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Five Ways to Upgrade Your PC Without Downsizing Your Wallet



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HOW TO FIX THE MOST ANNOYING THINGS ABOUT PCs, WINDOWS & THE WEB



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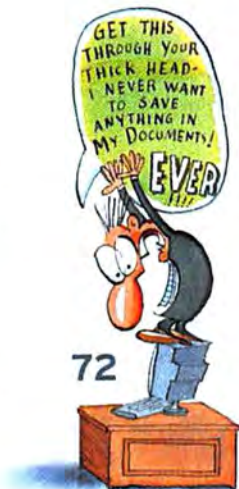


COVER STORY

72 How to Fix the Biggest PC Annoyances

Is your computer driving you up the wall? Steve Bass knows exactly what you're going through. He has encountered a plethora of PC irritations—from aggravating Windows eccentricities to irksome hardware problems to intolerable Web nuisances—and eliminated them with a set of simple yet effective remedies. So put down that sledgehammer and check out his solutions instead.

Cover Illustration by Hal Mayforth



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UPGRADES

84 Right on the Money

Upgrades can extend your PC's useful life and help you avoid a painful migration to a new machine—sometimes. Real computer users told us what *they* wanted to upgrade, and the PC World Test Center checked out the headaches and the values.

GRAPHICS BOARDS

99 High-Flying Graphics Cards

A new crop of graphics cards includes models that let you connect digital camcorders, hook up multiple monitors, and record TV shows. They offer great game play, too. We put 17 boards to work and find two winners.

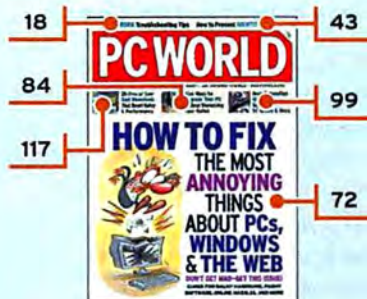


FREWARE AND SHAREWARE

117 Dynamite Downloads

We scoured the Web in search of the best PC and PDA programs that you can download for \$30 or less. Here they are: productivity apps, utilities, add-ons, and games, as well as our five all-time shareware all-stars.

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FUTURE GEAR

Video Is a Go

New devices abound, from video phones to handheld movie players.

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COMING UP IN NOVEMBER

Windows Improvements: Though it's good, Windows isn't perfect. Discover tips, tricks, and add-ons to make the OS do your bidding.

Dive Into Linux: Our expert takes the plunge to find out what you can expect when you install, configure, and (try to) use Linux.

Your Digital Rights? We look at the music and movie industries' efforts to restrict what you can do with the materials you buy.

Digital Cameras Under \$500: We put point-and-shoot models and more-feature-rich units through their paces to find two Best Buys.

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Casio Exilim EX-M1
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HERE'S HOW

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- 168 Hardware Tips**
Avoid problems by learning the steps you should take before upgrading your PC's hardware.
- 170 Answer Line**
Use shortcuts to share program access on a multi-user PC; resume downloads at the point of failure.

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UP FRONT

KEVIN MCKEAN

A Better Way to Choose What to Buy

New online guides and smart product rankings simplify decision-making.

ONE CONSISTENTLY POPULAR FEATURE of *PC World* is the *Top 100* section. Every month, our editors and Test Center staff produce detailed charts and reviews of products in categories that range from desktop PCs and printers to digital cameras, MP3 players, and CD-RW drives.

Unlike publications that review equipment categories once or twice a year, *PC World* is committed to bringing you regularly updated information on the ever-growing list of product types we track.

We're deepening that commitment this month. We've revamped the online version of the *Top 100* to make the rankings

easier to use. Thanks to the work of *PC World's* designers and engineers, we're converting the charts at PCWorld.com to a new format that fits on a single page and renders well when printed (see the *Top 100* charts in the list at find.pcworld.com/30644). You'll discover a review and photograph of every item; and with many of our online charts, you can even compare detailed specifications for two or more products side-by-side. The charts also feature new Test Report pages that list data for all lab-tested items.

In conjunction with the charts, use *PC World's* new online buyers' guides (see find.pcworld.com/30500) to get clear, well-organized advice on selecting anything from networking gear to wireless phones. And of course, the buyers' guides and *Top 100* are thoroughly linked to the Product Finder section, powered by our partner PriceGrabber.com, so you can compare current prices and find the best deal on any item that interests you.

We hope you'll find the new online *Top 100* and buyers' guides invaluable, easy-to-use resources to help you select equipment this fall and for years to come. ■

Kevin McKean (kevin_mckean@pcworld.com) is editorial director of *PC World*.

1 Start with the guides...

How to Buy a CD-RW

CD-Rewritable drives are becoming essential equipment on PCs. They offer you a way to quickly and easily store and share data, music, and photos on inexpensive recordable compact discs; the rewrite capability allows you to erase and reuse special rewritable discs up to 1000 times. With prices now between \$50 and \$200, these drives are affordable for most PC users. Follow the links below for all the information you need to find the right CD-RW drive.

Introduction
The Big Picture
The Big Picture
The Specs Explained
CD-RW Shopping Tips

2 ...then check the Top 10 rankings...

Top 10 CD-RW Drives

This month, two new drives debut—and both shoot to the top of the chart. At number one is the first CD-RW drive we tested that can write CD-R at 48X.

3 ...compare items side-by-side...

4 ...see the reviews and Test Reports...

5 ...and find the best deal.

Top 10 CD-RW Drives

Test Report Comparison

Back to Top 10 CD-RW Drives Chart

Overall rating: 92

Maximum rated speeds: 48X CD-R record, 12X CD-RW record, and 48X CD-RW read

Tested performance: CD-R speed to write 50MB (min/sec): 2:36, CD-RW speed to write 100MB (min/sec): 1:08

Installation/Documentation: Fair/Satisfactory

5 ...and find the best deal.

Product Finder

Find product by name: 48X/12X/48X (Internal, EIDE/ATAPI)

48X/12X/48X (Internal, EIDE/ATAPI)

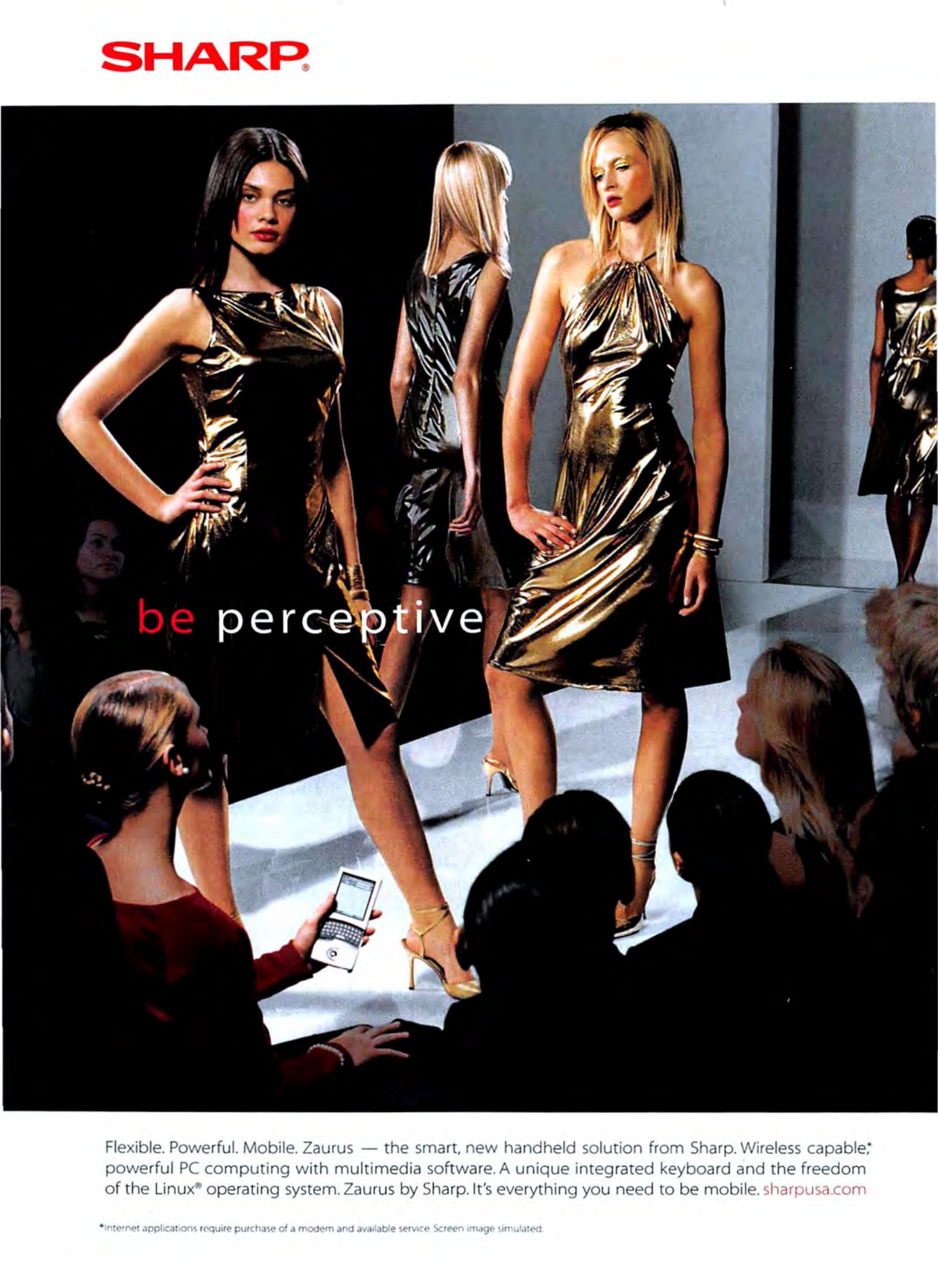
PC World's Discount: An inexpensive price and fast write speeds make the 48X/12X/48X an excellent value. Features Top 100 500GB, Best Buy, 500GB, Rating: 5.0/5.0

Completed list of products

Bar chart showing Price vs. Rating for various products.

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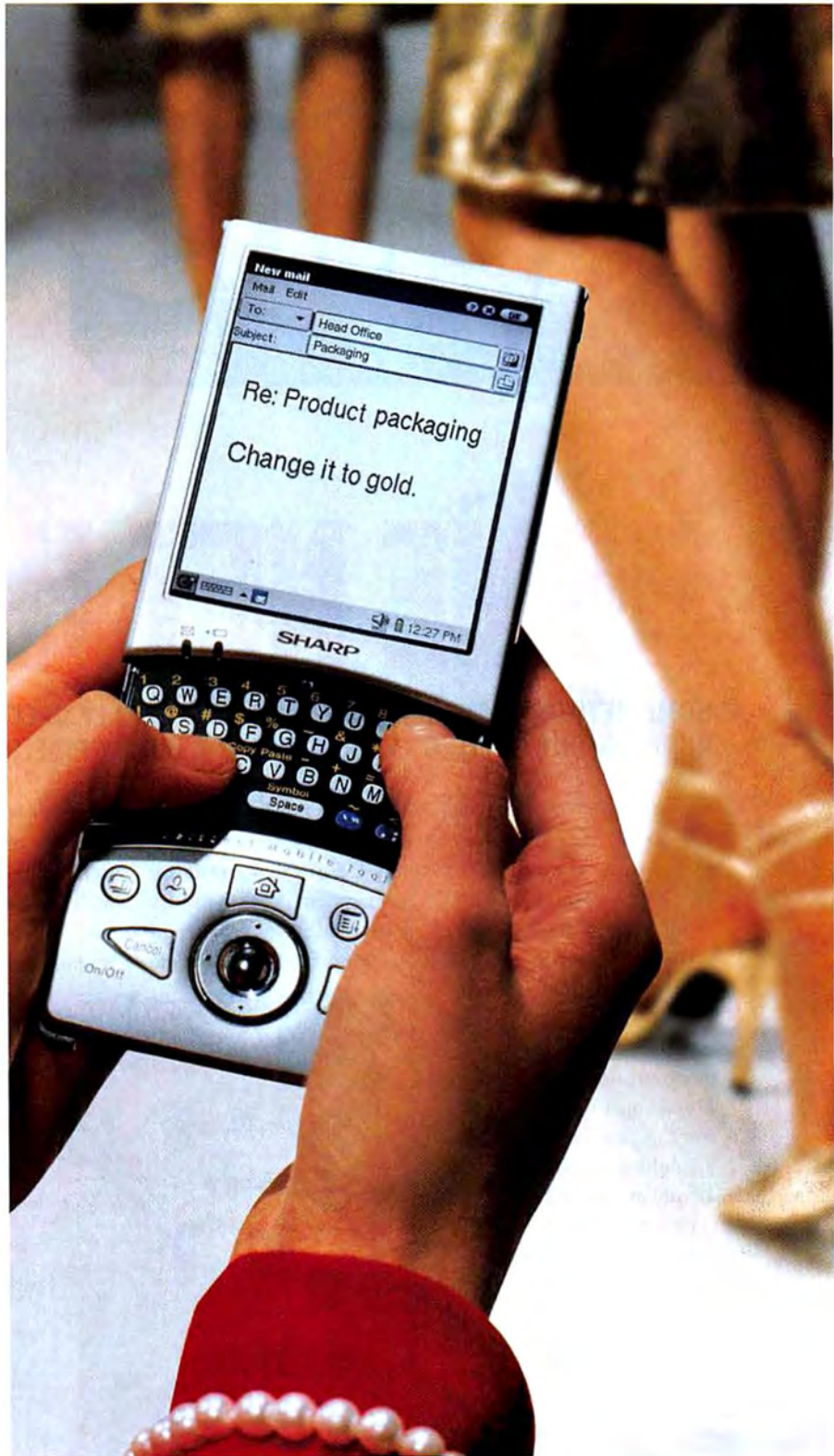
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NEWS & TRENDS

EDITED BY RAMON G. McLEOD

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HOME NET HASSLES

HOME NETWORKS ARE HOT AND CAN BE EXTREMELY USEFUL—ONCE EVERYTHING IS UP AND RUNNING. BUT GETTING THERE IS OFTEN A BUMPY RIDE. **BY YARDENA ARAR**

GOT NET? Not Internet, but a network of your own—one that connects two or more PCs so they can share files, printers, and a single Internet account? If you have a home network or are contemplating getting one, you're not alone: Research firm Parks Associates estimates that 7.2 million households will have a network by year's end—up from 5.7 million in 2001—and that 21 million will by 2006.

However, you've also got company if you've tried to set up a network and either failed or only partially succeeded.

Don't get us wrong: Home networks can really help you get the most out of your PCs and peripherals. But no matter what networking-gear Web sites or computer-sales reps may tell you, the technology is neither simple nor foolproof. When we asked PCWorld.com

visitors to tell us their networking woes, dozens of them detailed problems ranging from system crashes to PCs that couldn't see each other on the network to ISPs that made

network setups problematic.

Some users finally managed to make things work, often with the help of a network-savvy friend or a good networking site (see "Resources,"

page 22). A few gave up on do-it-yourself and hired an expert to handle their installation—an increasingly common service (see "Keep It Simple: Call In a Professional," page 22).

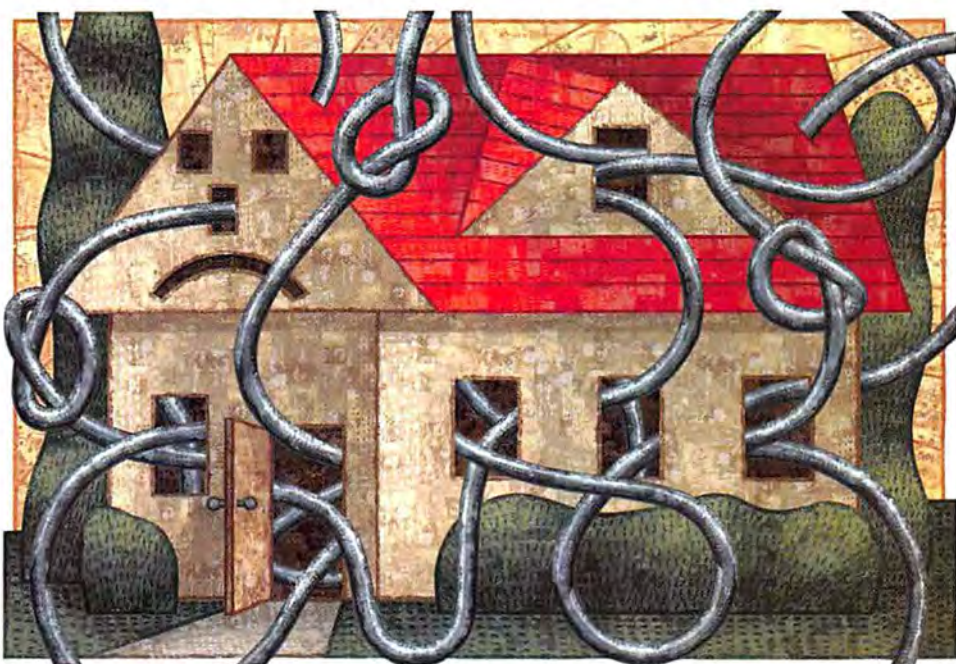


ILLUSTRATION: RICHARD DOWNS

Our take: Where there's a will to network, there's generally a way. But you may have to spend more time or money than you planned. For tips on solving typical problems, see "Cures for Common Networking Headaches," page 20.

TELLTALE TAPE

THE NUMBER of households with two or more PCs is rising along with those that have broadband Net access. That in turn has driven up demand for home networks, as users see the benefit of sharing files, broadband access, and peripherals such as printers (these are the likeliest motives for installing a home network, according to Parks Associates).

But while the need may be reaching mass-market status, the products seem to be trailing behind. Newcomers to networking may be somewhat tech savvy, but they're not the IT pros who used to be networking gear's primary consumers.

"So many of the products are IT-based, and people don't want an IT experience," says Giga Information Group research fellow Rob Enderle. "They want a consumer experience—something that just works."

"It's not nearly as plug-and-play as it should be," agrees Chris Kaminski, a former systems administrator with software and Web development experience who now runs a networking self-help Web site called HomeNetHelp.com.

Additional evidence backs the perception that network-

ing is not yet mass-market friendly. Most vendors and retailers won't comment publicly on networking-equipment return rates (CompUSA says that returns are about average compared with those for other products), but privately a few acknowledge they are high.

"If you go to any of the retailers and look on shelves, you'll see that a lot of stuff has been opened and resealed and put back," Giga's Enderle says, adding that the problem usually isn't due to faulty equip-



"I thought the whole purpose was to be able to network an older with a newer computer."

JOANN KOVACH, medical assistant

ment but to buyer frustration.

The vendors are attempting to respond. Linksys, a major home-networking gear maker, received so many tech support calls from customers last year that it has since increased its tech support staff from about 280 reps to almost 500. Other vendors hope to boost sales and head off support calls by further simplifying installa-

tion. Actiontec, for example, has introduced new products it touts as the "easiest home networking kits on the market," with color coding and pictorial guides. Even Microsoft is entering the fray, promising to make home networking a snap with a line of Wi-Fi products due by the holidays.

MYRIAD PROBLEMS

DESPITE the vendors' efforts, however, numerous hapless home networkers report finding a multiplicity of problems.

HomeNetHelp.com's Kaminski says that the most common queries posted on his site's user forums deal with five main issues: networking PCs that run different Windows versions; enabling networked PCs to see each other; making sense of confusing ISP instructions; running apps such as videoconferencing and games through a firewall; and setting up network security.

Users often turn to computer-savvy friends or to professionals for help. Because trouble can arise from so many sources—the networking gear, the operating system, the ISP, other system software—people don't know who to call for technical support. And some users who do call report that tech support reps try to pass the blame elsewhere.

That situation may persist while networking painfully transitions from IT product to consumer product. Standards for networking, cable or DSL access, and the like exist, but these can take you only so

IN BRIEF

Product Pipeline

ROCK OUT: Now there's a new-car sound to accompany that new-car smell. The 2003 models from DaimlerChrysler, Ford, GM, and other automakers will feature satellite radios that provide more than 100 channels of music, news, sports, and other programming from coast to coast. Satellite broadcaster XM's programming costs only \$10 a month, but it has fewer commercial-free channels and less original programming than competitor Sirius's \$13-a-month service. The cost of your car's satellite radio (which also picks up AM and FM signals) starts at \$299 with either service. Some advice: If you're buying satellite radio for your current car, skip the adapter and spend a little extra for a true satellite receiver. If you're located way up north or way down south, you will get better reception with Sirius's three satellites than with XM's two.

Did You Know?

ATHENS, GEORGIA, is creating a 24-block wireless "cloud" over its downtown area where anyone working outside with an 802.11b card in their laptop can have access to free Internet connectivity.

24 BLOCKS Spearheading the effort is the Wireless

Athens Group, which is a joint project of local government and the University of Georgia (with its more than 31,000 students).

far. Faced with so many pieces that need to work together, the industry is unlikely to establish a single interoperability standard anytime soon.

SOLUTIONS?

FIGURING OUT how to troubleshoot a home networking problem isn't easy. On her own, JoAnn Kovach, a medical assistant from Zion, Illinois, put in a router and an ethernet network to connect an older PC with a newer one so her visiting children and grandchildren could share her AT&T Broadband Net access. File and printer sharing were no problem, but the broad-

band connection went down every two days and wouldn't return until she rebooted.

Her router maker told her to consult her ISP. An AT&T rep came to her home but failed to fix the problem, blaming it on an unspecified configuration issue. A friend thought the trouble might be that one system was running Windows 98 and the other Windows XP, but "I thought the whole purpose was to be able to network an older with a newer computer," Kovach says.

Since her router seemed to have difficulty resuming her Internet connection, we tried walking her through configur-

ing its firmware; this helped, but it did not fix the problem. She's still working on it.

Mark Tracy of North Sioux City, Iowa, a telephone sales representative for Gateway Computers, had to enlist a colleague's aid to get file sharing and encryption working on the wireless network he set up between a Gateway laptop and a Gateway desktop using a Linksys router. They finally solved the problems by changing the settings for Windows networking and for the Wired Equivalent Protocol (WEP, Wi-Fi's built-in security). Still, Tracy complains, none of his equipment vendors responded

to his request for assistance.

"Gateway [which sold him the router] said it was a Linksys installation technical support question," Tracy recalls. "Linksys said that since I was successfully connecting to the Internet through the AP [access point], it was a Microsoft operating system configuration issue—and of course, Microsoft would be more than happy to help, for a fee."

Call-center coordinator Anthony Gabriel of St. Joseph, Michigan, can't set up his network to share Net access; he thinks his broadband ISP (his cable company) may be the problem. His IP address is ►

CURES FOR COMMON NETWORKING HEADACHES

A HOME NETWORK that won't work can be very frustrating, but don't give up. Here, courtesy of HomeNetHelp.com's Chris Kaminski and Linksys product support manager Shannon Lehmann, are some basic troubleshooting steps to try when you're faced with three common problems.

I can't see other PCs on the network.

Make sure the workgroup name is the same for all networked PCs. For Windows 98, right-click *Network Neighborhood* (My Network Places in Windows Me), click the *Identification* tab, and enter the workgroup name. In Windows 2000, right-click *My Computer* and select *Properties•Network•Identification•Properties*. Click the *Workgroup* radio button, and then enter the name. In Windows XP, right-click *My Computer*, select *Properties•Computer Name*, and—if the workgroup name needs to be changed—click *Change* and then select the *Workgroup* radio button.

My network adapter doesn't work. Make sure you've properly installed the driver. Windows 98 and Me users must have their Windows installation CD-ROMs handy, or know where the installation files (.cab files) reside on the hard drive (Win XP and 2000 users, don't worry about this). All users must know where the driver files are locat-

ed on the hardware's installation CD-ROM.

I can't get online. This may be a problem with a gateway/router setting. If so, you should be able to fix it via the device's Web-based firmware. Check your manual for the device's default IP address (it will be in the format 192.168.x.x). Launch a



browser and then point it to that address.

Setup routines vary from vendor to vendor, but at some point you should be asked whether you have a dynamic IP address (as most residential users do) or a static IP address. If your broadband ISP uses PPPoE software to log you in automatically via a user ID and password, you should be asked to enter those as well.

Some ISPs check to see whether a connection is coming from the device you first

used for access; they do this by checking its MAC identifier (a string of numbers and letters unique to a device). If you buy a router after getting broadband, the router will have a different MAC identifier than the ethernet card you probably used to connect from one PC. To bypass this problem, newer routers include a MAC cloning feature that copies the MAC address from the adapter to the router; otherwise, you may have to call your ISP and inform it of your router's MAC identifier (check with the vendor to determine what it is).

You can also try releasing and renewing your PC's IP address. In Windows 98 and Me, click *Start•Run*, type *winipcfg*, and click *OK*. You'll see a window with IP addressing information and a drop-down list of available adapters. Select your adapter, click *Release*, and then click *Renew*. At this point, your PC will seek a new IP number from your ISP. In Windows XP, open *Network Connections*, right-click the adapter that you're using, and then select *Status•Support•Repair*. In Windows 2000, select *Start•Run*, type *cmd*, select *OK*, type *ipconfig /release_all*, press *<Enter>*, type *ipconfig /renew_all*, and press *<Enter>*.

For more network troubleshooting, see "Upgrades: Right on the Money," page 84.

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Enjoyment Matters

one reserved for Network Address Translation, the technology that lets several PCs on a network access the Internet via one external IP address (assigned by the ISP). Some smaller ISPs that have too few external IP addresses use NAT themselves, which can create conflicts for any users who want to set up NAT for their businesses or homes.

Gabriel's ISP, Greene County Cable TV, confirms that it does use NAT to serve its residential clients, but the situation may change soon. The company doesn't support home networks for users on its low-end plan. In fact, many ISPs support third-party products like networking gear only for users who buy the equipment or multiple IP addresses from them. (But



"I had the wrong cable, and then it just went from bad to worse."

BLAKE HANSEN, insurance agent

that doesn't mean users can't get home networks to work.) As of this writing, Gabriel was considering an ISP switch.

Blake Hansen, an insurance agent from Idaho Falls, Idaho, spent 8 hours trying to set up a simple peer-to-peer network

between two systems at his home. "I had the wrong cable, and then it just went from bad to worse," Hansen says. Frustrated by the experience, he chose not to contact his retailer's customer support before calling in a pro.

NET BENEFITS

STILL, EVEN the readers who e-mailed us about their networking problems had generally positive views about home networking.

If you're thinking of installing a home network, don't let the prospect of running into installation hassles dissuade you. But don't count on having a completely trouble-free experience, either. Try to do as much research as possible, invest in newer equipment (which generally is more user-friendly than early home net-

Resources

CHECK THESE links, including our how-to guides, for help in setting up home networks.

◆ How to Set Up Your Home Network

find.pcworld.com/30506

◆ The No-Hassle Networking Guide

find.pcworld.com/30509

◆ HomeNetHelp.com

www.homenethelp.com

◆ PracticallyNetworked

www.practicallynetworked.com

◆ Microsoft Community Newsgroups: Windows XP, Networking and the Web

find.pcworld.com/30512

working products), and give yourself a few hours to read manuals and troubleshoot any problems that may arise. And don't feel embarrassed about asking for help—from the Web, from a friend, or from a paid consultant. Once your network is up and running, you'll be glad you did. ►

SERVICE

KEEP IT SIMPLE: CALL IN A PROFESSIONAL

IF YOU'RE TOO nervous or too busy to take on setting up a home network, you'll be glad to know that it's now easier to find someone who'll do the job for you.

For example, if you buy your networking gear at one of its stores, CompUSA will send a rep to your home (for \$99 to \$199) to set up either a wireless network or a network with wires that have already been installed. The \$99 service will network two PCs for file and printer sharing; the \$149 option adds shared broadband access, and the \$199 plan lets you connect another PC.

Last fall, Gateway began offering to include wireless-network installation with the necessary hardware for two PCs to share broadband Net access: a base station and a wireless client adapter (the second PC uses



CHRIS KAMINSKI, founder of the FutureHome Guild.

a wired connection to the base station's ethernet port). Prices range from \$249 for users who also buy broadband access and a laptop with a Wi-Fi adapter to \$499 for those who buy just the base station, the adapter, and installation. Since you can get

a base station for under \$150 and a Wi-Fi adapter for \$70 to \$80, the \$499 package is costly. But if you're buying a Wi-Fi laptop anyway, the \$249 package is a good deal.

If your networking needs are more complex—if you want to add devices such as a networkable ReplayTV or an MP3 server, for example—you might want to hire a consultant. HomeNetHelp.com's Chris Kaminski recently founded the FutureHome Guild, a national organization of networking professionals who for \$60 to \$120 an hour will discuss your home networking plans with you and install the equipment. For basic networking, this service is probably too costly; but it could make sense for upscale users who want to prepare for the coming wave of IP-addressable appliances.



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SECURITY

HOW SECURE IS INSTANT MESSAGING?

COMPANIES BALANCE CONVENIENCE WITH SAFETY CONCERNS.

AS INSTANT messaging use grows, so do business concerns about security, authenticity, and encryption.

Companies that wouldn't dream of conducting business through public, Web-based e-mail now worry that employees are sending unrestricted messages on public programs from AOL, MSN, and Yahoo.

Business users will make up nearly half of the 506 million IM users expected online by 2006, say IDC researchers. As business use increases, corporate network managers shudder at trying to control data traveling over public IM networks. Because users can activate IM themselves, IT doesn't know who sees sensitive data. Also, virus writers have begun to explore public IMs as a new



way to spread their pests.

Still, IM's convenience and popularity is prompting businesses to determine how to implement the technology safely and to seek services that provide the desired security.

"We can use [IM] as a strategic tool to talk to customers [and] suppliers," says Francis DeSouza, chief executive officer of IMLogic, which markets

IM monitoring software. Its tools are intended to help IT staff secure and track IM without quashing it entirely.

Regulated industries, such as medical, pharmaceutical, and financial firms, already closely monitor all communications and archive all e-mail to deter (or identify) inappropriate or illegal correspondence. When those industries

want IM, they opt for closed systems that record all communications. For example, eight major financial firms, including Merrill Lynch and Morgan Stanley, use Communicator Hub IM Service, a server-based closed IM service that provides encryption.

Private IM applications are found in communications servers such as IBM's Lotus SameTime and Microsoft Exchange. Separate IM products are available from Bantu, FaceTime, Jabber, and NetLert Communications.

Securing IM reassures companies worried about intellectual property dribbling out the IM window, says Terry Olkin, chief technical officer for online security firm Sigaba.

"[Public] messaging creates a big gaping hole that they have no coverage for whatsoever," Olkin says.

—Frank Thorsberg

INTERNET

WORLDCOM'S WOES AND YOUR ISP

INTERNET REDUNDANCY SHOULD CUSHION MELTDOWN'S EFFECT ON YOUR SERVICE.

AS FINANCIAL scandals and restructuring rock the telecommunications industry, anyone who uses a phone or modem might feel nervous. Bankrupt WorldCom is the Internet's largest backbone, routing 28 percent of global traffic and supporting more than 20 million business customers, say Jupiter analysts. (WorldCom is PCWorld.com's

ISP and hosting provider.)

That means the odds are high that your ISP relies on WorldCom for some access. Fortunately, the Internet is all about redundancy, and you have little to fear—for now.

"If WorldCom were to go away or go down, we have a plan using multiple providers," says Dan Greenfield, a spokesperson for EarthLink,

which has backups through backbone providers Sprint and Level 3. AOL has redundant networks through Genuity, Qwest, and Sprint, says Nicholas Graham, an AOL spokesperson. Neither ISP will say exactly how much it depends on WorldCom. (Both Genuity and Qwest have financial problems too.)

Ironically, redundancy is part of the problem. "The telecom industry easily built 20 times over what is needed,"

borrowing hundreds of billions of dollars in the process, says Dylan Brooks, a Jupiter senior broadband analyst. Consequently, dozens of telecom firms went bankrupt in the past year, according to TeleGeography.

However, industry analysts do not expect users to encounter even briefly spotty service, as @Home customers experienced last summer when that ISP went under.

—Tom Spring ►



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HANDHELDS

PDA PHONE RINGS TRUE

T-MOBILE'S POCKET PC PHONE HAS PLENTY OF USEFUL FEATURES, GOOD LOOKS, AND COOL EXTRAS, ALL AT AN ATTRACTIVE PRICE.

IN THE ongoing quest for the perfect combination of handheld and cell phone, Microsoft has taken a decidedly PDA-centric path. Its Pocket PC 2002 Phone Edition operating system includes the entire Pocket PC 2002 OS, as well as extra features designed for personal digital assistants with built-in wireless voice and data capability.

We looked at the first Pocket PC 2002 Phone Edition-based device, from T-Mobile (formerly known in the U.S. as VoiceStream). The device fits nicely in the hand and is easy to use as a phone with or without the included stereo headset. It supports both U.S. and European GSM/GPRS networks, an ability that will endear it to international travelers. And at \$550 with service contract, it's more attractively priced than Audiovox's \$800 Thera, a Pocket PC-CDMA cell phone hybrid that doesn't use the new OS.



T-MOBILE
Pocket PC
Phone Edition.

(Microsoft says a CDMA device using the new OS will be available within a few months.)

PDA CONVENIENCE

THE T-MOBILE PDA's features are easy to use while you talk on the phone through the headset. For example, if you want to take notes during a call, you can tap on an icon to bring up a memo sheet containing contact information for the person you've called (as long as the person is in your Pocket Outlook contacts).

If you're listening to music on Windows Media Player and a call comes in, the OS turns down Media Player's volume so you can hear the phone ringing, and pauses the music if you decide to take the call (or make a call yourself). Additionally, the OS supports Tel URLs—phone numbers received in e-mail or SMS messages. When embedded in an e-mail or SMS message,

a Tel URL becomes a link, and you can dial it simply by tapping on it.

The device also features caller ID information that uses your contact list; call logs; voice mail; flashing missed-call alerts; and a soft phone keypad that lets you easily dial numbers with your fingertip if a stylus isn't handy.

The T-Mobile GPRS data network, operating at speeds approaching those of 56-kbps dial-up connections, delivers Web pages to Pocket Internet Explorer with acceptable (if not lightning) speed. One drawback: Web pages that are designed for display on larger PC screens are difficult to read on the T-Mobile device.

Also, T-Mobile's Pocket PC Phone Edition suffers from some design quirks. For example, that useful note-taking icon does not appear if you initiate a call from your Pocket Outlook contacts (as opposed to starting from the phone-keypad interface).

However, the operating system offers powerful tools for well-heeled corporate types who are willing to invest time in learning its features. People who would prefer a smaller, more phonelike phone-PDA hybrid may want to wait until Microsoft introduces its Windows Powered SmartPhone 2002 OS later this year.

—Yardena Arar ▶

IN BRIEF

Product Pipeline

TATTOO YOUR DISCS:

Yamaha's CRW-F1 is not just for burning CDs. Sure, the drive writes to CD-R at about 44X and is the first to write to CD-RW at 24X. But it also is the first



such drive to have an alternative use for the laser that burns data onto a disc. As long as disc space is available, you can use the included software and the drive's laser to burn—or, as Yamaha calls it, DiscT@2 ("tattoo")—text such as album titles or images like your company logo onto the disc's underside. You'll pay for the privilege, though: The \$180 drive is about \$50 more than other models with similar speed.

BATTERY POWER: IBM is now shipping its latest ThinkPad X series ultraportable, the X30. The 3.5-pound unit boasts a 4.5-hour battery life; a 1-pound wedge that attaches to the bottom of the unit can add another 3.5 hours. Among the usual ports, the laptop also offers one FireWire (IEEE 1394) and two USB 1.1 ports, as well as a CompactFlash slot. You get both a modem and ethernet built in, and optional 802.11b and Bluetooth wireless support. Pricing starts at \$1999.



POCKET PC PHOTOGRAPH: MARC SIMON

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HANDS-ON

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LINDOWS.COM COMES UP WITH A LOW-COST, LINUX-BASED SYSTEM THAT ANYONE CAN RUN IMMEDIATELY, BUT THERE ARE CATCHES.

PC PURCHASES traditionally involve choosing a Windows operating system. But now your OS choices are broader. Walmart.com, the online arm of the world's largest retailer, is offering a line of ultrabasic Microtel PCs equipped with a Linux-based OS from Lindows.com. We took a look at the \$299 Sysmar701 with LindowsOS 1.1, an interesting entry-level PC somewhat hampered by LindowsOS 1.1's odd mixture of polish and omissions.

Our Sysmar701 had an 850-MHz Duron processor, a 10GB hard drive, 128MB of RAM, a 22X-52X CD-ROM drive, a Trident Blade video card, a modem, an ethernet card, a keyboard, and speakers, but no floppy drive or monitor. Owners also may download any three pieces of Linux software in the Lindows.com online Click-N-Run Warehouse software library for free (via their own existing Internet connection).

STREAMLINED

OUR MICROTEL system booted straight to LindowsOS 1.1, a KDE 3 desktop modified to remove some friendly features that would be unfamiliar to Windows users. Version 1.1 limits Linux's inherent security by essentially logging you in with administrator privileges,



MICROTEL'S Sysmar701 with LindowsOS 1.1.

which could allow a user to inadvertently open the PC to outside attack or cause some system damage.

Despite this model's humble hardware, with Linux in charge it zips right along, doing a good job of Web browsing, e-mail, and office work. The desktop contains familiar, Windows-like icons. The Start menu is neatly organized, but most of its folders contain only a single entry, Add, which when selected takes you to Click-N-Run. There (for \$99 annually) you get easy, unlimited access to downloads of more than 1600 software packages. However, we were not always directed to exactly what we needed. For instance, OpenOffice.org's office suite wasn't categorized under Word Processing.

Lindows.com tracks what you download; even if you let your subscription lapse, your software remains accessible to

you—for as many personal PCs running LindowsOS as you like. This is convenient, but it feels odd to pay for access to a collection of software that can mostly be found for free elsewhere on the Web.

As advertised, it took us exactly one click to download and install each software package we selected on Click-N-Run, including OpenOffice.org, GnuCash personal accounting software, and RealPlayer 8. Thanks to the included Wine software, which makes it possible for Windows applications to run on Linux, we even installed Office 2000 straight from the CD-ROM. However, most other Windows software—including games—will not run on this system.

FINAL VERDICT?

RIGHT NOW the Microtel Sysmar701 with LindowsOS 1.1 is a workable, inexpensive PC for users who aren't wedded to Windows and whose needs are simple. However, whether this is an awkward but promising entry in an emerging field or just a footnote in PC history remains to be seen.

—Matthew Newton ►

Microtel Sysmar701

Walmart.com

★★★★☆

List: \$299

find.pcworld.com/30518

IN BRIEF

Product Pipeline

WAIT TILL DARK: Interested in viewing or recording images in the dead of night? Check out the NiteMax Digital Night Vision Viewer from Infrared Imaging (go to find.pcworld.com/30641). Resembling a digital camera, this \$499 device promises to capture clear pictures at a distance of 300 feet in total darkness; the images may then be displayed on the Night Vision Viewer's 2.5-inch LCD screen or output for viewing elsewhere via its RCA video jack.



Downloads

Head to find.pcworld.com/30354 to find these files.

TOP 5

- 1 Ad-aware 5.83** 827KB
Rid your computer of sneaky advertising spyware with this freeware utility.
- 2 QuickTime 6** 525KB
Experience the latest version of Apple's versatile audio/video player.
- 3 Ashampoo UnInstaller Suite 1.30** 4.3MB
Err on the side of caution by creating a snapshot of files before you uninstall.
- 4 PowerToys for Windows XP** 1MB
Add applications and adjust hidden settings with this free suite of system tools.
- 5 Trillian 0.73** 2.3MB
Trade instant messages with your pals no matter what service they use.

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DESKTOPS

NEW RAM POWERS P4 PERFORMANCE

LATEST PC1066 MEMORY PLUS 533-MHz BUS APPEARS TO GIVE P4 THE JOLT IT NEEDS.

NEARLY TWO years after its debut, Intel's Pentium 4 CPU appears poised to finally deliver the performance its high clock speeds have long promised—thanks in part to new technology from oft-maligned memory designer Rambus. Exclusive *PC World* tests showed that a PC with Intel's 2.8-GHz P4 and new PC1066 RDRAM outperformed two other P4 PCs and an AMD Athlon XP system, all comparable to it except for having more, but slower, memory.

The \$2849 Sys Performance 2800 PC scored 129 on PC WorldBench 4, a new high. The Sys completed our tests 5 and 6 percent faster than a \$3158 Dell Dimension 8200 and a \$2999 Gateway 700XL, which earned modest scores of 122 and 121 despite having

1GB of PC800 RDRAM each. The Sys also outran our AMD Athlon XP 2200+ system, a \$3169 Alienware Aurora DDR model with 1GB of 266-MHz DDR, which scored 123.

One note: The Sys ran Windows XP Professional; the others ran Windows XP Home. However, history shows that performance differences between the two are negligible.

IT'S THE MEMORY

IN OUR July issue (see find.pcworld.com/30635) Kevin Krewell, a senior analyst at MicroDesign Resources, predicted PC1066 RDRAM—combined with Intel's 533-MHz frontside bus—could help the P4 shine, and that appears to be the case. Expect a 3 to 5 percent boost with PC1066, depending on the

SYS Performance
2800 PC.



application, he says. Intel has yet to validate the memory, but that should happen soon.

The new memory's biggest drawback is its price, Krewell says. RDRAM has traditionally cost more than DDR, and PC1066 is no exception. Pricing for 256MB of Kingston's ValuRAM provides a good illustration: While 266-MHz DDR is \$78, PC800 RDRAM is \$118 and PC1066 is \$159. It was those high prices, and the PC industry's unwillingness to switch to RDRAM, that eventually forced Intel to stray from its early plans to use only RDRAM with the Pentium 4, Krewell says.

The Sys sells for less than

our comparison PCs because of its smaller RDRAM allotment and less-robust graphics card (it carried a 64MB NVidia GeForce4 MX 440 board; the others used 128MB NVidia GeForce4 Ti 4600 cards).

Though further testing is required, initial results seem to indicate that systems with a fast P4 and PC1066 RDRAM could soon leave PCs with AMD's current chips in the dust. Plus, expect to see a 3-GHz P4 within a few months.

Of course, AMD won't be standing still: By year's end the company hopes to launch its eighth-generation family of chips, code-named Hammer.

—Laurianne McLaughlin ■

TEST REPORT

FASTER MEMORY ADDS PUNCH TO P4

SYSTEM	Processor	Memory	PC WorldBench 4 Faster	AutoCAD (seconds)	Adobe Photoshop 6.0.1 Lighting effects (seconds)	Multiple filters (seconds)	Musicmatch Jukebox 7 (seconds)	Windows Media Encoder 7.1 Audio file conversion (seconds)	Video file conversion (seconds)	Unreal Tournament (frames per second)
Sys Performance 2800 PC find.pcworld.com/30542	2.8-GHz Pentium 4	512MB PC1066 RDRAM	129	262	46	61	16	50	48	86
Alienware Aurora DDR find.pcworld.com/30533	1.8-GHz Athlon XP 2200+	1GB DDR266 SDRAM	123	286	46	59	21	60	58	111
Dell Dimension 8200 find.pcworld.com/30527	2.8-GHz Pentium 4	1GB PC800 RDRAM	122	282	49	61	16	51	49	118
Gateway 700XL find.pcworld.com/30545	2.8-GHz Pentium 4	1GB PC800 RDRAM	121	277	48	63	16	56	52	122
Average of six systems	2.4-GHz Pentium 4	512MB	120	n/a	n/a	n/a	n/a	n/a	n/a	n/a



HOW WE TEST: All systems were tested with PC WorldBench 4, *PC World's* applications-based benchmark. For more details, see www.pcworld.com/benchmark. In the Photoshop 6.0.1 lighting effects test, we time the running of a macro that applies a series of lighting effects to a 16MB image file; in the multiple filters test, we time the running of a macro that applies a series of other filters to the same image file. In the AutoCAD test, we time Autodesk Group International's AUGI Gauge benchmark, which runs CAD tests. In the Musicmatch encoding test, we time the conversion of a raw 14.3MB .wav file into an .mp3 file using Musicmatch Jukebox 7. Using Windows Media Encoder 7.1 (which uses Windows Media 8 format), we time the conversion of an 8.9MB .mp3 audio file to .wma format; in a separate test, we time the conversion of an 11.2MB .avi file to .wmv format. In the Unreal Tournament test, we run our own demo and report its results. Higher scores on PC WorldBench 4 and Unreal Tournament are better; in all other cases, lower is better. All rights reserved. n/a = Not applicable; we did not perform this test on these systems.



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LETTERS

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**MORE SITES ON
OVERCLOCKING**

**CAN THE SCANNER
DESCREEN?**

**SMALL-CLAIMS
COURT CAVEAT**



SPAM, SPAM, AND MORE SPAM

TO SPAMMER Ryan Dong, who says [in "Spam Inc.," August], "We're not there to bother [spam recipients]. All they have to do is hit delete": And my neighbors aren't trying to bother me when they're still partying at 2 a.m., either.

All we have to do is delete it? Not quite. I must wait for it to download; buy and update an antivirus program to ensure you don't infect my machine; sift through the spam to find the messages worth

keeping; add the trash to my kill filter; and finally, delete your garbage—only to repeat it all tomorrow.

But I'll make you a deal, Mr. Dong. Pay for my computer, phone line, e-mail client, antivirus program, and ISP, and I'll be happy to accept and even read your trash. Until then, you are not welcome.

Tim Joyce, via the Internet

MOST SPAM IS just annoying. But some I find highly offensive—namely, all the spam from porn sites advertising rape sex, child pornography, and incest. As a survivor of rape and childhood sexual abuse, I find such material not just offensive, but intolerable.

Dawn G., Tucson, Arizona

IRONICALLY, MOST of the proposed anti-spam laws and many of the enacted state laws prohibit things that don't need to be prohibited. Forging headers, for example, is something that system administrators frequently do to test new systems, and is not in itself the issue.

Andrew K. Bressen, Dedham, Massachusetts

MY SOLUTION to the spam problem: Pass a law requiring all e-mail ads or solicitations to start the subject line with ADV.

Scott Murphy, North Cape May, New Jersey

IF ISPS WERE really dedicated to stopping spam, they would file a class action lawsuit against the credit card conglomerates for allowing their customers to send unsolicited business e-mail. This would avoid government controls and First Amendment conflicts, and probably eliminate spam within days.

Allan Hytowitz, Norcross, Georgia

YOUR ARTICLE should have included—for obvious reasons—the e-mail addresses of the spammers you talked to.

Bob Johnson, Wilmington, Delaware

THE SERVICE PROBLEM

AS A PRACTICING corporate investigator for over 20 years, I know well the power of small-claims court, as discussed in August's *Consumer Watch*. However, the author overlooked a significant obstacle facing every plaintiff—that of serving the defendant [with a process or notice to appear in court]. Often, defendants know they are targets and do all they can to avoid service. Unless a defendant is properly served, the victim will never be able to see the inside of a courtroom.

Eugene F. Ferraro, Golden, Colorado

HARD-DISK BACKUPS

REGARDING YOUR article on backups ["Data Saviors," August]: I can't figure out how you missed including Castlewood's Orb. I've used the company's 2.2GB internal drive for three years; it remains reliable, convenient, and cheap (at one cent per MB). It's infinitely rewritable. It's many times faster than tape for backup (and vastly superior for partial re- ▶

CROSS FIRE

Tolerate E-Mail Ads? Or Ban Spam?

WHILE I AGREE spam ads are a pain in many ways, it is just junk mail. Let law enforcement entities crack down on fraudulent e-mail. But legitimate spam, whether we like it or not, has its place. If you don't like it, don't use a credit card, don't place an online catalog order, don't join an online mailing list, don't order anything by phone, and don't give your e-mail address to anyone. Spam is a price we pay for putting ourselves out there.

Colleen Noon, via the Internet

SPAMMERS HAVE NO more right to force me to deal with their commercial messages than a vacuum cleaner salesperson has a right to walk into my house and force me to listen to a pitch.

Once the American people realize this and demand that their representatives pass laws requiring all e-mail solicitations be opt-in only, with progressively heavy fines and jail time for repeat offenders, this whole discussion will go away.

Robert Simms, Los Angeles

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LETTERS

stores). And it's more practical than portable hard disk drives. (Who's going to buy three Iomega units to maintain a proper off-site rotation?) You can share with other users, too. If my Orb failed today, I'd buy the new 5.7GB Orb.

Larry Simms, New York

MISSING SCANNER FEATURE

YOUR SCANNER article ["Souped-Up Scanners," August] did not mention the so-called descreen feature. This is quite valuable to anyone who scans photographs or art from newspapers, magazines, or books. Generally the included image-tinkering software is inadequate for these purposes, but scanners with a compensation feature built in—and good drivers—can do an excellent job.

Hugh T. Hoskins, Downey, California

OVERCLOCKING SITE KNOCKED

I AM CONCERNED about your recommendation of HardOCP.com and its forum as a top pick for overclocking information ["Best of Today's Web," August].

While the site has some useful information, the forums are awash with bad language and flaming. I would strongly encourage you to direct your readership to friendlier Web sites, such as www.overclockers.com, www.overclockers.co.uk, and www.AOforums.com (as well as their forums), where they will receive a warm welcome and good information.

*Alasdair C. Ewen
 Albrighton, United Kingdom*

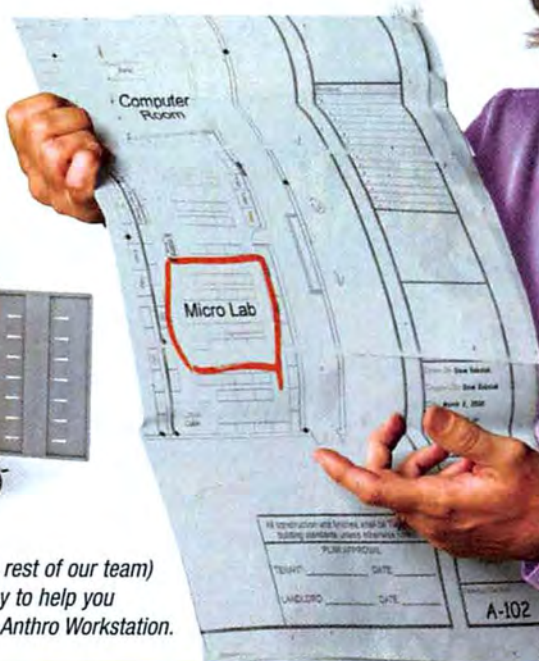
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CORRECTIONS

IN SEPTEMBER'S *Home Office*, the URL to sign up for Steve Bass's online newsletter should have been printed as find.pcworld.com/25821.

In August's "Best of Today's Web," we should have said that the Internet Archive's Wayback Machine comprised the largest publicly accessible database in the world.

PC World regrets the errors.



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CONSUMER WATCH

ANNE KANDRA

**HOW TO PREVENT
IDENTITY THEFT**

**PRIVACY WATCH:
ANONYMOUS SURFING**

**ON YOUR SIDE: SUPPORT
CHANGES AT MICROSOFT**

Don't Let Them Steal Your Good Name

Identity theft is skyrocketing—and it's even being used to fund terrorism.



IT STARTED WITH a phone call from the Bank of America, asking about payment for a new truck purchased the previous month. The problem was that Michelle Brown—then 29 years old and working in international banking—hadn't bought a truck. She immediately canceled all her credit cards, issued fraud alerts, and notified her bank. But it was too late—the damage had been done.

Over the next year and a half, Brown's identity was used to purchase more than \$50,000 in goods and services, to rent property, and even to engage in drug traf-

ficking. Brown estimates she spent well over 500 hours trying to clear her name and credit and to simply sever all connections with the criminal, who was eventually arrested and incarcerated. But Brown says, "I don't think I'll ever be able to close the books on this. The existence of [the thief] has robbed me of the normal life I have strived for and deserve."

As Brown's story illustrates, identity theft—the criminal use of your personal information to make fraudulent purchases, open accounts, and even take out loans—can financially and emotionally

devastate its victims. And what's worse, government officials say terrorists are now using identity theft to finance their crimes and cover their tracks.

The Web can be a real boon for identity thieves, helping them find information about victims and profit from the crime. As the Web increasingly becomes part of our lives, identity theft is growing at an alarming rate. Reports of identity theft to the Federal Trade Commission more than doubled last year. And that's just a fraction of the cases. If you include all local law-enforcement and police reports across the United States, the number of victims in 2001 probably falls between 750,000 and 1 million.

"The risk starts the minute you're issued a Social Security number," says Jay Foley of the Identity Theft Resource Center (www.idtheftcenter.org), a San Diego-based nonprofit resource and advisory center for victims. "And," he adds, "it continues until well past your death."

FUNDING TERROR

WHILE MOST OF the perpetrators of identity theft are common criminals, some are quite a bit scarier. Dennis M. Lormel, chief of the FBI's Terrorist Financial Review Group, recently told a Senate subcommittee that identity theft is a "key catalyst" fueling the activities of terrorist groups, including cells of Al Qaeda.

Why are cases of identity theft skyrocketing? Foley blames two factors.

First, criminals are catching on to how lucrative—and low-risk—identity theft can be and are starting to act in organized groups. Identity theft is a lazy criminal's dream: Its practitioners can simply ►

grab a cold one, boot up, and commit their crimes in the comfort of their own homes without breaking a sweat.

Less than 10 percent of identity thieves ever face criminal charges, Foley says. And even if convicted, identity thieves usually receive light punishment—probation and maybe community service. Rarely are perpetrators sentenced to more than a year of jail time.

The second factor fueling the increase is the loosening in some credit card companies' application procedures. A smart thief armed with only a stolen name and Social Security number could easily open dozens of credit accounts—online and anonymously, with no face-to-face verification required—and put their unsuspecting victim potentially thousands of dollars in debt within an hour or two.

Lots of identity thieves get the informa-

tion they need the old-fashioned way, sorting through a trash bin or jotting down a credit card number at a store. But many others use technology—hacking into a company's personnel files or visiting a Web site that sells Social Security numbers or other personal information.

WEB LEAKS HELP

SOMETIMES WEB SITE administrators inadvertently simplify the process. Recently, the tele-management firm Resi-com acknowledged that it had mistakenly posted the names, addresses, and Social Security numbers of about 2000 students on the Web, where any surfer could see them. Last year, genealogy site RootsWeb.com came under fire for posting indexes to some birth records. Both companies removed the information when the problems came to light, and so

far no cases of identity theft based on these Web disclosures have been confirmed. But both provided the type of information identity thieves need.

How can you protect yourself on the Web? Here are some steps to help prevent your personal information from falling into the wrong hands:

- Provide only essential information when you buy online: Your name, address, and credit card number are all any vendor should need for a transaction. If you're uncomfortable giving out any information online, pick up the phone.
- If you're selling or donating a computer, repartition and then reformat the hard drive before you part with the system to ensure that the next user won't come across any of your personal information.
- Order and then carefully review your credit report at least once a year. You ▶

PRIVACY WATCH

How to Surf Without Leaving a Trace

WORRIED THAT SOMEONE may be looking over your shoulder—in the virtual sense—as you browse the Web? If so, you don't have to be an online agoraphobe any longer: New tools from old hands in Web privacy will let you surf with complete anonymity.

A certain degree of paranoia about the Web is justified. Advertisers track Web surfers all the time, planting cookies that track you as you surf from site to site so they can see what you want and where you go.

Proxy servers, such as the Safeproxy CGIProxy (available at find.pcworld.com/30212), have been around for years. These sites open another site, say, Amazon.com, in a pane of the proxy. That way, Amazon won't see your IP address and the proxy can block ads and some cookies.

But proxy sites still allow destination sites to implant some ad cookies and Web bugs—the two most common tracking devices—on your system. Worse, many proxies are just too slow.

New browser plug-ins block far more than just your IP address. Both Anonymizer.com's Private Surfing (\$30 per year, limited-feature free version; www.anonymizer.com) and Zero-Knowledge's Freedom WebSecure (\$50 per year; www.zeroknowledge.com) promise to make you invisible to everyone on the Internet. Each product will encrypt transmissions between your computer and Web sites, scramble URLs so that they can't be seen by administrators, disable the tracking function of cookies (while still letting

them save preferences or perform automatic log-in at Web sites that use cookies for those purposes), and block some—though not all—advertising banners and graphics.

The plug-ins work only with Internet Explorer versions 5 and higher. Anonymizer's plug-in is compatible with versions of Windows from 98 through XP; a Zero-Knowledge spokesperson tells me that its tool can't run on some installations of Windows 98 and Me, but that it works well with Windows 2000 or XP.

The two plug-ins behave similarly: After a short download, each service adds a small button to Internet Explorer's toolbar that toggles the application on and off. Private Surfing and Freedom WebSecure both generate a toolbar at the top of your Web browser window. Once you log in with your user name and password, the software becomes active and you can surf anonymously to your heart's content.

Related services from these companies in the past offered anonymous surfing, but at a snail's pace. The new versions are dramatically faster. Freedom WebSecure seemed positively peppy, while Anonymizer still was a bit slower than unprotected surfing because of its encryption.

If you're concerned about the bread-crumbs trail you leave across the Internet as you browse the Web, either of these tools can sweep those crumbs away and keep profilers off your back.

—Andrew Brandt



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Dell recommends Microsoft® Windows® XP Professional for Mobile Computing

*AOL: New members only. Must register for AOL within 30 days of invoice. To avoid paying monthly membership fees, cancel during the 6-month promotional period. Even during promo period, telephone access charges on your phone bill (call your phone co. for details) and surcharges for premium services and 800# access may apply, including in AK. Availability may be limited, especially during peak times. For new, 18+ U.S. members with major credit card or checking account only. Limited time offer.

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Standard Features

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Dell | Solutions

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- Belkin® SurgeMaster™ Maximum Series Surge Protector, \$49
- Kodak® CX4230, \$249

Notebook

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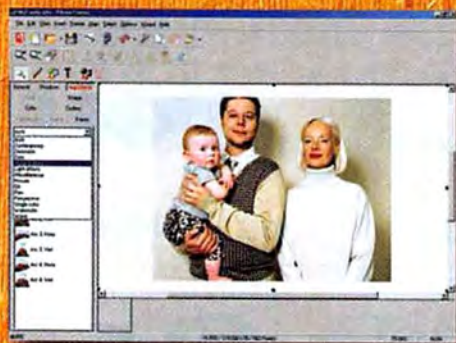
phone line and compatible service required. **PURCHASE PLAN:** Dell Preferred Account. Offered by CIT OnLine Bank to qualified U.S. residents. Taxes and shipping charges are extra and vary. **TrueMobile:** Connect at rate of 11Mbps up to 100m from connected access point. Range and speed may vary due to number of users, interference, transmission barriers (such as walls and building material) and other factors. **CompleteCare:** CompleteCare service excludes theft, loss, and damage due to fire or intentional damage. CompleteCare is currently not available in all states. Not available for Dell Home Sales customers in CA, FL or NY. Not available for Employee Purchase Program customers (Government, Health Care and Relationship/Faculty, Staff and Students) in CA or FL. May not be available to all customers. For complete details, visit http://www.dell.com/us/en/gen/services/service_service_contracts.htm. **DVD+RW/R- Drives:** Discs burned with this drive may not be compatible with some existing drives and players; using DVD+R media provides maximum compatibility. **Trademarks/Copyright Notices:** Intel, Intel Inside, Pentium and Celeron are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are registered trademarks of Microsoft Corporation. America Online, AOL, the Triangle logo and Buddy List are registered service marks of America Online, Inc. ©2002 Dell Computer Corporation. All rights reserved.



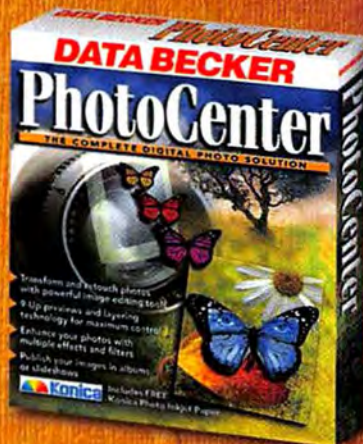
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can request a copy of your record online from the three major credit-reporting bureaus—Equifax (www.equifax.com), Experian (www.experian.com), and TransUnion (www.transunion.com).

- Visit CardCops (www.cardcops.com) to see whether your credit cards are in their database of possible fraud targets. The site offers a wealth of information about credit card and e-commerce fraud.

- Be wary of providing powerful information like your mother's maiden name to verify your identity at Web sites. Similarly, don't use easy-to-guess passwords like your date of birth, anniversary, or dog's name. The best passwords are at least eight characters long and cryptic, using a combination of letters and numbers.

There are also many offline precautions you should take, such as shredding financial statements, keeping key documents in a secure place, and reviewing credit card statements for bogus transactions.

If you have a life, you're vulnerable to

the financial and emotional damage of identity theft. And because it is an incredibly difficult crime to undo, you should take every precaution you can to avoid becoming its next victim. ■

Anne Kandra is a contributing editor, Grace Aquino an associate editor, and Andrew Brandt a senior associate editor for PC World. Address e-mail to any of these three at consumerwatch@pcworld.com.

ON YOUR SIDE

Microsoft Changes Tune on Support

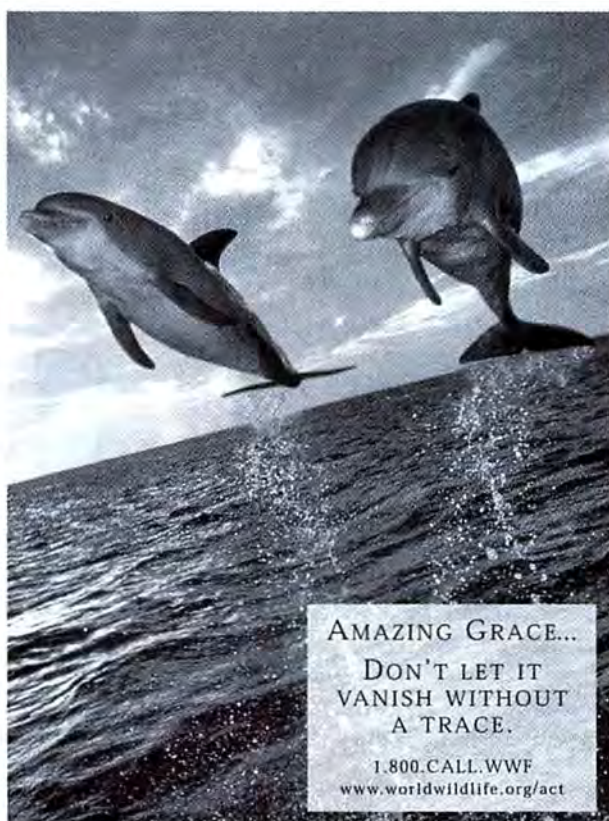
I PURCHASED Microsoft Plus for Windows XP, and now it doesn't work. I can't delete, repair, or reinstall it. I asked Microsoft for help four times, and each time the technician referred me to my PC manufacturer, Dell (online resources didn't help, either). The Dell rep sent me back to Microsoft, saying Dell isn't responsible for the program because it didn't install it. I explained this to Microsoft, but the rep said the only way a Microsoft tech will help is if I pay \$35—which doesn't seem fair since I already paid \$39 for the buggy program.

Marion Martinez, Los Angeles

On Your Side responds: When I first contacted Microsoft on Martinez's behalf, Director of Windows Client Support Matt Fingerhut said Microsoft doesn't provide free support for many Plus users. But after the conversation, Microsoft changed its policy, giving free, unlimited assistance for all owners of Plus for Windows XP.

Martinez ended up reformatting her hard drive, with the help of a Dell technician, to get rid of Plus. She doesn't want to reinstall the software. For her trouble, Microsoft offered her a refund.

—Grace Aquino



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** Growth figures represent a ten-year period ending 2010. Source: *National Industry Occupation Employment Matrix*, a publication of the U.S. Bureau of Labor Statistics.



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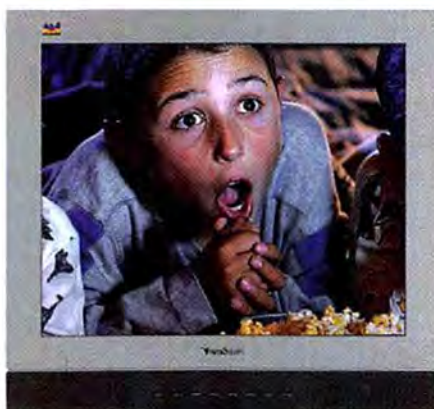
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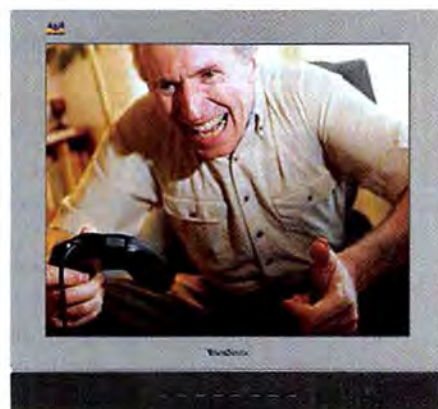
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with 28-key remote control, NextVision N5 is the perfect desktop addition for those looking to maximize productivity by monitoring television news or stock quotes – and have some fun, too. It's also great for small offices where space is too tight for a separate computer display and television. Setting up NextVision N5 is as easy as a TV. No complicated cards or software to install. Use the included cable to connect the NextVision N5 directly to your monitor (you don't even need a PC). Turn an ordinary desktop into an extraordinary viewing experience. Visit ViewSonic.com today and See the Difference.®

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I LOVE WEB SITES that offer great information and ask only for my zip code in return, rather than my name, e-mail address, or some other personally identifiable information. Despite the lack of intimacy, the results are tailored to me—or more specifically, to where I live. Zip codes won't unlock every door online, but many sites let me use them to pinpoint what I need quickly and easily.

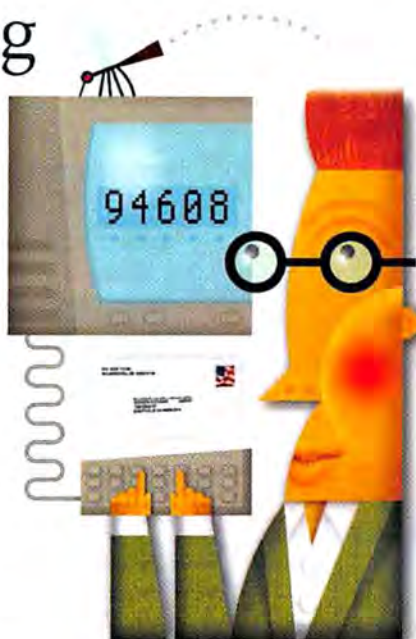
UP TO CODE

I NEVER START A day online without first checking in at Weather.com, where entering my zip code turns up so much great localized information—including golf and boating forecasts, pollen counts, and scrolling severe weather alerts—that talking about the weather is no longer mundane. And in the Indian summer, I jump over to Skeeterbites.com to see if I should pack insect repellent when I step outside.

At some sites I can enter my zip code to find replacements for resources I left behind when I moved into a new home outside Washington, D.C. If I need a contractor to repair some cabinetry, for exam-

ple, I go to ContractorGuide.com. I've also found ImproveNet (www.improvenet.com) to be a big help, but the site also requires data such as cross streets (not names, addresses, or phone numbers, though). To find a lawyer, I go to FindLaw (directory.findlaw.com); for doctors, I head to the American Medical Association site (find.pcworld.com/30009). I haven't yet found a tool that I like for locating a dentist near me (though I have found a dentist, rest assured).

My zip code also helps me learn about where I live—or where I might live if I move again. At APBnews.com (find.pcworld.com/30008), I quickly discovered that crime in my zip code is almost nonexistent (although nearby zip codes aren't so lucky). At Yahoo Real Estate (find.pcworld.com/30398), I received a detailed profile of my zip code, including average annual utility costs—very helpful. But the granddaddy of all demographic tools is the U.S. Census Bureau's American FactFinder (factfinder.census.gov). Click the link to the 2000 Summary File 1 and choose Detailed Tables or Quick



Tables to start exploring the reams of data the census collects about your zip code.

At the end of my day, I just want to relax. So I pop over to TV Guide Online (tvguide.com/listings) to see what's on my favorite network and cable TV channels. Where else is a detailed guide to eight seasons of "Diff'rent Strokes" just a click away? And if the TV listings are uninspiring, I check MovieFone.com to see what's playing nearby, or Fandango (www.fandango.com) to buy movie tickets for select local theaters.

Of course, when I do go out, I want to make sure I can be reached in case of an emergency—and for a reasonable fee. GetConnected (www.getconnected.com) lets you compare wireless phone plans, local phone services, and more.

When offered the choice of giving your name and address or just your zip code, type the five simple digits. You'll save a little time, protect your privacy, and get some great information in return. ■

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

GIMME FIVE

Top Online Learning Sites

1. University of Phoenix: A pioneer in online education. Offers degrees in areas like business administration, IT, and education. online.phoenix.edu

2. Columbia Interactive: Ivy League university has fee-based online seminars taught by the school's faculty. Semester-length courses require admission and tuition. ci.columbia.edu/ci/index.html

3. U.C. Berkeley Extension Online: Take courses for continuing education, corpo-

rate training, or academic credit. Course selections include computer science, Web design, and e-commerce. learn.berkeley.edu

4. The Kaplan Colleges: Degree programs in criminal justice and paralegal studies are prominent, as well as business and IT concentrations. www.kaplancollege.com

5. CyberU: College classes, professional training, and computer software courses under one roof. It's suitable for individuals or businesses. www.cyberu.com

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SNAPSHOTS: All the key facts about your entire business.

TASKS: What you have to do.

HOT ITEMS: Know what's selling the most right now.

REMINDERS: Things you gotta get to, problems you gotta solve.

The screenshot shows the Oracle Small Business Suite interface with various sections: Events (listing a 10:00 am Press Interview), Search (with filters for Name and Search For), Settings (with links to Set Preferences, Customize Center, etc.), Top 5 Sales Reps (listing Mark Grogan, Clark Kozar, etc.), Top 5 Customers (listing CVM Business Solutions, Jennings Financial, etc.), Tasks (listing Discuss Hardware Supply Problem, etc.), Snapshots (listing Bank Balance, Web Site Hits, etc.), Top 5 Sales By Item (a bar chart), Reminders (listing 15 Employees to Pay, etc.), and Corporate Accounts (listing Bay Media research, Chess Art Gallery, etc.).

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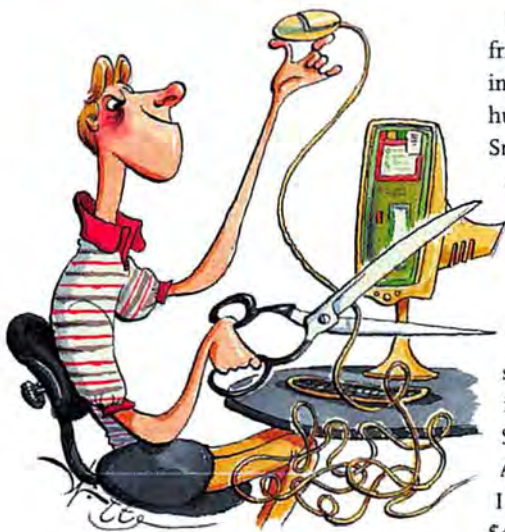


HOME OFFICE

STEVE BASS

Some Cords I'll Cut, but Some I'll Keep

Wireless devices are hit-and-miss. Here are two keepers, and two to toss back.



MY EDITOR ASKED ME to try some wireless gadgets. "Sure, boss," I thought. "I love being a guinea pig." I visualized the assignment turning into a reality-TV kind of situation—"Will Bass live through the ordeal of snipping printer cables, cutting mouse wires, and sending data and pictures through the air?" In fact, things went pretty smoothly, though I'm still not a complete wireless convert.

You can find wireless versions of most peripherals, but I tried four—a mouse, a PC-to-TV link, a remote control, and a printer adapter. Still, just two found a home in my office. (For another opinion on wireless, see *Full Disclosure*, page 186.)

The highlight of my wireless adventure was Logitech's \$70 Cordless MouseMan Optical. An untethered mouse is bliss—I never have to pull a cord up from the floor or push it out of my way. An optical mouse has more-precise cursor movements than a mechanical one, I never have to clean it, and I've thrown away my mouse pad. Try one, and you'll never use a tethered mouse again.

I often want to play Internet videos for friends, but I can't bring a dozen people into my tiny home office and have them huddle around my PC monitor. I tried Smarthome's Wireless VGA/TV Converter: The device beams images from my PC to the TV in my living room. Installation took 10 minutes, and the converter worked as advertised.

So why did this gadget end up back in its box? The image on the TV's screen didn't look any better than it did in Windows Media Player 8, and the \$230 price tag is hefty for what you get. Also, the lack of a remote control means I had to use a third wireless device: the \$49 Keyspan Digital Media Remote. It's so compact, it could hide behind a credit card. However, the Keyspan is a keeper because it's also a handy accessory for controlling PowerPoint presentations.

A LITTLE BLUE IN THE TOOTH

THE MOST INTRIGUING product of the bunch was 3Com's Wireless Bluetooth Printing Kit, which I installed in only 15 minutes. The kit converted my laser printer into a wireless receiver for printing any files that I send from my notebook, PDA,

mobile phone, and (of course) computer.

Bluetooth is unobtrusive, and I can use it without hassling with any of my PC's TCP/IP or other network settings. Some notebooks have Bluetooth wireless hardware built in. And Microsoft is pushing a Bluetooth-enabled keyboard and mouse, as well as a Bluetooth USB hub. But Bluetooth's range tops out at 30 feet, much shorter than the 300-foot coverage of Wi-Fi (in geek-speak: 802.11b).

The kit runs about \$188; that includes a receiver for my printer's parallel port and a USB transmitter for the PC. Want to print from your notebook? You'll need another USB transmitter, or you'll have to shell out \$107 more for a Bluetooth PC Card. The wireless arrangement is great, especially if you have to print data from a PDA. But if you already have a wired network, my advice for printing is to connect your notebook to the network, either with an existing network card or by buying a cheap ethernet PC Card (about \$30).

What about devices that must be connected with wires? USB can help. I minimize cable clutter by attaching my digital camera, MP3 player, and label printer to a USB hub via short 2- and 3-foot USB cables. I also have a 2-foot Cat 5 patch cable between my DSL modem and my network router. The cables cost less than \$5 each at Belkin (www.belkin.com) or Great Cables (www.greatcables.com).

I admit it. I'm a wired kind of guy, with or without caffeine. ■

Contributing Editor Steve Bass runs the Pasadena IBM Users Group. Reach him at homeoffice@pcworld.com; visit find.pcworld.com/25821 to sign up for his online newsletter.

Cordless MouseMan Optical

★★★★★

\$70

Logitech

www.logitech.com

Wireless Bluetooth Printing Kit

★★★☆☆

\$188

3Com

www.3com.com

Keyspan Digital Media Remote

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Keyspan

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★★★★★

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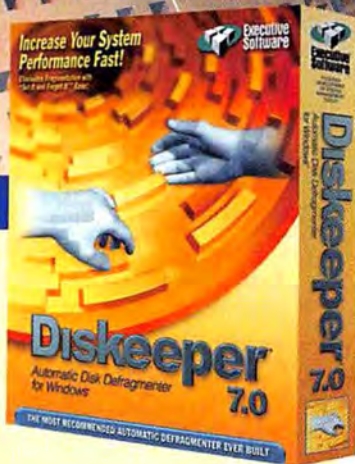
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BUGS & FIXES

STUART J. JOHNSTON

Plug Dangerous Holes in Word, Excel

Bad guys have four new ways to target Microsoft's Office products.

IF YOU KEEP putting off installing security patches, now would be an excellent time to stop procrastinating and take some action: Microsoft recently released cumulative patches for the 2000 and 2002 versions of Excel and Word.

The patches include all previous fixes for those two programs, as well as patches for four newly discovered security bugs (three in Excel and one in Word). Although Microsoft classifies these recent bugs as "moderate" on its severity scale, don't let that lull you into complacency. They can still give you a nasty bite.

To be fair, crackers haven't exploited any of these new holes—yet. But an attack that penetrates any of the four flaws could give a miscreant the ability to wreak havoc on your system (such as steal your data or reformat your

hard drive) and even the ability to do anything you can do on your own computer.

STOP MACRO ATTACKS

THE THREE BUGS that are lurking in Excel involve the spreadsheet's ability to run



user-defined macros. These handy programs are stored as part of a workbook and can do things like automate repetitive keystrokes or regenerate a table of monthly payments after you've changed the inter-

est rate in a loan application.

In order to mount a successful assault, an attacker would need to either send you an Excel workbook as an e-mail attachment and induce you to open it or get you to download an Excel workbook from the Web that you then open on your machine. The harmful code can be hidden inside macros, in HTML scripts embedded in a workbook, or in a workbook that contains a hyperlink to the attacker's Web site.

Ordinarily, security code in Excel ensures that macros don't do anything sneaky. Unfortunately, in these three important cases, Microsoft's programmers overlooked ways around Excel's macro safeguards.

MAIL-MERGE HOLE

THE LATEST Word flaw is a variant of a bug Microsoft thought it had fixed in 2000. In this case, an attacker would need to either send you a Word mail-merge file saved in HTML format or persuade you to click a Web link to it. If you have Microsoft's Access database software on your machine, when you open the file in Word the attacker's code would execute in Access. A clever cracker could then completely take over your PC with

predictably awful results. Visit find.pcworld.com/30320 for both cumulative patches. ■

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

IN BRIEF

Fix for PGP Glitch

NETWORK Associates released a plug for a security hole in its Pretty Good Privacy e-mail encryption plug-in for Microsoft Outlook. The PGP Hotfix patches PGP Desktop Security 7.0.4, PGP Personal Security 7.0.3, and PGP Freeware 7.0.3. Go to find.pcworld.com/30326 to grab the patch.

Three Blind Mice

MICROSOFT SAYS that a small percentage of its Wheel Mouse Optical, IntelliMouse Explorer, and IntelliMouse Optical mice may stop functioning properly. Symptoms include the cursor freezing and buttons failing to respond. If your faulty mouse is still under warranty, Microsoft will replace it for free. Go to find.pcworld.com/30329 for more details.

WINDOWS MEDIA PLAYER SECURITY FIX

SPEAKING OF CUMULATIVE patches, Microsoft just released one for Windows Media Player. The patch handles all old holes in the player for Windows XP, as well as in versions 6.4 and 7.1 of the software. It also fixes three new security bugs that could give a villain control of your PC—Microsoft rates them as "critical" on its severity scale. The first hole is related to how WMP handles licenses for secure media under its digital rights management system. The second is a flaw in how the active playlist is stored. And the third involves the way WMP handles access to local storage devices. Visit find.pcworld.com/30323 to get the patch.

BUGGED?

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NEW PRODUCTS

EDITED BY YARDENA ARAR

Larger Screens, Smaller Investments

LOOKING TO UPGRADE FROM YOUR OLD CRT DISPLAY? TODAY'S LARGE-SIZE LCD MONITORS ARE MORE AFFORDABLE THAN EVER.



EIZO Nanao Flex-Scan L665 (left), ViewSonic VX900.

MONITORS

LOOKING TO reclaim some of the desktop space lost under your giant CRT, but unwilling to settle for a low-cost 15-inch LCD? Today you can buy a good 18-inch flat-panel display

for under a grand, or a 19-inch model for as little as \$1100. Admittedly, those prices are two or three times higher than the price of a CRT with a similar viewing area, but for some users the space and energy

savings may justify the cost.

We tested three new 18-inch LCDs—BenQ's \$935 FP882, Dell's \$950 UltraSharp 1800-FP, and Eizo Nanao's \$1089 FlexScan L665—and ViewSonic's \$1099, 19-inch VX900. All four units have skinny profiles and check in at 16 to 17 pounds, far lighter than CRTs that offer comparable viewing areas. Each shipping model takes standard digital (DVI) and analog input and has a native resolution of 1280 by 1024 pixels.

UNDER \$1000

THE TWO least-expensive units, the BenQ FP882 and the Dell 1800FP, share several features, notably a respectable horizontal and vertical viewing angle (vendor-specified at 160 degrees), which made for good image quality even when we weren't sitting directly in front of the screen. Both monitors also have a contrast ratio of 350:1 (about average for this class of monitor), which permits them to display a wide range of light and dark tones. And both support a decent re-

sponse time of 30 milliseconds, meaning they redraw their screens quickly enough to avoid image blurring (important as you scroll through text or view moving images in games or DVD movies).

For its higher price, the Eizo Nanao FlexScan L665 has more robust specifications, including a 170-degree horizontal/vertical viewing angle (most useful when multiple viewers are present), and a 400:1 contrast ratio. It also offers adjustment options for such color variables as hue, saturation, and color temperature (referring to reds and blues, often adjusted to accommodate different ambient lighting conditions). The FlexScan L665's response time of 40 ms is a bit slower than the BenQ's and the Dell's, however, so you might see some blurring.

BenQ FP882

BenQ

★★★★☆

Solid 18-inch display with good image quality and worthy features at a low price.

Street price: \$935

find.pcworld.com/30408

Eizo Nanao FlexScan L665

Eizo Nanao Technologies

★★★★☆

Pricier 18-inch display offers picky viewers a superior image.

Street price: \$1089

find.pcworld.com/30410

58 LCD MONITORS

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PORT REPLICATOR

Keyspan Mini USB Port Replicator



CASIO
Exilim EX-M1 camera.



SUB-\$1000: Dell UltraSharp 1800FP (left), BenQ FP882.

The BenQ and Eizo Nanao models come with built-in stereo speakers that free up yet more desk space. Nevertheless, for listening to CDs, watching DVDs, or playing

computer games, most people will want to use more powerful desktop speakers. The BenQ FP882 offers additional USB 1.1 ports (one upstream and two downstream), as well.

AN EXTRA INCH

MOVING UP from an 18-inch LCD to a 19-inch model used to entail a hefty surcharge, but at \$1099 the **ViewSonic VX900** breaks that pattern. It sells for just \$164 more than the BenQ, \$149 more than the Dell, and \$10 more than the Eizo Nanao.

In addition to providing about 12 percent more viewable screen space than the 18-inch models, the VX900 boasts a significantly higher contrast ratio (600:1), which creates a wider range of tones. The unit

offers a faster response time (25 ms) and more-powerful speakers, too—on a par with many low-budget tabletop PC speakers. It's also the only unit that comes with color calibration software to help viewers print on-screen colors more accurately.

HANDS ON

ALL FOUR models were easy to connect to standard analog monitor ports, using included cables. But only Dell and ViewSonic were considerate enough to include a digital cable (digital connections generally provide better image quality). The ViewSonic and Dell monitors offered easier on-screen navigation controls than the BenQ or Eizo units.

When we simultaneously

viewed the four monitors connected via their analog interface, we observed that the Dell and Eizo Nanao models had the starkest contrast (for example, the darkest blacks), which produced vivid images for most of the graphics-based tests. The Eizo Nanao also distinguished itself by providing the best color hues and saturation, while the BenQ and ViewSonic models did the best job of displaying highlights and shadows in our graphics tests. In the text-based tests, all four monitors came through with bright, sharp, and legible text.

Overall, we rate the ViewSonic VX900 as the best choice in this group, thanks to its larger screen size, extra features, and very reasonable price. But for image quality alone, the Eizo Nanao FlexScan L665 is our hands-down favorite.

—Richard Jantz ►

Dell UltraSharp 1800FP

Dell

★★★★☆

Affordable LCD with good image quality but no built-in sound.

Street price: \$950

find.pcworld.com/30407

ViewSonic VX900

ViewSonic

★★★★☆

Attractively priced 19-inch LCD delivers sharp images and includes color calibration tools.

Street price: \$1099

find.pcworld.com/30413

FEATURES
LARGE-SCREEN LCDs

MODEL	Estimated street price	Viewable screen (diagonal)	Viewing angle (horizontal/vertical)	Contrast ratio	Built-in stereo speakers/power
BenQ FP882	\$935	18.1 inches	160/160	350:1	Two/ 2 watts each
Dell UltraSharp 1800FP	\$950	18.1 inches	160/160	350:1	None
Eizo Nanao FlexScan L665	\$1089	18.1 inches	170/170	400:1	Two/ 1 watt each
ViewSonic VX900	\$1099	19 inches	170/170	600:1	Two/ 3 watts each

Money Management 2003: Stand Pat

PERSONAL FINANCE

LOOKING FOR A top-notch personal finance manager? Grab Quicken 2002 before it disappears from store shelves. And if you already own it, don't even think about upgrading to Quicken 2003—unless you've always wondered what archival Money is like.

Having looked at beta versions of **Quicken 2003 Premier** (a new high-end edition) and **Money 2003 Deluxe**, I can no longer tell these programs apart. But in roughly equal measure, each has every tool, wizard, and report you could ask for in a money manager.

The most significant change this season: Quicken has sacrificed its straightforward interface, apparently in hopes of making users aggressive consumers of online financial services (which has long been a Money objective). Both new programs are heavily laden with ads, alerts, and advice links that whisk you away to pages where the extra-cost services of the publishers and their partners are conspicuously available. Of course, you can experience most of these so-called benefits using last year's software if you like. The new versions offer no signifi-

cant innovations, though a few old features have been slightly tweaked and/or relocated.

QUICKEN CHANGES

THOSE OF Quicken's 16 million users who upgrade religiously will spot the interface remodel immediately: According to Intuit, it's now more task-oriented. But the changes aren't always for the better.

Quicken windows that once brimmed with data and made moving to other screens easy are now dominated by active links to other parts of the program—similar to Money's design. The QuickTab Bar for navigating those windows is gone. Instead, you click a link for a task—say, investing—and Quicken assembles the tools and data that it thinks you need. You may not always agree with the program's judgment, however.

Why the change? Intuit says that it wants users to be able to take action more easily. But not coincidentally—at least as far as investing goes—many of the added menu items take you to the new Quicken Brokerage section of the Quicken.com Web site, where you can begin immediately filling in your buy or sell order.

A midpriced service, Quicken Brokerage will sync your financial data with any Deluxe or better version of Quicken, and—for users of Quicken 2003 Deluxe or better—it will forecast the tax consequences of a trade. That's still not a

Most of the innovation, however, is reserved for the MSN.com Web site and can be unlocked only if you sign up for a .Net Passport password. Even though Money isn't as insistent about your taking that step this year, it exerts gentle pressure pretty relentlessly. Still, Money lovers set on upgrading will thank Microsoft



NEW LOOK: Quicken's reorganized Home Page jumbles data-poor tasks together. The Account Bar (left) replaces QuickTab navigation.

good enough reason to spend \$30 to \$90 (before rebates) on an upgrade, depending on the version you decide to go with. Quicken offers four: Basic; Deluxe; Premier, with extra investment and tax-related features; and Premier Home & Business, which adds support for some small businesses.

ABOUT MONEY

IN CONTRAST, Money—an already effective desktop gateway for now-and-future Microsoft .Net services—got just a nip and a tuck. My favorite tweak is Tax Estimator 2003, which compares last year's tax line items against this year's, side-by-side, and estimates your obligation/refund. The Capital Gains Estimator shows you how your taxes change for different stock sales.

for not changing the way the program works just to sell this year's models (which go for \$35 to \$95 before mail-in rebates, depending on the edition: no-frills Standard; full-featured Deluxe; Deluxe & Business, which has Schedule C support; or Suite, with tax and legal software).

Current users of Quicken or Money already have the best money managers available. Both software lines are full-featured, and the easiest program to use is the one you already know. If you haven't chosen yet and you want to buy a lot of online services, you might prefer Money. It's more tightly linked to its partner Web site, and MSN.com's service offerings are broader than Quicken.com's.

—Mike Hogan ▶

Money 2003 Deluxe

Microsoft

★★★★☆

An advanced money manager, but skip this upgrade unless you need tax and capital gains estimators.

List: \$65 (Standard, \$35; Deluxe & Business, \$85; Suite [Money Deluxe, H&R Block TaxCut Deluxe, and Kiplinger Home and Business Attorney] \$95). Rebates for all.

find.pcworld.com/30392

Quicken 2003 Premier

Intuit

★★★★☆

Still a solid product, but interface changes make the market leader look and feel virtually identical to its archival Money.

List: \$80 (Basic, \$30; Deluxe, \$60; Premier Home & Business, \$90). Rebates available for upgraders only.

find.pcworld.com/30395

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Gateway's Larger Profile

DESKTOP

THE FOURTH-GENERATION version of Gateway's all-in-one Profile desktop is larger and more powerful than its predecessor, especially if you opt for the new 17-inch LCD screen. But it remains a stylish, space-saving alternative to the usual drab case-and-monitor duo.

Aside from the handsome charcoal-and-silver décor that graces Gateway's line these days, the company has introduced other thoughtful design changes. The optical drive (a 16X/10X/24X CD-RW drive in our preproduction unit) and the floppy drive now reside below the monitor, making them easier to reach than they were in their previous side-loading locations. And the built-in speakers produced the best-quality sound that we have ever heard from an integrated audio system.

Our upper-end **Profile 4 X** was configured with the 17-inch LCD, a 2.4-GHz Intel Pentium 4 chip, 512MB of 266-MHz DDR SDRAM, and a roomy 120GB hard drive. But for graphics you have to settle for a less-powerful integrated NVidia GeForce2 MX-400 graphics chip. With ports galore (six USB 1.1, two Fire-Wire [IEEE 1394], and one each ethernet, modem, parallel, and serial) at your dispos-

Profile 4 X

Gateway

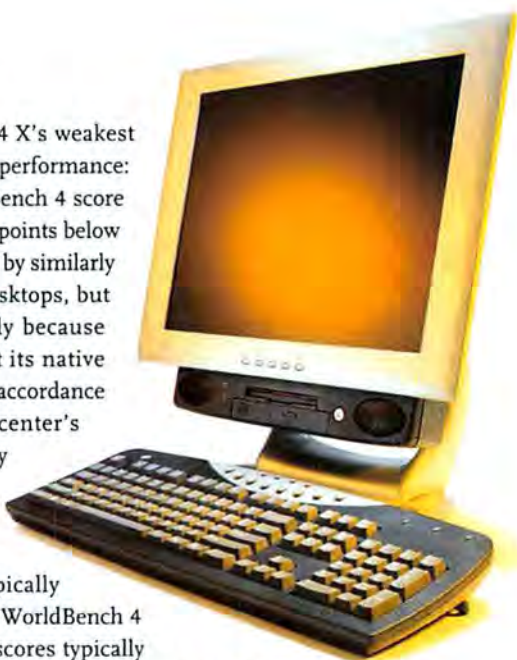
Preproduction unit; not rated
Great all-in-one desktop for users who value good looks and a small footprint more highly than top-notch performance.
Street: \$1799
find.pcworld.com/30401

al, plus a PC Card slot, adding peripherals or connections shouldn't be a problem. If the 4 X's \$1799 price tag seems too steep, you can save up to \$800 by choosing lesser components, such as a 15-inch LCD, a slower CPU, less RAM, and a smaller hard drive.

The Profile 4's thicker LCD support makes it look sturdier than its predecessor, though its depth (7.9 inches) is approximately the same. Our 1280-by-1024-resolution 17-inch display was acceptable, though not as crisp as others we've seen (Gateway says that the picture will improve when its firmware is finalized).

The Profile 4 X's weakest attribute is its performance: Its PC WorldBench 4 score of 111 is a few points below those achieved by similarly configured desktops, but that's probably because we tested it at its native resolution, in accordance with our test center's policy for any LCD-based system. At the lower resolution we typically use to run PC WorldBench 4 (800 by 600), scores typically improve a few points because the display makes fewer demands on system resources.

Either way, the Profile 4 X is no speed champ. But for general business tasks in offices



CHIC: Gateway's Profile 4 X.

or homes where space is limited and style matters, this all-in-one is well worth a look.

—Yardena Arar

Turn PC Monitors Into TVs

CONVERGENCE

THOUGH FLAT-SCREEN televisions look sexy, their cost has always cooled my ardor. But now, for several hundred dollars less than the price of a genuine LCD TV, ViewSonic's **NextVision 5** external TV tuner can turn any PC monitor—CRT or LCD—into a television, without requiring a computer connection.

NextVision 5 comes with a high-definition video processor that has an RGB computer pass-through, so you can watch TV (including both HDTV and DVD movies) with or without a PC. The box also contains a built-in 181-channel TV tuner. Nicely designed in black and silver, it can hook up to a standard TV antenna or cable line, a DVD player, a VCR, a video camcorder, or a game console. It has S-Video and composite-

video inputs, too. And since it can be connected to a computer, you can switch from TV to your desktop with a click of the included remote control.

I tested a shipping copy of the \$149 NextVision 5 linked to a 15-inch ViewSonic VG150 LCD monitor and computer speakers. I adjusted the LCD's screen resolution to 1024 by 768 (NextVision's maximum) and quickly replaced the 14-inch TV in my bedroom. With 15-inch LCDs selling for \$400 to \$600, the whole setup would have cost \$750 or less. In contrast, Sharp's 15-inch Aquos LCD TV fetches about \$1000.

Picture quality, while adequate, was far less crisp than I've seen on true LCD TVs. Text looked blocky, and was difficult to read. Imaging and clarity improved with a DVD movie, but they still didn't

knock me over. Nevertheless, that nice, slim LCD looked so right I would happily put up with the image imperfections.

The product really sparkled when we hooked it up to my son's Nintendo GameCube and a PC. This let him easily flip from game play to a game cheat Web site. Heaven. Moreover, imaging was crisp, with beautifully rendered colors.

NextVision is not for viewers who demand superior TV image clarity. But if you prize sleekness or want to liberate a TV trapped in game-console purgatory, check it out.

—Ramon G. McLeod ►

NextVision 5

ViewSonic

★★★★☆

Great for game play, adequate for television; the ability to use an LCD monitor as a TV gives it appeal in some situations.
Street: \$149
find.pcworld.com/30404

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Introducing the newly designed Sony SuperLite™ LCD Projector Series VPL-CS5 (and its SuperLite Series partner, the VPL-CX5). It's so light, compact and powerful, you can take it to a sales call or to the boardroom at the drop of a hat. In fact, it may be the only projector you need.

Either model is so intuitive, it adjusts the picture, corrects keystoneing, adjusts its legs, and retracts its lens cover... all automatically! The VPL-CX5 even has a Memory Stick® slot for PC-less presentations, so you can leave your laptop at home.

These new SuperLite™ models both employ Sony LCD technology delivering SVGA resolution (1800 ANSI lumens*) in the VPL-CS5, and true XGA resolution (2000 ANSI lumens) in the VPL-CX5. Best of all, they're amazingly affordable.

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AUTO



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adjustment



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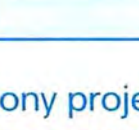
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*ANSI lumen is a measuring method of the American National Standards Institute (77.228).

External Audio Enhancers Miss the Mark

AUDIO SYSTEMS

MP3 HOUNDS tired of listening to tunes through generic sound cards and cheap plastic PC speakers may be tempted to try Xitel's new \$50 **HiFi-Link** or M-Audio's \$90 **Sonica**. Each unit—about the size of a deck of playing cards—promises to boost audio quality by cutting your old sound card out of the loop and connecting your PC via USB to your stereo receiver.

The claim certainly sounds good, but regrettably the shipping products I tested did not.

Xitel outfits the HiFi-Link with 30 feet of shielded cable, which almost makes the package worth the price. A 0.125-inch audio connector on one end attaches to the HiFi-Link;



XITEL'S HIFI-LINK didn't improve sound quality, but the included shielded cable is a plus.

two RCA plugs on the other end hook up to the receiver.

Setup was a snap, and after switching my audio setting to use the HiFi-Link instead of my sound card, I launched

Musicmatch and prepared for some easy listening. But the audio sounded dull and lacked dramatic highs and lows—even after I cranked up the receiver to obtain acceptable speaker volume. To determine whether the setup's long cable was the source of the problem, I unplugged the HiFi-Link, restored my old audio setting, and then plugged the cable into my PC's so-generic-it-lacks-a-name sound card. The audio clearly brightened, so the cable wasn't the culprit.

Though the HiFi-Link fared slightly better when I listened through powered PC speakers or headphones, it did not perceptibly improve the quality of my sound card.

M-Audio's more expensive Sonica promises more features—most notably a digital output in addition to an analog one. Since M-Audio comes without cables, I used the Xitel cable to test the Sonica's analog output.

After tech support resolved a setup problem (Musicmatch required use of the Sonica's CD Quality Mode), I could finally listen in. But the output was

little better than audio from the HiFi-Link. The Sonica's modest array of extra features—including speaker and



SONICA supports DVD audio.

bass settings, dial enhancement, and a range of surround-sound modes—didn't help much, and neither did using the Sonica with my PC speakers or headphones.

The Sonica's digital output was a bright spot. I connected the unit to my digital-ready receiver with my own digital optical cable; using a notebook with a DVD drive, I played a DVD movie with full Dolby Digital 5.1 surround sound. The Sonica's audio options seemed more useful here, too.

But with full-featured DVD players available for the price of the Sonica, how many people would bother using their notebook as a player? Also, the \$75 cost of the 20-foot optical cable to connect my PC and receiver seemed high.

Unless your system has no sound card at all—or you desperately need a digital audio link between your PC and receiver—I can't recommend either of these products. If you are interested in an external audio upgrade, give Creative Labs' bigger and slightly more expensive SoundBlaster Extigy a try. It sounds vastly superior.

—Tom Mainelli ▶

QUICK TAKES

Easy Label Printing

WITH MOST desktop label printers, threading the roll of labels into the device is a major hassle. Dymo's nifty, petite **LabelManager PC** eliminates that headache by working with rolls stored in pop-in cartridges that come in assorted background hues and print in different colors. Dymo promotes the product for labeling file folders, disks, shelf tags, and the like, but I found a shipping unit equally handy for creating address labels. In fact, the device's Smart Paste feature lets you easily create single or multiple labels from letters or lists. The \$99 USB-based device installs quickly, and Dymo's software makes it a cinch to print vertically or horizontally in varied font sizes, with bar codes, images, or you name it. You can accelerate address printing by pasting text from a document or spreadsheet. The only downside: Depending on the width of the finished label (0.25 to 1 inch), the cartridges can cost as much as \$25 per 23-foot roll. But that's the price of no-hassle convenience. Dymo, find. pcworld.com/30344.

—Michael S. Lasky



HiFi-Link

Xitel

★★★☆☆

External sound system that links to a stereo doesn't enhance audio much but comes with a useful cable.

List: \$50

find.pcworld.com/30338

Sonica

M-Audio

★★★☆☆

Pricy, lacks a cable, and fails to improve sound noticeably—but can channel Dolby Digital audio from a PC DVD drive to a stereo.

List: \$90

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Boardwatch (ISPworld.com)

June 2002

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Communications Convergence

May 2002

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Casio's SkinnyCam

DIGITAL CAMERA

INTO THE ever-shrinking world of digital cameras comes a new breed of slim and practical supermodels from Casio. The \$350 **Exilim EX-M1** weighs 4 ounces; it measures about 2.25 inches high by 3.5 inches wide by 0.5 inches thick. The EX-M1's 1.2-megapixel image resolution, low by today's exacting standards, is good enough to handle Internet-bound photos or 3-by-5-inch prints. I looked at a shipping version of the EX-M1.

My indoor and outdoor shots appeared bright and colorful on both the camera's LCD and my desktop monitor. But as you might expect with a 1.2-megapixel model, some edges weren't as sharp and smooth as they could have been, and some blues and reds looked drab.

Unlike the similarly sized \$130 Logitech Pocket Digital (which has a 0.3-megapixel resolution), the EX-M1 has a built-in flash, LCD, 4X digital zoom, video-capture mode, and Secure Digital/MultiMediaCard slot (though media isn't included). The unit even doubles as an MP3 player; earphones and an audio control strip are bundled.

Unfortunately, the memory card reader couldn't read the MP3s on a couple of my SanDisk SD cards. (Casio has created a downloadable firmware patch to correct this problem.) The EX-M1 does pack 12MB of internal memory—scant

space for an MP3 collection, but enough to store 24 photos in 1280 by 960 mode, 75 photos in 640 by 480 mode, or 15 in 1600 by 1200 mode at the



CASIO'S Exilim EX-M1 camera is the size of a business card case.

normal compression setting.

Another snag: The power button and the shutter button are situated too close together on the EX-M1's top right edge; as a result, instead of pressing the shutter button to take a picture, you might inadvertently turn the camera off.

You can transfer photos from the Exilim to a PC via the included USB cradle (which doubles as a battery charger) or by using a memory card and reader. If you don't need this model's MP3 player and audio recording capability, opt for the less expensive (\$300) version, the Exilim EX-S1.

Shutterbugs who can settle for average-looking snapshots will appreciate the EX-M1's sleek and portable size, along with its handy imaging and audio features. For the same price as either Exilim, however, you can get a (larger) camera with two or more times the resolution, such as the popular 2-megapixel Canon PowerShot S200 Digital Elph.

—Grace Aquino

Exilim EX-M1

Casio

★★★★☆

Fashionably thin but pricey minicamera comes with some useful perks, including an LCD and a memory card slot.

List: \$350

find.pcworld.com/30347

A Mouse That Stands Up for Comfort

INPUT DEVICE

EVOLVENT'S **VerticalMouse** offers a new and welcome twist on pointing devices. Unlike a conventional mouse, which you grip with your hand parallel to the desktop, the VerticalMouse lets you work in a relaxed handshake position that eliminates unnatural forearm twisting—a potential factor in carpal tunnel syndrome and other mouse-related injuries.

Shaped like a convex dome, with the main action buttons and a scroll wheel on the right

side, the optical mouse has a total of five programmable buttons. Even if you don't install its software, the VerticalMouse will perform basic functions with the left and right buttons and the scroll wheel when you plug it into a PC's USB port.

I was a bit skeptical before I tested a preproduction unit, but within minutes the surprising comfort of working at an upright angle completely won me over. No longer was I twisting my forearm to accommodate the mouse—it accommodated me. Molded nicely to fit the hand, the mouse allowed my thumb to rest in a balanced position with access to a programmable thumb button. The mouse uses an optical sensor, which has no moving parts and is more accurate and reliable



EVOLUENT
VerticalMouse.

than the older, mechanical guide-ball system.

Even if you have no physical problem using a regular mouse, the VerticalMouse is an excellent \$50 investment in preventive, pain-free mousing. And if your current mouse gives your forearm occasional cramps, the VerticalMouse could be a pointer in the right direction.

—Michael S. Lasky ▶

VerticalMouse

Evoluent

★★★★☆

This exceptional replacement mouse's unique upended, ergonomic design provides surprising comfort.

List: \$50

find.pcworld.com/30350



Challenge
me.

Surprise
me.

Amaze
me.

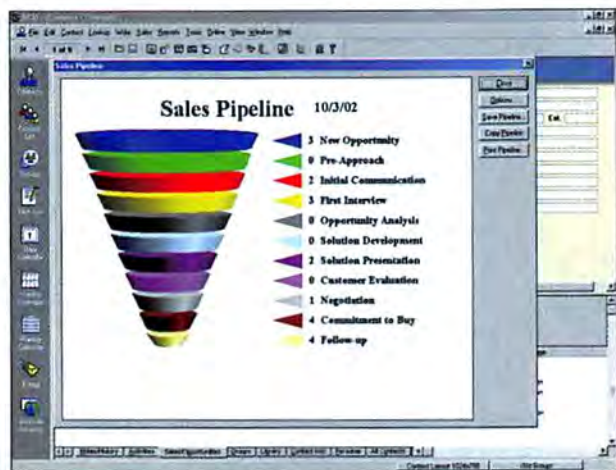
Free
me.

Recognize
me.

Complement
me.

Inspire
me.

Contact Managers: Looks Matter



SALES SUPPORT: ACT 6 includes useful tools for small businesses, including a report generator that can create pipeline graphics.

CONTACT MANAGER

THE LATEST editions of Best Software's ACT and Surado's Smart Contact Manager each try to serve you a gourmet contact-management entrée with a side dish of basic sales planning and forecasting. But ACT's recipe is much tastier.

Both products cater to business users who deal with lots of people—small-business owners, real estate agents, or financial services salespeople, for example. People moving up from the more basic Microsoft Outlook can import their contact data into either package. (Both also import delimited text files. In addition, ACT accepts Access database files; and Smart Contact Manager can handle .dbf and .dif files, as well as files from ACT 5 or later, Excel 5 or later, and Goldmine 4 or later.)

ACT, a longtime Symantec product now offered by Best Software, has a loyal following of users who value the product's ability to group all sorts of information about a contact (from customizable details to

attached documents to related sales opportunities) on one screen. My preproduction copy of the \$180 **ACT 6** let me view related documents—Microsoft Word, Excel, PowerPoint, Adobe Acrobat, and .bmp and .jpeg files—inside ACT. (If you click on an attached document created by any other program, ACT will launch that application.) Among its other smart improvements, ACT 6 now lets you associate Web pages or Outlook messages with particular contacts to put together a more complete history of your dealings.

Also worthwhile: You can now do lookups based on contact activity—for example, to check which people you have not called in the past 30 days.

ACT 6

Best Software

★★★★★

Hard to beat for serious contact management if you've outgrown Outlook.

Street: \$180 (\$100 for upgrade from any previous version)

find.pcworld.com/30353

You may also do annual event lookups, to search for customer events that happen in the same month every year.

Notably, ACT 6's interface still looks clean. You can easily converse with someone on the phone while finding the field that you need.

A free tool, ACT Link 2 for Palm OS handhelds, lets you download information to and from devices that use the popular PDA operating system. For workgroups or small businesses that want remote Internet access to an ACT database, the company offers ACT Web Access (\$199 to \$359, depending on the number of users).

THE CLUTTER FACTOR

SURADO'S **Smart Contact Manager 2001, Rev 1** tries to match ACT's contact-management features, but it also touts a collection of customer-relationship management capabilities, including sales tracking tools. However, while a small business could use these features to obtain visual snapshots and reports, ACT 6 provides similar basic forecasting tools and graphics.

Moreover, judging from my experience with a shipping copy of Smart Contact Manager, you must fully understand sales and forecasting processes, as well as sales lingo, to

Smart Contact Manager 2001, Rev 1

Surado Solutions

★★★☆☆

A cluttered interface makes this package difficult to use.

Street: \$149 (\$69 upgrade from any previous version)

find.pcworld.com/30362

QUICK TAKES

Old Ports for New Notes

IF YOU OFTEN travel with an ultraportable that lacks legacy ports, but you don't want to lug along a bulky docking station, check out Keyspan's **\$79 Mini USB Port Replicator**. This petite, translucent gray unit weighs a mere 2 ounces but packs a serial port and a parallel port on one side, and two USB 1.1 ports on the other. After a quick driver install, you can attach the cell phone-size device to a USB port (even the tiniest of subnotebooks usually has one or two of them) and then use the serial and parallel ports to hook up your notebook to a printer, a PDA, or a digital camera. Keyspan, find.pcworld.com/30389.

—Kalpana Narayanamurthi



make good use of this \$149 product. The same goes for the included marketing campaign module. This software is an organizer—a series of templates—not an instructor.

More important, I found Smart Contact Manager's interface to be complicated and sometimes hard to follow. If you're staring at a program for hours every day, you want it to look crisp; instead, this one packs in tabs and tiny cells. The company says that the next version, expected to ship later this fall, will sport a major interface overhaul. That seems worth the wait.

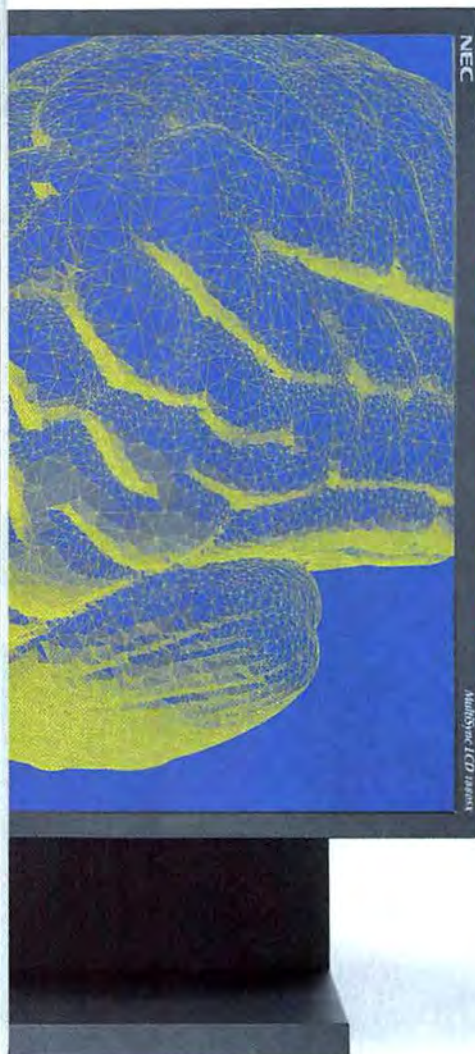
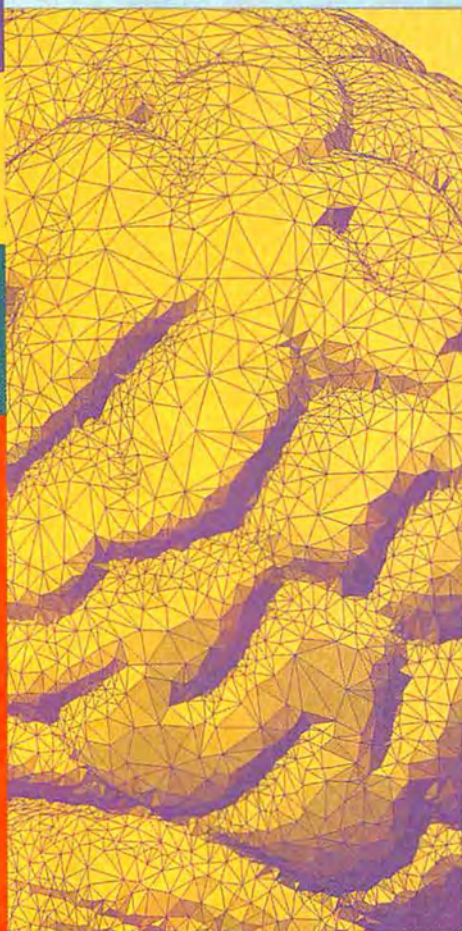
—Laurianne McLaughlin ■

A photograph of five office workers in a cubicle. A man in a suit stands in the background, leaning on a desk. Four other people (three women and one man) are seated at desks with computers and papers, looking towards the camera. The cubicle is cluttered with papers, books, and office supplies. A large whiteboard is visible in the background.

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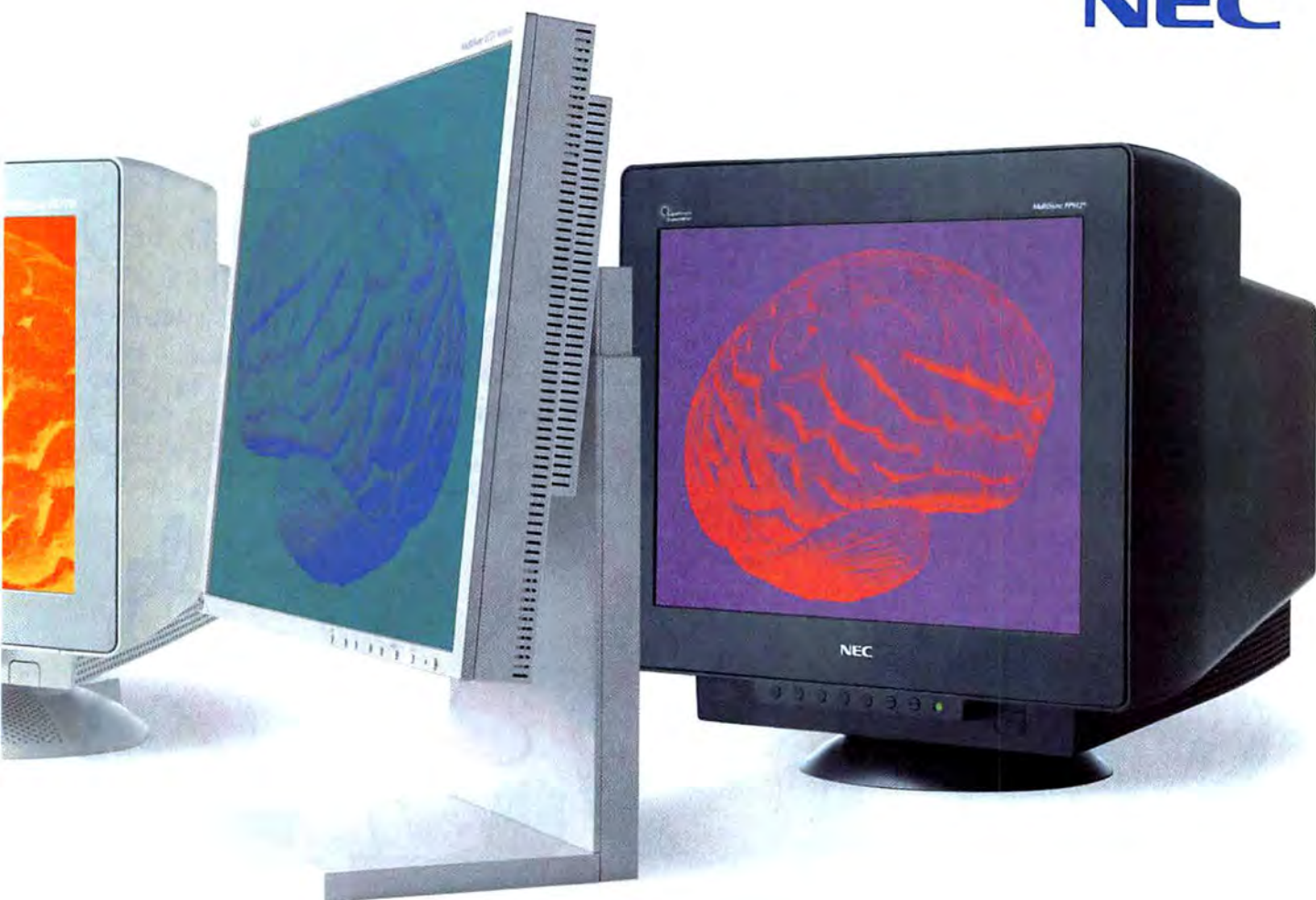
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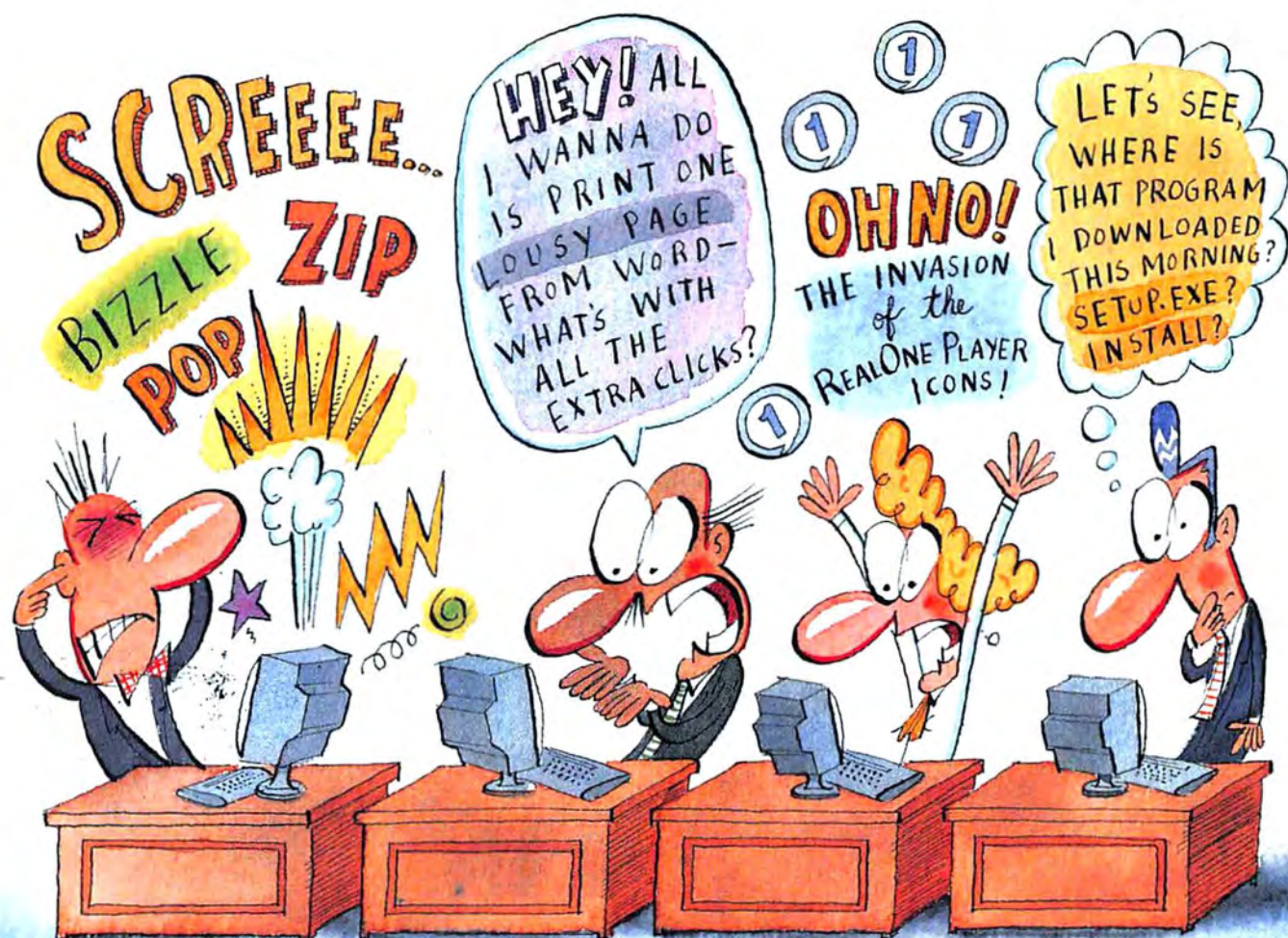
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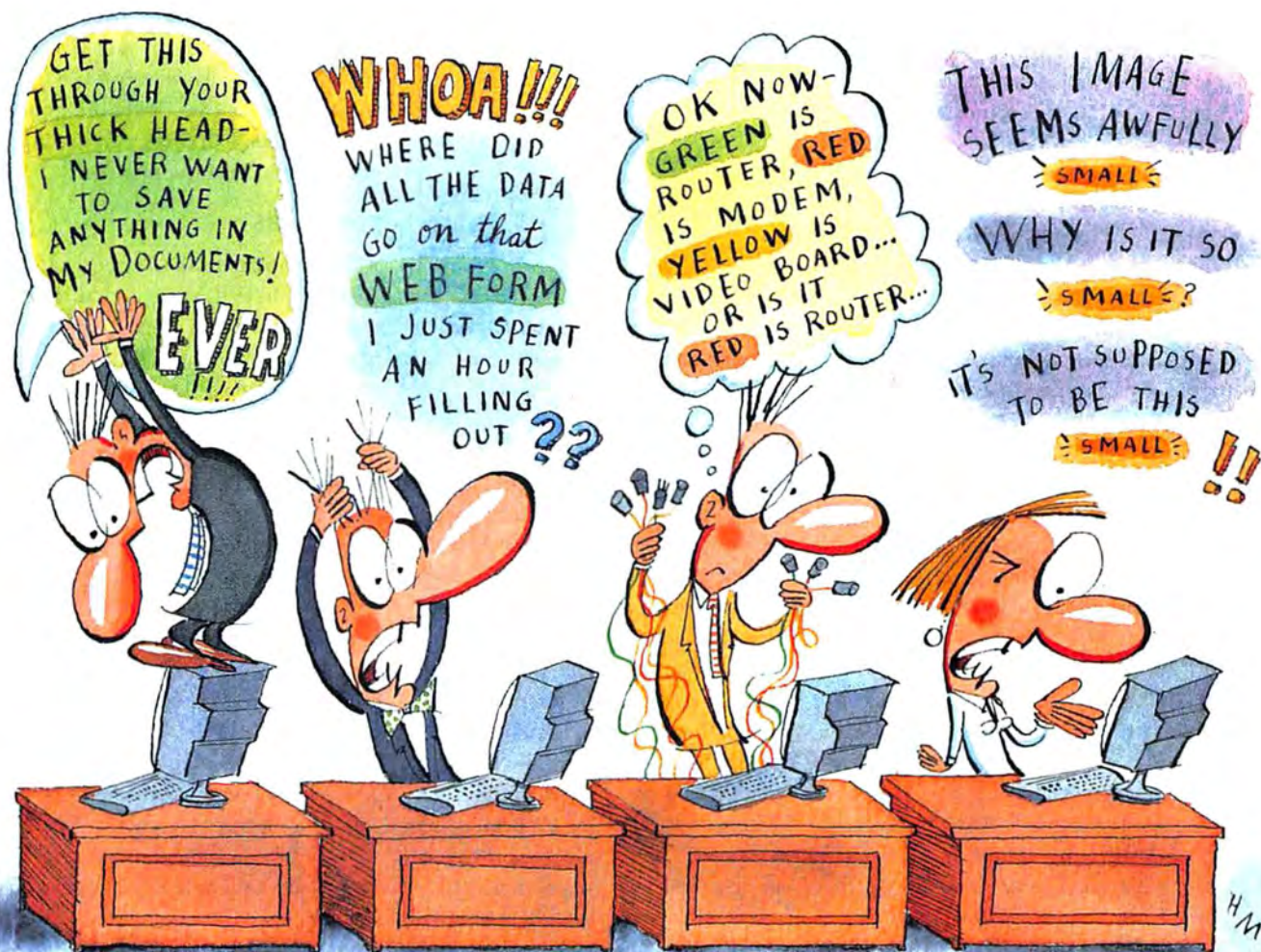
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COMPUTING HASSLES DRIVING YOU BONKERS? WE FEEL YOUR PAIN.

How to Fix Biggest PC



AND WE HAVE SOLUTIONS—FOR HARDWARE, SOFTWARE, AND THE WEB.

the Annoyances

BY STEVE BASS ILLUSTRATIONS BY HAL MAYFORTH

SO YOU'RE ANNOYED, EH? Ticked off about your PC's dumb habits? You've come to the right place, because I'm *PC World's* foremost complainer. And my editors have unleashed me to kvetch to my heart's content. Get ready: I'm going to tell you how to wipe out the most aggravating PC behavior once and for all. ►

VANISHING WEB DATA

► **THE ANNOYANCE:** I spend an hour filling in a lengthy form on a Web page only to be told after I submit it that it's missing an item. My fault, sure, but when I hit my browser's back button—zap!—everything's gone. Now I have to start from scratch. Aggravating? You bet.

► **THE FIX:** Instead of growling, fix your browser's cache settings to hold on to the information. In Internet Explorer, click *Tools*•*Internet Options*, select the *General* tab, choose *Settings*, and then check *Every time you start Internet Explorer*. In Netscape, click *Edit*•*Preferences*, double-click *Advanced*, and click *Cache*. Set the memory cache to at least 1024KB, and the disk cache to a minimum of 7680KB. Then clear both caches. Note that you may have to click your browser's refresh button to see a revisited page's dynamic data.

REALONE RUNNING AMOK

► **THE ANNOYANCE:** Near the top of my list of irritations is RealNetworks' RealOne Player. It's infuriating how RealOne salts my PC with desktop icons and browser links. The program also lights my fuse when it offers me confusing choices for audio and video file associations. Quick, get me my blood-pressure meds.

► **THE FIX:** If you're installing RealOne

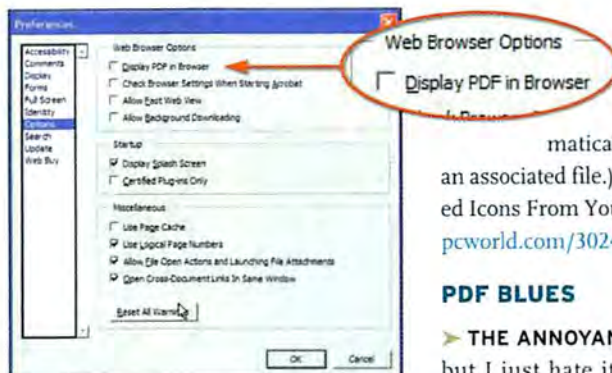


FIGURE 1: SAVE SYSTEM RESOURCES by preventing PDF files from loading in your browser automatically when launched.

from scratch, pay close attention to each screen. Always choose a custom installation to see more options. On the Program Location and Desktop Settings screen, uncheck the locations you think are non-essential. I unchecked all of them; I knew that a RealOne icon would end up in my Start menu anyway. At the Default Media Player screen, choose *Customize*, scroll through the choices, and carefully select which of the 14 audio and video file types you want to associate with RealOne.

Already have RealOne (or RealPlayer) on your PC? Dump all of the program's icons except the one you use most often, such as the one on your desktop. Next, remove the RealOne shortcut from your

system tray. (You don't need it, since the player loads auto-

matically whenever you open

an associated file.) See "Remove Unwanted Icons From Your System Tray" at find.pcworld.com/30242 for more help.

PDF BLUES

► **THE ANNOYANCE:** Call me a carper, but I just hate it when I try to read a Portable Document Format file on a Web page, and Adobe Acrobat Reader 5 insists on opening right in my browser. On top of that, a small Acrobat applet loads into memory, taking up system resources. Still more grating, that applet *doesn't* unload when I close the reader. Even my mother agrees with me on this gripe.

► **THE FIX:** It's simpler, more efficient, and just as fast to open Acrobat Reader separately. First, launch the reader from your Start menu, select *Edit*•*Preferences*, choose *Options*, and uncheck *Display PDF in Browser* (see FIGURE 1). Now when you select a PDF file while browsing, you'll see a File Download box. The reader starts automatically when you choose 'Open'.

On the other hand, if you use the reader integrated with your browser, you can unload the applet after closing your browser by pressing **<Ctrl>-<Alt>-<Delete>**, choosing *AcroRd32*, and clicking *End Task*. In Windows XP and Windows 2000, choose the *Processes* tab in Task Manager; then select *AcroRd32.exe* and click *End Process*.

PORT IDENTITY CRISIS

► **THE ANNOYANCE:** Take a look at those little icons on the back of your modem, router, sound card, or graphics board. It's almost impossible to identify the ports they represent, right? If companies wanted to make it easy for users, they would place raised labels above the ports that we could read without resorting to a symbolology guide and a magnifying glass.

► **THE FIX:** Before I install any board or device that cables plug into—and while I can read its port icons—I stick a round Avery label above the port with its ID. I also crawl under my desk and carefully

WORST OFFENDER

FIX YOUR FONT SIZE

► **IT DRIVES ME NUTS** when every other Web page I visit has a different font size: One's too small, and the next one's too big. It's enough to throw Goldilocks into a tizzy. I found the fix that sets my fonts juuuust right. In Internet Explorer, select *Tools*•*Internet Options*, choose the *General* tab, click the *Accessibility* button, and check *Ignore font sizes specified on Web pages* (the wording varies depending on your IE version). In Netscape 6 and 7, choose *Edit*•*Preferences*, select *Fonts* (double-click *Appearance* if you don't see 'Fonts' listed), and then either check *Use my default fonts* or uncheck *Allow documents to use other fonts*, depending on your version (the wording of these choices also varies).



wrap all the cables with mailing labels on which I've written identifying information. Martha Stewart, eat your heart out.

DIALOG-BOX DILEMMAS

► **THE ANNOYANCE:** It bugs me no end that every Microsoft program automatically tries to save every file I create in the My Documents folder. I never use that folder and I never will, except by accident. It's also the last place I'd think to look for a file I've misplaced. Another thing: Microsoft Office apps don't let me add or remove items from the left panel of the Open and Save dialog boxes, so I'm stuck with the History, My Documents, Favorites, and My Network Places shortcuts there. And one more: I can't stand the way Windows opens a dialog-box window the size of a postage stamp whenever I open or save a file. Harrumph already!

► **THE FIX:** There may be no cure for the My Documents dumbness, but I stopped grumbling about it when I began using utilities to make dialog boxes work my way. Start with FileBox EXtender, a \$20 utility that adds two buttons to file-open and file-save dialog boxes that show your favorites and recent folders (see **FIGURE 2**). The program also makes many unresizable Windows file dialog boxes larger. If you use Windows XP, grab a free copy of Tweak UI: It permits you to add up to five favorites to Common Dialog box panels. Just choose *Common Dialogs*, click *Custom places bar*, and select an option from each



FIGURE 2: EXERCISE MORE CONTROL OVER your Windows dialog boxes by getting the \$20 FileBox EXtender utility.

WORST OFFENDER

PLAY BIG SOUNDS THE MINI WAY

► WINAMP, WINDOWS Media Player, and all the other media players I've tried are behemoths. All I really want to do is play some Brubeck while I work and not feel overwhelmed with features, gaudy skins, and razzle-dazzle visualizations flashing in my face. I canned the bells and whistles with Chime's TrayPlay, a tiny player with no superfluous features. It has all the controls I need, including random play and volume. Oh yeah—TrayPlay's a freebie that parks itself in my system tray, so it doesn't take up space on my taskbar. Go to find.pcworld.com/30243 to pick up your copy.



drop-down menu. Go to find.pcworld.com/30243 to download Tweak UI, a trial version of FileBox EXtender, and all the other programs mentioned in this article.

TOO MANY CDs ON THE ROAD

► **THE ANNOYANCE:** Boy, it burns me up to have to schlep all my CDs along when I travel with my notebook. Just as irritating are all the games that yell bloody murder if they're not loaded from the CD drive.

► **THE FIX:** My workaround uses CD Anywhere, a \$30 utility that saves compressed CD images to my hard drive. I can then run many games—and most other content from a CD—without the physical disc. Hard drive access is faster, so my games run a lot quicker. Besides traveling much lighter, I preserve my notebook's battery life.

AUTOCOMPLETE OVERLOAD

► **THE ANNOYANCE:** I do like the way Internet Explorer's Auto Complete stores what I type into Web address fields and forms. Not familiar with it? Instead of entering the same things repeatedly, I just double-click a

field to bring up a history of entries. What's nettlesome is having to wade through a long list of ancient entries.

► **THE FIX:** When I see an entry I rarely use, I select it and press <Delete>. Now and then I do major housecleaning and dump the entire list of Web-form entries. Open IE, click *Tools>Internet Options*, select the *Content* tab, choose *AutoComplete*, and then click the *Clear Forms* button.

PC NOISE POLLUTION

► **THE ANNOYANCE:** PCs are way too loud. Their hard disks grind, their fans whine, and their cases clatter. Bother-some? Yes. Insurmountable? No way.

► **THE FIX:** You can reduce the noise with a few simple tweaks. First, turn your PC off, remove the case cover, turn the system back on, and use a car mechanic's stethoscope—or just a paper-towel tube—to isolate the noise source (don't forget to turn your PC off and put the case cover back on when you're done).

If your hard drive chatters, make sure the screws attaching it to the PC case are tight, and examine the bracket holding the drive to confirm that it's tightly connected to the PC. Check the gap around the case cover for vibrations; if you detect any, wedge in a piece of cardboard or use sealing foam. If you're careful, you can lubricate the cooling fans by removing the sticker covering the lube hole and ►

dripping one drop of oil into the hole. Wipe off any excess oil and then either reapply the sticker or replace it with tape. *Hardware Tips* columnist Kirk Steers has more PC-quietude tips. Go to find.pcworld.com/30244 to read about them.

SHOW ME THE MENU

► **THE ANNOYANCE:** Office 2000 and Office XP insist on hiding menu options that I haven't used for a while. They call it a feature. I call it a pain.

I want to see all my menu options—and without waiting or making an extra click.

► **THE FIX:** 'Custom' menus are the default in Office; but once you change this setting in one Office app, it affects every other installed Office program in one fell swoop. In Word, click any empty spot on the toolbar, choose *Customize>Options*, and check *Always show full menus*. Voilà: No more à la carte Office menus.



FIGURE 3: THE FREE ClearTweak utility presents you with many more options for resetting the contrast of your ClearType fonts.

FOGGY CLEARTYPE SETTINGS

► **THE ANNOYANCE:** Here's something that got my pulse racing: I upgraded my system to Windows XP, bought a cool LCD monitor, and looked forward to seeing crisp, sharp fonts on the screen. But noooo, XP just ignored my hardware and forced me to dig around to find my LCD's type-display settings on my own.

► **THE FIX:** If XP won't do it for us, I guess we'll have to do it ourselves: Right-click anywhere on the desktop, choose *Properties*, select the *Appearance* tab, and click the *Effects* button. Make sure that the 'Use the following method to smooth edges of screen fonts' option is checked, and choose *ClearType* from the drop-down menu. (By the way, this fix is ideal for setting your notebook's fonts as well.) If you would like to do even more

fiddling around with your ClearType settings, grab a copy of ClearTweak, a free program that you can download from find.pcworld.com/30243 (see FIGURE 3).

WASTEFUL WORD PRINTING

► **THE ANNOYANCE:** When I print from Word, I sometimes want to print only the page I'm viewing. Other times, I want to print just a few lines of that page, such as

THE AGGRAVATIONS YOU CAN'T DO ANYTHING ABOUT

SOME PC ANNOYANCES we have to learn to live with—but that doesn't mean I can't give the Powers That Be an earful about how poorly their products are engineered.

DON'T DO THAT: Whenever my system freezes and I have to reboot my PC, Windows paternally tells me as it's reloading that I shouldn't have turned it off without exiting correctly. Well, fine—I won't do unauthorized restarts if you won't crash.

STOP FLEEING ME: If you run a small business, a government agency, or a corporation, Microsoft happily gives you a discount on Windows XP, Office, and many other products by way of a site license. The company will also gladly give a price break to students. But if your family has more than one PC (an increasingly common circumstance), you're stuck buying a separate copy of the programs for each machine.

YOU'RE IN TROUBLE: Error messages rarely tell us anything. And what in the

world does Windows 98's notorious 'You have performed an illegal operation and the system will shut down' error message mean? Hey, I never perform an illegal anything.

WHY REBOOT? It bugs me that in Windows 98 and Me, I have to restart my PC every time I make the slightest change to my network settings.

ASK MY PERMISSION: Programs that automatically (and arrogantly) install themselves in my Startup group without my permission make my blood boil. Worse are the dunderheads that place components in a hidden spot in the Registry, making it even tougher to find and eradicate them.

CHANGE LOCATIONS: Windows 2000 and XP do one thing right—all the important data is in the Documents and Settings folder, making regular backups a breeze. Then



they muck it up by filling the folder with temporary and cache files, along with other junk that I have no desire to back up.

WHY PAY FOR A FREE TRIAL? Any company that charges my credit card the minute I sign up for a free trial, and then takes three months to process the credit when I cancel, has automatically earned a special place in the all-digital eighth circle of hell.

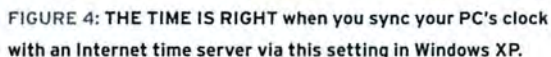
DRIVERS REBEL: Why do vendors treat drivers as an afterthought? Microsoft's solution is to scare the living daylights out of us when we install an uncertified driver.

► **THE FIX:** First I created a macro for each task. Jim Welp's "Macros 101" will show you how to do this in less than 5 minutes; go to find.pcworld.com/30245 for step-by-step instructions. With the macros created, I added two toolbar buttons. Right-click the toolbar in Word, choose *Customize*, and click the *Commands* tab. In the *Categories* list, click *Macros*, find the two macros in the *Commands* list, and drag them to the toolbar.

► **THE ANNOYANCE:** When I download a program or an upgrade, the last thing I want the file named is 'setup.exe' or 'install'. Because I don't always install the program right away, I may lose track of it. Worse, other downloads invariably have the same name, making it even harder to figure out which is which. What a pain.

► **THE FIX:** I simply rename the file in the Save As dialog box before I download it, using the program's name and version.

► **THE ANNOYANCE:** Internet Explorer 6 has an irksome way of handling large or odd-size images: It resizes the image to fit



four outlets capable of accommodating hefty adapters. Since I have more than four large adapters, I bought a vertical rack-mount power strip designed for a workbench. It has eight outlets spaced over its 4-foot length, each about 6 inches apart. But take note: I plug the strip into the

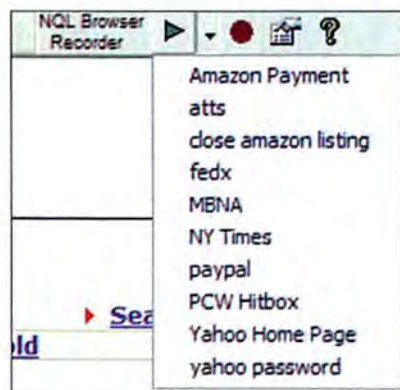


FIGURE 5: REPLAY YOUR BROWSING with the NQL Browser Recorder plug-in for IE.

surge protector, not directly into the wall outlet, and I use it *only* for AC adapters, not power strips or extension cords.

BONUS TIP: If you don't like lugging around that brick-size, 6-pound transformer to power your paper-thin notebook, try the \$119 Targus Universal AC Adapter. This pricey (but well worth it) gizmo is 2 inches thick and weighs 4.5 ounces; linked with the right connector

(and many of them are included), it allows you to power most notebooks as well as to recharge many cell phones and PDAs.

PASSWORD OVERPROTECTED

► **THE ANNOYANCE:** Some sites I use daily—PayPal and Yahoo Groups, for instance—always bug me for a password. I have to enter my password each time (and unfortunately, the sites override Internet Explorer's AutoComplete). Sure, I know it's for my own protection, but besides my two mutts looking over my shoulder, I'm the only one using the PC.

► **THE FIX:** I use NQL Browser Recorder, a \$10 Internet Explorer plug-in that creates "dynamic bookmarks" and plays back entire sessions of Web navigation that I've recorded—including password entry (see FIGURE 5). Don't worry about security: The utility is itself password-protected. Netscape owners can use ShortKeys Lite, a free tool that plays back recorded keystrokes. Go to find.pcworld.com/30243 to grab a copy of either program (one is a trial version of NQL Browser Recorder).

DYNAMICALLY DUMB XP MENUS

► **THE ANNOYANCE:** First Windows XP hides infrequently used icons in the system tray, then it adds program shortcuts to my Start menu's left pane. Enough!

► **THE FIX:** Take charge of your system



FIGURE 6: LIMIT THE NUMBER of shortcuts on your Start menu via this Windows setting.

tray icons: Right-click the Start button and choose *Properties*, select the *Taskbar* tab, and uncheck *Hide inactive icons*. Or decide for yourself which system tray icons you want to see and which you want out of the way: Leave *Hide inactive icons* checked, click *Customize*, and then choose each icon one at a time and set its Behavior to *Always show*, *Always hide*, or *Hide when inactive*. If you don't want XP to add items to its Start menu list of frequently used programs, reopen your Taskbar and Start Menu Properties dialog box, choose the *Start Menu* tab, click *Customize*, and set 'Number of programs on Start menu' to a figure of your choosing (see FIGURE 6).

HYPERLINKS FROM HELL

► **THE ANNOYANCE:** When I'm writing in Word or WordPerfect and I type a URL or e-mail address, the program automatically creates a hyperlink. I know many people like this feature, but I wish the default was not to create a hyperlink.

► **THE FIX:** In Word, click *Format*•*AutoFormat* and choose the *Options* button. Under *Replace*, uncheck *Internet and network paths with hyperlinks*. Click *OK* and then *Cancel* (unless you would like to auto-format the document). In WordPerfect, click *Tools*•*QuickCorrect*, select the *SpeedLinks* tab, and then uncheck *Format words as hyperlinks when you type them*. ■

Contributing Editor Steve Bass writes the Home Office column and is King of Kvetchers at the Pasadena IBM Users Group.

WORST OFFENDER

RECLAIM YOUR IE HOME PAGE

► **COULD SOME** Microsofty (other than a representative from the marketing department) please tell me why every time I upgrade Internet Explorer, it changes my home page to MSN and adds a half-dozen new items to my Links bar? I'm never going to join, and I'm not going to follow those links. Ever. Luckily, changing the home page back to my choice is easy. Navigate to the page, choose *Tools*•*Internet Options*, and click *Use Current* in the 'Home page' area under the *General* tab. (By the way, you can thwart home-page interlopers by clicking *Use Blank*.) The added links? Just right-click them and choose *Delete*.



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**It seems the more freedom
people have to be apart**

the more they work together.

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You'll find select models of our award-winning IBM ThinkPad notebook family are designed and optimized for wireless connectivity. Features like our unique dual antennas on select models maximize signal strength.* IBM Access Connections software makes switching between operating environments easier. And select models give you connectivity choices, from modem to Ethernet to Bluetooth™ technology for greater convenience. And everything is designed to be compatible with the most commonly used infrastructures. The fact is, you can pick from a wide range of systems, including select IBM ThinkPad notebooks which offer the exceptional performance and agility of the Mobile Intel® Pentium® III Processor - M. The choice is yours. Easier wireless management. Greater flexibility. Or all of the above.



IBM recommends Microsoft® Windows® XP Professional for Business.

*Requires compatible wireless-enabled options, sold separately.

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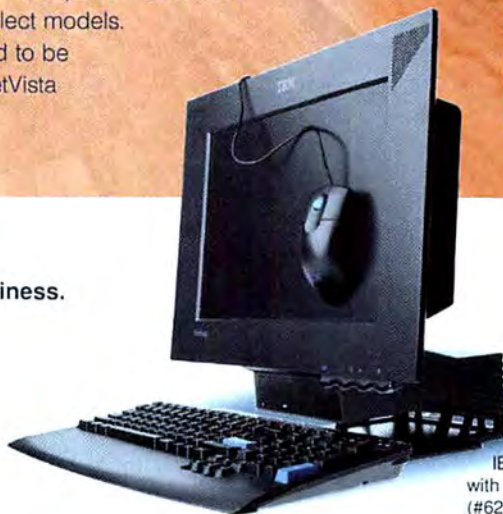
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- Microsoft® Windows® XP Professional
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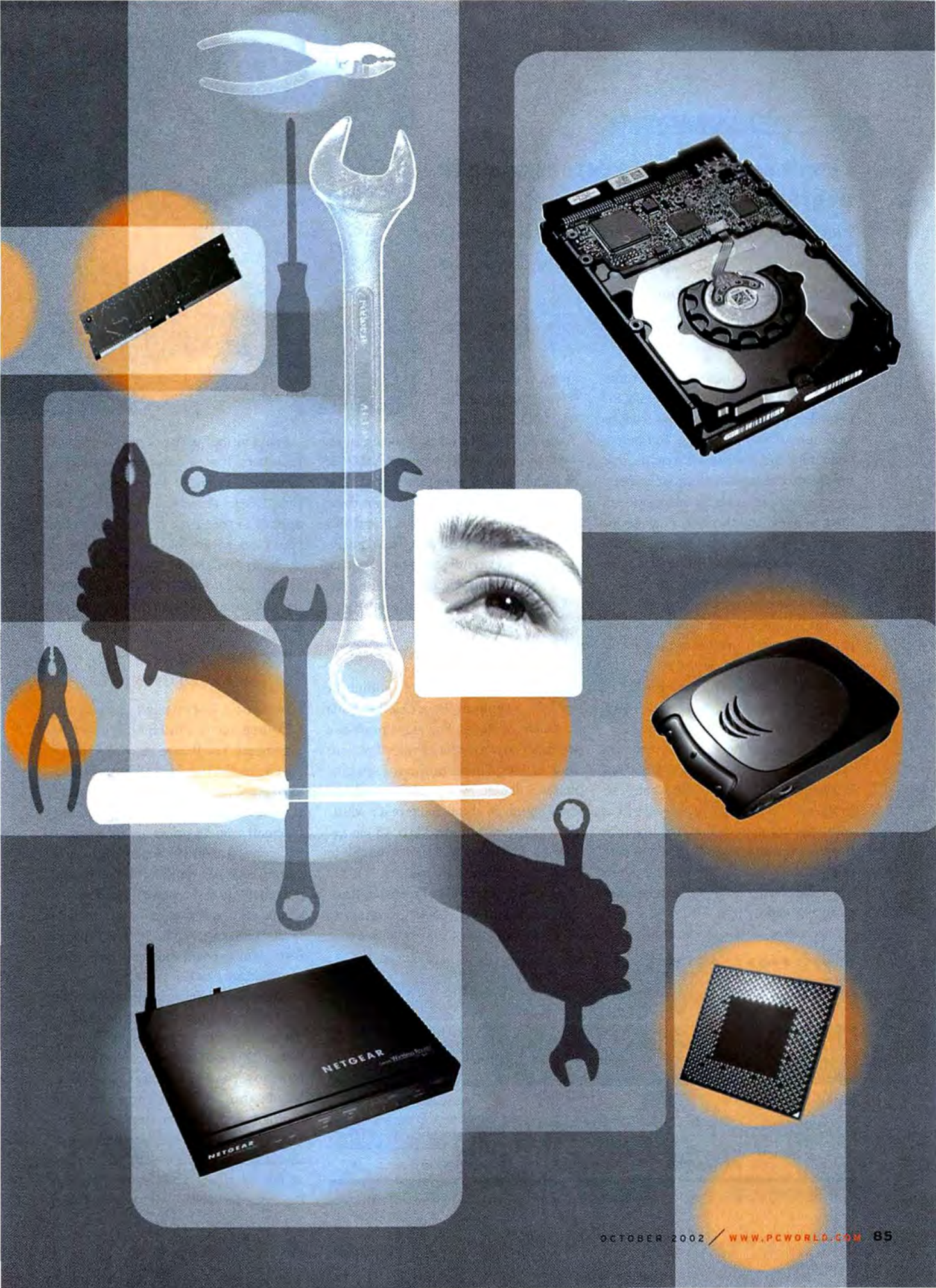
Right on the Money

The right upgrades breathe new life into aging PCs; **the wrong ones waste your time and cash.** Here's the real scoop on today's top options, and how to get the job done.

BY ERIC KNORR PHOTO-ILLUSTRATION BY GEOFF SPEAR

SMART PC USERS KNOW that they often can save a buck by souping up their old computers instead of buying new ones. Carefully chosen upgrades can extend your PC's life and help you avoid the pain of migrating your data, software, and settings to a new machine. But which projects are worth the money? First we asked PCWorld.com readers what hardware they wanted to upgrade; then we turned to the PC World Test Center to performance-test the latest CPU, memory, and USB 2.0 upgrades and to work through networking and hard-drive installations—warts and all.

As you consider the possibilities for your PC, remember the golden upgrade rule: If your total hardware upgrade price approaches the \$500 mark, you're probably better off buying a new machine and dealing with the migration headache instead of overspending on upgrades. Even the cheapest new PC will probably be better than your upgraded model—and it will have a warranty. ►



CPU BOOST

I can't seem to find a decent guide to upgrading processors. My main problem is that I don't know what processors are compatible with my computer. Then again, would a CPU upgrade be a good idea for me at all?

Al Highsmith, former electronics technician, Umatilla, Florida

THIS IS A COMMON question, so we tested three different PCs with several CPU upgrades. In a few cases, the speed boosts were remarkably satisfying. But before you check the benchmark results, you need to determine whether your computer is a likely candidate for an upgrade in the first place; and then you must decide whether opting for a motherboard upgrade or for a packaged CPU upgrade—or just swapping in a raw new processor—would be the best course of action.

To determine whether to upgrade, you often need more information than the class and clock speed of your current CPU—and in any case, you should verify the CPU you have. So start by downloading, installing, and running a system information utility from PowerLeap (www.powerleap.com) or Evergreen Technologies (www.evertch.com), the companies that manufacture the processor upgrades we tested. (Don't rely on the General tab of the System Properties dialog box—it doesn't always positively identify your CPU.)

Once you've verified the chip and clock

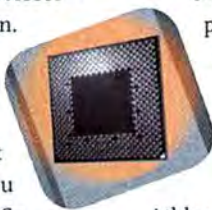
speed, it's time to see if you qualify as an upgrade contender.

Your CPU will fall into one of three groups:

Group 1: Intel Pentium or 486; AMD K6; or earlier. So you want more speed? Buy a new computer. CPU upgrades for these oldsters are available, but you'll probably be left with a slow hard disk, an old graphics card, and too little memory. Upgrade everything you need, and the components will cost more than a new PC. Give that old hand-me-down system to someone you love. Or hate.

Group 2: Intel Pentium II, Pentium III, or Celeron; AMD Athlon, or Duron. You may already be a winner. The (very) general rule: If you can find an inexpensive processor upgrade that will double your machine's original clock speed, go ahead and give it a whirl.

Group 3: Pentium 4 or AMD Athlon XP. These are fast already. You may be able to find a compatible CPU with double the clock speed, but it will be expensive. Probably too expensive. Look at upgrading other components of your system first.



Some further refinements for group 2 members: If your current Pentium III, Celeron, Athlon, or Duron runs faster than 1 GHz, the advice for group 3 also applies to you: Even if you can double your clock speed, that isn't the same as doubling your system's performance. Try to squeeze another three to six months out of your current system, and then opt for a motherboard swap or a new PC.

MOTHERBOARD, RAW CPU, OR PACKAGED UPGRADE?

FOR GROUP 2 MEMBERS, the classiest CPU upgrade is a full motherboard replacement. You'll have the widest possible choice of CPUs, and all the speed advantages of new motherboard technology. It's not an upgrade for beginners to try, but motherboard prices are quite low—between \$50 and \$250, depending on how cutting edge you want to get. You'll need new memory and a new CPU, as well—raising the practical price for this upgrade to the \$300-to-\$700 range (see September's "Motherboard Buying Guide"; find.pcworld.com/30617).

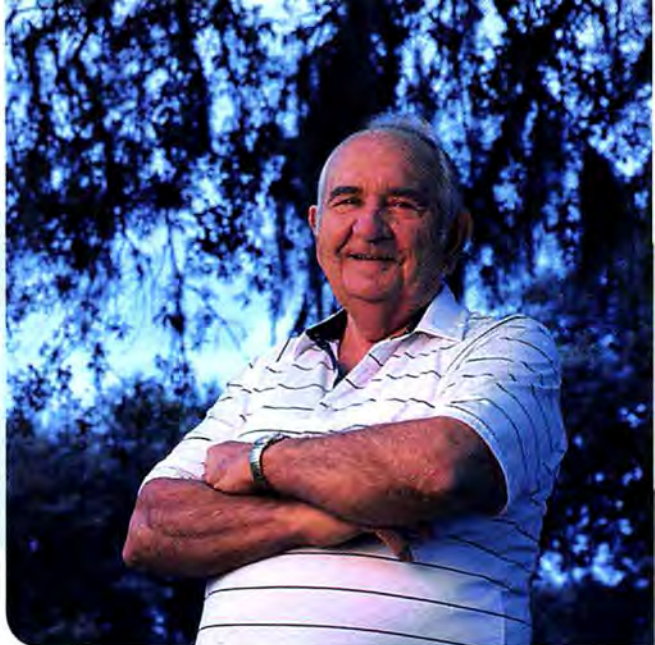
Is that too rich for your blood? Then the cheapest, simplest thing to do is to replace your current processor with the fastest CPU your motherboard will allow. First, you'll have to identify your motherboard's chip set and, in some cases, the motherboard revision number. PowerLeap's free CPU Control Panel utility, available at find.pcworld.com/30662, extracts all this information and more, including the processor socket or slot type and even

TEST REPORT

TEST Center UPGRADE PROCESSORS

SYSTEM	PC WorldBench 4 score <small>Faster</small>	Evergreen 1.1-GHz Pentium III		PowerLeap 1.4-GHz Celeron	
		PC WorldBench 4 score <small>Faster</small>	Speed boost (percent)	PC WorldBench 4 score <small>Faster</small>	Speed boost (percent)
Dell 733-MHz Pentium III	81	91	12	incompatible	n/a
Gateway 450-MHz Pentium III	63	91	44	98	56
Quantex 350-MHz Pentium II	54	85	57	incompatible	n/a

n/a = Not applicable.



the CPU serial number (although you won't be needing that detail).

With this data in hand, call your system manufacturer's tech support and find out which CPUs are compatible with your system. You can also visit your motherboard vendor's Web site and see which processors will work with your motherboard's make, model, and revision. If you can buy a CPU that doubles your clock speed (or thereabouts), great. For example, Intel's D810E2CA3 motherboard accepts a wide range of processors, beginning with the 400-MHz Celeron and ending with the 1-GHz Pentium III, which you can buy on the street for about \$120.

All too often, however, the range of supported CPUs is limited. For example, certain revisions of the Intel SE440BX-2 motherboard, which shipped in millions of Pentium II and Pentium III systems, support Pentium III chips only in the 450-MHz to 600-MHz range. Worse, the SE440BX-2 uses the old Slot 1 CPU connector—and nobody outside of EBay sells plain-vanilla Slot 1 CPUs anymore.

Fortunately, packages from companies like PowerLeap and Evergreen Technologies can widen the scope of available CPU upgrades. For example, people who own SE440BX-2 motherboards have several Slot 1 upgrades to choose from—topping out with a fast 1.4-GHz model from PowerLeap. Basically, packaged upgrades contain circuitry designed to fool the motherboard into working with CPUs faster than the BIOS and the chip set were originally designed to accept. There is one big caveat, however: As our lab discovered, compatibility problems make these prepackaged upgrades a hit-or-miss affair.

NICE SPEED IF YOU CAN GET IT

FIRST, THE GOOD NEWS: When these babies work, they really cook. An old 350-MHz Pentium II from Quantex enjoyed the biggest boost, posting a PC World-Bench score 57 percent faster with Evergreen's \$170, 1.1-GHz Performa III installed. (See the "Upgrade Processors" chart on page 86.) An old 450-MHz Pentium III Gateway Performance outfitted

PRE-UPGRADE TIPS

BEFORE YOU START...

ONCE YOU HAVE the upgrade hardware in your hot little hands, you'll want to dive in and get it done. But that instinct can get you into trouble. Here are a few practical tips to help ensure that the whole process goes smoothly. (For more ideas, see *Hardware Tips*, page 168.)



1 Image your drive. No, you probably won't kill your hard drive, but everyone should create a perfect image backup of the entire hard disk on occasion, so that applications and data can be restored in a flash to a replacement drive. So why not do it now? CD-RW discs provide the cheapest, easiest backup medium. At the very least, copy crucial data files off your hard disk before you start.

2 Save this number, XP users. After a major hardware upgrade, Windows XP may balk when you boot, telling you that the operating system has already been installed on another system. To reactivate XP, call Microsoft at 888/571-2048 and give the rep the Product Key that came in the shrink-wrapped box.

3 Back up your BIOS. It's always a good idea to have the latest BIOS version from your system vendor, but updating a BIOS is serious business: If the upgrade fails, you can't boot your system. Usually, depending on the system vendor, performing a BIOS upgrade involves creating a bootable floppy that contains the upgrade routine. So make sure you download your current BIOS and create a bootable

floppy for it as well—if the new one fails, at least you can load the old one and boot.

4 Double-check expansion boards and cables. Often, a card that doesn't work hasn't been pushed in all the way—even though the retaining screw is tight. And it's all too easy not to plug a cable in completely, to forget to reconnect it, or (even worse) to plug it in backward or to bend or break one of its pins. Remember, too, that some newer cards—particularly for high-end graphics—must be hooked to your system's power supply to work.

5 Don't wear polyester. This tip applies to any situation, but particularly to upgrades, since polyester clothing generates static electricity, which can destroy electronic components. To release any static buildup before you pop the hood of your computer, it's a good idea to touch a grounded piece of metal, such as the fan grille on the power supply while your computer is plugged into a grounded outlet. But do unplug it afterward; even when "off," modern PCs use a trickle of power that will damage your PC if you manage to direct it where it doesn't belong.

with a \$170 PowerLeap PL-iP3/T 1.4-GHz Celeron upgrade did nearly as well, logging an awesome 56 percent speed increase. As predicted, however, anything less than double the clock speed seems hardly worth the price: When we upgraded a 733-MHz Pentium III Dell system to Evergreen's 1.1-GHz Performa III, we saw a mere 12 percent boost.

And now for the bad news: PowerLeap could only assure us that its packaged upgrades would work in one of the three sys-

tems we tested, and we didn't stumble upon pleasant surprises when we tried them in the other two. The moral here: You should check the lists of systems that the manufacturers have explicitly certified as compatible on their upgrade Web sites, or even better, submit your system details via e-mail so the companies can give you a thumbs-up or thumbs-down before you buy. If all else fails, both PowerLeap's and Evergreen's products come with a 30-day money-back guarantee. ▶

MEMORY CAPACITY

How much RAM is enough? New motherboards hold 1GB or more. Where is the point of diminishing returns?

Tom Kielick, technology project manager, Baltimore

DEPENDING ON WHAT kind of memory your machine takes, an entire gigabyte at today's prices will probably cost you between \$100 and \$300, so the temptation is to say "fill 'er up." On the other hand, a few bucks is still a few bucks—or big bucks when you're talking about a company full of computers.

To find the answer to your question, we ran our application-based PC WorldBench 4 test suite on five computers with widely varying amounts of memory: 64MB, 128MB, 256MB, 512MB, and 1GB. Two of these computers ran Windows XP Professional, one ran Windows 98 SE, and two ran Windows Me. Some of the faster PCs we tested started with more memory to better mimic common configurations.

Our conclusion: For RAM, 256MB is just about right. But underneath that general advisory, you'll find some interesting data. First and foremost, the speed differences were quite small: For example, when we upgraded a 450-MHz Pentium III Gateway system running Windows 98 from 64MB to 128MB, PC WorldBench 4 ran a mere 3.3 percent faster. A 933-MHz Pentium III Dell PC

running Windows Me enjoyed a healthier 6.1 percent increase with the same upgrade, but that's still nothing to write home about. Upgrading these two machines from 128MB to 256MB

yielded even paler results (1.6 and 2.3 percent, respectively). And above that? Negligible.

The Windows XP machines were a slightly different story. When upgraded from 96MB to 224MB, our 1.6-GHz

Athlon XP+ system from MicronPC squeezed out 8.5 percent better performance. But once again, upgrades beyond 256MB made little difference. PCs with integrated graphics, like the MicronPC Millennia we tested, reserve a certain amount of main memory (32MB in this case) for graphics use. That arrangement decreases the amount of memory available to the OS. If you own a PC with integrated graphics, you should adjust your memory upgrading plans accordingly.

Overall, these tests and others we've conducted show that a memory upgrade improves performance if it reduces a machine's resort to virtual memory (a technique that lets you load more applications

and data than you have actual memory for, but uses hard disk reads and writes to accomplish the task). Virtual memory's use of the hard disk slows performance. For PCs with 64MB or less of RAM, just loading the operating system, an application, and some data can call up virtual memory, slowing your system. And that happens even sooner with larger OSs (read XP). Above 64MB, how often your system slows for virtual memory depends on how much you load into your PC (and to a degree, how fast your CPU is; slower PCs see less performance improvement for the same size memory upgrade).

With 128MB of RAM, if you keep opening mail or browser windows—as most of us do these days—you'll start slogging around in virtual memory pretty quickly, especially with a Windows XP system. At just \$20 or \$30 more than 128MB costs, the added headroom of 256MB pays for itself in productivity—so we'll stick by our 256MB recommendation.



TEST REPORT

TEST
Center

RAM UPGRADES: BEST VALUE AT 256MB

SYSTEM	CPU	Speed	Memory type	Operating system	PC WorldBench 4 score at:				
					64MB	128MB	256MB	512MB	1024MB
Dell Dimension	Pentium III	933 MHz	PC133	Windows Me	n/a	89	91	91	n/a
Dell Dimension	Pentium III	933 MHz	PC100	Windows Me	82	87	89	90	n/a
Gateway	Pentium III	450 MHz	PC100	Windows 98 SE	61	63	64	64	n/a
IBM NetVista	Pentium 4	1.5 GHz	PC800	Windows XP Pro	n/a	n/a	100	101	101
MicronPC Millennia ¹	Athlon XP 1900+	1.6 GHz	DDR266	Windows XP Pro	n/a	(96MB) 106	(224MB) 115	(480MB) 116	(992MB) 117

n/a = Not applicable. ¹The Micron Millennia reserves 32MB of RAM for graphics use, reducing the amount of available system memory.



PHOTOGRAPH: WALTER CALAHAN

When I upgraded my home network by adding a third PC, the new machine couldn't connect with the other PCs on the network, nor could it access the Internet. What do I do now?

Andy Ferguson, pastor, Cleveland, Tennessee



INSTALLING OR upgrading a Windows network at home or work isn't nearly as complicated as it used to be, as long as everything goes smoothly. Run into a glitch, and you can lose hours as you try new settings (some of which may add to your problems). But you don't need to.

Your first step should be to rule out physical connection or hardware problems. Check your network adapter to confirm that the lights indicating a good connection are lit. If they aren't and you're on a wired network, check your cabling. If you're on a wireless network, run the installation routine for your wireless adapter one more time and double-check your network ID and encryption settings.

If the PC's connection is good, but it won't connect to the Internet, it may have an incorrect IP address. To assign a correct one, you need to ensure that your network uses exactly one Dynamic Host Configuration Protocol server (which assigns a unique IP address to each computer on your local network), check that the DHCP server is on, and confirm that the new computer is connected to the network.



CONFIGURE TCP/IP settings from your network connection's Properties page.

Here's how to check for DHCP: If your modem is connected directly to a computer that then shares that connection with other PCs on your network, you've set up Internet Connection Sharing (available in Windows 98 and later versions) or a similar program, and it is your DHCP server. If you're using a router, you'll find an "enable DHCP" option in the router configuration software that you can access via a Web browser on one of the working computers on the network. Double-check it, and while you're there, make sure that you have set the number of users high enough to accommodate all of your (and your guests') PCs and notebooks.

Now reboot the new PC, and see if you can browse the Internet. If not, the easiest way to get all the necessary default settings is to remove and reinstall your system's TCP/IP protocol. If your new PC uses Windows 98 or Me, open *Control Panel*, open *Network*, select *TCP/IP* → [*network card*] (where [*network card*] is the name of your network card), and click *Remove*. Add • *Protocol*. Add • *Microsoft*. In the right pane, choose *TCP/IP*, and click *OK*. Press *<Enter>* when asked if you want to reboot your PC.

For a Windows 2000 computer, select *Start* • *Settings* • *Network and Dial-up Connections*. Right-click the icon for your network, and open its *Properties* dialog box. Then select *Internet Protocol (TCP/IP)*. Uninstall • Yes • Yes • No. Once your computer has restarted, reopen the network *Properties* dialog box, and select *Install* • *Protocol*.

Add • *Internet Protocol (TCP/IP)* • OK • Yes.


XP won't let you uninstall TCP/IP, so you must reset its default TCP/IP settings manually: Open *Control Panel*, open *Network Connections*, right-click your network icon, and select *Properties*. Internet Protocol (TCP/IP) • Properties • Obtain an IP address automatically • Obtain DNS server address automatically • OK.

While we're here, click the *Advanced* tab and make sure that the *Protect my computer...* box is unchecked. Click *OK* and *Yes* if asked whether you're sure you want to turn off Internet Connection Firewall. If your network is router-based, you have sufficient protection without a software firewall like XP's ICF. If one of your PCs shares its Internet connection, your firewall belongs on that system. If you don't already have one, we recommend Zone Labs' \$50 ZoneAlarm Pro 3, which automatically senses when ICS is running and stops intruders without affecting local network access.


For a more comprehensive look at network setup and troubleshooting, check out May's "No-Hassle Networking Guide" (www.pcworld.com/30509). ▶



Andy Ferguson

A black office chair is shown from a side-rear perspective. The backrest features a white rectangular panel. The chair is positioned on a dark, patterned carpet. The text "Like you, it does four different jobs at once." is printed in bold black font on the white panel.

**Like you,
it does four
different jobs
at once.**

A large, silver HP LaserJet 9000 multifunction printer is positioned in a modern office setting. The machine features a large paper tray on the left, a control panel on the right, and three drawers at the base. It is situated next to a large window that looks out onto a cityscape with bare trees. The office has a clean, minimalist design with a grey carpet and a white ceiling with recessed lighting.

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USB 2.0 VS. FIREWIRE

I'm shopping for an external hard disk to back up several computers. I want a fast drive with a fast interface, so I'd like to add a USB 2.0 or FireWire card for the drive and the computers. Which should I choose? Which is faster?

Carm Lyman, public relations specialist, Lake Tahoe, California

YOU'VE CORRECTLY identified the two fastest interfaces for connecting external devices—and sensibly ruled out the poky USB 1.1 interface, which would be too slow for your application. Remember, though, that your immediate need for an external hard disk isn't the only factor in your decision. The whole idea behind external interfaces like USB and FireWire is to accommodate a wide range of devices, so which other ones you might want to attach should influence your choice as much as anything else.

USB 2.0 is a much newer spec than FireWire, and fewer devices currently support it. But its chief backer is Intel, which will be building support for USB 2.0 into all its computer chip sets. Other chip set vendors are behind it as well, which is why most new motherboards are shipping with USB 2.0 ports built in. This guarantees that manufacturers of digital cameras, camcorders, hard disks, scanners, CD-RW drives, and

so on will build support into their devices. In addition, USB 2.0 ports can receive USB 1.1 devices. That's a fairly minor issue, since virtually all PCs four years old or less already have a USB 1.1 port, but it makes the transition to USB 2.0 much easier.

Having originated on the Macintosh, FireWire is typically an add-on for PCs. Nonetheless, by the time you read this, you'll still have a wider selection of FireWire than USB 2.0 devices on the market to choose from—especially among digital video camcorders, where FireWire appears to have established a permanent niche. And such companies as ATI and Creative Labs are beginning to build FireWire ports into their graphics cards and sound boards, respectively.

Finally, our performance tests confirm that if there's one thing you shouldn't worry about in comparing the two interfaces, it's speed. (See the "USB vs. Fire-



Wire" test report below.) Although USB 2.0 supposedly supports throughput as high as 480 megabits per second versus FireWire's 400 mbps, FireWire actually turned out to be slightly faster. But these differences may flatten out over time as newer USB 2.0 devices are refined.

Our conclusion: If you want the widest compatibility with future devices, go with USB 2.0. If you're primarily interested in digital video, choose FireWire. Or as long as you're going to the trouble of adding an expansion card, why not buy one that supports both interfaces? At about \$100 on the street, Adaptec's DuoConnect is a little pricey, but you get three USB 2.0 ports, three FireWire ports, a six-foot FireWire cable, and Sonic MyDVD 3 video editing software. Not a bad purchase if you want to be prepared for anything.

For either interface, the upgrade is simple. Turn off and unplug your PC. Use an antistatic wrist strap to prevent static damage while working inside your PC's case. Locate an empty PCI slot, and remove the metal slot cover. Gently insert the new card and fasten it down using the screw you removed earlier. Plug your PC back in and turn it on. Once Windows boots, it should detect the new card and prompt you to install drivers. Follow the manufacturer's directions for any software that came with the card. With the drivers installed, you should be able to start using your USB 2.0 or FireWire devices by plugging them into the new card. ▶

TEST REPORT

TEST Center USB VS. FIREWIRE

PRODUCT	Task	Performance times ¹		How does FireWire compare to USB 2.0?
		USB 2.0	FireWire	
CD-RW	LaCie U&I CD-RW	83.4	82.7	Virtually the same
	Write 650MB to CD-R on the fly	201	200	Virtually the same
SCANNER	Epson Perfection 2450 Photo	372	377	Imperceptibly slower
	300-dpi color image	15.3	15.0	Imperceptibly faster
HARD DRIVE	Iomega HDD 30GB Portable Hard Drive	60.5	55.4	Over 9.2% faster
	Photoshop 6.0.1	321	310	About 3.5% faster

¹ All times in seconds.



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HARD DRIVE MANAGEMENT

My computer came with a 20GB hard drive. Right now, I've filled about 8GB. Should I think about adding a second drive if I want to dabble in digital audio and video? Should I leave the original 20GB as the master drive with the OS installed—or are there advantages to reversing the two?

Spencer Pasero, educator, Batavia, Illinois

IF YOU'RE INTERESTED in video editing, you've picked the only application that can overflow today's high-capacity hard drives. Music won't do it—unless you plan on exceeding 50,000 or so MP3s. Digital photography won't come close. But video? Hard-drive manufacturers get on their knees and pray that more people will start making movies on their PCs. Most hobbyists work with digital video in 720 by 480 resolution with 5:1 compression. That works out to a space requirement of about 3.6MB per second. If you dedicated an entire 80GB drive to video, you would have room for only about 6 hours worth—enough for an editing studio, but not for storing your creations. That takes a CD-RW or rewritable DVD drive (see our September buying guide to rewritable DVD drives at www.pcworld.com/30653).

As for swapping the old and new hard drives, you seldom see a noticeable performance difference between two drives of the same vintage. Rather, where you will store critical files, such as your OS and apps, may be the better basis for deciding whether to switch the drives.

Swapping makes more sense when your old drive is a low-end 5400-rpm model and your new unit is a top-of-the-line, 7200-rpm unit with an extra-large buffer. In general, it's a good idea for the drive that the system accesses more frequently to be the one with the greater kick.

In that case, your first step is to install the new drive so you can copy everything over. Follow the manufacturer's direc-

tions to install the drive, and be sure to set the new drive as a slave. The best way to copy is by using drive imaging software; this ensures that

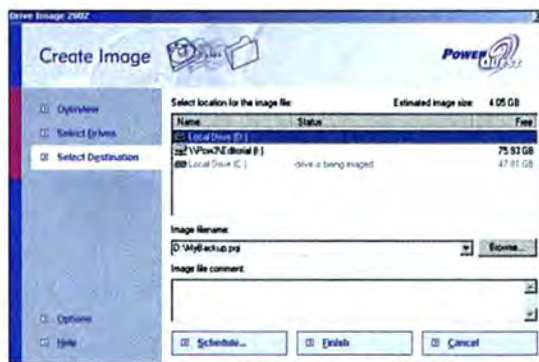
everything—apps, data, settings, hidden files—will get moved from the old drive to the new, completely duplicating your current setup. Before you start, back up any data you may already have stored on the new drive (you can just copy

it to the old drive if it will fit); to be safe, you should do a full backup of the old drive, as well. And make sure you have the manufacturer's documentation for both drives.

If you run Windows XP, you'll need to use either the XP-compatible drive imaging software that may have come with your hard drive or a commercial product like Norton's Ghost 2002, PowerQuest's Drive Image 2002, or V Communications' Copy Commander (PowerQuest's Drive Copy doesn't support XP at this writing).

Once everything is backed up and you have imaged the 20GB drive to the new drive, shut down the PC, ground yourself, unplug the power cord, and open the case. With documentation in hand, switch the jumpers on your hard drives so that the new drive is the master and the original

drive is the slave (using a pair of tweezers makes this a lot easier). Ensure that both drives have power and IDE cables connected, plug in the PC's power cord, and turn it on. If everything boots up fine, re-close the PC; if not—and if a double-check of cabling and of master and slave jumper



POWERQUEST'S Drive Image 2002 can exactly copy the data stored on your current hard disk to your new drive.

positions doesn't reveal an error—switch the jumpers back, reboot, and start over.

After you have successfully booted with the new drive, you can format the 20GB drive to make room for other stuff: Open *My Computer*, right-click the drive, and choose *Format*.

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

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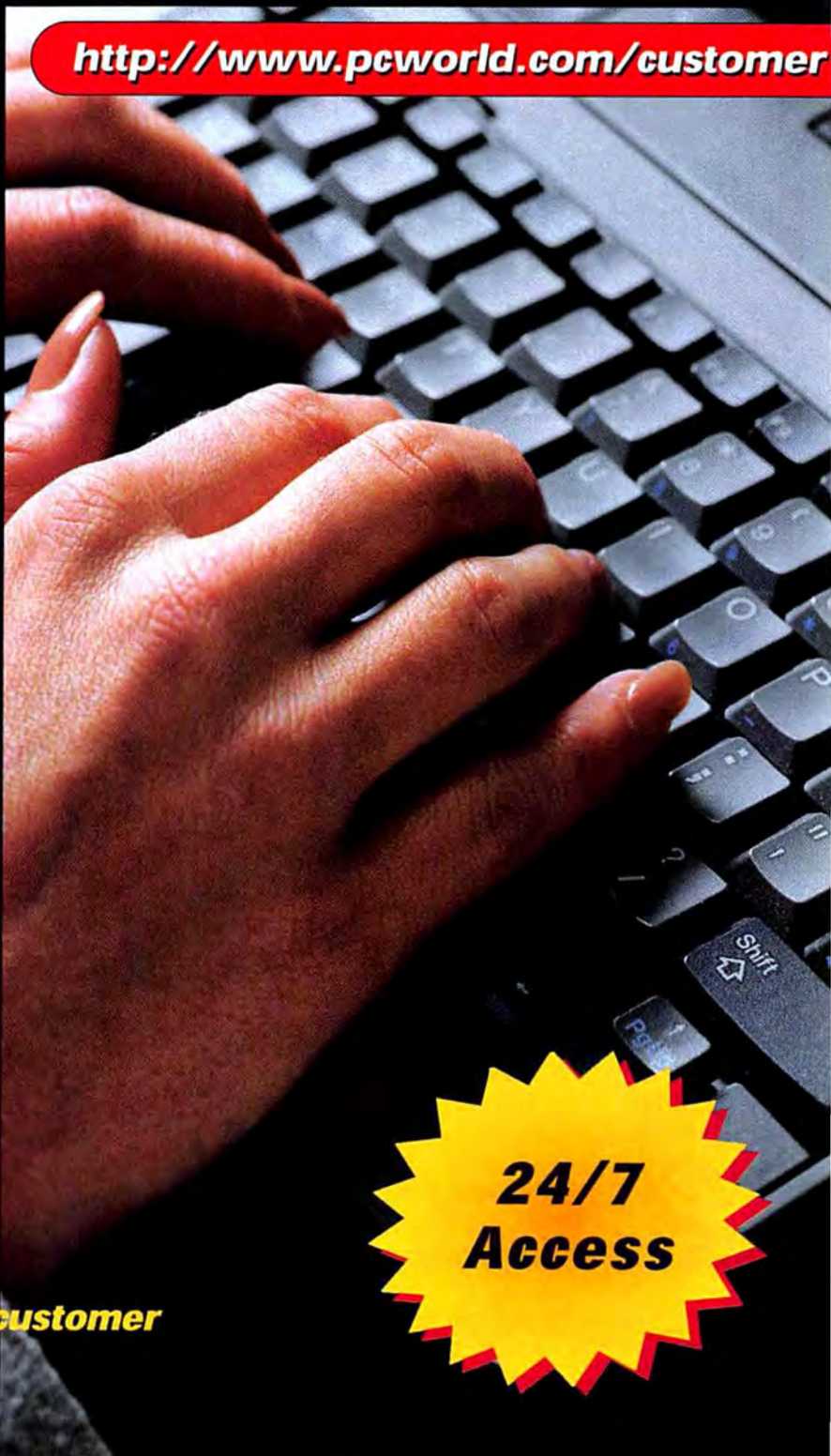
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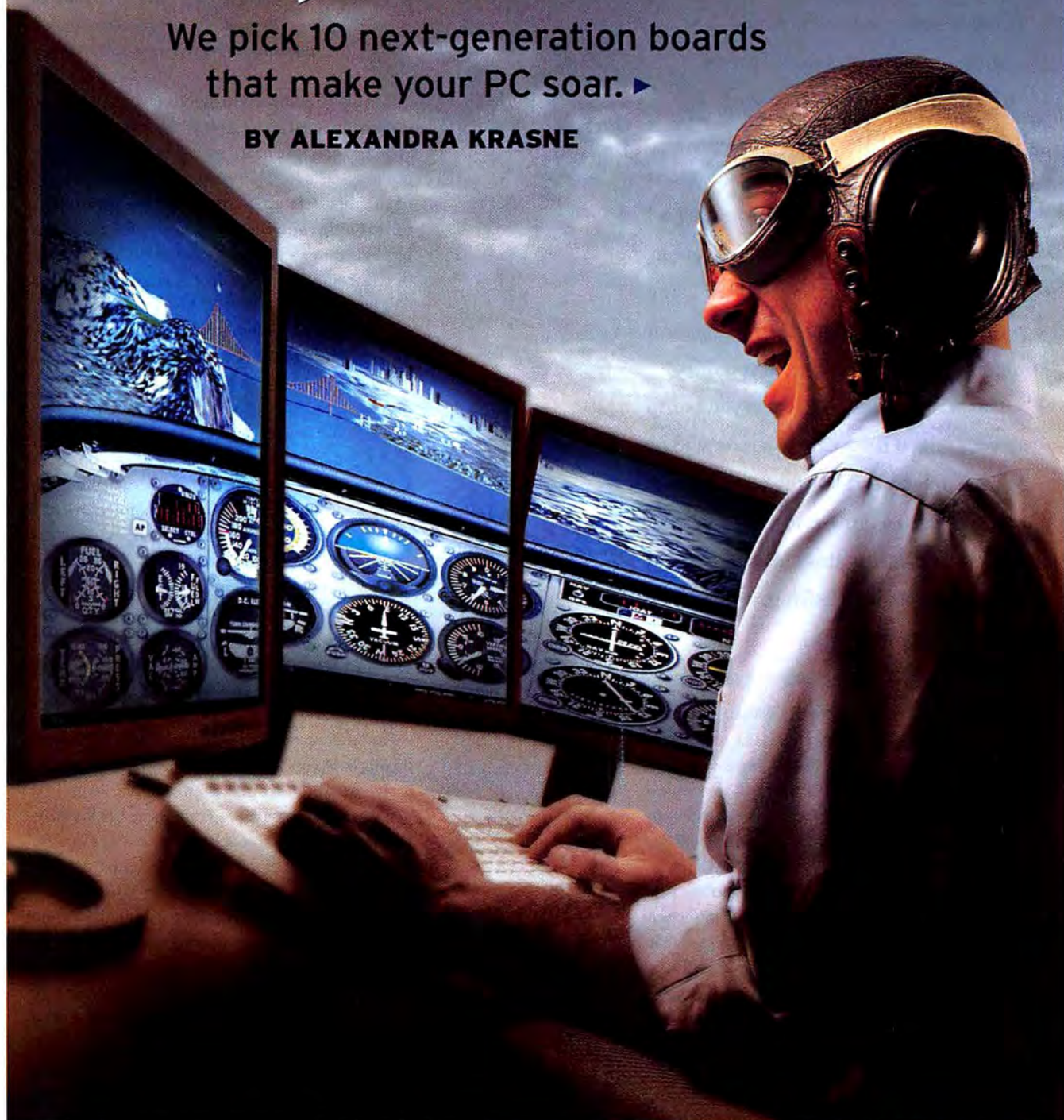
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High-Flying Graphics Cards

We pick 10 next-generation boards that make your PC soar. ►

BY ALEXANDRA KRASNE



TODAY'S GRAPHICS CARDS do more than let the teenager in your house scream through first-person shooter games until all hours of the night. In fact, we tested a variety of boards that offer all sorts of options as individual as your computing needs.

Some cards let you save TV shows on your hard drive and record them onto DVDs. Another has a FireWire port into which video editing fans can plug a digital camcorder. You can find budget cards with TV tuners, video inputs, dual-display support, and excellent game performance; some high-end cards permit you to plug in any peripheral you own.

The Matrox Parhelia-512 lets you bump up your screen resolution to a roomy 3840 by 1024, effectively allowing you to stretch a spreadsheet, a browser, and a word processing app across three displays. (And while your boss isn't looking, you can play a little Flight Simulator.)

NEW-CARD CAROUSEL

FOR THE PAST COUPLE of years, NVidia has dominated mainstream graphics chips. The majority of boards and systems in our *Top 10 Graphics Boards*, *Top 15 Office PCs*, and *Top 15 Home PCs* charts have some flavor of GeForce chip set. But that's likely to change as a slew of new boards hit shelves over the next few months. Here's the current lineup.

Hoping to recapture its old standing in the performance graphics arena, ATI recently launched the Radeon 9000, 9000 Pro, and 9700 chips. Their specs look impressive (at press time, we had received only the 9000 Pro). Geared toward gamers on a budget, the Radeon 9000 should compete head to head with NVidia's GeForce4 MX 440. Currently, boards that are equipped with the MX 440

Graphics Board Best Buys



**Best
BUY**

TWO GRAPHICS CARDS FROM MSI earn Best Buy awards: The **GeForce4 MX460-VTP** (top) prevailed in our value category, and the **GeForce4 Ti4400-VTD** reigns over the power chart. Both cards offer a ton of extra features, such as dual-monitor support, S-Video-in and -out, and bundled games. They also powered through our gaming tests, though the GeForce4 MX460-VTP lagged a bit in some.

chip typically sell in the \$100 range. Targeted at mainstream gamers, the slightly faster Radeon 9000 Pro graphics board (which performed well on our tests) sells for \$129—still a relative bargain. All of the new ATI chips incorporate a technology called Fullstream, which is designed to smooth the blocky textures and rough edges that often show up in streaming Internet video. And unlike NVidia's GeForce4 Ti chips, the Radeons support DirectX 8.1, an updated version of Microsoft's application programming interface that allows the chip to render more textures in a single pass. (NVidia's current Ti chips support DirectX 8, but not 8.1.)

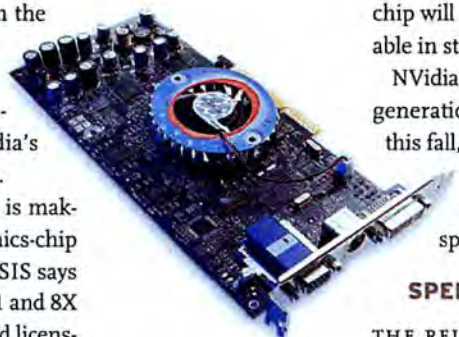
Hard-core gamers at this year's E3 convention were treated to a sneak preview of Id's *Doom III*, a DirectX 9 version of the cult favorite, running on ATI's Radeon 9700. It didn't disappoint them. ATI claims its new chip will be faster than NVidia's top-speed chip, the GeForce4 Ti 4600. The Radeon 9700 will provide support for 8X AGP, as well as full hardware support for games based on DirectX 8.1 and the upcoming DirectX 9 as they appear. DirectX 9 takes advantage of new hardware features that game programmers can use to create more complex and realistic lighting effects and textures.

For buyers watching their budget, graphics boards based on Trident's new line of chips should arrive in stores around the time this issue hits newsstands. According to Trident, the cards will be the least-expensive models on the market to offer hardware support for DirectX 8.1 and partial support for DirectX 9. Cards based on Trident's XP4 T1 chip will sell for a retail price of around \$69, and promise performance similar to that of more-expensive cards based on NVidia's GeForce4 Ti 4200 chip. Video cards running on the Trident XP4 T2 should provide performance comparable to that of boards with NVidia's second-most-powerful chip, the GeForce4 Ti 4400; at \$79, however, they

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individual
as your
computing
needs.

will be priced about \$30 to \$40 less than the GeForce4-based boards. Trident's new line tops out with the \$99 XP4 T3, which the company says will fall somewhere between the performance of NVIDIA's GeForce4 Ti 4400 and ATI's Radeon 9700.

Meanwhile, Silicon Integrated Systems is making its first serious foray into the 3D-graphics-chip realm with the midrange Xabre 400 chip. SIS says that the Xabre 400 will support DirectX 8.1 and 8X AGP. Like NVIDIA, SIS makes the chips and licenses them to partner companies that manufacture and sell the graphics boards. A reference version of the Xabre 400 that we tested was a bit slower than we had expected. Its speed scores matched those of budget-level graphics boards based on the GeForce4 MX 440. Boards based on the Xabre 400



Asus AGP-V8440

chip will retail for about \$150 and should be available in stores by the time you read this.

NVIDIA isn't sitting on its laurels, either. Its next-generation chip (code-named NV30), launching this fall, will support DirectX 8.1 and 9, as well as 8X AGP. At press time, NVIDIA wasn't publicly releasing details on price, clock speeds, ship dates, or card configuration.

SPEEDY AND GOOD LOOKING, TOO

THE RELEASE OF the first DirectX 8 games gave us the opportunity to upgrade our graphics test suite. We tossed out Id's Quake III, Interplay's MDK2, and Infogrames's Test Drive 6, and we replaced them with NovaLogic's Comanche 4, Discreet's 3D Studio Max (a 3D modeling application), and a pair of OpenGL game titles—Croteam's ▶

TEST REPORT

Top 10 Graphics Boards

	POWER BOARD	Street price (7/23/02)	Overall value	Features ¹	Frame rates ² (frames per second)				
					Comanche 4	Serious Sam	Return to Castle Wolfenstein	Unreal Tournament 2003	3D Studio Max
1	Best BUY MSI G4Ti4400-VTD ★★★★★ find.pcworld.com/30446	\$259	89	NVIDIA GeForce4 Ti 4400 chip, 128MB of DDR SDRAM; dual-display support, DVI-out, S-Video-in and -out, composite-in and -out	40	107	61	90	29
2	Gainward Ultra/650XP Golden Sample ★★★★☆ find.pcworld.com/30143	\$199	86	NVIDIA GeForce4 Ti 4200 chip, 128MB of DDR SDRAM; DVI-out, S-Video-in and -out, composite-in and -out	27	99	59	82	28
3	VisionTek Xtasy GeForce4 Ti 4400 ★★★★★ find.pcworld.com/28361	\$250	85	NVIDIA GeForce4 Ti 4400 chip, 128MB of DDR SDRAM; DVI-out, S-Video-out	39	108	62	91	28
4	EVGA.com E-GeForce4 Ti 4600 ★★★★★ find.pcworld.com/30146	\$380	84	NVIDIA GeForce4 Ti 4600 chip, 128MB of DDR SDRAM; DVI-out, S-Video-out, composite-out	40	114	64	99	44
5	Asus AGP-V8440 ★★★★☆ find.pcworld.com/30452	\$250	83	NVIDIA GeForce4 Ti 4400 chip, 128MB of DDR SDRAM; DVI-out, S-Video-out	39	107	62	90	29
VALUE BOARD									
1	Best BUY MSI G4MX460-VTP ★★★★★ find.pcworld.com/30638	\$119	91	NVIDIA GeForce4 MX 460 chip, 64MB of DDR SDRAM; dual-display support, S-Video-in and -out, composite-in and -out	30	59	44	41	23
2	ATI Radeon 9000 Pro ★★★★★ find.pcworld.com/30458	\$129	90	ATI Radeon 9000 Pro chip, 400-MHz RAMDAC, 64MB of DDR SDRAM; dual-display support, DVI-out, S-Video-out, composite-out	29	73	50	53	13
3	Gainward Pro/600TV Golden Sample ★★★★☆ find.pcworld.com/28581	\$99	90	NVIDIA GeForce4 MX 440 chip, 64MB of DDR SDRAM; S-Video-out, composite-out	27	45	37	34	22
4	MSI G4MX440-VTP ★★★★☆ find.pcworld.com/28562	\$105	90	NVIDIA GeForce4 MX 440 chip, 64MB of DDR SDRAM; S-Video-out, composite-out	26	49	36	34	21
5	VisionTek Xtasy GeForce4 MX 420 ★★★★☆ find.pcworld.com/30623	\$100	86	NVIDIA GeForce4 MX 420 chip, 64MB of SDRAM; S-Video-out	17	26	18	20	18

HOW WE TEST: We test graphics cards under Windows XP Professional on PCs with 1.73-GHz Athlon XP 2100+ processors and 512MB of DDR SDRAM. To test each board, we use manufacturer-supplied drivers. We use Epic's Unreal Tournament 2003 and NovaLogic's Comanche 4 (DirectX 8 games) and Croteam's Serious Sam and Id's Return to Castle Wolfenstein (OpenGL games). We also use 3D Studio Max, a 3D modeling application. For performance tests, we run each card at several resolutions: 1024 by 768 using 16- and 32-bit color; and 1280 by 1024 and 1600 by 1200, both using 32-bit color. We also perform antialiasing tests using Unreal Tournament 2003 at 1024 by 768 resolution with 32-bit color and the manufacturer-recommended settings. Our chart rankings are divided into two categories: power and value. The power chart ranks price (5 percent), performance (60 percent), features (25 percent), and vendor service and support policies (10 percent). The value chart ranks price (55 percent), performance (25 percent), features (10 percent), and service and support policies (10 percent). See find.pcworld.com/10860 for details on PC World's Star Ratings. ¹ Unless otherwise noted, all cards have a 350-MHz RAMDAC. ² Tested at 1280 by 1024 using 32-bit color. Visit find.pcworld.com/30626 for reviews of all products tested this month and ranked in this chart.

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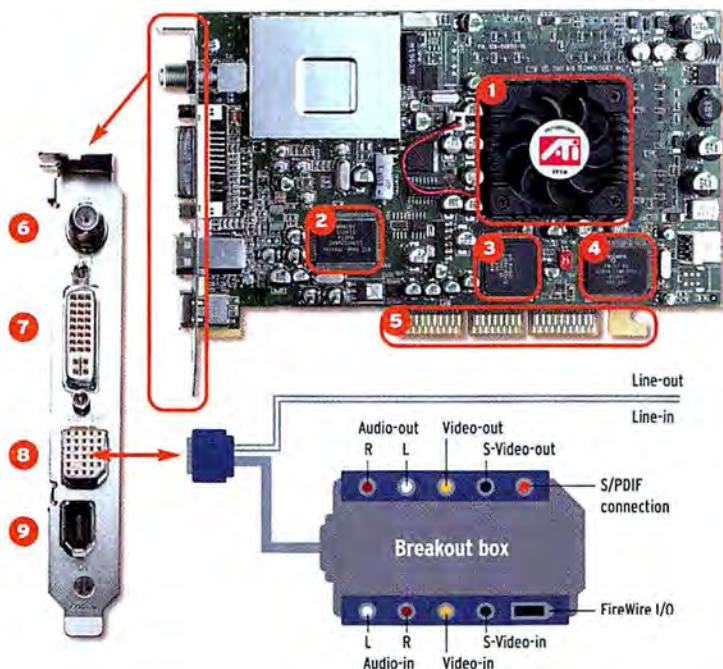
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HOW IT WORKS

Getting to Know Your Graphics Card

DO YOU KNOW your DDR SDRAM¹ from your RAMDAC? We pulled out ATI's All-in-Wonder Radeon 8500DV to illustrate the different components you might find on a graphics board. Aside from the standard array of on-board components, this feature-packed card has an external connector that adds audio, video, FireWire, S-Video, and composite (via adapter) ports to connect a VCR or a camcorder.



1. **Graphics chip and RAMDAC (underneath the fan and heat sink):** These days the graphics chip houses the graphics processor and the RAMDAC, which takes digital data and converts it to analog for your monitor.
2. **Analog video chip:** Handles analog video.
3. **Bridge chip:** Together with the FireWire/DV chip, it enables a direct connection to DV camcorders.
4. **FireWire/DV chip:** Provides the FireWire interface.
5. **AGP connector:** Goes in a PC's AGP slot, allowing data to move between the graphics chip and memory.
6. **Cable or antenna port:** Accepts a standard coaxial connection (for cable TV) or an amplified antenna.
7. **DVI-I port:** Lets you plug in a digital monitor (or an analog one using the included DVI-I-to-VGA dongle).
8. **Breakout port:** Allows you to attach a box that provides most of the input and output connections.
9. **DV input/output port:** Along with the breakout box, offers another FireWire connection.

¹Unlike most graphics cards, this Radeon board has its 64MB of DDR SDRAM memory located on the other side.

Serious Sam: The Second Encounter and Id's Return to Castle Wolfenstein (which uses an advanced version of the Quake engine). We also upgraded from Epic's Unreal Tournament to the new DirectX 8 version, Unreal Tournament 2003. (In part, we selected these games because of their built-in benchmarking capabilities.)

The PC World Test Center put 17 graphics boards through their paces with the new benchmark, testing each at different resolutions: low (1024 by 768 at 16- and 32-bit color depths) and high (1280 by 1024 and 1600 by 1200, at 32-bit color). We also ran Unreal Tournament 2003 with antialiasing (which smooths the jagged edges on graphics) turned on, to gauge its effect on frame rates and image quality. Each card was scored for image quality and speed, as measured by frame rates. And in antialiasing tests, a panel of judges assessed the boards' effectiveness in smoothing images.

MSI's G4Ti4400-VTD won top honors among power boards. It was a solid performer in all of our tests, and it has extra features like dual-monitor support and bundled games, along with toll-free



EVGA.com E-GeForce4
Ti 4600

technical support. Scoring a doubleheader sweep, MSI also prevailed in our value category with the G4MX460-VTP. That board is a mixed bag for gamers, however: It screamed through some of our tests and lagged a bit in others (see chart, page 101). Though it's slower than power boards we tested, it's a solid choice if you're looking for a good value.

Our performance tests revealed some of the differences between high-end boards and budget models. The more-expensive products—those in the \$200 to \$300 range—sustained higher frame rates than did their less-expensive cousins, especially at resolutions of 1280 by 1024 and above. In almost all cases, the value boards could run our suite of games, but they generally couldn't maintain more than 60 frames per second at resolutions above 1024 by 768. For game performance, 60 fps is the magic number: The farther above 60 fps your board can go, the less likely you are to see stuttering or other image-quality problems in complex scenes as your frame rates bounce up and down.

But speed is only one factor of good performance; image quality is another. To test image



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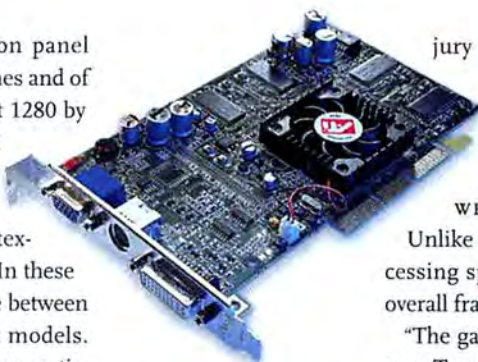
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quality for each card, our three-person panel watched demos of all four of our test games and of our 3D modeling application running at 1280 by 1024 in 32-bit color—the resolution and color depth typically used with 19-inch monitors—and noted each video card's ability to render complex textures and to display colors and contrast. In these areas, the panel observed little difference between the high-priced boards and the budget models. Occasionally, a board would render a scene particularly quickly, or it would make water look especially realistic and rippled. Overall, however, our



ATI Radeon 9000 Pro

jury of observers found only minute differences between the various power and value cards in DirectX 8 test games.

THE FRAME-UP

WHY SHOULD you care about frame rates?

Unlike a computer with the fastest overall processing speed, a graphics board with the fastest overall frame rate may not win.

"The game doesn't run at 150 fps all the time," says Tony Tamasi, general manager of desktop graphics products at NVidia. "The reason why people shoot for high rates is because they want ▶

TEST REPORT

Antialiasing Demands Loads of Power

ANTIALIASING CAN DELIVER smoother-looking graphics in your favorite games; but maintaining frame rates above 60 fps, which we consider necessary for fluidly moving images, takes a lot of processing power. The results here were influenced by the vendors' settings. Antialiasing works by taking samples of the pixels in an image and coloring the surrounding pixels to present a smoother (but often somewhat fuzzier) image. Taking more samples requires additional processing effort but generally produces more appealing results.

CARD	Chip	Frame rate ¹		Antialiasing number of samples per pixel
		1024 by 768 resolution using 32-bit color	1024 by 768 resolution using 32-bit color and antialiasing	
Asus AGP-V8440	GeForce4 Ti 4400	138	97	2
ATI All-In-Wonder Radeon 8500DV	Radeon 8500	75	42	2
ATI Radeon 7000	Radeon 7000	Not available ²	Not available ²	Not available ²
ATI Radeon 9000 Pro	Radeon 9000 Pro	83	43	2
EVGA.com E-GeForce4 Ti 4600	GeForce4 Ti 4600	149	71	4
Gainward Ultra/650XP Golden Sample	GeForce4 Ti 4200	128	98	5
Gainward Pro/600TV Golden Sample	GeForce4 MX 440	55	30	5
Hercules 3D Prophet 8500 128MB	Radeon 8500	91	21	4
Matrox Parhelia-512	Parhelia	75	48	16 ³
MSI G4MX420-T	GeForce4 MX 420	31	15	5
MSI G4MX440-VTP	GeForce4 MX 440	55	30	5
MSI G4MX460-VTP	GeForce4 MX 460	65	31	5
MSI G4Ti4400-VTD	GeForce4 Ti 4400	137	107	5
PNY Verto GeForce4 Ti 4200	GeForce4 Ti 4200	128	97	5
SIS Xabre 400 (reference)	Xabre 400	53	18	*
VisionTek Xtasy GeForce4 Ti 4400	GeForce4 MX 420	33	16	5
VisionTek Xtasy GeForce4 MX 420	GeForce4 Ti 4400	140	110	5

¹ Frames per second; larger is faster. ² Unable to perform test. ³ Vendor asked us to also use anisotropic filtering (for texture smoothing), which adds to the processing workload. ⁴ Application doesn't report the number of samples but was set at medium.



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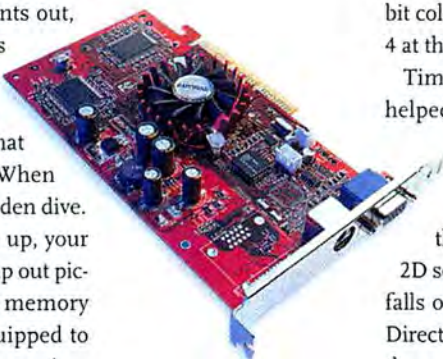
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the frame rates to be above the [60-fps] minimum at all times." Because graphics processors can't guarantee sustained frame rates, he points out, "You never know when your frame rates will suddenly decrease. You could be walking down an empty hallway in Quake III, and turn the corner to find that there are a hundred people in battle." When that happens, your frame rates take a sudden dive.

Furthermore, as screen resolutions go up, your graphics board has to work harder to pump out pictures. A power card typically has more memory and a faster processor, so it's better equipped to handle the challenges of high-resolution gaming. If you plan to run at lower resolutions, such as 1024 by 768 (the resolution typically used with a 17-inch monitor), a budget card will suffice.

Generally, games with more-complicated textures and lighting, and with faster-moving images, put more stress on your graphics card and your CPU. For instance, in our Unreal Tournament



Gainward Pro/600TV
Golden Sample

2003 tests, all of the cards (except the Radeon 7000) managed better than 60 fps at 1280 by 1024 in 32-bit color, but no card cleared 60 fps on Comanche 4 at the same resolution and color depth.

Tim Sweeney, a developer at Epic Games who helped program Unreal Tournament 2003, says that new games based on the Unreal engine will run well on any 3D card with hardware transform and lighting. (T&L is the process of transforming 3D textures to a 2D screen environment and calculating how light falls on a particular object.) With cards that have DirectX 8 hardware acceleration and T&L support, the game can be written so that computing occurs in your graphics processor rather than in the CPU, in theory making the game run faster and look better. If the card's hardware doesn't support the version of DirectX that the game was programmed on, the card will offload the task to your CPU. All of the chip sets in the graphics cards we tested, except for ATI's Radeon 7000, support hardware T&L. ▶

BOOST GRAPHICS POWER

Proceed With Caution! A Lesson in Overclocking

ASK ANY HARD-CORE gamer to name the easiest way to turbocharge a PC's graphics, and the answer is likely to be: "Overclock it!" But is it safe to run a new \$250 board faster than the manufacturer intended? In most cases, yes—if you are cautious—but it's probably not worth the effort.

Most cards we tested for this roundup—models from Asus, Hercules, and MSI, for example—include overclocking utilities. But the leading graphics chip manufacturers we talked to frown on the concept. ATI put it most bluntly: "If you overclock your chip, that voids the warranty," says David Nalasco, technology marketing manager for ATI. "That doesn't mean products won't run properly when they're overclocked."

Warns Matrox spokesperson Liv Stewart, "Overclock your memory too far, and that can result in corruption of the memory or could cause permanent damage." What's more, pushing your graphics clock too much can potentially hang your system or fry the graphics processor, she says.

That's overclocking to the extreme. Less

obvious is the long-term damage that overclocking can do to your graphics board—primarily due to overheating.

KEEP IT COOL

MOST VENDORS PUT their chips through a series of performance and torture tests to determine the ideal balance of speed, reliability, and longevity. (One of ATI's grueling tests involves running the chip at 131 degrees Fahrenheit).

"When you run your engine [or graphics card] in the red, you are reducing the lifetime of that engine," ATI's Nalasco says. He points out that many serious overclockers modify their PCs to keep components cool.

Overclocking by 5 to 10 percent isn't uncommon, says Tony Tamasi, general manager of desktop graphics products for Nvidia. "In really extreme cases, people overclock by 20 to 30 percent." But if you don't provide proper cooling or enough power, he cautions, pushing your board's processor just 2 percent beyond the manufacturer's speed could fry it.

As you turn up clock speed and add fans, your PC consumes more power. Tamasi recommends adding a higher-wattage power supply if you take that route.

If you want more speed but worry about voiding your warranty or crashing your PC, some vendors—Gainward is one—actually ship slightly modified cards. Gainward says it adjusts some cards' designs and adds faster memory so the boards run reliably at faster speeds. In our tests, however, the Gainward Ultra/650XP Golden Sample card showed only a slight performance boost over other Nvidia GeForce4 Ti 4200-based graphics cards we tested.

"The boards usually have another 20 to 30 MHz of room to push the engine clock and 40 to 50 MHz of room to push the memory," says Hans-Wolfram Tismer, managing director of Gainward in Europe.

If you're dying to squeeze extra juice out of your card, be sure to use fans and heat sinks to keep things cool, and add a beefier power supply to compensate for the extra power the components will require.

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ANTIALIASING

Blending Pixels Can Improve Image Quality



ANTIALIASING SOFTENS the rough edges that appear at lower resolutions by sampling and then blending pixels based on an average of those samples. The image on



the left is a scene from Unreal Tournament 2003 running at a resolution of 1024 by 768 without antialiasing. The middle image is the same scene with **MSI's G4Ti4400-VTD**



antialiasing set to take five samples per pixel. And as shown on the right, **Matrox's Parhelia-512** takes 16 samples and renders the scene with almost no visible jaggies.

(Systems with integrated graphics generally don't support hardware T&L.) "Right now we run at over 60 fps on NVidia's and ATI's latest and greatest cards. Last time we tried the game on the [NVidia] TNT2, we saw around 9 frames per second—this shows that games are capable of running on that older hardware, but not very well," says Sweeney.

FAST PLAY OR FANTASTIC SCENES?

GAMES LOOK MORE realistic when images are smooth and contain natural curves instead of rough, pixelated edges. Most graphics cards offer antialiasing to refine and soften the jagged edges that mar 3D images. At higher resolutions—1280 by 1024 and above—curved and diagonal edges of objects appear smoother, so you probably won't need to use antialiasing. Once you step your resolution down to 1024 by 768 or less, though, jagged edges frequently appear on both text and images. Running games with antialiasing slows performance, but as graphics boards get more powerful, this becomes less of an issue.

Typically, antialiasing works by sampling and then coloring pixels based on an average of those samples. Though it usually smooths edges effectively, it can also blur images. Graphics vendors employ various levels of sampling: ATI's Smoothvision takes up to six samples per pixel (though ATI asked us to use two-sample mode for faster performance), and NVidia's Quincunx takes five. On the other hand, Matrox's fragment antialiasing works in a completely different way—taking up to 16 samples



Gainward Ultra/650XP
Golden Sample



MSI G4MX440-VTP

but smoothing just the pixels on the edges, reducing the number of processing cycles.

Another way to improve image quality in games is to use anisotropic filtering, a method that smooths scenes in which a textured image (like a tiled floor) starts in the foreground and extends into the background. But this method relieves only blurriness—not jagged edges, as antialiasing does.

For our antialiasing tests, we asked each graphics card vendor for the settings that would provide the best balance between speed and image quality, and then we ran tests with Unreal Tournament 2003 at 1024 by 768 resolution with 32-bit color. Overall, the higher the sample rate, the better (and smoother) the game looked—and in most cases, the lower the frame rate. The image-quality leader was Matrox's Parhelia-512. That card hit only 48 fps, however—about two-thirds of the 71 fps the EVGA.com E-GeForce4 Ti 4600 card earned using four-sample mode, although edges remained somewhat jagged. MSI's G4MX420-T board scored the lowest in image quality because rough edges didn't improve much with antialiasing.

AGP XTRANEIOUS

SUPPORT FOR THE new 8X AGP interface is creeping into graphics boards. The 8X AGP interface doubles the transfer rate from about 1GB per second (4X AGP) to about 2.1GB per second. But will this improvement result in faster performance? Motherboards with 8X AGP support weren't available when we started testing, but ▶



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PROBLEM SOLVER

Top 5 Reasons to Upgrade Your Graphics Card

1. If playing Unreal Tournament feels like real torture, try the **MSI G4Ti4400-VTD**. (If price is no object, go for the **EVGA.com E-GeForce4 Ti 4600**.)
2. If you want to transform your PC into a video editing and multimedia command center, look at the **ATI All-In-Wonder Radeon 8500DV**.
3. If it's time to ditch your TiVo, try a card bundled with **ATI's Remote Wonder** or **NVIDIA's Personal Cinema** hardware.
4. If you find that day trading works better on dual displays, opt for an **MSI G4Ti4400-VTD**, **MSI G4MX460-VTP**, or **ATI Radeon 9000**.
5. If you want the ultimate surround-gaming (or surround-working) system, get the **Matrox Parhelia-512**.

graphics experts we interviewed about the speed increase that 8X AGP provides were not optimistic.

"AGP hasn't been a performance bottleneck since the day it was created," Peter N. Glaskowsky, editor in chief of the *Microprocessor Report*, says.

Matrox's Sebastian Macdougall agrees with that assessment. "Most applications don't need 8X [AGP] bandwidth, and right now the graphics card isn't transferring that much over the bus." The graphics card's processor handles most of the heavy lifting.

The bottom line: For the time being, 8X AGP is not a compelling reason to upgrade.

DIRECTX 8 AND 9 UPDATE

IF YOU'RE AN avid gamer, the promise of hardware support for Microsoft's DirectX 8 would seem a compelling reason to upgrade (budget cards support it in software). However, DirectX 8 didn't make that big a difference in our image quality tests, as our three-judge panel saw only minute differences between boards using DirectX 8 and DirectX 7. Even though DirectX 8 games have just arrived, DirectX 9 games—including Doom III—and graphics boards with hardware support for them will appear soon.

OpenGL, an open-source API, lets programmers create games for both Windows and non-Windows platforms, unlike games built solely with DirectX. OpenGL 2.0 is coming, and it promises hardware programmability not offered in previous versions.

SURROUND GAMING AND MORE

THE FIRST CONSUMER-LEVEL card to support up to three displays at once, Matrox's Parhelia-512 lets you experience a new level of immersive gaming—or a wide-screen view of large spreadsheets.

We tested the Parhelia with three Samsung LLT1620-B analog LCD monitors. We began the

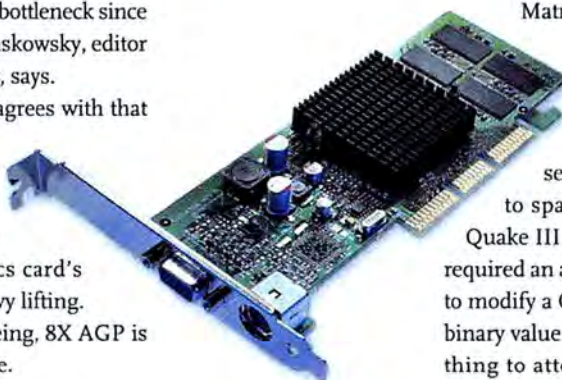
setup by connecting cables from the monitors to the board. Then we installed the drivers and Matrox's PowerDesk display management utility, which also required Windows .Net Framework (a 20MB download from Microsoft). After we completed those tasks, modifying the settings to allow the Windows Desktop to span three monitors was easy. Getting Quake III to work with three displays, however, required an additional tweak from Matrox: We had to modify a Quake III configuration file and add a binary value in the Windows Registry—not something to attempt unless you know what you're doing. We played Microsoft's Flight Simulator 2002 with only a change in resolution, though it topped out at 1920 by 400.

Multiple-monitor support isn't the only extra feature worth considering. ATI's All-In-Wonder Radeon 8500DV (see "Getting to Know Your Graphics Card," page 104) thinks it's a TiVo: It includes a TV tuner and DVD software, so you can record TV shows and save them onto DVD media or a hard drive. It also has an RF remote control, so you can change channels from another room.

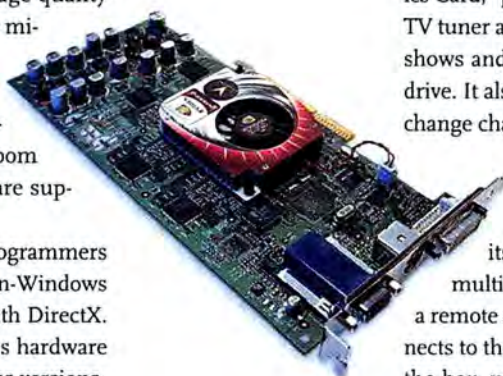
NVIDIA's Personal Cinema, bundled with some new GeForce4-based graphics cards or available for \$49 by itself, gives you an assortment of add-on multimedia options. The package comes with a remote and a lime-green AV/tuner box that connects to the card. By hooking a cable or antenna to the box, you can watch and record live TV, skip over commercials, replay scenes, and save TV shows. The unit also provides ports for a camcorder, VCR, or Webcam.

Boards packing even more multimedia features are sure to appear in the future. Visit find.pcworld.com/30626 for more in-depth reviews. ■

Alexandra Krasne is an associate editor for PC World.



VisionTek Xtasy
GeForce4 MX 420



VisionTek Xtasy
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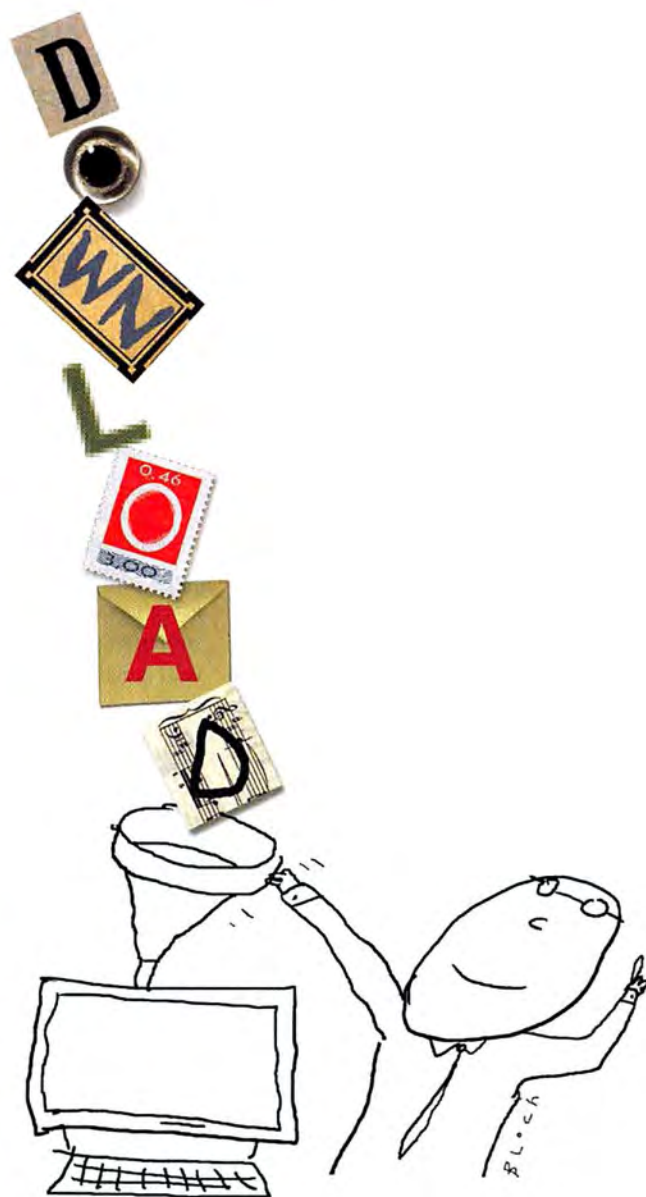
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DOWNLOADS

EDITED BY KALPANA
NARAYANAMURTHI
ILLUSTRATIONS
BY SERGE BLOCH



Forget pricey shrink-wrapped software. We uncover 25 shareware and freeware gems—from office workhorses to must-have Web utilities and handheld apps. ►

JUST as a cup of coffee in the afternoon can put a little pep in your step, the right download can give your PC some added zip. We've located 20 freeware and shareware programs that promise help with an array of functions, from backing up your data to managing your MP3 files. Every program that we recommend costs \$30 or less and is a complete application—not a trial version of a more expensive software package. We've also evaluated each program's ease of use, features, and overall value.

Of course, downloading programs from the Internet is sometimes a perilous process, and many programs can be downright hazardous to your PC. In "The Dark Side of Downloading," on page 120, we look at the sorts of programs to avoid and explain what you can do to protect yourself. And finally, we pinpoint five downloadable programs that your PC shouldn't go without. Visit find.pcworld.com/30428 to download any of the programs listed here.



THE DELTA MAIL e-mail application has an easy-to-use interface, and it automatically encrypts your messages.



BUSINESS/PERSONAL PRODUCTIVITY

TAKE A LOOK AT these helpful productivity applications, which range from an e-mail program to a synonym finder. One of these downloads could be just the tool you've been yearning for.

Easy E-Mail

Delta Mail, 76KB, \$12, ★★★★★

TWO WORDS PEOPLE RARELY USE when describing e-mail software: simple and safe. Delta Mail's (find.pcworld.com/30551) clean interface recalls the days when e-mail clients weren't cluttered with icons, toolbars, and menus. And the program is as easy to set up as it is to use: Just enter your SMTP and POP3 servers, your e-mail address, and your user name and password. But what really sets Delta Mail apart is its automatic encryption of outgoing messages (including the subject line and attachments) using a 256-bit algorithm that doesn't require digital IDs. You also get protection from many e-mail viruses simply because most virus writers target Outlook and Outlook Express. —Dennis O'Reilly

View That Document

MakePDF for Word 3.1, 1.7MB, \$30, ★★★★★

MAYBE YOU NEED to convert your heavily formatted Microsoft Word documents to Adobe's Portable Document Format so people who don't have Word running on their PCs can read them, but you can't justify spending \$249 for Adobe Acrobat. MakePDF for Word (find.pcworld.com/30554) is a less expensive (albeit less function-

al) alternative for people like you. Copy the MakePDF.dot template into your Word Startup folder to add a MakePDF toolbar to Word. Click the toolbar's 'Print to PDF' button to create a PDF version of the Word file and save it to the folder of your choice. You get a range of encryption and file-compression options, but you don't get Acrobat's internal links, bookmarks, password protection, and other advanced features. —Dennis O'Reilly

Maintain Contact

Wordware Personal Information Manager 2002a, 602KB, \$24, ★★★★★

A COTTAGE INDUSTRY has developed around utilities that add functions Microsoft neglected to provide in Word. One of the most useful of these gap fillers is



EDIT YOUR CONTACTS list the easy way with Wordware Personal Information Manager.

Wordware PIM (find.pcworld.com/30557), a simple program that introduces to Word a menu command (to the right of Help), along with a single-button toolbar, that leaves your personal and business contacts' e-mail addresses, phone numbers, and other information just a click away. That click opens a dialog box where you can arrange to enter, edit, and delete contacts and their information; import and export data; create envelopes and mailing labels; send faxes; and even generate reports. Anyone who has struggled with

the bulky Outlook interface will appreciate Wordware PIM's clean, simple look. The program does lack some features available in stand-alone PIMs, but if Word is your primary productivity tool, an integrated contact manager like this may be all the PIM you need. —Dennis O'Reilly

My Notes Are Here Somewhere

TexNotes, 2.6MB, \$15, ★★☆☆☆

FOR PEOPLE WHO USE Microsoft Word or Notepad as a scratch pad to scribble down quick notes, TexNotes (find.pcworld.com/30560) represents a flexible alternative that allows you to track your note-keeping. The program lets you organize files and

documents in different "notebooks," which it saves to your hard drive and lists in an Explorer-style browser along the right side of the screen for easy retrieval. You can add new files and documents by clicking a button. Each new note is a blank, white page; but a Microsoft Office-style toolbar lets you format your notes however you like, with different fonts, styles, and backgrounds. —Lisa Cekan

At a Loss for Words?

Idea Magic, 1.92MB, \$20, ★★★★★

IF YOU'RE DISSATISFIED with the word choices offered by Microsoft Word's Thesaurus tool, this program is for you. Idea Magic (find.pcworld.com/30563) finds synonyms from a database of 30,000 words, and it works in Word, Notepad, WordPad, and even Excel. When you select a word for it to search on, it identifies the word's various contexts in one pane and provides a list of synonyms for the selected context in another pane. For instance, typing in *slippery* brings up contexts such as "smoothness" and "improbability," along with synonyms for the currently selected context. Now the right words won't escape you. —Kalpana Narayanamurthi

ALL-STARS

LOOKING FOR the very best downloads a little money can buy? Don't overlook these five must-have tools and utilities.

1 Ad-aware: 872KB, free, find.pcworld.com/30431

Protect your privacy and prevent the system crashes that secretly downloaded ads sometimes cause.

2 Cookie Crusher: 325KB, \$15, find.pcworld.com/30608

Set this tool to accept or reject cookies; use it to determine whether cookies are tracking your Web surfing, as well.

3 Winamp: 1.97MB, free, find.pcworld.com/30611

This customizable media player saves playlists and equalizer settings.

4 WinZip: 1.76MB, \$29, find.pcworld.com/30614

This easy-to-use compression utility makes the task of sharing and moving files uncomplicated.

5 ZoneAlarm: 2.78MB, free, find.pcworld.com/30434

Use this firewall program to protect your Internet connection and dramatically reduce its vulnerability to hackers.



UTILITIES/ADD-ONS

THINK OF THESE handy utilities and program add-ons as the tonic your PC needs to acquire some performance verve.

Back It Up

Handy Backup, 1.36MB, \$30, ★★★★★

EVERYONE SHOULD back up data on a regular basis, but it's such a Herculean task that we tend to put it off. Enter

Handy Backup (find.pcworld.com/30566), an easy-to-use utility that employs a nifty wizard to guide you through the process. You can back up to your hard drive, to another computer on a LAN, to your CD-RW drive, or to an FTP site. You can set the program to back up daily, weekly, or monthly at a specific time. You can even instruct the program to encrypt your data using 128-bit encryption. The simple interface is so user-friendly, you might actually find yourself backing up your PC regularly. —Kalpana Narayanamurthi

Stay Healthy

AntiVir Personal Edition, 3.45MB, free, ★★☆☆☆

ANTIVIRUS SOFTWARE has become an essential utility that every PC needs to have installed. For the best protection and easiest controls, we recommend Symantec's Norton AntiVirus program (\$50, see find.pcworld.com/27361). If your budget is tight, however, you'll want to consider AntiVir Personal Edition (find.pcworld.com/30569). This simple but very effective antivirus application provides real-time protection by scanning a file every time it gets accessed. The program also lets you scan entire drives—but not individual files or folders—on demand. With AntiVir's basic scheduler and a little tinkering, you can also set up regularly occurring program updates, though not automatic drive scans (as you can with Norton AntiVirus). —Seán Captain

Antivirus Fire Drill

EICAR Standard Anti-Virus Test File, 68KB, free, ★★★★★

THE BEST TIME TO LEARN how your antivirus scanner works most assuredly isn't in the middle of an attack. Fortunately, you can run your PC through a test using the EICAR Anti-Virus Test File (find.pcworld.com/30572), a small program that antivirus vendors list in their virus definition databases. The Test File shows you how your scanner will react to a bona fide infection and lets you familiarize yourself with the warning messages and dialog boxes you'll have to navi- ►



CLICKING THE DICE button in SuperBladePro will give your photo a random mix of interesting editing effects.

gate. Once you know the ropes, you won't be caught off-guard when forced to deal with a real virus attack. —Seán Captain

Make Photos Feel Manipulated

SuperBladePro, 4.1MB, \$30, ★★★★★

ALL IMAGE EDITING applications come

with vast assortments of filters for jazzing up photos. But many of them don't allow you to tweak the filters. Though SuperBlade-Pro (find.pcworld.com/30575) is really a surface and texture generator plug-in, it can work as a self-contained image editor. Start it from within your image editing app (it works with any image editing program that accepts Adobe Photoshop-compatible plug-ins, including Photoshop Elements, Jasc Paint Shop Pro, and Ulead PhotoImpact), and you can bend, twist, and color-shift for hours. Play with settings like Glassiness, Iridescence, and Glare; induce Rain, Evaporation, and Grit. A collection of single-function plug-ins capable of doing all this would definitely cost a mint. —Alan Stafford

Shoo, Ads, Don't Bother Me

AdsGone Pop Up Killer, 2.53MB, \$19, ★★★★★

POP-UP ADS can drive you crazy, especially when you spend more time closing them than perusing the Web page you intended to visit. AdsGone (find.pcworld.com/30629) runs while you browse the Web with either Internet Explorer or AOL, and it blocks pop-ups before they appear. You can configure the program to block banner ads, too, and you can alter settings by adding ad servers to or removing them from the blocking list. The easy-to-use interface has a status bar that lists how many ads have been blocked, as well as a logging button that provides information about each ad. Not having to scoot your pointer around the screen closing unwanted windows will make you a much happier Web surfer. —Kalpana Narayanamurthi ▶

THE DARK SIDE OF DOWNLOADING

IF YOU'VE EVER USED the popular file-sharing program Kazaa, you probably know that copies of its downloaded client software contained code that would have enabled the program to take over your PC's processor and storage space on your hard drive for a planned distributed-computing network.

Many downloaded programs contain elements that can be harmful to your PC. Fortunately, you can take a few measures to protect yourself and ensure that the programs you download aren't performing tasks you're unaware of.

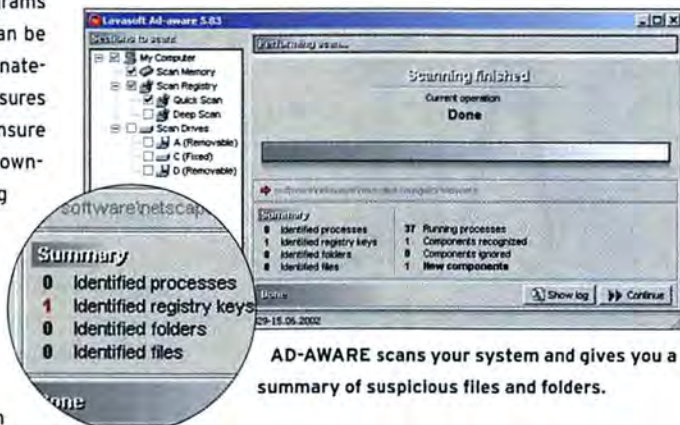
Adware and spyware are the two most widespread insidious elements that a download can contain. Adware—which installs itself on your PC during the download process—puts links and ads on Web pages that you visit, without your knowledge or consent. Spyware monitors your system information and your Web browsing patterns, and then uses your Internet connection to send that information to advertisers.

According to Jason Catlett, president of Junkbusters, there is no easy way to determine whether a program contains adware or spyware. He cautions against trusting any program. "Remember

that once a program starts running on your PC, it can do anything with anything on your computer. You wouldn't give the keys to your house to a stranger," he says.

To defend yourself against potential problems with a download, Catlett advises taking the following steps:

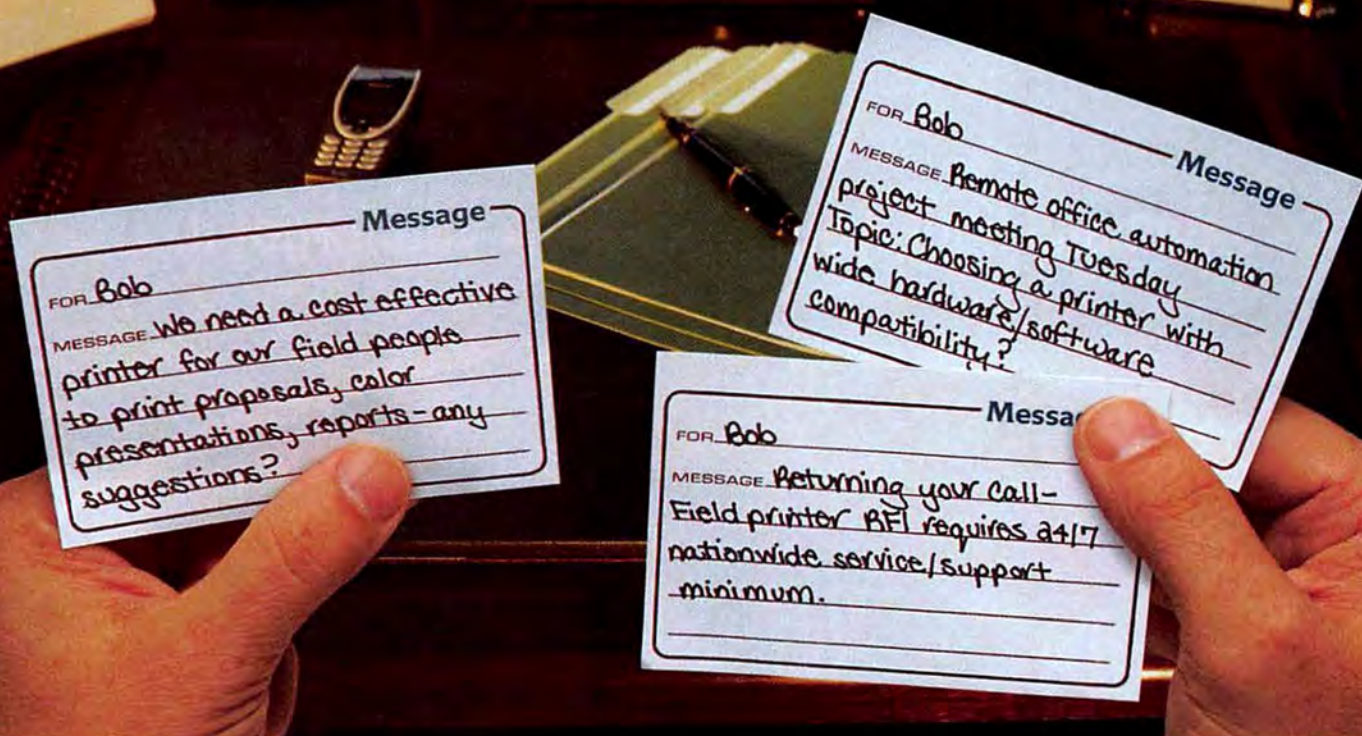
- ♦ Check whether the download is listed on Spychecker.com, a site with a database of over 1000 freeware and shareware programs that contain spyware or adware.
- ♦ Investigate software packages before downloading them. Examine professional reviews of download programs, and peruse user testimonials.
- ♦ Use Lavasoft's Ad-aware (find.pcworld.com/30431), a freeware utility that scans



AD-AWARE scans your system and gives you a summary of suspicious files and folders.

your system's Registry and hard drive for spyware components.

- ♦ Consider using Zone Labs' ZoneAlarm (find.pcworld.com/30434), a free firewall program that will notify you if a program starts "phoning home" or attempts to send outbound information back to an advertiser over your Internet connection.
- ♦ Uninstall a program if you suspect it of being malicious. Most programs include an uninstall feature; look for it in the file description or the program's feature list. —Kalpana Narayanamurthi



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Spinning Images

PanoStitcher, 6.2MB, \$30, ★★★☆☆

PIXTA'S PANOSTITCHER (find.pcworld.com/30632) is the best of several inexpensive applications you can use to create 360-degree panoramic images. (Better, more-sophisticated programs typically cost hundreds of dollars.) PanoStitcher doesn't have all the features the pricey packages do; but it's fast and relatively easy to use, and it produces acceptable results. Use PanoStitcher to create QuickTime VR panoramas that you can spin and zoom in on with your mouse, or to stitch together a composite .jpg image, as well as a Web page to display either. A special tripod head will improve your panoramas, but PanoStitcher works with freehand shots, too. The demo version is fully functional, except that it watermarks "Pixtra" over the entire image. The \$30 version omits the watermark. —Alan Stafford

Go Online, Offline

WinHTTrack Website Copier 3.15, 2.4MB, free, ★★★☆☆

WHETHER YOU WANT to preserve a copy of some research information or back up your own Web site, this handy utility can do the trick. WinHTTrack Website Copier (find.pcworld.com/30581) lets you copy or mirror entire Web sites; and while the interface isn't particularly inviting or user-friendly (neophytes may wish to consult the instructive online help), it does suffice to walk you through how to copy a site or pages. You can set various parameters (say, whether to include images; whether to exclude specific URLs; and whether to stay within the URL domain). The efficient software notifies you of problems it encounters, and it handled with aplomb the JavaScript code on one of the sites we downloaded. —Melissa J. Perenson

Log Me In, Please

AI RoboForm, 609KB, free, ★★★☆☆

IF YOU FIND YOURSELF writing down all your log-in names and passwords on little pieces of paper so you won't forget them, AI RoboForm (find.pcworld.com/30584) can put your house in order. In



MP3 WAV CONVERTER converts .wav files to .mp3 format and works as a media player.

your browser, RoboForm installs various hot buttons that you can click to automatically fill in Web-based forms and to enter log-in names and passwords instantly. You must supply the program with your name, date of birth, address, phone numbers, and any other data you want to store. To fill out a form, click the Fill Forms button; the program will fill in the blanks using the information you've provided. RoboForm uses Passcards to store your log-in names and passwords. The program can manage multiple users because each Passcard is password-protected; to access and change your information, you must remember your Passcard password. —Kalpana Narayanamurthi

Play Music Your Way

MP3 WAV Converter 2.6, 2.6MB, \$20, ★★★☆☆

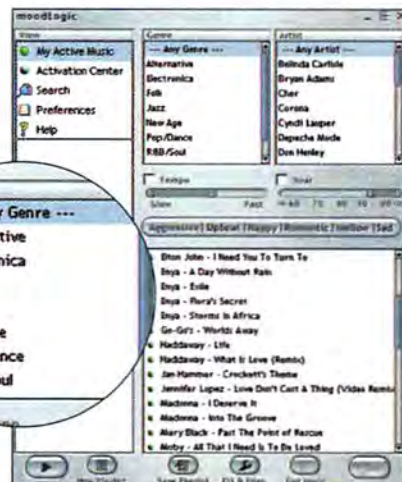
WHEN IT COMES to digital music, sometimes you want the compactness of MP3s, and sometimes you want the quality of a CD. MP3 WAV Converter (find.pcworld.com/30587) makes it easy to have both. By changing .wav music files into .mp3 files, the program reduces them to roughly a tenth of their original size; it converts MP3s to .wav format for playback on standard CD players.

MP3 WAV Converter also doubles as an audio player, minus the fancy skins and light shows most players have these days. The program completes its conversions in seconds, and it allows you to convert and play batches of files at the same time. Any .wav files converted into .mp3 format are automatically normalized to a consistent volume level. —Dennis O'Reilly

Mood Music

MoodLogic 2.0, 3MB, \$30, ★★★☆☆

IT DOESN'T TAKE MUCH to throw your MP3 collection into disarray. A download here, a ripped CD there—and before you know it, your library is full of files with misspelled song titles and recordings attributed variously to "Simon and Garfunkel" and to "Simon & Garfunkel." MoodLogic (find.pcworld.com/30590) automates the process of fixing ID3 tags and organizing digital music (MP3, WMA, and .wav) in bulk. Once the files are organized, you can sort your music by genre, artist, tempo, or mood (aggressive, mellow, upbeat, happy, romantic, sad), and create playlists accordingly. Musical mood information is culled from MoodLogic's database, which is populated by songs profiled by users. If your songs aren't already profiled, though, you must manually complete the five-screen profiling process to add each song to a MoodLogic playlist. —Melissa J. Perenson ▶



MOODLOGIC requires you to categorize MP3 songs by artist, type, mood, and tempo.

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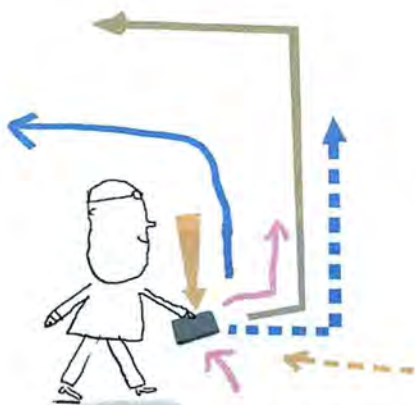
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HANDHELDS

YOU CAN LOAD these PDA programs, which range from a file manager to simple games, onto either your Palm OS PDA or your Pocket PC device.

PALM OS DOWNLOADS

File Finder

FilePoint, 894KB, \$30, ★★★★★

THE MORE applications, documents, and games you add to your Palm OS PDA, the more you realize that it desperately needs a good file management tool. FilePoint (find.pcworld.com/30593) lets you organize and find Palm apps, documents, and files with drag-and-drop ease. This utility simplifies creating folders, launching programs, tracking recently used files, and (especially) moving files to and from expansion memory cards. A \$50 deluxe version, FilePoint Pro, extends this functionality from the PDA to the PC desktop. Each time you resync, any drag-and-drop changes you made in PC file and folder locations are updated accordingly on your Palm OS device. Now why didn't Palm think of that? —Michael S. Lasky

Let's Make a Date

Palm DualDate, 282KB, free, ★★★★★

THE PALM DATE BOOK that comes standard on Palm OS handhelds is a single calendar for tracking appointments and reminders only. Palm DualDate (find.pcworld.com/30596) expands on those solo capabilities by letting you and other DualDate users send, receive, and synchronize calendars—so, for instance, you and an associate can more easily locate a

time when you both are free for lunch.

The enhanced screen views include side-by-side calendars on the same page to complement the original single view. You also get handy user options for maintaining privacy by limiting the data sent or received to your specifications. Though DualDate will work on both monochrome and color screens, color is better for differentiating between twin calendars, especially in monthly views. You can switch between solo and dual calendar views with a single icon tap. —Michael S. Lasky

A Gem of a Game

Bejeweled, 68KB, \$15, ★★★★★

ULTIMATELY, simple games wind up being the most popular—like Bejeweled for the Palm. Bejeweled (find.pcworld.com/30599) is highly addictive, combining the beguiling style of classic Tetris with its own unique puzzle. Five types of gems randomly drop into an 8 by 8 array; you play by tapping two adjacent dissimilar gems so they trade places. The object is to switch the gems' positions so that three or more matching gems align horizontally or vertically, causing them to disappear. As the matched sets fade out, random gems fall from the top to replace them. Color graphics and animation are sharp and lively, but you can play Bejeweled in gray scale on a monochrome Palm OS device as well. For a heart-pounding experience, switch to the caffeinated, timed game mode. Just don't plan to get very much work done. —Michael S. Lasky



IN BEJEWELED, you move colorful jewels around the screen so matching gems align.

POCKET PC DOWNLOADS

Tap Once to Remember

Pocket Informant, 2.6MB, \$29, ★★★★★

POCKET PC PDAs come with built-in applications for scheduling appointments and maintaining contacts and to-do lists. Pocket Informant (find.pcworld.com/30602) improves on these tasks by integrating them. For instance, if you want to make sure you don't forget a friend's birthday, you can create an alarm that links to your friend's name, letting you



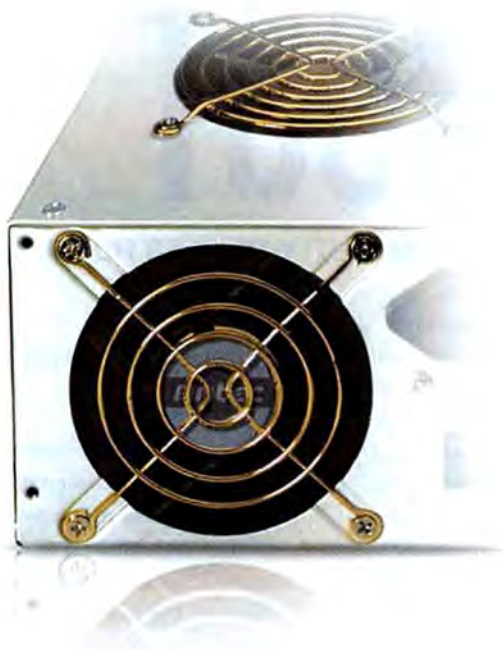
POCKET INFORMANT maintains contact info and helps you schedule appointments.

see the details for that entry. The app's excellent task manager allows you to filter tasks to view the matters that require immediate attention. —Richard Baguley

Burst Your Bubble

Bubbles, 82KB, \$15, ★★★★★

IN THIS SEEMINGLY simple game (find.pcworld.com/30605), five colors of "bubbles" are randomly placed on a grid. You play by clicking on a bubble; it and every adjacent bubble of the same color pops. The more you pop at once, the more points you get. When you pop the bubbles, ones above sink into the available spaces, and others waft down from above those; if you can maneuver the bubbles together to form bigger blocks, you score more points. —Richard Baguley ■



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SEEKING THE PERFECT HOST

HOW TO FIND HAPPINESS (AND RETURN ON INVESTMENT) WITH WEB HOSTING

Companies today are demanding solutions that deliver quantifiable business benefits—making their buying decisions based on tangible returns on investment.

As a result of this new focus, Web hosting is rapidly emerging as a powerful way to drive increased business performance and efficiency. Let's face it, today's businesses must have an online presence to compete effectively.

Whether or not your company utilizes the Internet as a revenue stream, you can benefit from the right Web hosting relationship with a Web hosting company on which you can consistently rely. Armed with the right criteria to evaluate hosting services, even a non-tech-savvy individual can make an informed and quick decision.

WEB HOSTING CHECKLIST

Four tips to ensure you receive the highest standard in Web hosting:

1 Security and Reliability. In today's world, with the threat of viruses, hackers, and data thieves, you need extra layers of electronic protection. Make sure that your Web hosting provider keeps your data behind firewalls, protected by dynamic encryption and port blocking, and reinforced by a knowledgeable, dedicated security staff. Be certain that your provider offers automatic, fail-safe redundancy, so that when a server fails

or is disabled by an attack, another will immediately take up the load and continue service without interruption.

2 Service and Support, 24 x 7. When something goes wrong with your service, you will want fast, intelligent answers and the problem resolved immediately, regardless of when it occurs. Consequently, you should investigate your hosting provider's

ability to proactively inform customers before it becomes an emergency. Having access to

self-help tools and trained technicians enables you to obtain answers quickly and streamlines your process to resolution.

3 Scalability. Your needs are likely to change as your business grows, so the flexibility to upgrade your service is important. Can your Web hosting provider grow with your needs should your business evolve from a starter Web site to a high-traffic e-commerce site? Does it offer an array of services, including shared and dedicated hosting packages?

4 Financial Stability. Your Web host is a direct reflection of your business. Be sure to choose a hosting partner with the financial strength to succeed in all economic times. Failure on its part puts your business at risk. Seek a provider that has proven experience in providing business-class hosting with a state-of-the-art network, unsurpassed reliability, and superlative customer service.



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The majority of companies with Web sites today are leaving Web hosting to the experts, with the cost savings and the need for greater technical resources driving their decisions.

Outsourcing to a full-service Web hosting provider such as Interland enables you to concentrate on your business and not the technology that underpins it. What's more, you eliminate the expensive up-front cost for equipment acquisition, maintenance, and training. Interland provides customers with access to secure networks and servers, scalable hosting plans to accommodate your changing needs, faster time-to-market, technical expertise, and proactive site maintenance and management.

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TOP 100

EDITED BY THE REVIEWS STAFF

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Office PCs

The stylish but expensive Gateway 700XL debuts on the *Top 15 Office PCs* chart this month. This system comes with an excellent 18-inch LCD screen and a DVD-RAM/-R drive.

Rewritable DVD Hits the Mainstream

Once upon a time, rewritable DVD drives were the preserve of those with plenty of cash and a strong desire to spend it expanding their PC. But with prices falling, these drives are now becoming common. In fact, five of the seven computers on the power section of our *Top 15 Home PCs* chart now come with recordable DVD drives. There is still no consensus on format, however: Two systems include a DVD+RW drive, two go for a DVD-RW drive, and one comes with a DVD-RAM drive.

Check out our comprehensive roundup of the latest graphics cards on page 99; it replaces our *Top 10 Graphics Boards* chart this month.

Freelance writers Dan Littman, Mick Lockey, and Carla Thornton, and PC World reviews editors Richard Baguley, Tracey Capen, Seán Captain, Lisa Cekan, Rebecca Freed, Melissa Perenson, and Alan Stafford contributed to the Top 100 section this month. Ulrike Diehlmann, Elliott Kirschling, Jeff Kuta, Tony K. Leung, and Thomas Luong of the PC World Test Center performed testing on the products reviewed in this section, with logistical support provided by Julio Gian-nobile and Julian Weatherby.

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Digital Cameras

Pentax's Optio 230 comes with a fold-out LCD screen that allows you to take self-portraits; photo quality was a little disappointing, however.



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CD-RW Drives

Speed is in on our *Top 10 CD-RW Drives* chart, with two new 48X drives—the Lite-On 48x12x48 and the CenDyne Lightning IV 48x12x48—at second and fifth places, respectively.



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Notebooks

The new Gateway 450XL boasts a great keyboard and a combo DVD/CD-RW drive in a svelte 7.5-pound package.

**YOUR GUIDE TO THE TOP 100**

EACH MONTH WE TEST a large number of PCs, printers, monitors, and other products. Only the best products land on the charts, which are refreshed monthly.

System configurations are shown as tested. The overall rating for each product is calculated on a 100-point scale and reflects results from our hands-on evaluations

and performance tests. A 90-point score is exceptional, while one in the 70s is above average.

The PC WorldBench 4 score is a measure of how fast a PC can run a mix of common business applications as compared with our baseline machine, a Gateway Select 1200 with a 1.2-GHz Athlon processor, 128MB of PC133

SDRAM, and a 20GB hard drive. For example, a PC that scores 120 is 20 percent faster than the baseline system. The policies score is based on vendor support policies (not shown on charts). Please see find.pcworld.com/15720 for additional details on how we compile charts for the *Top 100*.

TOP 15 OFFICE PCs

	POWER SYSTEM		Overall rating	Street price (7/17/02)	PC WorldBench 4 performance score ¹	Faster	Comments
1	Best BUY Gateway 700XL find.pcworld.com/30185	NEW	81	Very expensive \$3359	Windows XP Home Very good 120		This system has a wealth of features, including an 18-inch LCD screen and a DVD-RAM/-R drive for archiving data and burning video to disc. (★★★★☆)
2	Dell Dimension 8200 find.pcworld.com/29930		81	Very expensive \$2947	Windows XP Professional Very good 120		Expensive unit provides plenty of processing power, loads of storage, and a DVD+RW/+R drive for backing up data. (★★★★☆ Sept 02)
3	Micro Express MicroFlex 2100A find.pcworld.com/28761		80	Very inexpensive \$1499	Windows XP Professional Outstanding 128		Bargain PC offers high-speed performance using a motherboard with an overlocked CPU. Monitor is top-notch. (★★★★☆ Aug 02)
4	ABS Conquest G4 find.pcworld.com/27041		79	Inexpensive \$1921	Windows XP Professional Outstanding 125		Powerful model has four USB 1.1 and four FireWire ports conveniently placed on the front; small text looked fuzzy on the monitor. (★★★★☆ July 02)
5	Polywell Poly 883VR-2200 find.pcworld.com/29939		77	Expensive \$2495	Windows XP Professional Very good 124		Fine performance scores for this well-equipped system, which includes a wireless keyboard and mouse. (★★★★☆ Sept 02)
6	Dell OptiPlex GX260 find.pcworld.com/30191	NEW	77	Average \$1947	Windows XP Professional Good 112		Corporate system has a full range of remote-management options plus tool-less case entry and drive-bay access. (★★★★☆)
7	Tangent Valera DDR 2000+ find.pcworld.com/25281		77	Inexpensive \$1649	Windows XP Professional Very good 117		A strong performer; includes video capture and editing software—but no FireWire ports for connecting digital camcorders. (★★★★☆ June 02)
VALUE SYSTEM			Percent of overall rating ▶	15 percent	20 percent		
1	Best BUY Gateway 500S find.pcworld.com/26961		83	Average \$1249	Windows XP Professional Very good 108		PC features a stylish silver-and-black chassis that's easy to open; the matching 15-inch LCD monitor displays crisp text. (★★★★☆ July 02)
2	Micro Express Micro Flex 1800B find.pcworld.com/26981		83	Inexpensive \$999	Windows XP Professional Outstanding 122		System achieves its speed in part by using a motherboard with an overlocked CPU as a default setting. (★★★★☆ July 02)
3	Dell Dimension 4500 find.pcworld.com/29933		80	Very expensive \$1637	Windows XP Professional Very good 109		Has plenty of expansion options, including USB 2.0 ports on the rear and front of the case. (★★★★☆ Sept 02)
4	Sys Performance 1700+ find.pcworld.com/25241		80	Average \$1211	Windows XP Professional Very good 111		Beige-box unit provides strong performance and comes with an impressive 19-inch CRT monitor. (★★★★☆ June 02)
5	IBM NetVista A22p find.pcworld.com/19341		78	Inexpensive \$1020	Windows XP Home Fair 91		Model features a pop-off front cover for easy drive-bay access; remote-management software can be downloaded. (★★★★☆ Mar 02)
6	MicronPC ClientPro CR find.pcworld.com/25161		77	Average \$1344	Windows XP Professional Good 95		Though this system targets business environments, MicronPC doesn't bundle any client management software with it. (★★★★☆ June 02)
7	Compaq Evo D510 find.pcworld.com/30200	NEW	73	Very expensive \$1614	Windows XP Professional Very good 109		A space-saver, but the case leaves little room for expansion. Provides below-average performance for its configuration. (★★★★☆)
8	Polywell Poly 845G-2260 find.pcworld.com/30194	NEW	73	Expensive \$1550	Windows XP Professional Very good 110		PC combines an array of features, a lackluster 15-inch LCD screen, and a roomy case with lots of expansion options. (★★★★☆)
			Percent of overall rating ▶	25 percent	15 percent		

All systems were tested or retested under our PC WorldBench 4 test suite. See find.pcworld.com/10860 for details on PC World's Star Ratings.

¹ Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. See "Your Guide to the Top 100" on page 133 for more details.

² Total capacity in gigabytes.

A NEW GATEWAY 700XL takes first place in the power section of our *Top 15 Office PCs* chart. This impressive system has pretty much every feature you could want: a humongous 120GB hard drive, a very nice 18-inch LCD screen, and plenty of performance from the 2.53-GHz Pentium 4 CPU. There's also a DVD-RAM/-R drive for backing up and archiving data or burning video discs. The array of goodies comes at a lofty price, though: At \$3359, the 700XL is the most expensive system on our chart.

The other new entry on the power side is the Dell OptiPlex GX260, which replaces the discontinued GX240. This system offers plenty for people looking to get easily manageable PCs into their cubicles; in addition to offering remote troubleshooting capabilities, it features a case and drive bays that permit tool-less access.

On the value side, two new systems enter at the bottom end: The Compaq Evo

Visit find.pcworld.com/28763 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION								Extra features	Design/ documentation	Vendor's reliability/ service
CPU	RAM (MB/type)	Hard drive ²	Monitor size (diagonal inches)	Graphics	Case type ³	Open bays/slots				
2.53-GHz Pentium 4	1024/ PC800 RDRAM	120	18 (LCD)	128MB GeForce4 Ti 4600	Tower	4/3	Outstanding: DVD-RAM/-R drive, 40X/12X/48X CD-RW drive, V.92 modem, network adapter, Office XP Small Business Edition	Very good/ Good	Good/ Fair	
2.4-GHz Pentium 4	512/ PC800 RDRAM	120	17 (LCD)	64MB GeForce4 Ti 4200	Midsize tower	2/1	Good: DVD+RW/+R/CD-RW drive, 24X-48X CD-ROM drive, network adapter, Microsoft Office XP Small Business Edition	Good/ Good	Outstanding/ Fair	
1.73-GHz Athlon XP 2100+	512/ DDR333 SDRAM	100	17	64MB Gainward GeForce3	Midsize tower	3/3	Very good: DVD-RAM/-R drive, 32X/10X/40X CD-RW drive, V.90 modem, network adapter	Fair/ Poor	✓	
1.73-GHz Athlon XP 2100+	512/ DDR266 SDRAM	120	19	128MB PNY GeForce4 Ti 4600	Midsize tower	3/1	Very good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, net- work adapter, Microsoft Office XP Small Business Edition	Good/ Good	✓	
1.8-GHz Athlon XP 2200+	512/ DDR333 SDRAM	80	18 (LCD)	128MB Asus V8460UL	Midsize tower	2/2	Very good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Lotus SmartSuite 2002	Good/ Fair	✓	
2.53-GHz Pentium 4	256/ DDR266 SDRAM	40	15 (LCD)	Integrated Intel 845 ³	Midsize tower	3/4	Fair: 8X DVD-ROM and 8X/4X/24X CD-RW combo drive, network adapter, tool-less drive-bay carriers, Wake-on-LAN	Good/ Fair	Outstanding/ Fair	
1.67-GHz Athlon XP 2000+	256/ DDR266 SDRAM	80	19	64MB MSI MS-8850	Midsize tower	6/4	Very good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, net- work adapter, tool-less drive-bay carriers	Good/ Fair	✓	
10 percent							15 percent	15 percent	25 percent	
2A-GHz Pentium 4	256/ DDR333 SDRAM	40	15 (LCD)	32MB GeForce2 MX200	Midsize tower	2/2	Outstanding: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter	Good/ Good	Good/ Fair	
1.53-GHz Athlon XP 1800+	256/ DDR266 SDRAM	62	17	64MB Leadtek WinFast GeForce2 Ultra	Midsize tower	3/4	Very good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter	Fair/ Fair	✓	
2A-GHz Pentium 4	256/ DDR266 SDRAM	40	15 (LCD)	64MB GeForce4 MX	Midsize tower	4/3	Good: 24X/10X/40X CD-RW drive, case lock, network adapter, tool- less drive-bay carriers, Office XP Small Business Edition	Very good/ Good	Outstanding/ Fair	
1.47-GHz Athlon XP 1700+	256/ DDR266 SDRAM	41	19	64MB Gigabyte AV64S-T Radeon 7000Pro	Midsize tower	4/4	Very good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, net- work adapter, Corel WordPerfect Office 2002	Good/ Fair	✓	
1.6-GHz Pentium 4	256/ PC133 SDRAM	41	15	32MB VisionTek GeForce2 MX	Midsize tower	2/3	Good: 16X/10X/40X CD-RW drive, network adapter, chassis-intru- sion detection, client management software, Wake-on-LAN	Good/ Fair	Good/ Fair	
1.7-GHz Pentium 4	256/ PC133 SDRAM	40	17	32MB GeForce2 MX200	Midsize tower	5/3	Good: 24X/10X/40X CD-RW drive, network adapter, Wake-on-LAN, Microsoft Office XP Small Business Edition	Good/ Fair	Good/✓	
2.53-GHz Pentium 4	256/ DDR266 SDRAM	20	17	Integrated Intel 845 ³	Desktop	0/2	Fair: 16X DVD-ROM drive, MultiBay expansion port, network adapter, client management software, Wake-on-LAN	Good/ Fair	Good/ Poor	
2.2-GHz Pentium 4	256/ DDR333 SDRAM	100	15 (LCD)	Integrated Intel 845 ³	Midsize tower	3/5	Very good: 16X DVD-ROM drive, 40X/24X/10X CD-RW drive, net- work adapter, Lotus SmartSuite 2002	Good/ Fair	✓	
10 percent							15 percent	10 percent	25 percent	

³ 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).

⁴ Insufficient data to give a rating, or rating is derived from vendor's Reliability and Service survey scores for its home PCs.

⁵ Uses main memory.

D510 makes its debut at number seven, while the Polywell Poly 845G-2260 just sneaks in at number eight.

Like the Dell OptiPlex GX260, the Compaq Evo D510 is aimed at companies that intend to buy multiple PCs; it provides remote-administration tools to make information services managers' lives easier. The Evo is a low-profile box that would easily fit into small spaces—although

its dimensions also mean that there is minimal room for expansion.

Housed in Polywell's stylish and roomy aluminum case, the Poly 845G-2260 comes packaged with a disappointing 15-inch LCD display; colors look dark, and the monitor is bulky compared with other 15-inch LCDs, partly due to the built-in speakers, which produce lackluster sound.



THE DELL OPTIPLEX GX260 comes with drive bays that permit tool-less access.

TOP 15 NOTEBOOK PCs

	POWER NOTEBOOK	Overall rating	Street price (7/12/02)	PC WorldBench 4 performance score ¹	Faster	Comments
1	Best BUY Dell Inspiron 8200 find.pcworld.com/28021	88	Average \$2279	Windows XP Home	Very good 100	The Inspiron 8200 is big and heavy, has lots of features, and guzzles power—its battery lasted just under 2.5 hours. (★★★★☆ Aug 02)
2	MicronPC TransPort GX3 find.pcworld.com/29897	85	Average \$2619	Windows XP Professional	Good 94	A fingerprint reader and an impressive keyboard highlight this stylish laptop; but like the Inspiron, its battery lasted only 2.5 hours. (★★★★☆ Sept 02)
3	HP Pavilion ZT1000 Series find.pcworld.com/30248 NEW	85	Average \$2499	Windows XP Home	Good 98	This consumer notebook comes wireless ready; it also offers a plethora of multi-media ports and easily accessible CD audio controls. (★★★★☆)
4	IBM ThinkPad T30 find.pcworld.com/29898	84	Very expensive \$3499	Windows XP Professional	Good 95	Lightweight, two-spindle machine is IBM's first with dual pointing devices. It also has both Bluetooth and Wi-Fi (802.11b) wireless built in. (★★★★☆ Sept 02)
5	Gateway 450XL find.pcworld.com/30251 NEW	84	Average \$2277	Windows XP Professional	Good 91	Features a single-bay design and a great keyboard. Slightly smaller than Gateway's 600XL, and lacks that model's audio-player controls on the front. (★★★★☆)
6	Gateway 600XL find.pcworld.com/30254 NEW	83	Expensive \$3149	Windows XP Professional	Very good 100	A generous screen distinguishes this wireless-ready desktop replacement; unit holds two optical drives, three batteries, or three hard drives. (★★★★☆)
7	Sony VAIO PCG-GRX570 find.pcworld.com/30257	80	Average \$2670	Windows XP Home	Average 89	Jumbo screen has resolution of 1600 by 1280. Model offers a Memory Stick slot for loading digital pictures, as well as a Jog Dial pointing device. (★★★★☆ Sept 02)
VALUE NOTEBOOK		Percent of overall rating ▶	15 percent	20 percent		
1	Best BUY Dell Latitude C610 find.pcworld.com/21183	83	Expensive \$2208	Windows XP Professional	Very good 99	Revamp of older model allows both wireless and standard networking connections to be built in, eliminating the need for PC Cards. (★★★★☆ Apr 02)
2	Fujitsu LifeBook S Series find.pcworld.com/30263 NEW	82	Average \$1929	Windows XP Professional	Very good 94	Ultraportable with a DVD-ROM/CD-RW combination drive and a great keyboard is wireless ready; has the smallest screen on the chart. (★★★★☆)
3	Acer TravelMate 632XCi find.pcworld.com/30266 NEW	81	Inexpensive \$1499	Windows XP Professional	Very good 94	Wireless-ready, single-bay design includes a DVD-ROM/CD-RW combination drive and a Smart Card reader. (★★★★☆)
4	Compaq Presario 1720 find.pcworld.com/19482	81	Average \$1599	Windows XP Home	Very good 95	Lightweight, well-equipped consumer laptop comes with a DVD-ROM/CD-RW combination drive and a FireWire port. (★★★★☆ Mar 02)
5	Dell Inspiron 2650 find.pcworld.com/28201	80	Average \$1829	Windows XP Home	Very good 98	A basic all-in-one notebook with a DVD-ROM/CD-RW combination drive, but only average battery life and price. (★★★★☆ Aug 02)
6	Compaq Presario 2701 find.pcworld.com/19483	80	Average \$1999	Windows XP Home	Very good 97	Dual-optical-drive design lets you use DVD-ROM and CD-RW drives simultaneously. Price includes second battery. (★★★★☆ Mar 02)
7	Fujitsu LifeBook A Series find.pcworld.com/30269 NEW	79	Average \$1649	Windows XP Professional	Good 87	All-in-one is nicely priced for a model with a wireless antenna and better-than-average battery life, but it suffers from awful-sounding speakers. (★★★★☆)
8	IBM ThinkPad A31 find.pcworld.com/27181	79	Very expensive \$2674	Windows XP Professional	Good 90	The A31 provides plenty of features for the price—including dual modular bays—but its performance in our tests was unimpressive. (★★★★☆ July 02)
		Percent of overall rating ▶	20 percent	15 percent		

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

¹ Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. See "Your Guide to the Top 100" on page 133 for more details.

² Except where noted, all CPUs are SpeedStep chips, which run at a slower speed when on battery power.

³ In gigabytes.

NOTEBOOK SPEED TICKS UP another notch this month with the first chart appearance of a laptop with a mobile 2-GHz/1.2-GHz Pentium 4 processor. The \$3149 Gateway 600XL, our new number six power notebook, earned a solid PC WorldBench 4 score of 100. While that's not much faster than the results we got from 1.2-GHz Pentium III models tested last year, it is about 5 percent better than the average performance we've seen for laptops with the Pentium 4 generation of chips.

A giant with a 15.7-inch screen, the gray-and-silver Gateway 600XL would make a good desktop replacement; but its nearly 10 pounds of traveling weight, including the power adapter, means it would be quite a load on the road. The similar-looking \$2277 Gateway 450XL—our new fifth-place power portable—has a 15-inch screen and weighs a more reasonable 7.5 pounds fully loaded.

Visit find.pcworld.com/30272 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION							Extra features *	Overall design	Battery life (hours:min) *	Average weight (pounds) *	Vendor's reliability/ service
CPU †	Screen (inches)	RAM (MB)	Hard drive ‡	Pointing device	Multi-purpose bays						
1.7-GHz Pentium 4-M	15.1	256	40	Touchpad, eraserhead	1	Very good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office XP SBE 2002	Outstanding	Average/ 2:28	Very heavy/ 9.4	Good/ Fair	
1.8-GHz Pentium 4-M	15	256	40	Touchpad	1	Very good: 8X DVD-ROM drive, built-in modem and network adapter, Microsoft Office XP SBE 2002	Outstanding	Average/ 2:36	Average/ 8.0	Fair/ †	
1.9-GHz Pentium 4-M	15	512	40	Touchpad	1	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Bluetooth support	Very good	Average/ 2:20	Average/ 7.6	Good/ Fair	
1.8-GHz Pentium 4-M	14.1	256	40	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Bluetooth support	Outstanding	Average/ 2:30	Light/ 6.7	Good/ Fair	
1.8-GHz Pentium 4-M	15	256	20	Touchpad	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Works 2002	Very good	Average/ 2:40	Average/ 7.5	Fair/ Fair	
2-GHz Pentium 4-M	15.7	512	40	Touchpad	2	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Works 2002	Outstanding	Average/ 2:33	Very heavy/ 9.9	Fair/ Fair	
1.6-GHz Pentium 4-M	16.1	512	40	Touchpad, Jog Dial	1	Very good: 8X DVD-ROM and 16X/10X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Word 2002	Very good	Average/ 2:08	Very heavy/ 9.8	Good/ †	
5 percent							10 percent	10 percent	5 percent	10 percent	25 percent
1-GHz Pentium III-M	14.1	256	20	Touchpad, eraserhead	1	Good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Very good/ 3:56	Average/ 7.8	Good/ Fair	
1-GHz Pentium III-M	13.3	256	40	Touchpad	1	Very good: 8X DVD-ROM and 16X/10X/24X CD-RW combination drive, built-in modem and network adapter	Average	Average/ 2:43	Very light/ 5.7	Good/ †	
1.6-GHz Pentium 4-M	14.1	256	20	Touchpad	1	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter	Very good	Average/ 2:47	Average/ 7.2	†/ †	
1-GHz Pentium III-M	14.1	256	20	Touchpad	1	Good: 6X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in modem and network adapter	Average	Good/ 3:13	Average/ 6.8	Fair/ Poor	
1.6-GHz Pentium 4-M	14.1	256	30	Touchpad	0	Very good: 8X DVD-ROM and 8X/8X/24X CD-RW combination drive, built-in modem and network adapter, Microsoft Works 2002	Average	Average/ 2:18	Heavy/ 8.3	Good/ Fair	
1-GHz Pentium III-M	15	512	30	Touchpad	1	Very good: 8X DVD-ROM drive, 8X/4X/24X CD-RW drive, built-in modem and network adapter	Very good	Good/ 3:19	Very heavy/ 10.1	Fair/ Poor	
1.2-GHz Athlon 4	14.1	256	40	Touchpad	0	Very good: 8X DVD-ROM and 8X/4X/24X CD-RW combination drive, built-in modem and network adapter	Average	Average/ 2:48	Average/ 7.6	Good/ †	
1.6-GHz Pentium 4-M	15	256	40	Eraserhead	2	Good: 8X DVD-ROM and 4X/4X/24X CD-RW combination drive, built-in network adapter, Lotus SmartSuite	Outstanding	Average/ 2:33	Heavy/ 8.2	Good/ Fair	
5 percent							10 percent	10 percent	5 percent	10 percent	25 percent

* Word score reflects both listed and unlisted features.

† Unless otherwise noted, all notebooks come with a lithium ion battery.

‡ Includes computer, AC adapter, power cord, floppy drive, and optical drive.

† Insufficient data to give a rating.

Also new to the power chart, the number three HP Pavilion ZT1000 Series (\$2499) is wireless ready and has a futuristic design that includes a black case and lots of flashy status lights.

Dell's \$2208 Latitude C610, a business notebook we reviewed in April, grabs the value Best Buy this month (the previous Best Buy, MicronPC's TransPort XT2, was discontinued). Placing second is

Fujitsu's new LifeBook S Series. The \$1929 LifeBook S, at a minimum weight of about 4 pounds, is one of the lightest notebooks with a modular bay. However, its battery life of 2 hours, 43 minutes falls short of the standard set by the C610. Other new value models this month are Acer's wireless-ready TravelMate 632XCi, taking the third spot, and Fujitsu's LifeBook A Series, ranking seventh. ▶



THE HP PAVILION ZT1000 Series has easily accessible audio-player controls on the front.

TOP 15 HOME PCs

	POWER SYSTEM	Overall rating	Street price (7/19/02)	PC WorldBench 4 performance score ¹	Faster	Comments
1	Best BUY Dell Dimension 8200 find.pcworld.com/28921	97	Expensive \$3058	Windows XP Home	Good 121	Fast system has a great LCD and thundering sound; you must enter the "Hot Deals" section of Dell's site to get this price. (★★★★★ Aug 02)
2	Gateway 700XL find.pcworld.com/29921	95	Average \$2999	Windows XP Home	Good 121	Price drops \$360 on this multimedia powerhouse that's fully equipped for video, music, and games. (★★★★☆ Sept 02)
3	MicronPC Millennia XP+ Xtreme find.pcworld.com/25103	92	Inexpensive \$2419	Windows XP Home	Very good 123	Fast system handles games with aplomb. Comes with a top-notch monitor and an extensive system manual. (★★★★★ June 02)
4	HP Pavilion 792 find.pcworld.com/30284	88	Very expensive \$3528	Windows XP Home	Good 119	High-priced system's large LCD monitor displayed crisp colors, but its small case provides limited room for upgrades. (★★★★☆)
5	ABS Awesome 3300 find.pcworld.com/28901	87	Inexpensive \$2109	Windows XP Home	Very good 123	Zippy PC has AMD's latest processor and a powerful six-speaker sound system. Colors on the monitor looked a bit dark. (★★★★★ Aug 02)
6	Alienware Aurora DDR find.pcworld.com/30278	85	Expensive \$3090	Windows XP Home	Very good 123	System provides ample room to grow; CRT delivers colorful graphics; booming six-speaker set enhances impressive game play. (★★★★☆)
7	Polywell Poly 880XP-2100 find.pcworld.com/28981	84	Very inexpensive \$1899	Windows XP Home	Good 122	Powerful system's price drops \$151 this month. Monitor quality was disappointing for text, however. (★★★★☆ Aug 02)
VALUE SYSTEM		Percent of overall rating ▶	10 percent	25 percent		
1	Best BUY Dell Dimension 4500 find.pcworld.com/29918	90	Expensive \$1468	Windows XP Home	Good 108	A price drop sweetens the deal on Dell's midrange model. Performance is good, but the sound system is weak. (★★★★☆ Sept 02)
2	ABS Bravado 2300 find.pcworld.com/30275	85	Average \$1239	Windows XP Home	Very good 115	Fast system's monitor offers sharp text but muted colors. Six-speaker set delivered beautiful sound. (★★★★☆)
3	ABS Awesome 3110 find.pcworld.com/17321	83	Very expensive \$1609	Windows XP Home	Outstanding 117	Stalwart system has a larger monitor and slightly higher performance than the Bravado 2300, but at a price premium. (★★★★★ Feb 02)
4	Polywell Poly 883VF-2000 find.pcworld.com/30287	80	Average \$1275	Windows XP Home	Outstanding 117	Offers zippy performance and a large hard drive at an affordable price. Monitor is unexceptional, however. (★★★★☆)
5	HP Pavilion 752 find.pcworld.com/29924	75	Average \$1283	Windows XP Home	Good 102	Handsome blue-and-gray system lagged in our performance tests, and you can't upgrade its integrated graphics. (★★★★☆ Sept 02)
6	NuTrend Kila-Intel find.pcworld.com/17301	75	Inexpensive \$1073	Windows XP Home	Good 103	Low-cost, high-performance value PC with nice extra features. Monitor quality is unimpressive, however. (★★★★☆ Feb 02)
7	Gateway 300S find.pcworld.com/30281	70	Very inexpensive \$899	Windows XP Home	Fair 84	Bargain, compact system is fine for basic computing. But anemic performance and weak graphics rule out high-end uses. (★★★★☆)
8	Polywell Poly 1000DU find.pcworld.com/15114	61	Average \$1188	Windows XP Home	Fair 93	System squeezes respectable performance from an aging low-cost processor and includes a variety of extras. (★★★☆☆ Dec 01)
		Percent of overall rating ▶	20 percent	20 percent		

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

¹ Performance word scores reflect comparisons of PCs in the same category (power or value) running the same operating system. For more details, see "Your Guide to the Top 100" on page 133.

² Total capacity in gigabytes.

FIVE NEW SYSTEMS join the Home PCs chart this month. Debuting at number four on the power side, the pricey HP Pavilion 792 has a 2.53-GHz Pentium 4 CPU, a good-looking LCD monitor, and a keyboard with shortcut buttons aplenty. It also comes with a second-generation DVD+RW drive that supports the write-once +R format; discs written in this format promise increased compatibility over +RW discs in consumer DVD players. In sixth place, the Athlon-based Alienware Aurora DDR

delivers the solid performance numbers and smoothly flowing graphics that game players demand. And gamers, being upgrade fanatics, also should appreciate its roomy case and obsessively neat interior.

At the same time we welcome new systems, we say farewell to some highly rated older models. At press time, HP told us it was planning to upgrade the processors offered with the Compaq Presario 8000Z,

Visit find.pcworld.com/30305 for reviews of all products tested this month and ranked in this chart.

BASE CONFIGURATION						Extra features	Graphics/ sound quality	Setup and ease of use	Vendor's reliability/ service
CPU	RAM (MB/type)	Hard drive ²	Monitor (inches)	Graphics	Case type ³				
2.53-GHz Pentium 4	1024/ RDRAM	120	17 (LCD)	128MB GeForce4 Ti 4600	Midsized tower	Good: DVD+RW/-R/CD-RW drive, 24X-40X CD-ROM drive, V.90 modem, net- work adapter, Microsoft Office XP Small Business Edition	Very good/ Outstanding	Very good	Outstanding/ Good
2.53-GHz Pentium 4	1024/ RDRAM	120	18 (LCD)	128MB GeForce4 Ti 4600	Midsized tower	Outstanding: DVD-RAM/-R drive, 40X/12X/48X CD-RW drive, V.92 modem, net- work adapter, four USB 2.0 ports, Microsoft Office XP SBE, Pinnacle Studio 7	Very good/ Very good	Outstanding	Fair/ Fair
1.67-GHz Athlon XP 2000+	512/DDR SDRAM	120	19	128MB GeForce4 Ti 4600	Midsized tower	Good: DVD-RW/-R/CD-RW drive, V.90 modem, network adapter, Pinnacle Studio 7	Very good/ Very good	Outstanding	Fair/ Fair
2.53-GHz Pentium 4	1024/DDR SDRAM	120	17 (LCD)	64MB GeForce4 MX440	Minitower	Outstanding: DVD+RW/-R/CD-RW drive, 32X/10X/40X CD-RW drive, V.90 modem, network adapter, Microsoft Works Suite 6, ArcSoft ShowBiz	Very good/ Good	Good	Fair/ Poor
1.8-GHz Athlon XP 2200+	512/DDR SDRAM	120	15 (LCD)	128MB EVGA GeForce4 Ti 4600	Midsized tower	Good: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, V.90 modem, network adapter, Corel WordPerfect Office 2002, four games	Good/ Outstanding	Good	*/
1.8-GHz Athlon XP 2200+	1024/DDR SDRAM	120	19	128MB GeForce4 Ti 4600	Tower	Good: DVD-RW/-R/CD-RW drive, 16X DVD-ROM drive, V.90 modem, network adapter, Ulead VideoStudio 4.0 SE Basic, Deus Ex game	Very good/ Outstanding	Very good	*/
1.73-GHz Athlon XP 2100+	512/DDR SDRAM	120	19	128MB GeForce4 Ti 4600	Midsized tower	Fair: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, four USB 2.0 ports, three games, Roxio Easy CD Creator 5	Very good/ Good	Good	*/
10 percent						10 percent	15 percent	5 percent	25 percent
2A-GHz Pentium 4	256/DDR SDRAM	40	15 (LCD)	64MB GeForce4 MX420	Midsized tower	Fair: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter, six USB 2.0 ports, Microsoft Works Suite 2002, Dell Picture Studio	Good/ Fair	Very good	Outstanding/ Good
1.6-GHz Athlon XP 1900+	256/DDR SDRAM	60	17	64MB GeForce4 MX460	Midsized tower	Very good: 16X DVD-ROM drive, 40X/12X/48X CD-RW drive, V.92 modem, net- work adapter, Corel WordPerfect Office 2002	Good/ Outstanding	Very good	*/
1.53-GHz Athlon XP 1800+	256/DDR SDRAM	60	19	64MB PNY Verto GeForce3 Ti 500	Tower	Outstanding: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, V.90 modem, network adapter, Corel WordPerfect Office 2002, Roxio Easy CD Creator 5	Very good/ Outstanding	Very good	*/
1.67-GHz Athlon XP 2000+	256/DDR SDRAM	120	19	64MB GeForce4 MX420	Midsized tower	Fair: 16X DVD-ROM drive, 40X/12X/40X CD-RW drive, V.90 modem, network adapter, four USB 2.0 ports, Lotus SmartSuite Millennium	Good/ Fair	Good	*/
2A-GHz Pentium 4	256/DDR SDRAM	120	17	Integrated Intel 845GL using main memory	Minitower	Good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.90 modem, network adapter, six USB 2.0 ports, Microsoft Works, Encarta, and Money 2002	Good/ Fair	Fair	Fair/ Poor
1.7-GHz Pentium 4	256/DDR SDRAM	40	17	32MB VisionTek Xtasy 5332	Midsized tower	Good: 16X DVD-ROM drive, 24X/10X/40X CD-RW drive, V.92 modem, network adapter, Corel WordPerfect Office 2002	Good/ Very good	Good	*/
1.8-GHz Celeron	256/DDR SDRAM	40	17	Integrated Intel 845GL using main memory	Desktop	Fair: 24X/10X/40X CD-RW drive, V.92 modem, network adapter, six USB 2.0 ports, Microsoft Works Suite 2002, The Sims game	Good/ Fair	Good	Fair/ Fair
1-GHz Duron	128/DDR SDRAM	40	19	32MB Matrox Millennium G450	Midsized tower	Good: 16X DVD-ROM drive, 16X/10X/40X CD-RW drive, V.90 modem, network adapter, Lexmark 253 Color Jetprinter, Logitech Webcam	Good/ Very good	Fair	*/
10 percent						10 percent	10 percent	5 percent	25 percent

² Vertical cases are towers (over 20 inches), midsized towers (15.5 to 20 inches), or minitowers (under 15.5 inches). Horizontal cases are desktops (5 inches or taller) or compacts (under 5 inches). All-in-one PCs integrate a system and a monitor.

³ Insufficient data to give a rating.

which took fourth place on September's power chart, and the Presario 6000, which was last month's value Best Buy.

The well-rounded Dell Dimension 4500 moves up to the number one value spot. It's joined on the chart by three new value systems—two computers with plain-Jane exteriors that nevertheless stand out for their high performance, and one snappy-looking but sluggish contender.

With a good price and a robust set of features—including a six-speaker sound system—the ABS Bravado 2300 snatches the second position. Two rungs lower, the Polywell Poly 883VF-2000 offers top-notch speed. In seventh place, the Gateway 300S provides a space-saving black-and-gray case and a budget-friendly price, but the trade-off is lethargic performance and modest multimedia components. ►



BEIGE IS BEAUTIFUL: The ABS Bravado 2300 has great performance and sound.

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Integrated AGP Graphics
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Integrated AGP Graphics
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TOP 10 PRINTERS

TOP 100

TEST
Center

Visit find.pcworld.com/30296 for reviews of all products tested this month and ranked in this chart.

THREE OF THE FOUR new lasers we tested this month join our chart. On the corporate side, the Brother HL-2460N takes second place thanks in part to speedy, attractive text printing. Xerox discontinued its DocuPrint N2125, a longtime Best Buy, clearing room at the top for Samsung's ML-1651N. Among

small-office models, Brother's new HL-1850, at number four, posted the best text speed mark we've seen. Minolta's PagePro 1250E comes in fifth, helped by touches like an ethernet option. Samsung's ML-1430 costs \$199 and prints graphics quickly, but it falls short on output quality and features. ►

	SMALL-OFFICE LASER	Street price (7/15/02)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/graphics	Comments
1	Best Buy Brother HL-1440 find.pcworld.com/11581	\$300	82	11.2/5.3	Very good/ Very good	FEATURES: Rated 15 ppm. Standard 2MB of RAM, 1200-by-600-dpi maximum resolution, 250 sheets input, 150 output. SUMMARY: Brother's HL-1440 delivered quick performance and smooth gray-scale output. Its RAM is expandable to 34MB, and adding an ethernet card (available for \$299 more) makes the unit suitable for a small workgroup. (★★★★☆ Oct 01)
2	Samsung ML-1450 find.pcworld.com/24241	\$299	82	10.4/4.8	Very good/ Good	FEATURES: Rated 15 ppm. Standard 4MB of RAM, 1200-by-600-dpi maximum resolution, 650 sheets input, 350 output. SUMMARY: This nicely designed printer provides the largest standard paper capacity of any SOHO model here. It excelled at printing text and lines and can magnify documents into 6-page-by-6-page poster format. (★★★★☆ June 02)
3	Lexmark E320 find.pcworld.com/17421	\$299	78	12.8/6.0	Very good/ Fair	FEATURES: Rated 16 ppm. Standard 4MB of RAM, 1200-by-600-dpi maximum resolution, 150 sheets input, 100 output. SUMMARY: The E320 printed graphics faster than any other SOHO printer on our chart, and its price is competitive. But while text looked crisp and even, gray-scale images were too dark and lost detail. (★★★★☆ Feb 02)
4	Brother HL-1850 find.pcworld.com/30101 NEW	\$500	77	13.6/5.3	Very good/ Good	FEATURES: Rated 19 ppm. Standard 16MB of RAM, 2400-by-600-dpi maximum resolution, 350 sheets input, 150 output. SUMMARY: Fast print speeds and an optional third input tray make the HL-1850 a viable choice for a small workgroup. You can make it networkable by adding an ethernet card for another \$200. Output looked clean, and text was legible even at small sizes. (★★★★☆)
5	Minolta-QMS PagePro 1250E find.pcworld.com/30102 NEW	\$299	76	12.4/4.7	Good/ Fair	FEATURES: Rated 17 ppm. Standard 16MB of RAM, 1200-by-1200-dpi maximum resolution, 250 sheets input, 100 output. SUMMARY: All the prints from the 1250E appeared somewhat dark—a serious liability only for graphics. Photos lacked detail and looked blocky, but text and line art seemed reasonably clear. A 500-sheet paper feeder is a \$149 option. (★★★★☆)
CORPORATE LASER						
1	Best Buy Samsung ML-1651N find.pcworld.com/17402	\$499	85	10.8/4.3	Very good/ Fair	FEATURES: Rated 17 ppm. Standard 16MB of RAM, 1200-by-1200-dpi maximum resolution, 650 sheets input, 250 output. SUMMARY: The least-expensive network-ready printer on the chart, the ML-1651N is fast enough for small workgroups, but not for larger offices. Anyone at the printer can reprint the previous job—a security risk in workgroups. (★★★★☆ Feb 02)
2	Brother HL-2460N find.pcworld.com/30103 NEW	\$1000	84	14.6/3.9	Very good/ Fair	FEATURES: Rated 25 ppm. Standard 16MB of RAM, 2400-by-600-dpi maximum resolution, 600 sheets input, 500 output. SUMMARY: Versatile workgroup model offers plenty of paper-handling options, including a \$400 duplex and up to three additional paper trays. Though it came out a bit light, text looked evenly weighted and attractive. (★★★★☆)
3	HP LaserJet 4100n find.pcworld.com/11661	\$1550	82	13.6/4.5	Outstanding/ Good	FEATURES: Rated 25 ppm. Standard 32MB of RAM, 1200-by-1200-dpi maximum resolution, 600 sheets input, 300 output. SUMMARY: An optional infrared port, supplementing the standard ethernet interface, lets notebook users print directly from their laptops. This unit raced through our speed tests, and it reproduced text superbly.
4	Minolta-QMS PagePro 9100 N find.pcworld.com/25861	\$1499	82	16.7/2.9	Very good/ Very good	FEATURES: Rated 35 ppm. Standard 64MB of RAM, 1200-by-1200-dpi maximum resolution, 700 sheets input, 500 output. SUMMARY: The 9100 N has a generous amount of standard memory and produced very good text, line, and gray-scale output. Its five-paper-tray capacity and standard ethernet interface are well suited for larger workgroups. (★★★★☆ June 02)
5	Lexmark T522dn find.pcworld.com/18342	\$1549	81	15.0/6.0	Very good/ Good	FEATURES: Rated 25 ppm. Standard 32MB of RAM, 1200-by-1200-dpi maximum resolution, 600 sheets input, 250 output. SUMMARY: One of the fastest printers on the chart, the T522dn flies when printing graphics. You can add a 2000-sheet tray and an envelope feeder. A version without the built-in duplex costs \$250 less. (★★★★☆ Oct 01)

HOW WE TEST: The overall rating for monochrome laser printers is based on price (25 percent), print quality (25 percent), features (15 percent), ease of use (15 percent), speed (10 percent), and service and support (10 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings.

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TOP 10 MONITORS

Visit find.pcworld.com/30293 for reviews of all products tested this month and ranked in this chart.

NEC's NEW FE791SB garners a Best Buy and the top spot on our chart, thanks to sharp, detailed graphics. It adds a button for adjusting screen brightness to any of three presets. Compaq's inexpensive S7500 offers good image quality in a stylish case. The CTX PR711F is an easy-to-tweak monitor with clean

text. Finally, squeaking onto the chart at number ten, Samsung's SyncMaster 765MB produces better text than graphics; it includes extra buttons for controlling brightness. The KDS XF-7b missed the chart, due to its dark, flat graphics and blurry text. Next month, we'll look at 19-inch CRTs. ►

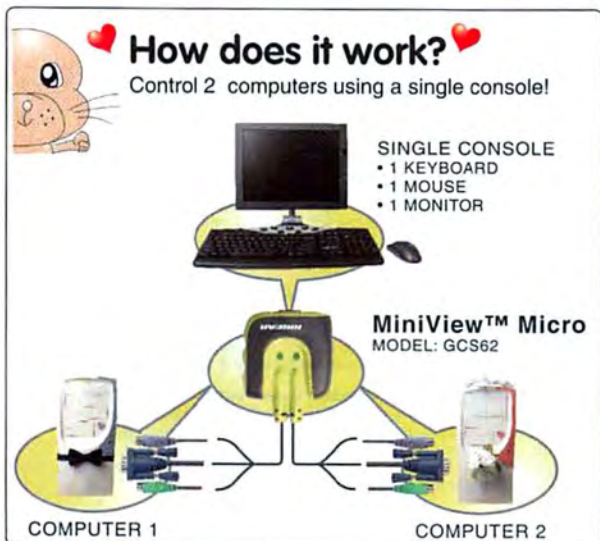
	17-INCH MONITOR	Street price (7/19/02)	Overall rating	Quality of text/graphics	Comments
1	Best Buy NEC-Mitsubishi MultiSync FE791SB find.pcworld.com/30290 NEW	\$239	93	Outstanding/Outstanding	FEATURES: 15.9-inch viewable area, .25mm ¹ Diamondtron M2 aperture grille tube, up to 116-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Both text and images are bright and sharply rendered. You can choose among three preset brightness levels with the on-panel "super bright mode" button. (★★★★☆)
2	Best Buy IBM P77 find.pcworld.com/21761	\$345	91	Outstanding/Outstanding	FEATURES: 16-inch viewable area, .24mm-.25mm ¹ FD Trinitron aperture grille tube, ³ up to 85-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Pricy professional model outshines its competitors with clear, detailed text display and rich, lifelike colors. Controls are comprehensive but can be confusing. (★★★★☆ Apr 02)
3	NEC-Mitsubishi MultiSync FE700+ find.pcworld.com/21762	\$199	90	Very good/Outstanding	FEATURES: 15.9-inch viewable area, .25mm ¹ Diamondtron NF aperture grille tube, up to 87-Hz refresh rate, ² up to 1024 by 768 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Crisp text and bright colors make this inexpensive newcomer suitable for all purposes. On-screen controls require a lot of button pressing. (★★★★☆ Apr 02)
4	ViewSonic G75f find.pcworld.com/13380	\$182	88	Very good/Good	FEATURES: 16-inch viewable area, .25mm ¹ Perfect Flat shadow mask tube, up to 105-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Text is clearly readable and colors appear well saturated. On-screen controls are nicely organized, but button combinations take a while to figure out. (★★★★☆ Nov 01)
5	Compaq S7500 find.pcworld.com/30239 NEW	\$189	88	Very good/Very good	FEATURES: 16-inch viewable area, .24mm ¹ shadow mask tube, up to 85-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Inexpensive, stylish monitor uses simple three-button navigation; menu icons may be difficult to decipher. Lacks the number eight PT20's high-end features, but text and photos look sharp. (★★★★☆)
6	Dell M782 find.pcworld.com/21763	\$199	88	Very good/Good	FEATURES: 15.9-inch viewable area, .25mm ¹ shadow mask tube, up to 75-Hz refresh rate, ² up to 1280 by 1024 resolution at 70 Hz, TCO'95 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Monitor with stylish black case and silver buttons displays clean, dark text and bright colors; suitable for general home or business use. Help button in on-screen controls provides useful tips. (★★★★☆ Apr 02)
7	CTX PR711F find.pcworld.com/30240 NEW	\$229	87	Very good/Very good	FEATURES: 16-inch viewable area, .24-.25mm ¹ FD Trinitron aperture grille tube, ³ up to 115-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 12-hour weekday, toll-free support. SUMMARY: Professional-quality monitor handles text and graphics well. Navigation control buttons are simple and intuitive, and menus are well marked. (★★★★☆)
8	Compaq P720 find.pcworld.com/16267	\$329	87	Outstanding/Very good	FEATURES: 16.2-inch viewable area, .25mm ¹ Diamondtron NF aperture grille tube, up to 118-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Sleek black-and-silver monitor has eight navigation and shortcut buttons. Image quality looked great all around, with sharp text and realistic colors. (★★★★☆ Jan 02)
9	Iiyama Vision Master Pro 413 find.pcworld.com/13260	\$250	86	Very good/Very good	FEATURES: 15.9-inch viewable area, .25mm ¹ Diamondtron NF aperture grille tube, up to 115-Hz refresh rate, ² up to 1600 by 1200 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 12-hour weekday, toll-free support. SUMMARY: Unit produces bright, vibrant graphics, but controls are woefully confusing. Dual, switchable inputs allow you to share the monitor. (★★★★☆ Nov 01)
10	Samsung SyncMaster 765MB find.pcworld.com/30241 NEW	\$229	86	Very good/Good	FEATURES: 15.9-inch viewable area, 0.25mm ¹ Natural Flat shadow mask tube, up to 85-Hz refresh rate, ² up to 1280 by 1024 resolution at 70 Hz, TCO'99 compliant, three-year warranty, 24-hour daily toll-free support. SUMMARY: Text is clean, but graphics look flat. Monitor includes a highlight button to brighten small or large areas of the screen and a MagicBright button to control general brightness. (★★★★☆)

HOW WE TEST: Twelve judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays screens of typical letters, spreadsheets, Web pages, and scanned photos. Overall rating is based on text and graphics quality (25 percent each), price (25 percent), features and ease of use (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings.

¹ Specification represents diagonal dot pitch for shadow mask monitors and stripe or varying stripe pitch for aperture grille monitors. ² Maximum refresh rate at 1024 by 768 resolution (the tested resolution for this size monitor). ³ Uses an aperture grille tube in which parallel wires near the sides of the screen are strung farther apart than those at the middle.



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TOP 10 CD-RW DRIVES

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Visit find.pcworld.com/30647 for reviews of all products tested this month and ranked in this chart.

THE PUSH TO 48X/12X/48X IS ON: This month, 48X-rated drives from Lite-On, CenDyne, and Universal Buslink join our chart—and all three provide CD-R and CD-RW write performance rivaling that of the first 48X drive we tested, Pacific Digital's Mach 48. The Mach 48 retains the number one

spot; close behind is our second Best Buy, Lite-On's 48x12x48 CD-RW. Two new 40X-rated drives, Samsung's \$95 SW-240 and PGI-Verbatim's \$110 40x12x48 VBT-401248A, also make this month's chart. Meanwhile, a \$15 price drop helps the Asus CRW-4012A climb from seventh to fourth. ▶

	CD-RW DRIVE	Street price (7/29/02)	Overall rating	Performance/support policies	CD-R write speed for 650MB/CD-RW write speed for 100MB (min:sec)	Comments
1	Best Buy Pacific Digital Mach 48 CD-RW find.pcworld.com/29906	\$100	92	Very good/ Outstanding	2:36/1:06	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 12-hour daily toll-free support. SUMMARY: This model sped through our CD-R tests; however, its CD-ROM read performance lags that of the fastest drives by about 10 percent. (★★★★☆ Sept 02)
2	Best Buy Lite-On 48x12x48 CD-RW LTR-48125W NEW find.pcworld.com/30521	\$90	89	Outstanding/ Fair	2:38/1:08	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 9-hour weekday support (calls are not toll-free). SUMMARY: This unit achieved the second-fastest times in both of our CD-ROM read tests. Lite-On now provides helpful manuals via its Web site. (★★★★☆)
3	TDK VeloCD 40/12/48 find.pcworld.com/28284	\$120	88	Very good/ Very good	3:15/1:08	FEATURES: 40X/12X/48X, IDE, internal, 2MB buffer, Ahead Nero Burning ROM 5.5 and InCD 3.24, one-year warranty, 10.5-hour daily toll-free support. SUMMARY: Price falls \$15 this month, but faster drives cost less; still, it's one of two drives on the chart with daily tech support. Includes TDK's Digital MixMaster audio software. (★★★★☆ July 02)
4	Asus CRW-4012A find.pcworld.com/29561	\$75	88	Very good/ Fair	3:27/1:07	FEATURES: 40X/12X/48X, IDE, internal, 2MB buffer, Ahead Nero Burning ROM 5.5 and InCD 3.23, one-year warranty, 11.5-hour weekday support (calls are not toll-free). SUMMARY: Bargain-priced drive achieved fast times on our CD-RW packet-writing tests. Model features play, fast-forward, and stop buttons. Price drops by \$15. (★★★★☆ Aug 02)
5	CenDyne Lightning IV 48x12x48 CD-RW LTR-48125W NEW find.pcworld.com/30524	\$100	87	Outstanding/ Fair	2:37/1:08	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 12-hour weekday and 4-hour Saturday support (calls are not toll-free). SUMMARY: Another high-flying performer, this unit includes a well-illustrated manual with troubleshooting information. (★★★★☆)
6	Universal Buslink CD-RW 48x12x48 NEW find.pcworld.com/30530	\$95	87	Outstanding/ Fair	2:36/1:08	FEATURES: 48X/12X/48X, IDE, internal, 2MB buffer, Mt. Rainier support, Ahead Nero Burning ROM 5.5 and InCD 3.27, one-year warranty, 9.5-hour weekday support (calls are not toll-free). SUMMARY: Documentation is limited, but not performance: This drive ties for fastest CD-R write speed and second-fastest audio extraction. (★★★★☆)
7	LG Electronics GCE-8400B find.pcworld.com/29907	\$100	87	Good/ Good	3:18/1:08	FEATURES: 40X/12X/40X, IDE, internal, 2MB buffer, Roxio Easy CD Creator 5.1 and DirectCD 5.1, one-year warranty, 13-hour weekday toll-free support. SUMMARY: A good performer in our CD-mastering and packet-writing tests, this drive is suitable for all burning tasks; it's the same price as the Pacific Digital 48X drive, however. (★★★★☆ Sept 02)
8	Sony CRX195A1 find.pcworld.com/28281	\$100	87	Very good/ Very good	3:16/1:06	FEATURES: 40X/12X/48X, IDE, internal, 2MB buffer, B's Recorder Gold 3.23 and Clip Wizard 3.24, one-year warranty, 12-hour weekday and 12-hour Saturday toll-free support. SUMMARY: Earned good marks on our CD-R and CD-RW write tests; posted the fastest time on our digital audio extraction test. Price drops by \$40 this month. (★★★★☆ July 02)
9	PGI-Verbatim 40x12x48 VBT-401248A NEW find.pcworld.com/30536	\$110	86	Very good/ Fair	3:13/1:06	FEATURES: 40X/12X/48X, IDE, internal, 2MB buffer, Ahead Nero Burning ROM 5.5 and InCD 3.22, one-year warranty, 8-hour weekday and 4-hour Saturday toll-free support. SUMMARY: A fast CD-R and CD-RW writer, this drive is also a great CD-ROM reader; it ranked third in our CD-ROM read tests. Includes a CD-label applicator. (★★★★☆)
10	Samsung SW-240 NEW find.pcworld.com/30539	\$95	86	Good/ Fair	3:32/1:14	FEATURES: 40X/12X/40X, IDE, internal, 8MB buffer, Roxio Easy CD Creator 5.1 and DirectCD 5.1, one-year warranty, 12-hour weekday toll-free support. SUMMARY: A generous 8MB buffer theoretically helps minimize use of the buffer underrun protection, but the drive was a lackluster performer in our CD-RW write and CD-ROM read tests. (★★★★☆)

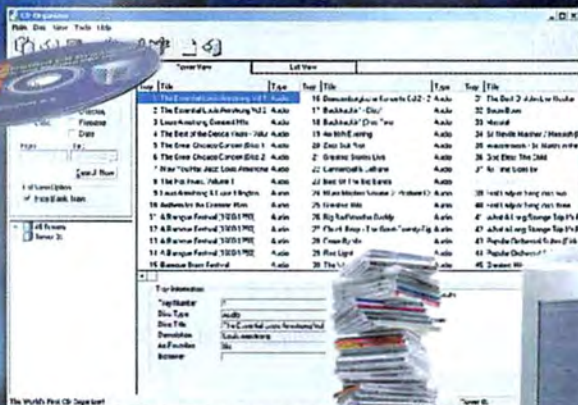
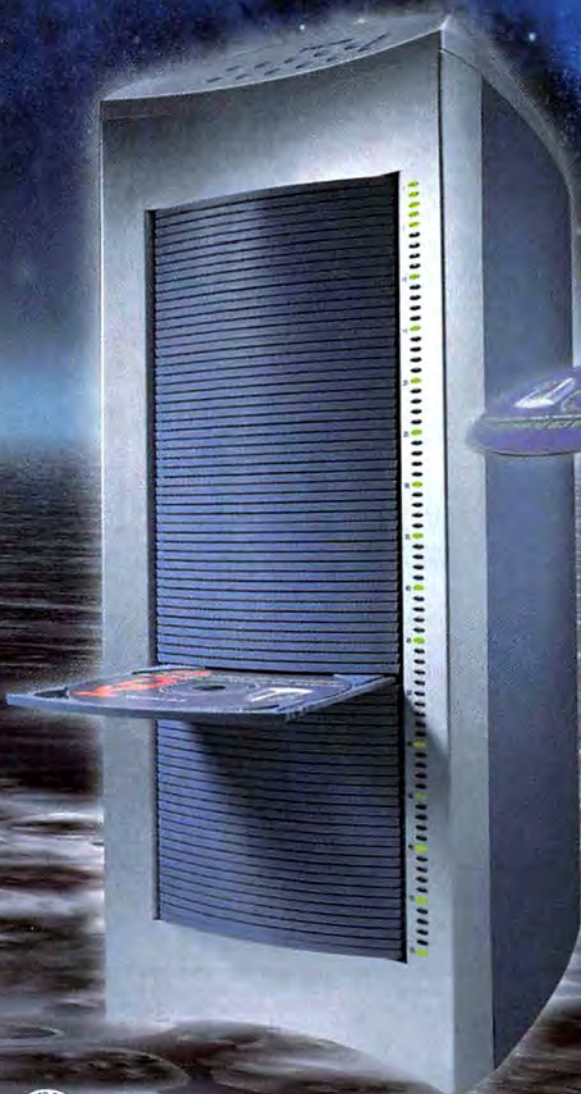
HOW WE TEST: To determine CD-R write performance, we burn data to CD-R discs from an image file and on the fly. We measure CD-RW performance by copying 100MB of files to a CD-RW disc, and then rewriting the same data to the same disc. To gauge CD-ROM read performance, we time how long the drive takes to install Microsoft Office 2000 SBE (disc one); we also evaluate the drive's digital audio extraction speed by extracting 320MB of musical tracks from an audio CD to our hard drive. Overall ratings are based on performance (35 percent), price (25 percent), features (20 percent), tech support policies (10 percent), and ease of installation (10 percent). See find.pcworld.com/10860 for details on PC World's Star Ratings. ¹ Vendor's speed ratings, listed in order: CD-R write/CD-RW write/CD-ROM read. ² Except where noted, all drives use buffer underrun protection.

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TOP 10 DIGITAL CAMERAS

TEST
Center

Visit find.pcworld.com/30449 for reviews of all products tested this month and ranked in this chart.

THREE NEW CAMERAS land on our chart this month. A point-and-shoot model that takes detailed photographs, Olympus's D-550 Zoom offers above-average battery life and image quality for a reasonable price. The compact Pentax Optio 230 has a few nifty features such as an LCD screen that

swivels out and lets you take self-portraits. Though its colors looked too bright in our test photos, it has the longest battery life on our chart. Finally, Toshiba's PDR-3300 is a low-priced camera with full manual exposure control. The buttons and menus are easy to use, but batteries run out quickly. ►

	CAMERA: UNDER \$500	Street price (7/26/02)	Overall rating	Image quality	Ease of use	Battery life/ shots	Comments ¹
1	Best BUY Olympus C-3020 Zoom find.pcworld.com/25702	\$449	78	Very good	Good	Fair/ 270	FEATURES: 3.2-megapixel resolution, 16MB SmartMedia card, 32mm-96mm focal range; USB output; 14.2 ounces. SUMMARY: This bulky camera has a fast lens and many controls that photo hobbyists desire, but you'll have to be content with making silent movies. Price drops by \$50 this month. (★★★★☆ June 02)
2	Best BUY Nikon Coolpix 2500 find.pcworld.com/25761	\$299	78	Good	Good	Fair/ 284	FEATURES: 2-megapixel resolution, 16MB CompactFlash media, 37mm-111mm focal range; USB output; 7.5 ounces. SUMMARY: Great-looking, compact point-and-shoot has a novel design that protects the lens during storage; it captures video but not sound, and has no optical viewfinder. (★★★★☆ June 02)
3	Olympus D-550 Zoom find.pcworld.com/30422 NEW	\$399	77	Very good	Good	Good/ 336	FEATURES: 3-megapixel resolution, 16MB SmartMedia card, 36mm-100mm focal range; USB and video output; 11.6 ounces. SUMMARY: This sturdy, easy-to-use camera has fine battery life and takes great pictures. You get few extras, and the zoom button could be better, but the price is low for a 3-megapixel model. (★★★★☆)
4	Pentax Optio 230 find.pcworld.com/30419 NEW	\$299	77	Fair	Good	Outstanding/ 572	FEATURES: 2-megapixel resolution, 16MB CompactFlash media, 38mm-114mm focal range; USB and video output; 8.2 ounces. SUMMARY: Compact and simple to use, the Optio 230 has some unusual features, like a 3D picture mode and a fold-out color LCD screen for self-portraits. Pictures had a grayish cast in our tests. (★★★★☆)
5	Toshiba PDR-3300 find.pcworld.com/30425 NEW	\$349	77	Fair	Very good	Limited/ 141	FEATURES: 3.2-megapixel resolution, 8MB MultiMediaCard media, 35mm-100mm focal range; USB and video output; 11.7 ounces. SUMMARY: This heavy, black camera includes manual control of both aperture and shutter speed for a great price. Color photos look flat and the battery runs out quickly, however. (★★★★☆)
6	Olympus D-380 find.pcworld.com/29381	\$199	76	Fair	Good	Outstanding/ 541	FEATURES: 2-megapixel resolution, 8MB SmartMedia card, 35mm focal length; USB output; 9.5 ounces. SUMMARY: Camera has uncomplicated controls, as well as the lowest price and the second-longest battery life in the Top 10; with mediocre print quality and few extras, it's as basic as digital cameras come. (★★★★☆ Aug 02)
7	Fujifilm FinePix 2600 Zoom find.pcworld.com/17965	\$279	76	Fair	Fair	Fair/ 286	FEATURES: 2-megapixel resolution, 16MB SmartMedia card, 38mm-114mm focal range; USB and video output; 9 ounces. SUMMARY: This simple model comes with a relatively large storage card, but its controls are rudimentary and its photos looked unimpressive in our tests. (★★★★☆ Feb 02)
8	Sony Cyber-shot DSC-P71 find.pcworld.com/25701	\$399	75	Good	Good	Good/ 334	FEATURES: 3.2-megapixel resolution, 16MB Memory Stick media, 39mm-117mm focal range; USB and video output; 10 ounces. SUMMARY: A relatively compact and easy-to-use point-and-shoot camera, the Cyber-shot DSC-P71 includes rechargeable AA batteries for flexible power options. (★★★★☆ June 02)
9	Canon PowerShot S200 find.pcworld.com/29361	\$349	74	Good	Fair	Fair/ 180	FEATURES: 2-megapixel resolution, 8MB CompactFlash media, 35mm-70mm focal range; USB and video output; 7.7 ounces. SUMMARY: The S200 updates its predecessor, the S110, with style tweaks, reworked menus, and new navigation buttons. Has a stylish stainless-steel body and tiny travel charger. (★★★★☆ Aug 02)
10	Kodak DX4900 Zoom find.pcworld.com/29402	\$399	72	Good	Fair	Good/ 315	FEATURES: 4-megapixel resolution, 16MB CompactFlash media, 35mm-70mm focal range; USB and video output; 10.4 ounces. SUMMARY: This 4-megapixel camera offers high resolution for a great price and includes a docking station for easy photo uploads. However, its controls are jerky and slow to react. (★★★★☆ Aug 02)

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 photograph a complex still life and a mannequin to see how well each camera captures details and subtle colorings such as skin tones. A panel of judges reviews the on-screen and printed photos and assigns image-quality scores; we then average those scores. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. See find.pcworld.com/10860 for details on PC World's Star Ratings. ¹ Resolutions are expressed in effective pixels, focal range is identified as 35mm equivalent, and camera weights include batteries.

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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 charts, go online and type in the *PC World* Find-It URL at the

top of each chart (for example, find.pcworld.com/30092 for products listed on the *Top 10 15-Inch LCD Monitors* chart). Next month's *Top 100* section will include coverage of hard drives, 19-inch CRT monitors, and ink jet printers. ■



IN ADDITION TO futuristic styling, the Sony Cyber-shot DSC-F707 boasts a 5X zoom lens and has the ability to shoot photographs in very low light.

THE SAMSUNG SyncMaster 152T renders exceptionally crisp, smooth letters.



MONITORS

find.pcworld.com/30092

15-INCH LCD MONITORS From the September 2002 issue

1	Best Buy NEC MultiSync LCD1550X find.pcworld.com/24881
2	Best Buy Samsung SyncMaster 152T find.pcworld.com/29942
3	NEC MultiSync LCD1550M find.pcworld.com/29943
4	Iiyama Pro Lite 3835UT find.pcworld.com/24801
5	Sharp LL-T15V1 find.pcworld.com/24921
6	CTX PV520A find.pcworld.com/24841
7	ViewSonic VX500+ find.pcworld.com/29945
8	Dell 1504FP find.pcworld.com/29944
9	IBM T560 find.pcworld.com/29946
10	Eizo Nanao FlexScan L365 find.pcworld.com/24901

MONITORS

find.pcworld.com/29714

21-INCH MONITORS From the August 2002 issue

1	Best Buy Compaq P1220 find.pcworld.com/28842
2	Best Buy ViewSonic P225f find.pcworld.com/28882
3	Sony CPD-E540 find.pcworld.com/28865
4	Samsung SyncMaster 1200NF find.pcworld.com/28861
5	Sampo AlphaScan 912ST find.pcworld.com/10801
6	NEC AccuSync 125F find.pcworld.com/28843
7	Iiyama Vision Master Pro 511 find.pcworld.com/11381
8	Cornerstone Peripherals P1650 find.pcworld.com/11380
9	LG Electronics StudioWorks N2200P find.pcworld.com/28863
10	Hitachi CM827 find.pcworld.com/28864

PRINTERS

find.pcworld.com/30077

TOP 10 INK JET PRINTERS From the September 2002 issue

1	Best Buy Canon S750 Color Bubble Jet Printer find.pcworld.com/22841
2	Best Buy Epson Stylus C80 find.pcworld.com/16660
3	Canon S520 Color Bubble Jet Printer find.pcworld.com/27442
4	HP Deskjet 940c Color Inkjet Printer find.pcworld.com/16681
5	HP Deskjet 920c Color Inkjet Printer find.pcworld.com/19264
6	HP Deskjet 845c Color Inkjet Printer find.pcworld.com/16680
7	Epson Stylus Photo 820 find.pcworld.com/29816
8	Epson Stylus C60 find.pcworld.com/16647
9	HP Color Inkjet Printer Cp1700 find.pcworld.com/29817
10	Lexmark Z65 Color Jetprinter find.pcworld.com/27441

DIGITAL CAMERAS

find.pcworld.com/29969

DIGITAL CAMERAS \$500 AND OVER From the Sept 2002 online chart

1	Best Buy Canon PowerShot G2 find.pcworld.com/14800
2	Best Buy Nikon Coolpix 995 find.pcworld.com/14801
3	Nikon Coolpix 5000 find.pcworld.com/23881
4	Olympus Camedia E-20N find.pcworld.com/23901
5	Sony Cyber-shot DSC-F707 find.pcworld.com/23902
6	Sony Cyber-shot DSC-S85 find.pcworld.com/14803
7	Canon PowerShot S40 find.pcworld.com/19141
8	Olympus D-40 Zoom find.pcworld.com/19143
9	Sony CD Mavica MVC-CD400 find.pcworld.com/28121
10	Fujifilm FinePix F601 Zoom find.pcworld.com/29703



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"Think of it this way," said my Introduction to Computers professor (whose name is lost to antiquity): "The CPU controls how big a bite your computer takes of a data sandwich, and the RAM determines how fast it can chew it."



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Kingston's configurator, prominently located on the site's home page, enables you to select your hardware from hundreds of products in just two clicks. First, you select



your hardware's manufacturer. Next, you pick the specific model. In an instant you'll see the available upgrade modules, as well as simple installation illustrations to further assist you in selecting the correct component. You can further refine your search by memory type, manufacturer model or, if you know it, the part number. If you're still stuck, click on "I'm not sure," and a Kingston rep will promptly contact you. Sound simple? It is.



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PC AMERICA: INVENTORY MANAGEMENT AT POINT OF SALE

www.pcamerica.com

While many motorists in Dimondale, Mich. say the family-owned Windmill Truck Stop is a home away from home, its controller, Kevin Edelmann, says it's been more like a house of accounting horrors. Besides monitoring retail fuel sales in the truck stop's "truckers only" area, he also has to keep an eye on commuters' and travelers' purchases in the king-sized complex's convenience store, family restaurant, motel, and auto service center. "Keeping track of all of that inventory has been a nightmare," Edelmann says.

The Point of Sale (POS) system that the Windmill had been using since 1982 did a fine job of ringing up sales, but it couldn't tell store managers anything about what was on the shelf. "The system only broke sales down by department," Edelmann says. "So it couldn't tell the difference between a tube of toothpaste and a bottle of shampoo."

Edelmann found only a few POS solutions that were easy to use, Microsoft Windows-based, and able to support multiple input devices. And none of them could manage the 20,000-plus items in the Windmill's convenience store and restaurant. "We desperately needed a solution that could bring all of these components of our business together," he says.



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.

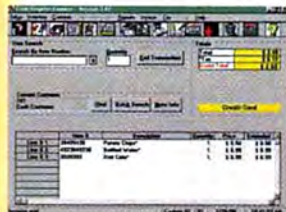
Now PC America is helping retailers like the Windmill to move beyond the sale itself to increase revenues. A new feature in CRE 2000 gives businesses the ability to print coupons on the bottom of sales receipts on an Epson TM-T88II receipt printer. They can use the coupons to advertise specials on slow 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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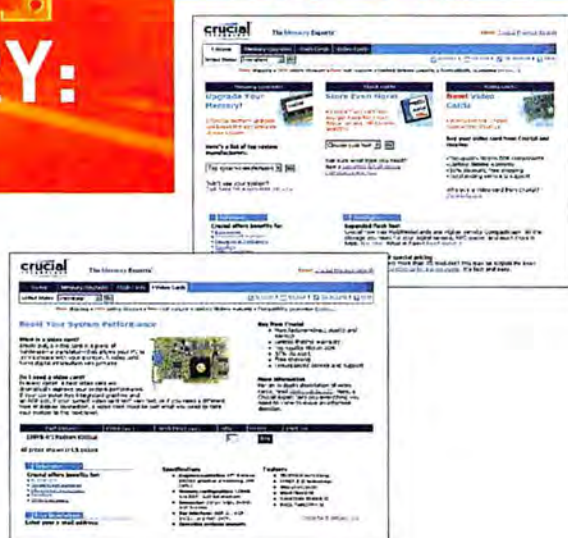
Achieving a higher level of performance and extending the life of your system are the two primary reasons why you should look at increasing the amount and speed of your system's RAM. A RAM upgrade is cost-effective and convenient, and best of all, it delivers immediate results.

Savvy users also know they can get improved performance by increasing video-specific RAM. While a video card's components must smoothly integrate to deliver top-shelf 3D performance, the amount and type of RAM is most important. For people who work with digital photos, PC games, and other intense graphic-processing applications, Crucial Technology has just released the Crucial® Radeon™ 8500LE video card.

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128MB of six-nanosecond precision DDR SDRAM doubles the amount of RAM most other cards offer, and gives this card its performance. The card's RAM is manufactured by Micron, Crucial's parent company, and that means you're getting some of the world's highest-quality RAM. And because you're buying from Crucial, you're also getting superior customer service and support and a limited lifetime guarantee.

Also onboard the card is ATI's Graphics Processor Unit to provide you with advanced 2D, 3D, and multimedia graphics performance designed to accelerate Microsoft's DirectX API



and OpenGL graphics. Regular retail price of the card is \$149.99. It is currently available online, at www.crucial.com, for \$134.99, including free second-day shipping within the contiguous U.S.

While that's an attractive price for a high-performing video card, Crucial wants to do more than save you money. They want to assure you that you have received the best value in video cards. Try your new video card for 30 days. If you aren't happy with it, return it to Crucial for a refund. It's that easy.

THE NEED FOR SPEED

Exactly how do you know if you would benefit from a video card upgrade? Well, it's a good bet that if you run multimedia, especially graphics, you're a candidate. Graphics place the biggest processing demands on your system. Whether you work with images from a digital camera, video images from a camcorder, or custom graphics created with Adobe Photoshop or AutoCAD, you need a video card that can handle the demand.

One telltale sign that it's time for an upgrade is reduced performance—for example, hesitation in animated scenes. Other examples occur when you're forced to use a lower resolution, reduce desired background effects, limit the number of colors, or scale back details. Avoid all of these performance-inhibitors with the Crucial Radeon 8500LE video card.





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Ask savvy technology buyers what matters most to them when purchasing computers for their organizations, and they'll come back at you with a wish list that looks something like this:

- High performance for maximum efficiency and effectiveness
- Customization for today's diverse needs
- A great warranty and peerless professional support
- All the above at a fair price

This sought-after combination of purchase criteria points in the direction of one single supplier—Sys Technology (Sys International, Inc., dba Sys Technology), www.sys.com. This Cypress, California-based manufacturer has been producing high-performance systems since 1988. Along the way, Sys Technology's products have run up an impressive string of independent awards from major magazines and test labs.

For example, the lab team at *PC World* put the SYS Performance 1400TD desktop computer to the test and in its November 2001 issue listed it as a "Best Buy," with an online review calling it "one of the best performers we've seen." Then for its January 2002 issue, *PC World* retested the 1400TD using their just-updated benchmark. The result: another "Best Buy" award.

The magazine attributed the 1400TD's "speed demon" character to its 1.4-GHz Athlon processor and 256MB of 266-MHz DDR memory. The system also has a 61.5-GB hard drive, a 16X DVD-ROM drive, and a 16X/10X/40X CD-RW drive. The 19-inch ViewSonic PF790 monitor "adds to the allure, delivering deep, rich colors and distinct, legible 12-point text that blurred only slightly at the maximum resolution of 1600 by 1200."

SYS PERFORMANCE SERIES OUT FRONT

Consider another member of the SYS Performance series, the 1700+ desktop computer. The *PC World* lab team put the 1700+ to the test, labeling this high-performance machine as one of the Top 15 Office PCs in its August 2002 issue. *PC World* called the 1700+ "a solid, generic PC for



the more experienced PC user." The 1700+ comes equipped with a 1.47-GHz AMD Athlon 1700+ CPU, 256-MB DDR memory, and Microsoft Windows XP Professional, all standard.

Reviewers found "the chassis' interior is neat and well organized" and "the bays easy to access." It is features like these that contribute to the high level of customization that Sys Technology offers all its customers, in addition to the breadth of the company's product offerings.

This kind of independent assessment of the value and performance of Sys Technology's computers is no flash in the pan. **In fact, Sys Technology's systems have made *PC World's* Top 15 and Top 10 charts for 26 of the last 27 months.**

Sys Technology also offers a line of pedestal and rack-mount servers. The SYS PowerNet servers all feature high-performance Intel processors, motherboards, and chassis. Available at competitive prices, PowerNet servers implement the latest server technologies, including RAID and system management.

Additionally, the company markets a line of high-quality flat-panel monitors in 15", 17", and 18" models.

INDUSTRY-BEST WARRANTY

Standing firmly behind the products it makes and sells, Sys Technology offers an industry-leading six-year warranty on CPU and memory, five years on labor, and three years on other system components. In addition, the company offers a highly-trained and courteous professional support staff as well as nationwide on-site service.

So whether you're buying for a major corporation, government entity, or educational organization, or whether you're just a savvy end user who demands the very best for your money, it makes sense to explore Sys Technology. The experts there will customize to your exact specifications, and then stand behind their products with unmatched service, support, and warranties.



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June 2002
November 2001



SYS Performance 2000 +
January 2002
May 2002



\$896.00 Best Value

SYS TaskMaster C1700 Desktop

- | | |
|---------------------|--|
| CPU | • Intel Celeron, 1.7GHz (Pentium 4 core) |
| RAM | • 256MB, PC2100, DDR SDRAM |
| Hard Drive | • 40GB, 7200 rpm, ATA/133 |
| Video | • ATI RADEON 128 Pro, 32MB |
| Monitor | • SYS 15" (13.7" v.i.s.) |
| CD/DVD | • 40x12x48 CD-RW |
| Sound | • Integrated AC97 audio |
| Speakers | • Altec Lansing speakers, 2 pc. |
| Modem | • 56K/v.92, PCI modem |
| NIC | • Integrated 10/100 NIC |
| Chassis/PS | • MicroATX tower, 250W p/s |
| OS | • Microsoft Windows XP/Home |
| Keybd, mouse | • SYS keyboard and mouse |

\$1,060.00 Home/Office System

SYS Performance 2000+ Desktop

- AMD Athlon XP 2000+
- 256MB, PC2700, DDR SDRAM
- 60GB, 7200 rpm, ATA/133
- ATI RADEON 7500 LE, 64MB
- Optique Q71 17" (16" v.i.s.)
- 40x12x48 CD-RW
- Integrated AC97 audio
- Altec Lansing speakers, 3 pc.
- 56K/v.92, PCI modem
- 10/100 PCI NIC
- ATX tower, 300W p/s
- Microsoft Windows XP/Home
- SYS keyboard and mouse

\$1,877.00 Gaming AMD System

SYS Performance 2200+ Desktop

- AMD Athlon XP 2200+
- 512MB, PC2700, DDR SDRAM
- 80GB, 7200 rpm, ATA/133
- LEADTEK A170 DORT (GF4), 64 MB
- SYS 152L 15" LCD (15" v.i.s.)
- 40x12x48 CD-RW; 16X DVD
- Creative Labs Sound Blaster Audigy (OEM)
- Logitech Z-560 speakers, 6 pc.
- Integrated 10/100 NIC
- ATX tower, 300W p/s
- Microsoft Windows XP/Professional
- SYS keyboard and mouse
- Corel WordPerfect Office 2002 (OEM)

\$2,068.00 Gaming Intel System

SYS Performance 2400 Desktop

- | | |
|---------------------|--|
| CPU | • Intel Pentium 4, 2.4GHz (533MHz FSB) |
| RAM | • 512MB, PC2100, DDR SDRAM |
| Hard Drive | • 80GB, 7200 rpm, ATA/133 |
| Video | • LEADTEK A170 DORT (GF4), 64 MB |
| Monitor | • SYS 152L 15" LCD (15" v.i.s.) |
| CD/DVD | • 40x12x48 CD-RW; 16X DVD |
| Sound | • Creative Labs Sound Blaster Audigy (OEM) |
| Speakers | • Logitech Z-560 speakers, 6 pc. |
| NIC | • Integrated 10/100 NIC |
| Chassis/PS | • ATX tower, 300W p/s |
| OS | • Microsoft Windows XP/Professional |
| Keybd, mouse | • SYS keyboard and mouse |
| Other | • Corel WordPerfect Office 2002 (OEM) |

\$4,218.00 Auto CAD/Graphic

SYS PowerHouse D2400 Workstation

- Dual Intel Xeon, 2.4GHz
- 512MB, PC800 RDRAM
- 80GB, 7200 rpm, ATA/133
- NVIDIA Quadro4 900 XGL, 128MB
- Optique Q95 19" (18" v.i.s.)
- 40x12x48 CD-RW
- Integrated AC97 audio
- Altec Lansing speakers, 3 pc.
- Integrated 10/100 NIC
- EATX tower, 430W P/S
- Microsoft Windows XP/Professional
- SYS keyboard and mouse
- Corel WordPerfect Office 2002 (OEM)

\$2,572.00 Best Rackmount

SYS PowerNet D1266RM Server

- | | |
|---------------------|--|
| CPU | • Dual Intel Pentium III-S, 1.266GHz |
| RAM | • 256MB, PC133, Reg ECC SDRAM |
| Hard Drive | • Dual, hot-swap, 40GB, 7200 rpm, ATA/133 |
| Video | • ATI RADEON XL, 8MB |
| Monitor | • Monitor optional |
| CD/DVD | • 24x slim CD-ROM |
| NIC | • Dual integrated 10/100 NICs |
| Chassis/PS | • 1U rack mount, 250W p/s |
| OS | • Microsoft Windows 2000 Server w/ 5 clients |
| Keybd, mouse | • SYS keyboard and mouse |

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HERE'S HOW

EDITED BY DENNIS O'REILLY AND ERIC DAHL



WINDOWS TIPS

SCOTT DUNN

Quick and Easy Ways to Master Windows Printing

ALL Versions PRINTING IS ONE of the activities we've come to take for granted in Windows—until it doesn't work. Don't wait until then to dig into the secrets of Windows' printing powers. These tips make getting hard copies faster and easier.

Every time you tell one of your applications to print, the information goes to a spool file on your hard disk before being sent to the printer. Windows starts channeling data to the printer as soon as the

spool file has enough information to print the first page, even if the data is still moving from the application to the spool file. This is a compromise between freeing your application sooner and getting your printed document quicker. If you're not in a compromising mood, don't settle for Windows' default arrangement. (Note that these tips may not work for some printers, including network printers and devices set to print to a file.)

To find the settings that govern the

spooling feature, choose *Start* or *Start+Settings* and click or double-click *Printers* or *Printers and Faxes*. Right-click the icon for the printer you want to tweak and choose *Properties*. In Windows 9x and Me, click the *Details* tab and then select the *Spool Settings* button. In Windows 2000 and XP, click the *Advanced* tab.

If your top priority is to minimize the time your application forces you to wait, make sure *Spool print jobs so program finishes printing faster* is selected (it should already be selected by default) and then choose *Start printing after last page is spooled* underneath (see **FIGURE 1**). This option requires more free disk space to store the spool file, however.

If you want to see those pages coming out of the printer faster, and you don't mind keeping your application busy longer, select *Print directly to the printer*. In some versions of Windows, this option is disabled if you share the printer; if you want to enable this capability, click the *Sharing* tab and choose *Not shared*. This setting requires that your printer be on, and you won't be able to pause printing.

You can return to this dialog box and restore the defaults if you find that neither of the two options works for you. Select the spool command to let the program finish printing faster, and then choose either *Start printing after the first page is spooled* or *Start printing immediately*. When you're done, click OK.

PRINT WHEN YOU WANT

Windows 2000 WHEN YOU PRINT a document, pages normally start coming out of the printer after only a short delay. But in Windows XP and 2000, you can print your documents at a later time—say, during your

160 WINDOWS TIPS

Print faster and smarter by tweaking Windows' printer settings; get more control over the Windows print queue.

164 INTERNET TIPS

Gain more hard-disk space by archiving old Outlook e-mail; keep your instant messages confidential.

166 STEP-BY-STEP

If you really want more boom out of your PC's box, go the motherboard-upgrade route. We show you how.

168 HARDWARE TIPS

Upgrade your hardware the right way with these seven tips; a freebie from Intel identifies your PC's CPU.

170 ANSWER LINE

Give users sharing a single PC access to all of its applications; resume interrupted downloads where they left off; remove unchecked items from Msconfig's Startup list; convert a GIF into an icon; automatic defrags.



FIGURE 1: TWEAK WINDOWS' SPOOL settings to get faster access to your app after printing a document.

lunch break or after hours—without having to remember to send all the necessary documents to the printer at that time. Setting specific print times can make busy network printers more efficient by letting some documents print right away and others print later. It's also handy if your printer is nearby and you want to minimize noise while you work.

To schedule printer availability, open the Properties dialog box for your printer as described in the previous tip and click the *Advanced* tab. Select *Available from* and use the controls to the right to set the start and end times for Windows to send jobs to your printer (see FIGURE 2). Then click OK. From now on, you can add files from your applications to the print queue whenever you want, but nothing will print until the preset time. Just make sure the printer is turned on at that time.

You can also designate a printing time for individual documents in the print queue rather than using a blanket setting for all the queued files. First, double-click the printer's icon in the 'Printers' or 'Printers and Faxes' window to open the print queue. Double-click a document in

the list to open its Properties dialog box. Under the General tab, click *Only from* in the Schedule box and specify the start and end times during which this document can be printed. Click OK.

PRINT IT YOUR WAY

ALL SOMETIMES YOU Versions may want to spool documents so you get access to your application sooner, and other times you want the printout pronto. Or on

some days you may choose to print everything at night, and on other days you want to print right away. Another possibility is that you're prevented from using the tips above because you're sharing a printer connected to your computer. Fortunately, there's an easy way to print what you want, when you want, and without your having to dig through dialog boxes to configure your printer every time. The trick is to install multiple icons for a single printer and then set each icon to one of the preferences you're most likely to use. (Note that this tip may not work for networked printers on Windows 2000.)

Open the 'Printers' or 'Printers and Faxes' window and use the tips described above to configure your printer with the settings you'll use most often. Select the icon for the printer you just configured, press <F2>, type a name that will remind you of this icon's settings—for example, **spooled printing**—and press <Enter>.

Now double-click the *Add Printer* icon, or in XP click the *Add a printer* link on the left. Step through the Add Printer Wizard as if you were installing your existing printer all over again. When the wizard

asks whether to keep the existing driver or use a new one, select *Keep existing driver (recommended)* and click *Next*. When prompted for a name for your printer, type something appropriate for the settings—for example, **direct printing**. Click *Next* and follow the prompts to finish the wizard. Now select the icon you just created and follow the steps above to configure this shortcut with your alternative settings (see FIGURE 3).

Now choose the appropriate custom printer icon from the print dialog box. Usually you'll see your custom printer icons in a Name drop-down list. Select the one you want, specify any other dialog box settings you prefer, and click OK or *Print*.

PREVIEW WITH THUMBNAILS

Windows 2000 IF YOUR PRINTER supports it, Windows lets you print several pages at once on a single piece of paper. This is a great way to make archival hard copies of files, analyze a document's layout, or make ▶

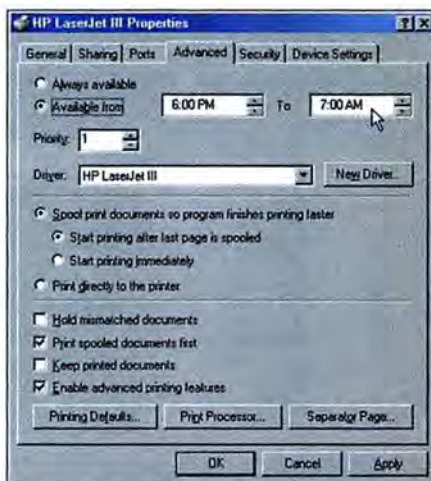


FIGURE 2: WINDOWS 2000 AND XP let you schedule when the printer will print.



FIGURE 3: CREATE MULTIPLE printer icons and give each its own unique settings.

paper-saving proofs of large-type documents (such as presentation slides).

Open your application's Print dialog box, select the desired printer, and click *Properties* or *Preferences*. If the Print dialog box has a *Layout* tab, click it. You may need to right-click the printer icon and choose something like *Printing Preferences*. In the box next to Pages Per Sheet, make a selection—the options are usually 1, 2, 4, 6, 9, and 16, plus a Booklet setting. You'll see an example of the resulting layout elsewhere in the dialog box. When you're done, click *OK* or *Print*.

MIND YOUR Ps AND QUEUES

ALL WINDOWS' PRINT queue shows you which documents are waiting to be printed and lets you cancel print jobs or determine the priority order of awaiting documents—provided you have the necessary permis-

sion. You usually control only the documents you sent to the printer yourself.

Open the queue window by double-clicking the printer icon in the system tray of the taskbar (near the clock). Or open the 'Printers' or 'Printers and Faxes' window as described above and double-click the icon for the appropriate printer. If you sent multiple documents to your printer, the files will be listed in the order that they were submitted to the queue.

To change their print order in Windows 98 and Me, just drag items up or down the list. In Windows 2000 or XP, double-click a document in the queue to open the Properties dialog box. Under the General tab, set the Priority slider to the left to lower the document's print priority, or to the right to increase its print priority. A numeric value appears below the slider to help you set a precise level between 1 and 99.

Windows 2000 and XP give you another way to set your printing priorities. Open the Properties dialog box as described above and click the *Advanced* tab. Check *Print spooled documents first* to give a higher priority to documents that Windows has already sent to the hard drive. This setting overrides the manual priority settings discussed above and (according to Microsoft) improves printer efficiency.

To cancel a print job in any version of Windows, right-click a document in the list and choose *Cancel Printing* or *Cancel*. Or select the document in the queue and press <Delete>. Click *Yes* if prompted.

WINDOWS TOOLBOX

A Better Way to Rename Files

WINDOWS HAS ALWAYS been brain-dead when it comes to renaming multiple files and folders at once. Windows XP lets you give several files the same name followed by a number (see August's "Rename Multiple Files or Folders at Once" at find.pcworld.com/29828), but it doesn't let you search for and replace text within file names, change the numbering style, or alter capitalization, among other options.

The \$15 Better File Rename is the most versatile and easiest group-file-rename program I've ever used. Just select the files or folders to rename in Explorer,



right-click, and choose *Better File Rename* to see a dialog box with abundant options. The trial version limits you to renaming ten files at the same time. Go to find.pcworld.com/29831 for your copy.

Print (see FIGURE 4). For most file types, the associated application will automatically open, send the file to the printer, and close without further ado. Sometimes—for example, with image files in Windows XP—the right-click Print command will launch a special process, such as the Photo Printing Wizard. This adds a few steps, but if you're printing with the default settings you can zip through the wizard without changing anything. ■

Send your Windows-related questions and tips to scott_dunn@pcworld.com. Windows Tips pays \$50 for published items. Scott Dunn is a PC World contributing editor.



FIGURE 4: YOU CAN SEND YOUR documents to the printer faster by using this handy right-click menu option.

PRINT IN A FLASH

ALL MOST PEOPLE print a file by opening its application, then opening the file, choosing *File•Print*, and finally closing the app. To save on mouse clicks and keystrokes, try the following technique instead.

Open Windows Explorer and locate the file or files you want to print. Right-click the file or a group of selected files and choose

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INTERNET TIPS

SCOTT SPANBAUER

Stop Outlook Messages From Hogging Disk Space

ATTENTION, OUTLOOK users: A space hog is consuming your hard-disk real estate. Outlook logs your e-mail, appointments, contacts, and notes in a continuously expanding .pst data file. As the file grows, it eats up lots of hard-disk space.

The solution is to archive the Outlook data file. The AutoArchive feature in Outlook 2000 and 2002 moves your aging items to a .pst archive file automatically. Before you enable automatic archiving, adjust your default settings: Choose **Tools•Options•Other**, click the **AutoArchive** button, and modify the settings there to your liking. Next, choose **View•Folder List** and decide which folders you'd like to archive differently from the default method (you

might want to leave your Notes folder unarchived, for example). Right-click each of these folders, choose **Properties**, click the **AutoArchive** tab, and modify the settings as you wish. Finally, choose **File•Archive**, select **Archive all folders according to their AutoArchive settings**, and click OK. This will start the AutoArchive process immediately, which is why it's important to set up the global default and individual custom folder settings first.

I prefer to move data around manually. I usually leave the last 9 to 12 months of e-mail unarchived, and then archive everything up to a certain date into a single file with a memorable name, such as "2001 Outlook Archives.pst." To do this, click **File•Archive**, select **Archive this folder and all subfolders**, choose the folder to archive (selecting the top level—**Personal Folders**—will include everything Outlook knows how to archive), select the latest date for items to archive, and choose the file location (see **FIGURE 1**). Click OK to start the archiving process.

The final step is to compact the original .pst file to reclaim the space used by archived items. In Outlook 2002, choose **File•Data File Management**, select the **Personal Folders** file in the list of data files, click the **Settings** button, and choose the **Compact Now** button. In Outlook 2000, right-click **Personal Folders**, select **Properties for "Personal Folders"**, and click **Advanced** and then **Compact Now**.

If you later need to see a message or other item you've archived, simply choose **File•Open•Outlook Data File** (in Outlook 2002) or **File•Open•Personal Folders File (.pst)** (in Outlook 2000); then browse to the archive file you created and double-

click it. You'll be able to view the file's contents just as you would the contents of any other folder, and even to drag and drop items from the archive back into your **Personal Folders** file.

SECURE INSTANT MESSAGES

ONLINE CHAT is addictive, but it's not just for teenagers. Increasingly, businesses are using instant messaging to stay in touch with customers and employees. And while it may seem safe enough, IM can be as dangerous to your privacy as any other Internet technology.

Most instant messenger clients lack the encryption features found on e-mail programs, so everything that you send and receive travels as easily readable plain text.

If your instant messaging activity involves sensitive information, consider



FIGURE 1: TAME OUTLOOK'S data file by archiving old messages and other items.

encrypting the contents of your messages with IMpassé Systems' \$20 (free for the first 14 days) IMpassé utility (download available at find.pcworld.com/30011). IMpassé allows you to conduct 448-bit secure encrypted conversations with other program users via AOL Instant Messenger, MSN Messenger, and Yahoo Messenger; and IMpassé Systems reports that ICQ support will be coming soon. ■

Send your questions and tips to nettips@spanbauer.com. We pay \$50 for published items. Scott Spanbauer is a contributing editor for PC World.

NETMASK UNMASKED

WINDOWS, YOUR FIREWALL, and other Internet-connected software often require both an IP address and another mysterious set of numbers called a netmask. The netmask serves as a filter that reduces the vast quantity of possible IP addresses your data transmissions broadcast to. Since the first three sets of digits (known as octets) separated by periods in a network segment's IP address (192.168.77.0, for example) are usually identical, the last octet in the address is often the only one that matters. A netmask of 255.255.255.0 (the most commonly used value for most of us) masks the first three octets, preventing unnecessary network traffic. So why is 255.255.255.0 the magic number? The filtering is done in binary, and the decimal number 255 is 1111111 in binary, which makes it the best mask.



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STEP BY STEP

STAN MIASTKOWSKI

Upgrade Your System With a Motherboard Swap

CHANGING A MOTHERBOARD is the ultimate upgrade project, the PC equivalent of a heart or lung transplant. But with the pace of processor, RAM, and bus speed improvements, it's a project that's often well worth the effort involved.

If your computer's more than a couple years old, a motherboard switch usually isn't worthwhile because small, slow hard drives and previous-generation add-in cards will bog things down. And if your PC is really long in the tooth and uses an AT-style case instead of an ATX one, you'll need to start with a new case; AT motherboards are no longer available.

Unless you're swapping CPUs on a fair-

ly recent machine, installing a cutting-edge processor of the AMD Athlon XP or Intel Pentium 4 lines effectively requires a new motherboard. Plus, new motherboards often include built-in network support, high-quality audio, USB 2.0 ports, and even FireWire (IEEE 1394) ports.

Most motherboards sell in the \$100 to \$150 range. Add a 1.7-GHz processor (AMD or Intel) and 512MB of DDR RAM, for example, and you'll have a lightning-fast system upgrade for about \$500. (Prices are averages at press time.) You might also consider getting a new case and power supply—see the next page.

One warning: If you are running Win-

THE TOP DOWN

Benefits: Improved system performance.

Costs: Motherboard, \$100-\$150; CPU, \$125-\$300; RAM, \$150-\$200; Fan/heat sink, \$15-\$30

Expertise level: Advanced

Time Required: 3-6 hours

Tools required: Phillips screwdriver, anti-static wrist strap (recommended)

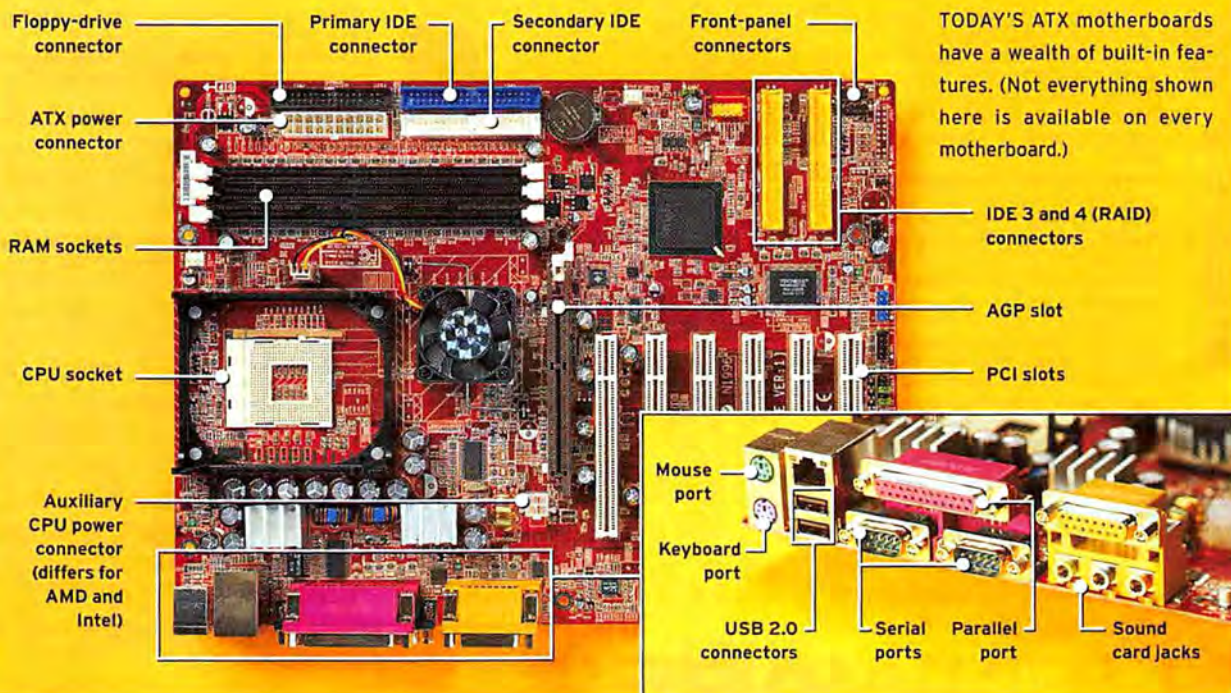
Vendors: Abit (www.abit.com.tw), AOpen (www.aopen.com), Asus (usa.asus.com), Epox (www.epox.com), Intel (www.intel.com), MSI (www.msicomputer.com), Soyo (www.soyo.com), Supermicro (www.supermicro.com), Tyan (www.tyan.com)

dows XP, a motherboard swap may trigger a new round of Microsoft's irritating Product Activation. Before you'll be able to use your upgraded system, you will have to call Microsoft and try to get a new Product Activation code.

As always, do a full backup before you start to work on your system. It's particularly important for this project. ■

Stan Miastkowski is a contributing editor for PC World. Send questions and comments to him at stan_miastkowski@pcworld.com.

TYPICAL ATX MOTHERBOARD COMPONENTS

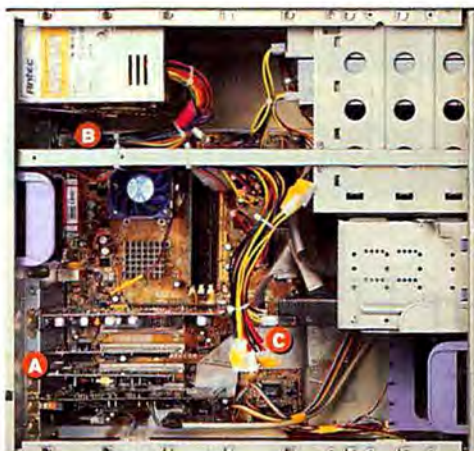


POWER SUPPLIES AND CASES

IF YOUR CURRENT power supply is rated at 200 watts or less (check the rear panel or look for a sticker on the supply), you'll want a new one to go with your new motherboard. We suggest a power supply of 275 watts minimum. Expect to pay \$50 to \$100. If your new motherboard uses a Pentium 4, you need a ATX12V power supply, which has an additional four-pin connector for P4 boards.

If you're changing your power supply, you should also consider upgrading your PC case. Cases start at about \$40; large cases or custom "designer" cases can go up to several hundred dollars. Most have power supplies included, so the extra cost is minimal, and a new case can give you more room for expansion and allow better air circulation (very important for today's high-speed processors).

Power supplies and cases are both available from Antec (www.antec-inc.com), PC Power and Cooling (www.pcpowerandcooling.com), and Sparkle Power (www.sparklepower.com).



1 Remove the cards and cables. Turn off your PC and unplug it from the wall. Disconnect the mouse, keyboard, monitor, printer, and any other external cables. Remove the PC's cover and look at what you need to remove and disconnect to reach the motherboard. In some cases, you'll have to remove a hard drive or other hardware.

Use an antistatic wrist strap according to the manufacturer's directions while working under your PC's hood.

Remove the screws holding add-in cards (A), carefully remove the cards, and lay them on a clean, flat surface. If your new motherboard includes features such as a LAN connector or integrated sound, put the boards you won't be reinstalling aside.

Label each cable with masking tape and write down what it connects to. Unplug the power connector (B), floppy-drive cable, and EIDE connectors (C). Note which cable connects to the primary EIDE connector and which one goes to the secondary.

Finally, unplug the small connectors attached to the front-panel switches and LEDs, as well as any other cables connected to the motherboard.

2 Remove the old motherboard and (optional) power supply. Most motherboards are attached to the case by four to eight screws. Find the screws, carefully remove them, and set them aside in a handy container, such as a coffee cup.

Remove the old motherboard by sliding it slightly toward the front of the case (so the connectors on the rear are clear of the case) and then pivoting the front of the motherboard upward and out.

If you're installing a new power supply, remove the screws (usually four) holding it, remove the supply, slide the new one in, and replace the screws.



3 Install the RAM and processor. Before you mount the motherboard in the case, carefully insert your new RAM modules into the slots (A) until the brackets on each side of the slots snap in. Begin with the slot marked "Bank 0."

Find the CPU socket, lift the lever on its side, and then carefully insert the CPU (B), making sure that Pin 1 on the CPU matches up with Pin 1 on the socket. Hold the CPU firmly in place, and lock the lever down.

Install the fan (C) that came with the CPU (if a fan was not included, you'll need to buy one), and plug it into the designated fan connector on the motherboard.



4 Install the new motherboard. Slide the new motherboard into the case. The mounting holes will line up when it's in the correct position.

Mount the motherboard with the screws you removed in step 2. Just "snug up" the screws; mounting them too tightly will damage the motherboard.

5 Reinstall the cards and cables. Now you can reinsert the cards and cables that you removed. Work slowly and carefully, and double-check each connection.

Secure add-in cards with the screws you removed earlier.

Reconnect the mouse, keyboard, monitor, printer, and other external devices. Don't put the cover back on your PC until you're absolutely sure that everything's working.

6 Start it up. Plug in the AC power cable and turn on your PC. If it beeps once and you see messages on the screen, that's a good sign.

Windows will require several reboots as it adjusts to your new hardware. Windows should detect components such as network, sound, or USB 2.0 support and then start the Add New Hardware Wizard. Follow the directions in your manual to install the motherboard drivers.

If nothing happens, or if your PC gets only part-way through start-up and then hangs, turn off your PC, disconnect the AC power, and recheck all your connections. If that doesn't help, contact your motherboard maker's tech support.

HARDWARE TIPS

KIRK STEERS

Keep Your Hardware Upgrades Hassle-Free

THOUGH ADDING a new graphics card, hard drive, or other hardware to your PC is easier than it used to be, such upgrades are still a long way from being foolproof.

Working inside your computer's case requires caution. PCs are still limited by such ancient, 20th-century design constraints as IRQs and I/O addresses. And manufacturers are still treating PC users as unwitting beta testers for products they prematurely rush to store shelves. If you botch an installation because you overlook one of these factors, it can take many days and many dollars to fix.

Here are my rules for PC hassle avoidance, developed from painful experience. **Think outside the box.** The easiest way to prevent the problems that may occur when you work inside your PC is not to open the case at all. Thanks to today's fast USB 2.0 and FireWire (IEEE 1394) external connections, many peripherals can run almost as well from outside your PC's case as they do from inside. External versions of network cards, modems, hard drives, optical drives, and other peripherals are easy to find in stores or online.

Don't burn your bridges. Before you start,

make an image of your hard drive using PowerQuest's \$70 Drive Image 5 or a similar disk-imaging program. If that's impractical, back up your Registry with Scanreg in Windows 98, or System Restore in Windows Me and Windows XP.

Do your homework first. Before taking screwdriver in hand, peruse the readme.txt files (usually found on the floppy or CD-ROM included with your hardware) and the documentation that came with the device's drivers. They provide solutions to problems other users have encountered. Also, go to the manufacturer's Web site to look for more up-to-date documentation for the product.

Make sure you have the latest driver version available for the device. Drivers evolve quickly; the ones that ship with a product are often out of date. You can also benefit from the experience of others by checking any knowledge bases or FAQs on the vendor's site for known problems or configuration tips. **Don't be afraid to ask.** If both the included and online documentation are unsatisfactory, call technical support before you start. Support techs are a great source of troubleshooting tips and off-the-record information. Not all support techs are created equal, however. If you're not satisfied with the treatment you get from one tech, call again and speak with someone else.

Get a fresh start. When replacing an existing device, remove the old one's drivers via Windows' Add/Remove applet in Control Panel before installing the new

one. Since graphics card drivers can't be removed, replace your old driver with Windows' Standard VGA driver. Right-click My Computer, choose Properties, and click the Device Manager tab (see FIGURE 1). In Windows XP, click the Hardware tab in System Properties and select the Device Manager button. Double-click your graphics card under 'Display adapters' and choose Update Driver under the Driver tab. Select Specify the location of the driver (Advanced) and click Next. Check Display a list of all drivers in a specific location... and click Next again. Now check Show all hardware. Scroll to the top of the list on the left under Manufacturers and select (Standard display types). Choose one of the Standard Display Adapter (VGA) options and click Next. Choose Yes at the warning.

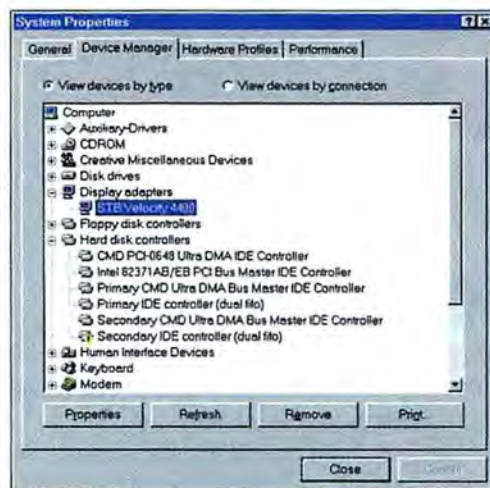


FIGURE 1: UPDATE YOUR DEVICE drivers via Windows' Device Manager, an option in your System Properties.

Finish what you start. Stopping a driver installation in midstream may damage key system files and require reinstalling Windows. If something goes wrong, or if you make a mistake during an installation, finish it and then uninstall the driver. **Take one step at a time.** Install one device, reboot your PC, and use it until you're satisfied that it's working correctly before you install another one. This will make problems easier to isolate and resolve. ■

Kirk Steers is a PC World contributing editor. You can reach him at kirk_steers@pcworld.com. Hardware Tips welcomes your tips and questions and pays \$50 for published items.

WHICH INTEL INSIDE?

EVER WONDER which Intel CPU is running in a PC? If you're buying a used system, or if you've simply forgotten which processor is in your current PC, check with the latest version of Intel's Processor Frequency ID utility (available at find.pcworld.com/30074). Both the Windows and DOS versions can run from a floppy, which is handy for checking preowned PCs prior to making a purchase.

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Share Programs the Easy Way on a Multiuser PC



I SHARE A PC with other family members. We each have a user name and password. Sometimes when I install a program, it's available only to me. How do I make it available to everyone?

Visubalan Nandakumar, San Marcos, Texas
ANY INSTALLED program is available to everyone. The problem is that the short-

cuts to everyone's Start menu. Right-click and drag the shortcut to the open Explorer window, and select *Copy Here*.

If you use Windows 2000 or XP, that's all you need to do. But with Windows 98 and Me, each user (other than yourself) must perform one more task. Select *Start>Settings>Control Panel*, double-click

the *Users* icon, and choose his or her user name. Then click *Change Settings* and uncheck *Start Menu* in the *Items* box. Click *OK* and *Close*. Now choose *Start>Log Off* [your name], and log back on. Reopen the *Personalized Items Settings* dialog box, and this time check rather than uncheck the *Start Menu* option.

Why the silly routine? Windows creates a different *Start Menu* folder for

each user, as well as a generic, all-user *Start Menu*. With Windows 98 and Me, the *Start Menu* option described above controls whether you see your own *Start Menu* or the generic one. (To be sure, you can get rid of this whole problem by having everyone unclick the option—but they'll also lose their personalized *Start menus*.) When a user's *Start menu* is turned on after being off, Windows copies everything from its generic *Start menu* to the person's own menu, making it a combination of what was in both menus.

So how do you install a new program in Windows 98 and Me so that everyone can

access it? First, log off as yourself, and at the log-on dialog box, click *Cancel*. Windows will come up, but since you aren't logged on as a particular user, you'll see the default *Start menu*. Install the application, and follow the instructions above for copying the generic *Start menu* onto the personalized *Start menu* of each user.

With Windows 2000 and XP, installing an application for everyone must be done via an *Administrator* account. In fact, people without such accounts may not be able to install anything. Some programs automatically become available to all accounts on a multiuser PC when the administrator installs them, but others don't. The best applications will ask you as part of the installation process whether you want everyone to have access to them. If a program you want to share appears only on your *Start menu*, follow the instructions above to place a shortcut to it on the *Start menus* of other users.

DOWNLOAD, INTERRUPTED



WHEN SOMETHING interrupts a file download in Internet Explorer, the second try always starts again from zero rather than from where the first attempt left off. Is there any way I can make IE resume interrupted downloads at the point where the first try failed?

Mohammed Osman, Toronto

INTERNET EXPLORER doesn't support resumed downloads, but plenty of download-management utilities do. These programs may provide this feature only when

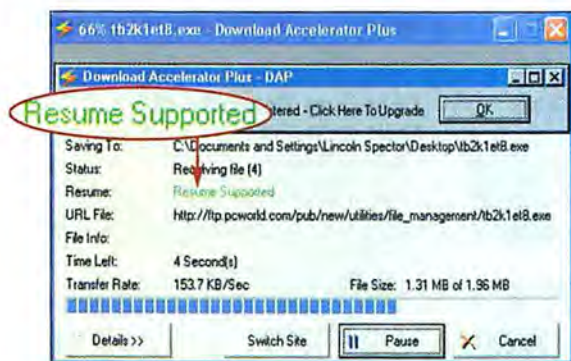


FIGURE 1: CONTROL AND RESUME downloads with the free version of SpeedBit's Download Accelerator Plus.

cuts to the programs aren't on everyone's *Start menu*. I'll tell you how to add the shortcuts, and I have some other application-sharing tips as well.

To make your applications available to everyone using the PC, open Windows Explorer and select your default *Start Menu* folder. If you're using Windows 98 or Me, it's probably *C:\Windows\Start Menu\Programs*. In Windows 2000 or XP, the path is *C:\Documents and Settings\All Users\Start Menu\Programs*. Click the *Windows Start* button, select *Programs (All Programs in XP)*, and choose the program or submenu you want to add

DEFRAG AUTOMATICALLY

YOU PROBABLY already know how to create a shortcut and set up a task in Windows' *Task Scheduler*. You might even know how to write a batch file. But if you want that shortcut, task, or batch file to defrag your hard drive automatically, you'll need a command line that automatically loads, runs, and then exits *Disk Defragmenter*. In Windows 98 and Me, the command is *defrag c: /noprompt*. In Windows XP, it's *defrag c:*. For Windows 2000, you need the free *AutoDeFrag* program; jump to find.pcworld.com/14300 to download it.

the site you're downloading from supports it—but luckily, most major download sites offer such support.

My favorite resume-capable download manager (taking price into consideration, of course), is the free, ad-supported version of SpeedBit's Download Accelerator Plus (the Premium version costs a steep \$30). Once installed, DAP comes up whenever you click a download link in IE, Netscape, or Opera, and thereafter it controls the entire download (see **FIGURE 1**). SpeedBit says that the program can also improve download performance, though I didn't notice a change. You can download DAP from find.pcworld.com/30072.

DAP will resume downloads interrupted by anything other than a system crash. SpeedBit also offers a for-cost subscription feature—Always Resume—that continues downloads interrupted from any site, even ones that don't support resume.

IS THAT COMPUTER LEGIT?



I'M ABOUT TO BUY a used computer. Is there any way for me to make sure it's not stolen?

Eduardo Ribeiro, via the Internet

THERE'S NO WAY to be certain, but it wouldn't hurt to check the Stolen Computer Registry (www.stolencomputers.org). At this site, you enter a description of a particular computer, including the machine's serial number, and the service tells you if it has been reported stolen.

How does a computer get into the registry? Insurance companies, police departments, and regular users report it. Unfortunately, not everyone knows about the service, so the list is by no means comprehensive. The service's executive director, Robert J. Zises, estimates that the registry identifies about 100,000 stolen computers. What's the total number of stolen computers? According to Zises, it's impossible to know. "Many are stolen from companies that are self-insured and don't report the theft," Zises says. He adds that there are "estimates of \$10 billion worth [of losses] a year."

There's no fee for entering a stolen computer into the database or for searching the list. You do have to fill out a registration form—and unfortunately there's

no privacy policy. Zises assured me, however, that the service does not use identifiable information except to help return a computer to the rightful owner.

CLEAN MSCONFIG



HOW DO I delete unchecked startup items in the Startup tab of Win 98's Msconfig? The list is swollen with programs I don't want to run at start-up.

Jeff Szymanski, Greendale, Wisconsin

TO SEE MSCONFIG's list of autostarting programs, select **Start+Run**, type **msconfig**, press **<Enter>**, and click the **Startup** tab. Unchecking an item will keep it from loading automatically each time you boot, but it won't remove the program from the list. Some maintenance tasks require that you visually scan the list, so removing unwanted programs makes a lot of sense.

Deleting items from Msconfig's Startup list requires editing the Registry, so make sure your Registry is backed up before you start tinkering. Go to find.pcworld.com/29890 for complete instructions.

Once you've finished backing up the

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Shared Tools\MSConfig\startupfolder. This time, however, don't bother with the right pane. Instead, look for keys (the Registry term for folders) below startupfolder in the left pane.

TURN IMAGES INTO ICONS



HOW DO I TRANSFORM a .gif file into an .ico file so that I can use it in Windows as an icon?

Ken Linder, Dallas

BEFORE YOU CONVERT an image into an icon, you have to be aware of the visual limitations of an icon. You can discern only so much of an image in a space that's 32 pixels high by 32 pixels wide. Furthermore, your version of Windows, the way you have Windows set up, and the limitations of the program you use to convert the image may prevent you from getting the exact colors you want.

Your image is probably larger than 32 by 32 pixels. If so, you'll have to shrink it or crop it—or do a little of both. Just about any graphics program can do the job,

including Windows' built-in Paint program, though ol' Paint isn't the best tool for shrinking or cropping.

For the conversion itself, I recommend Pinxy's Picture to Icon Converter (see **FIGURE 2**), a free program by Arifin Isawise-man that helps with the cropping, though colors

do not always convert properly (go to www.geocities.com/Baja/Trails/5050/).

Ontrack's \$30 PowerDesk Pro 4 or 5 gives you another option. When you view an image file in that program's file viewer, you can right-click the viewer pane and select **Convert Picture**. One of the file types you can convert the image to is .ico. The picture has to be 32 by 32 pixels beforehand, however. Go to find.pcworld.com/30356 to get PowerDesk Pro. ■

Send your questions to answer@pcworld.com. Answer Line pays \$50 for published items. You'll find Contributing Editor Lincoln Spector's humorous writing at www.thelink-inspector.com.



FIGURE 2: TURN A PICTURE INTO AN ICON using Pinxy's Picture to Icon Converter. You can crop any image to icon size.

Registry, select **Start+Run**, enter **regedit**, and press **<Enter>**. Navigating the left pane of the Registry Editor as if it were Windows Explorer, go to HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run-. Note the hyphen (-) at the end of the address (believe me, you do not want to go to ...CurrentVersion\Run). Once there, you can delete any listing in the right pane.

You may be able to identify several other unchecked start-up items in HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunServices-. Once again, note that final hyphen.

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The Hopelessly Tangled World of Wires

Wireless is still a luxury. But why is it so hard to connect things with wires?

UNWIRED IS UNRAVELING. By now anybody who thought we'd soon have a wireless world knows enough to think again. It's not just that dozens of overoptimistic companies have blown astounding sums in pur-

suit of riches in the airwaves. It's also that even on a supposedly unwired planet, we're still going to hang ourselves with plain old ugly cables.

For now, the much-touted Bluetooth wireless scheme is too slow, expensive, and clunky to take over the job of connecting most peripherals. (See *Home Office*, page 53, for another take on Bluetooth and other wireless options.) That dumps us back in the wonderful world of wire, where nothing can be taken for granted. Example: The simple term "Fire-Wire cable" can mean at least three different things, since the connectors come in two distinct varieties: 6-pin and 4-pin.

There are now at least four different flavors of USB plugs. USB 2.0 brings us the weaselly term "full speed," meaning slow old 1.1; at least 2.0 is not supposed to bring new connectors—thank goodness.

You once could be reasonably certain that a parallel cable would have a big honkin' Centronics-type connector on the printer end and a DB-25 connector on the other. No longer. My all-in-one printer/scanner/fax machine has a mini-Centronics jack and a cable

a couple of feet shorter than I'd like it to be. And a regular cable can't replace it.

Networking? Only the geekiest of geeks can tell a crossover cable from a standard one just by looking. Then there's the delicate matter of gender—having the right male plug for the right female connector. And don't get me started on what can happen when you insert a phone-style RJ-11 plug into an RJ-45 network jack.

THE AWKWARD BRICK

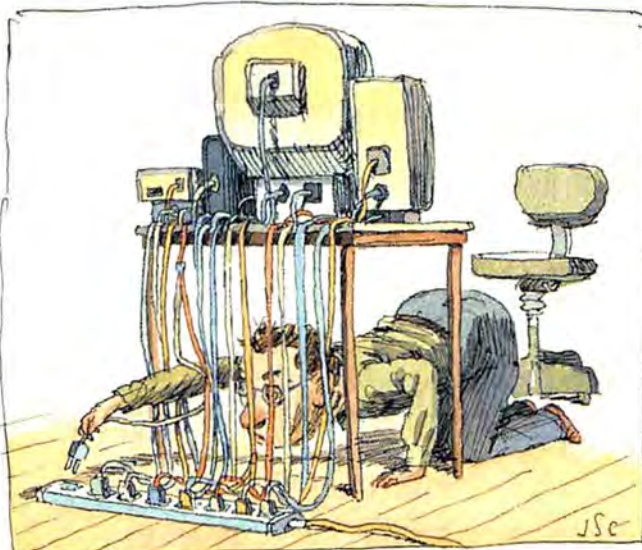
EVEN IF ALL THAT nonsense could magically disappear into the ether, there's one type of cable that won't: the AC power cord. In North America, the end that goes

into the wall is standard, even if it's stuck into the power brick in the worst possible orientation. But on the other end, anarchy rules—even in a single manufacturer's line. Hunt for external batteries on the Instant Power site (www.instantpower.com), and you'll discover three separate connectors just for Motorola cell phones—but none at all for the even stranger connector on my Sanyo model.

PDA connectors aren't standard either, and neither are the ones for notebooks. When the AC power brick for an ancient, well-traveled Sony notebook of mine recently stopped working, I had to shell out \$120 for a replacement. The one for a newer Sony model I own is of course totally different—and totally different from every other manufacturer's.

Sure, various products have distinct power and input needs. But not *thousands* of distinct needs. In fact, I bet a single adapter could easily be designed to charge a cell phone, a notebook, and a PDA, even including the extra wires that portable devices want for data. But I also bet that I'll be downloading high-definition, full-length movies to my wireless phone before I ever get to see such an all-in-one. ■

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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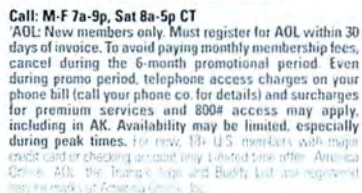
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