	POWER SYSTEM	Issue tested	Overall rating	Street price (8/10/01)	PC WorldBench 2000 performance score ¹	Faster	Comments
1	Best BUY MicronPC Millennia Max XP2 find.pcworld.com/11620	Oct 01	87	Average: \$2397	Windows Me	Outstanding 193	MicronPC's latest speed demon retains its top spot (and price). Tool-less access for most components. (★★★★☆ Oct 01)
2	Alienware Aurora DDR find.pcworld.com/11081	Oct 01	86	Very expensive: \$3599	Windows Me	Outstanding 193	Stunning, jet-black system wowed us with its speed and sound quality. Its high price doesn't budge from last month. (★★★★☆ Sept 01)
3	HP Pavilion 9800 find.pcworld.com/10384	Aug 01	83	Inexpensive: \$1914	Windows Me	Good 177	\$185 price drop this month, but tech-support quality declines. System comes equipped for video editing and includes a multimedia keyboard.
4	Gateway Select 1400 find.pcworld.com/11622	Oct 01	81	Very inexpensive: \$1749	Windows Me	Very good 181	Smartly constructed system is ready for home networking, with both ethernet and phone-line adapters. (★★★★☆ Oct 01)
5	Compaq Presario 7000Z find.pcworld.com/10383	July 01	81	Inexpensive: \$1935	Windows Me	Good 176	A first-class SOHO PC equipped for digital imaging. Reliability rating improves and price falls by \$199, but service quality goes down.
VALUE SYSTEM		Percent of overall rating ▶		10 percent	25 percent		
1	Best BUY Dell Dimension 4300 find.pcworld.com/13185	NEW	81	Expensive: \$1469	Windows Me	Good 157	Dell's latest model pairs a Pentium 4 with SDRAM for savings and comes in an attractive, well-designed case. ★★★★★
2	Best BUY NuTrend Athlon Special 2 find.pcworld.com/10401	Sept 01	81	Inexpensive: \$879	Windows Me	Outstanding 183	Sprightly bargain system runs business applications well but cuts corners with an older graphics card. (★★★★☆ Sept 01)
3	Polywell Poly 815TS-1133H find.pcworld.com/12941	NEW	80	Average: \$1399	Windows Me	Outstanding 187	This spartan Pentium III system takes honors as the fastest Intel-based home PC we've tested. ★★★★★
4	HP Pavilion 9800A find.pcworld.com/11623	Oct 01	80	Average: \$1199	Windows Me	Good 160	An average-quality system housed in a giant case with plenty of room for expansion. (★★★★☆ Oct 01)
5	Gateway Performance 1400 find.pcworld.com/10861	Oct 01	75	Average: \$1249	Windows Me	Average 152	Price of good-looking, well-constructed system for first-time buyers sheds \$175 this month. Hard drive is a bit small. (★★★★☆ Oct 01)
6	Polywell Poly KLX-850D find.pcworld.com/10396	June 01	73	Inexpensive: \$925	Windows Me	Average 141	This PC wrings impressive performance from a Duron-850, but colors appeared washed out on the monitor. Some components upgraded.
7	ABS Performance 3 find.pcworld.com/12900	NEW	73	Inexpensive: \$969	Windows Me	Average 148	Solid performance from a bargain-priced PC, but mediocre monitor quality mars the overall package. ★★★★★
8	Compaq Presario 5000 find.pcworld.com/11625	Oct 01	70	Average: \$1310	Windows Me	Average 138	\$105 price drop. CD-RW drive speed boost enhances this starter PC for Internet and light home-office work. (★★★★☆ Oct 01)
9	Dell Dimension 2100 find.pcworld.com/12940	NEW	69	Very inexpensive: \$819	Windows Me	Poor 131	Attractive, entry-level system is a bit sluggish but should serve first-time buyers who don't demand top performance. ★★★★★
10	Gateway Profile 3 CX find.pcworld.com/12921	NEW	66	Very expensive: \$1799	Windows Me	Good 158	Cute, zippy PC fits well into tight spots, but not tight budgets. Audio quality and game performance are low. ★★★★★
		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. See "Your Guide to the Top 100" at find.pcworld.com/11080 for more details.

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

NEW SYSTEMS, PRICE DROPS, and fresh reliability and service ratings shake up our value chart. The top spot goes to Dell's new Dimension 4300, a handsome system that finally ends Dell's beige-box days. Like the Dimension 8200's case, pictured in the *Top 100* introduction, the 4300's swings open to provide easy access. The 4300 is also the first home system we've seen with Intel's 845 chip set, which allows a Pentium 4 processor to work with standard SDRAM rather than pricier

RDRAM. Another new Dell, the Dimension 2100, takes ninth place.

Polywell's Poly 815TS-1133H wowed us with a PC WorldBench 2000 score of 187. Packing Intel's Pentium Processor-M III-1133 (originally intended for notebooks), this new number three beat all Pentium III and Pentium 4 systems we've tested with Windows Me. A less-muscular offering from ABS captures the seventh spot.

Visit find.pcworld.com/13200 for reviews of all products ranked in this chart or tested this month.

BASE CONFIGURATION						Extra features ¹	Graphics quality	Setup and ease of use	Vendor's reliability/service
CPU	RAM (MB/type)	Hard drive (GB)	Monitor (inches)	Graphics	Case type ²				
Athlon-1400	256/DDR SDRAM	60	19	VisionTek GeForce3	Midsized tower	Very good: 16X DVD-ROM drive, 12X/10X/32X CD-RW drive, network adapter, Microsoft Office XP Small Business Edition, Norton AntiVirus 2001	Very good	Average	Good/Fair
Athlon-1400	256/DDR SDRAM	60	22	ELSA Gladiac 920	Tower	Outstanding: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, network adapter, Microsoft Works 2001, Pinnacle Studio DV, IEEE 1394 card, joystick	Very good	Good	*/⁴
Athlon-1333	256/DDR SDRAM	75	19	Asus AGP-V7700 GeForce2 GT5	Midsized tower	Very good: 16X DVD-ROM drive, 12X/8X/32X CD-RW drive, network adapter, Microsoft Works 2001, Pinnacle Studio DV with IEEE 1394 card	Very good	Average	Fair/Poor
Athlon-1400	128/SDRAM	40	17	VisionTek GeForce2 Ultra ³	Midsized tower ³	Very good: 16X DVD-ROM drive, 12X/8X/32X CD-RW drive, network adapter, Microsoft Works 2001, Quicken 2001, Norton AntiVirus 2001	Good	Good	Fair/Fair
Athlon-1200	256/DDR SDRAM	60	19	Creative Labs Annihilator 2 Ultra	Midsized tower	Very good: 16X DVD-ROM drive, 12X/4X/32X CD-RW drive, network adapter, Word 2000, Quicken TurboTax, Pinnacle Studio DV with IEEE 1394 card	Very good	Good	Fair/Poor
10 percent						10 percent	15 percent	5 percent	25 percent
Pentium 4-1700	256/SDRAM	40	17	Dell GeForce2 MX	Midsized tower	Average: 16X DVD-ROM drive, Microsoft Works 2001	Good	Good	Outstanding/Good
Athlon-1333	128/SDRAM	30	17	MicroStar MS-8808 TNT2 M64	Midsized tower	Average: 16X DVD-ROM drive, network adapter, Corel WordPerfect Office 2000	Limited	Average	*/Fair ⁴
Pentium III-M-1133	256/SDRAM	40	17	Leadtek WinFast GeForce2 MX400	Midsized tower	Average: 12X/8X/32X CD-RW drive, network adapter, Norton AntiVirus 2000	Good	Good	*/Fair ⁴
Athlon-1000	128/DDR SDRAM	40	17	Asus AGP-V7100 GeForce2 MX	Tower	Good: 8X/4X/32X CD-RW drive, network adapter, Microsoft Works 2001	Good	Average	Fair/Poor
Pentium 4-1400	128/RDRAM	20	17	VisionTek RIVA TNT2 M64	Midsized tower	Good: 20X-48X CD-ROM drive, 8X/4X/32X CD-RW drive, network adapter, Microsoft Works 2001, Norton AntiVirus 2001	Average	Average	Fair/Fair
Duron-850	128/SDRAM	40	17	Leadtek WinFast GeForce2 MX	Midsized tower	Average: 16X DVD-ROM drive, network adapter	Good	Outstanding	*/Fair ⁴
Pentium III-933	128/SDRAM	30	17	ATI Radeon VE	Midsized tower	Average: 16X DVD-ROM drive, network adapter, WordPerfect Office 2002	Average	Average	*/Fair ⁴
Duron-900	128/SDRAM	40	17	Creative Labs Annihilator Pro	Midsized tower	Good: 16X DVD-ROM drive, 12X/4X/32X CD-RW drive, network adapter, Microsoft Word 2000, Quicken 2001 New User Edition	Good	Outstanding	Fair/Poor
Celeron-900	128/SDRAM	20	17	Integrated Intel 810	Minutower	Limited: 22X-48X CD-ROM drive, Microsoft Works 2001	Limited	Good	Outstanding/Good
Pentium III-1000	128/SDRAM	40	15 (LCD)	Integrated Intel 810E	All-in-one	Very good: 8X/8X/20X CD-RW drive, integrated LCD monitor, combo V.90 modem/network adapter, Microsoft Works 2001, Norton AntiVirus	Limited	Good	Fair/Fair
10 percent						10 percent	10 percent	5 percent	25 percent

¹ Unless otherwise noted, all home PCs come with a V.90 modem.

² Insufficient data to give a rating.

³ System now sold with a VisionTek GeForce3 graphics card and a mini-tower case.

⁴ Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

We bid farewell to three discontinued models: HP's Pavilion 9820 and ABS's Multimedia System 2 (last month's Best Buys), and IBM's NetVista X40i, which IBM will replace with a P4-based system.

Gateway's Profile 3 CX—a nimble, attractive, and pricey system with a built-in LCD monitor—slips in at number ten. Another Gateway, the Performance 1800, vied for a spot on the power chart. Despite

being the quickest Pentium 4 home system we've tested, it failed to unseat any of the incumbents, including the Athlon-based Gateway Select 1400.

Regrettably, several vendors slide in our support ratings: Compaq, Dell, HP, and MicronPC each drop a notch following our latest PC reliability and service survey. For details, see "Service Takes a Dive" on page 125.

—Sean Captain ▶



BLACK BEAUTY: Topping our value chart, the Dell Dimension 4300 pairs a P4 with SDRAM.

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TOP 10 PRINTERS

TOP 100

TEST
Center

Visit find.pcworld.com/13500 for reviews of all products ranked in this chart or tested this month.

COMPAQ, EPSON, AND SHARP have announced new ink jet printers; consequently, older models from those companies have been retired from our chart. Though we could not test the new models in time for inclusion in this issue, you can read about them in our January 2002 roundup of ink jets.

Meanwhile, we did look at Canon's new S500 and S630 Color Bubble Jets, and these ink jets proved formidable at producing color images. The three Canon Bubble Jet printers on the chart (the S500, S600, and S630) perform comparably, but their prices and consumables costs differ somewhat. ▶

	INK JET PRINTER	Street price (8/28/01)	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 Lexmark Z43 Color Jetprinter find.pcworld.com/10561	\$100	90	4.5/0.5	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: The Z43 produces high-quality text and detailed color graphics output. Its consumables costs make printing color text and images expensive. (★★★★☆ Sept 01)
2	Best BUY HP DeskJet 932C find.pcworld.com/10562	\$149	89	4.1/0.7	Good/Good	3.6/11.1	FEATURES: Rated 4.5 ppm monochrome/2 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: The 932C is easy to set up and use, though it's a bit slower on text than the Z43 and Z53 Lexmarks. It produces sharp text and detailed (if somewhat light) color graphics.
3	Lexmark Z53 Color Jetprinter find.pcworld.com/10560	\$130	87	5.7/0.6	Good/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: Like its Z43 sibling, the Z53 produces high-quality prints at a slightly higher speed. This month the price drops by \$10. (★★★★☆ Sept 01)
4	Canon S600 Color Bubble Jet find.pcworld.com/10567	\$149	84	3.9/0.3	Very good/Good	2/13.6	FEATURES: Rated 15 ppm monochrome/10 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: This photo-quality unit produces sharp text, albeit more slowly than several other printers on the chart. Individual ink tanks help keep consumables costs low. Price drops by \$50.
5	HP DeskJet 952C find.pcworld.com/10565	\$199	83	3.9/0.7	Good/Good	3.6/11.1	FEATURES: Rated 5.1 ppm monochrome/3.6 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: With crisp but slightly grayish text and vivid color prints, the DeskJet 952C fits well in a small or home office. Printing speed is adequate but not great.
6	HP DeskJet 842C find.pcworld.com/10568	\$119	82	2.6/0.5	Good/Good	7.2/14.6	FEATURES: Rated 4.6 ppm monochrome/3.1 ppm color. 1200-by-600-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: The DeskJet 842C has a low price but slow text performance. Output quality is mixed: dark, crisp text and smooth but foggy graphics. Documentation is outstanding.
7	HP Photosmart 1218 find.pcworld.com/13540	\$399	79	5.2/0.9	Good/Very good	3.6/11.2	FEATURES: Rated 6.5 ppm monochrome/5 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Still pricey, the 1218 drops by \$100 this month. It prints both photos and text well, and its ability to print from CompactFlash and SmartMedia cards gives it a real advantage.
8	Canon S500 Color Bubble Jet find.pcworld.com/13502	NEW \$149	78	3.8/0.2	Good/Very good	2/10.7	FEATURES: Rated 12 ppm monochrome/8 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: Canon's S500 prints rich color images. Priced \$50 below the S630, this model offers virtually identical performance and the same low consumables costs. (★★★★☆)
9	HP DeskJet 990Cse find.pcworld.com/13520	\$299	77	4.7/0.8	Good/Very good	4.8/12.3	FEATURES: Rated 6.5 ppm monochrome/5 ppm color. 2400-by-1200-dpi maximum resolution, 150 sheets input, 50 output. SUMMARY: HP lops \$100 off the year-old 990Cse's price. This model prints superb gray-scale images and vibrant plain-paper color output, but high-resolution glossy photos appeared flat.
10	Canon S630 Color Bubble Jet find.pcworld.com/13501	NEW \$199	76	3.9/0.3	Very good/Very good	2/10.7	FEATURES: Rated 17 ppm monochrome/12 ppm color. 2400-by-1200-dpi maximum resolution, 100 sheets input, 50 output. SUMMARY: The Canon S630 creates better details on small fonts and serifs than the S500. Unfortunately, its gray-scale images looked jagged and streaky. (★★★★☆)

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

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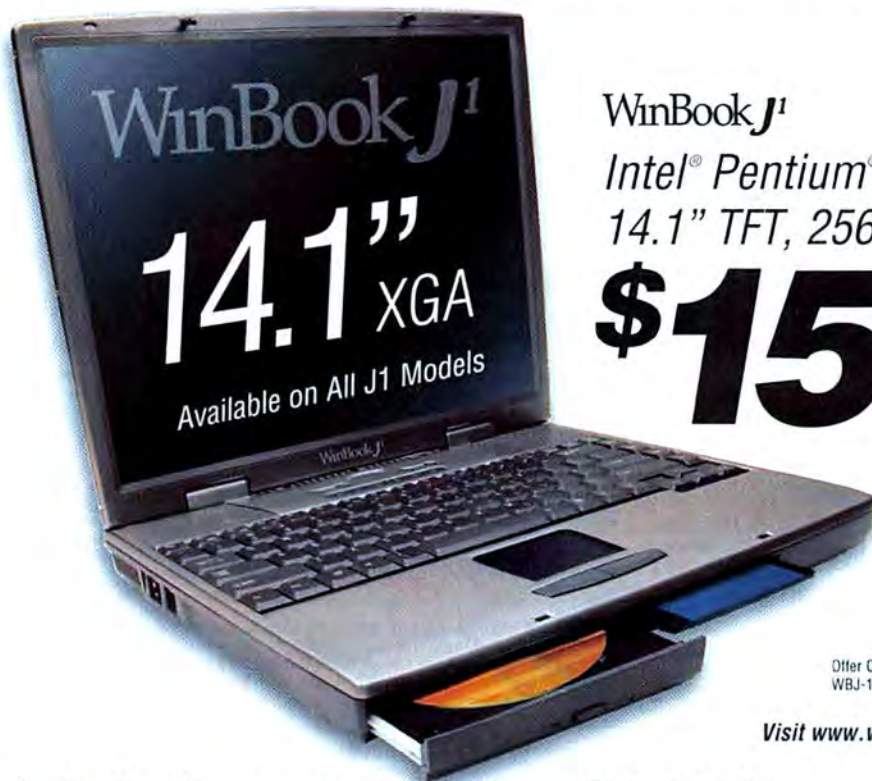
WITH EXCELLENT TEXT AND IMAGE quality and a moderate price, Samsung's SyncMaster 700NF defends the Best Buy title it won in our September "Screen Gems" roundup (see find.pcworld.com/13480). Reexamined this month under our new test suite, ViewSonic's G75f also landed in Best Buy ter-

ritory. Iiyama's new Vision Master Pro 413 earned top scores in both text and graphics, but it's priced higher than either of the chart toppers. Hewlett-Packard's latest offering, the P720, excelled at displaying text but faltered on our graphics tests. Next month, we'll look at 19-inch monitors. ▶

	17-INCH MONITOR	Street price (8/30/01)	Overall rating	Quality of text/graphics	Comments
1	Best Buy Samsung SyncMaster 700NF find.pcworld.com/10571	\$269	93	Excellent/Excellent	FEATURES: 15.9-inch viewable area, .25mm stripe-pitch Diamondtron NF tube, up to 119-Hz refresh rate, up to 1920 by 1440 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Renders extremely sharp text and beautiful color graphics. A nifty retracting panel on the front bezel holds easy-to-use on-screen controls. (★★★★★ Sept 01)
2	Best Buy ViewSonic G75f find.pcworld.com/13380	\$279	89	Excellent/Very good	FEATURES: 16-inch viewable area, .25mm stripe-pitch Perfect Flat tube, up to 105-Hz refresh rate, up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Produces clearly readable text and well-saturated colors in graphics. On-screen controls are well organized, but button combinations take a while to figure out. (★★★★★ Retested this month)
3	Iiyama Vision Master Pro 413 find.pcworld.com/13260 NEW	\$308	89	Excellent/Excellent	FEATURES: 15.9-inch viewable area, .27mm stripe-pitch Diamondtron tube, up to 115-Hz refresh rate, up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: Renders bright, vibrant graphics. Controls are woefully confusing, and the on-screen menus time out before you can decipher them. Includes dual inputs. (★★★★★)
4	Sony CPD-G220S find.pcworld.com/10572	\$350	88	Excellent/Excellent	FEATURES: 15.9-inch viewable area, .24-.25mm variable-pitch FD Trinitron tube, up to 85-Hz refresh rate, up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Top-notch image quality, but at a relatively high price. While the controls are a bit confusing, the manual explains them well and includes a thorough troubleshooting section. (★★★★★ Sept 01)
5	Eizo Nanao FlexScan T565 find.pcworld.com/10576	\$415	85	Very good/Very good	FEATURES: 15.8-inch viewable area, .25mm stripe-pitch Trinitron tube, up to 118-Hz refresh rate, up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 8-hour weekday toll-free support. SUMMARY: Colors in photos and Web pages look lovely, and detailed text is sharp. But far less expensive models perform even better, and tech support hours are minimal. Includes a USB hub. (★★★★★ Sept 01)
6	CTX EX700F find.pcworld.com/13281 NEW	\$185	83	Good/Satisfactory	FEATURES: 16.3-inch viewable area, .25mm diagonal dot-pitch shadow mask tube, up to 89-Hz refresh rate, up to 1024 by 768 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: With respectable text quality and a low price, this model makes a good choice for price-conscious buyers who don't work with graphics. (★★★★★)
7	Hewlett-Packard P720 find.pcworld.com/13321 NEW	\$259	82	Very good/Satisfactory	FEATURES: 15.9-inch viewable area, .25mm diagonal dot-pitch flat shadow mask tube, up to 89-Hz refresh rate, up to 1280 by 1024 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 11-hour weekday toll-free support. SUMMARY: A reasonably priced monitor for people who work primarily with text, but graphics fans should look elsewhere. Controls are basic but easy to navigate. (★★★★★)
8	Acer G773 find.pcworld.com/13280	\$209	82	Good/Satisfactory	FEATURES: 15.9-inch viewable area, .25mm diagonal dot-pitch shadow mask tube, up to 89-Hz refresh rate, up to 1024 by 768 resolution at 70 Hz, three-year warranty, 24-hour weekday toll-free support. SUMMARY: Produces sharp, dark lettering on spreadsheets and in Word documents, but colors appeared faded in our photo tests. On-screen controls are easy to navigate. (★★★★★ Sept 01)
9	Hitachi CM615 find.pcworld.com/13340	\$179	81	Good/Satisfactory	FEATURES: 16-inch viewable area, .24mm diagonal dot-pitch shadow mask tube, up to 85-Hz refresh rate, up to 1152 by 864 resolution at 70 Hz, five-year warranty, 11.5-hour weekday toll-free support. SUMMARY: While not top-of-the-line in performance, this monitor offers fairly sharp text and respectable colors for a very low price. On-screen control menu times out too quickly. (★★★★★ Sept 01)
10	Envision EN-780e find.pcworld.com/13420	\$180	80	Satisfactory/Satisfactory	FEATURES: 15.9-inch viewable area, .25mm diagonal dot-pitch shadow mask tube, up to 85-Hz refresh rate, up to 1600 by 1200 resolution at 70 Hz, three-year warranty, 10-hour weekday toll-free support. SUMMARY: Text quality was acceptable in our Microsoft Word test, and colors looked vivid on Web pages. Documentation and tech support hours are meager. Meets the MPRII standard, but not TCO standards. (★★★★★ Sept 01)

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 (20 percent each), price (20 percent), viewable area (20 percent), features and ease of use (15 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. *Maximum refresh rate at 1024 by 768 resolution (the tested resolution for this size monitor). †Uses an aperture grille 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

TOP 100

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THE NUMBER THREE IS SIGNIFICANT this month as three new boards—MSI's G3 Pro-VT64D and Asus's AGP-V7100 Pro Pure 32MB and AGP-V8200 Deluxe—capture places on the chart at second, third, and, seventh, respectively. NVidia's GeForce3, the high-powered gaming chip set, appears on two

of this month's new cards. Tumbling prices make GeForce3-based graphics boards more affordable: Four of the five GeForce3 cards on the chart cost less than \$400. Faced with a very strict budget? Four sub-\$200 cards—including one priced at under \$100—appear on this month's chart. ▶

	AGP BOARD	Street price (8/21/01)	Overall rating	Image quality	Overall speed	Features rating	Comments
1	Best BUY CardExpert GeForce2 MX TwinView/Vivo Golden Sample find.pcworld.com/11423	\$159	94	Very good	Good	Very good	FEATURES: 4X AGP, NVidia GeForce2 MX-400 chip, 32MB of SDRAM, 350-MHz RAMDAC; S-Video-in and -out, composite-in and -out. SUMMARY: Solid performance and strong graphics quality, and ability to display to two different analog monitors or to a monitor and a TV simultaneously. (★★★★☆ Oct 01)
2	Best BUY MSI G3 Pro-VT64D ¹ find.pcworld.com/13120 NEW	\$359	92	Excellent	Very good	Very good	FEATURES: 4X AGP, NVidia GeForce3 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-out, composite-in and -out; overclocking and desktop utilities, digital video tools, and software DVD player. SUMMARY: Strong image-quality performance plus an excellent software bundle. (★★★★☆)
3	Asus AGP-V7100 Pro Pure 32MB find.pcworld.com/13101 NEW	\$89	91	Very good	Good	Good	FEATURES: 4X AGP, NVidia GeForce2 MX-400 chip, 32MB of SDRAM, 350-MHz RAMDAC; color-calibration utility, software DVD player, and three PC games. SUMMARY: A generous game bundle, fine performance, and a low price make this newcomer a great choice for casual gamers on a budget. (★★★★☆)
4	CardExpert GeForce3 Power Pack find.pcworld.com/11301	\$369	91	Very good	Excellent	Very good	FEATURES: 4X AGP, NVidia GeForce3 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-in and -out, composite-in and -out; video-editing software. SUMMARY: Outperformed other GeForce3 cards in overall speed, but lagged slightly behind the others in image quality. (★★★★☆ Oct 01)
5	ATI All-in-Wonder Radeon find.pcworld.com/10140	\$249	91	Good	Good	Excellent	FEATURES: 4X AGP, ATI Radeon chip, 32MB of DDR SDRAM, 350-MHz RAMDAC; DVI-out, TV tuner, hardware DVD support; graphics-editing software. SUMMARY: This card makes a strong showing, thanks to its video features and bundled software. A \$30 price drop makes it more affordable.
6	MSI G2Pro Plus-T64D ² find.pcworld.com/10282	\$139	89	Good	Very good	Good	FEATURES: 4X AGP, NVidia GeForce2 Pro chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; DVD software; color-calibration, virtual desktop, and overclocking utilities. SUMMARY: This MSI board almost matched GeForce3 cards in overall speed, at a GeForce2 MX card's price. (★★★★☆ Sept 01)
7	Asus AGP-V8200 Deluxe find.pcworld.com/13100 NEW	\$349	89	Very good	Very good	Very good	FEATURES: 4X AGP, NVidia GeForce3 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; S-Video-in and -out, composite-out, VR port, VR glasses; color-calibration utility, software DVD player, and three PC games. SUMMARY: Fine bundle and performance for the cheapest GeForce3 board on the chart. (★★★★☆)
8	ELSA Gladiac 920 find.pcworld.com/10280	\$399	88	Excellent	Very good	Good	FEATURES: 4X AGP, NVidia GeForce3 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; DVD software, game. SUMMARY: Magnificent image quality earned the ELSA near-perfect image-quality scores. DirectX 8 hardware support will be a plus when DirectX 8 games arrive. (★★★★★ Sept 01)
9	AOpen MX400-A find.pcworld.com/11321	\$199	88	Good	Good	Very good	FEATURES: 4X AGP, NVidia GeForce2 MX-400 chip, 64MB of SDRAM, 350-MHz RAMDAC; S-Video-in and -out, composite-in and -out, TV tuner; video-editing software. SUMMARY: Has strong image quality and features, but costs significantly more than comparable cards. (★★★☆☆ Oct 01)
10	Hercules 3D Prophet III find.pcworld.com/11320	\$429	85	Very good	Very good	Very good	FEATURES: 4X AGP, NVidia GeForce3 chip, 64MB of DDR SDRAM, 350-MHz RAMDAC; DVI-out, S-Video-out, composite-out; color-calibration, overclocking, and DVD software. SUMMARY: Terrifically fast frame rates and vivid colors in test games. Plenty of features, but expensive. (★★★★☆ Sept 01)

HOW WE TEST: We test graphics boards under Windows Millennium Edition. Our performance scores are based on tests that we evaluate on frame rate (50 percent) and image quality (50 percent). We use GT Interactive's Unreal Tournament, id Software's Quake III Arena, Interplay's MDK2 Demo, Infogrames' Test Drive 6, and the Calligra TrueSpace 4.2 Benchmark for both performance and image-quality testing. We test graphics boards in a Dell Dimension 4100 Series with a PIII-933 CPU and 128MB of PC133 SDRAM. To test each board, we use drivers supplied by the vendor. Overall rating is based on performance (42.5 percent), features (27.5 percent), price (20 percent), and support policies (10 percent). See find.pcworld.com/10860 for details on PC World's Star Ratings. ¹ Renamed by vendor; initially called StarForce 822. ² Renamed by vendor; formerly called StarForce 831.

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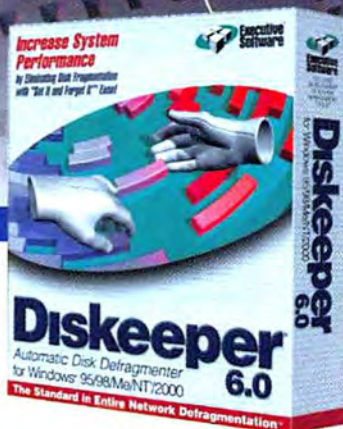


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TOP 10 SCANNERS

TOP 100

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Visit find.pcworld.com/10860 for reviews of all products ranked in this chart or tested this month.

CANON'S CANOSCAN N1240U enters the SOHO competition this month; it is the only model on the chart to use CIS technology (all others employ CCD sensors). Epson's new Perfection 1250 Photo is affordable, but slow scan speeds

kept it off the chart. The Umax Astra 4400 fell short because of middling speed and limited, fee-based support hours.

Meanwhile, Epson, Visioneer, and Umax have dropped prices for some of their popular scanner models. ▶

	SOHO SCANNER	Street price (8/17/01)	Overall rating	Scan quality	Scan speed (sec per page)		Comments
					Black-and-white	Color ¹	
1	Best BUY Epson Perfection 1240U Photo find.pcworld.com/10420	\$269	91	Good	20 @ 300 dpi	226 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 10.6-by-17.1-by-3.7-inch case; 6.2 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no automatic document feeder. SUMMARY: This fast unit creates crisp, colorful images and is supported by around-the-clock automated tech support.
2	Visioneer OneTouch 8820 find.pcworld.com/10421	\$170	91	Good	24 @ 300 dpi	214 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 16.7-by-11.7-by-4.5-inch case; 7.2 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter. SUMMARY: Zippy 42-bit-color unit has seven quick-start buttons. Live support (a toll call) is available only 9 hours on weekdays. (★★★★☆ Sept 01)
3	Microtek ScanMaker 4700 find.pcworld.com/10427	\$180	90	Good	29 @ 300 dpi	263 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 11.4-by-20-by-4.6-inch case; 8 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. SUMMARY: Has 42-bit color, high resolution, quick-start buttons, and lots of software; works with transparencies right out of the box.
4	Canon CanoScan N1240U find.pcworld.com/13141	NEW \$199	89	Good	40 @ 300 dpi	303 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 10.1-by-15.1-by-1.3-inch case; 3.3 pounds, 8.5-by-11.7-inch scanning area; no optional transparency adapter or ADF. SUMMARY: Compact newcomer offers glorious color and ample software, but it isn't as speedy as other USB units. (★★★☆☆)
5	HP Scanjet 4470c find.pcworld.com/12160	\$199	88	Excellent	58 @ 300 dpi	255 @ 1200 dpi	FEATURES: Parallel and USB, 1200 by 1200 dpi, 12-by-19.9-by-2.9-inch case; 6.3 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. SUMMARY: Splendid scan quality and easy-push buttons, but warranty and free support limited to 90 days. (★★★★☆)
6	Canon CanoScan Di230UF find.pcworld.com/10422	\$299	88	Good	35 @ 300 dpi	179 @ 1200 dpi	FEATURES: USB, 1200 by 2400 dpi, 11.3-by-18.1-by-4.3-inch case; 8.7 pounds, 8.5-by-11.69-inch scanning area; includes transparency adapter; no optional ADF. SUMMARY: Impressive unit does color-accurate reflective and transparency scanning on the quick—but at a premium price.
7	Microtek ScanMaker 3800 find.pcworld.com/12180	\$100	88	Good	31 @ 300 dpi	63 @ 600 dpi	FEATURES: USB, 600 by 1200 dpi, 11.3-by-17.1-by-3.1-inch case; 6 pounds, 8.5-by-11.7-inch scanning area; includes transparency adapter; no optional ADF. SUMMARY: Strong scan quality and great price, but low resolution limits size of enlargements. (★★★☆☆)
CORPORATE SCANNER							
1	Best BUY HP Scanjet 7450c find.pcworld.com/10423	\$760 ²	94	Good	17 @ 300 dpi	687 @ 2400 dpi	FEATURES: USB and SCSI, 2400 by 2400 dpi, 12.3-by-22.6-by-7.3-inch case; 13.8 pounds, 8.5-by-14-inch scanning area; includes transparency adapter and ADF. SUMMARY: High-resolution \$700 unit handles legal-size documents and transparencies. SCSI card and cable cost \$60 extra.
2	Microtek ScanMaker 8700 find.pcworld.com/10430	\$900 ²	94	Excellent	29 @ 300 dpi	83 @ 1200 dpi	FEATURES: USB and IEEE 1394, 1200 by 2400 dpi, 22.3-by-15.3-by-6.3-inch case; 25.5 pounds, 8.5-by-14-inch scanning area; built-in transparency adapter; ADF optional. SUMMARY: Great scan quality and performance. The \$380 ScanMaker 5700 is a more affordable alternative.
3	Epson Perfection 1640SU Office find.pcworld.com/10431	\$449	92	Good	17 @ 300 dpi	423 @ 1600 dpi	FEATURES: USB and SCSI, 1600 by 3200 dpi, 11.4-by-17.4-by-9.2-inch case; 14.8 pounds, 8.5-by-11-inch scanning area; transparency adapter optional; includes ADF. SUMMARY: 42-bit color powerhouse is an all-around performer with sharp scan quality. A \$199 version omits the ADF.

HOW WE TEST: All scanners are tested at default settings under Windows 98 on a Gateway GP7-550 (Pentium III-550) PC with 128MB of RAM, using each scanner's bundled software. Overall rating is based on image quality (25 percent), speed (SOHO 22 percent; corporate 25 percent), ease of use (SOHO 17 percent; corporate 10 percent), features (SOHO 16 percent; corporate 20 percent), support (10 percent), and price (10 percent). Speeds are timed from start of scanning until cursor control is regained. Data based on tests designed by the PC World Test Center. Visit find.pcworld.com/10860 for details on PC World's Star Ratings. ¹ At unit's maximum optical resolution. ² In order: width, depth, height. ³ Priced with SCSI or IEEE 1394 adapter.

* Tested with SCSI interface. ² Tested with IEEE 1394 interface. ³ Tested with USB interface.



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TOP 10 DIGITAL CAMERAS

Visit find.pcworld.com/13620 for reviews of all products ranked in this chart or tested this month.

PRICE BEFORE PIXELS: Though we often crow about the ever-increasing resolutions offered by high-end digital cameras, most of us shop the low end of the market. This month, the Olympus Camedia D-370 leaps to number one. Despite its paltry 1.3-megapixel resolution, our tests showed that the

D-370 can create pretty 4-by-6 prints. The other newcomer, Sony's Cyber-shot DSC-P50, brings more pixels to the party but costs twice as much. The discontinued HP Photosmart 618 and Fujifilm FinePix 2400 Zoom exit the chart, while the Toshiba PDR-M65 enters, thanks to a \$100 price drop. ►

	CAMERA: UNDER \$500	Street price (8/16/01)	Overall rating	Image quality	Ease of use	Battery life/shots	Comments
1	Best Buy Olympus Camedia D-370 find.pcworld.com/12780 NEW	\$199	81	Good	Good	Very good/253	FEATURES: 1.3-megapixel resolution, 2MB internal memory, 35mm focal length; USB and video output; 10.2 ounces. SUMMARY: The inexpensive D-370 improves on its predecessor, the D-360L, with better images and a sixfold increase in battery life. Also accepts SmartMedia cards. ★★★★★
2	Best Buy Toshiba PDR-M61 find.pcworld.com/10581	\$299	79	Good	Good	Excellent/312	FEATURES: 2.3-megapixel resolution, 8MB SmartMedia card, 38mm-114mm focal range; USB output; 14.3 ounces. SUMMARY: It's somewhat bulky and heavy, and it doesn't have manual controls, but the PDR-M61 delivers sharp images and great battery life. Price drops by \$100 this month. (★★★★★ Sept 01)
3	Olympus Camedia Brio D-100 find.pcworld.com/10582	\$249	76	Good	Very good	Limited/29	FEATURES: 1.3-megapixel resolution, 8MB SmartMedia card, 35mm focal length; USB and video output; 7.1 ounces. SUMMARY: A small, simple, and stylish point-and-shoot camera that's easy to use and inexpensive, though it suffers from pathetic battery life. (★★★★★ Sept 01)
4	Kodak DX3500 find.pcworld.com/10583	\$299	76	Very good	Very good	Very good/218	FEATURES: 2.2-megapixel resolution, 8MB internal memory, 38mm focal length; USB and video output; 8.9 ounces. SUMMARY: Superb images but few extra controls. A CompactFlash slot supplements the internal memory; a handy docking station is \$80 extra. (★★★★★ Sept 01)
5	Toshiba PDR-M65 find.pcworld.com/12860	\$499	76	Very good	Good	Very good/259	FEATURES: 3.34-megapixel resolution, 8MB SmartMedia card, 38mm-114mm focal range; USB and video output; 14.3 ounces. SUMMARY: A simple unit with fewer fancy controls than other cameras of the same resolution. A \$100 price drop this month switches it from the over-\$500 chart.
6	Olympus Camedia C-2040 Zoom find.pcworld.com/10584	\$499	76	Good	Good	Adequate/147	FEATURES: 2.11-megapixel resolution, 8MB SmartMedia card, 40mm-120mm focal range; USB and video output; 13.7 ounces. SUMMARY: This camera's image quality nearly equals that of its \$999 sibling, the C-3040. It has a lower maximum resolution, however, and can't capture audio with video.
7	Sony Cyber-shot DSC-P50 NEW find.pcworld.com/12781	\$399	75	Good	Good	Limited/57	FEATURES: 2.1-megapixel resolution, 4MB Memory Stick media, 41mm-123mm focal range; USB and video output; 9.8 ounces. SUMMARY: Average image quality in an easy-to-use camera, but extremely poor battery life. An optional lithium-ion battery and charger triples the life for \$100 more. ★★★★★
8	HP Photosmart 315 find.pcworld.com/12783	\$279	74	Adequate	Good	Adequate/148	FEATURES: 2.1-megapixel resolution, 8MB CompactFlash media, 38mm focal length; USB and IRDA output; 11.4 ounces. SUMMARY: Solid, easy-to-use unit with few extras; for example, it doesn't provide a zoom. Infrared port for sending images directly to some HP printers; support calls not toll-free.
9	Canon PowerShot A20 find.pcworld.com/10586	\$399	73	Good	Adequate	Limited/66	FEATURES: 2.1-megapixel resolution, 8MB CompactFlash media, 35mm-105mm focal range; USB and video output; 12.6 ounces. SUMMARY: Solidly built camera produces average-quality images. The controls are somewhat confusing, and battery life is extremely short. (★★★★★ Sept 01)
10	Ricoh RDC-5300 find.pcworld.com/10587	\$499	71	Adequate	Good	Adequate/153	FEATURES: 2.3-megapixel resolution, 8MB SmartMedia card, 38mm-114mm focal range; serial, USB, and video output; 15 ounces. SUMMARY: This Ricoh is relatively expensive, given its somewhat limited features. But you do get a varied photo software bundle and easy-to-use control settings.

HOW WE TEST: Each camera's overall rating is based on price (30 percent), picture quality (20 percent), ease of use (15 percent), features (15 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.

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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 Top 10 charts, go online and type in the *PC World* Find-It URL at

the top of each chart (for example, find.pcworld.com/12000 for products on the *Top 10 Monitors* chart). Next month's *Top 100* will cover CD-RW drives, 19-inch CRT monitors, color laser printers, and digital cameras \$500 and over. ■



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PRINTERS

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MONITORS

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CD-RW DRIVES

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DIGITAL CAMERAS

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SMALL-OFFICE	MONOCHROME LASER PRINTERS From the October 2001 issue					21-INCH CRT MONITORS From the October 2001 issue					CD-RW DRIVES From the October 2001 issue					DIGITAL CAMERAS \$500 AND OVER From the October 2001 issue				
	1	Best BUY	Minolta-QMS PagePro 1100L find.pcworld.com/11665			1	Best BUY	Optquest Q115 find.pcworld.com/10579			1	Best BUY	Yamaha LightSpeed CRW2200EZ find.pcworld.com/11146			1	Best BUY	Nikon Coolpix 995 find.pcworld.com/10771		
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	4		Samsung ML-1210 find.pcworld.com/11582			4		Sampo AlphaScan 912ST find.pcworld.com/10801			4		TDK 16/10/40 VeloCD ReWriter find.pcworld.com/11141			4		Casio QV-3500EX find.pcworld.com/11421		
	5		Lexmark Optra E312 find.pcworld.com/11670			5		Cornerstone Peripherals PI650 find.pcworld.com/11380			5		Sony CRX1611/82U find.pcworld.com/11136			5		Fujifilm FinePix 6800 Zoom find.pcworld.com/10773		
	1	Best BUY	Xerox DocuPrint N2125 find.pcworld.com/11600			6		Cornerstone Peripherals C1030 find.pcworld.com/10804			6		Iomega 16x10x40 Internal CD-RW find.pcworld.com/11128			6		Olympus Camedia E-10 find.pcworld.com/10777		
	2		IBM Infoprint 21 find.pcworld.com/11660			7		Hansol 2100A find.pcworld.com/11383			7		Teac CD-W516E 16x10x40 CD-RW find.pcworld.com/11143			7		HP Photosmart 912 find.pcworld.com/10778		
	3		HP LaserJet 4100n find.pcworld.com/11661			8		Sony MultiScan G520 find.pcworld.com/11382			8		Sony Double Density CRX200E/A1 find.pcworld.com/11138			8		Sony Cyber-shot DSC-P1 find.pcworld.com/10774		
	4		GCC Elite 21N find.pcworld.com/11580			9		Hewlett-Packard P1120 find.pcworld.com/11384			9		LG Electronics CED-8120B find.pcworld.com/11129			9		Sony Cyber-shot DSC-S75 find.pcworld.com/11420		
	5		Brother HL-1670N find.pcworld.com/11662			10		CTX VL1300 find.pcworld.com/11462			10		Imation CD Burn-R CRW1208A find.pcworld.com/11124			10		Toshiba PDR-M65 find.pcworld.com/10776		
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s1123195	FinePix 4800	Zoom 2.4 Megapixel	3x	3.75x	Yes	TFT active Matrix 2" color	16MB SmartMedia	\$599.00
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WINDOWS TIPS

SCOTT DUNN

Have You Clicked Your Links Toolbar Today?

ALL Versions ONE OF WINDOWS' most versatile features is also one of the most underused: the Links toolbar. You can customize other Windows toolbars by adding shortcuts to launch applications, documents, folders, and Web sites (for Windows 95, doing this requires using the Desktop Update portion of Internet Explorer 4). But the Links bar goes beyond these capabilities, letting you add multiple custom menus, for example. Any toolbar can be placed on

the taskbar at the bottom of the screen, positioned on any screen edge, or floated anywhere on the screen. But you can also put the Links toolbar at the top of all folder and Windows Explorer windows, and in all Internet Explorer browser windows.

Follow these steps to get the most out of the Links toolbar in the least screen space.

Note: If you use Windows 95 without the Desktop Update feature of IE 4, these tips will work only in the IE browser window, not on the taskbar or in folder windows.

Put 'er there: To add the Links toolbar to the taskbar, right-click the taskbar, choose *Toolbars*, and select *Links* on the resulting menu. Drag the Links toolbar off the taskbar to make it float anywhere on the desktop, or dock it on any edge of the desktop. To change the Links toolbar's appearance, right-click the toolbar and check or uncheck options: Uncheck *Show Text* to hide the text labels; choose the *View* submenu to select large or small icons; and uncheck *Show Title* to hide the word *Links*. To place the Links toolbar in a folder window or IE browser window, open the folder or browser, right-click the menu bar or toolbar at the top of the window, and choose *Links*. Unfortunately, you can't customize the toolbar's appearance when you add it to a folder or browser window, except as described below in "Keep the name short."

Add your links: Place shortcuts to files and folders onto the Links toolbar by dragging them from Explorer to a spot on the toolbar. To add a shortcut to the Web page currently open in your IE browser, drag the *Control* icon (the little blue 'e') in the upper-left corner of the browser and drop it onto the toolbar. You can drag shortcuts from the Start menu or its submenus to the Links bar, too (except for certain built-in Start menu items, such as *Start•Help* and *Start•Run*). To remove an item, drag it from the Links bar to the Recycle Bin, or right-click it and choose *Delete*.

Add custom menus: Want faster access to one of the menus that pops out of the Start menu? Just drag and drop it onto the Links toolbar. You can add your own custom menu to the Links bar via the Links folder, which holds the shortcuts whose icons appear on your Links toolbar. To open this folder, click *Favorites* on the

178 WINDOWS TIPS

Get around in Windows faster via the Links toolbar; make your folder title bar show the full folder path.

182 INTERNET TIPS

Keep Web bugs off your Internet track, plus more ways to e-mail URLs, and a tool that can record your browsing.

186 STEP-BY-STEP

The fastest, simplest, and least expensive way to give nearly any PC new zing is a RAM upgrade. We walk you through the process, and steer you around the pitfalls.

188 HARDWARE TIPS

Two approaches to locking out PC intruders: hardware and software. Also, low-cost multimedia boosts.

190 ANSWER LINE

Put your modem connection on hold to answer the phone; let Norton AntiVirus remind you to stretch.

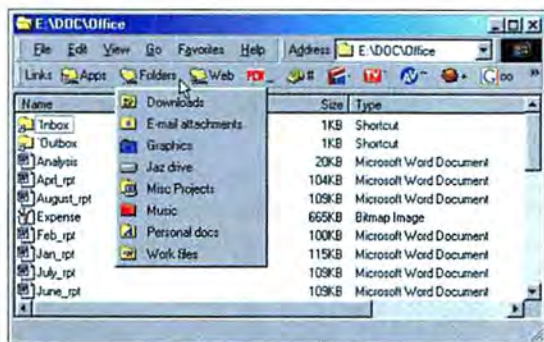


FIGURE 1: YOUR LINKS TOOLBAR shortcuts can have menus, custom icons, and single-character names.

Windows Explorer or Internet Explorer menu bar (or choose *Start>Favorites*), and then double-click *Links*. Right-click an empty area of the folder, and choose *New>Folder*. Type a name for the folder and click *OK*. Now in another folder window, select one or more application (.exe) files, documents, Web links, or other files that you want to create shortcuts to, and right-click and drag them to the new folder icon. Release the mouse button and choose *Create Shortcut(s) Here*. When you click the icon for your new folder on the Links bar, a menu will pop up showing the shortcuts you added to that folder (see **FIGURE 1**). **Note:** If you're using the first edition of Windows 98 or Windows 95 with IE 4's Desktop Update, the menus appear as pop-up toolbars. When they're visible, you can customize them by right-clicking and choosing the same options as you would for other toolbars.

Make a 'Recent Documents' menu: To add a menu to your Links bar that shows the same contents as your *Start>Documents* menu, use Microsoft's free Tweak UI utility to change the location of recent shortcuts to a folder inside the Links folder. For details, see last month's *Windows Tips*

versions, clicking the double greater-than symbol (>>) at the end of the Links toolbar shows the rest of the toolbar as a menu. Simply drag your custom folders from that menu and drop them anywhere on the Links bar. You can use this method to rearrange any of the icons on the Links bar, not just your new menus.

Keep it simple: You can create as many menus as you want on your Links toolbar—and even put folders within folders to create submenus. Adding too many menus, submenus, and shortcuts will slow your access to the files, however. You'll either get lost navigating through the items, or you'll have to click the double greater-than symbol to view all your Links shortcuts. Just add shortcuts to the items you use most often, and place items you use less often on a few simple menus that pop up from the toolbar. For example, make an 'Apps' menu for often-used programs, a 'Folders' menu for folder shortcuts, and a 'Web' menu for favorite Internet sites (as shown in Figure 1).

Get the look you like: It's easier to locate icons on your Links toolbar and its menus if each one has a distinctive look. This is especially true for generic Web and folder

(at find.pcworld.com/11760). Visit find.pcworld.com/11761 to download Tweak UI.

Rearrange as needed: If you don't see the custom menu you just created, it may lie off the edge of the Links toolbar. Early Windows and Internet Explorer versions required that you use the scroll button at the right end of the Links bar to view your custom folders, and then drag them left to the desired location. In later

shortcuts. To change a shortcut's icon, right-click it and choose *Properties*. With the appropriate Shortcut, Internet Shortcut, or Web Document tab in front, click *Change Icon* and select an icon (see **FIGURE 2**). If you don't see one you like, click *Browse*; then locate and open other files that contain icons. These include *Program.exe*, *Moricons.dll*, and *Pifmgr.dll* (look for these files in your Windows, System, or System32 folders), as well as icon files downloaded from the Web. Make your selection, and click *OK* twice.

You can also change the icon for a menu you added to the Links bar (or for any folder, for that matter), although doing so is a little trickier. For details, see "Unique Folder Icons," in the February 2000 *Windows Tips* (at find.pcworld.com/11762). The task is simpler when you use a utility such as *ChangeIcon* (which is available at find.pcworld.com/11763).

Keep the name short: If you want to save space on the Links toolbar, eliminate ▶

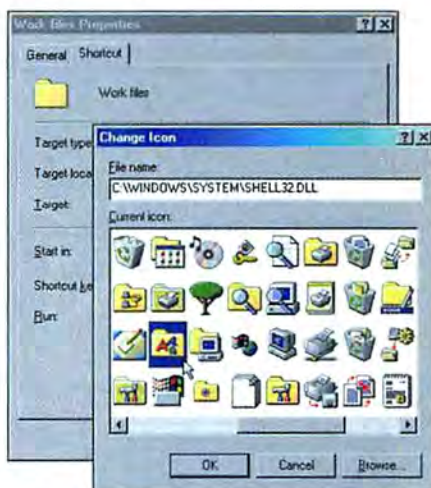


FIGURE 2: MAKE IT EASIER to distinguish between your Web and folder shortcuts by assigning them custom icons.

the icons' descriptive names. If your Links bar is free-floating or on the Windows taskbar, right-click an empty part of the toolbar and uncheck *Show Text*. When the Links bar is on a folder or IE browser window, hiding the text is more difficult, but you can name each icon with a single punctuation mark, as shown in Figure 1. If you have IE 5 or later, right-click an icon on the Links bar and choose *Rename*. In IE 4, open the Links folder as described in "Add custom menus" above, select an icon, and click its name (or press <F2>). Type your new name and press <Enter>.

Open folder links in the same window: When the Links toolbar is in a folder or browser window, selecting one of its folder shortcuts will likely open the folder in a new window. I say “likely” because how the folder opens depends on your version of Windows and IE, among other factors. To set your folders to open in the window that’s currently open, choose *View•Folder Options* (in Windows 9x) or *Tools•Folder Options* (in Windows 2000 and Me) and make sure the General tab is in front. (In some versions of Windows, you have to click the *Settings* button.) Now select *Open each folder in the same window* and click OK as many times as needed. **Note:** Shortcuts you open from the Links bar must be folder shortcuts, not applications. To find out which it is, right-click the item’s icon and choose *Properties*. If the text in the Target box is a path to a folder, the shortcut leads to a folder. If the Target box con-

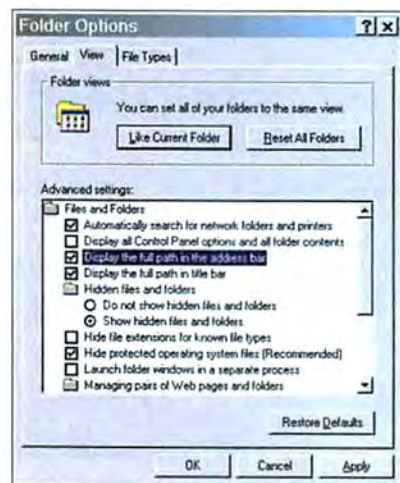


FIGURE 3: SET FOLDER OPTIONS to show the folder path in the title and Address bars.

tains an application file name (such as 'Explorer.exe'), the shortcut goes to an application, and this tip won't work for it.

When you have a single-pane folder or browser window visible, the shortcut will open in the same window when you right-click it and choose *Open*. With a two-pane Explorer window open (one with a folder tree on the left), right-click the folder shortcut and choose *Explore* (sometimes *Open* works, too). Unfortunately, this tip requires IE version 5 or later.

GET YOUR FOLDER BEARINGS



ALL Versions HOW DO YOU pinpoint a folder's location? You could click the down arrow on the right of the Address bar to see the path from the current folder to its parent folders. Or you could choose *View>Explorer Bar>Folders* (in Windows 98 SE and later) to see the folder's location in a tree diagram on the left. But there's a better way: Have each folder window display the full folder path in the title bar at the top of the screen. Choose *View>Options* or *View>Folder Options* (in Windows 9x) or *Tools>Folder Options* (in Windows 2000 and Me), and click the *View* tab. Now check the box labeled *Display the full path in the title bar* (the wording may vary depending on your Windows version) and click *OK*.

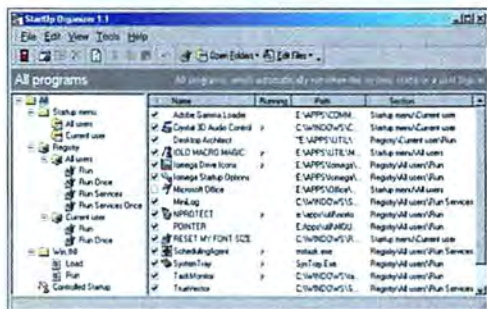
The complete folder path may not fit in the title bar, however. For example, the freeware utility Notify CD Player shows the current audio track in the title bar (see March 2001's *Windows Tips* at find.pcworld.com/11764). And when you're in full-screen mode (press <F11> to toggle this mode), the bar is hidden. Instead of relying on the title bar, view the complete folder path in the Address bar: Choose *View•Toolbars•Address Bar* (if needed). In Windows 2000 and Me, you may have to return to the View tab of the Folder Option dialog box and check the box labeled *Display the full path in the address bar* (see **FIGURE 3**). Then click **OK**. ■

Windows Tips pays \$50 for published tips and questions. Scott Dunn is a PC World contributing editor.

WINDOWS TOOLBOX

Take Charge of Startup

YOU CAN USE THE MSConfig utility in Windows 98 and Me to see which applications get launched when you start Windows. Choose **Start+Run**, type **msconfig**, press **<Enter>**, and click the **Startup** tab. Unchecking any of the programs listed will stop them from launching when Windows starts. But MSConfig is intended only to help you determine whether a Startup application is causing problems. It's easy to end up with duplications—some checked, some unchecked—when you use MSConfig. And prior to Windows Me, the utility didn't tell you whether an app was being launched from a command line in the Registry, from a Startup folder,



or from Win.ini, among other possible locations. (Windows 2000 doesn't have an MSConfig equivalent, nor a method to show you all your Startup applications.)

Fortunately, a solution is at hand. Meta-Products' \$25 StartUp Organizer shareware (shown above) lets you save backups of existing configurations and set other applications to launch at start-up. It's easy to filter the list of apps based on their start-up location (Registry, Startup folder, and so on). You can press a hotkey during log-on to choose which applications to start, or elect to be prompted before allowing certain apps to load at start-up. Visit find.pcworld.com/11765 to download StartUp Organizer.

On a tight budget? Startup Control Panel (available at find.pcworld.com/11766) is free and performs some of the same functions, but it's designed for older versions of Windows and can't ferret out every start-up application.

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YOU'VE CRUSHED your cookies. You've munged your e-mail. But still the spam streams into your in-box. Where's it coming from? One threat to privacy that you may not have considered is a little-known Web design trick called the Web bug.

If that's information you'd like to keep to yourself, it's time to start hunting down and exterminating the bugs.

If you use ad- or cookie-blocking software, you may already be able to block Web bugs. Programs such as InterMute's

AdSubtract (the free SE version of which can be downloaded at find.pcworld.com/11743) and GuidedScope's free GuidedScope utility (available at find.pcworld.com/11745) offer Web-bug-blocking features. And if your Web browser blocks third-party cookies or supports the P3P security standard (see "Crush Cookies With IE's P3P" below), you may already be safe from Web bugs that track your personal browsing.

The Privacy Foundation's free Bugnosis utility flashes a visible or audible ("Uh-oh!") warning when it detects a Web bug in a page you're browsing (see FIG-

few minutes, even over the slowest of connections, by going to the home page at www.bugnosis.com and clicking *Install*. The Privacy Foundation's FAQ at that same page explains more about how Web bugs work, and why you should care.

IF YOU'VE BEEN paying any attention to Internet privacy, you probably know about cookies—small text files that Web sites put on your hard disk to identify you and perhaps remember your preferences. Cookies have long been reviled as a threat to personal privacy, generating a small industry of cookie-smashing utilities and tips articles for disabling cookies. While many cookies are benign or helpful, others (like the Web bugs described above) can pass your browsing habits, your identity, and even your e-mail address to third-party advertisers and marketers.

The W3C (World Wide Web Consortium)—the folks who set many of the Web's standards—is finalizing a standard that will automatically describe a site's privacy practices. The Consortium's P3P (Platform for Privacy Preferences) standard may not yet be final, but Microsoft's Internet Explorer 6 already supports it, as do numerous Web sites (for the W3C's list of the latter, go to www.w3.org/P3P/compliant_sites). Visit the W3C's pages at www.w3.org/P3P to find FAQs and other P3P information.

You needn't do anything special to take advantage of P3P in IE 6, which at this writing is due to ship in late October. The browser's default Medium privacy setting blocks all third-party cookies (usually created by advertisements embedded in the current page) from sites that don't have a P3P policy in place, and it blocks any cookies that use personally identifiable information (such as your name or e-mail address) without asking for your per-



FIGURE 1: FIND HIDDEN WEB BUGS (like this one discovered on CNN.com's home page) by using the Privacy Foundation's free Bugnosis plug-in.

Also known as clear GIFs, Web bugs are tiny, invisible graphic images that Internet marketers and advertisers implant on their Web pages to track which pages are being viewed and by whom.

Web bugs aren't always a threat to your personal privacy—many Web sites, including PCWorld.com, use them simply to monitor site traffic without identifying individual users or IP addresses. When combined with cookies, customer databases, and other information-gathering methods, however, Web bugs can tell Web-site operators who you are, what sites you visit, and when you visit them.

FIGURE 1). The program is currently available only as an Internet Explorer 5.x add-on, but the forthcoming Outlook and Outlook Express versions of Bugnosis will be able to detect Web bugs in HTML-format e-mail messages, which are the same as Web pages. You can install Bugnosis in a

ALPHABETIZE YOUR BROWSER'S FAVORITES AND BOOKMARKS

AS YOUR LIST OF Internet Explorer Favorites grows, IE appends new shortcuts to the end of the list. IE eventually gets around to alphabetizing them for you, but you can hasten the process: Choose *Favorites*, right-click any item in the list, and select *Sort by name*. Netscape Navigator offers a similar command. To alphabetize Navigator bookmarks, press **<Ctrl>+B** and then choose *View>By name* (or *View>Sorted by name* in Netscape 6.1).



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mission. If that's too stringent or not secure enough for you, choose *Tools>Internet Options*, click the *Privacy* tab, move the slider up or down until you find a privacy level that suits your needs, and click *OK*.

It's too soon to tell whether P3P will really protect your online privacy, and whether other browser makers will support it. Netscape Navigator users already can block all third-party cookies (leaving the site's own cookies functional). In Navigator 4.7x, choose *Edit>Preferences*, click *Advanced*, check *Accept only cookies that get sent back to the originating server*, and click *OK*. In Netscape 6 and in the open-source Mozilla browser it's based on, choose *Edit>Preferences*, select *Cookies* under 'Privacy and Security', check *Enable cookies for the originating web site only*, and click *OK*.

MORE ON E-MAILING URLs

AFTER READING the tip on overcoming problems associated with e-mailing long URLs in the June 2001 *Internet Tips* column (see find.pcworld.com/11747), several readers submitted tips of their own. Eric Connor offers one of the simplest, noting that no matter how long the URL, Netscape Messenger's subject line can handle it. Internet Explorer seems to do just as well, and I'll bet you'd be hard-pressed to find a URL that's too long for your subject line. The only drawback: Your recipient's e-mail program probably won't display a URL sent in the subject line as a clickable hyperlink the way that it

does URLs included in the body of the message. You may have to explain in the accompanying message that the recipient must copy the URL in the subject line and paste it into the browser's Address field.

Ron Sommer suggests sending messages in Quoted Printable format as another way to preserve long URLs. This format inserts carriage returns at the end of paragraphs but not at the end of lines. In my limited testing, the technique worked like a charm. To send Quoted Printable messages in Outlook Express, choose *Tools>Options*, click the *Send* tab, click the *Plain Text Settings* button in the Mail Sending Format section (see **FIGURE 2**), select *Quoted Printable* from the 'Encode text using' drop-down list, and then click *OK* twice. In Outlook 2000, choose *Tools>Options*, click the *Mail Format* tab, click the *Settings* button, select *Quoted Printable* from the 'Encode text using' drop-down list, and finish by clicking *OK* twice.

Ronald Edwards says his favorite way to send a URL while browsing in Internet Explorer is to choose *File>Send>Link by E-mail*. This creates a new message in your default e-mail program that contains both the URL text in the message body and a URL attachment that recipients can click to launch the site if the URL in the message ends up broken. And Dana Hunter notes that when you drag links from IE's Favorites list and drop them into an Outlook message window, you create a clickable link. There's a drawback to URL attachments, though: They work only in Windows. As a result, Internet purists and users of the Macintosh, Linux, and other operating systems may squawk. You just can't win.

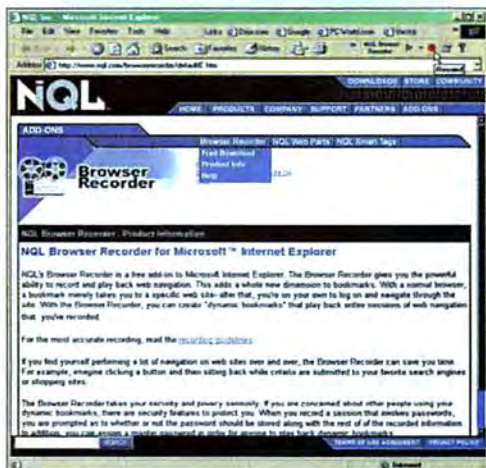
Finally, Loretta Harris offers a way to reconnect broken URLs. First, select the entire broken URL and press <Ctrl>-C to copy it to the Clipboard. Open Microsoft Word (or the text editor of your choice) and paste the broken URL into a document. Search for paragraph breaks, and replace them with spaces. To do this in Word 2000, choose *Edit>Replace*, enter ^p in the 'Find what' field, enter <Space> in the 'Replace with' field, and click *Replace*

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ONCE UPON A TIME, true PC power users did everything with long strings of keystrokes—<Alt>-W<N><Alt>-A..., yadda yadda. Before long those repetitive keystroke series began to get in the way, and keystroke-recording-and-playback batch files and utilities soon debuted.

Then along came Windows and the Internet. Now it's just click, click, click, all the livelong day. The increase in secure



Web applications that require you to enter user names, passwords, and search criteria creates a need for programs that record and replay on-screen input. NQL's free Browser Recorder plug-in for Internet Explorer records the clicks, form entries, and other data you enter to log into, navigate, and search a site. Save the recorded session as a link (similar to a bookmark), and play back the entire session with a single click. You can even password-protect sensitive sessions.

Download the 1.43MB program from find.pcworld.com/13400 or the author's page at www.nql.com/browserrecorder.

until the cursor has made its way through the fractured link. Now simply copy the reunited URL and paste it into your browser's address field.

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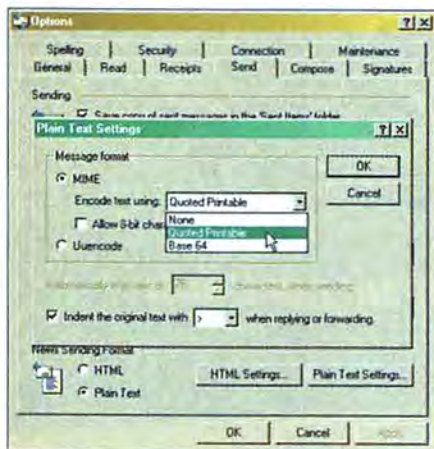


FIGURE 2: KEEP E-MAILED URLs intact in Outlook Express by selecting the Quoted Printable format for outgoing mail.

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STEP BY STEP

STAN MIASTKOWSKI

Bulk Up Your PC's RAM

FOR A LOW-COST, potentially dramatic boost to your system's performance, nothing beats adding memory. And there's never been a better time to do it: RAM prices are amazingly low (about \$25 for 128MB at press time), and applications and operating systems continue to demand more and more of it. For Windows XP alone, 128MB is recommended.

Add a few concurrently running applications, and it no longer seems ridiculous to equip your PC with 256MB, 512MB, or even more.

Adding RAM makes your PC work better because it makes data instantly available. If you start a task and your PC has insufficient unused RAM to handle the job, Windows copies a dormant task to a swap file on your hard drive, freeing RAM

THE TOP DOWN

Benefits: Increased system performance, ability to keep additional concurrent applications open, smoother graphics and video editing

Cost: 128MB \$25, 256MB \$50, 512MB \$125 (prices were averages at press time—check your dealer for the latest figures)

Time required: 15 to 30 minutes

Tools required: Phillips screwdriver, anti-static wrist strap (recommended)

Expertise: Intermediate

Vendors: Crucial Technology (www.crucial.com), Kingston Technology (www.kingston.com), PNY Technologies (www.pny.com), SimpleTechnology (www.simpletech.com), Viking Components (www.vikingcomponents.com)

for the new task. Switch to a swapped-out task, and Windows makes it trade places with some other dormant task, causing a significant performance hit.

Most recently made PCs use Dual Inline Memory Modules to hold RAM. Most common are PC-100 (100-MHz) and PC-133 (133-MHz) SDRAM DIMMs. Newer systems based on high-speed AMD processors use PC2100 DDR (double data rate) SDRAM, which runs at 266 MHz. Some Intel-based PCs instead use more expensive Rambus modules (called RIMMs), available in speeds up to 800 MHz.

If your PC is four or five years old, it's probably designed for 66-MHz SDRAM, but you should still be able to use 100-MHz or 133-MHz SDRAM modules. Although they won't work at full speed, they remain the best value. Some older computers use Single Inline Memory Modules for RAM. We show DIMM installation here; SIMMs pivot into their slots and must be installed in pairs. ■

Stan Miastkowski is a PC World contributing editor.

Match the DIMM Most memory modules look similar, but they're designed for different systems and have different capacities. The label says it all.

1 Find out how much RAM your PC has. Most PCs check RAM as they start up and display the total amount. Alternatively, you can check your system BIOS (details for accessing it vary by PC). Or from within Windows 95 or above, right-click *My Computer* and select *Properties*. The amount of RAM is displayed at the bottom of the screen.

2 Ground yourself. Memory modules are extremely sensitive to static electricity—it can destroy them. The safest bet is to purchase an antistatic wrist strap from your local RadioShack. You'll have to unplug your PC in order to work inside it, so you'll need to connect the wrist strap to a ground. Loosen the faceplate of an AC outlet and clip the wrist strap to it. If you opt not to use a wrist strap, touch a grounded metal object before working with your RAM.





3 Find the RAM. Turn off your PC, unplug it, and remove the case. The RAM slots are normally located on the right side of the motherboard toward the front of the case. Use masking tape to mark any cables you remove to get to the slots. Motherboards have two, three, or four RAM slots, each marked by a number on the board. Insert new modules in the lowest-numbered empty slots first.

4 Remove old RAM (optional).

The easiest way to upgrade your RAM is to add to what you have. But if all the slots are filled, you'll need to remove some of the old modules. DIMMs have clips on each side. Move the clips to the side, and pull the old modules straight out of the slots. If they feel tight, rock them gently.



5 Insert the new RAM. Note the notches on your DIMMs. Modules fit into slots only one way. Carefully press them in straight down. The clips will snap into place when the DIMMs are fully inserted.



6 Power up your PC and check it out. Don't put the cover back on your PC until you're sure that everything works. Turn the machine on and see if it recognizes the new RAM (see step 1). If your PC fails to recognize the new RAM, locks up, or won't start, turn it off, unplug it, and make sure the memory modules are firmly seated in their slots. If you had to remove cables to install the RAM, make sure you've reconnected them. Defective memory modules are rare. If you still run into problems, call your memory vendor's tech support line.

FREQUENTLY ASKED QUESTIONS



WE GET MAIL, lots of mail, with questions about RAM upgrades. Here are some answers.

Q: Can I mix different-capacity RAM modules?

A: No problem for SDRAM. You can fill your PC's RAM slots with virtually any combination of standard 32MB, 64MB, 128MB, and 256MB modules as long as they're the same type. In fact, it's the best way to upgrade without pulling RAM from your PC.

Rambus memory is different. You can install a single RIMM, but if you're using a Pentium 4 processor, installing in pairs will increase performance through memory interleaving. In this case, RIMM capacities and speeds must match.

Q: Can I mix memory modules of different speeds?

A: Yes. But all modules must be the same type. It's okay to add higher-speed modules; they just won't run at full speed. The most common speeds for SDRAM are 100 MHz and 133 MHz. Rambus modules currently come at speeds of 700 MHz and 800 MHz, and higher-speed modules are expected to become available soon. DDR (double data rate) modules come only in PC1600 (200 MHz) and PC2100 (266 MHz) varieties.

Q: Do I need to fill all the memory slots?

A: Not with SDRAM or DDR RAM. But with Rambus, every slot must be filled. You can buy continuity modules (about \$10) that fill Rambus slots without adding memory.

If your PC is more than four or five years old, it probably uses SIMMs, which must be installed in pairs.

Q: Can I mix modules from different manufacturers?

A: Sure, as long as they're the same RAM type. Don't believe dealers who say it can't be done. They want you to buy the RAM they have available, which is usually from one manufacturer.

Q: What's ECC RAM, and should I buy it?

A: Error-Correcting-Code RAM modules have special circuitry that corrects memory errors on the fly. They're used primarily in servers and high-end workstations. ECC SDRAM will work in non-ECC motherboards, but you won't get the benefit of the ECC circuitry, so it doesn't make sense to pay the extra cost.

Q: I just filled my RAM slots with 768MB of RAM. Now my system doesn't work right and locks up.

A: You're running into a problem with Windows or the limitations of your PC's BIOS. Windows 95, 98, 98 SE, and Me aren't designed to work with more than 512MB of RAM. (Windows NT, 2000, and XP don't have this limitation.) If you run into this problem, check find.pcworld.com/12620 for a workaround.

Some older motherboards aren't designed to take 256MB and 512MB RAM modules. Check your manual or your PC manufacturer's Web site; sometimes a BIOS upgrade solves the problem.

HARDWARE TIPS

KIRK STEERS

Keep PC Data Safe From Prying Eyes—And Fingers

WITH ALL THE attention currently being paid to hackers, viruses, and other forms of Internet intrusion, it's easy to overlook more-immediate threats to your PC's data: coworkers, family members, and anyone else who has physical access to your system when you're not around.

Windows and screen-saver passwords offer little protection from determined snoops. And anyone who uses your PC, even without malicious intent, can inadvertently erase or damage key files. Follow these steps to keep your data private and your PC safe while you're not around.

Use a CMOS password: With the exception of Windows 2000, the Windows password only prevents people from logging on as you. (For more on password-protection within Windows, go to find.pcworld.com/11741 and check out last month's *Answer Line*.) If you want real security, enable the password feature built into your system's CMOS setup program. Every time your system starts up, it will prompt you



FIGURE 1: KEEP A LID ON YOUR PC by using a lock such as Secure-It's CoverLock.

for a password: No password, no boot-up.

To activate your CMOS password, enter your PC's CMOS setup program by pressing the appropriate key as your system boots up. (This is often the <Delete> or <F1> key. Watch the monitor during boot-up; it usually announces the proper key.) Scan the menu choices for 'Security', 'User Password', or something similar. When prompted, enter your password of choice.

If you lose your password, check your system or motherboard manual for instructions on how to reset it. The motherboard may have a password-reset jumper directly on the board. If not, look for a CMOS-reset jumper, which will clear all of your CMOS settings, including the password. Write down your current settings on a piece of paper first so you'll be able to reenter them easily.

Your CMOS setup program's 'Restore Default Settings' function may not return your PC to its original state, since manufacturers sometimes make their own adjustments to the CMOS. If your PC has

no CMOS-reset jumpers—or if you can't find any documentation that identifies them—try clearing the CMOS settings by removing the small battery on the motherboard that powers your CMOS. You may have to keep the battery disconnected for more than an hour to erase the settings. If the battery is soldered on, take your system to a repair shop.

Keep your case closed: To keep unwelcome hands off the innards of your PC, invest in a locking mechanism for your case, such as Secure-It's CoverLock (\$30 without a cable and \$40 with a cable; see FIGURE 1). Of course, your PC case may be lockable with only a simple padlock or cable lock, which would preclude the need for a more expensive solution.

MUSCLE UP YOUR MULTIMEDIA



THE HOLIDAYS are coming, and I'm going to be running a lot of music, graphics, games, and other multimedia programs. I have a 400-MHz Pentium II system running the original version of Windows 98, and I'm on a tight budget. Are there any inexpensive hardware upgrades or free software updates that will improve my system's multimedia performance?

Nick Norman, Baltimore

YOU'LL GET THE MOST bang for your buck from more RAM, new speakers, and a new graphics card. Also, make sure you have the latest drivers installed for your graphics card and monitor, and that you are using the latest version of DirectX (8.0a, as of this writing), which is the part of Windows that controls your PC's multimedia operations. Visit find.pcworld.com/11740 to download the most recent release. If your PC is running games or graphics software written to take advantage of the latest DirectX, you'll probably notice a boost in performance. ■

See www.pcworld.com/heres_how for additional hardware tips. Send your tips and questions to kirk_steers@pcworld.com. We pay \$50 for published items. Kirk Steers is a PC World contributing editor.

CoverLock

List: \$30 without cable, \$40 with cable
Secure-It, www.secure-it.com

SLOW THE PRINTER FLOW

DO YOU EVER run out of memory when printing large graphics? Try forcing Windows to slow down. Select *Start>Settings>Printers*, right-click your printer's icon, and choose *Properties*. Click the *Details* tab and increase the number of seconds in the Transmission Retry box under 'Timeout settings'. This increases the maximum length of time Windows will spend sending data to the printer before Windows "times out" (which it does when it senses inactivity). The extra time allows large graphics to print on slow computer/printer connections.

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ANSWER LINE

LINCOLN SPECTOR

Pause Your Modem to Answer the Telephone

? MY MODEM and telephone share the same phone line, and I often miss important calls because I'm online. Is there a way to detect incoming phone calls while I'm connected to the Internet? If so, will I be given an option to stay connected, or do I have to disconnect to pick up the phone call?

Chan Chek Yuen

Negeri Sembilan, West Malaysia

YOU NEED A MODEM that notifies you of a call and gives you the option to go offline and pick up the phone. The good news is that the new V.92 modem standard offers this capability. The bad news is that your ISP probably doesn't support V.92 yet. The best news is that at least two manufacturers' modems offer this feature without V.92's need for ISP cooperation.

All call-notification modems—V.92 and otherwise—require that you have the call-waiting telephone service, which allows incoming phone calls to interrupt your current call. You can order call waiting

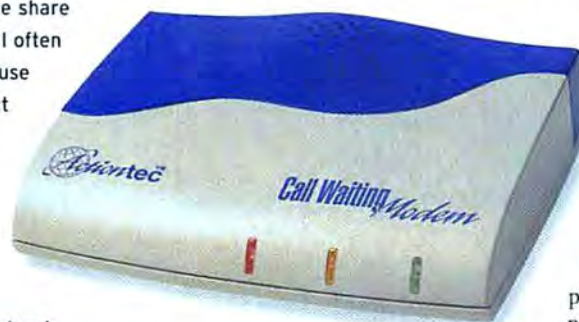


FIGURE 1: ACTION TEC's Call Waiting Modem enables you to put the Web on hold.

through your phone company for about \$4 a month, plus an activation fee.

If you have call waiting and both a modem and an ISP that support V.92, you'll be notified when a call comes in, and given the option to answer the call or ignore it. If you answer it, your modem connection will be placed on hold.

How long you can talk before you sever the online connection depends on your ISP. The company may opt to keep you online for any length of time it chooses: as little as 10 seconds (just long enough to find out who's calling and promise to call them back), for 1 or more minutes, or for an indefinite period. If you're surfing the Web, getting knocked offline should be no big problem, but if you're downloading a file, it could be a major irritant.

By the time you read this, most new modems will likely support V.92. But your ISP may not. Representatives of America Online, EarthLink, MSN, and NetZero told me that their companies hadn't yet decided what to do about V.92. I wouldn't hold my breath if I were you.

And isn't it nice to know you don't have

to? Both Action Tec and Zoom sell modems with call-waiting support now, and neither modem needs the cooperation of your ISP. Both companies sell controller-based PCI, serial, and USB call-waiting modems. (Controller-based modems are usually more reliable and more expensive than controllerless modems.)

Action Tec's Call Waiting Modem handles incoming phone calls better than Zoom's equivalent device. Street prices start at just over \$50. When the Action Tec modem receives a call-waiting signal from the phone company, it rings. If you pick up the phone, the modem connection goes on hold for about 7 seconds—enough time for you to say "I'll call you right back" or "Can you hold until I finish this download?" If the other party doesn't hang up, he or she will be on the line when you pick up the phone again.

By contrast, Zoom's modems break the online connection the moment you pick up the phone. All of the company's controller-based V.90 modems support call waiting, and a free program called Channel 2 adds call-waiting support without requiring ISP involvement. If you're online when a phone call comes in, the Channel 2 software will pop up a dialog box that gives you the option to disconnect and pick up the phone. Channel 2 doesn't come with all Zoom modems, but you can download it (find.pcworld.com/12641). Prices for Zoom's controller-based modems begin at about \$70. ■

Send your questions to answer@pcworld.com. Answer Line pays \$50 for published items. You can find Contributing Editor Lincoln Spector's humorous writing at www.thelinkspector.com.

USE NORTON ANTIVIRUS AS A BREAK-TIME REMINDER

REGULAR EXERCISE breaks can stave off repetitive strain injury, a sore back, and other computer-related ailments. But how do you remember to take these breaks? If you have Norton AntiVirus, you can use its scheduling program to set an exercise reminder. Launch the program, select *Scheduling*, and click *Add Event*. Choose *Schedule a message to be displayed* in the resulting wizard. Call your message something like *Do your exercises* and set it to run *Hourly*.

Call Waiting Modem

Street: \$54 (internal and external PCI), \$66 (USB); Action Tec, www.actiontec.com

Zoom/FaxModem 56K USB

Zoom/FaxModem 56K PCI Plus Model 2920

Street: \$70; Zoom Telephonics, www.zoomtel.com



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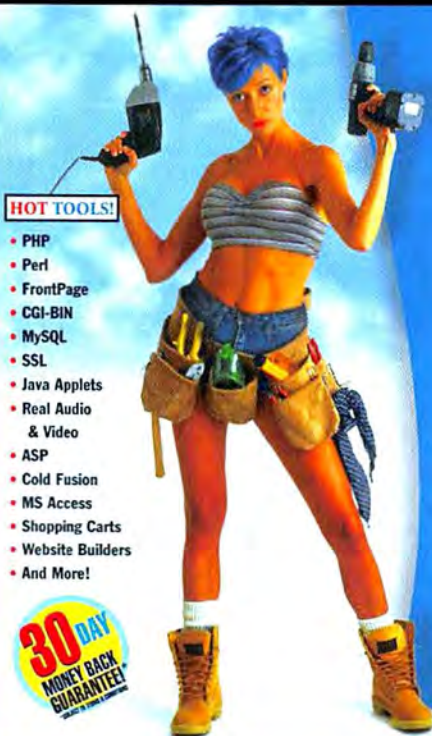
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Base Monthly Server Cost	\$18.95	\$18.95	\$59.95	\$89.95	\$149.95	\$359.95	\$1,999.95
Max. per domain cost @ \$2.00/domain/mo	N/A	N/A	\$50.00	\$125.00*	\$150.00	\$512.00	\$2,000.00
Max. possible cost to you/ month	\$18.95	\$N/A	\$109.95	\$214.95	\$299.95	\$871.95	\$3,999.95
Your monthly gross profit @ \$19.95 domain	N/A	N/A	\$498.75	\$498.75	\$1,496.25	\$5,107.20	\$19,950.00
Your monthly net profit reselling hosting	N/A	N/A	\$388.80	\$283.80	\$1,196.30	\$4,235.25	\$15,950.05
Additional Profit Reselling AIT Extras***	N/A	N/A	\$1,250.00	\$1,250.00	\$3,750.00	\$12,800.00	\$50,000.00
Total Monthly Profit	N/A	N/A	\$1,638.80	\$1,533.80	\$4,946.30	\$17,035.25	\$65,950.05

*Additional domains for Windows2000 Reseller Hosting Solution - \$5.00/month

***Assumes Reseller sells the many FREE AIT offerings at \$50/month per customer

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Pete Sussman	Records Room	03/20/2000 07:59:15 AM	Out of Schedule
John Michaels	Computer Room	03/20/2000 08:00:03 AM	Key Authorized
John Lefler	West Entrance	03/20/2000 08:12:16 AM	Key Authorized
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John Banks	Computer Room	03/20/2000 08:12:16 AM	Denied

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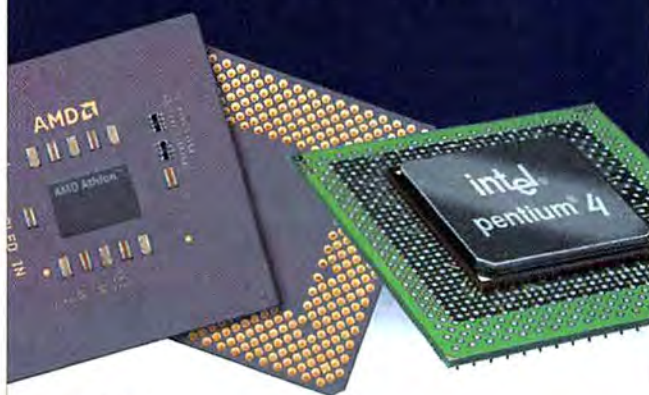
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120 Gigabyte \$995

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2-Bay Tower holds 120 Gigabytes of Hot-Swapable Drives. Bays incorporate exclusive Blue Neon Light.

FireVue™ FireWire 1394 Adapters

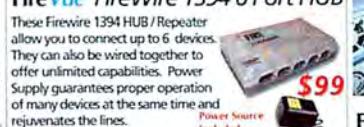


These FireWire 1394 Gender Changer and Cable Extenders allow you to use your current cables to extend or change your connector ends. Combined with the added versatility that these devices offer is the ability to also monitor 1394 power. Exclusive LED circuit tells that power is being supplied to the 1394 bus.

4-4 Pin - Connects 2 Cables
6-6 Pin - Connects 2 Cables
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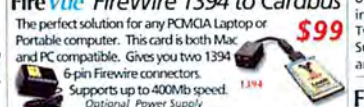
FireVue™ FireWire 1394 6 Port HUB



These FireWire 1394 HUB / Repeater allow you to connect up to 6 devices. They can also be wired together to offer unlimited capabilities. Power Supply guarantees proper operation of many devices at the same time and rejuvenates the lines.

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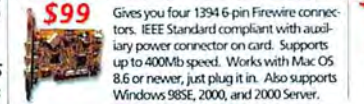
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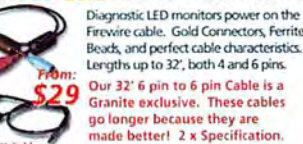
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Diagnostic LED monitors power on the FireWire cable. Gold Connectors, Ferrite Beads, and perfect cable characteristics. Lengths up to 32', both 4 and 6 pins.

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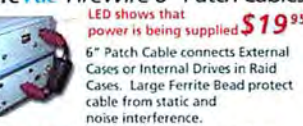
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Hot-Swap Case Kit

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IDEVue™ ATA 100 TPO Cables

Ultra 66/100 TPO Cables use 80 conductor cable and special 40 pin connectors. The best you can buy for internal or external use.

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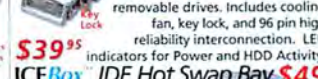
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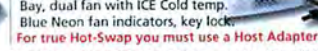
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Benefits:

- Improves SCSI Bus Performance
- Less Errors; More Reliable Data Transfer
- Diagnoses Problems • Analyzes Signal Quality

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- Active Regulation • Fast 50 & Fast Wide 68
- Status Indicators • Gold Contacts

Gold Diagnostic Adapters



From: **\$39**

- Both 50 pin and 68 pin (all combinations)
- 68 Pin Drive to 50 Pin IDC (runs wide drive as narrow)
- 80 Pin SCSI Drive to 68 Pin (converts SCSI to 68 SE or LVD)

For Adaptec Ultra Wide Cards

- Adapters with partial termination built in for 68 to 50 converters (converts Host Adapter)
- 48 Pin to 50 Pin Centronics or 20 Pin MicroD Adapters

SCSI Cable Tester - LED Readout

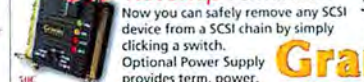


Three models to choose:

- 50 IDC
- 50 Cen
- 68 MD

From: **\$29**

\$49 Hot Swap Terminator



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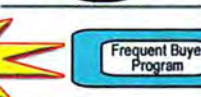
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Probably the best advertisement for any online casino is news of big winners. And every day the amount of cash being won at The Gaming Club sets new records – and this spiral of winnings is likely to continue growing. Aside from the regular wins on the casino games, the casino offers players a chance to share in the biggest progressive jackpot on the net, CashSplash™, which has paid out over \$24 million to date. Transactions operate through secure e-cash, and your security and privacy are guaranteed. Winnings are paid without question or delay.

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Some recent Gaming Club winners

- Debra M. a Midwest housewife, scooped \$80,790.11 on slots after just fifteen minutes on her first visit.
- Lysbeth Q. won a \$77,981.46 payout on CashSplash™ – the largest progressive jackpot on the net.
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Jon K. is one of them, and a regular big winner at The Gaming Club. He is typical of The Gaming Club's growing following who see online casinos as both reward and relaxation in a busy life.

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"I first heard about you from business associates. I knew The Gaming Club was one of the oldest and most established online casinos on the net, and from the word go I was impressed by the way you looked after me. It's reward just to play. Winning is a bonus."

"I wasn't expecting to win as early as I did, and then I kept on winning. Apart from my regular wins at slots and roulette, I love your Cash Back rewards program – I never know when my pot will be topped up with an unexpected extra cash bonus!"

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Security, Microsoft Style: No Safety Net?

IMAGINE OWNING A CAR WHOSE door, ignition, locks, and security system could be easily defeated by anyone following simple instructions posted on the Web. Anybody who knew the secret could break into the vehicle and either remove its contents or simply drive it away.

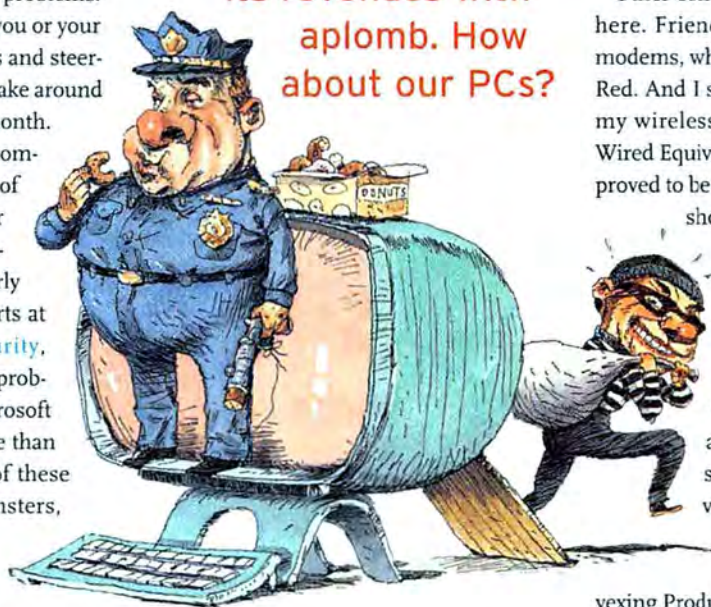
No big deal, says the car's maker. Just pop by our Web site every week or so to see if we've found any new problems. Parts are free, but it's up to you or your mechanic to take your doors and steering column apart; it should take around half an hour—six times a month.

In the car business, that company would be laughed out of existence. In the computer business, it's standard operating procedure—particularly at Microsoft. Check the alerts at www.microsoft.com/security, and you learn that security problems are discovered in Microsoft software an average of more than six times a month. Some of these are minor. Others are monsters, like the buffer-overflow error that allowed the truly miserable Code Red worm to attack. (See "Holey Software!" on page 135 for more ugly examples and statistics.)

Windows XP's firewall is the latest in a long line of security half-measures from Microsoft. It's meant to prevent intrusions from the outside, but unlike products such as ZoneAlarm, it does nothing about Trojan horses—such as script viruses made possible by Microsoft's lax security precautions—that find their way into your PC and work from within.

The preview panes in Outlook and Outlook Express are another obvious exam-

The company defends its revenues with aplomb. How about our PCs?



ple. You can't tell those panes to display the HTML source code in messages instead of executing it. That means you may run potentially compromising code without even formally opening a document. And Windows preserves a bogus sheen of simplicity by hiding file-type extensions by default, so risky .exe files can masquerade as harmless .txt ones.

Worse, few of Microsoft's fixes are cumulative. Instead of installing a single file that says "Secure my machine right

now," you have to wade through dozens of individual files. The Personal Security Advisor at www.microsoft.com/technet/mpsa is of no use to users of Windows 95, Win 98, or Win Me. But it does inform me that I need to run 28 security "hot-fixes"—and edit the Registry—to secure my Windows 2000 machine.

Other companies are hardly blameless here. Friends are cursing Cisco's DSL modems, whose software was hit by Code Red. And I still wonder what to do about my wireless 802.11 network, now that Wired Equivalency Privacy encryption has proved to be as private as a glass-enclosed shower in Times Square.

As the market leader, Microsoft should act as if it had the most to lose over lackadaisical security. But its own servers have proved vulnerable, and its Passport authentication service presents serious security and privacy hazards. Most galling: The company's highest-profile security effort—the vexing Product Activation copy-protection scheme in Windows XP and Office XP—is designed to protect its own revenues.

If there were reasonable alternatives to Microsoft products and their half-baked security, knowledgeable users would gobble them up. Until then, we're forced to make our own time-consuming repairs of defects that should never have appeared in our vehicles for computing. ■

Contributing Editor Stephen Manes, a cohost of the public television series Digital Duo, has written about PCs for nearly two decades.



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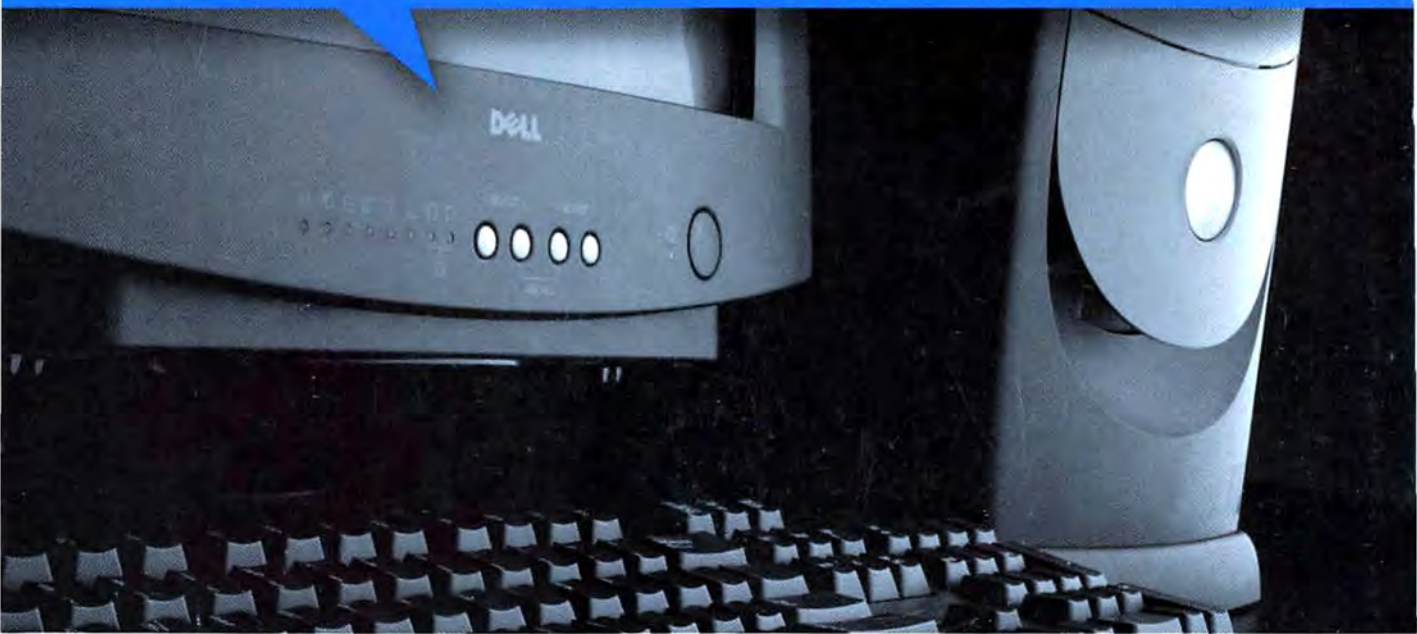
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